

PRODUCTIVE GROUND
21ST CENTURY DESIGN STRATEGIES FOR FAIRMONT PARK

by

NATALE MARTELL

A REPORT

submitted in partial fulfillment of the requirements of the degree

MASTER OF LANDSCAPE ARCHITECTURE

Department of Landscape Architecture and Regional and Community Planning
College of Architecture, Planning and Design

KANSAS STATE UNIVERSITY
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Approved by:

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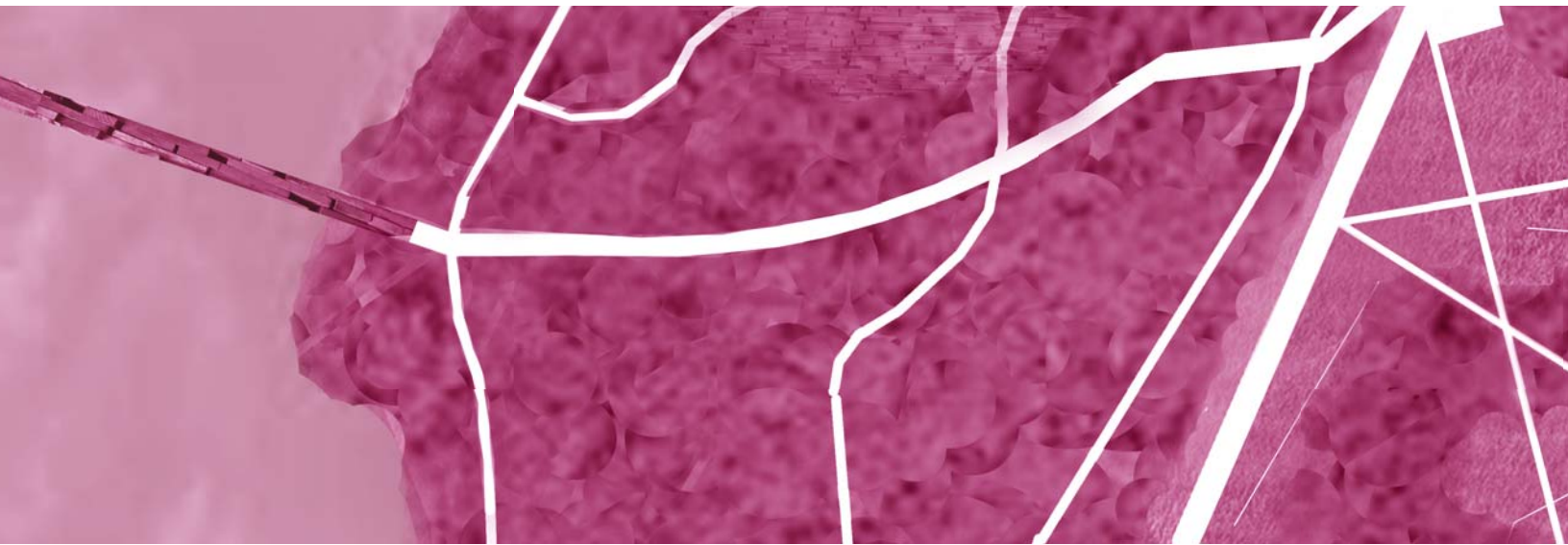
2013

ABSTRACT

As urban populations continue to grow, parks will become a critical component in creating and sustaining healthy cities. A review of literature related to landscape performance and 21st century parks reveals a paradigm shift in the ways we engage our built landscapes. No longer is it environmentally or fiscally responsible to implement and maintain resource consumptive city parks that are exclusively concerned with fulfilling social needs. To create ecologically, socially, and economically beneficial spaces, 21st century parks must include design elements and best management practices that ensure long-term sustainability. In Manhattan, Kansas, most of the city's parks are recreation centric and primarily focused on fulfilling social needs. However, Fairmont Park has yet to be fully realized, and therefore presents the city an opportunity to implement its first sustainable park.

Using the Sustainable Sites Initiative's 2009 Guidelines and Performance Benchmarks as a guide, a series of sustainability evaluations were conducted on Fairmont Park's existing conditions in order to reveal its current level of sustainability. To understand how the park was originally envisioned to perform, the same analysis was conducted on Fairmont Park's 1998 Master Plan. Findings from this process revealed an opportunity to update the park's current master plan, in order to achieve enhanced environmental, social, and economic benefits.

Guided by 21st century park design, implementation, and management strategies, the redesign of Fairmont Park will not only help Riley County fulfill its goal of becoming a State leader in sustainable design, but it will provide the Manhattan community with a state-of-the-art productive park, which promotes environmental education and stewardship, physical activity, local food production and composting, and stormwater management practices.





P R O D U C T I V E

G R O U N D

21ST CENTURY DESIGN STRATEGIES FOR FAIRMONT PARK

NATALE MARTELL / 2013

P R O D U C T I V E
G R O U N D

21ST CENTURY DESIGN STRATEGIES FOR FAIRMONT PARK

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SPRING 2013

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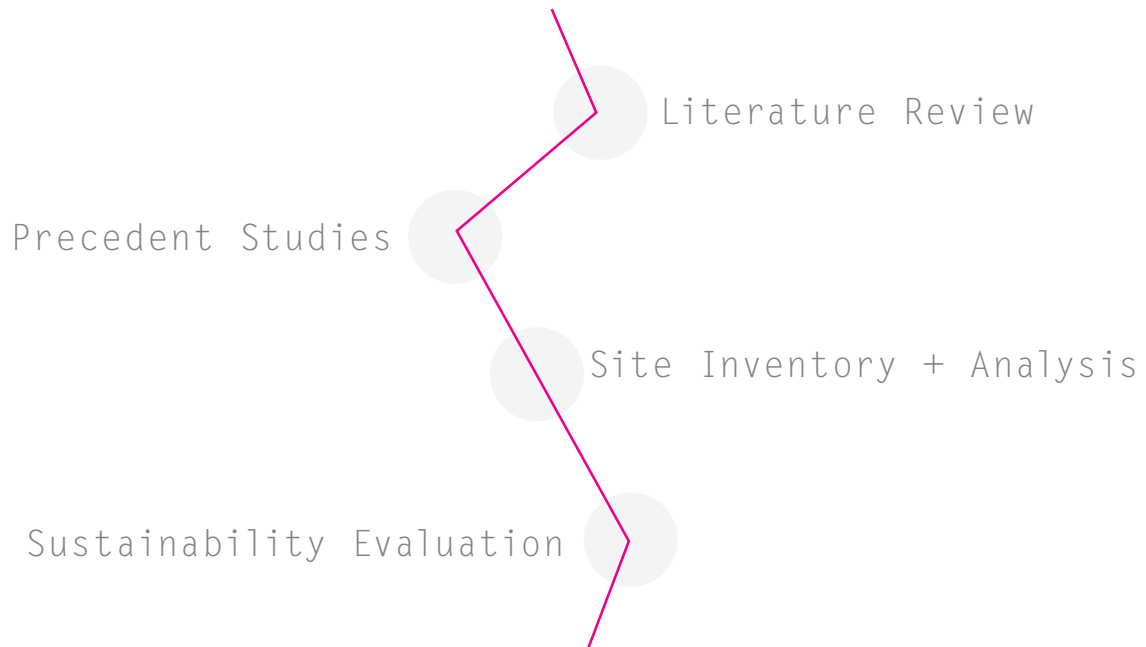
I would like to thank the faculty of the Department of Landscape Architecture / Regional and Community Planning at Kansas State University for their dedication to my education over the past five years. A sincere thank you to my major professor, Jessica Canfield. I am so grateful for your continued guidance, patience, and support, not only through this process, but throughout my time at K-State. I could not have done this without you. I would also like to thank to my committee members, Chip Winslow and Jon Hunt. I appreciate the feedback and support you have provided throughout this process.

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SITUATE



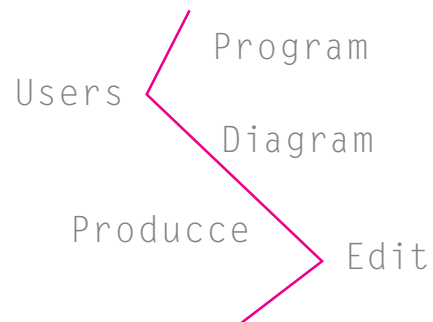
INVESTIGATE



SYNTHESIZE



DESIGN



REFLECT

figure 00.01 / Design Process
(by Author)

The diagram at left (Figure 00.01) illustrates the overall design process used to guide and complete *Productive Ground*. The project went through five different phases: situate, investigate, synthesize, design, and reflect. During this iterative design process phases were revisited to continue refining the project based on new research findings.

P R E F A C E

“In the past our municipal landscapes were conceived to look a certain way and stay that way – that is, to provide a safe and beautiful setting for recreation” (Gardstein et. al. 2010, 7). Today however, the design and management of 21st Century parks has changed. Due in part to impending climate change, financial constraints, ever-growing urban population, concern for air and water quality, and concern for naturally functioning systems, it is no longer feasible to continually create and maintain resource consumptive spaces. This represents a paradigm shift in the way we engage our built landscapes, and perhaps now, more than ever, there is a need and demand for the design and development of ecologically, socially, and economically productive public spaces.



S I T U A T E

This chapter provides the foundation for the project by presenting the dilemma and thesis, site location and context.

DILEMMA

Traditional city parks across the U.S. are typically recreation centric, and require intensive resources to be maintained. However, it is no longer environmentally or economically responsible for cities to implement and maintain resource consumptive parks that are exclusively concerned with fulfilling social needs. Demands of our 21st century parks have come to include a need for sustainable design and best management practices as well. This paradigm shift—due in part to concerns for climate change, ever-growing urban populations, air and water quality, and financial constraints—has caused municipalities, citizens, and designers to look at city parks in new ways.

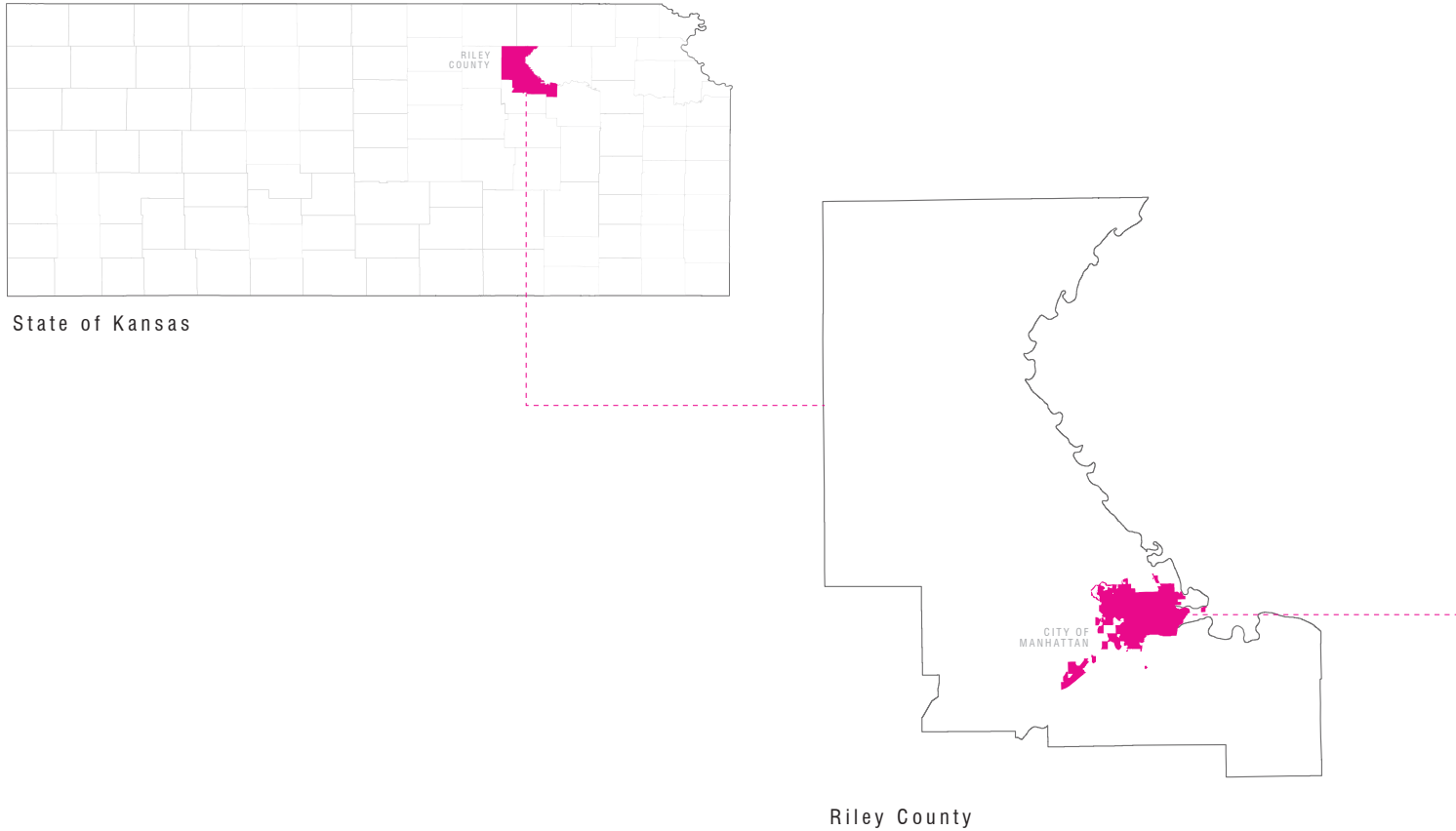
In Manhattan, Kansas, most of the city's parks are recreation centric, and primarily focus on fulfilling social needs. However, the county has expressed a desire to become "a leader in implementing sustainability within the State of Kansas," which, in addition to buildings, could come to include sustainable park design and management as well (Meredith and Leaper 2007, 36).

Fairmont Park, originally designed in 1998, is a city and county park that has yet to be fully implemented. The current master plan falls short of capitalizing on the site's full potential to become an environmentally, socially, and economically sustainable community amenity. Therefore, if redesigned with 21st century park design elements and sustainable implementation and management strategies, a restructured Fairmont Park could not only help Riley County fulfill its goal of becoming a State leader in sustainable design, but it could provide the Manhattan community with a state-of-the-art productive park that promotes environmental education and stewardship, physical activity, local food production and composting, and stormwater management practices.

THESIS

Guided by best management practices for 21st century park design and implementation, Fairmont Park can become a multifunctional, multi-beneficial, and multigenerational amenity for the Manhattan community. The layering of restored and constructed ecologies, passive and active recreational amenities, and sustainability demonstration facilities, will improve the park's overall environmental, social, and economic benefits. As the city's first sustainable park, environmental stewardship, physical activity, local food production and composting, stormwater management, and sustainability education are achieved.

figure 01.01 / Fairmont Park Context
(by Author)



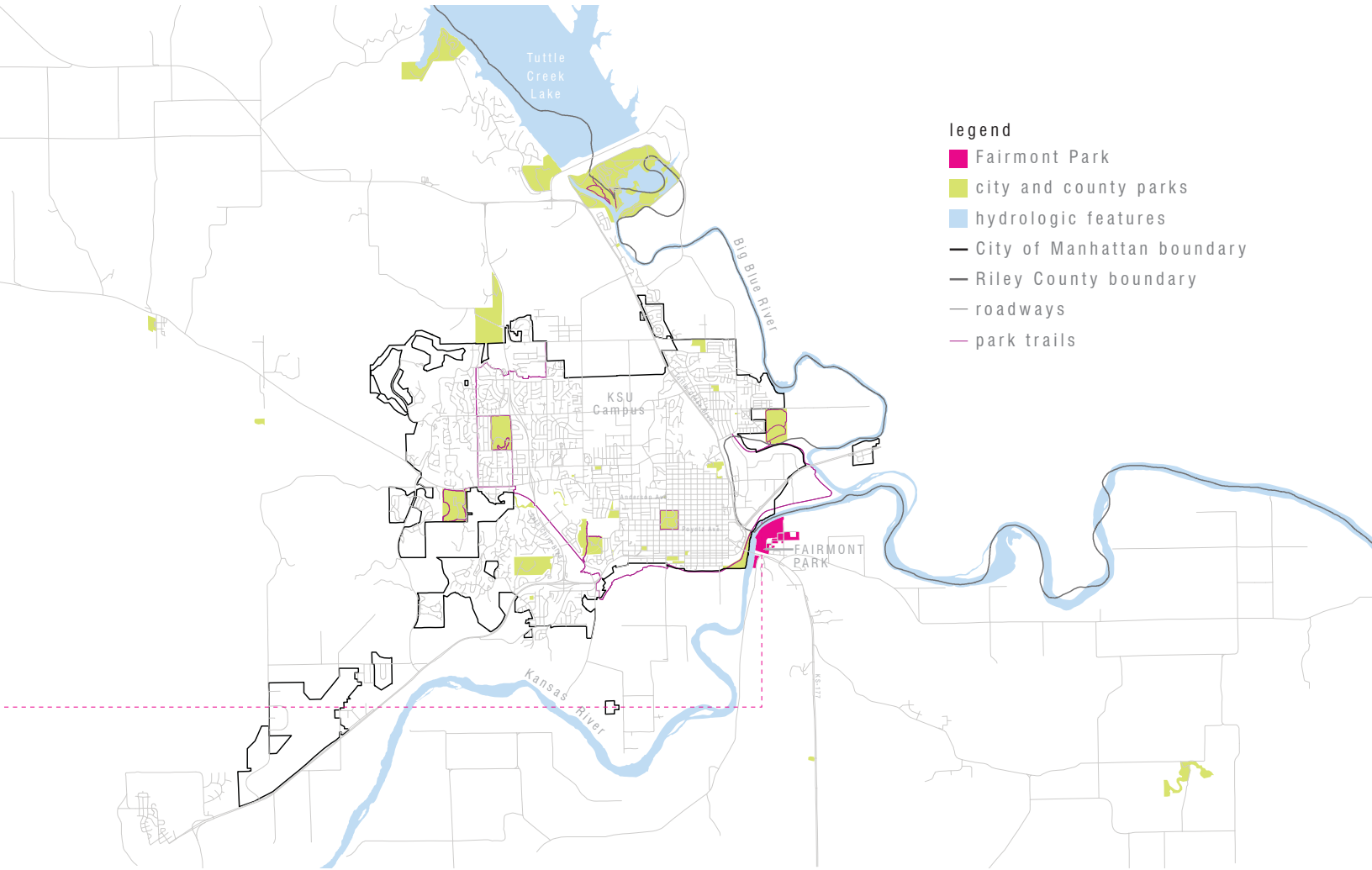
SITE

Fairmont Park is located in Riley County, Kansas, just outside Manhattan's city limits. The land for Fairmont Park was acquired in 1995 after the flood of 1993. At 110 acres, the park represents 11 percent of Manhattan's total park land, which consists of 21 parks and 1,000 acres (Figure 01.01). Fairmont Park is owned by three different public entities: the City of Manhattan owns approximately 40 acres; the Riley County Parks Department owns approximately 60 acres; and the Kansas Department of Transportation owns 10 acres, which are part of a bridge and roadway easement (Riley County Kansas n.d.).

Manhattan, Kansas is located along the Kansas River within the Flint Hills, a region characterized by tallgrass clad rolling hills. The largest city in Riley County, Manhattan, is largely supported by Kansas State University and the nearby U.S. Army base, Fort Riley. Manhattan's population is

expected to grow to 58,105 people by 2020. This represents an increase of 29.6% from the population in 2000 (City of Manhattan 2006, 3-3). In order to fulfill the social and recreational needs of an increased population, there is a need for additional amenities within the Manhattan parks and open space system. For an inventory of program elements currently provided by Riley County and Manhattan's parks, see Table 01.01.

Fairmont Park holds a unique position within the Manhattan community. The park is located along the Kansas River, approximately one mile away from Manhattan's downtown core and new Flint Hills Discovery Center. Though access to the park is currently limited, there are opportunities to develop connections to these two important and frequently visited areas of Manhattan. The Kansas River acts as a barrier isolating Fairmont Park from the city. To the west of



City of Manhattan

the River sits the City of Manhattan with its downtown and surrounding medium density residential and commercial development. To the east, Fairmont Park fronts the river and is then surrounded by very low-density residential and commercial development, agricultural land, and the Flint Hills. The only connection spanning the River today is K-177, a major roadway and entrance into the city. While these aspects are currently major challenges for Fairmont Park, they also pose great opportunities.






	 BLUEMONT SCENIC OVERLOOK	 CICO PARK	 CITY PARK	 DOUGLASS PARK	 EISENHOWER BASEBALL COMPLEX
■ OWNERSHIP	MHK	RC + MHK	MHK	MHK	MHK
■ ACERAGE		97 ACRES	45 ACRES	1.4 ACRES	20 ACRES
GATHERING/AMENITIES					
■ BUTTERFLY GARDEN					
■ COMMUNITY CENTER		■			
■ CONCESSIONS					■
■ FAIRGROUNDS		■			
■ GRILLS			■	■	
■ OUTDOOR STAGE			■		
■ OVERLOOK	■				
■ PICNIC TABLES	■		■		
■ RESTROOMS		■	■		■
■ ROSE GARDEN			■		
■ SHELTERS			■	■	
RECREATION					
■ BASEBALL FIELDS		■	■		■
■ BASKETBALL COURT			■	■	
■ DISC GOLF COURSE					
■ DOG PARK					
■ FISHING					
■ OPEN SPACE					
■ PLAYGROUND		■	■	■	
■ SAND VOLLEYBALL			■		
■ SKATE PARK		■			
■ SOCCER FIELDS					
■ SOFTBALL FIELDS					
■ SPLASH PARK			■		
■ SWIMMING POOL		■	■		
■ TENNIS COURTS		■	■		
■ TRAILS		■	■		

table 01.01 / Program Inventory of Manhattan and Riley County Parks, continued on next pages
(by Author)



FAIRMONT PARK

RC + MHK

110 ACRES



FRANK ANNEBERG PARK

MHK

104 ACRES



GOODNOW PARK

MHK

20.4 ACRES



GRIFFITH PARK

MHK

45 ACRES



K177 OVERLOOK PARK

MHK



KEATS PARK

RC



MHK = Manhattan, Kansas

RC = Riley County, Kansas

	LINEAR PARK TRAIL	LONG'S PARK	NORTHEAST COMMUNITY PARK	NORTHVIEW PARK	ROCKY FORD PARK
■ OWNERSHIP	MHK	MHK	MHK	MHK	RC
■ ACERAGE		2.9 ACRES	79 ACRES	5 ACRES	
GATHERING/AMENITIES					
■ BUTTERFLY GARDEN					
■ COMMUNITY CENTER					
■ CONCESSIONS					
■ FAIRGROUNDS					
■ GRILLS		■		■	
■ OUTDOOR STAGE					
■ OVERLOOK					
■ PICNIC TABLES			■		
■ RESTROOMS			■	■	
■ ROSE GARDEN					
■ SHELTERS		■	■	■	
RECREATION					
■ BASEBALL FIELDS				■	
■ BASKETBALL COURT					
■ DISC GOLF COURSE					
■ DOG PARK					
■ FISHING					■
■ OPEN SPACE					
■ PLAYGROUND		■		■	
■ SAND VOLLEYBALL					
■ SKATE PARK					
■ SOCCER FIELDS					
■ SOFTBALL FIELDS					
■ SPLASH PARK					
■ SWIMMING POOL				■	
■ TENNIS COURTS					
■ TRAILS	■		■		

table 01.01 / Manhattan and Riley County Parks Program Inventory, continued
(by Author)

SOJOURNER TRUTH PARK

STAGG HILL PARK

SUNSET ZOOLOGICAL PARK

WARNER PARK

WASHINGTON MARLATT PARK

MHK

MHK

MHK

MHK

KSU

2.79 ACRES

23 ACRES

45 ACRES

82 ACRES

150 ACRES



MHK = Manhattan, Kansas

RC = Riley County, Kansas

TIMELINE OF THE DEVELOPMENT OF MANHATTAN'S MUNICIPAL PARKS

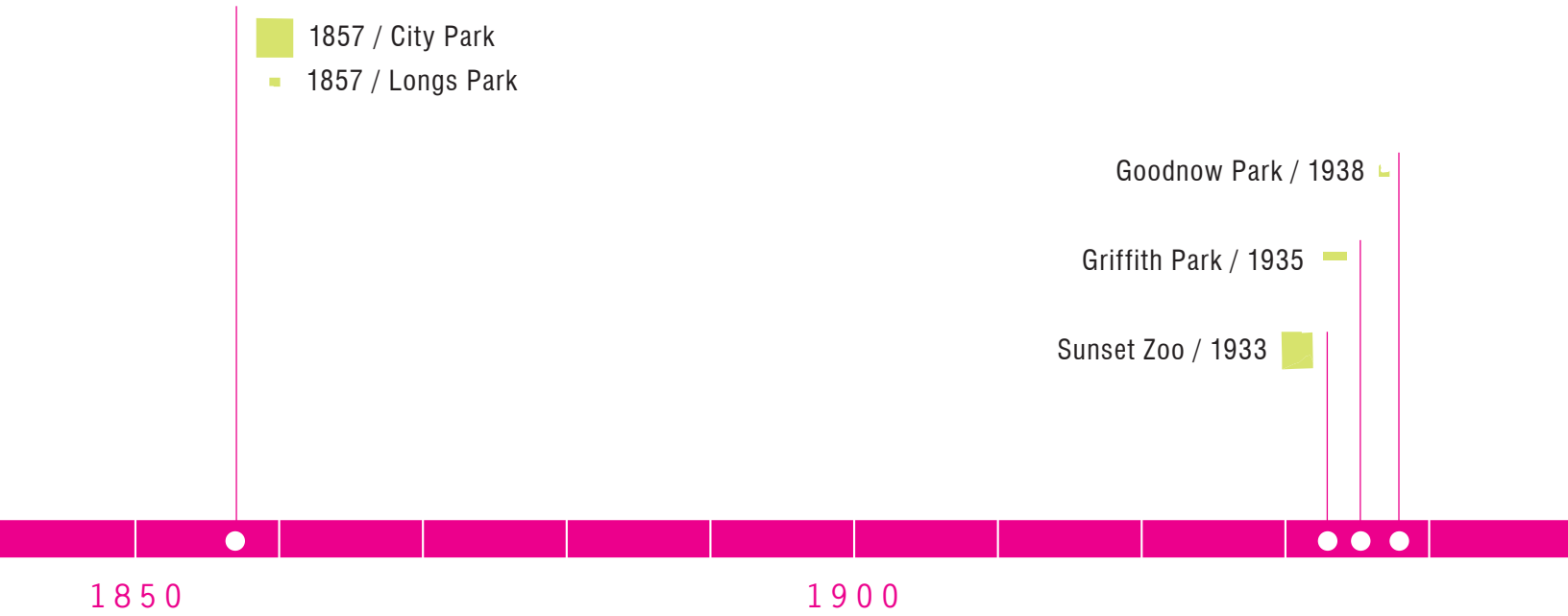
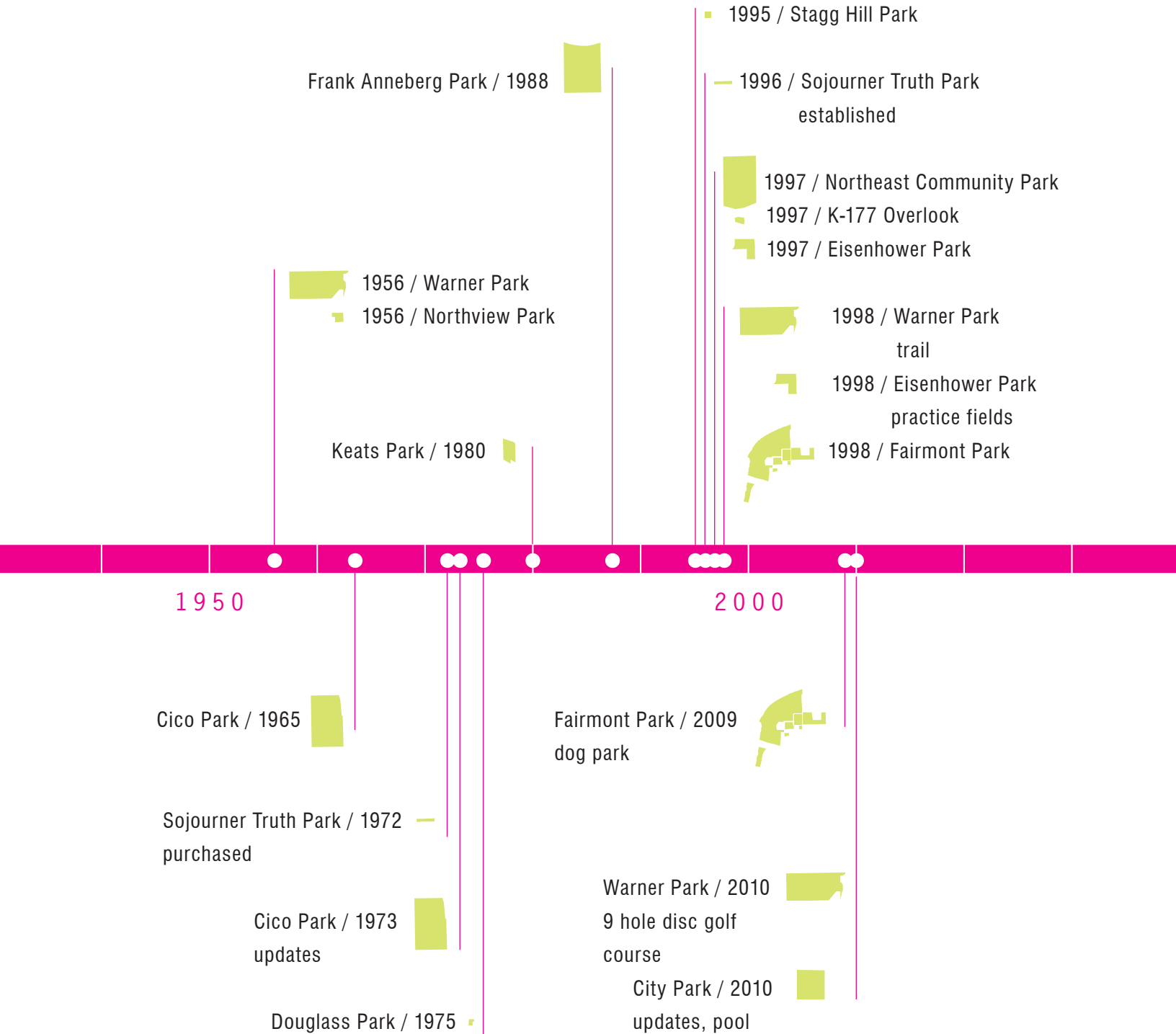


figure 01.02 / Timeline of the Development of Manhattan's Municipal Parks
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I N V E S T I G A T E

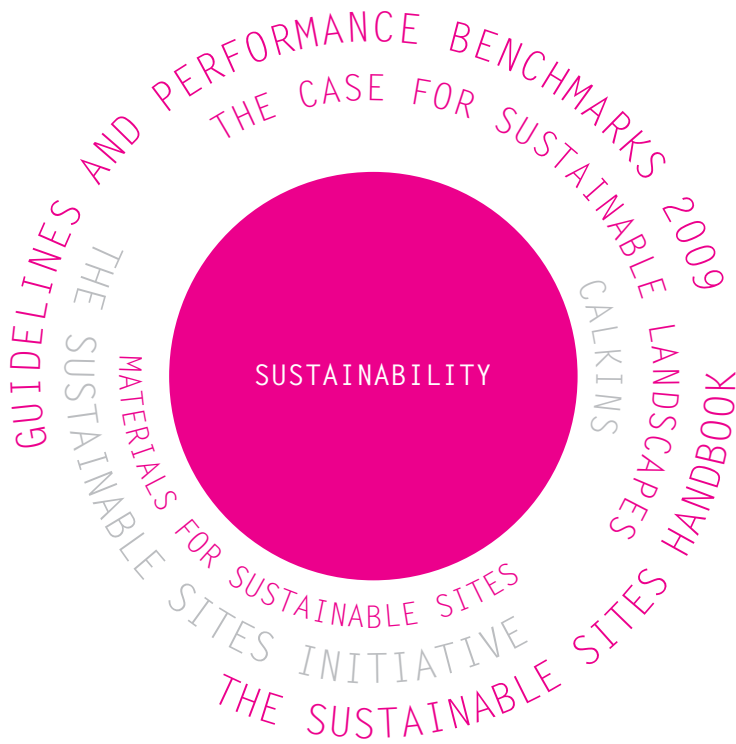
This chapter investigates literature, precedents, and site specific conditions in order to guide the development of site specific design goals that will establish Fairmont Park as Manhattan's first sustainable park.

02.01

L I T E R A T U R E

R E V I E W

Literature pertaining to 21st century parks, sustainable sites, and landscape performance benefits was used to establish the need for, as well as guide in, the redevelopment of Fairmont Park.



LITERATURE MAP

The literature map (Figure 02.01) visually illustrates the topics covered through the literature review. The literature can be divided into two main categories, Sustainability and Parks, with a tertiary Analytical Methods category. Main literature sources and their authors are presented, radiating out from the central topic. An increased level of significance is represented by the increasing size of sources and authors. These topics are not mutually exclusive, overlap between topics also exist. For instance, many of the sources in the Parks category also address sustainability in some way.

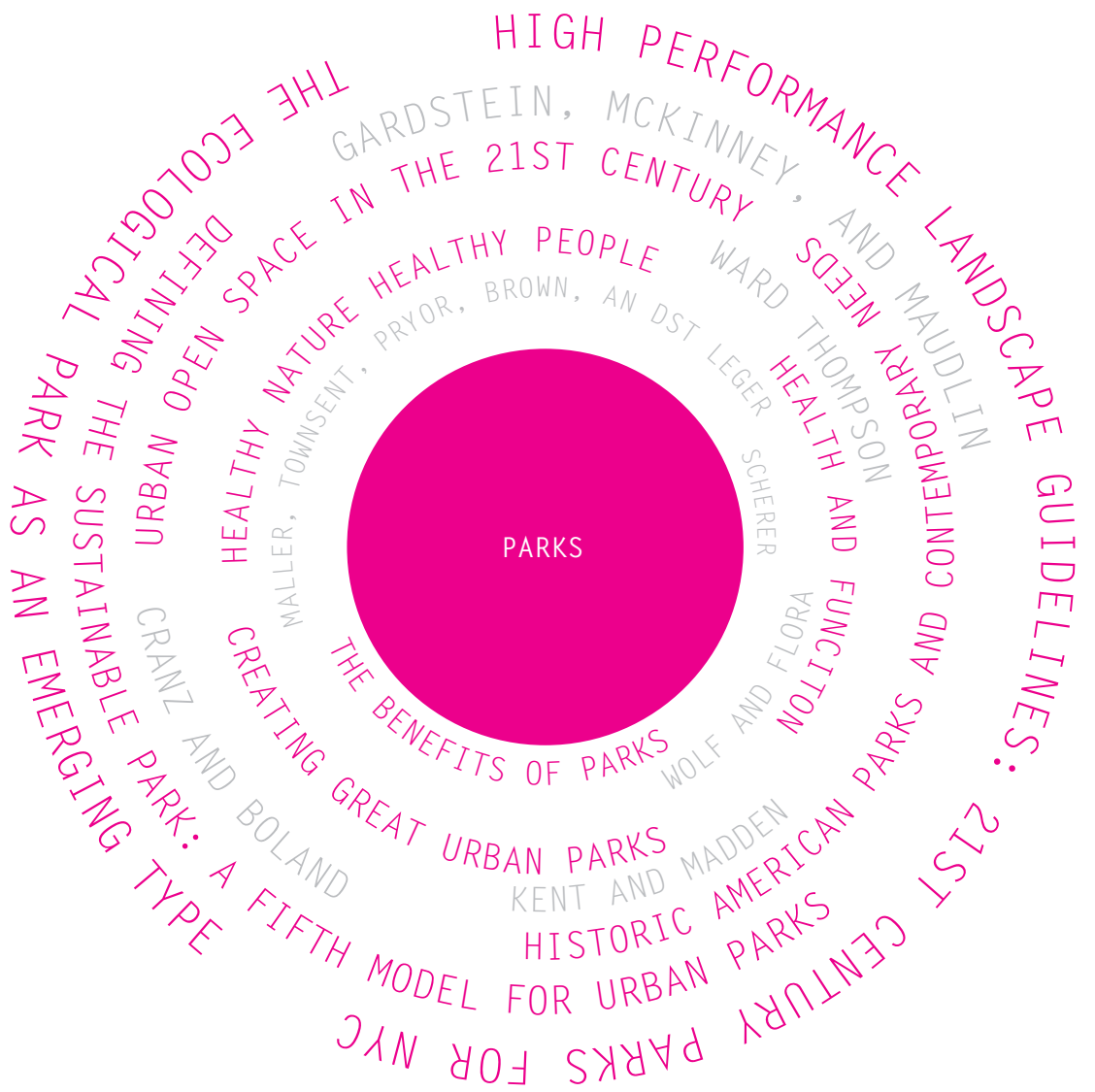


figure 02.01 / Literature Map
 (by Author)



SUSTAINABLE SITES

Many of the landscapes we interact with today have been developed to provide a safe and beautiful setting for recreational use. However, our parks are no longer exclusively concerned with providing recreational opportunities; the needs of our 21st Century parks have expanded to also encompass function and performance. In *High Performance Landscape Guidelines: 21st Century Parks for NYC* (2010), editors Cynthia Gardstein, Chelsea Maudlin, and Charles McKinney write that this represents a paradigm shift in the way we engage our built landscapes (Gardstein et. al. 2010, 7). It is no longer feasible to continually create and maintain resource consumptive spaces; there is a need for the design and development of ecologically, socially, and economically productive spaces.

Galen Cranz and Michael Boland, in their article *Defining the Sustainable Park: A Fifth Model for Urban Parks* (2004), also show the importance of accommodating environmental,

social, and ecological elements within parks. The authors argue that historically, parks “responded to social problems and expressed various ideas about nature, but they showed little concern for actual ecological fitness” (Cranz and Boland 2004, 102). Today, as many ecological issues have become some of the most pressing social issues, Cranz and Boland express that a new urban park type which “focuses on solutions to ecological problems and expresses new ideas about nature can build upon the traditional social genesis of urban parks in the United States to help improve the quality of life in American cities” (Cranz and Boland 2004, 102). The authors have established this fifth park type as the Sustainable Park. They present a historical analysis of park types in comparison to their idea of a Sustainable Park in [Table 02.01](#). This analysis illustrates the shifting social purposes and formal characteristics of parks through time.

table 02.01 / Comparison of the Sustainable Park to Prior Park Types
(adapted by Author from Cranz and Boland 2004, 2)

	Pleasure Ground 1850-1900	Reform Park 1900-1930	Recreation Facility 1930-1965	Open Space System 1965-?	Sustainable Park 1990-present
Social Goal	public health + social reform	social reform; children's play; assimilation	recreation services	participation; revitalize city; stop riots	human health; ecological health
Activities	strolling, carriage racing, bike riding, picnics, rowing, classical music, non-didactic education	supervised play, gymnastics, crafts, Americanization classes, dancing, plays + pageants	active recreation: basketball, tennis, team sports, spectator sports, swimming	psychic relief, free-form play, pop music, participatory arts	strolling, hiking, biking, passive + active recreation, bird watching, education, stewardship
Size	very large, 1000+ acres	small, city blocks	small to medium, follow formula	varied, often small, irregular sites	varied, emphasis on corridors
Relation to City	set in contrast	accepts urban patterns	suburban	city is a work of art; network	art-nature continuum; part of larger urban system; model for others
Order	curvilinear	rectilinear	rectilinear	both	evolutionary aesthetic
Elements	woodland + meadow, curving paths, placid water bodies, rustic structures, limited floral displays	sandlots, playgrounds, rectilinear paths, swimming pools, field houses	asphalt or grass play area, pools, rectilinear paths, standard play equipment	trees, grass, shrubs, curving + rectilinear paths, water features for view, free-form play equipment	native plants, permeable surfaces, ecological restoration green infrastructure, resource self-sufficiency
Promoters	health reformers, transcendentalists, real estate interests	social reformers, social workers, recreation workers	politicians, bureaucrats, planners	politicians, environmentalists, artists, designers	environmentalists, local communities, volunteer groups, landscape architects
Beneficiaries	all city dwellers (intended), upper middle class (reality)	children, immigrants, working class	suburban families	residents, workers, poor urban youth, middle class	residents, wildlife, cities, planet

THE SUSTAINABLE SITES INITIATIVE

The Sustainable Sites Initiative (SITES™) is an interdisciplinary partnership between the American Society of Landscape Architects, the Lady Bird Johnson Wildflower Center, and the United States Botanic Garden. Originally formed in 2005, the Initiative is “dedicated to fostering a transformation in land development and management practices that will bring the essential importance of ecosystem services to the forefront” (SSI 2009b, 5). The central message they want to convey, not only to the design community but also to the public, “is that any landscape, whether the site of a large subdivision, a shopping mall, a park, an abandoned rail yard, or a single home, holds the potential both to improve and to regenerate the natural benefits and services provided by ecosystems in their undeveloped state” (SSI 2009b, 5).

SITES™ has defined sustainability as “design, construction, operations, and maintenance practices that meet the needs of the present without compromising the ability of future generations to meet their own needs” (SSI 2009a, 5). Only when environmental, social, and economic demands are addressed, can long term site sustainability be achieved (Figure 02.02). To guide the development of sustainable sites, the Initiative has outlined a set of principles (Table 02.02) in their document, the Case for Sustainable Landscapes (2009). Through future reports, publications, and projects, SITES™ hopes to:

- “Elevate the value of landscapes by outlining the economic, environmental and human well-being benefits of sustainable sites
- Connect buildings and landscapes to contribute to environmental and community health
- Provide performance benchmarks for site sustainability
- Link research and practice associated with the most sustainable materials and techniques for site

- development construction and maintenance
- Provide recognition for high performance in sustainable site design, development and maintenance
- Encourage innovation”

(SSI 2013)

A number of public, scientific, trade, academic, conservation, and public organizations have partnered with SITES™ to become Participating Organizations. These organizations all have interests in supporting landscapes which provide for environmental, economic, and human needs. They provide feedback on SITES™ publications, publicly support the Initiative, and expand the knowledge base of sustainable sites through research as well as design, construction, and maintenance practices (SSI 2013). Funding for the Sustainable Sites Initiative is provided by the founding partners as well as the Meadow Foundation, Landscape Structures Inc., the U.S. Environmental Protection Agency, the Texas Commission on Environmental Quality, the Horticulture Research Institute, and the USDA Forest Service, and the U.S. General Services Administration (SSI 2013).



figure 02.02 / Sustainable Design
(image adapted from Calkins 2012, 3)

table 02.02 / Guiding Principles of a Sustainable Site
(adapted from SSI 2009a, 9)

DO NO HARM

Make no changes to the site that will degrade the surrounding environment. Promote projects on sites where previous disturbance or development presents an opportunity to regenerate ecosystem services through sustainable design.

PRECAUTIONARY PRINCIPLE

Be cautious in making decisions that could create risk to human and environmental health. Some actions can cause irreversible damage. Examine a full range of alternatives—including no action—and be open to contributions from all affected parties.

DESIGN WITH NATURE AND CULTURE

Create and implement designs that are responsive to economic, environmental, and cultural conditions with respect to the local, regional, and global context.

USE A DECISION-MAKING HIERARCHY OF PRESERVATION, CONSERVATION, AND REGENERATION

Maximize and mimic the benefits of ecosystem services by preserving existing environmental features, conserving resources in a sustainable manner, and regenerating lost or damaged ecosystem services.

PROVIDE REGENERATIVE SYSTEMS AS INTERGENERATIONAL EQUITY

Provide future generations with a sustainable environment supported by regenerative systems and endowed with regenerative resources.

SUPPORT A LIVING PROCESS

Continuously re-evaluate assumptions and values and adapt to demographic and environmental change.

USE A SYSTEMS THINKING APPROACH

Understand and value the relationships in an ecosystem and use an approach that reflects and sustains ecosystem services; re-establish the integral and essential relationship between natural processes and human activity.

USE A COLLABORATIVE AND ETHICAL APPROACH

Encourage direct and open communication among colleagues, clients, manufacturers, and users to link long-term sustainability with ethical responsibility.

MAINTAIN INTEGRITY IN LEADERSHIP AND RESEARCH

Implement transparent and participatory leadership, develop research with technical rigor, and communicate new findings in a clear, consistent, and timely manner.

FOSTER ENVIRONMENTAL STEWARDSHIP

In all aspects of land development and management, foster an ethic of environmental stewardship—an understanding that responsible management of healthy ecosystems improves the quality of life for present and future generations.

GUIDELINES AND PERFORMANCE BENCHMARKS

The Sustainable Sites Initiative has created the first national rating system for sustainable landscapes. The system, *The Sustainable Sites Initiative: Guidelines and Performance Benchmarks 2009*, took more than four years to be developed through input from leading sustainability experts, design professionals, and scientists. Public input from both individuals and organizations was also taken into account through two open-comment periods (SSI 2013). Ultimately, these benchmarks “are meant to guide, measure, and recognize landscape practices on a site-by-site basis” (SSI 2009a, 8).

The Guidelines and Performance Benchmarks utilize a points system, assigning values based on the potential of each benchmark to improve site sustainability. A series of prerequisites and credits are organized into nine different categories:

1. Site Selection
2. Pre-Design Assessment and Planning
3. Site Design—Water
4. Site Design—Soil and Vegetation
5. Site Design—Materials Selection
6. Site Design—Human Health and Well-Being
7. Construction
8. Operations and Maintenance
9. Monitoring and Innovation

(For a complete list of prerequisites and credits, see Appendix XX)

Sites that are able to achieve all prerequisites, and at least 40 percent of the total points, will be able to achieve SITES™ Certification. Based on the amount of points, different levels of certification are possible:

One Star	–	100 points (40% of total points)
Two Stars	–	125 points (50% of total points)
Three Stars	–	150 points (60% of total points)
Four Stars	–	200 points (80% of total points)

In order to test and demonstrate the application of *The Sustainable Sites Initiative: Guidelines and Performance Benchmarks 2009*, the SITES™ Pilot Program was developed. Over 150 projects representing diverse project types, sizes, and geographic locations participated over a two-year period. The feedback gained from the Pilot Projects is being used to revise the rating system as well as develop a technical reference manual to be used alongside the Guidelines and Performance Benchmarks. Both are expected to be released in the fall of 2013.

BENEFITS OF SITES™ CERTIFICATION

While there does not seem to be any tangible benefit of SITES™ Certification, many of the firms who participated in the pilot projects were pleased with their experiences, saying that “going through the process revamped how they interact with their contractors and clients, design, specify, document, build, and maintain” (Green 2011). Additionally, one firm explained that SITES™ can have a large influence on contractors and their methods. After explaining the

SITES™ requirements to a local contractor, the contractor decided to create a memorandum for how he would change his business because he saw a future in it (Green 2011). As landscape architects are testing the SITES™ Guidelines and Performance Benchmarks, they have begun to “view the initiative as valuable because it ‘adds clarity and vigor to technical content’” (Green 2011).

LIMITATIONS OF SITES™ CERTIFICATION

One of the major challenges many firms faced in the pilot projects were finding contractors who were familiar with sustainable practices. Some also had trouble finding local manufactures or fabricators for their specified materials (Green 2011). If they could find local products, many firms could not trace back the original sources of the materials which made up the product which is needed to gain some of the credits. Additionally, local regulations regarding stormwater have kept other firms from achieving some of the water efficiently goals outlined in the guide. The documentation and certification process was said to be both challenging and time consuming, making client support and financing crucial to achieving SITES™ Certification (Green 2011).

ENVIRONMENTAL BENEFITS OF SUSTAINABLE SITES

In a world which lives beyond its means – over consuming our ecological resources such as available water, energy, and raw materials and/or generating enormous amounts of waste and atmospheric emissions – it is important to think about how these issues can be diminished or offset, especially during the design, implementation, and management of municipal parks. Parks which include sustainable features and practices have the potential to not only reduce resource consumption, but to increase the positive benefits of natural systems through ecosystem services.

Our landscapes and parks have the ability to provide a number of different ecosystem services such as stormwater management, carbon storage, shading, evaporative cooling, and air quality improvement (Gardstein et. al. 2010, 12). In their document, *The Case for Sustainable Landscapes* (2009), the Sustainable Sites Initiative identifies a number of benefits provided by ecosystems which can be protected or regenerated through the development and management of a sustainable site. These ecosystem services include global and local climate regulation, air and water cleansing, erosion and sediment control, hazard mitigation, pollination, habitat functions, waste decomposition and treatment, human health and well-being benefits, food and renewable non-food products, and cultural benefits (Table 02.03).

Ecosystem services are considered “goods and services of direct or indirect benefit to humans that are produced by ecosystem processes involving the interaction of living elements, such as vegetation and soil organisms, and non-living elements, such as bedrock, water, and air” (SSI 2009b, 6). These services regulate essential ecosystem processes such as nutrient cycling, climate stabilization, or the decomposition of waste, the benefits of which are evident at a local, regional, and global scale (ettec 2005, ii).

Due to the high interconnectivity of functioning ecosystem elements, systems can experience a devastating ripple effect when unsustainable land development and management approaches are utilized (SSI 2009a, 14). Once these natural services are destroyed, they are often difficult, expensive, or impossible to duplicate. For this reason, ecosystem services are considered a source of economic value; “ecosystems and the biological diversity contained within them provide a stream of goods and services, the continued delivery of which remains essential to our economic prosperity” (ettec 2005, ii). See the Economic Benefits of Sustainable Sites section, below, for details on the economic value of ecosystem services.

table 02.03 / Ecosystem Services
(adapted by Author from SSI 2009a, 27)

ECOSYSTEM SERVICE	FUNCTION
GLOBAL CLIMATE REGULATION	Maintaining balance of atmospheric gases at historic levels, creating breathable air, and sequestering greenhouse gases
LOCAL CLIMATE REGULATION	Regulating local temperature, precipitation, and humidity through shading, evapotranspiration, and windbreaks
AIR AND WATER CLEANSING	Removing and reducing pollutants in air and water
EROSION AND SEDIMENT CONTROL	Retaining soil within an ecosystem, preventing damage from erosion and siltation
HAZARD MITIGATION	Reducing vulnerability to damage from flooding, storm surge, wildfire, and drought
POLLINATION	Providing pollinator species for reproduction of crops or other plants
HABITAT FUNCTIONS	Providing refuge and reproduction habitat to plants and animals, thereby contributing to conservation of biological and genetic diversity and evolutionary processes
WASTE DECOMPOSITION AND TREATMENT	Breaking down waste and cycling nutrients
HUMAN HEALTH AND WELL-BEING BENEFITS	Enhancing physical, mental, and social well-being as a result of interaction with nature
FOOD AND RENEWABLE NON-FOOD PRODUCTS	Producing food, fuel, energy, medicine, or other products for human use
CULTURAL BENEFITS	Enhancing cultural, educational, aesthetic, and spiritual experiences as a result of interaction with nature

SOCIAL BENEFITS OF SUSTAINABLE SITES

Through our parks come a variety of social benefits. Parks are able to provide city residents with a sense of community, encouraging the “reconnection of citizens to each other and to the land by providing new vehicles for direct public participation in the conception, creation, and stewardship of parks” (Cranz and Boland 2004, 114). With this, comes an increased sense of connection to the local and regional environment through the increased contact with and expanded awareness of ecological processes (Cranz and Boland 2004, 114).

Parks also expose the public to new ideas and attitudes about nature, the landscape, and ecological benefits, giving them high educational value (Cranz and Boland 2004, 114). By informing and engaging people through site design, people will better understand site functions such as stormwater flows, how open space encourages investment in surrounding areas or offsets carbon emissions, inspiring them to “talk about and take action on these issues in the broader public realm” (Gardstein et. al. 2010, 53).

HUMAN HEALTH

Parks can provide a number of health benefits, both mental and physical. Through their research, social scientists and psychologists have shown that exposure to nature can play a role improving mood, relieving symptoms of depression and anxiety, restoring the ability to concentrate, and reducing aggression. Views of nature also decrease hospital patient recovery time and reduce the number of sick days taken by office workers (SSI 2009a, 19).

With physical inactivity as a contributing factor to child obesity, it is important to provide access to nature; a setting where children are more likely to stay active. An estimated 32 percent of children in the United States today are overweight (SSI 2009a, 18). Exposure to nature through parks encourages physical activity which can offer overall improvements in health as well as weight loss. The opportunities for play provided in parks also help children to “develop muscle strength and coordination, language, cognitive thinking, and reasoning abilities” (Sherer 2006,

21). The SSI suggests that “when inactive adults increase their participation in regular moderate physical activity, annual mean medical costs are reduced by \$865 per person” (SSI 2009a, 19). Additionally, physical activity can reduce the risks for stroke, heart disease, colon and breast cancer, high blood pressure and hyperextension, osteoarthritis, non-insulin dependent diabetes, fall-related injuries, and obesity in adults (SSI 2009a, 19). Vegetation also helps to improve air quality and evaporative cooling, reducing asthma rates and mitigating the urban heat island effect (Gardstein et. al. 2010, 66).

ECONOMIC BENEFITS OF SUSTAINABLE SITES

When making land use decisions, people underestimate or ignore ecosystem services because they often occur in the background. For this reason, many public and private entities do not include them in their cost accounting (SSI 2009b, 5). The benefits offered by ecosystems are worth a great deal to the economies of our cities; “One effort to calculate a global number placed an average price tag of \$33 trillion a year on these fundamental ecosystem services—nearly twice the value of the global gross national product of \$18 trillion (both figures in 1997 dollars)” (SSI 2009a, 13). In addition to becoming cost effective solutions to formerly resource consumptive sites, sustainable sites can leverage additional cost and multiple benefits for both public and private entities (SSI 2009a, 13).

In her lecture, “Resilient Urban Environments” (2013), Susannah Drake, founder and principal of dlandstudio, spoke about the economic value of trees. Drake stated that “350 trees will generate \$250,000 worth of oxygen, provide almost \$500,000 in pollution control, recycle \$300,000 of water, and contribute almost \$4 million in shade value for a 10 year gain of \$50 million” (Drake 2013).

Meg Calkins also quantifies the economic value of various ecosystem services in her book, *The Sustainable Sites Handbook: A Complete Guide to the Principles, Strategies, and Best Practices for Sustainable Landscapes* (2012). She writes that studies have found:

“Urban trees in the conterminous United States remove an estimated 784,000 tons of air pollution annually, with a value of \$3.8 billion (Nowak, Crane, and Stevens 2006).

The establishment of 100 million mature trees around residences in the United States is estimated to save about \$2 billion per year in reduced energy costs (Akbari et al. 1992; Donovan and Butry 2009).

Urban trees in the conterminous United States currently store 770 million tons of carbon, valued at \$14.3 billion (Nowak and Crane 2002).” (Calkins 2012, 6)

These sources clearly illustrate the immense economic gain in providing ecosystem services within our sites. Combining these economic benefits with the numerous environmental benefits, protecting or providing new ecosystem services becomes an obvious basis for the design of sustainable sites.

PROPERTY VALUES

In his article *The Benefits of Parks: Why America Needs More City Parks and Open Space* (2006), Paul Sherer writes that parks, when well maintained and secure, have been proven to provide positive economic impact through increased property values in their surrounding areas (Sherer 2006, 15). This is true in both residential and commercial areas of development. The SSI reports, in *The Case for Sustainable Landscapes* (2009), that “trees and green space generally increase property values, starting from around 4 percent to as much as 10 percent” (SSI 2009a, 19). To this end, parks also have the ability to spur economic revitalization in impoverished areas because people are attracted to the quality of life that parks offer (Sherer 2006, 17).

02.02

P R E D E D E N T
S T U D I E S

Relevant precedents were analyzed to reveal various sustainable design strategies, amenities, and materials, which in turn helped inform the programming and design considerations for the proposed redevelopment of Fairmont Park.

PRECEDENT SELECTION

Precedent analysis offers a means of informing program and design considerations. The literature review revealed a need to incorporate sustainable design, function, and performance into our 21st Century landscapes, therefore it was important to select precedents that illustrated these concepts. Projects exhibiting innovative and contemporary programming, 21st century design thinking, and environmental, social, and economic benefits were explored. Projects with characteristics, such as project type, context, or size, similar to Fairmont Park, were first considered. However, criteria most influential in the precedent selection process included innovation in sustainable design strategies, amenities, and materials.

Through this process (Figure 02.03), four different projects were chosen, each with specific relevance to Fairmont Park. Evergreen Brick Works, a project in Toronto, Canada, was selected for its incorporation of nature, culture, and community into its design strategies. This project also incorporated a variety of contemporary and educational amenities which became influential. Blue Hole Regional Park in Wimberley, Texas, was selected because of its similar character to Fairmont Park, but also its overall design strategies which incorporate environmental, social, and economic considerations. The Urban Outfitters Headquarters project was selected for its reuse of existing site materials, representing a strong environmental strategy.

Landfill Garden was chosen not only for its incorporation of reused materials, but also for its use of innovative sustainable technologies such as wind power and greywater reuse. Additional projects were also influential in the design development process, but are not specifically documented in this report.

ANALYSIS METHODOLOGY

After identifying the design team, client, ownership, surface size, year built, and context of each project, an analysis of their design strategies, amenities, and materials was conducted. It was important to analyze these three features in order to incorporate a design strategy for Fairmont Park grounded in sustainability with a focus on providing environmental, social, and economic benefits. Additionally, the precedents help to consider a range of contemporary and educational 21st century amenities as well as methods of material reuse into the redesign of Fairmont Park.

After completing the analysis, precedents were synthesized into a matrix (Table 02.04 on Pages 64-69) which categorized the design strategies, amenities, and materials of each precedent by the degree of environmental, social, and economic productivity. Some of the elements possess all three productive qualities while others possess one or two.

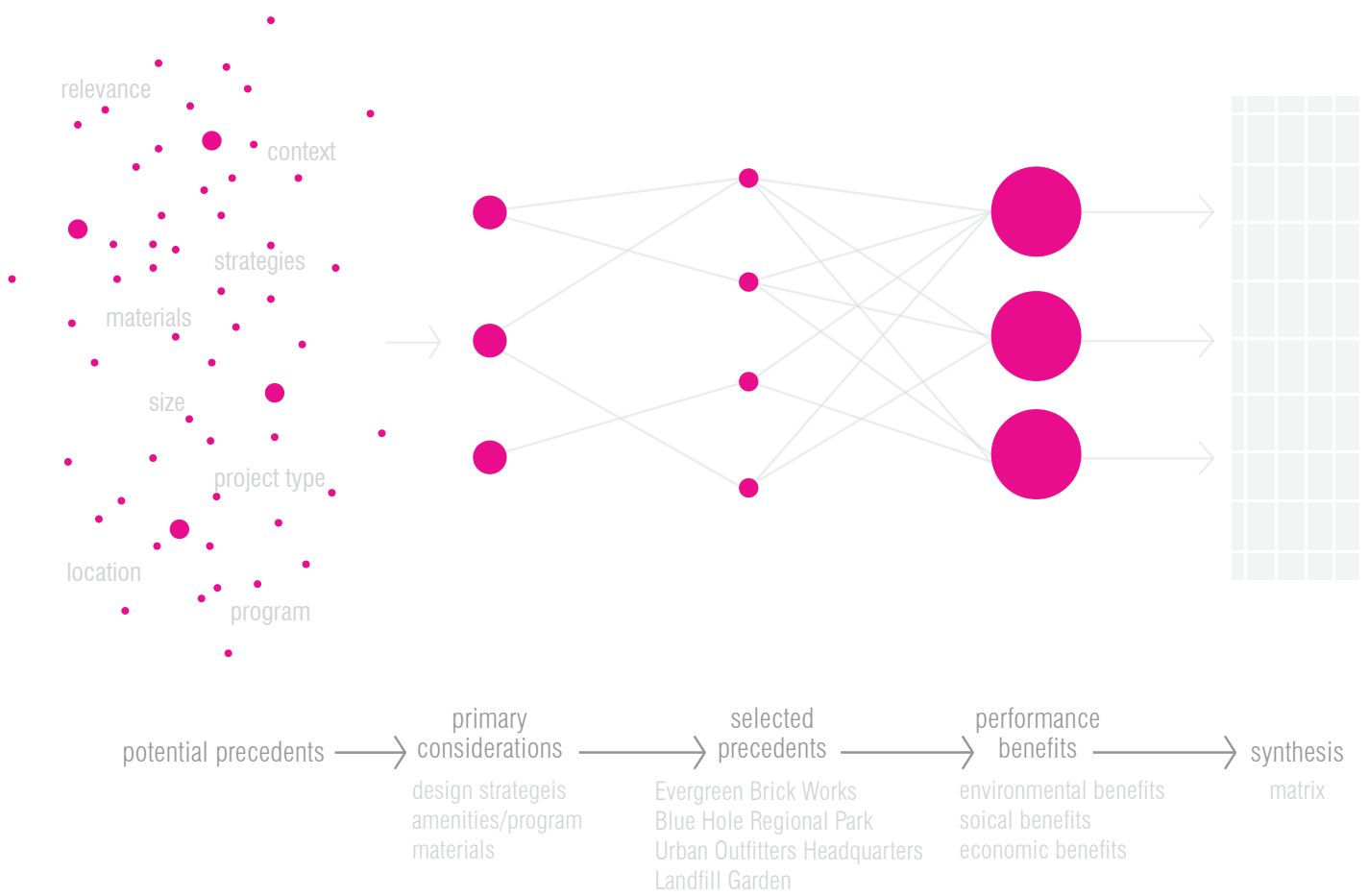


figure 02.03 / Precedent Study Methodology
(by Author)

EVERGREEN / BRICK WORKS

LOCATION	Toronto, Canada
DESIGNERS	Claude Cormier + Associés Inc., du Toit Alsop Hillier, Diamond+Schmidt Architects Inc., E.R.A. Architects Inc.
CLIENT	Evergreen
OWNERSHIP	Private
SURFACE	12.1 acres
YEAR	2006-2010
STATUS	Built
CONTEXT	Located in the heart of Toronto's urban center within the floodplain of the Don River Valley

Don Valley Brick Works is a publicly owned industrial and natural heritage site which has been redeveloped as an active, environmentally based community center. Evergreen, a Toronto based non-profit which focuses on reconnecting city communities with local natural systems, collaborated with the city of Toronto and the local Conservation Authority to take over management of the site (Lister 2007, 52). Evergreen has created a site which "moves the notion of 'park' well past nature preservation and into the realm of a learning landscape, designed to teach sustainability by example" (Lister 2007, 52).

RELEVANCE

This project was selected because the design strategies were aimed at providing a variety of social, environmental, and economic benefits with an emphasis on environmental education. Evergreen Brick Works also illustrates inventive use of 21st Century park amenities.

SUSTAINABLE DESIGN STRATEGIES

Evergreen's vision for the Brick Works site is framed by three interrelated strategies: Nature, Culture, and Community. The combination of these strategies work to provide a place learn, but also to explore "our relationship with the natural world in a ways that engage people and allow them to become active participants in shaping this relationship" (Evergreen 2007, 4).

01 nature

The site's "program plan will interpret the natural significance of the site through authentic, hands-on activities that encourage people to learn about nature and to become active participants in bringing nature back to our cities" (Evergreen 2007, 4).

02 culture

While the historic culture of Don Valley Brick Works is still evident through the restoration of its fifteen heritage buildings which remain from the former quarry and brick-making plant, Evergreen Brick Works also works to provide a contemporary culture. The new, dynamic cultural center engages visitors in creative ways, showcasing sustainability, local food, artisans, theater and musical performances.

03 community

The Brick Works provides a variety of programs to encourage the cultivation of ideas and relationships. The site is a "place where people can come to think and

imagine, eat and be entertained, experiment and practice” (Evergreen 2007, 4).

The Brick Works provides a variety of programs to encourage the cultivation of ideas and relationships. The site is a “place where people can come to think and imagine, eat and be entertained, experiment and practice” (Evergreen 2007, 4).

Additionally, Evergreen sought to provide a variety of solutions that would “maximize environmental and social benefits within reasonable economic parameters” (Torza 2011). Their solution was to become self-sustaining in terms of ongoing operations and maintenance by generating revenue through a “combination of property management, admissions, site rentals, conferences, events and retail sales” (Evergreen 2007, 17).

AMENITIES

The Evergreen Garden Market sells native plant species which occur naturally in the region as well as non-native plants which provide ecological benefits such as drought tolerance, pest or disease resistance, edible or medicinal value, biodiversity support, pollinator attraction, or promotion of healthy soils. All plants sold are sourced locally in order to support local growers while minimizing the impact on the environment through travel distances.

Evergreen’s Farmers Market was established to “support the connection between rural and urban communities, and promote the benefits of eating and growing local foods” (Evergreen 2013). The Farmers market promotes not only a healthy lifestyle, but also the celebration of food and cultural diversity or traditions through a hands on approach. The market also aims to provide a positive economic and environmental impact by “educat[ing] and empower[ing]

individuals to be part of a food system that is socially equitable, ecologically sustainable and economically viable” (Evergreen 2013).

Additionally, Evergreen Brick Works provides access to public transit, bike rentals, a winter ice skating trail, event space, a restaurant, outdoor classrooms, and demonstration gardens. The demonstration gardens are “mounds containing native plants [that] showcase different themes or habitats such as a butterfly garden and a water garden” (Evergreen 2013). Visitors, such as families, school groups, or community groups can participate in the planting, care, and maintenance of the gardens, inspiring them with tips and techniques for creating their own garden spaces. Event spaces are used for various community gatherings, festivals, programs, and classes.

MATERIALS

Where materials could not be reused, “new materials were selected to lessen the impact of extraction, manufacture and transportation associated with construction, including sourcing local materials with high recycled content, and sustainably harvested wood products” (Torza 2011). In order to provide infiltration for groundwater recharge, water-pervious paving was utilized in areas throughout the site not contaminated by the previous site use while concrete unit pavers are used for walkways and pervious concrete for parking lots (Evergreen 2013).

BLUE HOLE REGIONAL PARK

LOCATION	Wimberley, Texas USA
DESIGNER	Design Workshop
CLIENT	City of Wimberley
OWNERSHIP	Public
SURFACE	126 acres
YEAR	2005-2011
STATUS	Built
CONTEXT	Located in a small, suburban town along Cypress Creek in Texas Hill Country

Blue Hole Regional Park is named after the spring-fed swimming hole known as the 'Blue Hole.' This swimming hole has served as an important resource for both wildlife and residents over a number of years, making the park a popular destination with 10,000 visitors each year. This high use has compacted soils along the banks of the Blue Hole, preventing the growth of new vegetation. A re-design of the park was developed to accommodate the large number of site users as well as needed recreation activities.

RELEVANCE

I chose to look at Blue Hole Regional Park because it is similar in size, context, and character to Fairmont Park. The Wimberley community has emphasized a focus on recreation as they have in Manhattan. Additionally, the design strategies look at how to implement sustainability while preserving the existing environmental resources which relates to Fairmont Park as well.

SUSTAINABLE DESIGN STRATEGIES

The design of Blue Hole Regional Park aims to implement sustainability while protecting the park's sensitive landscapes (Design Workshop n.d., 10). High consideration was taken in protecting the site's environmental resources. Reducing development impacts and protecting the landscape were important strategies throughout the design process. Due to the high environmental impacts of active recreation areas and their needed infrastructures, these uses were located in previously disturbed areas of the park, leaving flora, fauna, and natural hydrologic systems undisturbed. Low-Impact Development strategies, including rain gardens and bioswales, were utilized to improve stormwater volumes entering the creeks and also added biodiversity to the site (Design Workshop n.d., 11).

Additionally, it was important to the City of Wimberley that "the initial capital costs and the on-going operations and maintenance associated with the design must be accommodated without increasing sales or property taxes in the community" (Design Workshop n.d., 9). So the revenue generated from onsite amenities was planned to cover the cost of the park's on-going operation and maintenance, making it economically sustainable.

AMENITIES

Blue Hole Regional Park provides many recreational benefits such as the swimming hole, campground, two soccer fields, six tennis courts, a volleyball court, a playscape, two pavilions, a bathhouse, an amphitheater, trails, and picnic facilities. Interpretive signs are used to illustrate and point out the performance features found throughout the park, such as underground drip irrigation, bioswales, or rain gardens, providing educational benefits, but also helping to protect important landscape features. These rain gardens and bioswales, along with minimal impervious surfaces, helped to decrease the volume and velocity of stormwater entering the creek even with the additional programming and development. Irrigation is only utilized for recreation fields in order to decrease potable water consumption. Where irrigation is needed, subsurface drip irrigation uses re-claimed water from a nearby wastewater treatment plant. Rainwater is also directed from all building on site into cisterns where it is stored, filtered, and then pumped for re-use in toilet flushing. Solar lighting is also used to save on electricity (Design Workshop n.d., 22-23).

MATERIALS

Invasive cedars were removed from areas throughout the park and reused as fencing or mulched to create nature trails. Native plants were used to revegetate previously disturbed areas while limestone and karst features were preserved throughout the development of Blue Hole Regional Park.

URBAN OUTFITTERS HEADQUARTERS

LOCATION Philadelphia, Pennsylvania USA
DESIGNER D.I.R.T. Studio; Meyer, Scherer, and Rockcastle, Ltd.
CLIENT Urban Outfitters, Inc.
OWNERSHIP Private
SURFACE 9 acres
YEAR 2005-2011
STATUS Built
CONTEXT Located along the Delaware River at the Historic Core of the Navy Yard

Large industrial and manufacturing buildings on League Island previously served as ship building sites for more than 150 years. In order to accommodate a new headquarters for Urban Outfitters (URBN), these industrial relics were retrofit into a modern corporate campus.

RELEVANCE

The Urban Outfitters Navy Yard Headquarters was chosen for its inventive re-use of existing site materials. I appreciated the way a contemporary program was layered with the existing materials which “were unearthed and refashioned with an artistic vengeance” (Bargmann and Hill 2009, 52).

SUSTAINABLE DESIGN STRATEGIES

Rather than using typical demolition procedures which excavate and dispose most material, “the goals was to refashion the demolition debris, harvest its embodied energy along with intensifying porosity, doubling the life cycle and increasing the urban (and URBN) habitat” (Bargmann and Hill 2009, 57). By salvaging and harvesting existing site materials and layering them with contemporary spaces, traces of past site production can be revealed. Rethinking this everyday demolition process was extremely important to the designers; “we believe that removing the deep evidence of site histories erases imbedded human agency. We insist on applying regenerative systems to rebuild ecological and cultural resources for social benefits, not simply checking off items on a sustainable list. We strive to give voice to the mute materiality of the landscape” (Bargmann and Hill 2009, 54). The studio developed a six-step salvaging strategy to utilize on site:

01 count

353,180,000 BTUs of asphalt and 1,034,790,000 BTUs of concrete were calculations of the embodied energy of the existing paving (Bargmann and Hill 2009, 55).

02 probe

“For a full scale mock-up, a baffled contractor was directed to strip off the asphalt veneer and bust up the concrete with care to make ‘waste’ a precious material” (Bargmann and Hill 2009, 55).

03 pile

760 cubic yards were saved from landfill disposal (Bargmann and Hill 2009, 55).

04 puzzle

Lifted by a skid steer, then manually placed, Salvaged concrete was arranged in an imperfect puzzle pattern (Bargmann and Hill 2009, 55).

05 name

“The former subsurface property of the Navy became novel material for branding Urban Outfitters’ new digs at the yard. The old debris reworked as new paving was affectionately nicknamed “Barney Rubble” after the 1960s cartoon character” (Bargmann and Hill 2009, 55).

06 trickle

The existing 600 square feet of permeable area was increased to 47,100 square feet, allowing stormwater to seep through, making it 80 times more porous (Bargmann and Hill 2009, 55).

AMENITIES

The campus provides shaded areas for URBN employees as well as vegetated areas which work to collect and filter any stormwater falling on site (Bargmann n.d., 59).

MATERIALS

Calico-colored ‘mulch’ was created from left-over crushed pieces of brick, concrete, and asphalt. All material was found onsite, “no imported materials were necessary, nor desired” (Bargmann and Hill 2009, 56) and 100% reuse of demolition debris, which usually ends up in a landfill, was achieved (Margolis and Robinson 2007, 114). Native trees and plants were also utilized throughout the project.

LANDFILL GARDEN

- LOCATION** Providence, Rhode Island USA
- DESIGNER** L+A Landscape Architecture; Kite Architects;
SEA Consultants; CH2M Hill
- CLIENT** Urban Outfitters, Inc.
- OWNERSHIP** Private
- STATUS** Built
- CONTEXT** Located near the Field's Point Wastewater Treatment Facility on the Providence River and Narragansett Bay

The Field's Point Wastewater Treatment Facility operations center is now the "largest integrated fixed-film activated sludge treatment process in the world for biological nutrient removal" (Holmes 2012). In a modernization effort, the newly integrated campus incorporated the Landfill Garden into its new operations center.

RELEVANCE

This project was selected for its use of energy technologies as well as its material reuse.

SUSTAINABLE DESIGN STRATEGIES

Innovation in energy and water systems was an important aspect of the project. These ideas were adopted from the mission developed by the Commission. L+A also sought to create an educational landscape, not only for school groups to tour, but also for staff to utilize during breaks. The reuse of demolition debris on site was also a design goal. Additionally, the plan sought to utilize native plant materials.

AMENITIES

L+A created a three turbine wind farm on site. Approximately 35 to 45 percent of the current electrical power demand for the facility will be supplied by these 360 foot tall, 1,500 kW wind turbines. These turbines are able to produce enough electricity "[offsetting] approximately 3,000 tons/year of carbon dioxide that would have been released from fossil fuel generated electricity" (Holmes 2012).

The site also provides roof gardens as well as on-site filtration, retention, and reuse of water. Stormwater runoff is directed through vegetated swales while greywater available from buildings on-site is pre-treated then filtered through a constructed wetland.

MATERIALS

Existing, on-site concrete ash storage tanks were sawn into individual planks to be reused on the ground plane. Asphalt from an existing parking area was removed and crushed to be reused. By reusing these materials in the garden, approximately 90 tons of debris were diverted from the landfill (Holmes 2012).

PRECEDENT MATRIX - SUMMARY OF FINDINGS

	EVERGREEN BRICK WORKS			BLUE HOLE REGIONAL PARK		
	DESIGN STRATEGIES	AMENITIES	MATERIALS	DESIGN STRATEGIES	AMENITIES	MATERIALS
ENVIRONMENTAL SOCIAL ECONOMIC	<ul style="list-style-type: none"> Determine solutions that will maximize environmental social benefits within reasonable economic parameters 	<ul style="list-style-type: none"> Farmers market Garden market Accessible by public transit 	<ul style="list-style-type: none"> Redeveloped post-industrial brownfield 			
ENVIRONMENTAL SOCIAL	<ul style="list-style-type: none"> Environmental education to encourage exploration of the natural world 	<ul style="list-style-type: none"> Demonstration Gardens Butterfly garden Water garden 		<ul style="list-style-type: none"> Users will understand the natural and cultural significance of the park Sustainability and the protection of sensitive landscapes 		
ENVIRONMENTAL ECONOMIC			<ul style="list-style-type: none"> Material reuse Local materials 		<ul style="list-style-type: none"> Solar lighting 	<ul style="list-style-type: none"> Limestone harvested on site Remove invasives and use as mulch

table 02.04 / Precedent Study Matrix
(by Author)

URBAN OUTFITTERS' HEADQUARTERS			LANDFILL GARDEN		
DESIGN STRATEGIES	AMENITIES	MATERIALS	DESIGN STRATEGIES	AMENITIES	MATERIALS
				<ul style="list-style-type: none"> • Wind farm - supplies 35 to 45% of the current electrical power demand of Fields' Point, offsets approx. 3,000 tons/yr of carbon dioxide • Rainwater system 	
<ul style="list-style-type: none"> • 100% material reuse 		<ul style="list-style-type: none"> • Material reuse 			<ul style="list-style-type: none"> • 90 tons of debris diverted from Rhode Island's Central Landfill • Concrete planks sawn from an existing ash storage tank • Crushed asphalt from an existing parking area • Earthwork mounds partially constructed with soil excavated on site

continued on next page

	EVERGREEN BRICK WORKS			BLUE HOLE REGIONAL PARK		
	DESIGN STRATEGIES	AMENITIES	MATERIALS	DESIGN STRATEGIES	AMENITIES	MATERIALS
SOCIAL ECONOMIC		<ul style="list-style-type: none"> • Bike rental • Ice skating • Event space • Restaurant 		<ul style="list-style-type: none"> • Park operations and maintenance will be shared by the city and user-groups • Visitors and community members view park as significant destination 		
ENVIRONMENTAL	<ul style="list-style-type: none"> • Maintain and restore the surrounding ecology • Re-establish and restore natural habitats 		<ul style="list-style-type: none"> • Native plantings • Pervious paving - concrete unit pavers for walkways, pervious concrete for parking lots • High recycled content materials • Sustainably harvested wood products 	<ul style="list-style-type: none"> • Natural flora and fauna are protected and restored to higher levels than occur on site today • Enjoyment of the night sky is protected and secured long-term • No degradation of Blue Hole water quality will occur due to development of the park • Active recreation activities and their need infrastructure will be placed in previously disturbed areas 	<ul style="list-style-type: none"> • Underground drip irrigation • Use of minimal impervious surfaces • Use of rain gardens and bioswales 	

table 02.04 / Precedent Study Matrix
(by Author)

URBAN OUTFITTERS' HEADQUARTERS			LANDFILL GARDEN		
DESIGN STRATEGIES	AMENITIES	MATERIALS	DESIGN STRATEGIES	AMENITIES	MATERIALS
<ul style="list-style-type: none"> • Harvest embodied energy of on-site materials • Intensify porosity of the ground plane 	<ul style="list-style-type: none"> • On-site stormwater collection and filtration 	<ul style="list-style-type: none"> • Native plantings 	<ul style="list-style-type: none"> • Reuse demolition debris • Reduce contaminated urban and suburban runoff 	<ul style="list-style-type: none"> • On-site infiltration, retention, and reuse of rainwater • Roof garden 	

continued on next page

		EVERGREEN BRICK WORKS			BLUE HOLE REGIONAL PARK		
		DESIGN STRATEGIES	AMENITIES	MATERIALS	DESIGN STRATEGIES	AMENITIES	MATERIALS
SOCIAL		<ul style="list-style-type: none"> Showcase local food, artisans, theater, and musical performances Cultivate ideas and relationships 			<ul style="list-style-type: none"> Recreation elements will address the needs for both visitors and community members. 	<ul style="list-style-type: none"> Interpretive signage Swimming hole Campground Soccer fields Tennis courts Volleyball court Playscape Pavilions Bathhouse Amphitheater Trails Picnic facilities 	
	ECONOMIC	<ul style="list-style-type: none"> Self-sustaining - revenue provided by a combination of property management, admissions, conferences, events, site rentals, and retail sales 			<ul style="list-style-type: none"> Construction costs will not exceed available and future funds Long-term operations and management, funding mechanisms and programming for volunteers will ensure economic sustainability of the park 		

table 02.04 / Precedent Study Matrix
(by Author)

URBAN OUTFITTERS' HEADQUARTERS			LANDFILL GARDEN		
DESIGN STRATEGIES	AMENITIES	MATERIALS	DESIGN STRATEGIES	AMENITIES	MATERIALS
	<ul style="list-style-type: none"> Shaded spaces for employees 		<ul style="list-style-type: none"> Create an educational landscape 		

02.03

A N A L Y Z I N G

M A N H A T T A N

Manhattan's population and demographics were studied to provide a profile of potential park users.

MANHATTAN'S POPULATION CHARACTERISTICS

Over the past 60 years, the population of Manhattan, Kansas has steadily increased. By 2020, Manhattan's population is expected to grow to 58,105 people (Figure 02.04). With a median age of just 23.8 years, Manhattan residents are rather young compared to a statewide median age of 35.2 (Figure 02.05). This reflects the influence of the college age population attending Kansas State University. The presence of this population also explains the higher population density near the university (Figure 02.06). This young population has also affected average household size with Manhattan at 2.3 persons per household, compared to 2.52 statewide (City of Manhattan 2012, 3-4).

The ethnic diversity of the Manhattan community is overwhelmingly disproportionate (Figure 02.07). The primary ethnic group is Caucasian at 80.2% while the remaining composition includes 5.8% Hispanic/Latino, 5.3% Black/ African American, 5.1% Asian, 2.9% of two or more races, and less than one percent American Indian/ Alaska Native or Native Hawaiian/ Pacific Islander (U.S. Census Bureau 2011). Additionally, there are approximately 1,000 more males than females (Figure 02.08).

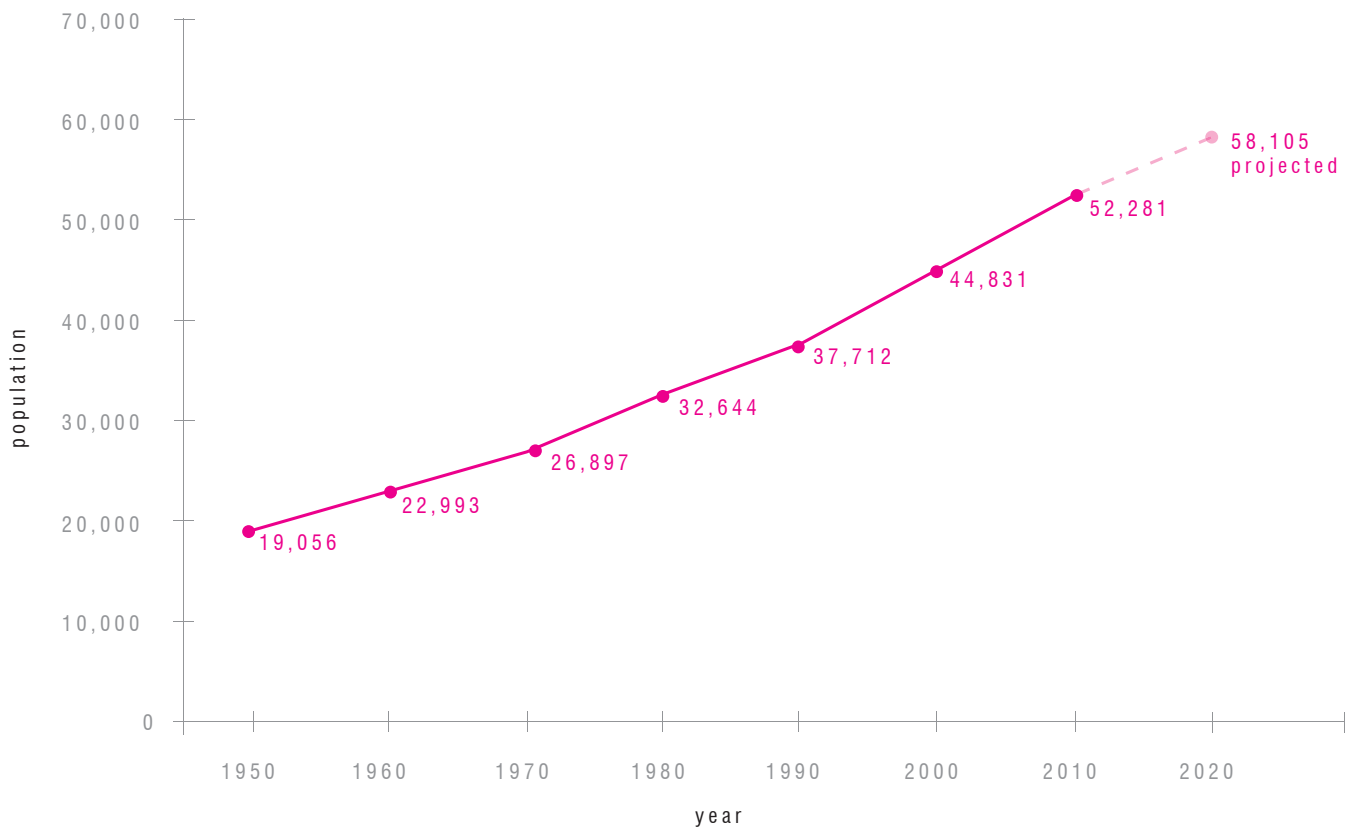
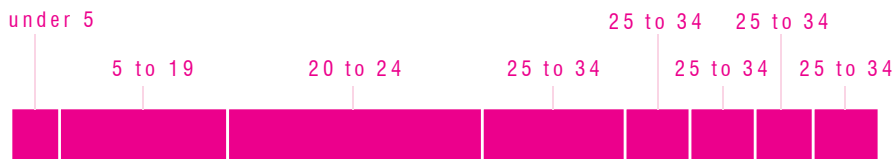
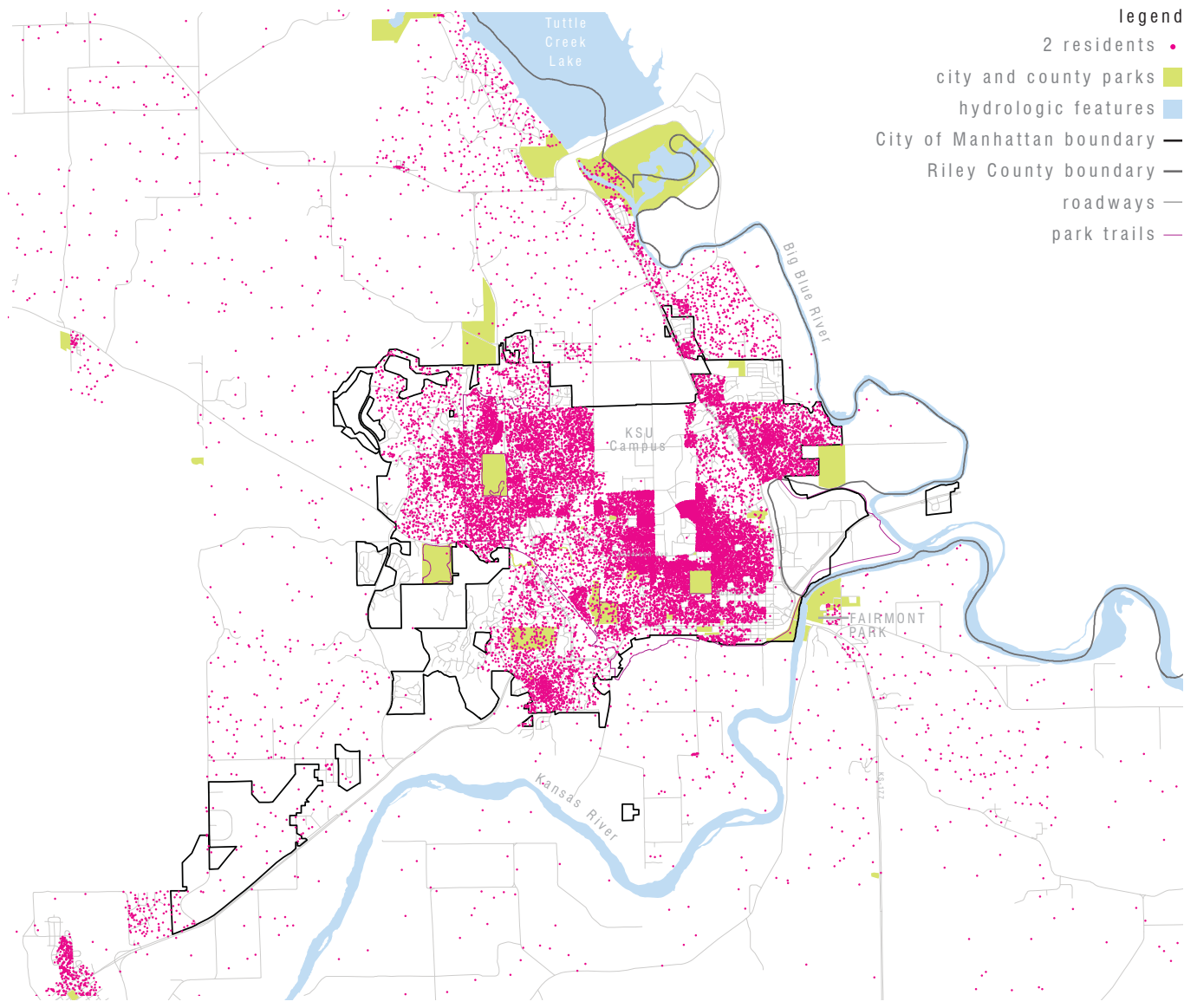


figure 02.04 / Manhattan's Population Projection
(by Author)



total population (2010)	52,281	100.0%
under 5 years	2,902	5.6%
5 to 19 years	10,163	19.4%
20 to 24 years	15,358	29.4%
25 to 34 years	8,615	16.5%
35 to 44 years	3,934	7.5%
45 to 54 years	3,907	7.5%
55 to 64 years	3,483	6.7%
65 years +	3,874	7.6%
median age: 23.8 years		

figure 02.05 / Manhattan Age Distribution
(by Author)



- legend**
- 2 residents •
 - city and county parks ■
 - hydrologic features ■
 - City of Manhattan boundary —
 - Riley County boundary —
 - roadways —
 - park trails —

figure 02.06 / Manhattan's Population Distribution
(by Author)



	Count	Percentage
total population (2010)	52,281	100.0%
Caucasian	41,914	80.2%
Hispanic or Latino	3,053	5.8%
Black or African American	2,770	5.3%
Asian	2,669	5.1%
Two or More Races	1,511	2.9%
American Indian and Alaska Native	212	0.4%
Native Hawaiian or Pacific Islander	81	0.2%
Other	71	0.1%

figure 02.07 / Manhattan Ethnicity (by Author)

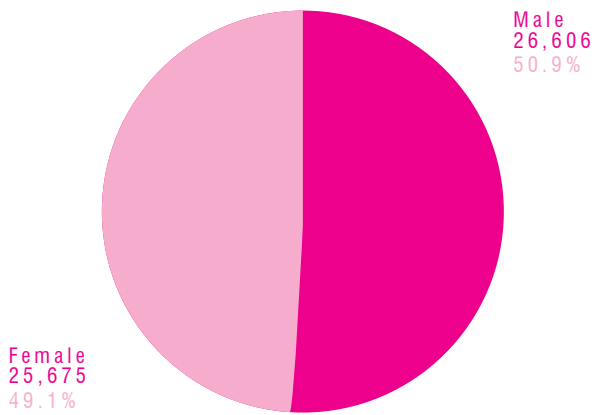


figure 02.08 / Manhattan Gender (by Author)

02.04

A N A L Y Z I N G

F A I R M O N T P A R K

This section begins with an exploration of Fairmont Park's site history and design evolution followed by an evaluation of the park's the existing and proposed conditions. The Sustainable Sites Initiative's Guidelines and Performance Benchmarks were used as a means of analysis for the evaluation. Findings from physical traces, captured during site visits are also presented.

02.04.01

H I S T O R Y A N D
E V O L U T I O N

To understand the quantity, quality, and types of amenities present on site, this section explores Fairmont Park from its original master plan to updated proposals and to present day conditions.

FAIRMONT PARK HISTORY AND DESIGN EVOLUTION

MASTER PLAN (1998)

In 1995, the Fairmont 2000 Park Planning Committee was formed to assist the County, City, and U.S.D. 383 School District in guiding the development of Fairmont Park. Through this group, and collaborations with a landscape architecture firm, a master plan was developed. It envisioned Fairmont Park as a park which could provide recreational opportunities for the Manhattan community without compromising the site's natural resources (Riley County Kansas n.d.). Park land for Fairmont was purchased in response to flooding of the area occurring in 1993. Development and revisions of the Master Plan continued through 1998.

This Master Plan included recreational areas such as utility and practice fields, sand volleyball courts, a playground, picnic shelters, and a sandy canoe launch area into the Kansas River (Figure 02.09). It also shows that the wooded area along the river should be conserved for plants and wildlife but that hiking and multi-use trails for bird watching and educational opportunities should be added. A bicycle and pedestrian bridge was proposed to connect the multi-use trails to the Linear Trail, located across the River. A community garden, plaza, open air stage, art element, and stream restoration were also proposed.

figure 02.09 / Master Plan 1998
(adapted from Riley County Parks Department by Author)



legend

- park boundary
- linear trail
- walkways
- roadways and parking
- plaza and bridge
- trees
- grass
- prairie grass
- recreational fields
- community garden
- playground
- staging area
- art concept
- historical bridge supports
- canoe launch
- kansas river

MASTER PLAN UPDATES (2012)

Since the completion of the Master Plan in 1998 several modifications have been made, including a soccer complex and playground. In 2006, plans for the Fairmont Park Soccer Complex were completed. The planning was a collaborative effort between the Riley County Parks Department and the Little Apple Soccer Club. The plan proposed an indoor soccer complex as well as three outdoor soccer fields. Additionally, flexible open space, an outdoor dining area, and bleachers are specified in the plan.

A playground concept was then developed for Fairmont Park in 2007. It proposed an expansive play area for a variety of age groups with traditional playground equipment such as swings, see-saws, and slides, as well as play mounds, a mini forest, climbing rocks, a fort, and village. Shelters and picnic tables are also proposed.

Both the playground and soccer complex remain unrealized to date. 2012 design goals for Fairmont Park, established by the Riley County Parks Department, include:

- Development of the soccer complex
- Creation of a new playground
- Further development of the hiking trails
- Expanding the disc golf course to a full 18 hole course
- Creation of a new planter for the entry sign

See [Figure 02.10](#) for Fairmont Park's Master Plan Updates.

figure 02.10 / Master Plan Updates 2012
(adapted from Riley County Parks Department by Author)



legend

- park boundary
- linear trail
- walkways
- roadways and parking
- bridge
- trees
- grass
- recreational fields
- artificial rec. field
- disc golf course
- playground
- play structures
- dog park
- indoor soccer building
- bleachers
- historical bridge supports
- restrooms
- kansas river

EXISTING CONDITIONS (2013)

In its current state (Figure 02.11), Fairmont Park provides football and baseball fields, a disc golf course, large and small dog parks, small playground, boat ramp, and hiking trails. Gathering spaces are limited to single picnic tables scattered throughout the park. Ecological habitat is abundant in the park due to its proximity to the river.

The existing condition of Fairmont Park is analyzed further throughout this chapter.

figure 02.11 / Existing Conditions 2013
(by Author)



legend

- park boundary
- linear trail
- walkways
- roadways and parking
- bridge
- trees
- grass
- recreational fields
- disc golf course
- playground
- dog park
- soil stockpile
- bleachers
- historical bridge supports
- restrooms
- kansas river

FAIRMONT PARK PROGRAM EVOLUTION

	1998 MASTER PLAN	MASTER PLAN UPDATES 2012	2013 EXISTING CONDITIONS
ENVIRONMENTAL			
Native Grasses	■		
Stream Restoration	■		
Corridor Conservation	■	■	■
SOCIAL			
Flex Fields	■		
Football Fields		■	■
Soccer Fields		■	
Baseball Fields		■	■
Artificial Field		■	
Disc Golf Course		■	■
Playground	■	■	■
Hiking Trails	■	■	■
Dog Park		■	■
Plaza	■		
Pedestrian Bridge	■		
Boat Ramp	■	■	■
Community Garden	■		
Event Space	■		
Art Features	■		

ECONOMIC	1998 MASTER PLAN	MASTER PLAN UPDATES 2012	2013 EXISTING CONDITIONS
Indoor Soccer		■	
Garden Plot Rental	■		

table 02.05 / Fairmont Park Program Evolution Matrix
(by Author)

PROGRAM EVOLUTION

Within Fairmont Park, the proposed and exiting program elements have evolved through time (Table 02.05). Many of the program elements originally specified were never implemented, such as the native grasses, community gardens, and pedestrian bridge. Additionally, these elements were never incorporated into the revisions of the original master plan. Instead, this plan specified recreational amenities such as soccer, baseball, and football fields, a disc golf course, and dog park. As the site exists today, Fairmont Park provides fewer program elements than specified in the original 1998 Master Plan or the revisions made to the Master Plan.

02.04.02

S U S T A I N A B I L I T Y
E V A L U A T I O N S

By utilizing the Sustainable Sites Initiative's Guidelines and Performance Benchmarks as a means of analysis, a series of evaluations were conducted. These evaluations examine 1) the original 1998 Master Plan, 2) the park's existing conditions, and 3) the revised 2012 Master Plan, providing a baseline understanding of its sustainability rating.

FAIRMONT PARK SUSTAINABLE SITES INITIATIVE EVALUATION

EVALUATION PROCESS

To determine the sustainability rating of Fairmont Park's existing and anticipated conditions, the Sustainable Sites Initiative's 2009 Guidelines and Performance Benchmarks, the first national rating system for sustainable landscapes, was used as a guide (see [Pages 44-47](#) for further explanation of SITES™). This evaluation process analyzed Fairmont Park's original 1998 Master Plan, the 2012 Master Plan Updates, and the 2013 Existing Conditions to establish the extent to which they were addressing sustainability. For each of the nine categories in the SITES™ Certification process, point values were assigned based on the requirements outlined in the document and information obtained from the Riley County Parks Department. Reasoning behind each point value was also documented for each credit or prerequisite within the nine categories. After totaling each of the categories, the sustainability rating for each of the plans was revealed. The results of each of the categories, as well as the overall evaluation, were then compared in a summary table ([Table 02.06](#)).

Detailed results of the sustainability evaluations (which document the reasoning for assigning specific point values under each prerequisite or credit) along with full descriptions and available point values, can be found in [Appendix A](#).

FINDINGS

Evaluations of Fairmont Park revealed that the 1998 Master Plan offers the highest level of sustainability, according to the SITES™ Certification process, receiving 52 points out of 250. Higher point values (when compared to the two other plans evaluated) were achieved in the Site Design – Water category as well as the Site Design – Human Health and Well Being category. The 2012 Master Plan Updates received a total of 47 points and was able to outscore the 1998 Master Plan in the Site Design – Soil and Vegetation category. The 2013 Existing Park achieved a total of 38 points, the lowest level of sustainability among the three plans evaluated. These results illustrate that the master plans have not been implemented to their full potential as the overall point value for the Existing Park is lower than those of the 1998 and 2012 Master Plans.

All three plans received zero points in the Pre-Design Assessment and Planning category because users and stakeholders must have been involved in all phases of the site design process. Points were not achieved by the three plans in the Monitoring and Innovation category as specifications for monitoring performance were not documented.

LIMITATIONS

The SITES™ evaluation method presented some limitations, introducing a level of error to the method. There was insufficient data available to adequately address certain credit categories, decreasing the accuracy of this evaluation method. In the evaluation of the Construction category, which focuses on minimizing the effects of construction related activities, the construction methods were neither documented nor specified by the County in any of the three plans; therefore, no points were awarded. This may have skewed the total point values. However, even by adding the maximum value available for the category, 21 points, each of the plans would remain ineligible SITES™ Certification.

In the Operations and Maintenance category, which focuses on maintaining the site for long-term sustainability, a maintenance plan was only specified in the evaluation of the site's 2013 Existing Conditions. Consequently, no points were given in this category for the 1998 Master Plan and Master Plan Updates. However, only two points were obtained from the 2013 Existing Conditions evaluation, keeping the level of inaccuracy for this section low.

Additionally, detailed reasoning behind original design intentions were not available for all aspects of the three plans, increasing the need for educated assumptions and thus influencing accuracy.

	MASTER PLAN 1998	MASTER PLAN UPDATES 2012	EXISTING PARK 2013
1. SITE SELECTION 21 POINTS	05 / 21	05 / 21	05 / 21
2. PRE-DESIGN ASSESSMENT + PLANNING 04 POINTS	00 / 04	00 / 04	00 / 04
3. SITE DESIGN - WATER 44 POINTS	13 / 44	08 / 44	08 / 44
4. SITE DESIGN - SOIL + VEGETATION 51 POINTS	21 / 51	22 / 51	17 / 51
5. SITE DESIGN - MATERIALS SELECTION 36 POINTS	00 / 36	00 / 36	00 / 36
6. SITE DESIGN - HUMAN HEALTH + WELL BEING 32 POINTS	13 / 32	12 / 32	06 / 32
7. CONSTRUCTION 21 POINTS	00 / 21	00 / 21	00 / 21
8. OPERATIONS + MAINTENANCE 23 POINTS	00 / 23	00 / 23	02 / 23
9. MONITORING + INNOVATION 18 POINTS	00 / 18	00 / 18	00 / 18
TOTAL 250 POINTS	52 / 250	47 / 250	38 / 250

table 02.06 / Sustainability Evaluation Summary
(by Author)

02.04.03

S I T E

A N A L Y S I S

An inventory and analysis of existing site conditions was utilized to determine needs and opportunities for, as well as to guide, the redesign of Fairmont Park.

FAIRMONT PARK CONTEXT

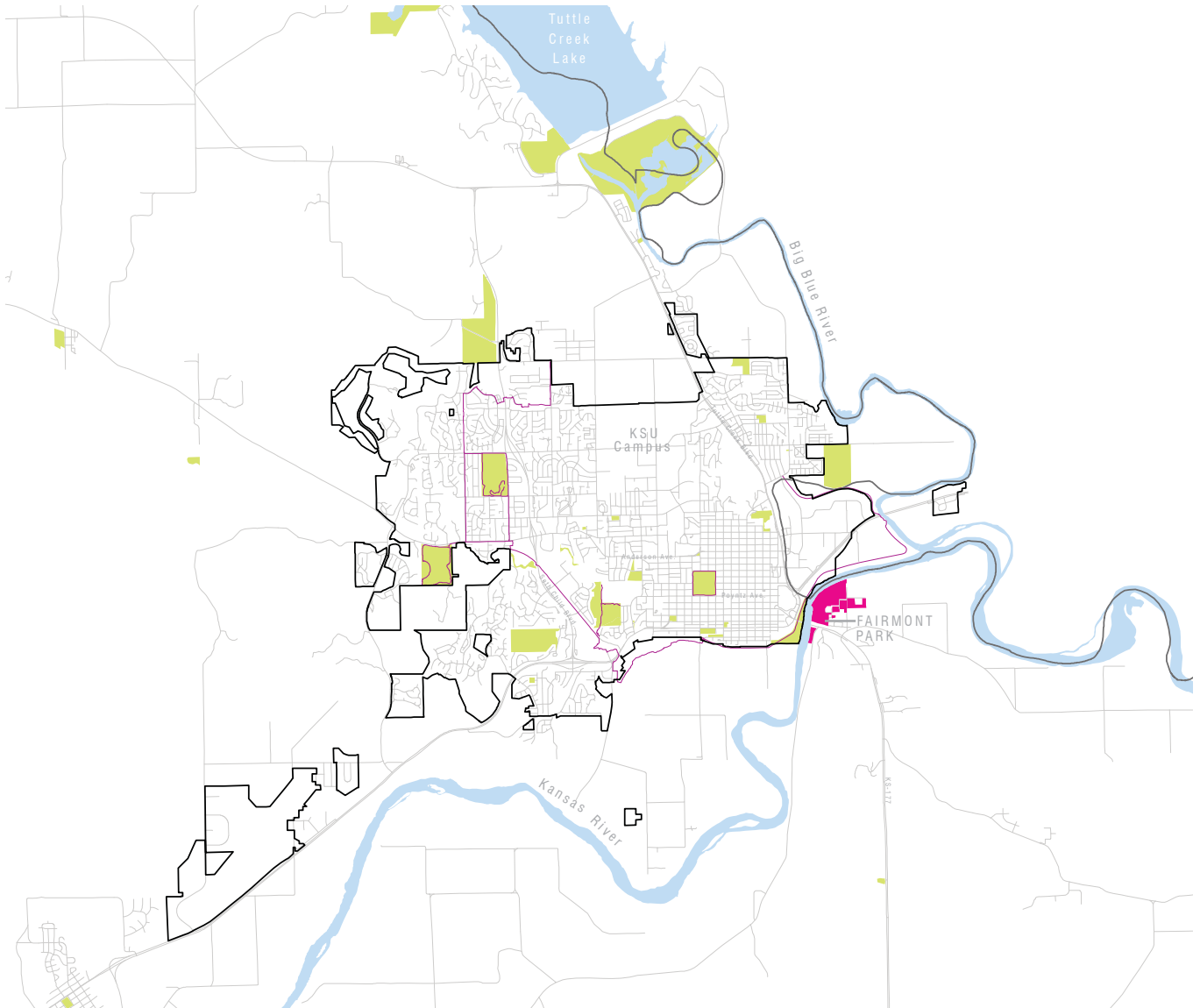


figure 02.12 / Fairmont Park Context
(source source source. year.)

Fairmont Park is located along the Kansas River just outside the City of Manhattan. There are opportunities to connect the park to the municipal parks and open spaces throughout the Manhattan community due to the close proximity of park trails.

legend

- Fairmont Park
- city and county parks
- hydrologic features
- City of Manhattan boundary
- Riley County boundary
- roadways
- park trails

PARK OWNERSHIP

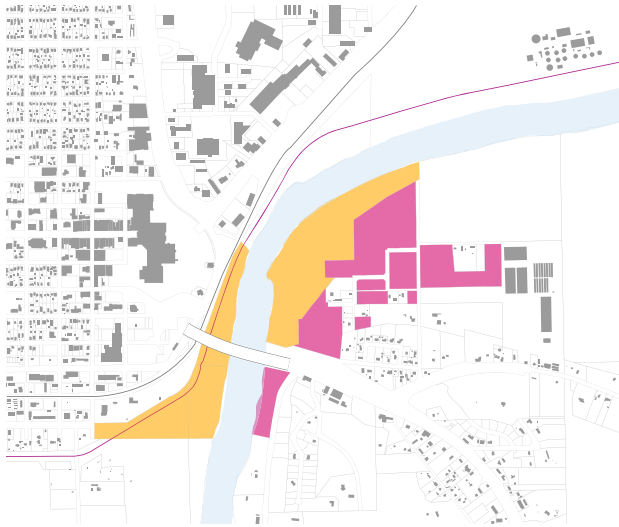


figure 02.13 / Park Ownership
(by Author)

The City of Manhattan owns approximately 40 acres of Fairmont Park and Riley County owns approximately 60 acres. While the two municipal entities collaborate on certain projects, there are opportunities for further collaboration to ensure future success of the park.

legend

- City of Manhattan
- Riley County
- Linear Trail

ZONING

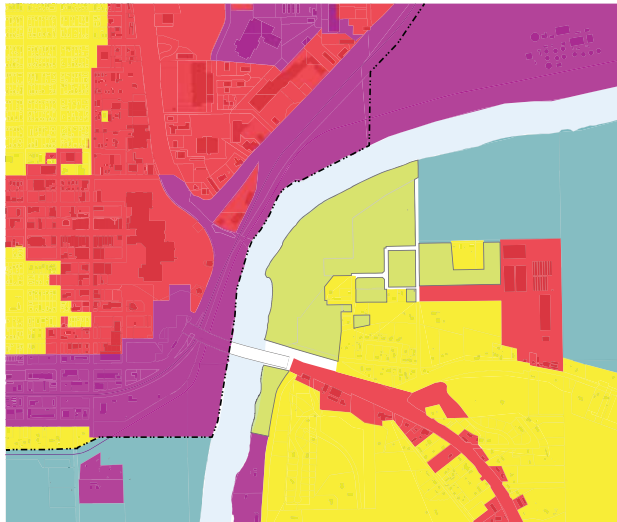


figure 02.14 / Zoning
(by Author)

Light industrial development is located across the river from Fairmont Park while the park itself is surrounded by low density residential and commercial development as well as agricultural land.

legend

- Fairmont Park
- commercial
- industrial/manufacturing
- residential
- agricultural
- - City of Manhattan boundary

WALKING DISTANCES

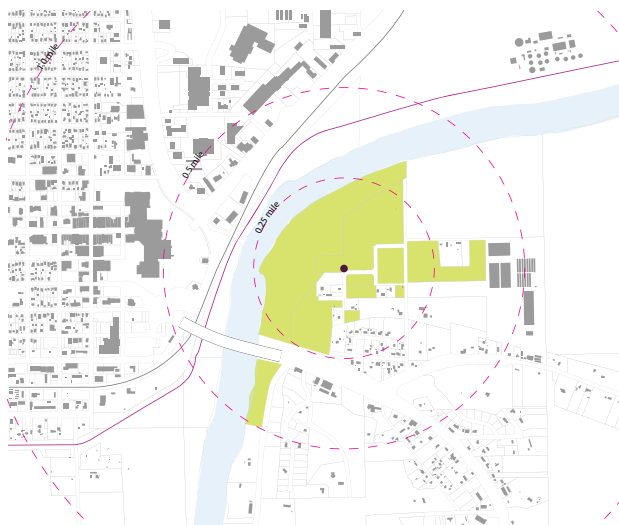


figure 02.15 / Walking Distances
(by Author)

Although the Kansas River currently acts as a barrier between Fairmont Park and Manhattan's downtown, it is located within a ten to fifteen minute walking radius. There is an opportunity to establish easier pedestrian connections within the redesign of Fairmont Park.

- Linear Trail
- - walking radius

HISTORIC SITES AND DISTRICT

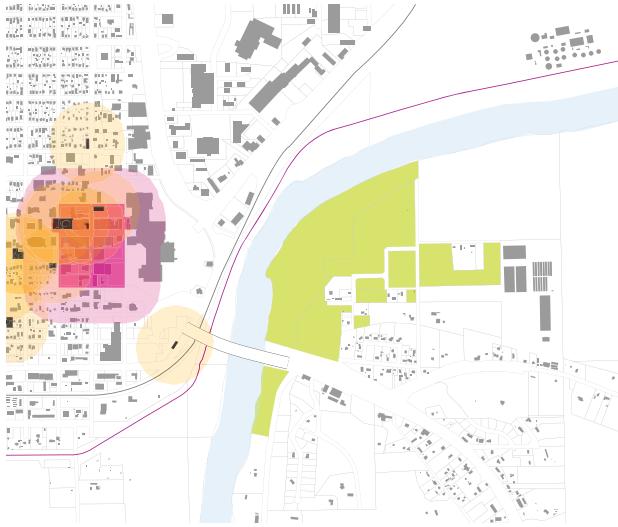


figure 02.16 / Historic Sites and District
(by Author)

Due to their close proximity, there are opportunities to establish connections between Fairmont Park and these historic sites.

legend

- historic downtown
- 500' buffer, historic downtown
- historic sites
- 500' buffer, historic sites

DISTRICTS

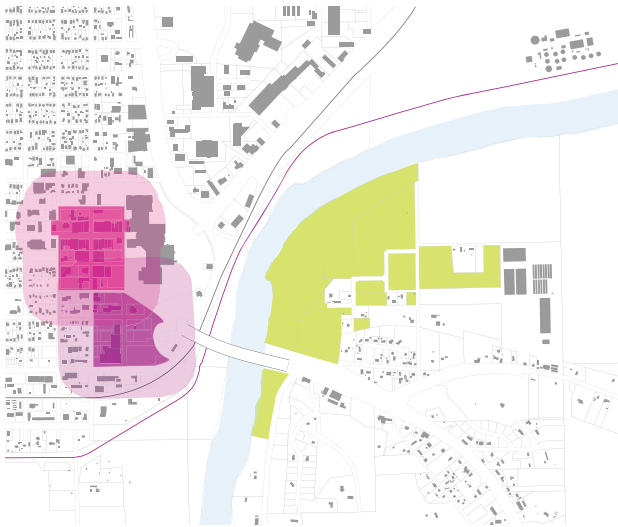


figure 02.17 / Districts
(by Author)

There are opportunities to establish connections between Fairmont Park and these two frequently visited areas of Manhattan in order to increase site use.

legend

- historic downtown
- 500' buffer, historic downtown
- entertainment district
- 500' buffer, entertainment district

OPPORTUNITY FOR CONNECTION

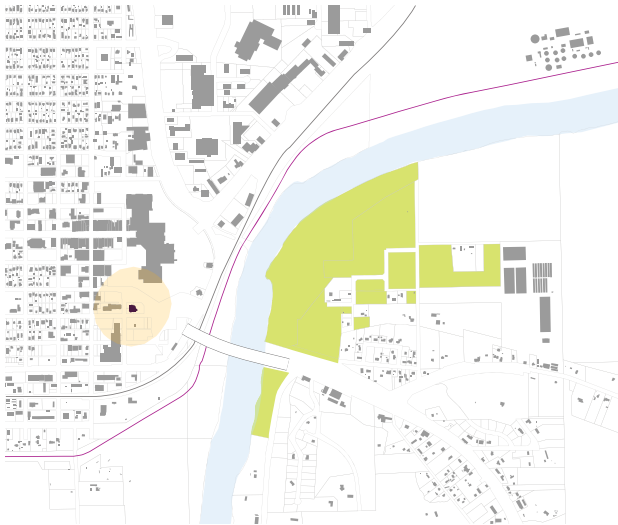


figure 02.18 / Opportunity for Connection
with Discovery Center
(by Author)

The Flint Hills Discovery Center is located within close proximity of Fairmont Park, creating the opportunity to establish a connection between the two. Additionally, because the Discovery Center focuses on educating the public about the tallgrass prairie ecosystem and becoming stewards of the land, a partnership could be made with the park to demonstrate these ecosystems and host outdoor programs or activities.

legend

- Flint Hill Discovery Center
- 500' buffer, discovery center

TOPOGRAPHICAL BARRIERS



figure 02.19 / Topographical Barriers
(by Author)

A variety of topographical barriers currently exist on site. Most prominent are the steep slopes of the seasonal stream which prevents easy access between the northern and southern portions of the site. Additionally, topographical change between the Kansas River and the park prevents most users from accessing the river's edge. A levee also runs through the site, preventing ADA accessibility. There is an opportunity to provide more accessible solutions in the redesign of Fairmont Park.

legend

■ topographical barriers

SITE ACCESS

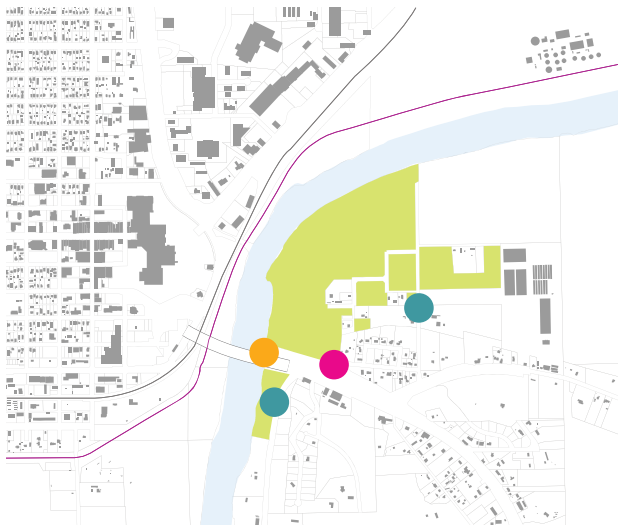


figure 02.20 / Site Access
(by Author)

The two existing main access points to the park are vehicular, one for the northern portion and one for the southern portion of the site. While there is an existing pedestrian access point to the park, is not well utilized due to the uncomfortable pedestrian environment along the K-177 corridor. Additionally, the site provides boat access to the Kansas River. There are opportunities to increase pedestrian safety and comfort as well as encourage bicycle access.

legend

■ pedestrian access

■ vehicular access

■ boat access

VIEWS

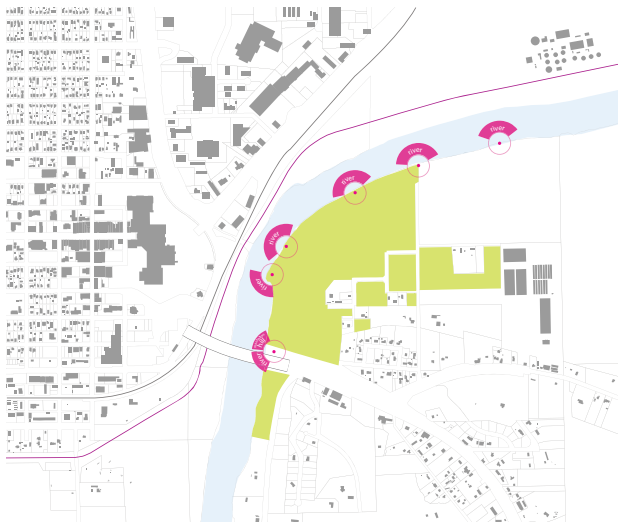


figure 02.21 / Views
(by Author)

There are many different points along the riverfront hiking trails which offer views of the river and surrounding context. Additionally, near the historic bridge support, there are views to Manhattan Hill, an icon of the City of Manhattan. Within the redesign of Fairmont Park, there is an opportunity to maintain these views.

legend

■ viewsheds

HYDROLOGY

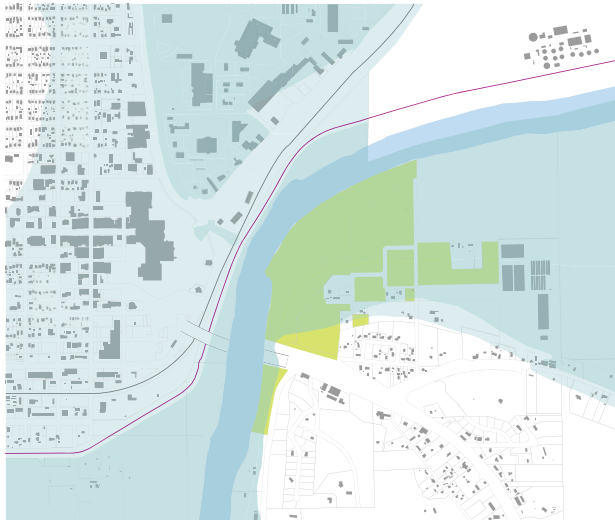


figure 02.22 / Hydrology
(by Author)

Located along the Kansas River, Fairmont Park lies within both the 100 and 500 year floodplains. The levee exiting on site does not deter either the 500 or 100 year flood event from entering the main part of the park. Consequently, site materials, furnishings, and vegetation will need to withstand significant flood events.

legend

- kansas river
- fema 100 year floodplain
- fema 500 year floodplain

SOILS

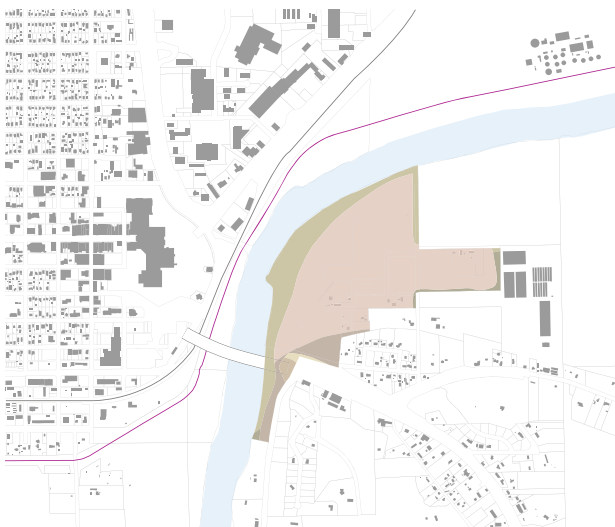


figure 02.22 / Soils
(by Author)

The majority of the site is made up of soils in the Eudora-Urbanland Complex which are rarely flooded while the soils along the river's edge are the Stonehouse-Belvue Complex which are occasionally flooded. Smaller patches of soils characterized by sloped topography can be found at the site's edges.

legend

- Clime-Sogn complex, 3 to 20% slopes
- Eudora-Urbanland complex, rarely flooded
- Stonehouse-Belvue complex, occasionally flooded
- Tully silty clay loam, 3 to 7% slopes
- Wymore-Kennebec complex, 0 to 17% slopes
- Zeandale silt loam, occasionally flooded

SEGMENTED SPACES

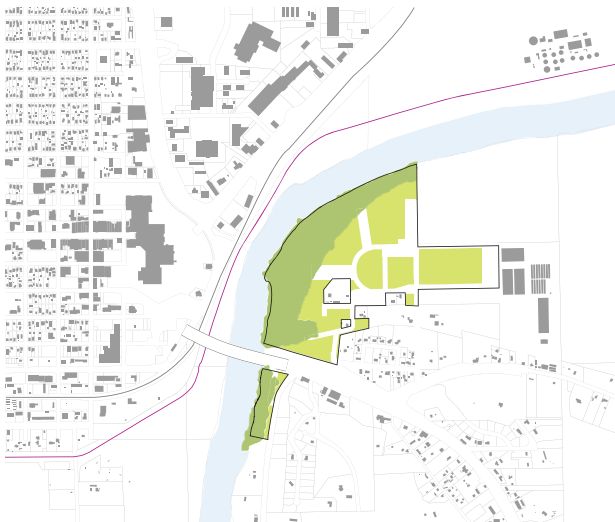


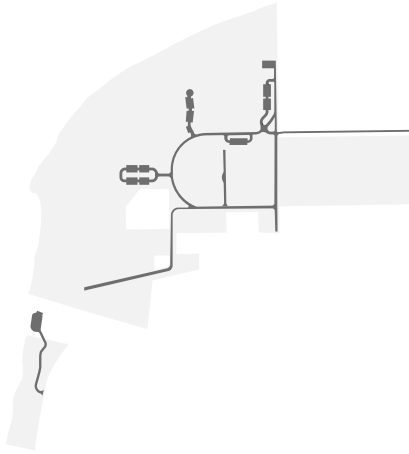
figure 02.23 / Space Segmented
by Vehicular Circulation and Parking
(by Author)

The current road and parking configuration on site segments existing open space, limiting the activities and amenities that can occur there. There are opportunities to reconfigure the vehicular access to increase safety and usable space within the park.

legend

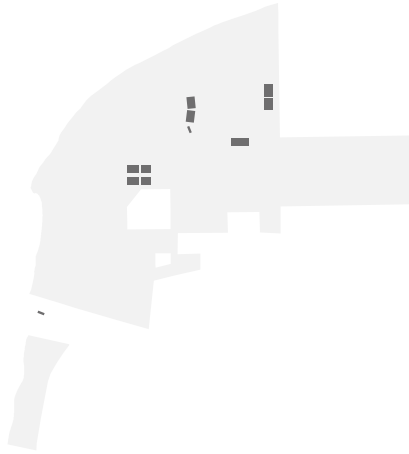
- open space
- heavy vegetation
- roads and parking

EXISTING CONDITIONS QUANTIFIED



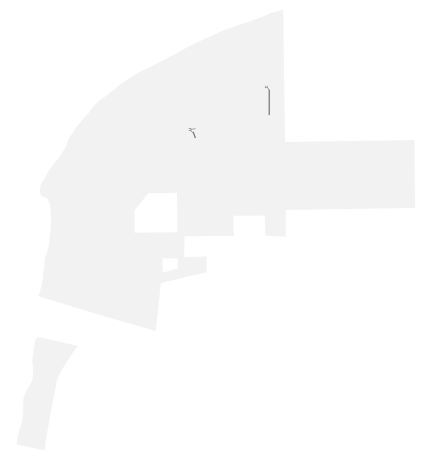
6%

VEHICULAR
ACCESS
6.4 acres



187

PARKING
SPACES



0.09 miles

PEDESTRIAN
CIRCULATION



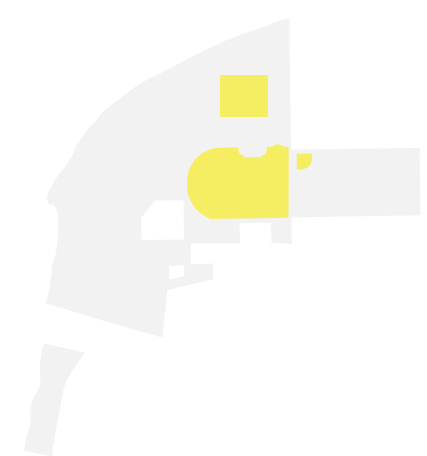
55%

TREE COVER
60 acres



24%

FLEXIBLE
OPEN SPACE
27 acres



15%

RECREATION
16.4 acres

figure 02.24 / Quantifying Existing Conditions
(by Author)



1.8 miles
TRAILS



4%
IRRIGATED
4 acres



0%
EDUCATION
0 acres

02.04.04

P H Y S I C A L

T R A C E S

To understand how current park users use the site, physical trace observations (a method that records visible marks and objects left behind from previous site use) were conducted.

PHYSICAL TRACES

Observing physical traces is a concept that was developed by John Zeisel and illustrated through his book, *Inquiry by Design: Tools for Environment-Behavior Research*, which was used as a supplemental site analysis tool. Physical traces are visible marks or objects left behind from previous site activity. By observing these traces, we can begin to understand “how an environment got to be the way it is, what decisions its designers and builders made about the place, how people actually use it, how they feel toward their surroundings, and generally how that particular environment meets the needs of its users” (Zeisel 1984, 89).

METHODOLOGY

To analyze the physical traces in Fairmont Park, a series of site visits were conducted and documented using photographs (Figures 02.25 to 02.34 in the following pages). Through these visits, I was interested in determining which areas of the park are most frequently visited as well as which of the existing amenities are most utilized. I chose to conduct the following site visits:

- 17 NOVEMBER 2012, Saturday Morning
I was hoping to document site users on this warm Saturday morning.
- 12 DECEMBER 2012, Wednesday Afternoon/Evening
On this chilly day, I went to document hiking trail use.
- 30 DECEMBER 2012, Sunday Afternoon
I went to document site use during a snowstorm.
- 09 JANUARY 2013, Wednesday Afternoon/Evening
I wanted to document the cumulative use of the park over a period of cold and snow by observing footprints in the snow before the weather warmed up.
- 02 FEBRUARY 2013, Saturday Afternoon
As the weather was beginning to warm up, I wanted to document the paths of site users by observing footprints in the snow.
- 29 MARCH 2013, Friday Afternoon/Evening
On this warm day, I wanted to observe site users and confirm hiking trail locations and use.



figure 02.25 / Traces, 17 November 2012
(by Author)





figure 02.26 / Traces, 17 November 2012
(by Author)





figure 02.27 / Traces, 12 December 2012
(by Author)





figure 02.28 / Traces, 30 December 2012
(by Author)





figure 02.29 / Traces, 09 January 2013
(by Author)





figure 02.30 / Traces, 02 February 2013
(by Author)





figure 02.31 / Traces, 02 February 2013
(by Author)





figure 02.32 / Traces, 29 March 2013
(by Author)

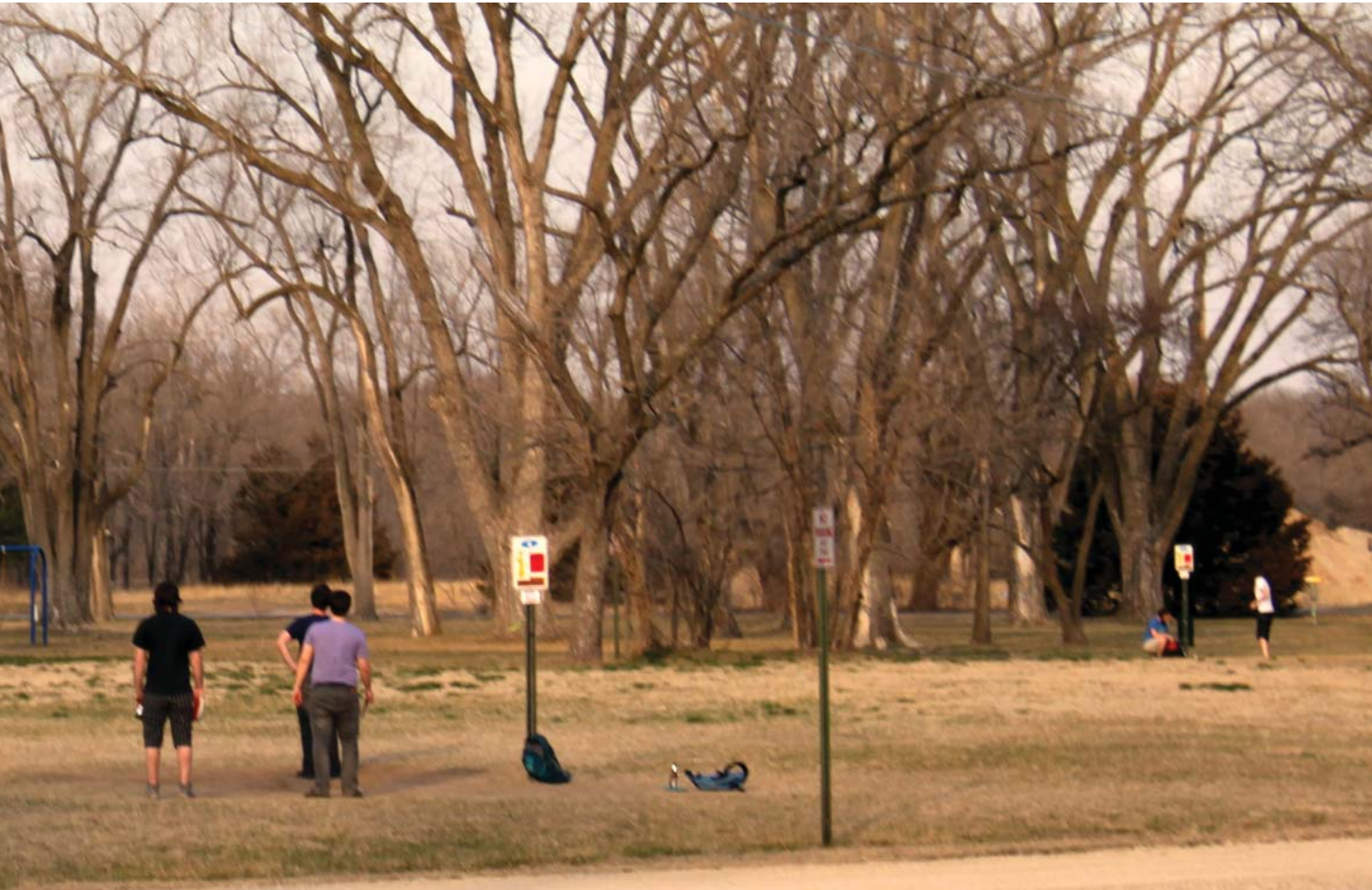




figure 02.33 / Traces, 29 March 2013
(by Author)





figure 02.34 / Traces, 29 March 2013
(by Author)



FINDINGS

In looking for signs of site use, I found many different indications from footprints in mud and snow to worn paths and discarded objects. At times, I was also able to observe actual park users including people, their pets, and wildlife.

Through my first few visits to Fairmont Park, it became evident that the majority of site users are dogs and their owners. The large dog park at the northern edge of the site is visited frequently by park users. Here dogs happily run around within the fenced area while their owners play with them or sit at one of the two picnic tables inside the enclosure. There is also a smaller dog park, for dogs less than 14 pounds, which was not used during my visits, but prints in the snow indicated some use. I also found that some owners prefer to take their dogs for walks on the hiking trails at the west edge of the park. I was able to confirm these initial observations with physical traces detected in the snow. Exact paths taken by dogs and their owners were revealed by observing footprints in the snow - something that was not apparent in my previous visits. I found a higher concentration of footprints in the northern

portion of the park around the dog park and on the football fields. From this, I determined that the northern portion of the site is the most used in the park, most likely due to the location of the dog parks. Footprints in the snow and mud also helped me conclude that the hiking trails are also frequently used by park guests. Additionally, another area of the park in which I observed occasional use was on the disc golf course. On my visits in during warmer weather, small groups could be found playing the course.

SUMMARY

Overall, the observation of physical traces within Fairmont Park revealed frequent use of the dog parks and hiking trails with occasional use of the disc golf course. This indicates that the dog parks, hiking trails, and disc golf course should be retained as amenities provided within the park, but could be expanded and improved to increase use. The lack of traces in other areas of the park leads me to believe that these spaces and amenities are underutilized. These areas can then be considered for improvement or as locations for adding new amenities to the park.

LIMITATIONS

Although the physical traces revealed site conditions that would remain unrealized through other methods, there are also some limitations associated with this analysis. Due to the timing of the project, site visits could only be made within a five month period, most of them during the winter months. This may have introduced a level of inaccuracy to the method as park use is generally higher in the warmer months. Additionally, the timing of the site visits was somewhat sporadic. It may have been more useful to return to the site at regular intervals to better understand patterns of use influenced by weather conditions or time of day. Ideally, the site would be observed year-round during different times of day and weather conditions in order to decrease the opportunity for error.



SYNTHESIZE

Informed by a synthesis of the literature review, precedent studies, site inventory and analysis, sustainability evaluations, and physical trace observations, goals were developed to guide the new 21st century park design for Fairmont Park.

METHODOLOGY

Information gained throughout the investigate phase was utilized to derive a list of design goals (seen at right) for the redesign of Fairmont Park. The overall design goal, to maximize environmental, social, and economic benefits, was influenced by the sustainable design strategies of Evergreen Brick Works, which was analyzed through the precedent study, as well as a literature review of the Sustainable Sites Initiative.

In the environmental category, the SITES™ 2009 Guidelines and Performance Benchmarks proved influential in developing each of the goals listed. The site inventory and analysis supported the need to restore the existing ecological corridor while the need for material reuse was also influenced by the Urban Outfitter's Headquarters precedent study. Additionally, the precedent study of the Landfill Garden supported the need for generating energy on site.

Much of social category was again influenced by the ideas presented within the SITES™ 2009 Guidelines and Performance Benchmarks as well as other literature related to the social health of sustainable sites. The Evergreen Brick Works precedent study further supported the ideas of promoting sustainability awareness and education through sustainability demonstrations and interactive elements as well as the importance of creating connections to the surrounding community.

For the economic category, the Evergreen Brickworks and Blue Hole Regional Park precedent studies proved influential due to their strategies for becoming economically self-sustaining while literature from the Sustainable Sites Initiative described the need for and value of ecosystem services.

DESIGN GOALS

MAXIMIZE ENVIRONMENTAL, SOCIAL, AND ECONOMIC BENEFITS

ENVIRONMENTAL

RESTORE EXISTING ECOLOGICAL CORRIDOR

- Control and manage invasive plants
- Provide habitat corridor connections

COLLECT AND STORE RECYCLABLES

- Provide dropoff center for household recyclables and foodwaste
- Compost vegetation trimmings

GENERATE ENERGY ON SITE

FACILITATE MATERIAL REUSE

SOCIAL

PROMOTE SUSTAINABILITY AWARENESS AND EDUCATION

- Demonstrate sustainable practices through interactive elements

PROVIDE COMMUNITY CONNECTIONS

- Improve site accessibility
- Develop partnerships within the community

PROVIDE OPPORTUNITIES FOR PHYSICAL ACTIVITY

ECONOMIC

PROVIDE AMENITIES WHICH GENERATE REVENUE

PROVIDE ECOSYSTEM SERVICES



The new 21st century park is explored through illustrative plans and renderings, performance benefits, a phasing strategy, and adaptive management plan for operations and maintenance.

FAIRMONT PARK PROGRAM EVOLUTION

PREVIOUS
PLANS

21ST
CENTURY
PARK PLAN



ENVIRONMENTAL

Native Grasses



Stream Restoration



Corridor Conservation



Corridor Restoration



SOCIAL

Flex Fields



Football Fields



Soccer Fields



Baseball Fields



Artificial Field



Disc Golf Course



Playground



Hiking Trails



Dog Park



Plaza



Pedestrian Bridge



Boat Ramp



Community Garden



Event Space



Art Features



Rock Climbing



Demonstration Gardens





ECONOMIC

PREVIOUS
PLANS

21ST
CENTURY
PARK PLAN

Indoor Soccer



Bike Rental



Farmer's Market



Composting



Recycling



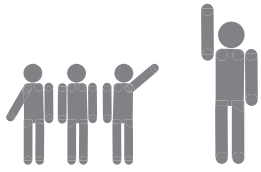
Garden Plot Rental



table 04.01 / Fairmont Park Program Evolution
(by Author)

Legend

- Master Plan 1998
- ▲ Master Plan Revisions 2012
- Existing Conditions 2013



teaching



walking



riding



playing football



relaxing



kayaking



dating



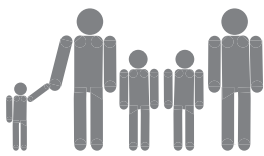
hiking



tumbling



dog fetching



family gathering



greeting



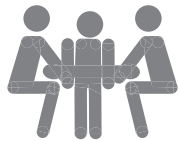
recycling



skating



shopping



dining



canoing



dog waking



bird watching



reading

MULTIGENERATIONAL USERS

The range of amenities provided in the redesign of Fairmont Park were designed to serve a variety of multigenerational user groups. Families, individuals, school groups, dogs, and wildlife were all considered in program development.

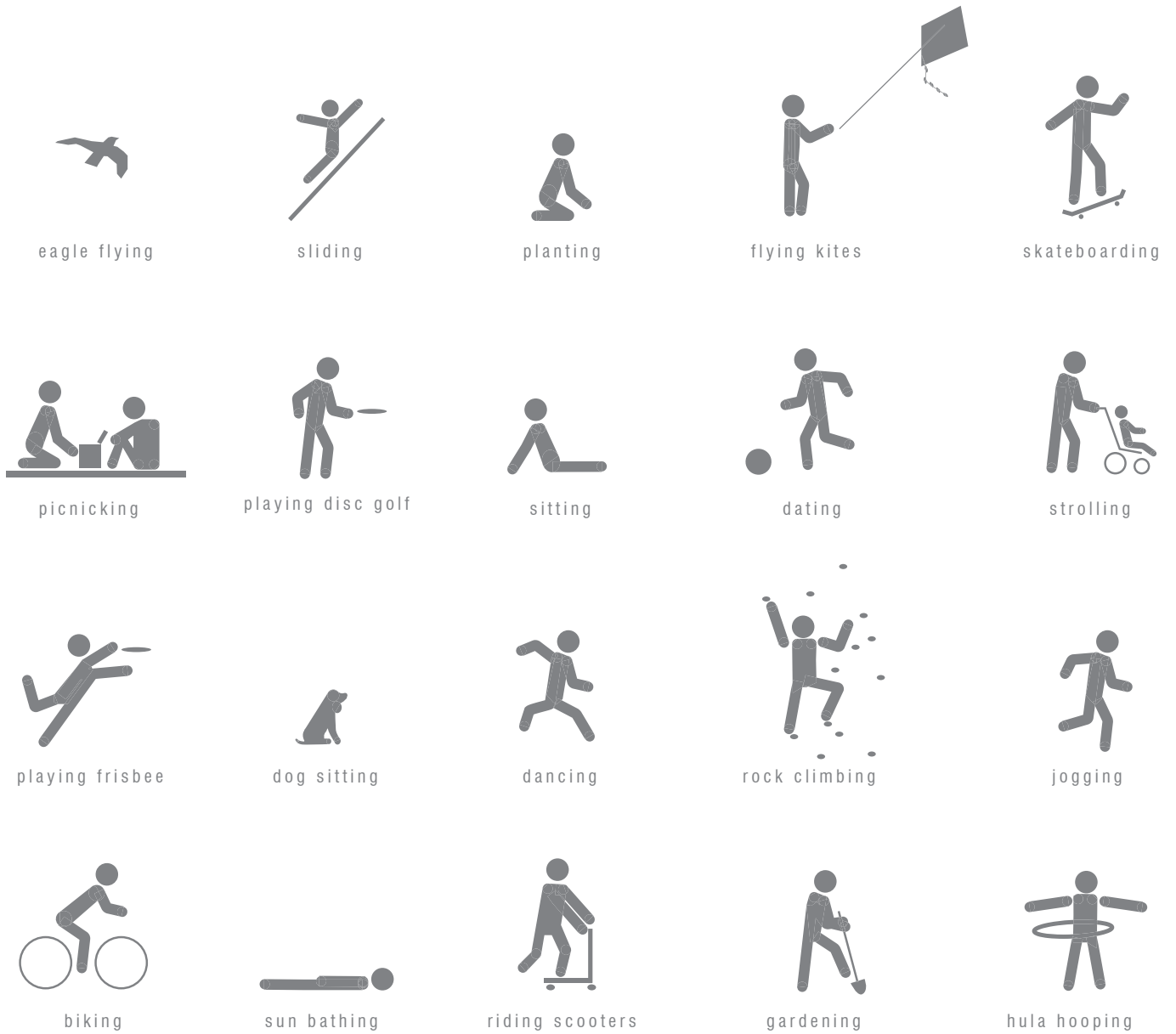


figure 04.01 / Multigenerational Users
(by Author)

FAIRMONT PARK AMENITIES

The amenities provided in the redesign of Fairmont Park not only serve as multifunctional and multigenerational resources for the community, but also provide a range of environmental, social, and economic benefits. Each amenity in the following pages indicates benefits provided through the icons below. A summary of benefits is included on [pages 188](#) and [189](#).



ENVIRONMENTAL



SOCIAL



ECONOMIC

figure 04.02 / Plan
(by Author)





HIKING TRAILS

DOG PARK
LARGE DOGS

WIND ENERGY DEMONSTRATION

DOG PARK
SMALL DOGS

RESTROOMS

SYNTHETIC FLEXIBLE FIELD

BIKE RENTAL/PARKING

PLAYGROUND

MARKET

RECYCLING AND COMPOSTING CENTER

DEMONSTRATION
GARDENS
ORCHARD/VEGGIE BARN/RAINY
RAIN GARDENS/WATERING
PLANTS/COMPOST/XERISCAPE

TURFGRASS
FLEX FIELD

INDOOR SOCCER

PLAZA DROP-OFF

DISC GOLF COURSE

FLEXIBLE OPEN SPACE

SOLAR ENERGY DEMONSTRATION

CLIMBING WALL
BOAT LAUNCH
SEATING ALONG RIVER

RESTORED SEASONAL STREAM

MESSENGER RD.

ZEANDALE RD.

0 100 200 400 600 ↑N



DEMONSTRATION GARDENS



The Demonstration Gardens at Fairmont Park serve as both a gathering space and educational center for the Manhattan community. Here residents can come to learn about growing their own fruits, vegetables, rain gardens, and native plants.

The Gardens provide 10'x10' plots which can be rented out to families who want to start growing their own food but may not have space in their yard at home or want to socialize with others who are interested in growing.

Additionally, larger areas or multiple plots can be rented out to community organizations. Schools, churches, girl and boy scout groups, and senior centers can host their own planting and harvesting programs to teach people about food production or set up a volunteer program to sell the food they grow at the Market as a way to generate money for their organization. There are also opportunities for local restaurants to rent plots and grow fresh, local food for their customers. Additionally, the Gardens provide raised plots



figure 04.03 / Demonstration Gardens
(by Author)

which are ADA accessible for the elderly or disabled. Some plots can even be retained by the Parks Department and the food grown there can be harvested and sold at the Fairmont Park Farmer's Market to go towards site operation and maintenance costs.

There is an opportunity for the Park to form a partnership with the Flint Hills Discovery Center in order to provide workshops to the community. These workshops could





DEMONSTRATION GARDENS



provide education on using native plants or harvesting stormwater for reuse. The park could host an event during the prescribed maintenance burns to teach people more about the native prairie ecosystem.

By providing the Demonstration Gardens as an amenity within Fairmont Park, a variety of environmental, social, and economic benefits are provided. The Gardens expose park users to native ecosystems which can provide a sense

of connection to the local environment while expanding awareness of ecological processes (Cranz and Boland 2004, 114). The Gardens can also help to users become more aware of their local food systems from an environmental perspective while also providing social benefits such as educational opportunities, knowledge of food security and healthy eating, or the importance of local access to healthy foods (Design Trust for Public Space 2012). These ideas support the shift toward 21st century parks, which focus on



figure 04.04 / Demonstration Gardens
(by Author)

providing productive, rather than resource consumptive,
spaces which are able to engage a variety of different users.





FARMER'S MARKET



The Farmer's Market will provide the Manhattan community with a permanent, yet flexible space for local farmers to sell their produce. Currently, the local farmer's market is held in a parking lot in Manhattan's historic downtown. By providing a designated marketplace within Fairmont Park, it could attract more farmers or vendors as well as expose more people to the importance of buying local produce. With the addition of the pedestrian bridge, downtown remains within a walkable distance of the new Farmer's Market.

Additionally, the Farmer's Market can provide a positive economic and environmental impact by "educat[ing] and empower[ing] individuals to be part of a food system that is socially equitable, ecologically sustainable and economically viable" (Evergreen 2013). Additional economic benefits include local economic stimulation, job growth and readiness, and food affordability (Design Trust for Public Space 2012).



figure 04.05 / Farmer's Market and Synthetic Flexible Use Field (by Author)



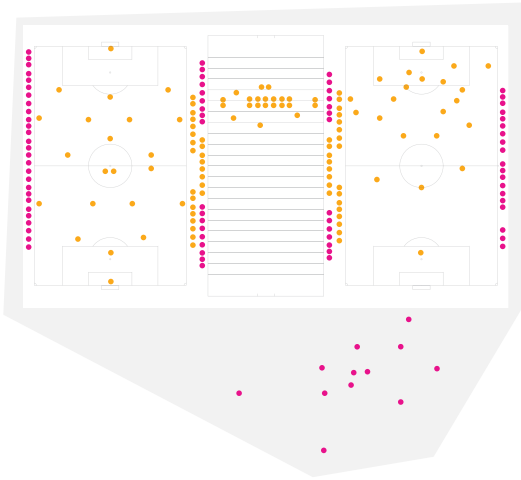
MULTI-FUNCTIONALITY

When not being used as a farmer's market or sports field, the open plaza space and synthetic flexible field can be used for a variety of recreational and cultural activities. The plaza space can accommodate not only a farmer's market or art fair, but a concert or movie screening as well. And when these events are not taking place, this space can become an extended play surface for four square or kickball, skateboarding, roller bladeing, writing with chalk, or any other activity. The synthetic flexible use field can accommodate a combination of two soccer fields and one football field, three football fields, or two football fields and a soccer field at any given time. Each field is appropriately marked and the space can easily transition between the different uses. When soccer and football games are not scheduled, the space can be used for open recreation. Movable benches, repurposed from the existing bleachers on site, will be available for teams and spectators to utilize during sporting events.

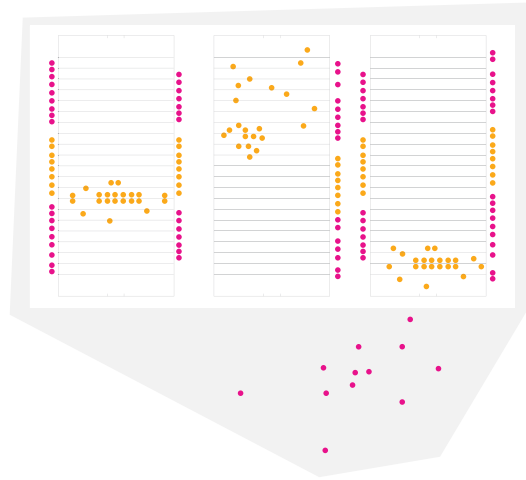
This idea of providing multi-functional spaces which accommodate a multitude of actives and appeal to different age groups and types of people reinforces shifting 21st century park ideals (Kent and Madden 2003, 72).

figure 04.06 / Multi-functional Use
(by Author)

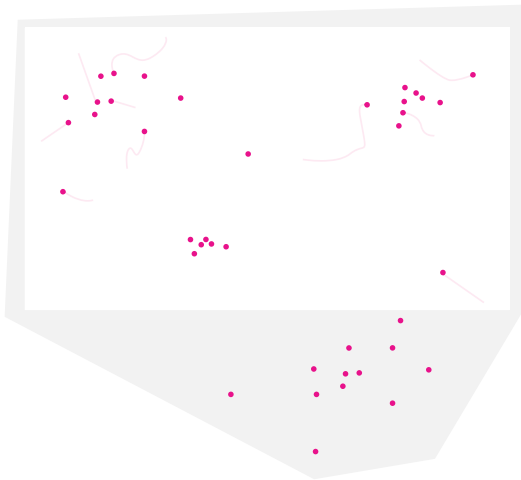
SOCCER AND FOOTBALL FIELDS



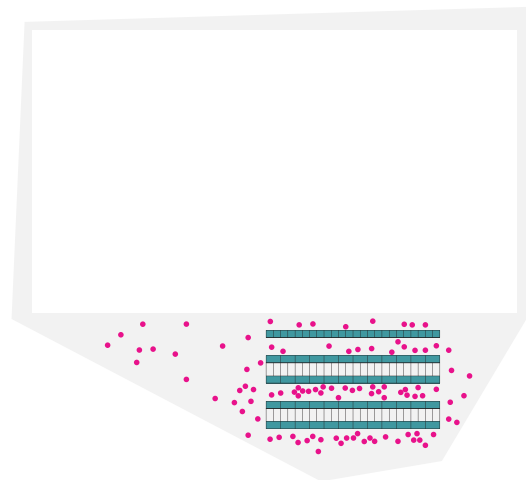
FOOTBALL FIELDS



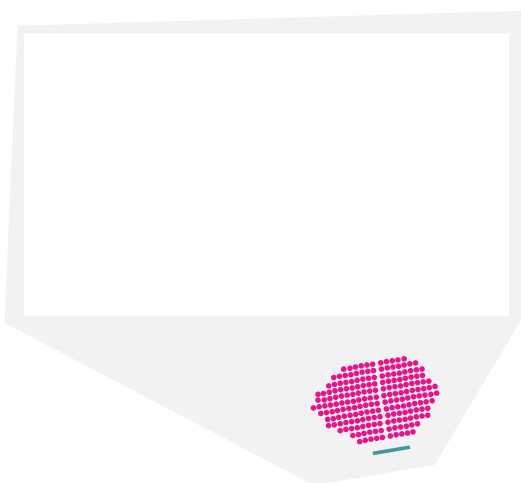
OPEN RECREATION



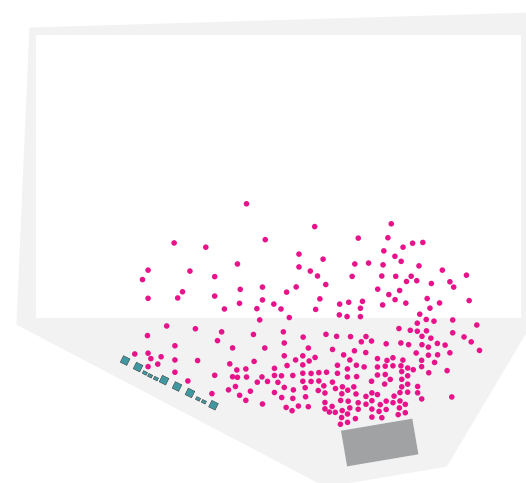
FARMERS MARKET / ART FAIR



MOVIE SCREENING



CONCERT VENUE





RECYCLING AND COMPOSTING CENTER



Manhattan's recycling and waste facilities currently exist only as utilities. The Fairmont Park Recycling and Composting Center provides a more accessible and educational setting for Manhattan residents to learn about reuse, recycling, and composting. Vehicular access is provided so residents can drop off recyclables and food scraps into their respective bins.

Food scraps from the Demonstration Gardens as well as those dropped off by residents will be combined with vegetative trimmings generated through park maintenance to be composted on site. Through this composting facility, a variety of environmental benefits can be achieved. Methane emissions that would be occurring in a landfill are eliminated as food decomposes aerobically (Bloom 2010, 19). Once the composting process is complete, food waste and other organic materials will have been transformed into

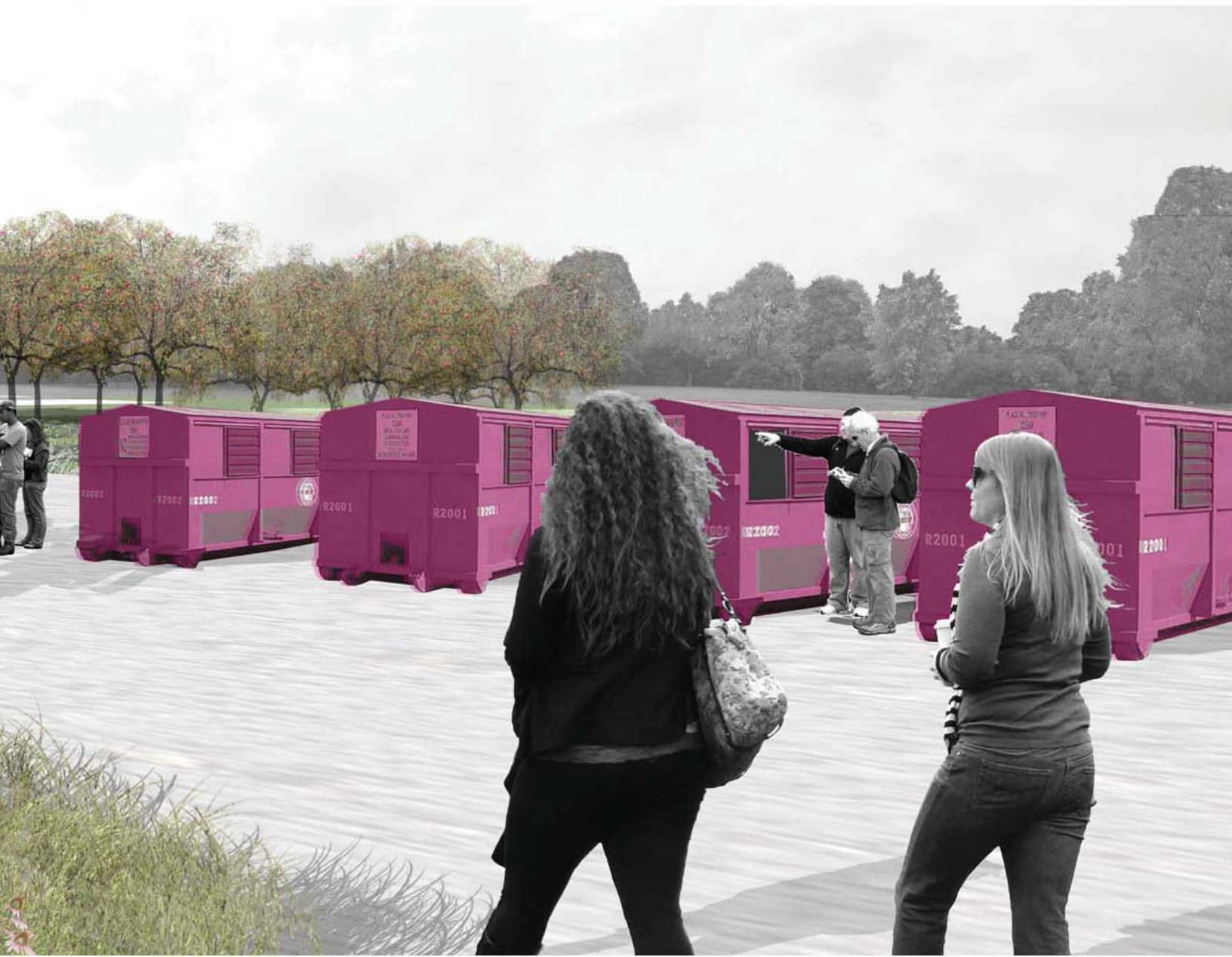


figure 04.07 / Recycling and Composting Center
(by Author)

“a useful soil amendment that re-circulates nutrients into the growing of new foods,” (Bloom 2010, 18) creating a closed-loop system. The finished compost can provide nutrients for food production within Fairmont Park or can be sold within the community in order to generate revenue, providing economic value. Additionally, there are opportunities for social benefits. This amenity can help to educate the community on the environmental impact of their current waste operations and encourage more sustainable practices.

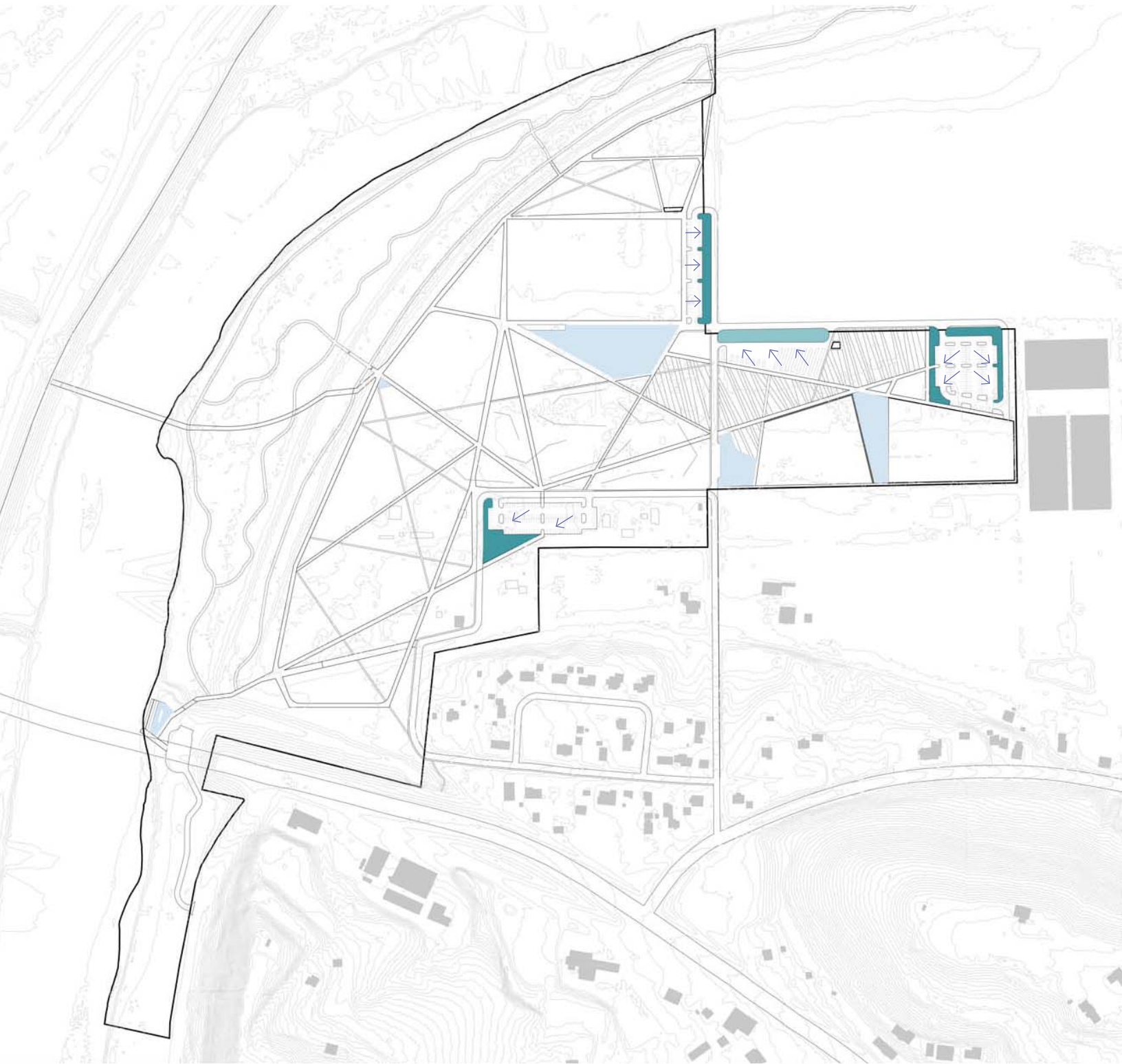


STORMWATER MANAGEMENT



Bioswales are proposed to capture and filter stormwater runoff from parking lots, preventing contaminated runoff from flowing through storm sewers directly to streams or rivers. A constructed treatment wetland captures and treats contaminated runoff from the Recycling and Composting Center using a subsurface and vegetative treatment process. The resulting recycled water from each of these systems will become available for reuse in restrooms on site for toilet flushing. Reusing water captured and filtered on site provides environmental and economic benefits by diminishing the amount of potable water required as achieving potable water quality requires an expensive, resource intensive treatment process. Permeable paving will be used in plaza spaces to allow infiltration of stormwater.

These stormwater management systems as well as rain barrels and rain gardens also provide social benefits to the park through educational opportunities (Echols and Pennypacker 2008).



legend

- bioswale
- constructed wetland
- permeable paving
- runoff direction

figure 04.08 / Stormwater Management
(by Author)



ENERGY DEMONSTRATIONS



By harvesting energy through wind and solar systems within Fairmont Park, not only are educational benefits provided to the community, but the harvested energy can power the indoor soccer building and lighting throughout the park. Excess energy can then be sold to the City of Manhattan as a source of additional revenue. Additionally, these sustainable energy technologies cut down on emissions that would be generated by traditional coal, oil, or natural gas power plants.

By demonstrating these energy technologies, it can show residents how they can use these technologies in their own homes. It also shows communities in the region how these technologies work. There are additional opportunities to tie into research on alternative energy sources occurring at Kansas State University.



figure 04.09 / Solar Energy Demonstration
Along Multi-use Path
(by Author)





COMMUNITY CONNECTIONS



The Pedestrian Bridge will serve as an access point between Fairmont Park and Linear Trail, a multi-use path over nine miles in length which connects to the greater Manhattan community. This amenity makes Fairmont Park more accessible for pedestrians and bikers in the area. The bridge will also create a stronger connection between Fairmont Park and Manhattan's downtown. There are additional possibilities to extend the ATA bus route to the park to further increase site accessibility.

Accessibility is an important aspect of creating a 21st century park. The park must be easy to get to and connected with the surrounding community (Kent and Madden 2003, 72). The addition of the Pedestrian Bridge can integrate Fairmont Park more closely with the rest of the Manhattan community, serving as a valuable social benefit.

By encouraging more sustainable community connections such as the Pedestrian Bridge or bus route through the redesign of



figure 04.10 / Pedestrian Bridge Looking Toward Fairmont Park
(by Author)

Fairmont Park, environmental benefits such as a reduction in emissions generated from vehicular use are provided.

In order to provide a gateway and sense of arrival as people enter Fairmont Park, signage will be added at five different park entrances. It can also help to make people passing by on K-177 more aware of the park and attract visitors to the site.





PLAYGROUND



The Fairmont Park Playground is designed to provide children with a more natural play space, an amenity not currently available in the Manhattan community. This will allow children the opportunity for more creative and imaginative play. Typical, prefabricated play structures sourced from catalogs are replaced with play components constructed from reused and recycled materials. The Playground offers children a space for physical activity as well opportunities to develop “muscle strength and

coordination, language, cognitive thinking, and reasoning abilities” (Sherer 2006, 21).

The Playground incorporates a number of opportunities for children of all ages to enjoy. The wooden play structure allows children to climb, balance, and swing from the crisscrossing round wooden beams. Swings will also be incorporated into this structure. Locally sourced wood or trees cleared from the ecological corridor on site can



figure 04.11 / Playground
(by Author)

become the wooded pieces of this play structure. Reused concrete culverts become tunnels for children to play in or climb on and a series of turfgrass mounds provide lookout or hiding spots. From the top of one of the mounds, children can slide down to a sandy landing where they can then dig, burry, uncover, and sift. Tree stumps made from trees harvested on site and concrete curbs reused from the existing parking lots become balancing beams or elements to hop between.





REPURPOSED CLIMBING WALL



By transforming the existing concrete structure, which once supported a bridge spanning the Kansas River, into a climbing wall, additional recreational benefits are added to the site without destroying its cultural and artistic presence within the community. The addition of this amenity provides a use to an already existing icon while helping to attract more people to the southern portion of Fairmont Park which offers access to the Kansas River and views to Manhattan Hill.



figure 04.12 / Climbing Wall
(by Author)





OPEN MEADOW



This flexible use space offers an open turfgrass lawn with pockets of shade provided by existing mature trees. The flexibility of the space accommodates a variety of uses and users which has become an important aspect in 21st century parks (Thompson 2002, 59).

Here, people can come to fly kites on a windy day, families can bring a picnic on a Saturday afternoon, children can run around and play, and friends can relax in the shade or sunbathe.

This area is planted with buffalo grass, which reduces the need for irrigation and mowing, but provides a good surface for any number of activities to occur here.



figure 04.13 / Flexible Use Open Space
(by Author)



DISC GOLF COURSE



The Disc Golf Course is an existing, well used amenity within Fairmont Park. Individual players as well as the Kansas State University Disc Gold Club use the course regularly. The course will remain nine-holes, but will be reconfigured to offer new, more challenging holes. The course winds through existing, mature trees which provide shade and add course difficulty. Hole lengths range from 200 to 350 feet throughout the course. Reused crushed asphalt will be used for the tees.



DOG PARKS



There are currently two dog parks in Fairmont Park as it exists today, one for large dogs over 14 pounds and one for small dogs less than 14 pounds. As revealed through physical trace observations, both areas are well used by the community residents and their pets. The large dog park will remain as it exists today while the small dog park will be relocated and expanded. These areas are fenced so that the dogs can run off leash. An agility course, dog accessible drinking fountains, and waste receptacles are also existing amenities available for use. Seating will be added for dog owners to relax as their pets play.



BOAT LAUNCH AND RIVERFRONT



The existing boat ramp remains to provide access to the Kansas River for canoes, kayaks, or other boats. Seating constructed from reused concrete curbs is added along a portion of the river to create an occupiable edge for people to gather.



INDOOR SOCCER COMPLEX



The indoor soccer building will provide the community with a synthetic soccer field available for year-round use. Here soccer leagues can be formed to generate revenue for the park. The building will also provide a concession stand or restaurant with an adjacent outdoor dining area. Fresh food harvested from the demonstration and community gardens can be used to compose the dishes on its menu. There are also opportunities to rent out the building for parties or events in order to generate additional revenue.



FLEXIBLE USE FIELDS



These two open spaces can be utilized for both organized and open recreation. The larger synthetic flexible use field can accommodate a combination of two soccer fields and one football field, three football fields, or two football fields and a soccer field at any given time. The turgrass field is smaller, accommodating one soccer field.



HIKING TRAILS



The existing hiking trails remain in the redesign of Fairmont Park. However, an additional trail is added which winds through the center of the ecological corridor, providing additional opportunities for physical activity. An ADA accessible path is also added to provide access to the new pedestrian bridge. The trail along the levee is also made ADA accessible.



BIKE RENTAL



A bike rental station is provided near the new Linear Trail access point. Here residents can come to rent bikes for the day or just for a few hours so they can go explore Linear Trail or ride around Fairmont Park. This would bring a new amenity to the community while also helping to generate revenue for the park.

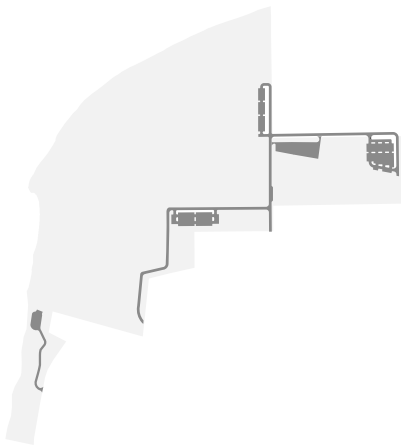
EXERCISE LOOP



A continuous multi-use path is provided for walkers, runners, joggers, bikers, and skaters as a means of physical activity. Parents can exercise, making their way around the loop while keeping an eye on their children at the playground.



PROPOSED 21ST CENTURY PARK DESIGN



7%

VEHICULAR
ACCESS

7.7 acres



383

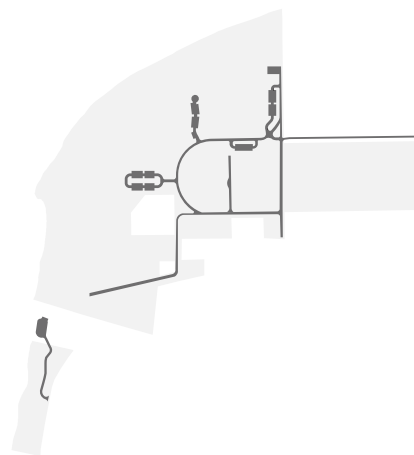
PARKING
SPACES



5.2 miles

PEDESTRIAN
CIRCULATION

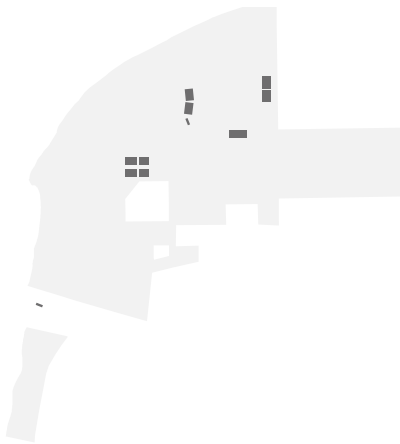
EXISTING CONDITIONS



6%

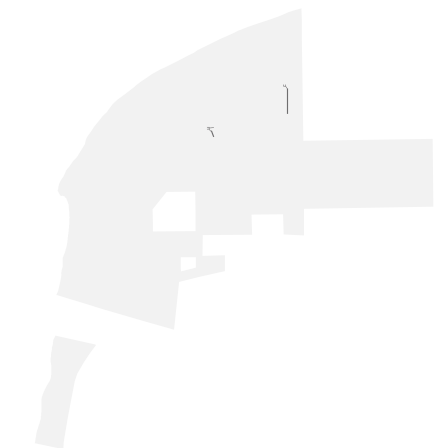
VEHICULAR
ACCESS

6.4 acres



187

PARKING
SPACES



0.09 miles

PEDESTRIAN
CIRCULATION

figure 04.14 / Quantifying Existing and Proposed Conditions
(by Author)

EXISTING AND PROPOSED PARK CONDITIONS QUANTIFIED

The redesign of Fairmont Park provides increased vehicular access and parking while pushing it to the parks edges provides greater continuity between park spaces. Pedestrian circulation is significantly increased, making the park more accessible for all users. The amount of hiking trails are also increased and connected to city trails. Opportunities for flexible open space, education, and stormwater management are also increased.



2.7 miles

TRAILS

connected to
9 miles of
city trails



1.8 miles

TRAILS

PROPOSED 21ST CENTURY PARK DESIGN



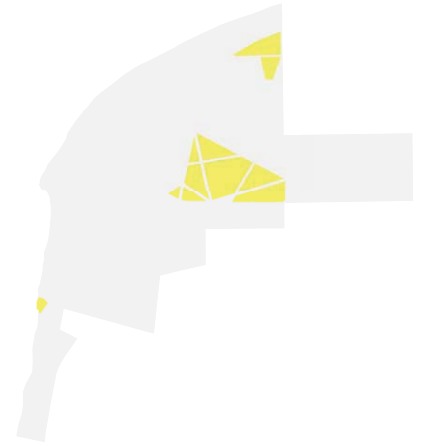
44%

TREE COVER
48.2 acres



27%

FLEXIBLE OPEN SPACE
27 acres



10%

RECREATION
16.4 acres

EXISTING CONDITIONS



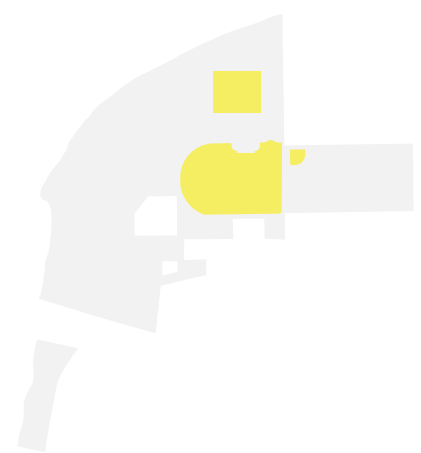
55%

TREE COVER
60 acres



24%

FLEXIBLE OPEN SPACE
27 acres



15%

RECREATION
16.4 acres

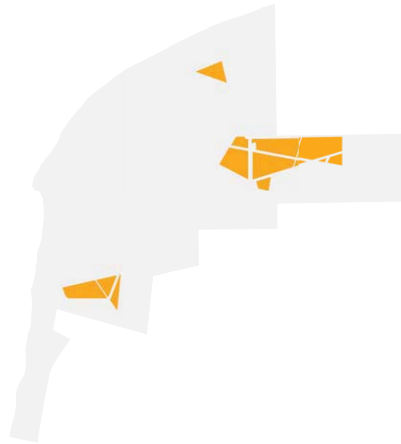
figure 04.15 / Quantifying Existing and Proposed Conditions
(by Author)



2%

STORMWATER
MANAGEMENT

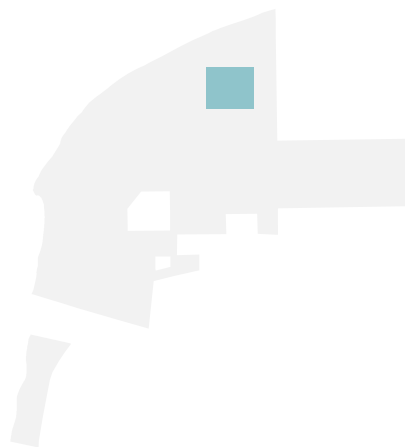
1.8 acres



10%

EDUCATION

11 acres



4%

IRRIGATED

4 acres



0%

EDUCATION

0 acres



figure 04.16 / Fairmont Park
(by Author)



04.01

P H A S I N G A N D
M A I N T E N A N C E

The phasing and maintenance plans guide the development and management of Fairmont Park to ensure its sustainability in the long term.

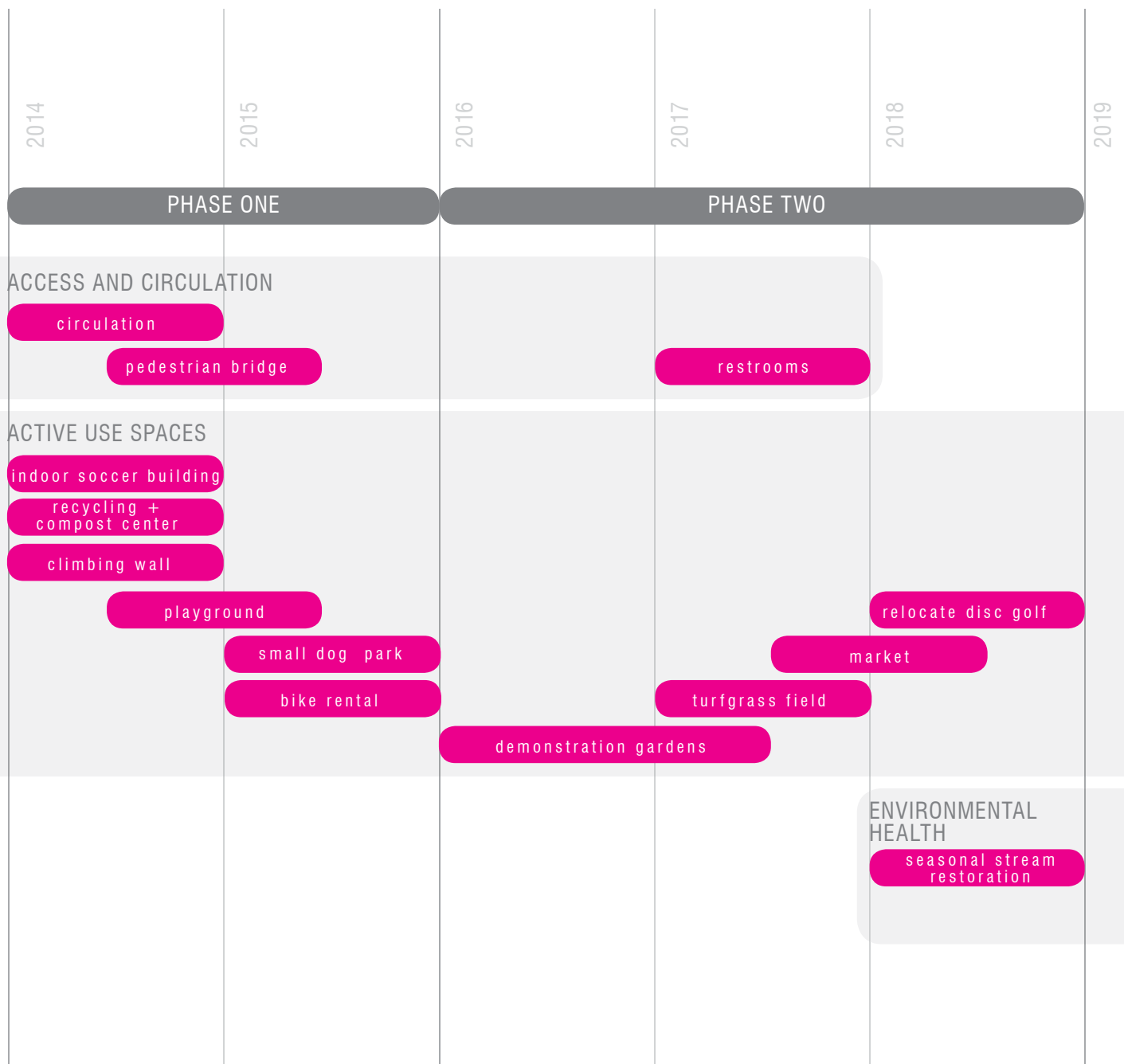
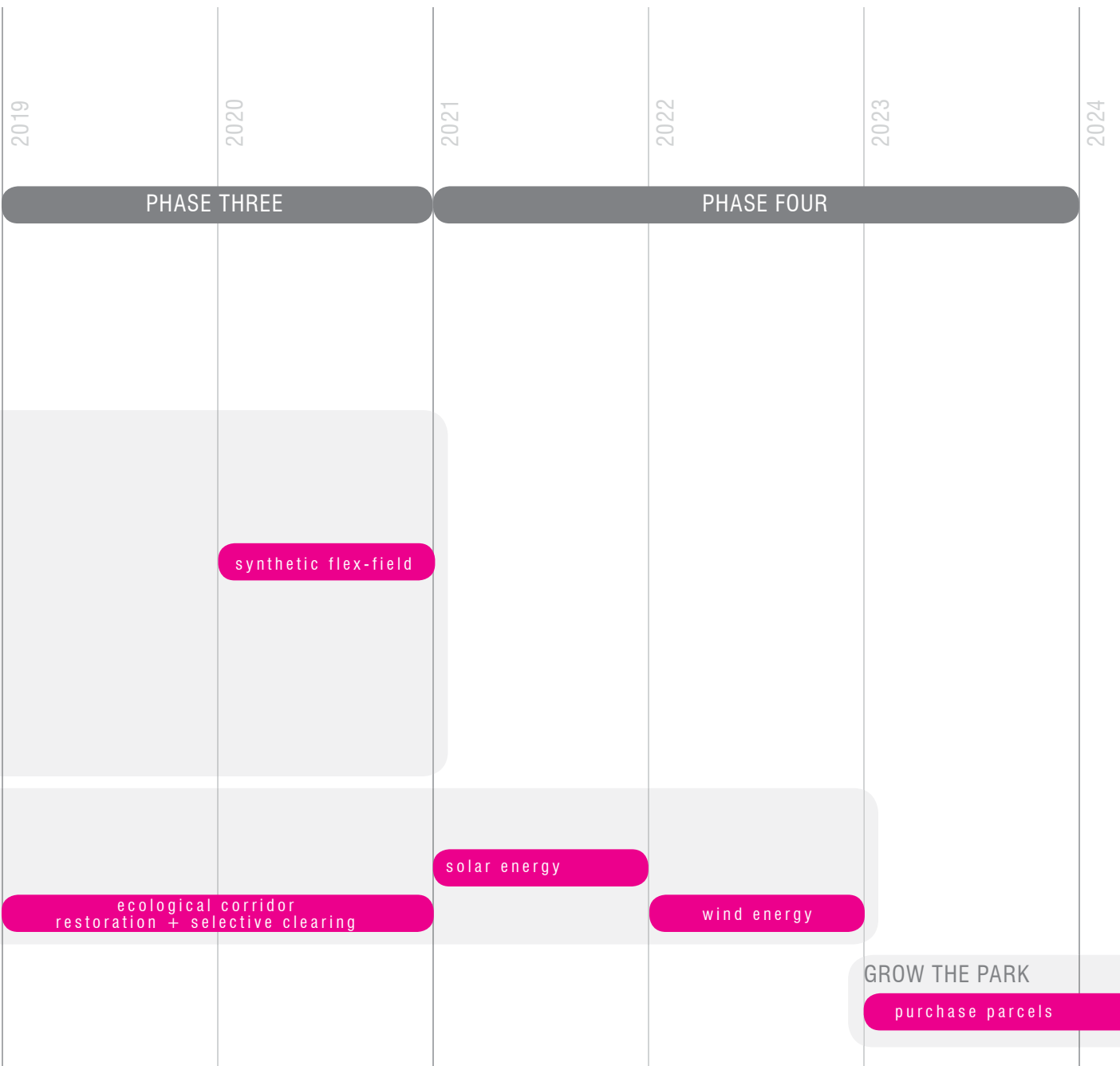


figure 04.17 / Fairmont Park Phasing Strategy (by Author)

PHASING

The Fairmont Park redesign will be established through four phases over ten years (Figure 04.17). Through these phases, access and circulation, active use spaces, environmental health, and growing the park are main strategies.



PHASE ONE

The first phase, expected to last two years, focuses on increasing park accessibility and awareness. This is achieved by first removing the existing roadway and parking configuration which currently segments the park's open space and replacing it with vehicular access and parking which is pushed to the edges, creating a cohesive park space with increased safety. Gravel from the existing vehicular circulation will be reused in the construction of the new roadways while the concrete curbs will be cut or crushed and utilized for pedestrian paths.

Pedestrian accessibility to the surrounding context and community is addressed through the addition of a pedestrian bridge which spans the Kansas River to connect the park with Linear Trail. Access to this highly used, nine-mile pedestrian and bicycling network will attract many multigenerational users to Fairmont Park.

In this first phase, it is also important to increase the active use spaces within the park. By adding high-use amenities such as the indoor soccer complex, recycling and composting center, rock climbing wall, and playground, more users will be brought to the park, increasing its awareness and generating support for future park development phases. With the addition of these different amenities, the existing dog park, football fields, hiking trails, and disc golf course remain usable during this first phase.

PHASE TWO

Expected to last three years, the second phase focuses on advancing active use spaces and environmental health within Fairmont Park. Restrooms will be added to accommodate the increased number of users. Educational opportunities will be achieved through the implementation of the demonstration gardens. Food harvested from the gardens can then be sold at the newly constructed market space, which also accommodates additional uses such as concerts or movie screenings. A flexible use turfgrass field, which supports a full size soccer fields, will be added for additional recreation space. The disc golf course will also be reconfigured during this phase.

Environmental health restoration on site begins in this phase with the restoration of the existing seasonal stream which currently exists as a regularly mown channel vegetated with turfgrass. By revegetating the stream with native plants, possibilities for erosion decrease while opportunities for wildlife habitat increase. Additionally, the existing football fields and hiking trails remain usable throughout this phase.

PHASE THREE

Phase three, expected to last two years, first advances Fairmont Park's environmental health through the restoration of the existing ecological corridor which fronts the Kansas River. The corridor will be restored through a number of different strategies focusing on increasing vegetative health, providing habitat for wildlife, and ensuring health of the system over time.

There are a number of invasive species currently located within the corridor, including Eastern Red Cedar and a Bamboo species. Invasive species, such as these, often grow rapidly, respond quickly to opportunity and disturbance, and spread easily. These characteristics create competition with native species, often outcompeting by inhibiting light penetration and reducing available nutrients, water, or other resources (Calkins 2012, 219). The invasive species on site should be cut and removed from the area, then mulched and composted to kill any invasive seeds present (Calkins 2012, 223). After removal, the area should be monitored to ensure the species do not reestablish themselves. Additionally, in areas of dense vegetation, plants should be selectively cleared and composted to ease competition among plants, improving overall health. The flexible use synthetic field, which can accommodate two soccer fields and a football field or three football fields, will replace the existing turfgrass football fields.

PHASE FOUR

Expected to last three years, the fourth and final phase begins with the addition of solar and wind energy demonstrations, providing both educational and economic value. In this final phase, the park has established itself and can look at expansion. Several parcels, which are currently occupied by low density single family homes, can be purchased to provide more open space or additional amenities to Fairmont Park.

MAINTENANCE AND MANAGEMENT

In order to create a truly sustainable park, the Fairmont Park redesign must employ an adaptive management strategy. This process “involves closely monitoring the site and adapting maintenance activities over time to provide the most effective stewardship for the site” (Calkins 2012, 479) and ensure that systems and amenities are performing as they were originally intended (Calkins 2012, 519).

Performance of the systems and amenities will be routinely monitored and recorded by the parks maintenance crew in order to study their previous and current effectiveness and ensure the site’s long-term desired outcomes. In order to adapt to changing site conditions and unforeseen circumstances, maintenance practices “should be revisited on a yearly basis to consider if the site performance is maintaining or improving over time with respect to the sustainability goals initially established for the site” (Calkins 2012, 520). And as the body of knowledge pertaining to site maintenance in landscape architecture continues to grow and evolve, Fairmont Park’s maintenance practices should be adapted to reflect those new findings. Through this adaptive management approach, the success of Fairmont Park as a sustainable site providing environmental, social, and economic benefits to the Manhattan community is ensured in the long term.

LANDSCAPE TRIMMINGS

Two types of organic waste will be produced on site: 1) landscape-based waste such as leaves, branches, twigs, and grass clippings, and 2) food scraps from the demonstration gardens. These components represent 38 percent of the waste stream within Riley County with only five percent being diverted from landfills to an isolated composting site. By managing the organic waste generated

in the operations and maintenance of Fairmont Park on site, it will keep material out of the landfill and reduce the greenhouse gas emissions generated by transporting the material and decomposition within the landfill (Calkins 2012, 488). Additionally, by showing sustainable management of organic waste materials, additional education value can be provided to the community.

The landscape trimmings generated in maintaining the bioswales, constructed treatment wetland, rain gardens, demonstration gardens, and ecological corridor will be composted at the Recycling and Composting Center on site. Vegetative clippings and mulched, chipped, or shredded woody trimmings will be compiled into rows about ten feet wide. These rows need to be monitored to ensure the pile has enough moisture and that the mix between fresh green materials and dried, carbon-heavy brown materials is maintained in order to keep the ideal carbon to nitrogen ratio. This will help the materials decompose at the appropriate rate and neutralize odors. Additionally, it is important to turn the pile occasionally using the tractor stored on site. Once the materials have gone through the appropriate cycles, the result is nourishing soil with high organic matter which can help to improve “soil health in several ways – it can reduce compaction and erosion, increase the nutrient content of the soil, improve water retention, and reduce the need for additional supplements such as fertilizers or pesticides” (Calkins 2012, 491). This resource can then be reused on site instead of importing material as needed.

Additionally, woody material can be chipped and used as mulch to prevent weeds and protect soil moisture (Calkins 2012, 493) or landscape trimmings can be left in place to

return nutrients directly to the soil through decomposition (Calkins 2012, 488).

If the amount of compost generated on site does not meet the park's needs, only organic fertilizers should be used as synthetic fertilizers are manufactured using harmful chemicals which can contribute to contaminated runoff and greenhouse gas emissions (Calkins 2012, 493). Even organic fertilizer should be applied only in specific areas as needed and in minimal quantities (Calkins 2012, 493).

NATIVE GRASSES

Instead of traditional mowing, yearly prescribed burns will be used to maintain areas of native grasses. Prescribed burns are commonly used to manage the local prairie ecosystems in the surrounding Flint Hill region. Burning helps "recycle biomass, promote nutrient cycling, and maintain robust and self-sustaining landscapes" (Calkins 2012, 504). Maintenance crews will need to be trained in controlled landscape burning to develop fire management zones, fire breaks, and mow or wet lines to protect structures and trees.

The grasses in the solar energy demonstration area will be mown instead of burned to ensure the solar panels are not damaged. Mowing should occur bi-yearly at an appropriate height that still encourages plant growth.

STORMWATER COMPONENTS

Bioswales, constructed treatment wetlands, and rain gardens on site will require typical vegetation maintenance, monthly monitoring and repair to ensure performance, as well as ongoing long-term maintenance strategies.

After vegetation is fully established, typical landscape maintenance practices – weeding, pruning, and mulching – will be utilized to ensure plant health (Calkins 2012, 507). Additionally, monthly inspections of the stormwater components will be performed. These inspections should be scheduled a few days after a storm event to monitor and evaluate the system for signs of unexpected standing water. The inspections "can identify issues that may be affecting the performance of the bioretention feature, such as eroded areas, litter, debris, cracks, or clogs at the inflow point, or clogging in the outflow device" (Calkins 2012, 508).

Long term maintenance will become an important component to ensure proper performance of Fairmont Park's stormwater features. One to two times per year, new mulch should be added, dead vegetation should be removed and replaced, and soil tests should be conducted. Deficiencies revealed by soil tests should be addressed by customizing and adjusting maintenance practices over time to ensure plant and human health (Calkins 2012, 509). Once every two or three years, the entire mulch layer should be removed and replaced with fresh mulch. Any snow removed near the stormwater management features should not be stored within the feature so soils and plant material are not compacted and damaged (Calkins 2012, 509). Results of the monthly inspections should be recorded in a maintenance log to maintain an appropriate schedule and ensure performance in the long term (Calkins 2012, 509).

04.02

P E R F O R M A N C E

B E N E F I T S

To determine the overall value generated by the redesigned Fairmont Park, the performance for each amenity was analyzed for its potential environmental, social, and economic benefits.

PERFORMANCE BENEFITS

The layering of restored and constructed ecologies, passive and active recreational amenities, and sustainability demonstration facilities within Fairmont Park works to improve the park's overall environmental, social, and economic performance benefits.

Although the majority of the amenities provided in the redesign of Fairmont Park remain social, many provide higher productive value than traditional recreational amenities and are not as resource intensive. Some of these new social amenities within Fairmont Park yield beneficial outputs such as green energy, non-potable water for re-use, organic compost, and locally produced food. The park's social agenda has also expanded to focus not only on recreational opportunities, but education and physical activity as well.

Environmental value is increased through the restoration of the ecological corridor and seasonal stream, providing native vegetation ideal for local wildlife habitat. Additionally, many of the added amenities provide environmental

benefits. Harvesting energy through wind and solar systems cuts down on emissions generated in traditional coal, oil, or natural gas power plants. Bioswales and constructed treatment wetlands filter stormwater naturally using vegetation as opposed to conventional, energy intensive, centralized wastewater treatment plants or untreated runoff which transmits toxins to local rivers and streams, degrading their ecological health. By composting organic material generated in the maintenance of the park as well as food waste generated by the community, methane emissions that would be occurring in a landfill are eliminated as food decomposes aerobically (Bloom 2010, 19). Once the composting process is complete, the organic matter has been transformed into "a useful soil amendment that re-circulates nutrients into the growing of new foods," (Bloom 2010, 18) creating a closed-loop system.

The indoor soccer complex, demonstration gardens, market, bioswales and constructed treatment wetlands, energy demonstrations, and bike rental provide savings or a source of revenue for Fairmont Park, adding economic value.

SUMMARY OF BENEFITS




	Farmer's Market		
	Demonstration Gardens		Recycling and Composting
 ENVIRONMENTAL			
Stewardship	■		■
Conservation			■
Stormwater Management	■		
Soil Improvement	■		■
Biodiversity + Habitat Improvement	■		
Awareness of Food Systems	■	■	■
 SOCIAL			
Youth Development + Education	■		■
Physical Activity	■		
Food Security	■		
Food-Health Literacy	■	■	
Access to Healthy Food	■	■	
Healthy Eating	■	■	
Empowerment + Mobilization	■	■	■
Community Connections			
 ECONOMIC			
Local Economic Stimulation		■	
Job Growth		■	
Job Readiness		■	
Food Affordability	■	■	

table 04.02 / Fairmont Park Metrics Benefits
(adapted from Design Trust for Public Space by Author)

Stormwater Management

Community Connections

Recreation*

Volunteer Programs

Energy Demonstrations

Playground

Indoor Soccer

School Programs/Trips



*includes: repurposed climbing wall, open meadow, disc golf course, dog parks, boat launch and riverfront, flexible use fields, hiking trails, bike rental, and exercise loop.



R E F L E C T

Conclusions, limitations, and future research opportunities are explored through a reflection of the work presented in *Productive Ground*.

SUMMARY AND CONCLUSIONS

Productive Ground utilizes a variety of sustainable strategies to ensure long term viability for Fairmont Park as a multifunctional, multi-beneficial, and multigenerational amenity in the Manhattan community.

To guide the implementation of Manhattan's first sustainable 21st century park, the ten year phasing strategy focuses on increasing access and circulation as well as active use spaces in the short term, to ensure safety and usability, but also generate greater interest in the park and attract more users in the long term. As park development continues, additional active use spaces are implemented which increases the social and economic benefits on site, as well as educational opportunities, while other strategies are employed to improve environmental health. In the long term, after overall sustainability is achieved, the phasing strategy focuses on growing the park by purchasing additional parcels located adjacent to the existing park.

Additionally, an adaptive management plan guides the operations and maintenance of the park, detailing sustainable strategies which are less resource intensive than typical maintenance practices and ensure the health of systems in the long term. However, the current knowledge

of the parks maintenance crew will need to be expanded in order to successfully perform these new practices.

Overall, this 21st century design strategy works to layer restored and constructed ecologies, passive and active recreational amenities, and sustainability demonstration facilities, in order to improve Fairmont Park's overall environmental, social, and economic benefits. Through *Productive Ground*, I hope to illustrate to the Riley County and Manhattan Parks Departments sustainable and productive 21st century park strategies that can be employed in maintaining, updating, and expanding their municipal parks and open space system to become more sustainable and productive.

LIMITATIONS

One of the most significant limitations of this study was the constraint of time. If this project were to continue, I would develop a detailed planting and materials palette, focusing on native plantings as well as reused and recycled materials. Additionally, I would like to place a greater emphasis on restoring and designing areas of the park with consideration for wildlife and ecology. Performance metrics would also be another focus. Measuring Fairmont Park's

ability to sequester carbon; infiltrate, cleanse, and capture water for reuse; or harvest solar and wind energy would prove useful in illustrating the productive benefits in more definitive terms.

Another limitation of this project was the absence of community outreach and participation. It would have been useful to engage residents within the community as well as work more closely with the Manhattan and Riley County Parks Department.

FUTURE RESEARCH OPPORTUNITIES

There are many opportunities for further research as 21st century parks and performance metrics continue to evolve and respond to the needs of our society. One topic of particular interest would be identifying and quantifying the performance benefits provided by different park amenities through time. As the evaluation of landscape performance is an emerging topic of concern in landscape architecture, appropriate methodology is still being developed and tested. The Sustainable Sites Initiative, Landscape Architecture Foundation, and Design Trust for Public Spaces have acknowledged the importance of evaluating performance

and have begun to develop preliminary methods for quantifying these benefits. As these methods are refined, it would be interesting to compare and test each of them to see which is most effective.

As the methods exist today, the indicator guide – developed by Design Trust for Public Space – may prove most useful in guiding the measurement of performance benefits within Fairmont Park. The guide looks to signs of progress and change to measure the environmental, social, and economic benefits provided by different amenities. The guide suggests documenting indicators such as pounds of food produced in the gardens, revenue generated from food sales at the farmers market, pounds of food waste or compost produced, value of food produced, or number of students visiting the site, in order to measure the overall impact of the amenities through time (Design Trust for Public Space 2013).



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A P P E N D I X A

P E R F O R M A N C E E V A L U A T I O N S

1 9 9 8

M A S T E R P L A N

FAIRMONT PARK – 1998 MASTER PLAN

1. SITE SELECTION \\ 21 possible points

Select locations to preserve existing resources and repair damaged systems

- MET **Prerequisite 1.1**
Limit development of soils designated as prime farmland, unique farmland, and farmland of statewide importance
Riley County has not designated the park as suitable farmland.
- MET **Prerequisite 1.2**
Protect floodplain functions
The park is located almost entirely in the 100 year floodplain; however there are not obstructive barriers to river and flood functions.
- N/A **Prerequisite 1.3**
Preserve wetlands
There are no wetlands on site.
- MET **Prerequisite 1.4**
Preserve threatened or endangered species and their habitats
The site provides large areas of habitat for many plant and animal species.
- 05 **Credit 1.5**
Select brownfields or greyfields for redevelopment (5–10 points)
5 points for greyfield redevelopment; the site formerly contained single family residences.
- 00 **Credit 1.6**
Select sites within existing communities (6 points)
Most services are located just outside the 0.75 mi walking radius.
- 00 **Credit 1.7**
Select sites that encourage non-motorized transportation and use of public transit (5 points)
The park does provide a connection to the Linear Trail (a bicycle network of at least 5 continuous miles) however, it does not provide bicycle racks for 5 percent or more of total site users.
- 05 PTS

2. PRE-DESIGN ASSESSMENT AND PLANNING \\ 4 possible points

Plan for sustainability from the onset of the project

- N/A **Prerequisite 2.1**
Conduct a pre-design site assessment and explore opportunities for site sustainability 33
- NO **Prerequisite 2.2**
Use an integrated site development process 44
- 00 **Credit 2.3**

Engage users and other stakeholders in site design (4 points) 46
Users and stakeholders must have been involved in all phases of site design.

00 PTS

3. SITE DESIGN—WATER \ 44 possible points

Protect and restore processes and systems associated with a site's hydrology

- NO? **Prerequisite 3.1**
Reduce potable water use for landscape irrigation by 50 percent from established baseline
- 00 **Credit 3.2**
Reduce potable water use for landscape irrigation by 75 percent or more from established baseline (2–5 points)
- 08 **Credit 3.3**
Protect and restore riparian, wetland, and shoreline buffers (3–8 points)
The initial and final average buffer width of the Kansas River went up to about 600 feet (> 300 feet) for a credit of 8 points.
- 05 **Credit 3.4**
Rehabilitate lost streams, wetlands, and shorelines (2–5 points)
The master plan indicates a re-alignment drainage channel or restoration of the streamway at the south of the site with native rocks and vegetation.
- 00 **Credit 3.5**
Manage stormwater on site (5–10 points)
Water storage capacity is not addressed.
- 00 **Credit 3.6**
Protect and enhance on-site water resources and receiving water quality (3–9 points)
Stormwater treatment is not addressed.
- 00 **Credit 3.7**
Design rainwater/stormwater features to provide a landscape amenity (1–3 points)
Stormwater features are not specified.
- N/A **Credit 3.8**
Maintain water features to conserve water and other resources (1–4 points)
There are no water features on site.

13 PTS

4. SITE DESIGN—SOIL AND VEGETATION \ 51 possible points

Protect and restore processes and systems associated with a site's soil and vegetation

- NO **Prerequisite 4.1**

Control and manage known invasive plants found on site
The plan only specifies conservation of plants in the forested area on the west side of the site.

- MET **Prerequisite 4.2**
Use appropriate, non-invasive plants
Native grasses are specified.
- NO **Prerequisite 4.3**
Create a soil management plan
A soil management plan is not included.
- 06 **Credit 4.4**
Minimize soil disturbance in design and construction (6 points)
Soil health has not been compromised in the master plan.
- 05 **Credit 4.5**
Preserve all vegetation designated as special status (5 points)
The riparian zone on the west of the site has been designated as a conservation area in the master plan.
- N/A **Credit 4.6**
Preserve or restore appropriate plant biomass on site (3–8 points)
Requirement compares existing conditions to proposed conditions.
- 04 **Credit 4.7**
Use native plants (1–4 points)
All new plant material is specified as native.
- 06 **Credit 4.8**
Preserve plant communities native to the ecoregion (2–6 points)
The riparian zone on the west of the site has been designated as a conservation area in the master plan. It also acts as a riparian habitat corridor for various species. 5 points for preserving at least 75 percent of the total area of existing native plant communities on site, and designate the native plant communities as a vegetation and soil protection zone. Additional point for preserving native plant communities to provide habitat corridor connections to off-site natural areas or buffers adjacent to off-site natural areas for migrating wildlife. This option applies to habitat for species of concern within your region as identified by state Wildlife Action Plans, state wildlife agencies, federal wildlife agencies, or other entities.
- 00 **Credit 4.9**
Restore plant communities native to the ecoregion (1–5 points)
Restoration of the vegetated area has not been indicated.
- N/A **Credit 4.10**
Use vegetation to minimize building heating requirements (2–4 points)
No buildings in master plan.
- N/A **Credit 4.11**
Use vegetation to minimize building cooling requirements (2–5 points)
No buildings in master plan.
- 00 **Credit 4.12**

Reduce urban heat island effects (3–5 points)
Parking lots are not effectively shaded by vegetation to reduce urban heat island.

00 **Credit 4.13**
Reduce the risk of catastrophic wildfire (3 points)
Site not designed to take into account wildfire risk.

21 PTS

5. SITE DESIGN—MATERIALS SELECTION \ 36 possible points

Reuse/recycle existing materials and support sustainable production practices

MET **Prerequisite 5.1**
Eliminate the use of wood from threatened tree species
No wood products have been specified.

00 **Credit 5.2**
Maintain on-site structures, hardscape, and landscape amenities (1–4 points)
Useful existing materials are not indicated.

00 **Credit 5.3**
Design for deconstruction and disassembly (1–3 points)
Thought for facilitating reuse or disassembly is not evident.

00 **Credit 5.4**
Reuse salvaged materials and plants (2–4 points)
No indication of plant and material reuse.

00 **Credit 5.5**
Use recycled content materials (2–4 points)
No indication of recycled content material use.

00 **Credit 5.6**
Use certified wood (1–4 points)
Use of wood is not evident.

00 **Credit 5.7**
Use regional materials (2–6 points)
Information not available.

00 **Credit 5.8**
Use adhesives, sealants, paints, and coatings with reduced VOC emissions (2 points)
Information not available.

00 **Credit 5.9**
Support sustainable practices in plant production (3 points)
Information not available.

00 **Credit 5.10**
Support sustainable practices in materials manufacturing (3–6 points)
No indication of supporting sustainable practices in materials manufacturing on the master plan.

00 PTS

6. SITE DESIGN—HUMAN HEALTH AND WELL BEING \ 32 possible points

Build strong communities and a sense of stewardship

00 **Credit 6.1**
Promote equitable site development (1–3 points)
No indication that economic or social benefits to the local community were specified for construction.

01 **Credit 6.2**
Promote equitable site use (1–4 points)
Open air staging area planned for public events.

00 **Credit 6.3**
Promote sustainability awareness and education (2–4 points)
Although the plan indicates interpretive and educational opportunities in the conservation area on the west side of the park, other opportunities are not indicated. A minimum of three educational or interpretive elements are required for the 2 points.

00 **Credit 6.4**
Protect and maintain unique cultural and historical places (2–4 points)
Fairmont Park has not been indicated as a landscape of cultural or historical value.

00 **Credit 6.5**
Provide for optimum site accessibility, safety, and wayfinding (3 points)
The master plan does not meet optimum site accessibility, safety, or wayfinding requirements.

04 **Credit 6.6**
Provide opportunities for outdoor physical activity (4–5 points)
Many of the amenities in the master plan encourage outdoor physical activity.

03 **Credit 6.7**
Provide views of vegetation and quiet outdoor spaces for mental restoration (3–4 points)
The plan indicates a variety of seating options and different spatial definitions for views of vegetation.

03 **Credit 6.8**
Provide outdoor spaces for social interaction (3 points)
A variety of gathering spaces are indicated on the master plan.

02 **Credit 6.9**
Reduce light pollution (2 points)
Lighting is not included in the master plan.

13 PTS

7. CONSTRUCTION \\ 21 possible points

Minimize effects of construction-related activities

Construction details were not specified.

- 00 **Prerequisite 7.1**
Control and retain construction pollutants
- 00 **Prerequisite 7.2**
Restore soils disturbed during construction
- 00 **Credit 7.3**
Restore soils disturbed by previous development (2–8 points)
- 00 **Credit 7.4**
Divert construction and demolition materials from disposal (3–5 points)
- 00 **Credit 7.5**
Reuse or recycle vegetation, rocks, and soil generated during construction (3–5 points)
- 00 **Credit 7.6**
Minimize generation of greenhouse gas emissions and exposure to localized air pollutants during construction (1–3 points)
- 00 PTS

8. OPERATIONS AND MAINTENANCE \\ 23 possible points

Maintain the site for long-term sustainability

A maintenance plan was not provided.

- 00 **Prerequisite 8.1**
Plan for sustainable site maintenance
- 00 **Prerequisite 8.2**
Provide for storage and collection of recyclables
- 00 **Credit 8.3**
Recycle organic matter generated during site operations and maintenance (2–6 points)
- 00 **Credit 8.4**
Reduce outdoor energy consumption for all landscape and exterior operations (1–4 points)
- 00 **Credit 8.5**
Use renewable sources for landscape electricity needs (2–3 points)
- 00 **Credit 8.6**
Minimize exposure to environmental tobacco smoke (1–2 points)

00 **Credit 8.7**
Minimize generation of greenhouse gases and exposure to localized air pollutants during landscape maintenance activities (1–4 points)

00 **Credit 8.8**
Reduce emissions and promote the use of fuel-efficient vehicles (4 points)

00 PTS

9. MONITORING AND INNOVATION \ 18 possible points

Reward exceptional performance and improve the body of knowledge on long-term sustainability

00 **Credit 9.1**
Monitor performance of sustainable design practices (10 points)
Performance monitoring not specified.

00 **Credit 9.2**
Innovation in site design (8 points)
Innovation beyond SSI categories is not evident.

00 PTS

057 **TOTAL POINTS**

M A S T E R P L A N

U P D A T E S

FAIRMONT PARK – MASTER PLAN UPDATES

1. SITE SELECTION \\ 21 possible points

Select locations to preserve existing resources and repair damaged systems

- MET **Prerequisite 1.1**
Limit development of soils designated as prime farmland, unique farmland, and farmland of statewide importance
Riley County has not designated the park as suitable farmland.
- MET **Prerequisite 1.2**
Protect floodplain functions
The park is located almost entirely in the 100 year floodplain; however there are not obstructive barriers to river and flood functions.
- N/A **Prerequisite 1.3**
Preserve wetlands
There are no wetlands on site.
- MET **Prerequisite 1.4**
Preserve threatened or endangered species and their habitats
The site provides large areas of habitat for many plant and animal species.
- 05 **Credit 1.5**
Select brownfields or greyfields for redevelopment (5–10 points)
5 points for greyfield redevelopment; the site formerly contained single family residences.
- 00 **Credit 1.6**
Select sites within existing communities (6 points)
Most services are located just outside the 0.75 mi walking radius.
- 00 **Credit 1.7**
Select sites that encourage non-motorized transportation and use of public transit (5 points)
The park is only accessible by vehicle and one pedestrian access point.
- 05 PTS

2. PRE-DESIGN ASSESSMENT AND PLANNING \\ 4 possible points

Plan for sustainability from the onset of the project

- N/A **Prerequisite 2.1**
Conduct a pre-design site assessment and explore opportunities for site sustainability
- NO **Prerequisite 2.2**
Use an integrated site development process
- 00 **Credit 2.3**
Engage users and other stakeholders in site design (4 points)

Users and stakeholders must have been involved in all phases of site design.

00 PTS

3. SITE DESIGN—WATER \ 44 possible points

Protect and restore processes and systems associated with a site's hydrology

- NO **Prerequisite 3.1**
Reduce potable water use for landscape irrigation by 50 percent from established baseline
- 00 **Credit 3.2**
Reduce potable water use for landscape irrigation by 75 percent or more from established baseline (2–5 points)
- 08 **Credit 3.3**
Protect and restore riparian, wetland, and shoreline buffers (3–8 points)
The initial and final average buffer width of the Kansas River went up to about 600 feet (> 300 feet) for a credit of 8 points.
- 00 **Credit 3.4**
Rehabilitate lost streams, wetlands, and shorelines (2–5 points)
No rehabilitation is indicated for the drainage channel at the south of the site.
- 00 **Credit 3.5**
Manage stormwater on site (5–10 points)
Water storage capacity is not addressed.
- 00 **Credit 3.6**
Protect and enhance on-site water resources and receiving water quality (3–9 points)
Stormwater treatment is not addressed on site.
- 00 **Credit 3.7**
Design rainwater/stormwater features to provide a landscape amenity (1–3 points)
Stormwater features are not specified.
- N/A **Credit 3.8**
Maintain water features to conserve water and other resources (1–4 points)
There are no water features specified.

08 PTS

4. SITE DESIGN—SOIL AND VEGETATION \ 51 possible points

Protect and restore processes and systems associated with a site's soil and vegetation

- NO **Prerequisite 4.1**
Control and manage known invasive plants found on site
Management of invasives is not specified.

- MET **Prerequisite 4.2**
Use appropriate, non-invasive plants
Invasive plants are not specified.
- NO **Prerequisite 4.3**
Create a soil management plan
A soil management plan is not included.
- 06 **Credit 4.4**
Minimize soil disturbance in design and construction (6 points)
Soil disturbance required in the design goals is minimal.
- 05 **Credit 4.5**
Preserve all vegetation designated as special status (5 points)
The riparian zone on the west of the site has been preserved.
- N/A **Credit 4.6**
Preserve or restore appropriate plant biomass on site (3–8 points)
Requirement compares existing conditions to proposed conditions.
- 00 **Credit 4.7**
Use native plants (1–4 points)
Vegetation choices are not specified.
- 06 **Credit 4.8**
Preserve plant communities native to the ecoregion (2–6 points)
The riparian zone on the west of the site has been preserved. It also acts as a riparian habitat corridor for various species. 5 points for preserving at least 75 percent of the total area of existing native plant communities on site, and designate the native plant communities as a vegetation and soil protection zone. Additional point for preserving native plant communities to provide habitat corridor connections to off-site natural areas or buffers adjacent to off-site natural areas for migrating wildlife. This option applies to habitat for species of concern within your region as identified by state Wildlife Action Plans, state wildlife agencies, federal wildlife agencies, or other entities.
- 00 **Credit 4.9**
Restore plant communities native to the ecoregion (1–5 points)
Restoration of the vegetated area has not been indicated.
- 00 **Credit 4.10**
Use vegetation to minimize building heating requirements (2–4 points)
While vegetation is provided around the building, it is not provided on the wall facing the prevailing winter winds.
- 02 **Credit 4.11**
Use vegetation to minimize building cooling requirements (2–5 points)
The indoor soccer complex is about 13,000 square feet. Baseline electricity for cooling in the Midwest is 0.9 kWh/square foot, so the complex would have an energy demand of 11,700 kWh for cooling. Estimated energy savings could not be calculated. Savings was estimated.
- 03 **Credit 4.12**
Reduce urban heat island effects (3–5 points)

30% of parking lots are effectively shaded by vegetation to reduce urban heat island.

- 00 **Credit 4.13**
Reduce the risk of catastrophic wildfire (3 points)
Site not designed to take into account wildfire risk.

22 PTS

5. SITE DESIGN—MATERIALS SELECTION \ 36 possible points

Reuse/recycle existing materials and support sustainable production practices

- MET **Prerequisite 5.1**
Eliminate the use of wood from threatened tree species
No wood products have been specified.
- 00 **Credit 5.2**
Maintain on-site structures, hardscape, and landscape amenities (1–4 points)
Useful existing materials are not indicated.
- 00 **Credit 5.3**
Design for deconstruction and disassembly (1–3 points)
Thought for facilitating reuse or disassembly is not evident.
- 00 **Credit 5.4**
Reuse salvaged materials and plants (2–4 points)
No indication of plant and material reuse.
- 00 **Credit 5.5**
Use recycled content materials (2–4 points)
No indication of recycled content material use.
- 00 **Credit 5.6**
Use certified wood (1–4 points)
Use of wood is not evident.
- 00 **Credit 5.7**
Use regional materials (2–6 points)
Information not available.
- 00 **Credit 5.8**
Use adhesives, sealants, paints, and coatings with reduced VOC emissions (2 points)
Information not available.
- 00 **Credit 5.9**
Support sustainable practices in plant production (3 points)
Information not available.
- 00 **Credit 5.10**

Support sustainable practices in materials manufacturing (3–6 points)
No indication of supporting sustainable practices in materials manufacturing.

00 PTS

6. SITE DESIGN—HUMAN HEALTH AND WELL BEING \\ 32 possible points

Build strong communities and a sense of stewardship

- 00 **Credit 6.1**
Promote equitable site development (1–3 points)
No indication that economic or social benefits to the local community were specified for construction.
- 00 **Credit 6.2**
Promote equitable site use (1–4 points)
Events not part of Fairmont Park's design goals.
- 00 **Credit 6.3**
Promote sustainability awareness and education (2–4 points)
Educational opportunities not addressed.
- 00 **Credit 6.4**
Protect and maintain unique cultural and historical places (2–4 points)
Fairmont Park has not been indicated as a landscape of cultural or historical value.
- 00 **Credit 6.5**
Provide for optimum site accessibility, safety, and wayfinding (3 points)
The design goals do not meet optimum site accessibility, safety, or wayfinding requirements.
- 04 **Credit 6.6**
Provide opportunities for outdoor physical activity (4–5 points)
Many design goals encourage outdoor physical activity.
- 03 **Credit 6.7**
Provide views of vegetation and quiet outdoor spaces for mental restoration (3–4 points)
The plan indicates a variety of seating options and different spatial definitions for views of vegetation.
- 03 **Credit 6.8**
Provide outdoor spaces for social interaction (3 points)
Opportunities for gathering are available in the new playground and soccer complex plans.
- 02 **Credit 6.9**
Reduce light pollution (2 points)
There is no indication of lighting in the design goals.

12 PTS

7. CONSTRUCTION \\ 21 possible points

Minimize effects of construction-related activities

Construction details were not specified.

- 00 **Prerequisite 7.1**
Control and retain construction pollutants
- 00 **Prerequisite 7.2**
Restore soils disturbed during construction
- 00 **Credit 7.3**
Restore soils disturbed by previous development (2–8 points)
- 00 **Credit 7.4**
Divert construction and demolition materials from disposal (3–5 points)
- 00 **Credit 7.5**
Reuse or recycle vegetation, rocks, and soil generated during construction (3–5 points)
- 00 **Credit 7.6**
Minimize generation of greenhouse gas emissions and exposure to localized air pollutants during construction (1–3 points)
- 00 PTS

8. OPERATIONS AND MAINTENANCE \\ 23 possible points

Maintain the site for long-term sustainability

A maintenance plan was not provided.

- 00 **Prerequisite 8.1**
Plan for sustainable site maintenance
- 00 **Prerequisite 8.2**
Provide for storage and collection of recyclables
- 00 **Credit 8.3**
Recycle organic matter generated during site operations and maintenance (2–6 points)
- 00 **Credit 8.4**
Reduce outdoor energy consumption for all landscape and exterior operations (1–4 points)
- 00 **Credit 8.5**
Use renewable sources for landscape electricity needs (2–3 points)
- 00 **Credit 8.6**
Minimize exposure to environmental tobacco smoke (1–2 points)
- 00 **Credit 8.7**

Minimize generation of greenhouse gases and exposure to localized air pollutants during landscape maintenance activities (1–4 points)

00 **Credit 8.8**
Reduce emissions and promote the use of fuel-efficient vehicles (4 points)

00 PTS

9. MONITORING AND INNOVATION \ 18 possible points

Reward exceptional performance and improve the body of knowledge on long-term sustainability

00 **Credit 9.1**
Monitor performance of sustainable design practices (10 points)
Performance monitoring not specified.

00 **Credit 9.2**
Innovation in site design (8 points)
Innovation beyond SSI categories is not evident.

00 PTS

047 **TOTAL POINTS**

2 0 1 3

E X I S T I N G

C O N D I T I O N S

FAIRMONT PARK – 2013 EXISTING CONDITIONS

1. SITE SELECTION \ 21 possible points

Select locations to preserve existing resources and repair damaged systems

- MET **Prerequisite 1.1**
Limit development of soils designated as prime farmland, unique farmland, and farmland of statewide importance
Riley County has not designated the park as suitable farmland.
- MET **Prerequisite 1.2**
Protect floodplain functions
The park is located almost entirely in the 100 year floodplain; however there are not obstructive barriers to river and flood functions.
- N/A **Prerequisite 1.3**
Preserve wetlands
There are no wetlands on site.
- MET **Prerequisite 1.4**
Preserve threatened or endangered species and their habitats
The site provides large areas of habitat for many plant and animal species.
- 05 **Credit 1.5**
Select brownfields or greyfields for redevelopment (5–10 points)
5 points for greyfield redevelopment; the site formerly contained single family residences.
- 00 **Credit 1.6**
Select sites within existing communities (6 points)
Most services are located just outside the 0.75 mi walking radius.
- 00 **Credit 1.7**
Select sites that encourage non-motorized transportation and use of public transit (5 points)
The park is currently only accessible by vehicle and one pedestrian access point.
- 05 PTS

2. PRE-DESIGN ASSESSMENT AND PLANNING \ 4 possible points

Plan for sustainability from the onset of the project

- N/A **Prerequisite 2.1**
Conduct a pre-design site assessment and explore opportunities for site sustainability
- NO **Prerequisite 2.2**
Use an integrated site development process
- 00 **Credit 2.3**
Engage users and other stakeholders in site design (4 points)

Users and stakeholders must have been involved in all phases of site design.

00 PTS

3. SITE DESIGN—WATER \ 44 possible points

Protect and restore processes and systems associated with a site's hydrology

NO **Prerequisite 3.1**

Reduce potable water use for landscape irrigation by 50 percent from established baseline
Using 8.53 inches/month (from July 2012 for grass in Colby, KS) and 163,296 square feet as the area (measured from Google Earth), the Baseline Landscape Water Requirement (BLWR) is 868,203.85 gallons/month.

00 **Credit 3.2**

Reduce potable water use for landscape irrigation by 75 percent or more from established baseline (2–5 points)

08 **Credit 3.3**

Protect and restore riparian, wetland, and shoreline buffers (3–8 points)
The initial and final average buffer width of the Kansas River went up to about 600 feet (> 300 feet) for a credit of 8 points.

00 **Credit 3.4**

Rehabilitate lost streams, wetlands, and shorelines (2–5 points)
The drainage-way at the south of the site is partially channelized with no native vegetation.

00 **Credit 3.5**

Manage stormwater on site (5–10 points)
Water storage capacity is not addressed.

00 **Credit 3.6**

Protect and enhance on-site water resources and receiving water quality (3–9 points)
Stormwater treatment is not addressed on site.

00 **Credit 3.7**

Design rainwater/stormwater features to provide a landscape amenity (1–3 points)
Stormwater features are not present.

N/A **Credit 3.8**

Maintain water features to conserve water and other resources (1–4 points)
There are no water features on site.

08 PTS

4. SITE DESIGN—SOIL AND VEGETATION \ 51 possible points

Protect and restore processes and systems associated with a site's soil and vegetation

NO **Prerequisite 4.1**

Control and manage known invasive plants found on site
Invasives are still present on site.

- MET **Prerequisite 4.2**
Use appropriate, non-invasive plants
Invasives have not been purposely planted.
- NO **Prerequisite 4.3**
Create a soil management plan
A soil management plan is not included.
- 06 **Credit 4.4**
Minimize soil disturbance in design and construction (6 points)
Major soil disturbance has not occurred on site.
- 05 **Credit 4.5**
Preserve all vegetation designated as special status (5 points)
The riparian zone on the west of the site has been preserved.
- N/A **Credit 4.6**
Preserve or restore appropriate plant biomass on site (3–8 points)
Requirement compares existing conditions to proposed conditions.
- 00 **Credit 4.7**
Use native plants (1–4 points)
There is no indication of new plant material (native or non-native).
- 06 **Credit 4.8**
Preserve plant communities native to the ecoregion (2–6 points)
The riparian zone on the west of the site has been preserved. It also acts as a riparian habitat corridor for various species. 5 points for preserving at least 75 percent of the total area of existing native plant communities on site, and designate the native plant communities as a vegetation and soil protection zone. Additional point for preserving native plant communities to provide habitat corridor connections to off-site natural areas or buffers adjacent to off-site natural areas for migrating wildlife. This option applies to habitat for species of concern within your region as identified by state Wildlife Action Plans, state wildlife agencies, federal wildlife agencies, or other entities.
- 00 **Credit 4.9**
Restore plant communities native to the ecoregion (1–5 points)
Restoration of the vegetated area has not been indicated.
- N/A **Credit 4.10**
Use vegetation to minimize building heating requirements (2–4 points)
- N/A **Credit 4.11**
Use vegetation to minimize building cooling requirements (2–5 points)
- 00 **Credit 4.12**
Reduce urban heat island effects (3–5 points)

Parking lots are not effectively shaded by vegetation to reduce urban heat island. Solar reflectance 0.42 for coarse limestone aggregate (gravel parking)

- 00 **Credit 4.13**
Reduce the risk of catastrophic wildfire (3 points)
Site not designed to take into account wildfire risk.

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5. SITE DESIGN—MATERIALS SELECTION \ 36 possible points

Reuse/recycle existing materials and support sustainable production practices

- MET **Prerequisite 5.1**
Eliminate the use of wood from threatened tree species
No wood products are present.
- 00 **Credit 5.2**
Maintain on-site structures, hardscape, and landscape amenities (1–4 points)
Use of onsite materials is not evident other than trees mulched and utilized for hiking trails (a small percentage).
- 00 **Credit 5.3**
Design for deconstruction and disassembly (1–3 points)
Thought for facilitating reuse or disassembly is not evident. However, some materials would be able to be reused.
- 00 **Credit 5.4**
Reuse salvaged materials and plants (2–4 points)
No indication of plant and material reuse. Some vegetation is mulched and utilized for hiking trails, but only a small percentage.
- 00 **Credit 5.5**
Use recycled content materials (2–4 points)
No indication of recycled content material use.
- 00 **Credit 5.6**
Use certified wood (1–4 points)
Only evident use of wood is for posts of the dog park fencing and football field lighting.
- 00 **Credit 5.7**
Use regional materials (2–6 points)
Information not available.
- 00 **Credit 5.8**
Use adhesives, sealants, paints, and coatings with reduced VOC emissions (2 points)
Information not available.
- 00 **Credit 5.9**
Support sustainable practices in plant production (3 points)
Information not available.

00 **Credit 5.10**
Support sustainable practices in materials manufacturing (3–6 points)
No indication of supporting sustainable practices in materials manufacturing.

00 PTS

6. SITE DESIGN—HUMAN HEALTH AND WELL BEING \ 32 possible points

Build strong communities and a sense of stewardship

00 **Credit 6.1**
Promote equitable site development (1–3 points)
No indication that economic or social benefits to the local community were utilized during construction.

00 **Credit 6.2**
Promote equitable site use (1–4 points)
No evidence of community events occurring on site other than recreation.

00 **Credit 6.3**
Promote sustainability awareness and education (2–4 points)
Educational opportunities not addressed.

00 **Credit 6.4**
Protect and maintain unique cultural and historical places (2–4 points)
Fairmont Park has not been indicated as a landscape of cultural or historical value.

00 **Credit 6.5**
Provide for optimum site accessibility, safety, and wayfinding (3 points)
The existing park does not meet optimum site accessibility, safety, or wayfinding requirements.

04 **Credit 6.6**
Provide opportunities for outdoor physical activity (4–5 points)
Many opportunities on site encourage outdoor physical activity.

00 **Credit 6.7**
Provide views of vegetation and quiet outdoor spaces for mental restoration (3–4 points)
While views of vegetation are available, there are not a variety of seating options.

00 **Credit 6.8**
Provide outdoor spaces for social interaction (3 points)
There are not many opportunities for social interaction in gathering spaces on site.

02 **Credit 6.9**
Reduce light pollution (2 points)
The only lighting on site is utilized for the football fields and only turned on during night games.

06 PTS

7. CONSTRUCTION \\ 21 possible points

Minimize effects of construction-related activities

Construction details are not specified.

- 00 **Prerequisite 7.1**
Control and retain construction pollutants
- 00 **Prerequisite 7.2**
Restore soils disturbed during construction
- 00 **Credit 7.3**
Restore soils disturbed by previous development (2–8 points)
- 00 **Credit 7.4**
Divert construction and demolition materials from disposal (3–5 points)
- 00 **Credit 7.5**
Reuse or recycle vegetation, rocks, and soil generated during construction (3–5 points)
- 00 **Credit 7.6**
Minimize generation of greenhouse gas emissions and exposure to localized air pollutants during construction (1–3 points)
- 00 PTS

8. OPERATIONS AND MAINTENANCE \\ 23 possible points

Maintain the site for long-term sustainability

- MET **Prerequisite 8.1**
Plan for sustainable site maintenance
Fairmont Park is maintained with bi-weekly mowing of 42 acres, checking of the dog park three times each week, daily building maintenance, and weekly trash pickup. While it may not be sustainable, there is a maintenance plan in place.
- MET **Prerequisite 8.2**
Provide for storage and collection of recyclables
Collection of recyclables occurs near the football fields.
- 02 **Credit 8.3**
Recycle organic matter generated during site operations and maintenance (2–6 points)
Trees that have fallen or been trimmed are mulched and utilized on the hiking trails.
- 00 **Credit 8.4**
Reduce outdoor energy consumption for all landscape and exterior operations (1–4 points)
Energy efficiency of fixtures and equipment is unknown.
- 00 **Credit 8.5**
Use renewable sources for landscape electricity needs (2–3 points)

Renewable sources are not utilized.

00 **Credit 8.6**
Minimize exposure to environmental tobacco smoke (1–2 points)
Tobacco smoke policies are not in place.

00 **Credit 8.7**
Minimize generation of greenhouse gases and exposure to localized air pollutants during landscape maintenance activities (1–4 points)
These details are not specified in the plan.

00 **Credit 8.8**
Reduce emissions and promote the use of fuel-efficient vehicles (4 points)
Privileges are not given for reduced emissions vehicles.

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9. MONITORING AND INNOVATION \ 18 possible points

Reward exceptional performance and improve the body of knowledge on long-term sustainability

00 **Credit 9.1**
Monitor performance of sustainable design practices (10 points)
Performance monitoring not evident.

00 **Credit 9.2**
Innovation in site design (8 points)

00 PTS

038 **TOTAL POINTS**

