FINAL WORK REPORT

RIVERFRONT STRATEGIC GROWTH PLAN | MUSCATINE, IOWA

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FOR SUSTAINABLE COMMUNITIES

The University of Iowa School of Urban & Regional Planning | Iowa Initiative for Sustainable Communities

ACKNOWLEDGEMENTS

EXECUTIVE SUMMARY

This report details the Mississippi Riverfront Student Group's work on our graduate capstone project, also known as Field Problems. The goal of this project was to create a Riverfront Strategic Growth Plan for Muscatine, Iowa over the 2013-2014 academic year as part of the Iowa Initiative for Sustainable Communities (IISC). In collaboration with Gary Carlson (HNI Corporation) and Rich Dwyer (Kent Corporation) of the Mayor's Community Improvement Action Team, we developed a plan to integrate existing and future redevelopment projects, physically and visually connect the downtown commercial district with the riverfront, and provide recreational amenities best suited to the interests of Muscatine residents and prospective visitors. In addition to ensuring that the riverfront corridor is a functional and beautiful place in and of itself, we also emphasized its roles as a component of the larger city parks system, as an element of local character, and as a gateway for regional recreation and tourism.

We commenced our project in August 2013 by conducting an intensive study of the project area and the larger community and identifying the core issues to be addressed. We distilled our preliminary research into the following problem statement to guide our work throughout the academic year:

"Muscatine's Riverside Park lacks consistent physical and visual connections both between its elements and with the downtown. Now that the city's initial riverfront redevelopment goals have been met, there is no strategic plan in place to nurture the relationship between the park and downtown or to guide future growth with respect to community preferences and the area's unique characteristics."

Once we established a foundation for our project, we came up with specific goals and research questions to guide our work. We then selected a theoretical approach and developed a comprehensive methodology for applying it. We chose to observe current conditions, review how other cities have approached such problems, evaluate community preferences, and finally, recommend alternative visions for the riverfront area based on our research findings. We observed current conditions by completing 12 field visits, during which we collected data on facility and parking lot usage in the park and downtown, including demographic data on observed park-goers. We also evaluated important constraints such as seasonal flooding, parking provision, and potential environmental impacts. We reviewed riverfront development plans from 10 other cities, including locations specifically recommended by our project partners as well as cities that we felt provided innovative examples of waterfront land

use. To evaluate community preferences, we developed and launched a public opinion survey which received over 300 responses. To achieve this statistically significant response rate, we established relationships with a variety of community groups to help with survey promotion and distribution. Efforts to market the survey included an article in the local newspaper, an ad in residents' monthly utility bill inserts, flyers posted in several downtown businesses, and online promotion by groups such as the Blue Zones Project, the Young Professionals Network, and the Muscatine Chamber of Commerce. City Hall, the Musser Public Library, and Muscatine's Diversity Service Center also assisted with both advertising and distribution of paper copies. These relationships proved to be especially important in garnering further public support for our public open house in March 2014. At this event, we presented conceptual designs for the riverfront area to the Muscatine community. We then evaluated these alternatives using a scoring system based on four key components: public opinion, city vision, implementation and maintenance costs, and compliance with constraints. Finally, we synthesized all this work into one final composite recommendation for the Riverfront Strategic Growth Plan. These accomplishments were made possible through ongoing communication with project partners, city staff, and community members, as well as extensive research. In addition to this detailed final work report, we have presented our findings in a condensed plan to be used by city officials and a promotional pamphlet to be shared with the public.

CHAPTER 1

Muscatine, Iowa: Community Profile

1. MUSCATINE, IOWA: COMMUNITY PROFILE

Population Information

In the 2011 Census, there were 22,918 people, 9,176 households, and 5,793 families residing in Muscatine. Figure 1.1 shows the racial makeup of the city: 82% White, 2% African American, 0.6% Asian, and 1% from two or more races. 14% of the total population identifies as Hispanic or Latino (Figure 1.1).

Population Projection

A population projection with detailed demographic information provides insight on the potential changes in community preferences and the future demand of Riverside Park. Using the cohort component method to project the population, we obtained detailed information with different age groups, which is an important dimension of population analysis that allows us to make predictions about the future needs and preferences affecting Muscatine's park system.

Adjusting with different fertility rates for the Hispanic Population, the result of the cohort component projection estimated that the city will have a population of 21,857 in 2032. Compared to the population of 24,820 in 2012, the 2032 population decreases by 12%. The main reason for the decreasing trend shown in Figure 1.2 is the net migration of the young adult groups who will move out of the city.
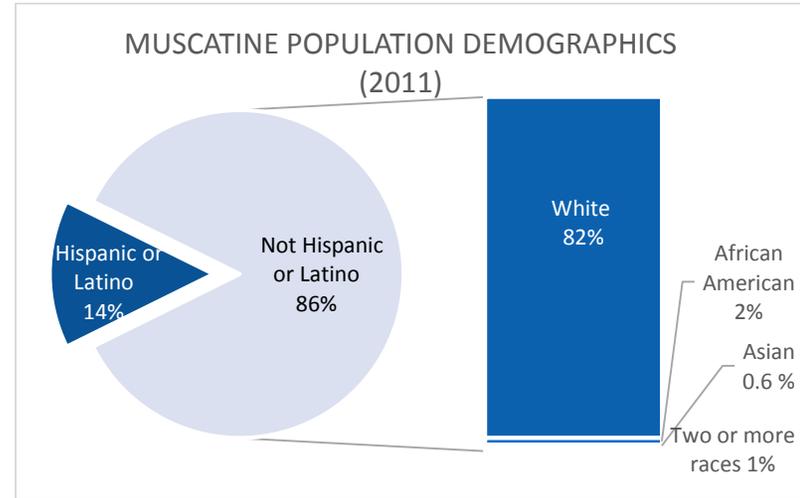
Figure 1.1. Muscatine population by Race/Ethnicity, 2011. Source: U.S. Census Bureau, 2009-2011 American Community Survey.
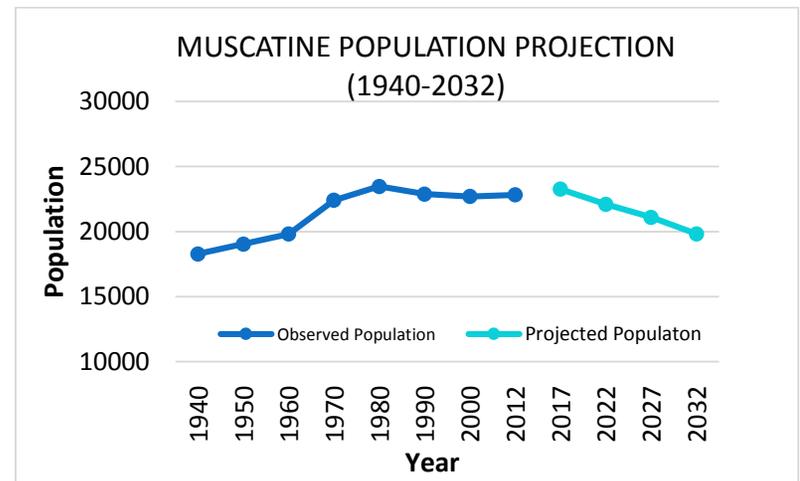
Figure 1.2. Muscatine Population Projection (1940-2032). Source: U.S. Census Bureau.

However, given the stability of Muscatine's population since 1980, a substantial decline is not likely to happen in the future. Although the cohort component model has limitations, it is valuable for predicting changes in population composition (Figure 1.3), which is important to the planning process and the recommendations for the future usage of the riverfront park area.

Table 1.1 displays the percent change of population in different age groups. We can see a slight increase in the number of senior citizens, but by losing young people, the city is losing today's younger generation and the generations that follow. This inter-generational echo posts a potential threat to the thriving growth of the city and region. As a result, providing a more attractive and livable city by taking advantage of the Mississippi Riverfront might be one of the solutions.

History of Muscatine

Muscatine is located in the southeastern corner of Iowa. The city was originally a trading outpost for General Davenport stationed just upstream in Rock Island, Illinois. Prior to the trading post, there was a failed settlement built around a mill next to the Mississippi River. In 1835, Colonel John Vanater created a town near General Davenport's trading post. The original town was named
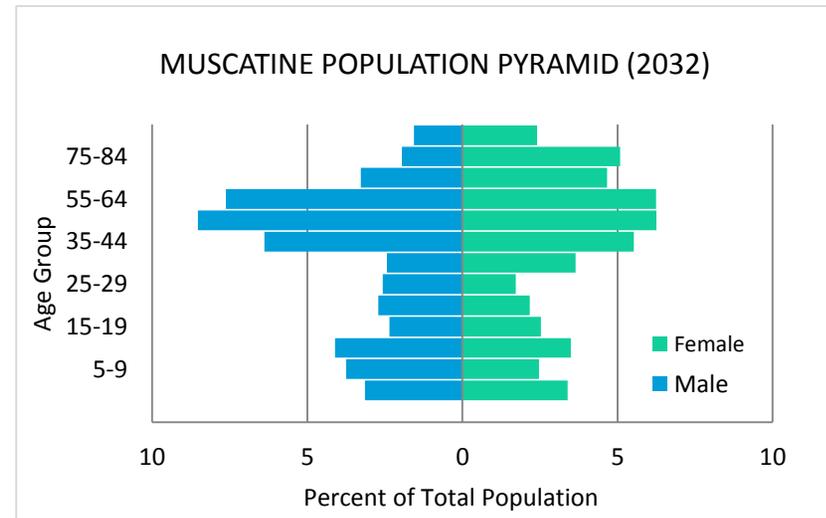
Figure 1.3. Population pyramid of Muscatine 2032.

Bloomington in honor of the Colonel's hometown in Illinois. Bloomington was renamed Muscatine in 1850. Muscatine incorporated in 1851.[1]

Railroads caught up with Muscatine in 1854 which brought rapid population growth and development. The railroad allowed lumber and secondary lumber processing factories to flourish. The lumber industry started to weaken as the forests thinned. By 1887 a new industry had dominated Muscatine. Pearl button factories sprung up due to the city's proximity to the Mississippi River and

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[1] http://www.muscatineiowa.gov/index.aspx?NID=341

accompanying mussel habitat. The button industry boomed once new technology decreased the time needed to make the buttons and reduced the cost. Roughly half of the Muscatine residents were employed by button factories. Three of the original factories are still in operation today.

1892 saw another large industry move into Muscatine. H.J. Heinz Company placed the bulk of its canning operations in Muscatine. Currently several industries such as H.J. Heinz, HNI Corporation, Kent Corporation, Bridgestone Bandag, SSAB, Stanley Consultants, Monsanto, and Musco Lighting are still operating in Muscatine. These companies still dominate Muscatine's downtown today. Two of the historic button factories structures can be seen from Riverside Park. HNI Corporation's building is also the gateway for travelers entering downtown from the north. Kent and HNI are headquartered in Muscatine and have significant impacts on local economic growth, investment opportunities, and philanthropic activities. Muscatine has also had a rich history with agriculture. Traditionally Muscatine produces corn, soybeans, and other commercial crops. Uniquely, Muscatine produces melons.

Age Groups	2012	2032	% change
0-4	1,728	1,296	-25%
5-9	1,505	1,231	-18%
10-14	1,603	1,506	-6%
15-19	1,270	969	-24%
20-24	1,379	968	-30%
25-29	1,444	850	-41%
30-34	1,578	1,207	-24%
35-44	3,011	2,362	-22%
45-54	3,138	2,930	-7%
55-64	2,762	2,749	0%
65-74	1,563	1,574	1%
75-84	1,304	1,396	7%
85-	523	787	10%
Total	24,820	21,857	-12%

Table 1.1. Percent population change from 2012 to 2032. Source: U.S. Census Bureau, 2005-2007, 2010-2012 American Community Survey.

CHAPTER 2

Project Description

2. PROJECT DESCRIPTION

The goal of this project was to create a Strategic Growth Plan for a portion of the Mississippi riverfront in Muscatine. The city has already accomplished many of its major redevelopment goals over the past decade, transforming the park from an industrial area to an attractive and functional public space. The purpose of this plan is to expand upon the work that has already been completed and develop a unified vision to guide development as Muscatine moves into the future. Our plan integrates existing and future redevelopment projects, strengthen the physical and visual connections between the riverfront and the downtown commercial district, and provide recreational space best suited to the interests of current and future Muscatine residents and visitors.

Project Area

Our study area centers on the main part of Riverside Park, located between Mississippi Drive and the Mississippi River, extending from Mad Creek downriver just past Ash Street (Figure 2.1). It is important to note that Riverside Park is considered by many residents to extend from Mad Creek all the way to Musser Creek. All functional and design elements recommended in our plan are applicable to the narrow riverfront area connecting Riverside and Musser Parks, but we did not examine specific features of this connecting area.

Figure 2.1.1. Our project area encompasses the riverfront and its connection with downtown. Map by Heather Milway.

Riverside Park is an important community asset due to its multiple roles as a component of the larger city parks system, as an element of local character, and as a gateway for regional recreation and tourism. It is therefore necessary to consider not only internal park elements, but also the park's connection to other parts of the city. Our plan emphasizes the connection between the downtown and the riverfront with the goal of bolstering both areas through a concerted approach.

Stakeholders

The Iowa Initiative for Sustainable Communities (IISC) partnered with two members of the Mayor's Community Improvement Action Team (CIAT) to catalyze this project. Gary Carlson (HNI), Rich Dwyer (Kent Corporation), and other members of the CIAT desired a plan that would encourage sustained use of Riverside Park and Downtown

Muscatine by both residents and visitors. Several city officials also proved to be important contributors since the project began. Steven Boka and Adam Thompson (Community Development) and Rich Klimes and Mark Even (Parks and Recreation) all assisted with gathering information, generating interest in our community outreach efforts, and providing feedback as the study progresses. Finally, we greatly valued input from Muscatine residents and community organizations as they are ultimately the people who will enjoy the benefits created by this plan.

Challenges

After beginning our research and conducting several field visits, we compiled a list of the key challenges to be addressed by our project. First, we noticed that certain areas of the park do not transition well into each other. Similarly, the connection with downtown also lacked appropriate visual cues, in addition to being somewhat pedestrian unfriendly. Additionally, parking lots covered a

Community preferences	Connectivity within Riverside Park	Connection between Park and Downtown	Parking provision	Use of existing open space
Park should meet or exceed resident expectations	Physical connections	Physical connections	Amount	More intensive use?
Community engagement	Unifying visual aesthetic	Unifying visual aesthetic	Location	Maintain as inherently valuable?
Create a plan that generates excitement and philanthropy	Unifying theme/vision	Unifying theme/vision		
End result: riverfront that is useful and a source of pride for residents				

Figure 2.2. Key challenges in creating a strategic growth plan for Muscatine's riverfront.

significant portion (25%) of the park, contrary to the typical vision of parks as predominantly green space. While it is necessary to provide free public parking at this location, it may also be desirable to soften the existing cementscape with natural elements. Downriver of the parking lots, a large open expanse was initially created to provide space for unstructured recreational activities such as Frisbee. It was suggested that this space may be suitable for an alternative or enhanced use, such as an outdoor performance venue; determining this capacity was part of the challenge. Finally, we observed that although quite a bit had been done to unify the area visually through elements such as the "String of Pearl" historic lighting, railings, and building renovations, there were places within the park where the theme broke down, as well as opportunities to expand the theme to create a richer aesthetic experience. These challenges, summarized in Figure 2.2, were then distilled into a clear and concise problem statement to be addressed by our study.

Problem Statement

Muscatine's Riverside Park lacks consistent physical and visual connections both between its elements and with the downtown. Now that the city's initial riverfront redevelopment goals have been met, there is no strategic plan in place to nurture the relationship between the park and downtown or to guide future growth with respect to community preferences and the area's unique characteristics.

Project Goals

Once we established the foundation of our project, we devised a set of specific goals to guide our work. Our first goal was to identify community preferences and if necessary, develop a plan to expand facilities to meet them. We also sought to improve the flow between Riverside Park facilities and between the park and Downtown to create a unified riverfront area. Finally, we recognized the need to determine the amount of public parking necessary to meet community demand while still maximizing park area, as well as potential uses for the large open space at the downriver end of the park. These goals are displayed in Figure 2.3.

Research Questions

Specific research questions defined the precise elements to be studied through our proposed methodology. Our first question addressed the need to develop a comprehensive understanding of current conditions before recommending change to the status quo; our work toward answering this question is summarized in the Report of Existing Conditions section. Next, we formulated questions that, when answered, would provide an understanding of current community preferences regarding the riverfront area and how those preferences may change in the future. These questions were addressed through field observations, public outreach efforts, and demographic analyses. Our final question category focuses on identifying ways to improve the connection between

facilities in Riverside Park as well as the connection between the park and Downtown to a physically and visually cohesive riverfront area. Methods for accomplishing this goal were investigated by researching waterfront plans in a variety of locations (Plan Comparison); preliminary suggestions for improving connectivity in the area are included in the Alternatives section. Figure 2.4 summarizes the key questions we sought to address through our research.

Approach & Methodology

Our team adopted a quasi-rational approach to address our stated goals and research questions. This approach combined select elements of the rational planning model with the fundamental ideals of the communicative planning model. Rational planning is reminiscent of the scientific method in that it proceeds in an orderly fashion from step to step and employs data-based critical analysis to develop solutions to planning problems. Communicative planning focuses on facilitating public discourse by opening the planning process to all members of a community. Key challenges were assessed both qualitatively and quantitatively, incorporating a pragmatic approach as well. Finally, we drew upon elements of inclusionary planning in classifying feedback from the community as a core component of the project.

To address the issues described in our problem statement, we began by observing current conditions, researching

Identify community preferences and develop a plan to expand facilities to meet them if necessary

Improve flow between park facilities
- Establish comprehensive riverfront vision
- Further develop unifying visual aesthetic between park elements

Strengthen connection with downtown
- Establish visually unifying theme between the riverfront and downtown
- Incorporate elements of selected park vision into the downtown, e.g. landscaping, signage, etc.
- Identify downtown uses/activities that complement park uses/activities to better integrate the two areas

Reconcile the need for parking with the desire to maintain a parklike aesthetic

Determine potential uses of large open space at the downriver end of the park

Figure 2.3. Goals to be addressed through the development of a strategic growth plan. Photos by Adnya Sarasmita.

What are the current conditions of Muscatine's Riverside Park, as well as the immediately surrounding area and larger related systems, such as the parks and regional trail systems?

Do the facilities currently offered at Riverside Park meet community recreational needs and design expectations?

•If not, how could park elements be modified to better align with community preferences?

How can we integrate existing and future Riverside Park facilities to maximize the area's functionality and aesthetic appeal? Specifically, what can be done to:

•Increase frequent, sustained usage of the riverfront?
•Capitalize on existing natural features while still promoting environmental stewardship?
•Meet or exceed resident expectations in terms of facilities provided and visual appeal of the park?

What can be done to strengthen the physical and visual connection between the riverfront and the downtown area? Specifically, what can be done to:

•Integrate the riverfront and downtown areas through strategic use of visual design elements?
•Convey to people in the park what amenities are in downtown and vice versa via signage?
•Facilitate Mississippi Drive pedestrian crossing through both improved safety measures such as lengthening traffic light times and visual cues such as painted crosswalks and signage?

How can we address changing community preferences to match park elements with projected future demands?

Figure 2.4. Core research questions.

examples of successful public spaces in other waterfront communities, and developing ways to evaluate community preferences. We then developed preliminary alternatives based on a synthesis of primary and secondary data gathered over the course of the Fall semester. In the Spring semester, we gathered additional information and public input, refined and expanded our proposed alternatives, and ultimately recommended the alternative that best fulfilled specific evaluation criteria. Figure 2.5 breaks our methodology down step by step.

Timeline

Phase 1: Establish baseline conditions

In Phase 1, we determined baseline conditions and constraints by collecting data through field observations and research. Existing facilities were examined for cohesion, function, and their relationship to larger systems. Key deliverables included the establishment of the project scope, problem statement, methodology, and proposed timeline, as presented to faculty and project partners on October 1, 2013.

Phase 2: Survey of best practices

Data collection and analysis continued into Phase 2 during the second half of the Fall semester. One major accomplishment during this phase was the completion and launch of the public opinion survey, which [ran] from November 11, 2013 to January 13, 2014. This accomplishment required extensive input from faculty and

stakeholders, as well as the establishment of a wide variety of relationships within the community.

Phase 3: Develop alternatives

Phase 3 began just before the end of the Fall term. The key step in this phase was the development of preliminary alternatives based on a synthesis of Phase 1 and Phase 2 research findings. This phase continued into the Spring semester, when we incorporated a greater degree of public input into the development of alternatives through our public opinion survey.

Phase 4: Focus on selected alternatives

The final phase involved the evaluation of proposed alternatives and the recommendation of one alternative or a combination of alternatives based on the results of this evaluation. Further public input was obtained through a community open house and was a key determinant in alternative selection. We also identified implementation tools and micro-projects for the alternative(s) favored by our project partners, city officials, and Muscatine residents. The final deliverable is a strategic growth plan for Muscatine's Riverfront and Downtown Area that represents the culmination of our research, community outreach, and analysis. Figure 2.6 presents the key components of each phase. Please see Appendix A for a full project timeline.
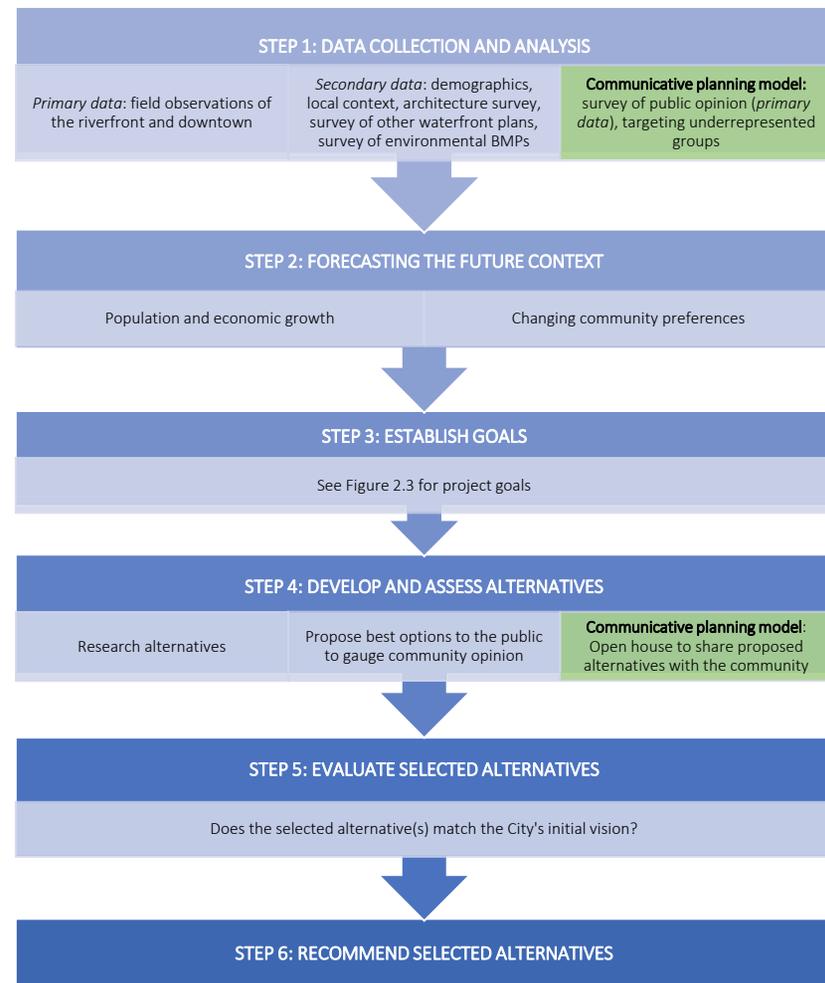
Figure 2.5. Step-by-step description of our quasi-rational research methodology.

PHASE 1

Rational Planning Steps

- Data collection and analysis
- Establish goals

Expected Deliverables

- Intermediate: partner updates, updates on baseline conditions
- Final: scope, problem statement, methodology, & project timeline; report of baseline conditions

Key Dates

- Oct 1 Presentation

PHASE 2

Rational Planning Steps

- Data collection and analysis
- Forecast future context
- Establish goals

Expected Deliverables

- Intermediate: partner updates, survey preparation, report of other plans/practices
- Final: finalized public survey, synthesis of feasible alternatives

Key Dates

- Oct 10 Presentation proposal submitted to National APA Conference
- Nov 22 Draft report submitted for faculty review
- Dec 3 Presentation
- Dec 13 Final report of work to date submitted to faculty and project partners

PHASE 3

Rational Planning Steps

- Develop and assess alternatives based on research findings

Expected Deliverables

- Intermediate: partner updates, public survey result analysis, development of viable alternatives
- Final: preliminary vision alternatives

Key Dates

- Mar 3 Presentation on expected direction, work products and assignments, and timeline

PHASE 4

Rational Planning Steps

- Evaluate selected alternative(s)
- Recommend selected alternative(s)

Expected Deliverables

- Intermediate: partner updates, public open house, synthesis of public open house outcomes
- Final: strategic growth plan recommendation

Key Dates

- Apr 18 Draft of final report submitted for faculty review
- May 8-14 Present final report to partners, mayor, city council, and public
- May 15 Final reports submitted

Figure 2.6. Planning steps, deliverables, and key dates for Phases 1-4.

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CHAPTER 3

Report of Existing Conditions
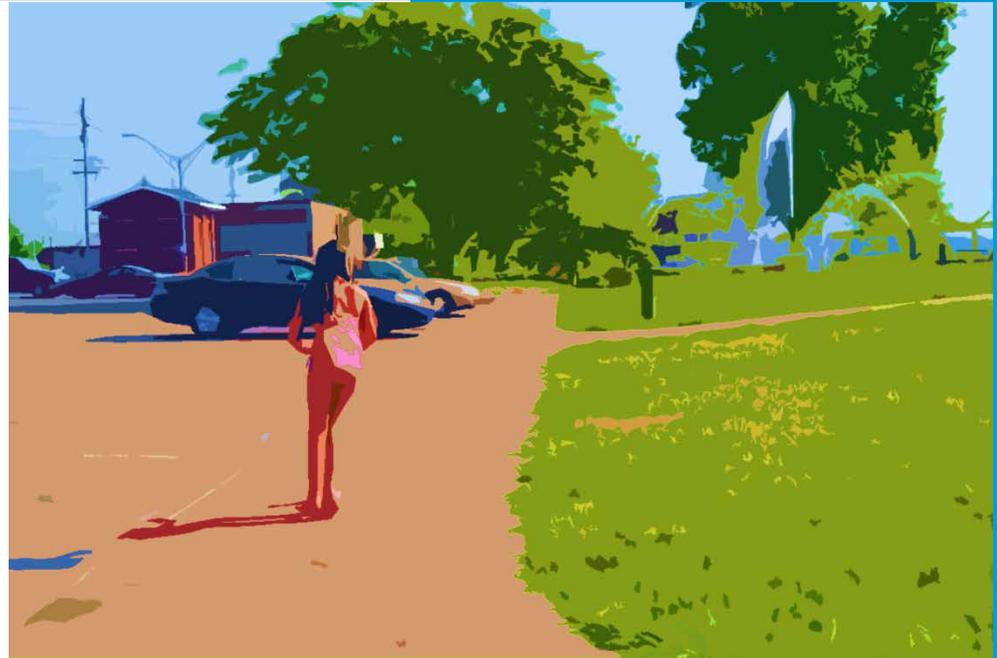
3. REPORT OF EXISTING CONDITIONS

History of the Riverfront

One of Muscatine's community parks, Riverside Park is located just south of the downtown between Mississippi Drive/County Highway 6 and the Mississippi River. Muscatine's riverfront has had multiple uses over its history. In the 1850s the land was dominated by a railroad switchyard and waste area (Figure 3.1). The city purchased the land and converted it into what is now named Riverside Park. The site, contaminated from the railroad use, required the city to place a clay cap to contain the hazardous material. The park gained a h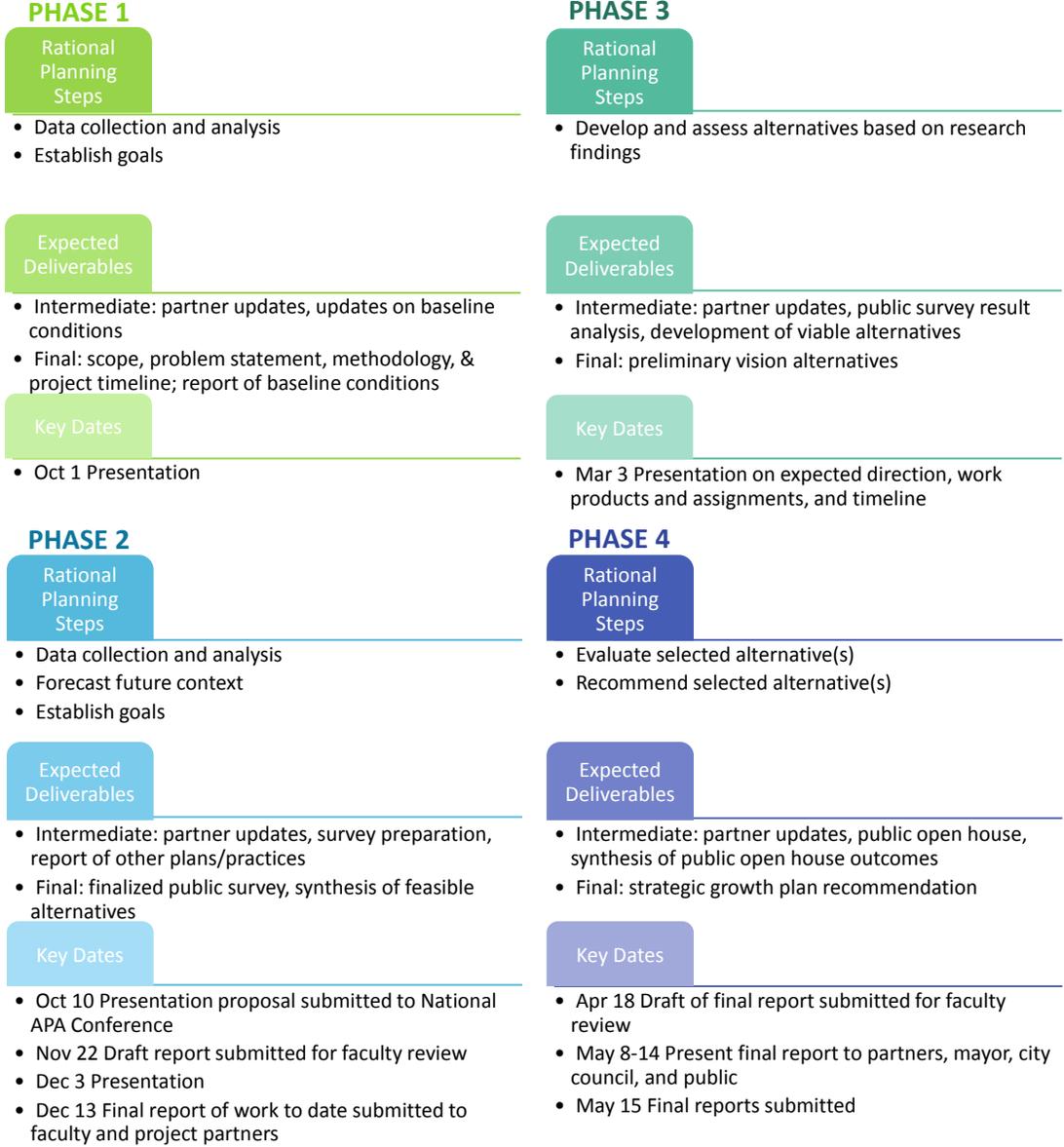arbor that was under the jurisdiction of the U.S. Army Corps of Engineers (USACE). USACE also constructed levees to protect the city from flooding. Both the harbor and the levees were purchased by the city in the 1970s and are no longer maintained by USACE.

1997 Riverfront Redevelopment Plan

The park remained relatively unchanged until 1996, when the city contracted a private planning firm, JJR Incorporated, to create a redevelopment plan. The plan took into account floodplain, river current, depth, public input, and various other components. The Riverfront Redevelopment Plan (RRP) was adopted by the city in 1997. The RRP outlined six areas to improve the riverfront. The first was to create a second boat launch at the upstream end of the park. The second was to expand the

Figure 3.1. The railroad switchyard dominated the area now known as Riverside Park. Source: Musser Public Library Collection.

boat harbor to dock more pleasure boats and larger boats such as houseboats and yachts. A bridge was proposed to allow pedestrian access to the harbor gateway; the bridge would allow boats unobstructed passage into the harbor. The third area for improvement, located just downstream from the boat harbor, was a section to be transformed into a pedestrian area named Millennium Plaza. The fourth area for improvement was the open space at the downstream end of the park. This area was slated to remain a grassy open space to allow various outdoor activities such as football, Frisbee, or sunbathing in the park. The fifth area of improvement was emphasizing the

historical markers. The plan proposed a history kiosk along the bike trail and more historical markers for the original mill, trading post, and other events that spurred the creation of Muscatine. The sixth improvement was increased tree and botanical plantings throughout the park.

The RRP expired in 2007 with many of the improvements outlined in the plan completed. The boat harbor expansion was not fully implemented as described by the RRP. The capacity of the harbor was increased by an additional dozen boats slips; however the bridge and pier were not constructed. Millennium Plaza was partially implemented through a water feature not recommended in the RRP that dominates a large section of the Plaza.

Community Projects

A second group in the city called the Community Improvement Action Team (CIAT) also made improvements to the park after the 1997 RRP's implementation. The CIAT created a plan called the Pearl of the Mississippi (PMI) to improve Riverside Park. The first project in the PMI placed historic lighting along the trails in the park. The second project expanded and remodeled the Riverview Center. The second plan was called the Pearl of the Mississippi II (PMII), which installed a water feature entitled "Mississippi Mist" in the area between the Riverview Center and Pearl City Station. The second project for PMII commissioned a twenty-five foot

tall statue entitled "Mississippi Harvest." All of the projects from both the city and CIAT shaped Riverside Park into its current form.

Riverside Park Facilities

Muscatine's Riverside Park provides various facilities, which not only meet visitors' requirements but also enrich the functions of the park. Generally, facilities provided by the park fall into seven categories: boat activity, physical recreation, walking and biking, relaxation and picnic, event venue, art or historic marker, and parking. Figure 3.2 indicates the spatial layout of the facilities pictured in Figure 3.3.

The new boat launch is located at the southeast end of the park. The old boat launch is next to the Pearl City Station. Compared with the old boat launch, the new one is in better condition. In terms of overall usage rate, the new one is higher than the old one.

The harbor has 18 slips for houseboats and 87 slips for smaller pleasure and speed boats; these slips are non-covered and equipped with electricity and water. More

information about renting is available on the city's official website. [2]

The Mississippi Mist splash pad is an interactive water feature with a riverboat smokestack themed center jet that shoots water up to 30 feet into the air.[3] The programmed water display features around the base sprout up at different intervals and include 4 mist jets and 4 outer cannons that shoot water into the center.[4] The splash pool works as a recreation facility as well as an aesthetic spot.

There are two trails (the Mississippi River Trail and the American Discovery Trail) running through the park and both are multi-functional: biking and walking. One trail is on the north side of the park and the other is located along the Mississippi River. Both trails are equipped with street lights.

The playground is equipped with play facilities and benches appropriate for a wide age range for visitors. The basketball court is located beside the playground; its target groups are children and youth coming from the playground.

Benches, shelters, and picnic tables provide visitors places to rest. Benches and picnic tables are located along the trail and around the playground. There are two shelters: one located at the east part of the park is equipped with benches and tables, and another near the playground is connected to a washroom and a vending machine.

Pearl City Station is available to the public for nonprofit events such as weddings, meetings and reunions from March to November. [5] The Riverview Center is a two-story designed to allow the first floor to be submerged during a flooding event; the second floor is protected as a result. The Riverview Center is accessible to the public; people can conduct nonprofit events such as wedding receptions, family reunions, class reunions, and meetings in the center by renting.[6]

The pier next to the Riverview Center serves as a fishing site and provides a closer view of the Mississippi River. The Mississippi Harvest statue symbolizes Muscatine's history; it is located near the river's edge and works as a memorial and aesthetic spot together with the small parcel of land in front of it.

[2] City of Muscatine Parks & Recreation, *Boat Harbor/Marina*.
http://www.muscatineiowa.gov/index.aspx?nid=169.
[3] City of Muscatine Parks & Recreation, *2013 Brochure*.
http://www.muscatineiowa.gov/DocumentCenter/View/9300.
[4] Ibid.

[5] City of Muscatine Parks & Recreation, *Pearl City Station*.
http://www.muscatineiowa.gov/index.aspx?nid=424.
[6] City of Muscatine Parks & Recreation, *Riverview Center*.
http://www.muscatineiowa.gov/index.aspx?nid=425

Muscatine Riverside Park Facility Layout

Legend: Park Boundary — SidewalkPolygons — Facility Area

Labels: New Boat Launch, Biking Trail, Harbor, The Riverview Center, Pier, Mssissippi Mist, Bench& Table, Clammer Statue, Playground, Old Boat Launch, Basketball Court, Pearl City Station, Walking Trail

0   0.1   0.2   0.4 Miles

N
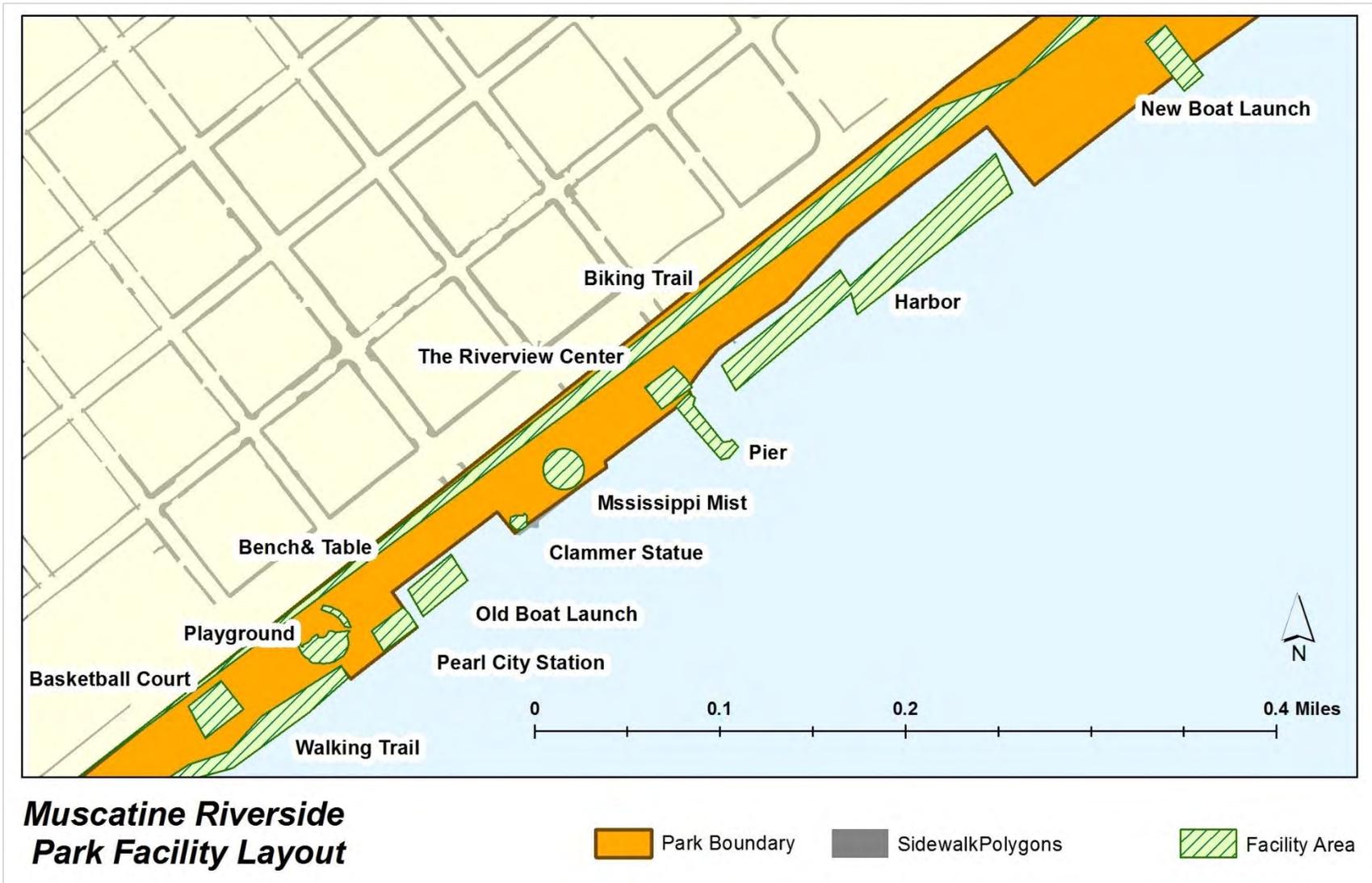
Figure 3.2. Spatial layout of Riverside Park Facilities. Map by Xiaomei Xu.

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Figure 3.3. Riverside Park facilities. Photos by Adnya Sarasmita.

Parking Facilities

There are ten parking lots in the project area: the parking lots along the Mississippi Drive that can be seen from the Riverside Park, and Riverside Park Parking Lots 1, 2 and 3. The layout of the parking lots is presented in Figure 3.4. Riverside Parking Lot 1 is located at the upriver end of the park next to the new boat launch. Parking Lot 2 is the biggest parking lot in Riverside Park and is located in the middle of the park. Parking Lot 3 is the smallest one which is between the playground and the basketball court. Riverside Park Lots 1, 2, 3 and the Cedar Street parking lot are for public use.

Figure 3.4. Riverfront parking facilities. Map by Xiaodan Chen.

Architecture & the Built Environment

Downtown Muscatine Historical Architecture

The Architectural and Historical Survey and Evaluation of the Downtown Commercial District in Muscatine, Iowa was completed in 2005 by SPARK Consulting for the Muscatine Historic Preservation Commission, as an effort to identify and protect historical and architectural resources of Muscatine, and to develop historic contexts that are relevant to the Muscatine downtown area.7

Following the Civil War, population and prosperity bloomed in Muscatine, and this was reflected in the characteristics of the buildings. Materials such as sandstone, limestone, tin, and cast iron were both acquired locally and imported to create a more ornate building façade (Figure 3.5). A notable change in direction of building style was the emergence of modern architecture in the downtown Muscatine area. Modern architecture is generally characterized by a more simplified form and a modest amount of ornamental features.

(a)   *(b)*

(c)   *(d)*

Figure 3.5. (a) Use of sandstone/limestone in a building; (b) Cast iron decorative pillars; (c) The first Art Deco styled building in downtown Muscatine (1917); (d) A modern red brick building with less decorative features (1922). Photos by Adnya Sarasmita.

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7 City of Muscatine. Muscatine Historic Preservation Commission. Architectural and Historical Survey and Evaluation of the Downtown Commercial District, Muscatine, Iowa. 2005.

Downtown Muscatine's Architecture Today

As seen in downtown Muscatine today, a large portion of the commercial buildings maintain their historic characteristics, with architecturally proper alteration(s). Some others, however, appear to have undergone a significant alteration that creates a discord with the overall historic essence of the downtown area (Figure 3.6).

The position of Downtown Muscatine along Mississippi Drive creates a viewshed visible from the riverfront area. Due to flood property buy-out and demolitions, the rear and side of the buildings that were previously out of sight are now exposed to the traffic on Mississippi Drive and visitors of Riverside Park. The south edge of Mississippi Drive facing Riverside Park is also in a similarly degraded condition, with the Muscatine Water and Power plant and remnants of the old button factories in clear view (Figure 3.7). Visual and physical improvements along this corridor and in general are needed to create a unifying cohesion between downtown area and riverfront area.

Riverside Park Architectural Elements

In addition to the historic downtown architectural elements, the architectural and decorative elements that are located on Riverside Park also provide potential concepts for creating a physically and perceptually cohesive downtown and riverfront area. For example, Norbert F. Beckey Bridge connecting Iowa and Illinois by itself is a strong structural statement that gives an identity

(a) *(b)*

(c)
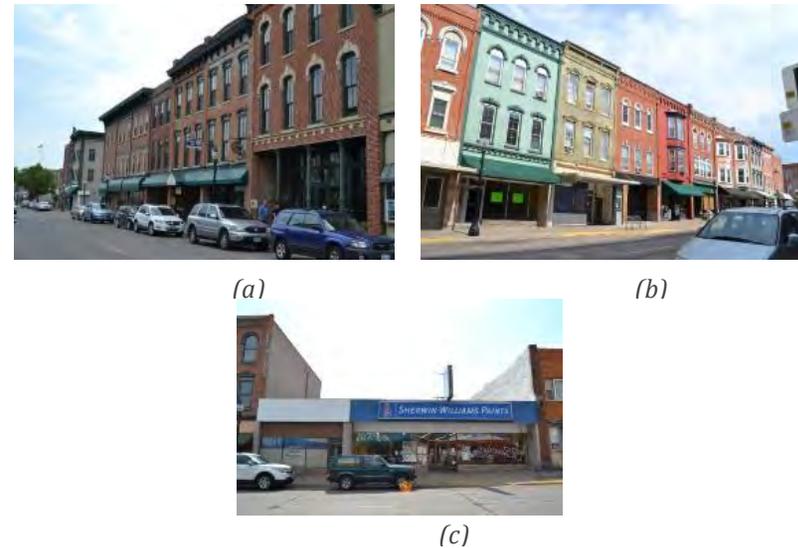
Figure 3.6. (a) Building facades with a uniform red brick; (b) A harmonic front created by variance in color schemes; (c) Disjointed fronts due to extreme difference in styles. Photos by Adnya Sarasmita.

Figure 3.7. Downtown Muscatine viewed from Riverside Park. Photos by Adnya Sarasmita.

to the riverfront area and Muscatine in general. The Riverview Center, the Pearl City Station, and the playground shelter consistently adopt the signature red brick façades of Muscatine (Figure 3.8). The walking trail along the river is lit by the String of Pearls, street light fixtures representing the historic role of the pearl button industry in Muscatine. Limestone material is also used

20

throughout the park, mirroring some of the earlier architectural styles in downtown area.

Access Points

Access Points from Mississippi Drive

The entrances at Iowa Avenue and Cedar Street are currently the two major access points into Riverside Park for pedestrians and automobiles from Mississippi Drive. The Downtown core is one block north of Mississippi Drive along 2nd Street, these two access points also serve as the connection points between the downtown and riverfront area. The Cedar Street access point appears to be the more formal entrance into the park, evident from the placement of the Riverside Park signage. This access point is also closer to the harbor and new boat launch area. The Mississippi Drive and Iowa Avenue access point, on the other hand, is not equipped with signage to inform visitors that it serves as an entrance to Riverside Park. However, this access point directly leads to a large expanse of parking, which can be convenient for visitors with automobiles (Figure 3.9).

There is currently no separation between pedestrian and automobile access at the two access points from Mississippi Drive. From observation, the crossings between downtown and the riverfront area are not accommodating to pedestrians, based on the minimum allocation of time and opportunity for pedestrians to cross Mississippi Drive. The lack of pedestrian scale amenities
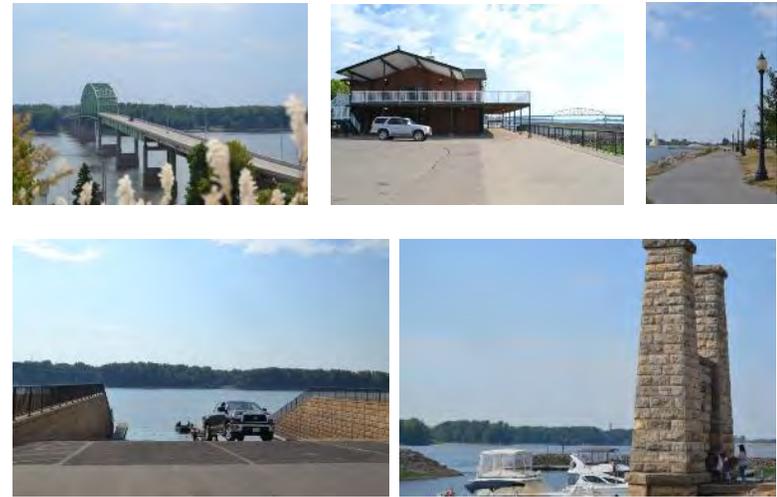
Figure 3.8. (a) Norbert F. Beckey Bridge; (b) The Riverview Center; (c) The String of Pearls; (d) Black railings and limestone use in the boat launch and the old bridge. Photos by Adnya Sarasmita.

on the five-lane highway may contribute to the apprehension and reluctance of pedestrians to cross Mississippi Drive unless it is out of necessity.

Both physical and perceptual connections are needed to create a cohesive sense of place, and the downtown and riverfront area are missing both of these elements. These connections are especially difficult to achieve with the existence of the five-line highway and railroad track separating the two areas. In order to attract a flow of visitors between downtown and the riverfront, points of attraction need to be established as an anchor. A simple spatial analysis using Geographic Information Systems

was conducted to determine a suitable placement for these anchor points.

The maps in Figures 3.13 and 3.14 illustrate the spatial distribution of the different types of establishments that are within the range of walking distance from the two access points on Mississippi Drive. In establishing the walking distance, the more broadly accepted distance that pedestrians would be willing to walk is 0.5 mile.[8] However, studies have indicated that walkable distances differ in each scenario. In this analysis, we are using 0.125 mile as the first buffer on our map, which has been indicated as the walkable catchment area for parks. Our second buffer uses a radius of 0.25 miles, which has been suggested to be the appropriate walkable catchment for high density urban cores.[9] A half mile radius buffer is used to indicate the farthest distances that pedestrians would likely to walk.

By analyzing the spatial distribution of different types of establishments, we can identify the spatial concentration of establishments that possess the potential for attracting visitors. Dining and drinking, retail, housing, and mixed use establishments are relatively more able to perform as

(a) *(b)*
Figure 3.10. a) Riverside Park signage at the Mississippi Drive & Cedar Street access point; (b) Parking space directly adjacent to the Mississippi Drive & Iowa Avenue access point. Photos by Adnya Sarasmita.
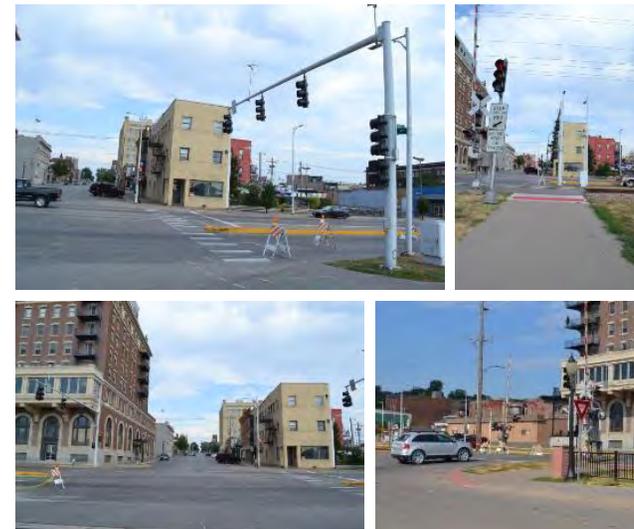
Figure 3.9. Pedestrian crossing at the Mississippi Drive & Iowa Avenue access points, highlighting the lack of attractive anchor points between downtown and riverfront. Photos by Adnya Sarasmita

[8]Leslie, E., Coffee, N., Frank, L., Owen, N., Bauman, A., & Hugo, G. (2007). Walkability of local communities: using geographic information systems to objectively assess relevant environmental attributes. *Health & place*, *13*(1), 111-122.

[9]Aurbach, L. (2005). TND Design Rating Standards: Version 2.2: TND Town Paper

placemaking points, compared to other types of establishments such as manufacturing. The identified vacant lots within the downtown core provide room for growth for future development of potential ideas to enhance the downtown and riverfront area.

Muscatine's Running River Bike & Pedestrian Trail System

Riverside Park is accessible from the Muscatine Running River Bike and Pedestrian Trail System, which also serves as part of the multi-state Mississippi River Trail and American Discovery Trail networks (Figures 3.11 and 3.12). The Mississippi River Trail system runs north to south, starting from Minnesota, through Iowa, and ending in Missouri. The American Discovery Trail network stretches from coast to coast, across fifteen of America's mid states. The fact that these two extensive trail networks cross over on Riverside Park provides a significant advantage for potential future developments of the park area as an integrated regional point of attraction.
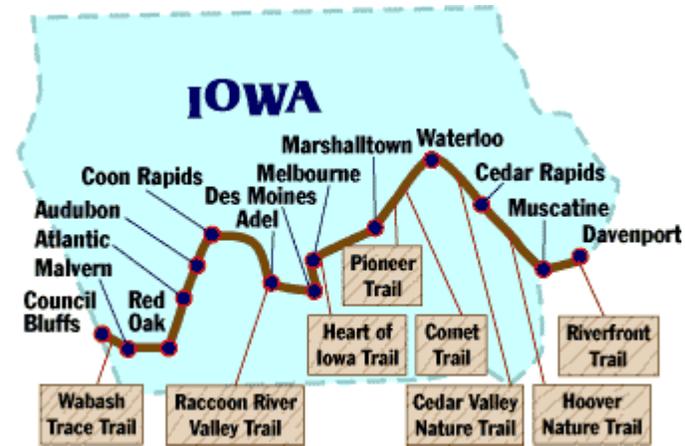
Figure 3.11. Iowa Mississippi River Trail Network. Source: Mississippi River Trail, Inc.
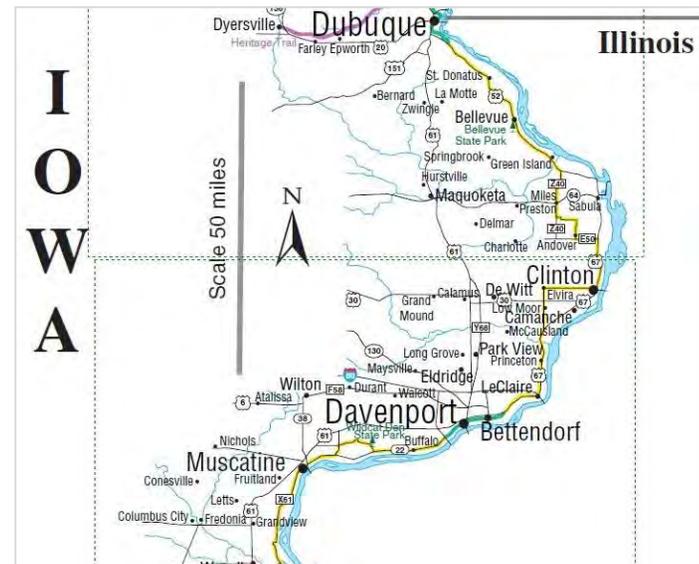
Figure 3.12. Iowa American Discovery Trail Network (bottom). Source: American Discovery Trail Society, 2001-2011.

Figure 3.13. Spatial distribution of different types of establishments within a walking distance. Map by Adnya Sarasmita.
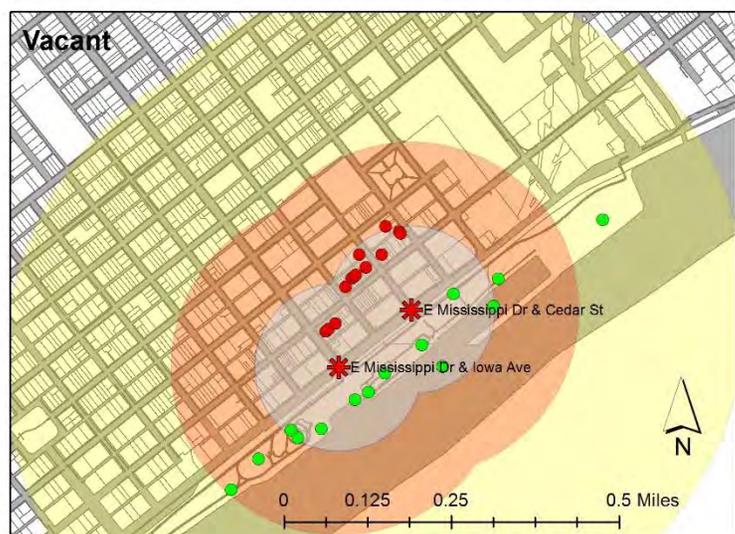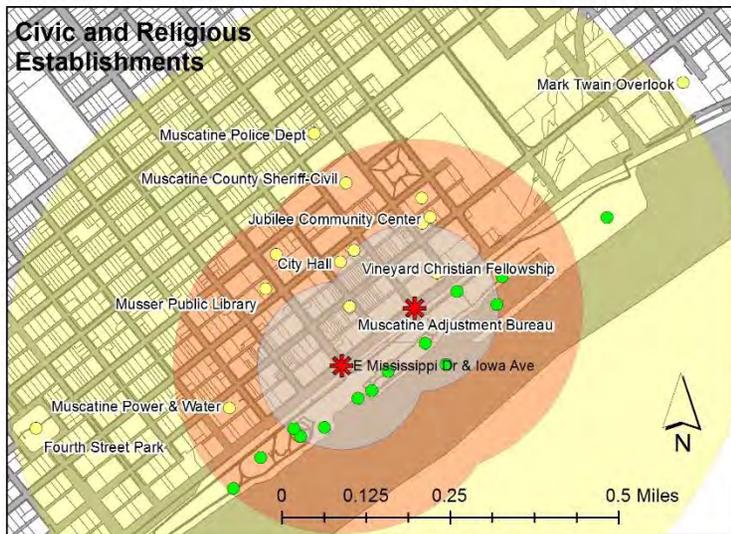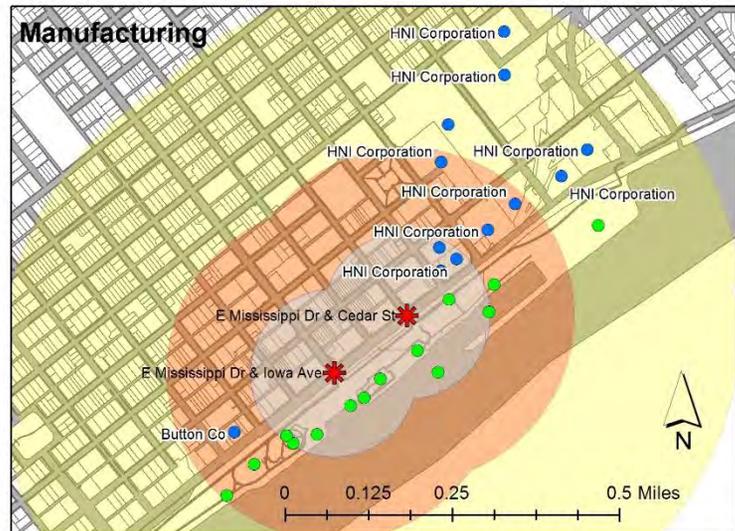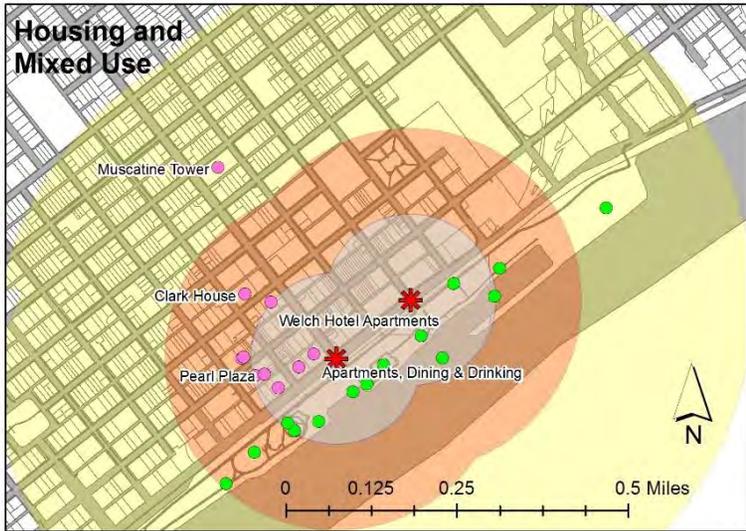
Figure 3.14. Spatial distribution of housing, manufacturing, civil and religious establishments, and vacant lots within a walking distance. Map by Adnya Sarasmita.

Constraints

Flooding

Flooding is one of the major constraints of riverfront development. Since 2000, there were 11 floods during which the river levels were higher than the flood stage of 16 feet. The highest flood stage was 25.61 feet in 1993 and the flooding in 2008 reached 24.42 feet of flood stage. From Table 3.1, the major flood stage is 20 feet and the moderate flood stage is 18 feet.

Currently, part of the function of Riverside Park is to serve as a buffer when floods occur. However, after flooding, heavy cleaning and repairs are needed, which pose a large constraint on the improvement of Riverside Park in the future.

Railroad & Highway Location

Riverside Park is situated beside a railroad along Mississippi Drive. The traffic and trains raise safety issues for park visitors walking across the corridor and the railroad. This inconvenience and the noise of the trains are also viewed as the unattractive elements of the park.

Facility Easements

Since the Iowa Department of Natural Resources has a contract with the city on facility easements until 2020, the old boat launch cannot be removed despite being underutilized.

Flood Categories (in feet)	
Major Flood Stage	20
Moderate Flood Stage	18
Flood Stage	16
Action Stage	15

Table 3.1. Flood Categories of Muscatine. Source: National Weather Service.

Figure 3.15. 2013 flooding in Muscatine (left). Source: Muscatine Journal, 2013. River Level 20.90, Flood in Muscatine, Apr 29 2008 (right). Source: City of Muscatine.

Figure 3.16. Parking Lot 2 at Riverside Park. Photo by Adnya Sarasmita.

Historic Character

The city put in a great deal of effort to maintain the historic character of downtown area of Muscatine. As a result, the development of Riverside Park should be compatible with the historic character of the surrounding environment.

Parking Needs

There are more than 400 parking spaces in Riverside Park which occupy almost 25% of the main park area. The number of parking spaces was counted in our field observation and the percentage of parking occupation is the result of geospatial analysis of the project area: parking area is 241,844 ft^2 and the main park area is 997,506 ft.^{2} The usage is high when several events are held in summer. However, peak usage is seasonal and the parking lot tends to be underutilized at other times of the year. At the same time, the parking lot in Riverside Park not only serve the visitors of the park, they also provide additional free parking space to the downtown area. The provision of parking space contributes to the large impervious surface area of Riverside Park which increases runoff to the river and is not visually appealing (Figure 3.16).

Viewshed of the Mississippi River

According to the conversations with project partners and the city administrators, Muscatine citizens put high value on the viewshed of Mississippi River. Riverfront facilities such as trees and buildings should not block the view of Mississippi River.

Muscatine Park System & Riverside Park Niche Analysis

A park system analysis of Muscatine revealed the strengths and weaknesses of Riverside Park, pointing out the future direction and potential improvement of Riverside Park. "Park types, facilities standards, and location criteria help the city with park planning, acquisition, development and upkeep." [10] The system of park classification from the National Recreation and Park Association (NRPA) establishes a framework for park development and enhances the overall function of various recreation parks in the city as a whole.

Community Park Defined

According to the National Recreation and Park Association, Community Parks possess three defining characteristics:

"Compared to mini parks and neighborhood parks, community parks are larger in size and intended to serve

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[10] National Recreation and Park Association, Recreation Park and Open Space Standards and Guidelines. 1983.

a broader range of activities and users. Community parks focus on meeting the recreation needs of several neighborhoods with more specialized activities, as well as preserving unique landscapes, open spaces or environmental features. They allow for group activities and offer other recreation opportunities not generally found at a neighborhood level." [11]

There are three community parks in Muscatine. They are Fuller Park, Riverside Park, and Weed Park.

Park Size & Location

Riverside Park has a linear shape spanning 44 acres. It is located between Mississippi Drive and the Mississippi River which meets the setting NRPA requirement that a community park should be next to an arterial or natural area rather than surrounded by housing on all sides.

Service Area

A community park services the surrounding neighborhoods within a 1 to 3 miles radius. Figure 3.17 shows the service areas of three community parks in Muscatine with a 1.5 miles radius. The total population distribution showed in the map is at the block group level and the proportion of Hispanic population is at the census tract level. From the map, we can see that the service

radius of the three community parks covers most of the residential area in Muscatine. Additionally most of Muscatine's Hispanic population lives close to Riverside Park and Weed Park. Given that the park service area is larger than the city's boundary, there may be a spillover effect which means that the parks might also attract visitors from other areas.

Physical Facilities

Table 3.2 shows the facilities provided by each community park in Muscatine. Riverside Park is unique with its splash pad and the programing for public events such as the Boat Show and 4th of July fireworks on the Mississippi River. More detailed information of programming in Riverside Park is in Appendix B. Though the different functions of these three parks are complementary, they fail to meet all of the public needs and leave room for potential development for Riverside Park. The orange lines of the table highlight these the missing facilities: waterfront access, a dog park, slough, natural resource protection and art opportunity.

Overall, the built environment of Riverside Park meets the basic requirements of a community park. The

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[11] Ibid.

requirements are improved paths, grassy area, comfort stations, a designed landscape, picnic tables and shelters, a

play area and lighting for safety at night. [12] However, improvements such as art opportunities and natural resources preservation could be included in the future development. According to the recreation guide and standards of NRPA, community parks are responsible for providing certain environmental benefits to the area. In response to this requirement, Riverside Park should include storm water infrastructure, native plants, natural habitat and other functional and educational green facilities.

Name	Riverside Park	Fuller Park	Weed Park
Acres	44	53	64
Play Equipment	√	√	√
Open Play Field	√	√	√
Sport Courts	√		√
Picnic Shelters	√	√	√
Picnic Table	√	√	√
Fountain	√	√	√
Bench	√	√	√
Swimming Pool			√
Skateboard Area	*		
Splash Pad	√		
Dog Park			
Garden			√
Slough			
Trails	√	√	√
Fishing docks	√		
Waterfront Access			
River View	√		√
Boat Ramp	√		
Parking Lot	√	√	√
Restroom	√	√	√
Natural Resource Protection			
Public Events	√		
Art Opportunity			

Table 3.2. Community park facility comparison. Source: City of Muscatine.
*There is a skateboard area located between Musser Park and Riverside Park.
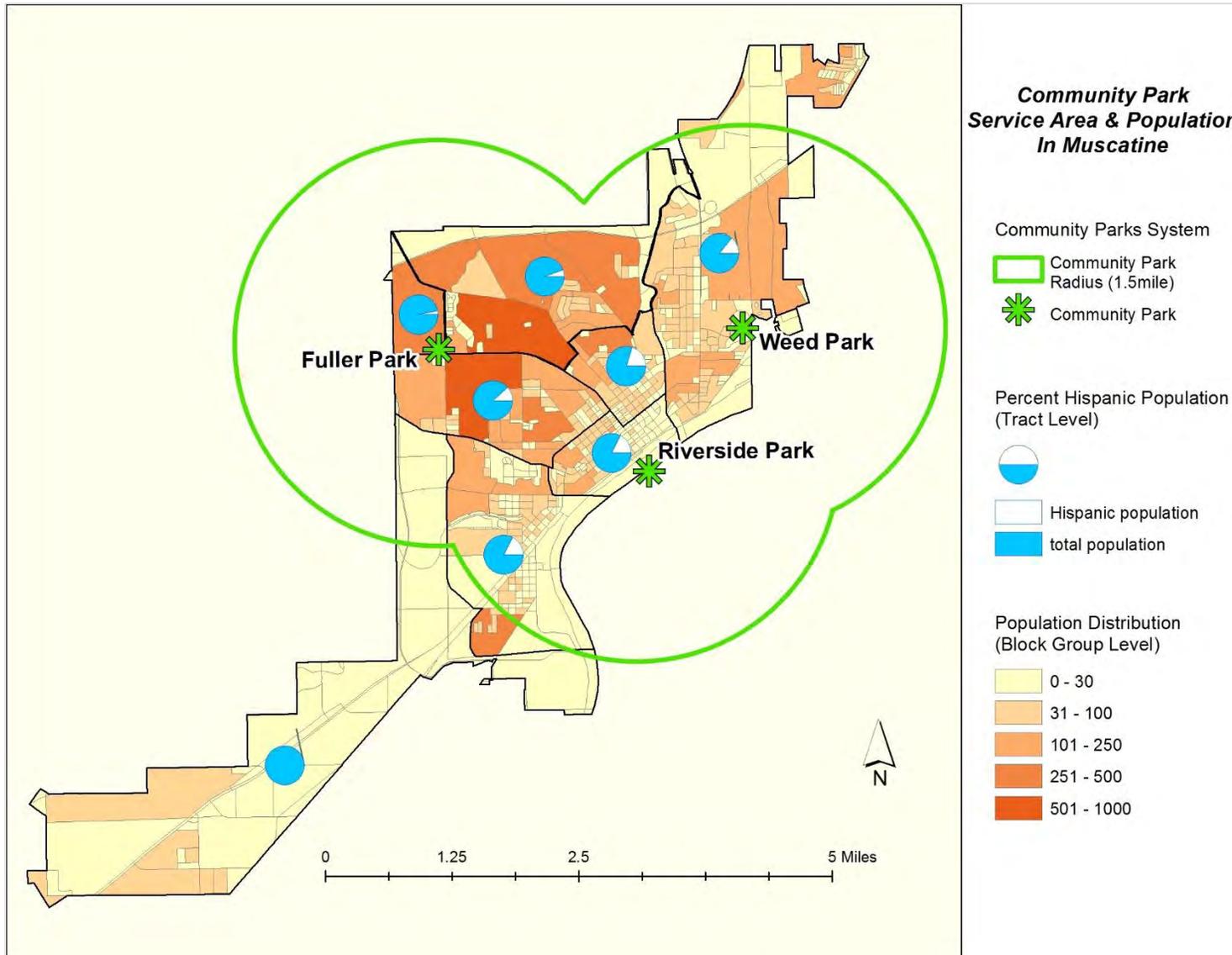
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12 NRPA, 1983.

Figure 3.17.Community park service area and population In Muscatine, IA. Source: U.S. Census Bureau, 2010 Census; City of Muscatine Comprehensive Plan; Recreation, Park and Open Space Standards and Guidelines, National Recreation and Park Association, 1983. Map by Xiaodan Chen.

Summary of Environmental Considerations

Freitag et al. (2009) stated that "...natural processes are the starting point of any successful project and they must be considered and built upon at every step, not considered as an addendum after making plans." [13] Following this rationale, it is important that Muscatine's Riverfront Strategic Growth Plan takes the environmental impacts of development into consideration given the project area's proximity to one of the nation's major waterways. According to the National Oceanic and Atmospheric Administration (NOAA), waterfront communities such as Muscatine face the unique challenge of "mak[ing] the best of limited land while protecting critical natural resources from the potentially damaging effects of growth."[14]

When wetlands are filled and drained and native vegetation is replaced with impervious surfaces such as concrete to accommodate human development, the natural hydrological system is no longer able to filter and absorb precipitation. Increasing the amount of impervious surface cover in an area also results in a greater amount of precipitation being discharged directly into natural waterways as stormwater runoff. Stormwater runoff flows across the land surface, carrying with it chemicals, debris, and sediment that are eventually deposited into the nation's waters. Environmental problems associated with stormwater runoff include increased frequency and severity of flooding, increased erosion and sedimentation, the conveyance of contaminants into natural waterways, additional habitat loss and degradation, and thermal pollution due to the fact that man-made hardscapes capture heat and thus increase runoff temperature. Given the project area's location along the Mississippi River, it is important to take environmental management into account as development progresses. Additional consideration should also be given to issues of vulnerability and resilience to natural hazards due to the area's location in a natural floodplain.

NOAA and the United States Environmental Protection Agency (US EPA) recommend guiding principles and specific implementation tools for development in waterfront communities. [15] Although some of these recommendations involve elements of growth that are beyond the scope of this project, many of principles are applicable to Muscatine's riverfront and downtown area.

[13] Freitag, Bob; Bolton, Susan; Westerlund, Frank; Clark, J.L.S. *Floodplain Management: A New Approach for a New Era*. Island Press, 2009.
[14] National Oceanic and Atmospheric Administration, *Coastal and Waterfront Challenges and Opportunities,* 2009.
http://coastalsmartgrowth.noaa.gov/challenges.html.

[15] National Oceanic and Atmospheric Administration, United States Environmental Protection Agency, The International City/County Management Association, and Rhode Island Sea Grant, *Smart Growth for Coastal and Waterfront Communities*, 2010.

These include green infrastructure, walkability, pedestrian access to water, tailoring development to fit with unique community character, and utilizing an inclusionary process to create a holistic vision for growth that engages diverse stakeholders. A detailed description of these policies and recommendations for their implementation are available in Appendix C.

Policy Audit

Waterfront development in any location requires coordination between national, state, and local regulations and policies.[16] Our project area is also located within the 100-year floodplain, meaning that any developments in this area may be subject to additional local land use regulations to minimize flood damage, as well as federal and state wetlands regulations. It is thus important to conduct a policy audit before beginning any public improvement project.[17]

National policies that apply to developments along the Mississippi River in Muscatine include the National Flood Insurance Act (NFIA), Section 10 of the Rivers & Harbors Appropriation Act of 1899, and Section 404 of the Clean Water Act. The NFIA requires local governments to adopt ordinances that restrict floodplain development; Muscatine's local floodplain regulations are described in the following paragraph. Riverfront development projects that involve construction, excavation, or filling on the floodplains may need to coordinate with the United States Army Corps of Engineers and the Iowa Department of Natural Resources to obtain a permit.[18] Additionally, any project that utilizes Federal funding and may have potential environmental impacts will be required to comply with the National Environmental Protection Act (NEPA). The City has already prepared several Environmental Assessments for projects in the Mississippi Drive Corridor in accordance with NEPA specifications.

At the local level, any project undertaken in Muscatine must comply with the land use and community improvement goals outlined in the City's comprehensive plan. In addition to more general community development goals, the plan specifically identifies the need to balance the economic and social use of land in the floodplain with adequate regulations to ensure compliance with the National Flood Insurance Act and avoid damage or loss of life caused by inappropriate development in flood prone areas. Ten of the comprehensive plan goals most relevant

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[16] Hersh, Barry F. The Complexity of Urban Waterfront Redevelopment. NAIOP, 2012.
[17] NOAA & US EPA, 2010.

[18] Iowa Department of Natural Resources, *Wetlands Permitting (Section 401)*, www.iowadnr.gov.

to our project were used to evaluate the alternative visions proposed for the riverfront area.

The zoning code is the City's primary tool for implementing the goals contained in the comprehensive plan. The current zoning ordinance includes two overlay districts that are necessary to qualify property owners for flood insurance through the NFIP: the Flood Plain Zoning District and the Flood Channel (Floodway) Zoning District. Our project area is partially covered by both of these overlays, meaning that future developments cannot interfere with the ability of natural features to convey storm- or floodwaters. Additionally, major construction projects must be reviewed by the Iowa DNR to "determine if the proposed use would increase flood levels within the community during the occurrence of the base flood." [19] In addition to these overlay regulations, the downtown central business district is currently classified as a Central Commercial (C-2) zone, while the entire area between Mississippi Drive and the Mississippi River is classified as Light Industrial (M-1), reflective of its land use history. However, the riverfront area is now entirely municipally owned and has been converted to public recreational land. The current ordinance, which dates back to the 1970s, will

be updated in the near future to reflect this change as well as the revised land use goals described in the 2013 Comprehensive Plan. Goal LU.14 of the comprehensive plan is to incorporate mixed-use developments into this area through the creation of a Downtown zoning district with a Downtown Commercial Historic District overlay that will encompass the majority of downtown. The riverfront area along Mississippi Drive will be changed from Light Industrial to a Parks & Open Space classification. The future Riverfront Strategic Growth Plan must consider such changes in allowable land uses when recommending public improvement projects. Riverfront projects should also take the guidelines established in the city's stormwater management policies and 2010 Flood Control Manual into account. Finally, projects and recommendations laid out in the Mississippi Drive Corridor Plan should be considered before undertaking new development projects to avoid conflicting goals. The core goals of the Comprehensive Plan and the Mississippi Drive Corridor Plan are summarized in Appendix D.

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[19] City of Muscatine, Iowa, *Comprehensive Plan*, 2013.

CHAPTER 4

Summary of Field Observations

4. SUMMARY OF FIELD OBSERVATIONS

Observed Visitor Count & Demographics

In order to get primary data about how people use facilities in the park, our group conducted 12 field trips to Muscatine's Riverside Park between September 7 and November 2, 2013. To ensure no bias on date and time in field trips, the group conducted trips on different dates and time: weekday, weekend, morning to noon (6:00 am-12:00 pm); afternoon (12:00 pm- 6:00 pm); and evening (6:00 pm and later). Table 4.1 summarizes the schedule of field trips.

	Morning	Afternoon	Evening
Weekday	1	4	1
Weekend	2	3	1

Table 4.1. Schedule of field trips.

Generally, the number of people observed in Riverside Park showed a declining trend. The trend of observed visitor number change is roughly correlated with the declining temperature over the fall of 2013 (Figure 4.1). [20] The splash pad is off in cold weather, discouraging people from visiting the park and thus reducing potential visitors. However, when there were certain activities in the park, the number of visitors may be higher than usual. For

example, on October 12, there was a wedding in the Pearl City Station, which brought an unusually high number of visitors to the park.

Figure 4.1. Summary of observed number of visitors and air temperature.

Among total observed Riverside Park visitors, in terms of race, white was the majority, followed by Hispanic, with few visitors of other races observed. We observed 561 visitors in total: 501 White, 47 Hispanic, 12 African American, 1 Asian, and 0 other. This indicates that non-Hispanic white people are the primary users of Riverside

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[20] This is a visual observation.

Park; this is likely due to their population ratio. However, since Muscatine has 14% Hispanic population, we cannot ignore the existence of Hispanic population in the project.

Race	Observed Number
White	501
Hispanic	47
African American	12
Asian	1
Other	0
Total	561

Table 4.2. Summary of total visitors observed during all field visits by race.

Park Facility Usage

Table 4.4 provides an example of the datasheets used to document the number of people using different facilities in the park.

Besides specific number of people observed, the content of remarks also helped to analyze the usage of the facilities in terms of people's behaviors. Figures 4.5 and 4.6 present the final result of Riverside Park facility usage rate. Usage rate is generated by the following formula:

$$Usage\ rate = \frac{[Number\ of\ visitors\ using\ a\ certain\ facility]}{[Total\ number\ of\ observed\ visitors\ in\ Riverside\ Park]}$$

The harbor usage rate equals the number of boats in the harbor/capacity of the harbor (105). The map uses graduated symbols to show different usage rates: the bigger the points, the higher the usage rates. The map provides us an overall pattern of people's preferences of facilities and the spatial layout of the facilities, which will help to make recommendations on facility modification, improvement or removing. We were able to draw some conclusions from the map and chart. First, Pearl City Station has the highest observed usage rate while the Riverview Center is the least used. The top 3 most highly used facilities are Pearl City Station, the bike and walking trails and the playground. Second, people use the new boat launch much more than the old one.

Because Riverside Park is open to the public, visitors of the park are made up of different age groups. Age group diversity is an important dynamic factor that influences park facility usage. People from different age groups may have different preferences and behaviors. Figure 4.7 shows the facility usage rates of different age groups, with full results presented in Appendix E. The usage rate of each age group is generated by the following formula:

$$Usage\ rate = \frac{[Number\ of\ visitors\ of\ a\ given\ age\ group\ using\ a\ certain\ facility]}{[Total\ number\ of\ observed\ visitors\ using\ the\ facility]}$$

Harbor usage rate is based on number of boats; as a result, we could not draw conclusion on harbor usage rate by age group. The map uses pie charts to show the facility usage rate of different age groups. The map provided us with a detailed pattern of how people of different age groups

PEOPLE IN RIVERSIDE PARK	Age groups present	Children (12 & under)	Youth (13-18)	Middle Age (20-60)	Senior Citizen (60-80)	Total	Comments
		1	2	3	1	20	
	Ethnicities present	White				20	
FACILITY USAGE		Children (12 & under)	Youth (13-20)	Middle Age (20-60)	Senior Citizen (60-80)	Total	
	Boat launch (new)					9	
	Boat launch (old)					0	
	Splash pad		2			2	
	Playground	3		2		5	
	Basketball court				1	1	
	Bike trail		3			3	
	Walking trail		2	2	1	5	
	Bench/Picnic table			2		2	
	Pearl City Station			1		1	
	The Riverview Center			1		1	
	Statue					0	
	Pier					0	
	Sitting in cars						
	Boats in harbor					8	

Figure 4.2. Sample template for data collection. Source: Field observation on Oct 19, 2013.

use park facilities, which helped to make recommendations on setting target visitors for Riverside Park. Additionally, the map will supplement the population projection by telling how usage might change if the age composition of the population changes. For example, we observed that the new boat launch was totally occupied by younger age groups. This might not be true in reality; however, we can guess that among all new boat launch visitors, youth ranks highest.

Second, not all facilities are used by all four age groups. The playground and the Mississippi Harvest Statue are shared by children and middle age visitors; no senior visitors record for the old boat launch and the splash pool; no youth record for the Riverview Center and pier; no middle age visitor record for the basketball court. Due to the limitations of our observations, conclusions generated from the observation cannot reflect the real facility usage rate 100% accurately; however, these conclusions should have some similarities with the real condition.

Third, different age groups showed different preferences towards park facilities. Children were the primary observed users of the Mississippi Mist, the "Clammer" Statue, the playground, the basketball court and the pier; youth were the primary users of the new boat launch, the old boat launch and Pearl City Station. Middle aged people
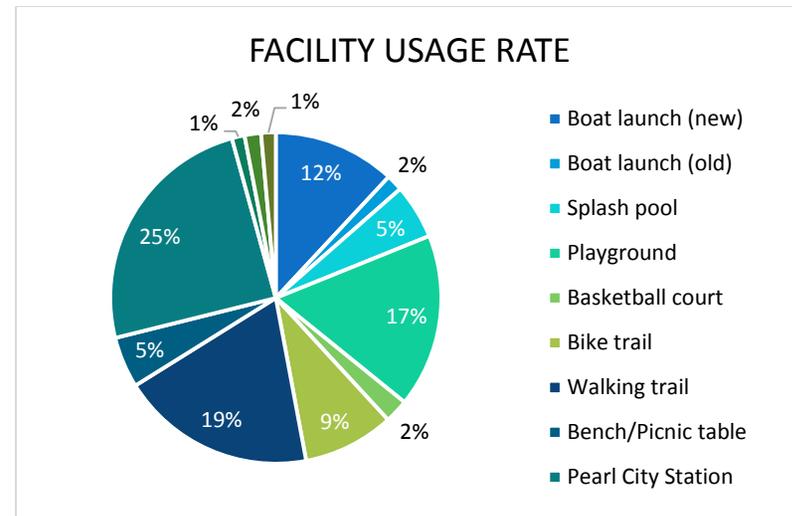

Figure 4.3. Summary of facility usage rate over all field visits.

were the primary users of the Riverview Center, the biking trail and walking trail, while senior citizens were the primary users of benches and picnic tables.
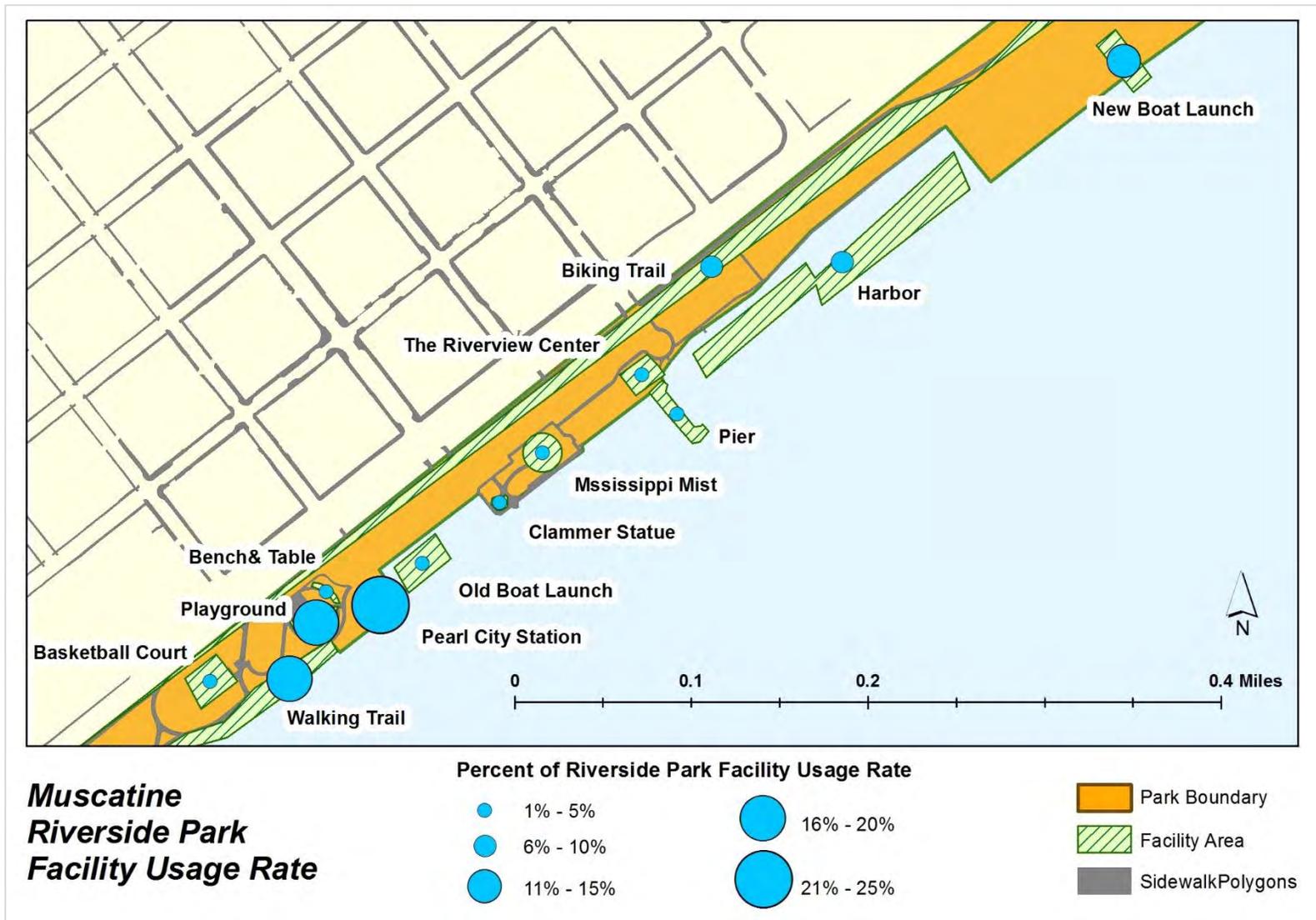
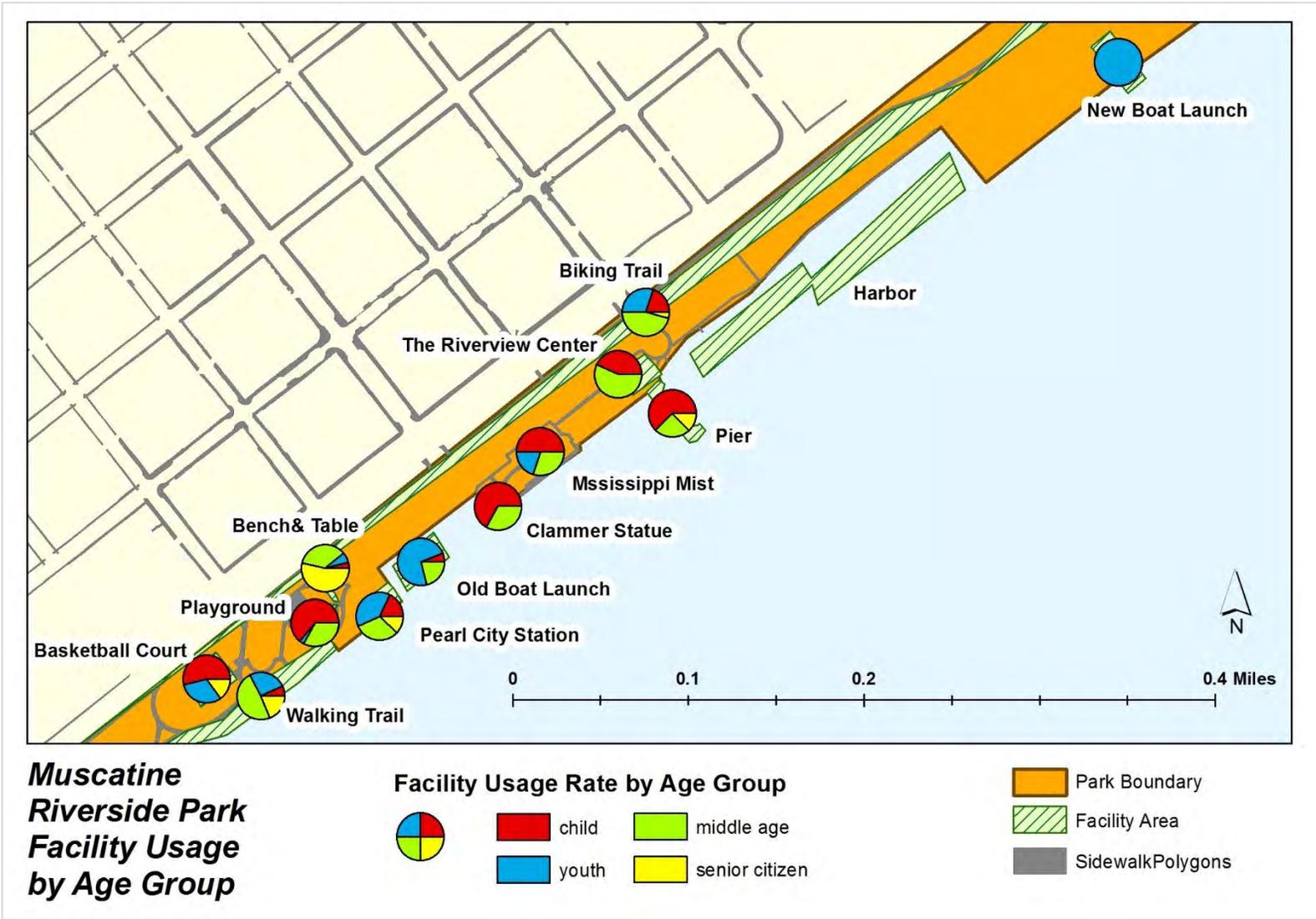*Figure 4.4. Summary of facility usage. Map by Xiaomei Xu.*

Figure 4.5. Facility usage by age group. Map by Xiaomei Xu.

Parking Data Summary

The goal of conducting parking observations was to find out the average and peak use of the parking lots. We also wanted to know the relationship between the Riverside Park parking lots and the nearby Downtown parking lots. However, one of the limitations of our observations was that several peak usages of the parking lot did not fall into the time period from September to November. For example, the annual Boat Show and 4th of July fireworks are held in the summer. Weather was another factor in the usage of the parking lots. Compared with cold weather, warmer weather attracts more visitors to Riverside Park.

The parking lots in Riverside Park are divided into three parts: Parking Lot 1 at the upriver end of the park aims at boat launching activities, Parking Lot 2 is located in the middle of the park facing downtown, and Parking Lot 3 is located beside the playground. The parking lots along Mississippi Drive that can be seen from the Riverside Park were included in our field observations. They were identified by the names of the streets on the east side of the blocks. Riverside Park Lots 1, 2, 3, and the Cedar Street Parking Lot are for public use.

Table 4.3 shows the average parking use on weekend and weekday. There are 385 parking spaces in Riverside Park. Lot 1 aims at boating activities. Its usage was less than 10% on both weekdays and weekends. The license plates survey indicates that it attracts an average of 23% cars from other counties and states on weekday and weekend. The peak usage of this parking lot is in summer when several events are held; however, it is used less in other seasons. Lot 2 not only serves the parking needs of park visitors, but also provides additional free parking space for downtown activities. Because the parking lot attracts more vehicles from downtown businesses than actual park visitors during the week, the percent of use on weekday is higher than weekend. The maximum use of this parking lot reached 82% with 200 cars parked in Riverside Park (Figure 4.8). At that time, about 30%-40% of vehicles were from other counties and states. Lot 3 is next to the playground and mainly serves parents with children. The average usage of Lot 3 was about 21% at weekend and 10% on weekday. The license plate survey indicated that most of the users are local residents of Muscatine. Another public parking lot facing Riverside Park is the Cedar Street parking lot. It had 81% use on weekdays and 47% use during the weekend. The high usage rate indicates a high demand for free parking in the downtown area near Riverside Park. The current solution to meet this need is the complementary function of the Riverside Park Parking Lot 2. During our field observations, we noticed many people who parked their cars in Riverside Park and walked across Mississippi Drive to the downtown area, rather than using these lots exclusively to visit the park.

AVERAGE PARKING USAGE (SEP 21 - NOV 2, 2013)

■ WEEKEND ■ WEEKDAY ■ MAX

	Riverside Parking Lot 1	Riverside Parking Lot 2	Riverside Parking Lot 3	Cedar	Chestnut	Iowa Ave	Sycamore	Walnut	Mulberry
■ WEEKEND	6%	22%	21%	47%	27%	29%	12%	4%	2%
■ WEEKDAY	4%	43%	9%	41%	36%	58%	39%	55%	53%
■ MAX	14%	82%	60%	50%	41%	77%	68%	76%	72%
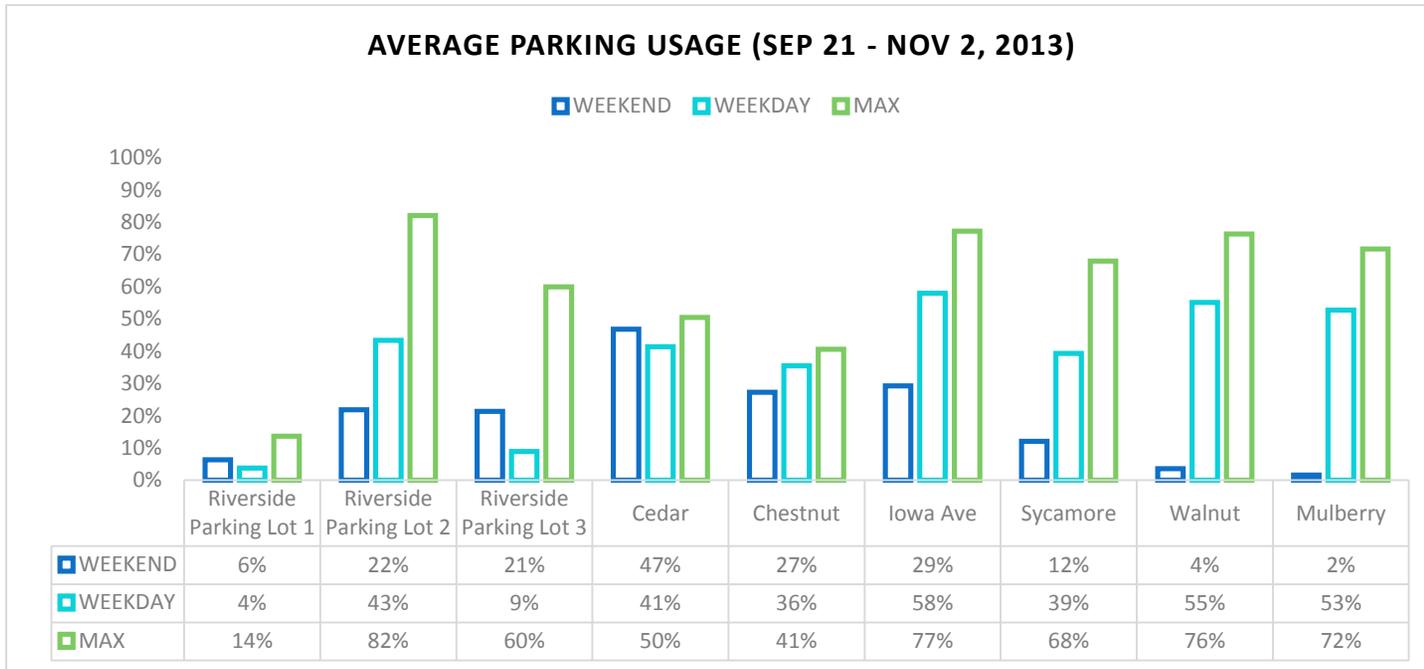
Figure 4.6. Average parking usage during field observations (Sep 21 - Nov 2, 2013).

WEEKEND				
Public Parking Lots	*Muscatine*	*Adjacent Counties*	*Other Counties*	*Other States*
Riverside Park Parking Lot 1	77%	12%	4%	8%
Riverside Park Parking Lot 2	69%	12%	7%	12%
Riverside Park Parking Lot 3	100%	0%	0%	0%
Cedar St Parking Lot	99%	0%	0%	1%
WEEKDAY				
Public Parking Lots	*Muscatine*	*Adjacent Counties*	*Other Counties*	*Other States*
Riverside Park Parking Lot 1	77%	23%	0%	0%
Riverside Park Parking Lot 2	74%	13%	5%	8%
Riverside Park Parking Lot 3	100%	0%	0%	0%
Cedar St Parking Lot	97%	1%	1%	2%

Table 4.3. Summary of weekday and weekend license plates survey.

CHAPTER 5

Survey of Best Practices

5. SURVEY OF BEST PRACTICES

Plan Comparison

 We conducted a comparison study on riverfront and thematic parks to provide insights on how problems and constraints similar to those observed in Riverside Park are addressed in other locations. In this phase, ten parks were selected based on their similarity to Riverside Park and its surrounding area. Seven parks in the Midwest highlight the cohesion between their riverfront and downtown, while three international parks exhibit overall concepts that could provide broad inspiration for future growth of the Muscatine Riverfront.

Parks in the U.S.	
Riverside Park	Burlington, Iowa
St. Charles River Corridor	St. Charles, Illinois
Phoenix Park	Eau Claire, Wisconsin
Downtown Riverfront	Chippewa Falls, Wisconsin
Southport Park	Kenosha, Wisconsin
Smale Riverfront Park	Cincinnati, Ohio
Memphis Riverfront	Memphis, Tennessee
International Parks	
Qinhuangdao Red Ribbon Park	Qinhuangdao City, China
Minghu Wetland Park	Liupanshui City, China
Superkilen Urban Park	Nørrebro, Denmark

Table 5.1. Riverfront and thematic parks surveyed to establish best practices.

Riverfront Parks in the Midwest

The first group of plans includes riverfront developments in cities comparable to Muscatine in terms of their physical, social, cultural, and demographic characteristics to identify how these cities tackled problems that are relatable to our project goals and objectives.

Riverside Park, Burlington, IA

City population: 25,663

City area: 9,819 acres (39.47 km2)

Waterfront planning document: Comprehensive Plan of Burlington Downtown/Waterfront, 2012

Year of redevelopment: 2012

Main function of the waterfront: Recreation

The comprehensive plan, which set goals for 2032 Burlington, emphasized waterfront area as an important part of its downtown development. Elements proposed for Burlington's waterfront area included public signage, riverfront access and connections, streetscaping improvements, and design guidelines for streets and sites.

The City of Burlington is currently installing boat docks around the Port of Burlington building to accommodate visitors and residents utilizing the river and downtown. In its plan, pedestrian connections from downtown to the riverfront were combined with tree-lined walkways. Tree-lined walkways enhanced pedestrian activity and made the riverfront more attractive and inviting to all visitors. Figure 5.1 illustrates the potential changes in vegetation.
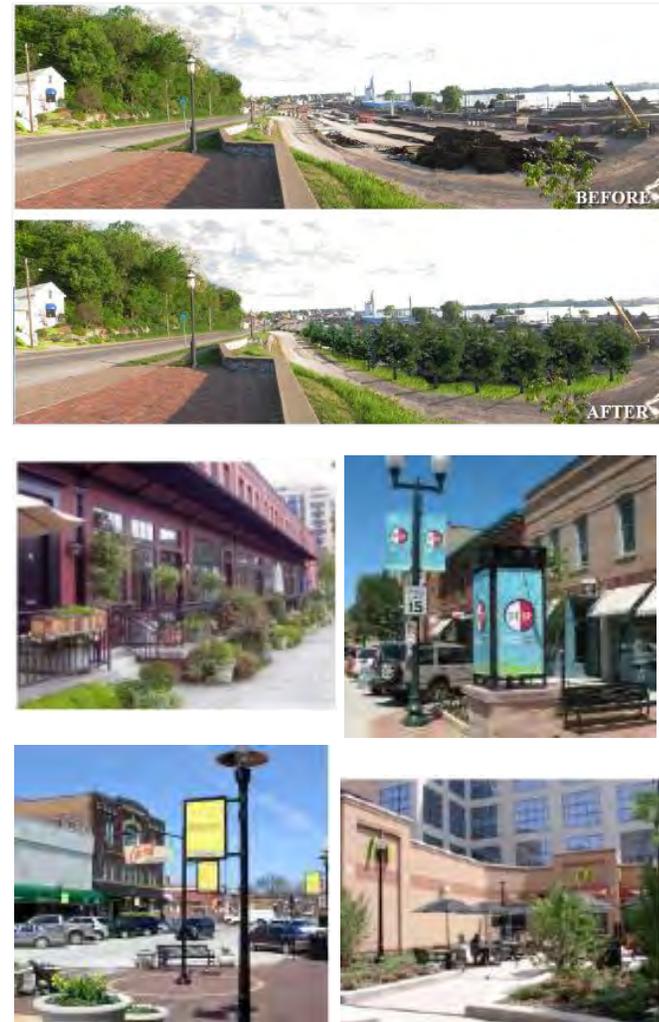
Figure 5.1. Source: Comprehensive Plan of Burlington, Chapter 5.7 Downtown/Waterfront, 2012.

St. Charles River Corridor, St. Charles, IL

City population: 33,327 (2012)

City area: 14.93 square miles (39 km²)

Waterfront length: 5.7 miles (9.3 km)

Waterfront planning documents: Downtown St. Charles Strategy Plan: An Appendix to the City of St. Charles Comprehensive Plan (2000); River Corridor Master Plan: St. Charles, IL (2002)

The Downtown St. Charles Strategy Plan indicated that in order to create a more integrated pattern of development in downtown and the riverfront, pedestrian crossings should be better facilitated. Pedestrian experience improvements could be achieved by eliminating or intensely landscaping surface parking lots in the downtown area to create active buildings along the pedestrian corridors and eliminating or relocating auto-oriented uses. Aesthetics of the area could be improved by eliminating or screening long expanses of blank or inactive walls along the riverfront, and creating visual separation between parking areas and public spaces with vegetated screens of at least 50 percent opacity with a minimum height of 28 inches and maximum height of 36 inches. Works of art and formal gardens were used at key urban intersections to create connections between downtown and the riverfront and form strong focal points to highlight the pedestrian experience.

Figure 5.2. Source: cbishop66's flickr, http://www.flickr.com/photos/17539467@N02/7896712890/.

Phoenix Park, Eau Claire, WI

City population: 65,883 (2010)

City area: 34.14 square miles (88.42 km^2)

Waterfront park area: 6.4 acres (0.026 km^2)

Year of creation: 2002, as part of the North Barstow Redevelopment District

Waterfront planning documents: North Barstow Area Redevelopment Architectural Design Guidelines (2005); Eau Claire Downtown Riverfront District: Redevelopment Strategy and Vision Plan (2012)

Phoenix Park is located at the center of Downtown Eau Claire, where the Chippewa River and the Eau Claire River intersect. The park currently serves as the trailhead for the Chippewa River State Trail, and offers a walking labyrinth, natural amphitheater, and year-round farmer's market. The park was first established in 2002 as part of the North Barstow Redevelopment District. In 2012, the Eau Claire Downtown Riverfront District redevelopment plan was created with a goal to integrate downtown area and its riverfront. The plan proposed landscaped boulevards to help slow traffic, soften the streetscape, provide pedestrians with safer crossing spaces, and better connect downtown and riverfront blocks. In addition, the plan proposed the redevelopment of underutilized streets into pedestrian plazas that create outdoor entertainment areas to improve vitality of the corridors.

Figure 5.3. downtowneauclaire.org, www.panoramio.com, volumeone.org, labyrinthsinstone.com.

Downtown Riverfront, Chippewa Falls, Wisconsin

City population: 13,704

Waterfront area: 653.6 acres (2.645 km²)

Year of (re)development: 2017- 2022

Budget: $5-9 million

Waterfront planning document: Downtown Riverfront Plan, Chippewa Falls (2007)

As stated in the plan, "the Downtown Chippewa Falls Riverfront Plan presents a vision for how Chippewa Falls can strategically invest in underutilized properties along its riverfront, and transform them into a critical regional asset and local amenity." The plan emphasizes primary elements of a riverfront park: mowed grass, hardscape, multiuse trails, an amphitheater, and support services such as restrooms and kiosks. The plan follows five guiding principles: publicly accessible waterfront, improved entrances to the downtown, new economic opportunities, regional and local connections, and pragmatic, strategic implementation. As more and more citizens have started to explore and enjoy the waterfront area, the plan focuses on the improvement of the waterfront area in terms of its connection with downtown and recreational function. The plan proposes connecting the riverfront park to the downtown area by a network of different paths. As presented in the red circle, there are several proposed paths; one of the paths would be multi-use and would

connect to the regional and city bike trail system, while other paths would be primarily for pedestrians.

Figure 5.4. Source: City of Chippewa Falls, Downtown Riverfront Plan; trialx.com; visitchippewafalls.com

Southport Park, Kenosha, Wisconsin

City population: 99,218 (2010)

Location: 2nd Avenue at the eastern terminus of 78th Street, along the shore of Lake Michigan in southeastern Kenosha

Waterfront planning document: Master Plan for Southport Park Kenosha, Wisconsin January, 2013.

Waterfront park area: 24.2 acres (0.098 km^2)

The Master Plan for Southport Park in Kenosha proposed a variety of programs to enrich the functions of the park Important components/elements of the plan include exploring opportunities for the addition of a fishing pier element and possible jetty reinstallation, addressing current parking configuration and allocation, maintaining an informal soccer field for pickup games and event space, and installing dog accommodations.

In addition, the plan placed great importance on public input. Interested groups included city officials, Kenosha Park Commission, and members of the community. The plan had various forms of public engagement such as informal stakeholder interviews and public informal meetings where participants were able to express their preferences by voting for their favorite programs. Three preliminary concept plans, which represented three very different levels of development, were generated after the first two public meetings. A preferred concept was presented at the final public meeting; after that, the park master plan was prepared.

Figure 5.5. Master Plan for Southport Park Kenosha, Wisconsin January, 2013.

Smale Riverfront Park, Cincinnati OH

City population: 296,550 (2012)

City area: 79.54 square miles (206 km²)

Waterfront park area: 45 acres (0.18 km²)

Year of redevelopment: 1997-current (Overall Riverfront); 2002-current (Riverfront Park)

Waterfront planning document: Central Riverfront Urban Design Master Plan (2000)

The Cincinnati riverfront area is the home of Paul Brown Stadium, Reds Ballpark, the National Underground Railroad Freedom Center, the Firstar Center, The Banks Mixed-Use District, and Riverfront Park. The goal of the Central Riverfront Urban Design Master Plan, conceived in 2000, was to enhance the design quality of the riverfront area in order to restore the area's historic importance as the front door to the city. In order to achieve the goal, the plan indicated the need to reconnect Downtown Cincinnati to the Ohio River, by inviting people back to the water's edge. Because an interstate highway disconnected physical and perceptual link between downtown and the riverfront, the plan proposed to facilitate below-grade east/west through movements, narrow the highway corridor down to be in scale with the typical city blocks, and restore the historic street scape with sidewalks and trees. The redeveloped Riverfront Park is a modern park with water elements integrated into its design. The double-rowed

trees running along its wide riverside promenade and a wide, continuous functional levee known as the "Serpentine Wall" bring activities closer to the river edge.
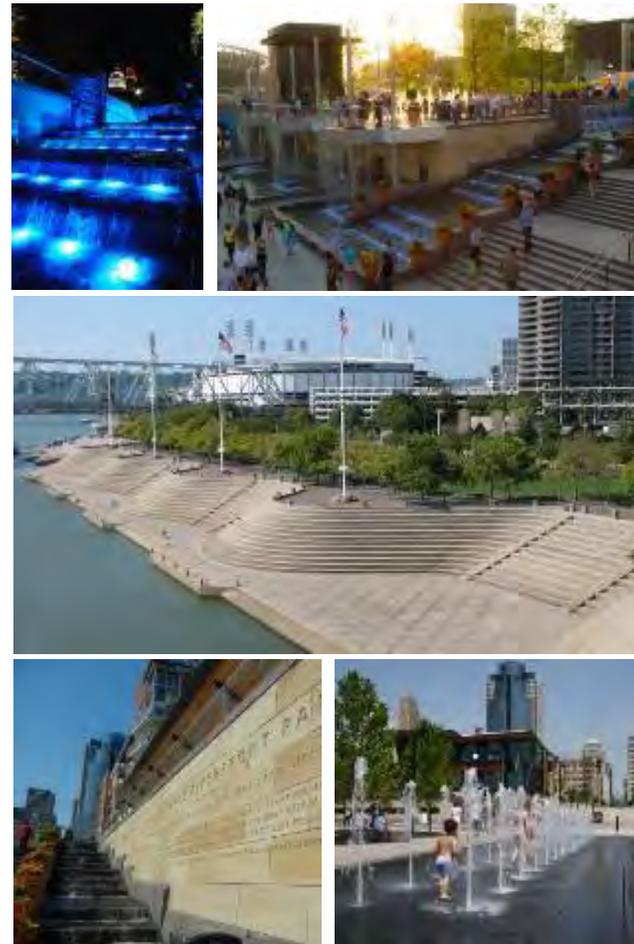
Figure 5.6. Sources: queencitytour.blogspot.com/2012, tthaddandmilan.com, forum.skyscraperpage.com, mysmaleriverfrontpark.org.

Memphis Riverfront, Memphis, Tennessee

City population: 655,155 (2012)

Year of redevelopment: 2004

Waterfront planning document: Memphis Riverfront Master Plan

The Memphis Riverfront Master Plan is a combination of different riverfront projects operated by the Riverfront Development Corporation. To enrich the functions of the riverfront area, the city provides amenities that help people better explore and enjoy the area. Mud Island River Park provides bike, canoe, kayak or pedal boat renting. The Mississippi River Museum allows its visitors to explore the city's history. The Mississippi River Trail is a bike route from St. Louis to New Orleans. The Memphis Queen Riverboats offer a variety of cruises on the Mississippi River, while the Riverfront Trolley Loop is an extension of the Main Street Trolley which links views of the river with downtown attractions. Additionally, as the city has 11 riverfront parks, the integration and connectivity of these parks would help to improve the riverfront area as a whole. According to the plan's annual report in 2010, 4 modern sculptures were created to show the city's history and culture and several trails and drives were built to serve the connectivity between parks.

Figure 5.7. Source: Memphis Riverfront, memphisriverfront.com

Parks with Unified Themes

Our second group of comparative plans was taken from cities overseas, generally from cities significantly different than Muscatine in terms of size, population, socioeconomic, and overall cultural characteristics. For these cities, we wanted to observe how they applied a unified theme to their respective parks and how we could take that concept and scale it down to Muscatine's relative size to be applicable. These concepts provided inspiration for the development of our alternative themes.

Qinhuangdao Red Ribbon Park, Qinhuangdao City, Hebei Province, China

Waterfront park area: 49.4 acres (0.2 km²)

Project completion: 2008

Architects: Turenscape

Red Ribbon Park is located on the Tanghe River, in the eastern urban fringe of Qinhuangdao City. The goal of the redevelopment was to preserve the natural habitats along the riverfront while accommodating the need of urban recreation and education. The riverfront park was formerly a dumpsite, covered with shrubs and messy grasses, therefore deemed inaccessible and unsafe for people to visit. A bright red "ribbon", the principal design element made from fiberglass, stretches for half a kilometer along the riverbank, integrating a boardwalk, lighting, seating, and linking the diverse native vegetation with the four flower gardens. This ribbon is lit from the inside, glowing red at night, and providing a vivid contrast against the green terrain and the shimmering river water. This park demonstrates how a minimal design solution can dramatically improve the landscaping of a natural park.

Figure 5.8. Source: Turenscape, www.turenscape.com.

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Minghu Wetland Park, Liupanshui City, Guizhou Province, China

Waterfront park area: 77.1 acres (0.31 km^2)

Project completion: 2012

Architects: Turenscape

Minghu Wetland Park is located along the Shuicheng River, Liupanshui City. The objectives of the park project were to restore the natural ecology of the river, upgrade the urban open space system, and increase the value of urban waterfront land. Shuicheng River has had severe pollution that diminished its capacity for natural flood control and ecological self-purification over time. The revitalization project started out with creating a series of terraced wetlands with different capacities of purification in order to regulate urban flood and recharge the river water. Native plantings and wildflower fields were reintroduced to the riverbank, while a network of pedestrian and biking trails were added to integrate urban recreation into the ecological space.

Figure 5.9. Source: Turenscape, www.turenscape.com.

53

Superkilen Urban Park, Nørrebro, Copenhagen, Denmark

Area: 7.4 acres (0.03 km²)

Project budget: 11 million USD

Project completion: 2012

Architects: Topotek 1/ BIG Architects/ Superflex

Superkilen stretches for half a mile through one of the most ethnically diverse and socially challenged neighborhoods in Denmark. The concept of the park was to incorporate urban characteristics of the 60 different nationalities within its vicinity, creating an exhibition of global urban diversity in contrast to the homogeneity of Denmark in the larger scale. This contemporary park caters to an extensive range of cultural, physical, and recreational activities, transforming the diverse space into one large urban living room for residents of all ages and cultural backgrounds.
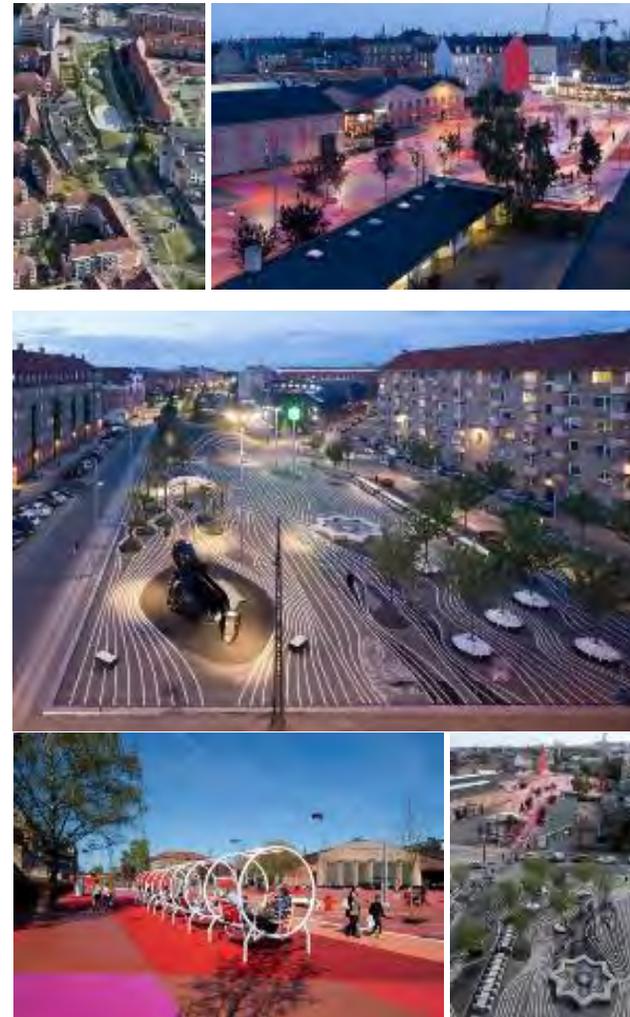

Figure 5.10. Source: ArchDaily, www.archdaily.com.

Survey of Environmental Best Management Practices

Because of the widespread problems and difficulties of regulating pollution from diffuse sources, nonpoint source pollution from stormwater runoff is generally considered to be the number one cause of waterway impairment in the nation today.[21] For this reason, it is recommended that municipalities such as Muscatine that are located in close proximity to major bodies of water incorporate stormwater management strategies into both new and existing developments.

Many environmental organizations such as the United States Environmental Protection Agency (US EPA) and the National Resources Defense Council offer a wide variety of strategies for managing pollution from stormwater runoff. Some of these strategies, such as watershed planning, conservation and performance zoning, and conservation design, are beyond the scale of this project. However, there are many site-specific control and treatment techniques that may be viable in both Riverside Park and the downtown. Site-specific best management practices (BMPs) are designed to slow and treat runoff before it reaches natural water bodies.[22] Because they are small-

scale improvements, it is typically possible to retrofit areas that are already developed, making such techniques a good fit for the existing developed areas of Riverside Park and downtown.

There are four general approaches to stormwater management control. Infiltration allows water to percolate through the soil, mimicking the natural hydrological cycle. Detention involves storing the runoff before slowly discharging it to reduce peak flows. Filtration requires the water to pass through some type of filter to remove pollutants. Finally, bioinfiltration and bioretention techniques use plants to filter and/or store runoff. Ideally, multiple approaches would be employed to capture the maximum benefit. The following site-specific stormwater best management practices may be suitable for installation in Riverside Park and the downtown:

Stormwater wetlands

Stormwater wetlands or constructed wetlands remove pollutants from stormwater through settling and biological uptake. Though they are typically less diverse than natural wetlands due to their specific purpose of

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[21] National Resources Defense Council, *Stormwater Strategies: Community Responses to Runoff Pollution*, 1999.
http://www.nrdc.org/water/pollution/storm/chap2.asp; Center for Watershed Protection, *Stormwater Management*, 2013.
http://www.cwp.org/2013-04-05-16-15-03/stormwater-management; U.S.

Environmental Protection Agency, *Nonpoint Source Pollution: The Nation's Largest Water Quality Problem*, www.epa.gov/OWOW/NPS/facts/point1, January 21, 1997.
[22] NRDC, 1999.

treating runoff, they are also able to provide habitat for many species that depend on aquatic ecosystems. Because of their ability to prevent pollutants from entering major waterways while providing valuable habitat and aesthetic benefits, they are considered one of the most effective and relatively inexpensive stormwater management practices.

Green parking

Green parking refers to a combination of techniques applied in concert to reduce the contribution of parking lots to total impervious surface cover. Green parking techniques that could be applied in the study area include installing bioretention areas between rows of parking spaces, encouraging shared parking, and utilizing alternative pavers. Bioretention cells temporarily store and filter stormwater while simultaneously providing an opportunity for attractive landscaping. Shared parking works best in mixed use areas, such as downtown Muscatine, by allowing two parties that need parking facilities at different times to share the same parking lot. Alternative pavers can be composed of gravel, mulch, pervious hardscape materials, and even grass pavers or turf blocks. These work best in overflow parking areas that are typically only utilized during peak periods.

Figure 5.11. Stormwater wetland. Source: NC State University, College of Agriculture and Life Sciences; McConnell Springs Park Flickr. Grasscrete and turf reinforcement grid, greenlandlady.com; ecohex.com.au.

Vegetated buffers

Vegetated riparian buffers protect water quality by employing plants to slow runoff, filter sediment, and prevent erosion. They are most effective and beneficial on floodplains, along stream banks, and on unstable slopes. These buffers are simple to install and maintain, they have been known to provide more than a 90% reduction in sediment and nitrate concentrations.[23] One variation on the vegetated buffer involves applying soil over the top of existing riprap to provide growth media for native herbaceous vegetation.[24]

Bioretention facilities

Bioretention facilities and rain gardens direct runoff into shallow, landscaped depressions that are specially engineered to remove pollutants. Runoff is temporarily stored and filtered before percolating down into the ground. Bioretention systems are best utilized in small sites and are often installed as parking lot islands or pocket parks in urban settings.

Figure 5.12. Vegetated riprap in Eau Claire, Wisconsin. Source: University of Wisconsin-Eau Claire E-View, 2005. Bioretention cells in a parking lot at Bradford Beach in Milwaukee, Wisconsin. Source: Sweet Water's flickriver.

[23] United States Environmental Protection Agency, National Pollutant Discharge Elimination System Fact Sheet, *Vegetated Buffers*, 2012.

http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&Rbutton=detail&bmp=50.
[24] City of Eau Claire, WI presentation at Upper Midwest APA Conference

Economic Development Research

This section will discuss the potential economic benefits of the proposed improvements of Riverside Park. Besides. Other benefits such as environmental benefits, aesthetic benefits, and historic& cultural benefits are also included in this section. According to cities that have already implemented successful riverfront redevelopment projects, these projects will bring numerous benefits to their local communities. Seven cities with successful park redevelopment projects were selected as references, which help to analyze the potential economic benefits of riverfront improvements. In addition, Greg Jenkins, President and CEO Greater Muscatine Chamber of Commerce and Industry, indicated that significant economic change will happen in the community due to the construction of a hotel, parking deck, and convention hall. This new construction will likely spur retail development and riverfront revitalization, allowing him to "envision a great deal more utilization of Muscatine's riverfront."[25]

Economic Principle Support

According to the American Planning Association, urban parks have five main economic impacts on local communities.[26] First, real property values are positively affected. Parks create a better environment for communities, and more visitors are attracted to the local places.

First, real property values are positively affected. According to the Roback Model, amenity effects play a prominent role in the U.S. real estate market.[27] The increased environmental and aesthetic benefits will promote local real property value.

Second, municipal revenues are increased. Property tax, sales tax and tourism-related benefits are included. "Property tax is one of the most important revenue streams for cities."[28] As mentioned before, real property values are positively affected; thus, with the development of property value, property tax revenue will increase as well. In addition, more tourism brings more sales activities

[25] Greg Jenkins, Personal communication, 26 Mar 2014.
[26] How Cities Use Parks for Economic Development. CITY PARKS FORUM BRIEFING PAPERS.
American Planning Association. From:
http://www.planning.org/cityparks/briefingpapers/economicdevelopment.htm

[27] Jan K. Brueckner. (2011). Lectures on Urban Economics. Chapter 11: Urban Quality-of -Life Measurement.
[28] Measuring the Economic Impact of Park and Recreation Services, JOHN L. CROMPTON, National Recreation and Park Association. 2010.

and more related benefits such as revenues of hotels and restaurants.

Third, affluent retirees are attracted and retained. An attractive park with multiple functions will not only draw more tourism but also retirees. Under the Roback Model, people tend to live in their desired places even by paying more. [29] "These retirees transfer their assets into local investment and banking institutions, expanding the local deposit base that can be used for commercial and industrial financing."[30]

Fourth, skilled workers and talent are attracted to live and work. Places with various outdoor recreational activities are more likely to attract skilled workers. These workers will devote their money to the local economy through jobs, housing and taxes.

Lastly, homebuyers are attracted to purchase homes. According to the National Association of Home Builders, "65 percent of home shoppers surveyed felt that parks would seriously influence them to move to a community."[31] This situation fits the Roback theory as well.

Case Studies

We chose seven cities for a comparison study on the possible economic benefits of improving Muscatine's riverfront area. The seven comparison cities were Burlington, Iowa, Chippewa Falls, Wisconsin, Davenport, Iowa, Des Moines, Iowa, Eau Claire, Wisconsin, Rock Island, Illinois, and St. Charles, Illinois. All selected cities have similar physical size and population to Muscatine, they are all located on a river, and have redeveloped or updated a park on a on a body of water.

Phoenix Park, Eau Claire, Wisconsin

The City of Eau Claire created a redevelopment plan for its Phoenix Park located along the Chippewa and Eau Claire Rivers. The plan was completed in 2005. This formerly blighted area is now home to numerous commercial and mixed-used developments that occurred since the redevelopment of the park. Developers attribute their interest in working in Eau Claire to the improved viewshed. The assessed land value has risen from $10 million to $46 million since redevelopment began, and the city predicts that it will reach $56 million. Rents for commercial spaces have increased dramatically and occupancy rates are high.

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[29] Jan K. Brueckner. (2011). Lectures on Urban Economics. Chapter 11: Urban Quality-of -Life Measurement.
[30] Measuring the Economic Impact of Park and Recreation Services, JOHN L. CROMPTON, National Recreation and Park Association. 2010.

[31] How Cities Use Parks for Economic Development. CITY PARKS FORUM BRIEFING PAPERS. American Planning Association.

Additionally, the volume of police alerts and monitoring has decreased due to the fact that there are more people living and working in the area. What is more, the tax base before development was $10,440,900; the new tax base is $23, 872 600.[32] Apart from housing, the park also has positive impacts on Eau Claire's farmers' market: $9 million has been invested for condominium and commercial construction that hosts the Eau Claire Farmers' Market.[33]

Port of Dubuque, Dubuque, IA[34]

The City of Dubuque relocated heavy industries from the Port of Dubuque to their Industrial Center West, thus opening the way for the redevelopment of all properties on the Port to support tourism and office space. According to Jill Connors, member of Dubuque's Economic Development Department, the redevelopment project has retained 766 jobs and created 834 jobs in the local community. She also stated that the redevelopment has been a positive economic step for Dubuque.

Figure 5.13. Train Festival in Rock Island. Source: http://qctimes.com/gallery/news/local/train-festival.

Schwiebert Park, Rock Island, IL[35]

Schwiebert Riverfront Park has become one of Rock Island's main attractions. It has far exceeded the city's expectations by bringing enormous economic benefits and opportunities for the local community. "On a daily basis in the summertime, we may see anywhere from 500 to 1,000 people go through the park in a day," Bill Nelson, city Parks and Recreation Director said. "We thought it would be fairly popular, but it is more than we imagined. In the first

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[32] Schreiber Anderson Associates. (2009). PHOENIX PARK AN URBAN REVITALIZATION CATALYST.
[33] Ibid.
[34] Jill Connors. Economic Development Department. (2014).

[35] SAA Design Group. Schwiebert Park Exceeds Expectations. From: http://www.saa-madison.com/currents/schwiebert-park-exceeds-expectations

year, we've had just about three to four years of use out of it."

The park even has a high tourism rate in the winter because it provides activities such as eagle watching during the colder months. Holding big events and providing various activities is one of the strategies that contribute to the success of the park. In 2011, a big event called Train Festival (Figure 5.14) brought more than 30,000 people from 46 states and 14 countries, generating an estimated economic impact of $5.5 million.

Smale Riverfront Park, Cincinnati, OH

The Smale Riverfront Park has had a positive effect in generating adjacent development. In its surrounding area, 400 residential units and office and commercial activities will be established.[36] The park itself is expected to bring over one million visitors downtown after redevelopment is completed.[37] In addition, the park will generate revenue by providing a venue for major events and festival; restaurants and concessions are also able to generate revenue.

Riverside Park, Burlington, Iowa

The City of Burlington updated its comprehensive plan in 2012. The document included a plan to redevelop and update the downtown waterfront. The implementation of the plan has not occurred. The city does not monitor the number of businesses in the downtown and cannot say if the plan has increased or decreased the amount of development or businesses locating in the area. However, the Greater Burlington Partnership, which plays an active role in economic development in the Downtown, predicts that the plan will have an increasing effect on commercial and other development activities. Additionally, they expect to see an increase in visitors to downtown restaurants and shops.

Downtown Riverfront Plan, Chippewa Falls, Wisconsin

The City of Chippewa Falls created a Downtown Riverfront Plan in 2007. Though plan implementation is not yet complete, economic activity is already increasing in the surrounding area. A consulting firm built their new $4.5 million headquarters in the area, a development that would not have occurred without the Downtown

[36] Cincinnati Park Board. CINCINNATI JOHN G. AND PHYLLIS W. SMALE RIVERFRONT PARK. From: http://www.sasaki.com/project/83/cincinnati-john-g-and-phyllis-w-smale-riverfront-park/
[37] Andrew Goodwin. (2008). Smale Riverfront Park in Downtown Cincinnati Has a Big Urban Impact. From: http://inhabitat.com/smale-riverfront-park-

in-downtown-cincinnati-has-a-big-urban-impact/cincinnati-smale-riverfront-park-14/

Riverfront Plan. Chippewa Falls expects vacant commercial spaces in the downtown to turn over and a handful of new buildings to be constructed in the future. In addition, a permanent farmers' market will be established, which is supposed to provide economic opportunities for small vendors. Also, those who have already invested in the community will be more convinced that the community will continue to be strong and vital with the plan.[38]

Davenport, Iowa

The City of Davenport created a plan for the Mississippi Riverfront, including Le Claire Park, Centennial Park, and Modern Woodmen Park, in 2007. This plan looked to update the city's previous riverfront development plan and create a stronger connection with the downtown. Since its implementation, 38 new businesses have moved into the downtown, and more than 300 units of market rate housing has replaced subsidized housing. The park now also serves as a flood buffer, preventing Davenport from having to construct a levee to protect the downtown. Davenport has also seen an increase in the number of tourists visiting the area after the plan update.

Proposed Economic Impacts on Muscatine

Muscatine's Riverside Park has similar functions as the parks studied in this section. Based on the successful experience of those riverfront parks, Muscatine is expected to have similar benefits and economic impacts after the proposed improvement projects are implemented. Mr. Jenkins also agreed that the redevelopment project will bring more traffic into the local community; the increased traffic may ignite additional development that could lead to buildings in the downtown being utilized for more multi-purposing than they are today.[39] This could result in more buildings having retail on the first floor, professional offices the next level and potential residential use on the top floors.[40]

With these developments, expanded restaurant activity and retail opportunities are also expected in the future. Figures 5.15 through 5.17 show existing retail, service, and drinking and dining establishments, which stand to gain economic benefits from additional riverfront improvements, according to Mr. Jenkins. These facilities include Riverside Restaurant LLC (303 E 2nd St, Muscatine, IA 52761); Salvatore's Ristorante (313 E 2nd St, Muscatine, IA 52761); Guadalajara Restaurant (208 E 2nd St, Muscatine, IA 52761); Tantra Cafe (213 Iowa Ave,

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[38] Chippewa Falls Government. From: http://www.chippewafalls-wi.gov/Downtown_Riverfront_plan.htm.

[39] Greg Jenkins. (2014),
[40] Ibid.

Muscatine, IA 52761); and Avenue Subs (113 Iowa Ave, Muscatine, IA 52761).

Restaurants located a little further from Riverside Park may also be impacted by the redevelopment project. Mr. Jenkins listed the following: Elly's, Port City Underground, Wine Nutz and Francesca's. Obviously, the improvement projects are expected to have a positive impact city-wide.

There are many retail operations in Muscatine. When asked which retailers are most likely to be impacted by riverfront improvements, Mr. Jenkins said that downtown retailers including Hall Tree, Just Because, Western Drug, hairstylists and two tire dealers are likely to be impacted by improvement projects. Apart from existing retail, additional retail operators will be attracted to the downtown area since increased traffic to the riverfront can drive some shopping once the river is better connected to the central business district.

In term of hotels, compared with restaurants, most hotels are located away from Riverside Park. Overnight visitors are the main source of economic benefits in this section. Besides what listed above, Mr. Jenkins mentioned other businesses that might be impacted by the redevelopment project as well: sports attire and equipment shops, bike shops, bars, and vendors who may be licensed on the riverfront.
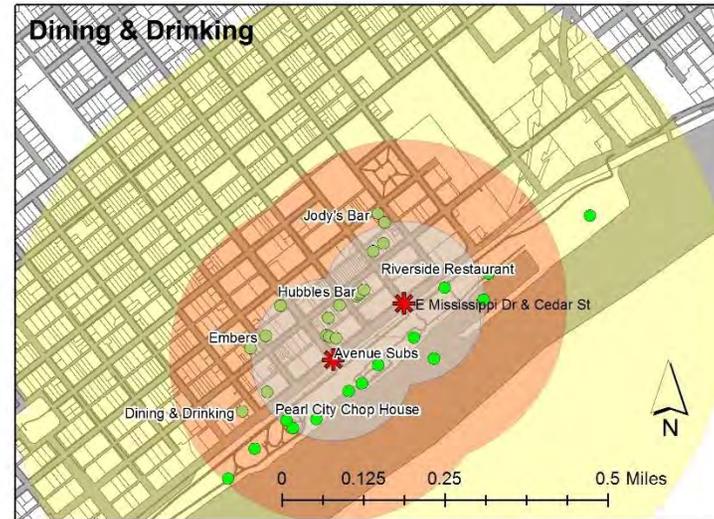
Figure 5.14. Spatial concentration of dining and drinking establishments within a walking distance. Map by Adnya Sarasmita.
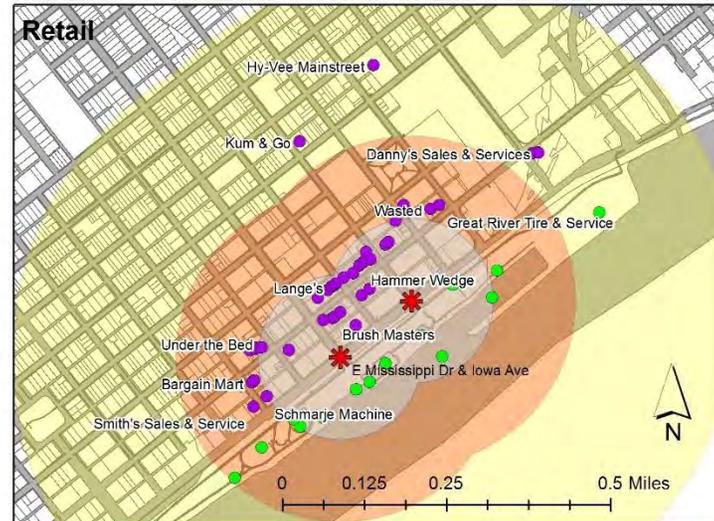
Figure 5.15. Spatial concentration of retail establishments within a walking distance. Map by Adnya Sarasmita.

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To conclude, the potential economic benefits brought by the proposed project is not only limited to riverfront area; it has a wider range of impacts by generating economic opportunities even from the outside of the community. This expectation is consistent with the economic impacts documented by cities with successful riverfront projects.
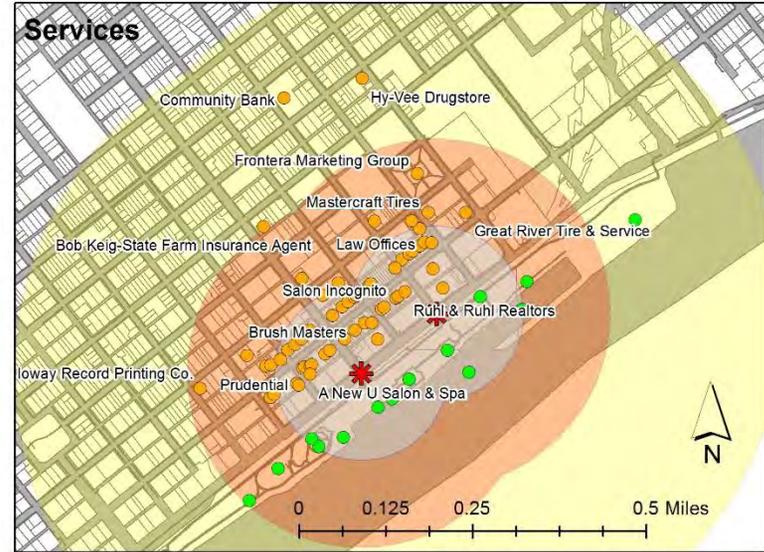
Figure 5.16. Spatial concentration of service establishments within a walking distance. Map by Adnya Sarasmita.

CHAPTER 6

Public Input

6. PUBLIC INPUT

Muscatine has a long history of successful public involvement in their planning processes. The two most recent plans to achieve this success were the 2013 Comprehensive Plan and the Mississippi Drive Corridor Plan. Partnership with the public is important to the implementation and success of the Riverfront Strategic Growth Plan as well. The Riverfront Strategic Growth Plan garnered public involvement in three ways: a public opinion survey, focus group data from other teams working in Muscatine, and finally, a public open house.

Survey

The survey was designed to examine how the park is currently used by the public. The twenty-two question survey asked the public to describe how they used and viewed the park, what future improvements they wanted to see, and what relationship Riverside Park and downtown share.

We used a targeted approach to distribute the survey. Reaching all population groups has been a challenge faced during Muscatine's prior planning projects. Our targeted approach increased the focus on groups that have been absent in the past; for example, the survey was translated into Spanish to encourage members of Muscatine's Hispanic population to take the survey. Eleven community groups assisted with survey promotion and distribution, including the Young Professionals Network, the Blue Zones
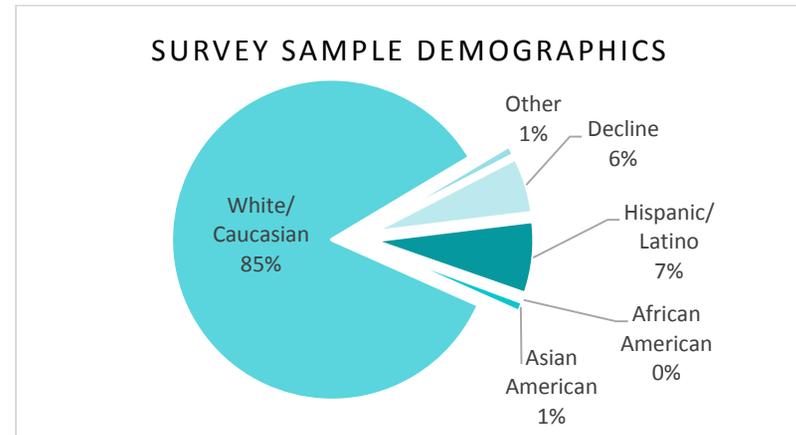
Figure 6.1. Demographics of the survey respondents were representative of the Muscatine population.

Initiative, the Diversity Service Center, the Rotary Club, and the Muscatine Soccer Club.

Participants accessed the survey online or obtained paper copies from the Musser Public Library, City Hall Community Development Department, and the Muscatine Diversity Center. The Diversity Center played a key role in distributing the survey to the Hispanic population, which constitutes 14% of Muscatine's total population. Additionally, the survey was advertised on utility bill inserts distributed in December 2013, expanding the targeted group to every resident that receives city utility bills. The survey launched on November 11th, 2013 and was available online and in paper copy locations until January 14th, 2014.

Survey Results

The survey received a total of 320 respondents with a margin of error of 5.44% at a 95% confidence level. 85% of respondents lived and worked in Muscatine. Three respondents did not live or work in Muscatine. The average age of respondents was 41-60. 78% of respondents had children. Demographic characteristics of the sample population were distributed as follows: 85% non-Hispanic white, 7% Hispanic or Latino, 0.3% African American, 1% Asian American, 1% other, and 6% declined to answer. Overall, this demographic composition was fairly representative of the entire Muscatine population.

Most respondents reported visiting Riverside Park on a monthly basis. Respondents cited physical activities, entertaining children, and enjoying the view of the river as their top three reasons for visiting the park. The biking/walking trail, playground, picnic tables/benches, and Pearl City Station/Riverview Center were listed as the most commonly used facilities. 67% of respondents both traveled to the park by car and preferred the current level of parking provided. Respondents reported not feeling completely safe crossing Mississippi Drive between Riverside Park and downtown. Respondents also indicated a disconnection between Riverside Park and the downtown area manifested in the visual appearance, physical connections, and environment of the two areas.

The survey asked respondents to choose an ideal park theme from the four images presented in Figure 6.2.

7. Which picture represents your ideal vision for the Riverside Park area? (Circle all that apply)

Figure 6.2. Four "ideal type" alternatives presented in the Riverfront & Downtown Area Survey. [1] High Tech Riverfront, [2] Botanical Art Garden Riverfront, [3] Natural Riverfront, [4] Fitness Riverfront.
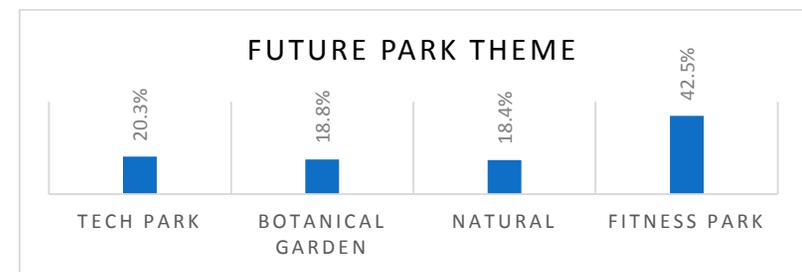
Figure 6.3. The image corresponding to the Fitness Park alternative was the most popular with survey respondents.

Preliminary High-Tech, Natural, Fitness, and Botanic Art Garden alternatives were developed to represent extreme examples for parks, based on Max Weber's "ideal type" theory.[41] The Natural Riverfront emphasized native plants, stormwater retention, and a prairie appearance. The Botanic Art Garden Riverfront featured public art, flowering plants, and a European garden appearance. The High-Tech Riverfront highlighted human-made structures such as fountains and cement hardscaping, giving it a futuristic appearance. Finally, the Fitness Riverfront focused on physical activities, fitness equipment, and an outdoor gym appearance.

Respondents favored images corresponding to the Fitness and Arts & Industry themes over the Working Ecosystem and Botanic Garden themes (Figure 6.3). Respondents also indicated that the top three facilities that could be added to Riverside Park to increase their frequency of their visits were a concert/performance venue, more outdoor recreation opportunities, and more landscaping and trees.

Correlations/ Regressions

We utilized correlations to determine if certain subsets of the Muscatine population had different preferences for the riverfront. All correlations were run at a 95% confidence level. Results showed that "young professional" respondents indicated that there is currently too much parking on the riverfront. Additionally, this age group responded that they would like to see wayfinding signage in Riverside Park to direct them to local restaurants and businesses in downtown. Secondly, older respondents identified that Riverside Park and downtown are not well connected. Additionally, older respondents did not find the view of downtown from Riverside Park visually appealing.

In addition to correlations, regressions were used to determine what characteristics of respondents influenced their answer choices. The characteristics used were age, number of children, gender, years lived in Muscatine, and minority classification. All regressions used a 95% confidence level. Examining the amount of parking, the model explained 40% of the variation and 17% of the relationship between respondents' characteristics and their answers. The model also showed that respondents who belonged to a minority and a younger age group indicated that there is too much parking at the Riverfront.

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[41] Ideal Type. Ashley Crossman. From:
http://sociology.about.com/od/I_Index/g/Ideal-Type.htm.

Focus Group Data from Other IISC Student Groups

We also gathered findings from focus group conducted by other IISC student groups working in Muscatine to increase the level of public comment taken into consideration for the Riverfront Strategic Growth Plan. According to a focus group organized by the Population Workforce Survey and Analysis group, young professionals wanted to see more outdoor dining options, a reduced emphasis on historic aspects of Muscatine, greater walkability, expanded recreational opportunities, and more wayfinding for local businesses and restaurants. Bicyclists interviewed by IISC's Connectivity Master Plan Group expressed a desire for more for parks and recreation areas to server as destinations or hubs for wayfinding and connectivity, more mobility in the downtown, more bike racks, and more amenities such as benches, water fountains, and restrooms in Riverside Park..

Public Open House

On Saturday March 8th, 2014 we held an open house to present our preliminary concepts to the community and gather public comment on each alternative (Figure 6.4). The open house asked residents to rank the alternatives through voting. Display boards containing descriptions, site plans, and design renderings of each alternative gave residents an idea of how different themes and features would look in the riverfront area. Residents received one sticker to vote for their favorite overall theme and three stickers to vote for their favorite proposed features from

Figure 6.4. 50 participants cast their votes for alternatives on March 8th, 2014.

any combination of the three themes. Participants could also vote for a "no improvement" or "business as usual" alternative by returning their stickers rather than placing them on a display board. Each alternative had five proposed facilities that fit with the overall theme. A willingness to pay component was the final activity of the open house. Participants indicated whether they would be willing to contribute finances or volunteer their time for physical labor or fundraising activities in order to help their favorite theme(s) be implemented.

Public Open House Results

A total of 50 participants cast their votes at the open house. The Arts & Industry theme was the favorite, capturing 44% of the votes. The Working Ecosystem alternative was the second most popular theme capturing 26% of votes, with

the Fitness Riverfront coming in third with 24%. 6% of participants voted to maintain baseline conditions (Figure 6.5).

The top facilities chosen were the sheltered picnic area, the amphitheater, stairs access to the river, and the farmers market (Figure 6.6). The demographic composition of the open house participants was not representative of the Muscatine population. 98% of participants were non-Hispanic white and 2% were Hispanic. The average age of visitors (31-65) is somewhat representative of the population.
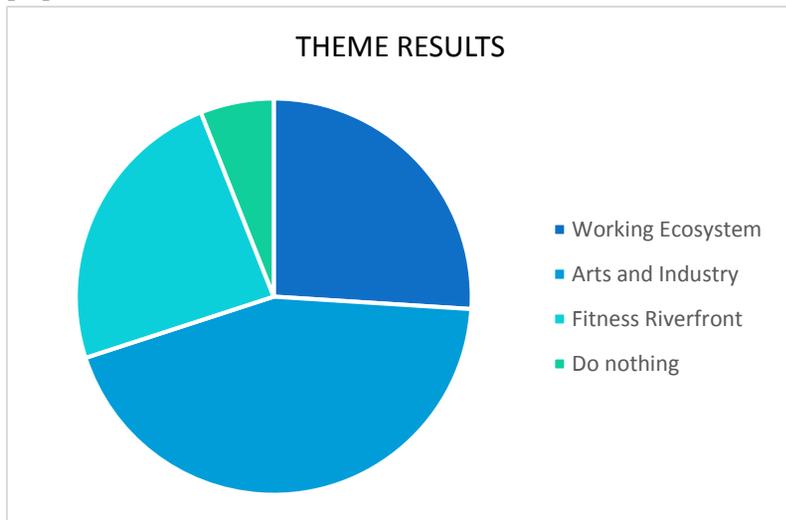
Figure 6.5. The Arts and Industry alternative received significantly higher votes than the other alternatives.

Figure 6.6. The features from the Working Ecosystem and Fitness alternatives received a high number of votes. The three colors represent the three different alternatives: Working Ecosystem (turquoise), Arts and Industry (blue), and Fitness (dark blue).
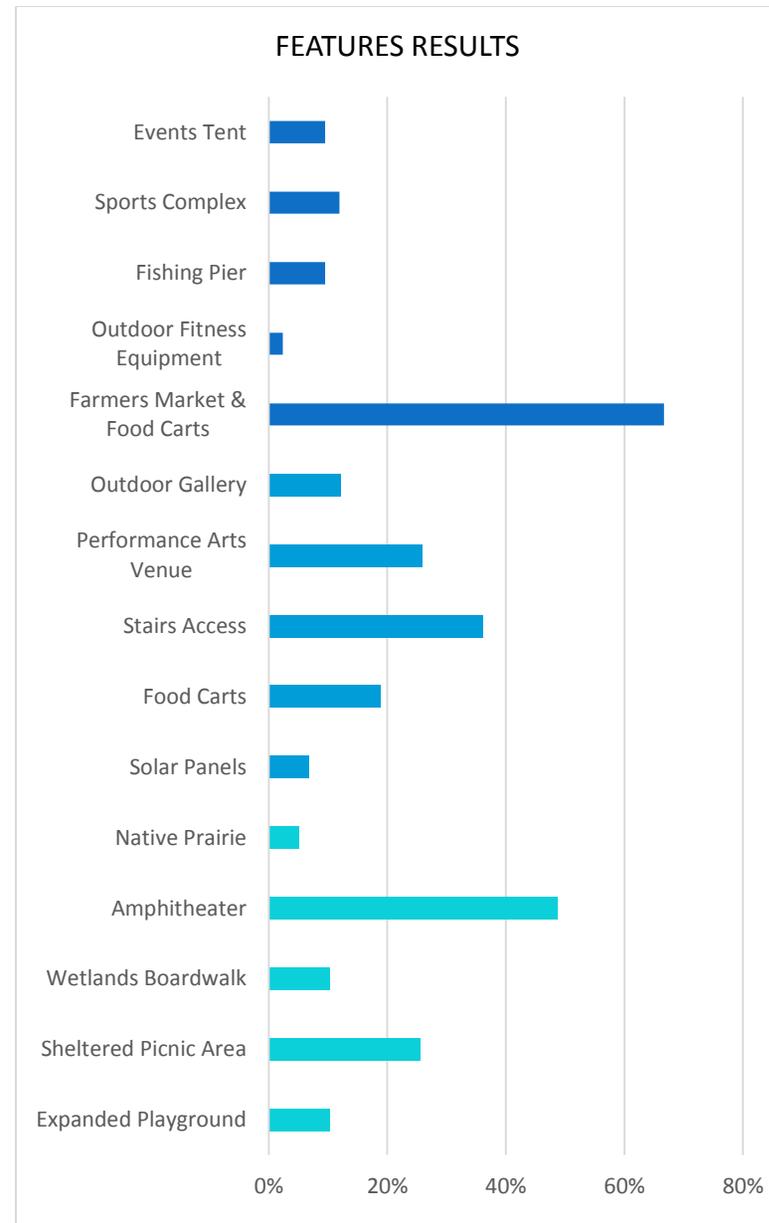
CHAPTER 7

Development of Alternatives

7. DEVELOPMENT OF ALTERNATIVES

Based on our research findings, our group developed four different "ideal type" alternatives to help guide the Muscatine community in articulating their visions and preferences for the future growth of the riverfront area. According to Max Weber, "the ideal type is an abstract model used as a standard of comparison, which enables us to see aspects of the real world in a clearer, more systematic way." [42] The broad, conceptual visions presented simplified realities of potential park models developed with respect to the city's goals and to the area's unique opportunities and constraints. By presenting divergent, extreme scenarios, we hoped to determine what broad vision appeals most to project partners, residents, and city staff. Our final recommendation encompassed a patchwork of elements from various alternatives to create a Riverfront Growth Plan tailored to Muscatine's unique needs and desires

Our group originally constructed five preliminary alternatives, including the option to stay the current course of riverfront development without adopting any overarching vision for the area. The remaining four alternatives reflected varying levels of activity, development, maintenance, and incorporation of larger city goals. This first round of alternatives consisted of the Business as Usual (maintain baseline conditions), Natural Riverfront, Hi-Tech Riverfront, Fitness Riverfront, and Botanic Art Garden themes. The High-Tech alternative was high-tech/artificial oriented, including various facilities focused on encouraging visitor interaction. This alternative required the largest modification of the current park in terms of landscape and was mainly derived from Cincinnati's Smale Riverfront Park, with its lit waterfalls and serpentine staircase. The Botanical Art Garden Riverfront aimed to increase trees and botanical plantings throughout the park. This idea was generated from several comparison cities: tree-lined walkways from Burlington, vegetated screens from St. Charles, and mowed grass from Chippewa Falls. The Natural Riverfront alternative focused on natural elements and environmental services. Elements from several comparison cities inspired this alternative: vegetated cover over rip-rap and natural landscaping techniques from Phoenix Park in Eau Claire, and stormwater wetlands from Qinhuangdao Red Ribbon Park in Qinhuangdao City and Minghu Wetland Park in Liupanshui City. The Fitness Riverfront came from the

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[42] Ideal Type. Ashley Crossman. From:
http://sociology.about.com/od/I_Index/g/Ideal-Type.htm.

objectives of the City's Blue Zones Initiative and was designed to encourage a healthier lifestyle within the community. Comparison cities with outdoor activity-rich facilities helped to build this alternative, with concepts based on the bike and pedestrian paths in Chippewa Falls, informal soccer field for pickup games in Kenosha, and boat renting in Memphis.

In the third phase of our project, we modified the preliminary alternatives based on our evaluation of the public opinion survey results. The Botanic Art Garden theme, which received few votes from survey respondents and included many high-maintenance elements, was taken out of the alternatives selection. The remaining three alternatives, excluding maintaining baseline condition option, were then further developed into design concepts. Two of the alternatives were renamed in order to better communicate the expanded visions; Natural Riverfront became "Working Ecosystem Riverfront" and Hi-Tech Riverfront evolved into "Arts and Industry Riverfront".

From our previous research and data collection, we compiled a list of facilities that would be featured in each alternative design. We attempted to integrate each facility into the overall theme to create unified park elements. Through these alternatives, we also aimed to balance the proportion of park and parking space to reaffirm the park's identity as an enjoyable recreational place. To improve the flow and connectivity between activities, the site is divided into three parts: the service area for visitor parking and

boating activities; the activity-intensive area that connects to downtown and offers variety of facilities; and the less developed area for conservation and occasional event purposes.

The Working Ecosystem, Arts & Industry, and Fitness alternatives were presented to the public in a Public Open House held at the Riverside Park's Pearl City Station in Muscatine on Saturday, March 8th, 2014 from 2:00 to 6:00 PM.

Alternative 1: Maintain baseline conditions

In this alternative, the overall vision of the park does not change. Individual improvements as described in the City's comprehensive plan and the Mississippi Drive Corridor Plan may be implemented. The current landscaping aesthetic will persist with routine maintenance and possible replacement of damaged or declining landscape elements. New facilities may include the possible construction of a band shell as described in the comprehensive plan. Pedestrian crossings may be enhanced by redesigning Mississippi Drive as a two-lane boulevard with a landscaped median, as referenced in the Mississippi Drive Corridor Plan. Existing vehicle crossings and other major access points will remain, and the current parking area will be maintained.

Alternative 2: Working Ecosystem Riverfront

Figure 7.1. Site plan for the Working Ecosystem alternative.

This concept emphasizes the use of natural elements to create a working landscape that provides environmental services with tangible benefits. Facilities featured in this alternative include an expanded playground, a sheltered picnic area, a wetland boardwalk, an amphitheater, and a native prairie walkway.

Research Examples

This vision incorporates elements such as vegetated cover over rip-rap and natural landscaping techniques as observed in Eau Claire, Wisconsin. Inspiration for a stormwater wetland park was taken from Qinhuangdao Red Ribbon Park in Qinhuangdao City, China and Minghu Wetland Park in Liupanshui City, China.

Figure 7.2. Existing activity areas are unified by an expanded playground area and a long, curving red bench.

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Features

A playground area is added near the splash pad to improve the flow of activities within the park. Based on our field observations, the playground is one of the most popular features of the park. However, the parking lot located between the playground and the splash pad poses a safety threat to children, who are the main users of these two facilities. Expanding the playground area to the splash pad would not only eliminate the safety issues associated with having to cross the parking lot but also create a better flow between elements within the park. This feature also addresses the public's desire to have more outdoor recreation amenities. A continuous curvy red bench runs along this area to give a more vibrant tone in contrast to the natural background colors (Figure 7.2). To address the popular public request for more sheltered picnic areas, this feature is situated adjacent to the playground and splash pad, allowing families and parties with concurrent activities to be close together (Figure 7.3).

One of the main features of this alternative is the restoration of wetlands. According to the NRPA Recreation Guide and Standards, a community park like Riverside Park is responsible for providing certain environmental benefits to the area. In response to this requirement, the vision of Working Ecosystem Riverfront includes a functional and educational reconstructed wetland, which provides flood mitigation and storm water filtration services to the area. This wetland area will be unique

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Figure 7.3. A sheltered picnic area provides additional seating and shade for park visitors.

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Figure 7.4. A reconstructed wetland filters stormwater, acts as a flood buffer, and provides an educational opportunity.

among Muscatine's three community parks. Reconstructed wetlands would be situated at the north end of the river and along the river edge and adjacent to the activity intensive area of the park (Figure 7.4). In addition to enhancing the enjoyment of the river, this feature also provides flood mitigation and storm water filtration services to the area, as well as creating habitat for birds and aquatic species. This supports one of the 2013 Comprehensive Plan's goals to improve environmental quality of the community and public understanding of environmental issues.

One of our project goals is to determine possible uses of the open space on the park, and a performance venue is one of the most desired facilities for concerts and public events (Figure 7.5). It is also consistent with the comprehensive plan goal to construct a performance venue at Riverside Park. By constructing the amphitheater into the ground, it preserves the viewshed of Mississippi River and is also consistent with the natural theme of the park. Another ecosystem service that this first alternative offers is the conversion of the park's large open space into a natural prairie habitat (Figure 7.6). This native vegetation helps to build flood resilience and is low in cost and maintenance.

Figure 7.5. A recessed amphitheater provides space for performances and community events without disrupting views of the river.

Figure 7.6. A native prairie walkway is a low-cost, low-maintenance way to build flood resilience.

Alternative 3: Arts and Industry Riverfront

Figure 7.7. Site plan of the Arts and Industry alternative.

Our third alternative is the Arts and Industry Riverfront theme. This concept combines elements of local arts and industry to celebrate Muscatine's past, present, and future. Facilities proposed for this alternative include the installation of solar panels, food carts, extension of the splash pad, stairs access to the river edge, a venue for performance arts, and an outdoor art gallery.

Research Examples

The lit waterfalls and serpentine staircase of the highly developed waterfront in Cincinnati, Ohio provided inspiration for this vision. The vision also includes foldable umbrella structures similar to those seen in Medina Haram Piazza, Saudi Arabia.

Figure 7.8. Mobile food vendors provide a unique outdoor dining opportunity and encourage visitors to spend more time in the riverfront area.

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Features

Muscatine's comprehensive plan states a desire to create public facilities that are a model for the private sector in implementing environmental quality programs. Additional environmental quality goals include reducing environmental impacts related to energy consumption and production. As part of Muscatine's vision of the future, the installation of solar panel roofs over the parking areas will not only provide shade for parked vehicles, but also set an example for renewable energy practices (Figure 7.12).

In addition to our public survey, we gathered public input information from other IISC groups that have conducted focus groups with various demographics. The young professionals group indicated that they would like to have more outdoor dining opportunities in the area, and bringing food carts into the park provides that option while at the same time inviting visitors to enjoy the river while having their meal (Figure 7.8). Encouraging downtown restaurants to invest in food carts as satellite locations provides one possibility for connecting with the downtown area. Food carts and a performance arts venue would attract more people to Riverside Park, increasing the low usage rate observed during our field visits.

A continuous, meandering set of stairs descending to the river runs along the river's edge, giving visitors access to the water and enhancing the river experience (Figure 7.11). Groundcovers for these wide steps alternate between stones and grasses to allow for some water

Figure 7.9. A traditional bandshell provides a venue for concerts and performances. Rendering by Matthew Gordy, 2013.

Figure 7.10. An outdoor gallery showcases Muscatine's unique local culture.

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absorption. For this alternative, the performance art venue takes the form of an enclosed staging area instead of the open amphitheater presented in the first alternative (Figure 7.9). This illustration is taken with permission from landscape architect Matthew Gordy's existing design for Riverside Park band shell.

In this alternative, the open space at the south end of the park is utilized as an outdoor art and industry gallery that will act as an outdoor extension of the Muscatine History and Industry Center located downtown (Figure 7.10). According to the NRPA Recreation Guide and Standards, one requirement of a community park like Riverside Park in Muscatine is to provide art opportunities to the community. The proposed outdoor gallery would promote the aesthetics and quality of life of Muscatine while filling the current lack of art opportunities among the three community parks in Muscatine. Sculptures and art works exhibited on the gallery are inspired by local industries and promote local and regional artists. Art works could be a mix of permanent and rotational exhibitions. This use of the open space is consistent with the comprehensive goal for installation of public art that enhances the aesthetics and quality of life of Muscatine.

Figure 7.11. Stairs to the water's edge connect park visitors to the river.

Figure 7.12. Solar panels address the city's desire to create energy efficient public facilities.

Alternative 4: Fitness Riverfront

Figure 7.13. Site plan of the Fitness alternative.

Our fourth alternative is the Fitness Riverfront theme. This concept builds on the objectives of the city's Blue Zones Initiative to promote a healthier lifestyle within the community. This alternative offers abundant opportunities for physical exercise and outdoor recreation, which addresses the City's stated goals of expanding year-round recreational opportunities and creating streets that are welcoming and comfortable for pedestrians. The on-site facilities include: a farmer's market and food carts, outdoor fitness equipment, a fishing pier, a sports complex, and an events tent.

Research Examples

Other outdoor activity-rich public spaces are found in Chippewa Falls and Kenosha, Wisconsin, Memphis, Tennessee, and Copenhagen, Denmark.

Figure 7.14. The farmers market provides a consistent weekly attraction while mobile food carts are available throughout the week.

Facilities

The existing farmer's market currently located in downtown is relocated to the riverfront to increase sustained usage of the park and give the shoppers an opportunity to enjoy the river and the other park facilities while supporting local business and agriculture (Figure 7.14). The farmer's market supports Muscatine's Blue Zones Initiative by providing healthy and local food options. Food carts and an outdoor dining area are integrated with the farmer's market to give an enhanced experience.

Clusters of outdoor fitness equipment are situated in the park to fill in the gaps between existing facilities and create a better flow throughout the park (Figure 7.15). This feature is also consistent with Blue Zones objectives. A fishing pier is added as a water-related recreational facility for people to enjoy the river and accommodate fishing activity (Figure 7.16). Riverside Park's fishing pier is currently the only fishing facility among the three community parks in Muscatine. This vision improves on the existing fishing pier by widening it and adding a fence to increase safety.

The park currently has one small on-site basketball court. For the Fitness alternative, this court is renovated and a second court is added to attract more users. Futsal (a modified form of soccer with fewer players and smaller field) fields are added for recreational games and to provide public practice space (Figure 7.17). An events tent

Figure 7.15. Outdoor fitness equipment acts as a riverfront gym that all community members can access.

Figure 7.16. An extended fishing pier enhances the river access that Muscatine residents already enjoy.

occupying the open space area of the park accommodates a variety of performances and events (Figure 7.18). The cover of this tent can be taken apart for more versatile uses.

Figure 7.17. Additional sports facilities provide structured recreational space.

Figure 7.18. An events tent acts as a versatile, flood-proof event venue.

CHAPTER 8

Recommendation of Selected Alternatives

8. RECOMMENDATION OF SELECTED ALTERNATIVES

Alternative Scoring Criteria

We developed a series of criteria to objectively assess the suitability of each alternative for Muscatine (Figure 8.1). The four criteria used to score alternatives were public input, economic feasibility, city vision, and compatibility with constraints. A weight was assigned to each criterion according to significance. Each alternative could score a maximum of ten points per criteria category; the points earned are then multiplied by the weight to determine total score for each category. The total scores for all criteria were added to determine the total points. The alternative with the most points was presumed the best suited for Muscatine.

Public Input

The residents and tourists of Muscatine are the primary users of the park and downtown, which makes them essential to the planning process. In order to make recommendations that reflect community preferences, we worked to create a partnership with the public as outlined in the methods section. Scoring for public input was determined by the public open house, where participants voted on alternatives and ranked them based on their opinion. The score was calculated by the number of the votes each alternative received, divided by the total number of votes that all alternatives received, and multiplied by ten. Public input has a weight of 10%.

City Vision

The City of Muscatine defined several goals in the 2013 Comprehensive Plan to guide future development and activities. The comprehensive plan is a mutually agreed upon vision for the future of Muscatine. The Riverfront Strategic Growth Plan must therefore align with these goals to be successful in achieving support and implementation. The alternatives were scored on their ability to meet ten comprehensive plan goals that pertain to Riverside Park. Each goal achieved earns 1 point. City vision is weighted 15%.

Compatibility with Constraints

All recommendations for riverfront improvements must operate within several constraints. Five of the constraints identified in the Constraints section of this report were selected to evaluate each alternative; the scored constraints are flooding, parking, viewshed, historical character, and environmental impacts. A maximum of 5 points could be awarded in the Flooding category. Parking, Viewshed, and Historic Character are each worth 1 potential point, and Environmental Impacts had a maximum of two points that could be awarded. Each constraint had subcategories that represent compatibility. Subcategories were worth an equal fraction of the total 2 points for each constraint. Flooding had five subcategories; the first was the alternative's reduction of impervious

surface area. The second was the flood resistance of the proposed alternative's facilities and landscaping. The third subcategory of flooding was that the alternative requires minimal maintenance after a flooding event. The last two categories awarded points if the alternative placed facilities outside the 100-year and 500-year flood event height. Each flooding subcategory was worth 1 point. Points were assigned in the parking category based on how adequately the alternative's parking recommendations met the baseline parking requirement; this category is worth 1 point. Viewshed's 1 point could be earned by the alternative's ability to maintain the current viewshed of both the Mississippi River and Downtown. Historical character had only one scoring area to award 1 point if the alternative enhances or complements the historical character of the riverfront area. Environmental impacts had two subcategories for scoring. The first is that the alternative provides wildlife habitat. The second was that the alternative uses best management practices for stormwater management. Each subcategory in environmental impacts was worth 1 point. Overall, compatibility with constraints was weighted 25%.

Economic Feasibility

The economic feasibility of an alternative is an important indicator of implementation potential. The Muscatine Parks System has an annual budget of $2.6 million to maintain over a dozen parks in the city, and the downtown's current vacancy rate prevents private money

alone from improving the downtown. Therefore cost must be considered because it influences the implementation of an alternative. This criterion was divided between implementation costs and maintenance costs.

Implementation costs are one-time occurrences that include all the up-front capital costs associated with the initial installation of a given project. Of the two cost categories, implementation costs have a greater potential to be partially funded by external investment sources. Implementation cost was scored by the rank of the alternatives' estimated cost relative to one another. Cost estimates were generated for each alternative based on cited literature. The alternative with the lowest implementation costs of the four alternatives earned 10 points. The second lowest-cost alternative earned 7.5 points. The third most expensive alternative earned 5 points. The most expensive alternative earned 2.5 points. Implementation costs received a 20% weight.

Maintenance costs represent the spending necessary to operate a given facility or amenity after it has been installed. These costs tend to impose a greater burden on the city budget because they occur regularly over the project's lifetime, resulting in continuous spending rather than a one-time payment. The project with the least maintenance costs of the four alternatives earned 10 points. The second low cost alternative earned 7.5 points. The third most expensive alternative earned 5 points. The most expensive alternative earned 2.5 points. Maintenance

costs were weighted 30% to represent the large burden these costs pose to the city.

Base cost estimates

Base cost estimates were calculated for each preliminary alternative using unit cost data from the 2006 R.S. Means Site Work & Landscape Cost Data journal. The first step was to choose the appropriate material for the new features proposed in each alternative. After determining the dimension of the materials and the units to be used, the next step was to find the cost per unit in R.S. Means. The total estimated cost of each alternative is the result of multiplying total feature dimensions by cost per unit. Cost estimates of proposed features that could not be found in R.S. Means were substituted with estimates from similar studies conducted by other cities or market retail prices. The detailed calculations are shown in Appendix L.

The Arts & Industry Riverfront had the highest implementation cost, earning 3.33 points in the scoring criteria. The second most expensive alternative is the Working Ecosystem Riverfront which earned 6.66 points. Finally, the lowest cost alternative was the Fitness Riverfront which earned 10 points in the scoring criteria.

These estimates were conducted solely for the purpose of ranking of the three alternatives against each other. They should not be regarded as final cost estimates to be used for project budgeting.

Selection of Recommended Alternative(s)

We selected the recommended theme based on the results of scoring each alternative according to our evaluation criteria. Overall, the Working Ecosystem theme received the highest score with 7.49 points out of 10. The Fitness Riverfront received the second highest score of 4.86, and the Arts and Industry earned the lowest number of points at 4.83.

The Working Ecosystem scored 0.26 points for public input, 0.9 points for city vision, 2 points for comparability with constraints, and 4.33 points for economic feasibility. Though the Working Ecosystem scored few points in public input and city vision, the theme still received the highest total score because it captured several points in the highest weighted categories, compatibility with constraints and economic feasibility, which represented 55% of the total possible points. The Working Ecosystem was estimated to be the second most expensive theme to implement, awarding it 6.66 points in the implementation cost category. It was also judged to be the least expensive to maintain, awarding it 10 points in the maintenance cost category, resulting in a 4.33 points out of a possible 5 points for economic feasibility. This theme was the most economical combination of implementation and maintained costs for all three alternatives. Full scores for all three alternatives can be found in Appendix M.

Category	Weight	Subcategories		Compatibility (Yes/No)	Points possible	Points	Total Points
Public Input	10%	Number of votes				10	
		Total Number of votes		50			
City Vision	15%	Public facilities should be a model for the private sector in implementing environmental quality programs			1		
		Reduce environmental impacts related to energy consumption and production			1		
		Work with community partners to improve environmental quality of the community and public understanding of these issues			1		
		Regulate development in the floodplain			1		
		Expand cold and all-weather amenities and activities			1		
		Streets that create an attractive public realm, further community appearance goals, and act as welcoming and comfortable places for people while safely accommodating vehicles			1		
		Public signage should promote community identity, further community appearance goals and visitor wayfinding			1		
		The City of Muscatine will be in compliance all relevant state and federal stormwater regulations			1		
		Installation of public art that enhances the aesthetics and quality of life of Muscatine			1		
		Construct a bandshell at Riverside Park that is aesthetically pleasing and consistent with the design of other developed amenities in Riverside Park; funding from non-municipal sources			1		
Constraints	25%	Flooding	Reduces impervious surface area		1		
			New facilities/plantings are flood resistant		1		
			New facilities/plantings need low maintenance after the flood		1		
			New facilities are outside max flood range		1		
			New facilities are outside average flood range		1		
		Parking	Meets baseline parking requirement		1		
		Viewshed	Viewshed unblocked		1		
		Historic Character	Compatible with historic character		1		
		Environmental Impacts	Provides wildlife habitat		1		
			Utilizes stormwater BMPs		1		
Economic Feasibility	20%	Implementation Costs	Estimated cost relative to other alternatives	1st	10		
				2nd	6.66		
				3rd	3.33		
	30%	Maintenance Costs	Estimated cost relative to other alternatives	1st	10		
				2nd	6.66		

Figure 8.1. Criteria for evaluating alternatives. A detailed breakdown of each alternative's score is available in Appendix X.

CHAPTER 9

Final Recommendation

9. FINAL RECOMMENDATION

Figure 8.1. Site plan for our final recommendation.

After scoring each alternative using criteria based on the results of open house, city goals expressed in the 2013 Comprehensive Plan, compatibility with the project constraints, and a basic economic feasibility study, our group arrived at our final recommendation. The Working Ecosystem theme ranked the highest across our evaluation criteria. This result was mainly due to the theme's relatively low maintenance and implementation costs, the two most heavily weighted categories. It also provides a greater number of potential funding opportunities from federal and state grants related to environmental projects.

The Working Ecosystem theme is geared towards utilizing elements of nature in a controlled and managed way to fit within project constraints while still highlighting the riverfront's unique characteristics. Green infrastructure is installed throughout the park to help cope with flooding and reduce the amount of pollution that flows into the Mississippi River from Muscatine. Although the Working

Ecosystem theme serves as the overarching concept across the park, individual features from all three alternatives were chosen based on feasibility and public support demonstrated at the open house.

Parking

The final recommendation proposes that some of the parking spaces on the Riverfront be shifted to downtown to create a more park-like aesthetic and reduce the amount of impervious pavement. Seven cities of comparable size and situation with successful riverfront [re]developments were examined to establish a baseline for riverfront parking provision. Currently 24% of Muscatine's riverfront is allocated to parking, with a total of 385 parking spaces for visitors. Of the seven cities examined, Muscatine has the highest percent coverage of pavement and number of parking spaces (Table 9.1). This data combined with the parking observations from field observations support our recommendation to shift a portion of the parking into downtown to improve physical and visual cohesion at Riverside Park.

Downtown Connectivity

One of our main project goals was to create a stronger connection between riverfront and downtown. We propose to accomplish this goal by transforming Iowa Avenue into a blending corridor between the park and downtown area through resurfacing of roads, creating active building façades along the corridor, and constructing gateways to welcome visitors. Wooden pergolas mirrored across Mississippi Drive onto Iowa Avenue corridor act as a gateway into the park and, along with the use of brick pavers, create a seamless connection between the two areas. This corridor would be

City	Total Area (acres)	Parking Area (acres)	Percent Coverage	Number of Parking Spaces
Burlington	22	2	11%	179
Davenport	60	4	7%	256
Des Moines	100	8	8%	300
Eau Claire	10	0.5	6%	81
Rock Island	9	0.3	4%	31
St. Charles	25	1	3%	41
Muscatine	44	11	24%	385

Table 9.1. Summary of parking data for comparable riverfront parks. Data from GIS analysis completed by Heather Milway.

transformed into the main pedestrian access for visitors moving between the riverfront and downtown, while auto traffic would be directed towards the Cedar Street entrance. To create a more attractive public realm, vegetative screens and consistent landscaping are used to enhance the visual experience along the Mississippi Drive Corridor, which also serves as an integral foreground for the park.

Farmer's market and food carts

Our project goals also included identifying community preferences and recommending facilities to accommodate those preferences in order to increase day-to-day usage of

Figure 9.2. Iowa Ave is transformed into a blending corridor through roadway resurfacing, creating active building facades, and constructing a gateway to welcome visitors.

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Figure 9.3. Design elements such as brick pavers and wooden pergolas continue from the downtown into the park at Iowa Ave, which becomes the main pedestrian entrance.

Figure 9.4. Consistent landscaping along Mississippi Drive creates a visual connection between the riverfront and downtown.

the park. One way to create a sustained increase in usage is by concentrating activities on the riverfront. The results of our public open house indicated strong support from the public for designating a portion of the park to accommodate the farmer's market and food carts. We recommend that the existing farmer's market be relocated to Riverside Park to draw visitors to the riverfront on Saturday mornings. This concept aligns with the Blue Zone objectives with its emphasis on healthy and local food options. To draw visitors during the rest of the week, we recommend introducing mobile food vendors, which are ideal for this location due to the flood constraint and their non-permanent nature. Movable food carts or trucks have been found to be effective community development tools in other communities. They could also provide entrepreneurial opportunities for small start-ups or serve as satellite locations for downtown restaurants, further enhancing the connection with downtown.

Picnic area and playground

Currently the Mississippi Mist area is surrounded by parking lot, separating the splash pad from the playground, two areas intended for children's activities. This condition is not ideal from an aesthetic, functional, or safety point of view. By relocating a portion of the parking lot, our recommendation reconfigures this space and creates a more unified recreational area for the visitors. We recommend that this area be transformed into a picnic area and additional children's playground. These facilities would support activities in the adjacent facilities, with the picnic area providing seating for food cart patrons and for guardians supervising children playing on the splash pad and playground. Picnic tables are shaded with individual umbrellas, due to the popular public request for more sheltered seating facilities.

Stairs to the River

Based on our public survey results, one of the top reasons for visiting the park was to enjoy the river, and we wanted to emphasize this defining natural feature in our recommendation. A meandering staircase down to the water connects people directly to the river, something that is not currently facilitated by the park's existing features. In our recommendation, there are two sets of staircases, one located to the south of the Riverview Center, and another where the old boat launch is currently located. This feature was originally inspired by the Serpentine Wall in Cincinnati and was one of the most popular facilities at the open house.

Events tent

Throughout this project, both our project partners and Muscatine residents have expressed a strong desire to see some form of performance arts venue constructed on the riverfront. Muscatine's comprehensive plan also lists the construction of such a facility as one of the city's visions for the riverfront. After considering several possible designs, a deconstructible tent-style venue was identified as the

most practical and versatile option for this particular location. The proposed structure would be sited to take advantage of existing landscape features and designed to be disassembled in the event of a flood or during a long event hiatus period, making it a flexible venue for a variety of community events.

Native prairie walkway and outdoor art gallery

In the remaining open space at the downriver end of the park, we propose combining natural prairie landscaping with an outdoor gallery, one of the features that received a high number of votes at the open house. This art gallery can act as an outdoor extension of the Muscatine History and Industry Center located downtown, giving visitors the experience of viewing artistic representations of local history and culture while walking through a landscape that reflects Iowa's natural history. The native prairie in our proposed design is a landscaped prairie rather than a purely natural prairie, giving it a well-maintained look. Breaking up the prairie using walkways and art displays would alleviate the problem of pests often associated with native prairies. The key to an [environmentally successful](#) prairie is selecting native plant species that are adapted to local conditions because they are more resilient to drought and flood, and also provide habitat for native butterflies.

Green parking

During our site visits in late summer through early fall, two of our main observations were that the park's activity areas are broken up by parking lots, and that during our observation period, parking usage was low on average. However, it was also apparent that people enjoy being able to park for free in this area, and parking must be maintained for large events. Inspired by our [best management practices research](#), we recommend the use of grass pavers for overflow parking during peak usage periods. This can be executed in various ways, such as installing grasscrete or a turf reinforcement grid. The idea of a green overflow parking area is beneficial both from an environmental and a parking provision standpoint. The green overflow parking serves as a permeable surface for [stormwater infiltration](#) and also provides 88 additional parking spaces when needed.

Through parking relocation and provision of green overflow parking, our recommendation is able to reconfigure the park into a more functionally and aesthetically cohesive recreational space while only reducing parking by 47 spaces, or 12% of the existing amount of parking. This shows that by improving space efficiency, it is possible to maintain a balance between Riverside Park's function as a public recreational area and providing parking to support park activities.

Figure 9.5. The relocation of the Saturday farmer's market and introduction of mobile food vendors supports a sustained increase in day-to-day usage.

Figure 9.6. Relocating parking to connect the splash pad and playground areas makes the activity space safer and visually more pleasing while maximizing the space park visitors have for recreation.

Figure 9.7. A staircase down to the water connects people directly to the river and emphasizes Riverside Park's defining natural feature.

Figure 9.8. The proposed events tent is sited to take advantage of existing landscape features and designed to be disassembled in the event of a flood, making it a flexible venue for a variety of community events.

Figure 9.9. An outdoor gallery landscaped with native prairie plants offers visitors the experience of viewing artistic representations of local culture while walking through a landscape that reflects Iowa's natural history.

Figure 9.10. Grass pavers installed in overflow parking areas contributes to a park-like aesthetic and expands activity areas while still providing parking for peak usage periods.

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CHAPTER 10

Implementation Strategy

10. IMPLEMENTATION STRATEGY

The Riverfront Strategic Growth Plan summarizes the city's broad goals related to riverfront development and recommends improvements designed to meet those goals. Although detailed implementation planning is beyond the scope of this project, the following strategy helps to identify potential roadblocks that may delay or prevent implementation. Securing funding and navigating environmental regulations are likely to be the largest barriers. Additionally, it is important to think proactively about the logistics of installing individual features, and develop a system for monitoring the plan's success in achieving original project goals post-implementation.

Potential Funding Sources

In the past, riverfront improvements have been funded by the city, Muscatine Power & Water, Federal grants, and private philanthropy. The Mayor's Community Improvement Action Team has played a large role in private fundraising for riverfront projects in recent years. The City of Muscatine invested millions of dollars during the early stages of development, ultimately transforming the riverfront from an industrial area to a continuous stretch of public open space. Now that many of the City's original redevelopment goals have been met, funding for additional improvements will ideally come from non-municipal sources, such as private donations, public-private partnerships, or grants.

Grants

Because the park is a public good, private sector actors generally have less incentive than the public sector to provide financial support for improvement projects. To ensure the successful implementation of the recommended projects, grants will therefore be a crucial source of financing.

Land and Water Conservation Fund (LWCF)

"The Land and Water Conservation Fund (LWCF) Program is a federally funded grant program which provides match funds of 50% for outdoor recreation area development and acquisition."[43] Iowa's cities and counties are eligible applicants. Eligible projects are listed below:

- » "Observation and sight-seeing facilities;
- » Picnic facilities, including open shelters;

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[43] Iowa Department of Natural Resources. From:
http://www.iowadnr.gov/InsideDNR/GrantsOtherFunding/LandWaterConservationFund.aspx

» Playground equipment and outdoor sports facilities such as ball fields and game courts, golf courses, etc;

» Lake and pond construction for boating, fishing and aesthetic purposes;

» Renovation or redevelopment of existing facilities which have deteriorated or become outdated;

» Support facilities including roads, parking, signs, walkways, utility systems, lighting, restrooms, concession buildings, trailer dumps, fences, etc."[44]

Based on these requirements, projects at Muscatine's Riverside Park are eligible to apply for this grant.

Natural Resources and Outdoor Recreation Trust Fund (fka Sustainable Funding)[45]

"The Natural Resources and Outdoor Recreation Trust Fund is generated by a sales tax rate of three-eighths of one percent. The trust fund will serve as a central depository for the revenue and will distribute the funds to seven funding subcategories:

» 7% Lake Restoration

» 10% Trails

» 13% REAP (Resource Enhancement And Protection program)

» 13% Local Conservation Partnership program

» 14% Watershed Protection

» 20% Soil Conservation and Water Protection (IDALS)

» 23% Natural Resources (DNR)"[46]

Public improvements at Riverside Park could qualify for funding from the Local Conservation Partnership program, Watershed Protection and Soil Conservation and Water Protection. Since parts of the project do not match these topics, it is expected to use this grant as part of the project budget. However, the fund has not acquired any receipts so far; therefore; it is a standby funding source for the project.

REAP City Parks and Open Spaces Grant Program

REAP provides money to cites for projects such as Parkland expansion and multi-purpose recreation developments through competitive grants.[47] The fund is distributed among three city size categories:

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[44] Ibid.
[45] Iowa Department of Natural Resources. NATURAL RESOURCES AND OUTDOOR RECREATION TRUST FUND REPORT, 2012.

[46] Ibid.
[47] Iowa Department of Natural Resources. From: http://www.iowadnr.gov/Environment/REAP/REAPFundingatWork/CityParksOpenSpaces.aspx

Population	2013 (FY14) Available Funding
0 - 2,000	$524,468
2,000-25,000	$782,752
Over 25,000	$1,086,517

Table 10.1. City Population and Available Funding. From http://www.iowadnr.gov/Environment/REAP/REAPFundingatWork/HistoricalResources.aspx.

Muscatine's population size falls into the second category. No fund matching is required to obtain this grant. The proposed park improvement projects also fit these application requirement. City Park and Open Space grant applications are typically due in mid-August.

Historical Resource Development Program

This program, operated by The State Historical Society in the Department of Cultural Affairs, provides grants for projects related to historic resource development or preservation.[48] "The purpose of this program is to provide funds to preserve, conserve, interpret, enhance, and educate the public about the historical resources of Iowa." [49] Agencies of Certified Local Government are

included in the list eligible applicants. "Historic preservation is one of the basic categories that supported by grants under this program."[50] Applications are accepted in mid-May each year.

The Riverfront Strategic Growth Plan not only helps to create a better environment for the community, but also makes efforts to protect historic resources in the park. For example, the remains of the old Muscatine High Bridge is part of Muscatine's historic heritage; preservation of such historic resources is involved in the plan.

Sales tax revenues

A statewide measure passed in fall 2010 allows Iowa counties to hold referenda on raising the sales tax by 3/8 cent.[51] The raised tax revenue will work as a dedicated funding source for environmental improvements. Researchers in the Iowa State University Department of Economics estimate that passing such a referendum in Muscatine County could potentially generate $1,639,544.[52]

Vision Iowa

Vision Iowa is a program that assists projects with recreational, cultural, entertainment and educational

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[48] Iowa Department of Natural Resources. From: http://www.iowadnr.gov/Environment/REAP/REAPFundingatWork/HistoricalResources.aspx
[49] Ibid.

[50] Ibid.
[51] Daniel Otto, Kristin Tylka, and Susan Erickson. *Economic Value of Outdoor Recreation Activities in Iowa*. Iowa State University, 2012.
[52] Ibid.

attractions.[53] Eligible projects for this program must be available to the general public for public use and consist primarily of vertical infrastructure (land acquisition and construction, major renovation and major repair of buildings, site development, and recreational trails[54]). The program includes three funds: Vision Iowa, Community Attraction and Tourism (CAT) and River Enhancement Community Attraction and Tourism (RECAT).[55] The City of Muscatine has successfully obtained CAT grants for riverfront improvements in the past.

Regulations and Policies

Because we have considered the goals and values expressed in local plans and ordinances since the beginning of the project, the Riverfront Strategic Growth Plan is unlikely to conflict with these important documents. Obstacles may arise, however, in assuring compliance with state and Federal policies regulating the environmental impacts of development. These policies are described in the Policy Audit section of this report.

Individual Features

Enhanced Connection with Downtown

Enhancing the visual connection between Riverside Park and the downtown central business district will require cooperation with downtown property and business owners. Including downtown area stakeholders early in the planning process will help to ensure cohesion throughout the district and a seamless transition between privately owned structures and the public right-of-way. Additionally, these improvements will need be coordinated with other public improvement projects such as those recommended in the Mississippi Drive Corridor Study.

Stairs Access

The riverfront stairway cannot be fully constructed until 2020, when the DNR easement on the old boat launch expires. However, implementation can be executed in stages, allowing a portion of the stairs to be constructed upriver of the old boat launch prior to 2020. This project will likely require a permit in order to comply with Section 404 of the Clean Water Act. If obtaining this permit results in the project being classified as a Federal action, compliance with the National Environmental Policy Act

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[53] VISION IOWA. Iowa Economic Development, 2014. http://www.iowaeconomicdevelopment.com/CommunityDevelopment/VisionIowa.

[54] Vertical Infrastructure Definition. Iowa Legislative Fiscal Bureau, 2000.
[55] Iowa Economic Development, 2014.

will also be required. Additional time and costs should be budgeted into the project to account for the intensive environmental impact analyses mandated by these policies. Given its location in the floodplain, it will also be necessary to ensure conformance with the National Flood Insurance Act, local flood plain zoning regulations, the 2010 Flood Control Manual, and local stormwater management policies.

After the facility is constructed, there will inevitably be maintenance and operational issues to address. The City of Muscatine will be responsible for overseeing maintenance, post-flood cleaning, and safety concerns associated with the structure, among other issues.

Farmers Market & Food Carts

Relocating the existing Muscatine Farmers Market is unlikely to require any major structural or institutional changes. Mobile food vendors will be a brand new amenity in Muscatine, so the City may wish to develop a program to organize and regulate riverfront food carts if it is not possible to regulate this use under existing food service regulations.

Both positive and negative impacts of mobile food vendors have been noted in other cities, providing Muscatine with the opportunity to learn from their experiences. These range from positive impacts such as improved "street vitality and neighborhood life," increased foot traffic, increased public perception of safety, and the creation of a venue for social interaction to negative effects such as excess garbage in the absence of adequate disposal facilities.[56] Thinking through the potential effects of food carts on the riverfront area will help the City capitalize on positive impacts while minimizing negative ones through preventive actions such as ensuring the availability of seating and trash receptacles.

With food carts growing in popularity across the county, many cities are now able to provide recommendations regarding the regulation of mobile food vendors. Building off of other cities' experiences, Muscatine can help ensure a successful food cart program by minimizing barriers to entry, establishing firm health and sanitation guidelines, and sharing information with all stakeholders. [57] This includes creating a centralized permitting process so that all necessary paperwork can be filed with one department

[56] Urban Vitality Group, *Food Cartology: Rethinking Urban Spaces as People Places*, https://www.portlandoregon.gov/bps/article/200738.
[57] National League of Cities, *Food on Wheels: Mobile Vending Goes Mainstream*, 2013.

http://www.nlc.org/Documents/Find%20City%20Solutions/Research%20Innovation/Economic%20Development/FoodTruckReport2013_Final_9-26.pdf.

	Connection with Downtown	Stairs Access	Farmers Market + Food Carts	Outdoor Gallery	Events Tent
Local					
Muscatine Comprehensive Plan	"Streets that create an attractive public realm, further community appearance goals, and act as welcoming and comfortable places" "Gateways into Muscatine will be attractive, contribute to improving the city's identity, and help implement the master community image/appearance plan"	"Construct a bandshell at Riverside Park…" "Community events and activities that enhance civic pride and spirit, improve the health of, enhance the quality of life in Muscatine, and reflect the diversity of Muscatine"	"Reduce litter problems…"	"Installation of public art that enhances the aesthetics and quality of life of Muscatine"	"Community events and activities that enhance civic pride and spirit, improve the health of, enhance the quality of life in Muscatine, and reflect the diversity of Muscatine"
Municipal zoning code	Downtown zoning district (updated ordinance) + Downtown Commercial Historic District overlay	Flood Plain Zoning District/Flood Channel (Floodway) Zoning District overlays			
Muscatine stormwater management policies	Potential for including stormwater management facilities?	X			
2010 Flood Control Manual		X		X	
State					
Facility easements		X (Iowa DNR)			
Federal					
Section 404 of the Clean Water Act		X			
National Environmental Policy Act		X			

or agency, and setting permit fees that generate revenue to pay for increased park maintenance associated with the presence of food carts while not prohibiting individuals from investing in food carts. At the beginning, the City of Muscatine will probably want to keep fees low to encourage vendors to undertake the risk of setting up. The City may even want to offer grants or other forms of assistance to encourage entrepreneurial initiatives. Finally, actively sharing information about the program will encourage restaurants and individuals to invest in food carts and make sure that the community is aware of this new dining opportunity.

We recommend that the City of Muscatine look to other cities where successful food cart programs have been established to get ideas for structuring permit forms and requirements and operating guidelines. The National League of Cities report on mobile food vending contains a comprehensive summary of food cart programs in cities across the U.S., while the Urban Vitality Group's study of food trucks in Portland, Oregon provides insight into potential benefits and challenges.

Outdoor Gallery + Native Prairie Walkway

Muscatine does not currently have a public art program to coordinate artists and corporate donors for the creation of a riverfront outdoor gallery. Although City staff and CIAT members have gained some experience in commissioning public art through projects such as "The Clammer," organizing multiple works may require additional planning and/or regulation. Many options exist for accomplishing this comprehensive plan goal, but it will ultimately be up to the city to decide what program structure will work best in Muscatine and what resources to allocate toward its operation. Public art programs can be initiated through percent-for-art programs, contracting a private art advisor or consultant, forming collaborative community partnerships, or holding public art competitions; the St. Louis Regional Arts Commission's Public Art Guide provides a basic overview of these and other options, including an 11 step public art planning outline.[58] The Americans for the Arts website also contains advice on commissioning artwork, navigating legal and copyright issues, and planning for maintenance.[59]

Native prairie landscaping surrounding the outdoor art gallery is expected to be both attractive and beneficial at

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[58] St. Louis Regional Arts Commission, "Public Art Practices: A Reference Guide for Developing Public Art Programs and Projects," 2007. http://www.art-stl.com/assets/pdfs/PublicArtGuide.PDF

[59] Tools and Resources for Public Art Professionals, Americans for the Arts, 2014. http://www.americansforthearts.org/by-program/networks-and-councils/public-art-network/tools-resources

Riverside Park. Although the recommended prairie landscaping area will likely be too small to support a full prairie ecosystem, using native prairie plants in place of traditional landscaping will have the advantages of being pest and drought resistant, requiring little to no irrigation or fertilization, and attracting butterflies to add a unique and interesting element to the Riverside Park experience.[60] Additionally, many such plants are adaptable to the wet or mesic soils that may be present at the riverfront. The University of Iowa Libraries provide a list of native prairie species by county along with descriptions of each species' characteristics and growth habits, allowing the City of Muscatine to select plants that are adapted to specific local conditions.[61] A more general statewide guide to landscaping with native plants is available from the Iowa State University Extension (Appendix O).

Sheltered Picnic Area

Because the sheltered picnic area is more in line with previous park developments, city staff and CIAT members will likely be familiar with the implementation of this project.

Events Tent

The proposed events tent is sited to take advantage of existing landscape features and designed to be disassembled in the event of a flood, thus addressing two major aspects of implementation. The City will have to develop plans for maintenance, event coordination, safety, food and/or alcoholic beverages provision at events, and potential liability issues, among other matters.

Green parking

Green parking should be implemented in low traffic areas, such as overflow parking spaces and service drives. The US EPA provides basic information related to green parking techniques, including limitations and cost considerations, on their NPDES website[62] as well as a more detailed report describing all types of green parking lot resources.[63] Companies such as NDS Pro, Invisible Structures, Terra Firm Enterprises, Grassy Pavers, Atlanta Core Systems,

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[60] Iowa State University Extension, *Sustainable Urban Landscapes: Introduction to Iowa Native Prairie Plants*, 2008. https://store.extension.iastate.edu/Product/sul18-pdf.

[61] The University of Iowa Libraries, "Iowa Prairie Plants: Prairie plants found in Muscatine county," 2014. http://uipress.lib.uiowa.edu/ppi/counties.php?record=77.

[62] United States Environmental Protection Agency, "Green Parking," 2006. http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&Rbutton=detail&bmp=89.

[63] United States Environmental Protection Agency, *Green Parking Lot Resource Guide*, 2008. http://www.streamteamok.net/Doc_link/Green%20Parking%20Lot%20Guide%20(final).PDF.

and Pavestone sell green parking products and may be able to ship to Muscatine.

Stormwater Wetland at Mad Creek

The construction of stormwater wetlands differs from the restoration of natural wetland systems in that they are specifically engineered to provide ecosystem services for human developments rather than to mimic natural conditions to support aquatic plant and animal life. However, benefits such as reduction of peak flows and pollutant removal can only be attained when stormwater wetlands are properly planned, sequenced, constructed, and managed. Ideally, the City of Muscatine will select contractors who are familiar with green infrastructure techniques and become familiar with the current information available on stormwater wetland construction. The EPA provides a basic overview of stormwater wetland principles and considerations on its National Pollutant Discharge Elimination System (NPDES) website,[64] while the North Carolina Cooperative Extension recently published a useful construction guide that provides more detailed advice (Appendix P).[65] Finally, Iowa-specific wetland information, including a list of

appropriate plant species, is available from the Iowa State University Extension's 1999 report, *Managing Iowa Habitats: Restoring Iowa Wetlands*.

Project Phasing

Although the proposed phasing could change due to the uncertainty of funding and other related issues, it is important identify a timeline for implementing specific features of the final recommendation based on expected financing and difficulty of construction.

We propose that implementation take place over three 5 year phases, with a total project duration of 15 years Figure 10.1). During Phase 1 (2015 to 2020), the city would start to acquire the necessary construction permits for all 3 phases. The city could install the expanded picnic area and park gateway arch, implement wetland restoration at Mad Creek, resurface the existing basketball court, relocate the farmer's market, and begin introducing mobile food carts during this phase. Construction of the outdoor gallery and events tent would also begin in Phase 1 if funds are available and likely continue into Phase 2. The installation of the riverfront staircase could be started

[64] United States Environmental Protection Agency, "Stormwater Wetland," 2012.
http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&Rbutton=detail&bmp=74.

[65] North Carolina Cooperative Extension, *Urban Waterways: Stormwater Wetland Construction Guidance*, 2010.
http://www.bae.ncsu.edu/stormwater/PublicationFiles/WetlandConstruction2010.pdf.

in this phase after acquiring the necessary permits from the US ACE and Iowa DNR.

Phase 2 (2020 through 2024) includes the installation of native prairie plantings and resurfacing of Iowa Avenue. The outdoor gallery and event venue initiated during Phase 1 could be completed before 2025. The city could also start working with downtown property owners to implement the downtown archway and other design features during this phase.

Phase 3 (2025 to 2030), involves putting the finishing touches on the final parking lot landscaping and downtown archway.

Monitoring & Performance Measurement

Performance indicators include the usage of the park and changes of downtown overtime.

Park Usage

After the full implementation of each phase, the observation of monthly and seasonal park usage will be helpful to answer whether the improvements of Riverside Park attract more events and people. The future field observation needs to include different times of a day, different days of the week, and different seasons of the year.

Simply counting the number of people using different facilities can yield quantitative data describing general usage of the park. Other formats might include interviewing or surveying park users. Interviews can provide more detailed information about demographic characteristics, number of visitors from outside of the region or local residents, and other qualitative information about people's satisfaction of the park. Generally, visitors from outside of the region are expected to generate a larger economic impact in the local area.

Events held in the park serve as another performance indicator. Staff should keep track of the number and kind of events that take place in the park. For example, date, place (which facility of the park), the name of the event, the name of the holder, and number of participation.

Parking is also an important component of the park. Through observation and counting the number of cars parked in the park, we can get the percentage of parking usage which indicates potential adjustment from the relation between parking supply and demand.

Staff in Muscatine's Community Development Department can compare future results to the data gathered from our group's field observation to analyze the performance and improvement of the park in the future. Sample data sheets that could be used to collect such data can be found in Appendices Q and R.
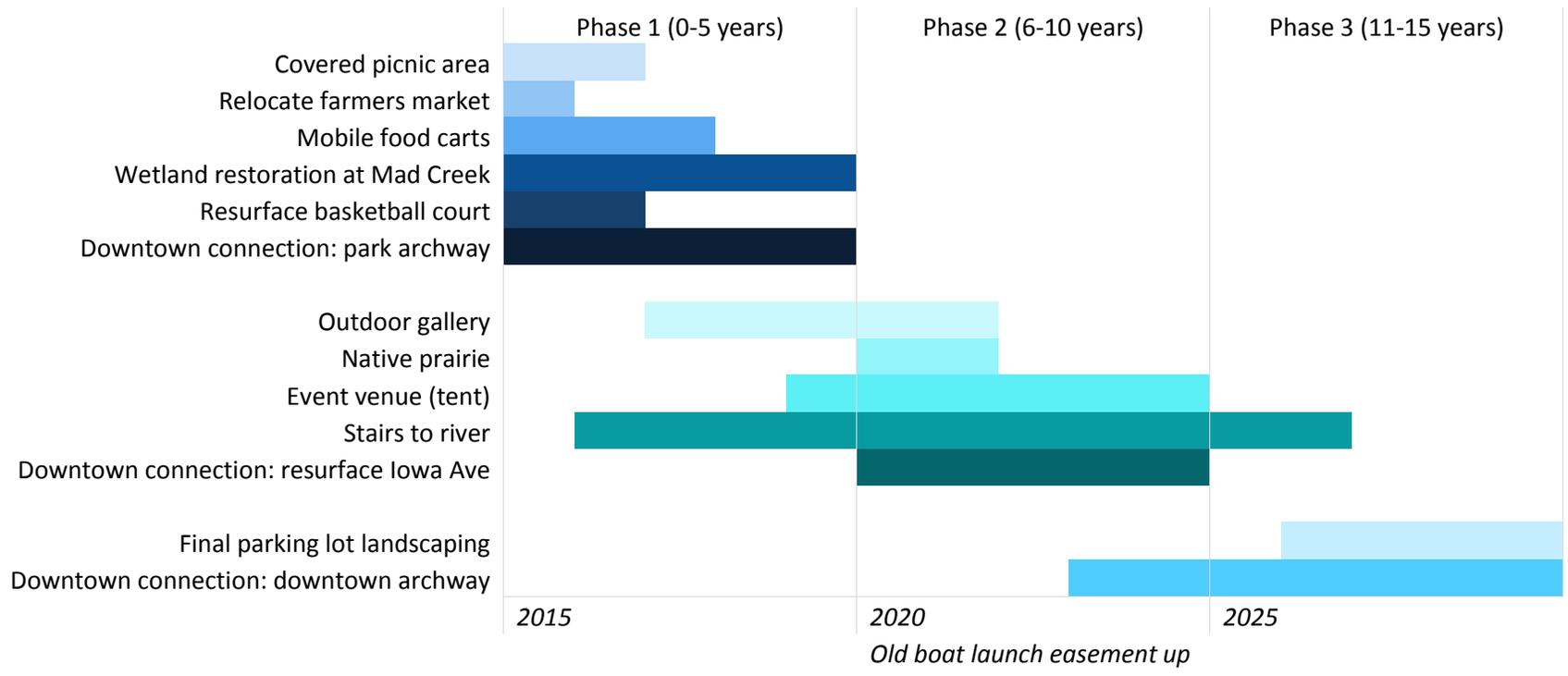
Figure 10.1. Proposed phasing of recommended riverfront improvement projects over the next 15 years.

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Changes in the Downtown Area

To measure the full impact of park improvements, we also need to look at changes manifested in the surrounding area over time. If park improvements are significant enough to encourage increased usage of the riverfront area, increased property values, sales tax revenues, and changes in land use patterns could represent the tangible economic benefits of such improvements. The indicators might include property value, land use pattern, and sales tax revenue of the city.

The property value in the downtown area adjacent to the park might increase due to the increased amenity value of the Mississippi River and Riverside Park. Property value data can be obtained from the American Community Survey Five-Year Estimate and from local government.

Municipal sales tax revenue may increase with more visitors coming to enjoy Riverside Park. People outside of the region and local residents tend to engage in more activities in the downtown area because of the better connection between the park and downtown area. Restaurants, retail, and accommodation services are likely to benefit from the improvement of the park and an increased number of public events.

Conclusion

Over the course of the 2013-2014 academic year, our team has learned and accomplished a great deal toward improving Muscatine's riverfront. The two biggest lessons learned are that Muscatine's residents wish to see the area change into a more unified space and that there are many opportunities for Muscatine to concentrate more activities at the riverfront.

Many considerations went into the final recommendation. The scoring criteria showed that this theme was the most economical to maintain and implement in addition to being compatible with the site constraints. Our research showed that the Working Ecosystem theme also has the most grant funding opportunities. Selecting features that are likely to yield a high level of public support ensures the success of implementation, which will rely at least in part on private fundraising.

Moving forward, Muscatine should use the implementation strategies outlined in our report to ensure smooth and efficient implementation. Muscatine should also continue to monitor and evaluate the effectiveness of the proposed improvements through field observations and public opinion surveys. The riverfront area is an important gateway and recreation space for Muscatine, and now has the opportunity to become a more connected and aesthetically pleasing area to draw future residents and tourists.

APPENDIX A – Project Timeline

2013 Fall Semester

	August	September					October						November			December	
	Week 0	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14	Week 15	Week 16	Week 17

PHASE ONE PHASE TWO PHASE THREE (Part 1)

Introduction

APA Submission

Presentation I

Report Draft Submission

Presentation II

Final Report Submission

Tasks
- Legal policy/legal context study
- Demographic study
- Historical architecture study
- Site survey
- Baseline condition update
- Problem statement, project goals, objectives, project scope, stakeholder identification
- Methodology & project timeline
- Stormwater and green infrastructure study
- Other riverfront development study
- Park/parking assessment methodology study
- Legal policy/legal context study
- Muscatine park system survey
- Façade improvement study
- Public opinion survey preparation
- Public opinion survey finalization
- Public opinion survey distribution
- Feasible solution techniques
- Develop viable alternatives

2014 Spring Semester

	January	February					March						April				May	
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14	Week 15	Week 16	Week 17

PHASE THREE (PART 2) PHASE FOUR

Presentation III

Oral Examination

Final Report Draft Submission

Final Presentation

Final Report Submission

Tasks
- Economic development research
- Design elements identification
- Public survey result collection
- Survey data analysis
- Scoring methods re-analysis
- Conceptual design developments for four alternatives
- Preparation for Public Meeting/Open House
- Conceptual designs Public Open House
- Public Open House result synthesis
- Development of selected alternative
- Riverfront Strategic Growth Plan Recommendation
- Preparation for final presentation
- Final report revision

APPENDIX B – Riverfront Community Events

DATE	PLACE	EVENT	Holder	PARTICIPATION
5-May	-	Car Show	JDRF	Community Wide
31-May	Pearl City Station	Dance Marathon	Senior Resources	Community Wide
1-Jun	Clamshell Plaza	Wedding		Private Party
11-Jun	Preservation Hall	Jazz Band		Community Wide
16-Jun	Old Boat Launch	Illinois Bass Federation		Community Wide
22-Jun	-	Wedding		Private Party
29-Jun	-	5K Run/Walk	Silver & Blue	Community Wide
1-Jul	-	Chalk The Walk		Community Wide
4-Jul	Pearl City Station	Muscatine Symphony Orchestra		Community Wide
4-Jul	-	Fireworks		Community Wide
21-Jul	-	Community Celebration San Pablo UMC		Community Wide
July 22-28	-	Great River Days		Community Wide
3-Aug	-	5K Run/Walk	HNI	Community Wide
17-Aug	-	Muscatine Boat Show		Community Wide
17-Aug	-	Community Event	Vineyard Church	Community Wide
2-Sep	-	Outreach With Music		Community Wide
Sep 6-8	-	Iowa Bass Nation Fall Tournament		Community Wide
14-Sep	Pearl City Station	International Fair		Community Wide
14-Sep	-	Louisa County Trail Ride		Community Wide
6-Oct	-	Mississippi Valley Blues Society		Community Wide
12-Oct	-	4H Fun Run/Walk		Community Wide

APPENDIX C – Summary of NOAA/EPA Smart Growth Principles

SUMMARY OF APPLICABLE NOAA/EPA ELEMENTS OF COASTAL SMART GROWTH

Element 4: Create walkable communities with physical and visual access to and along the waterfront for public use

Rationale	Development principles	Implementation actions
"Walkable communities offer more transportation choices, higher levels of social interaction, greater opportunities for physical activity, and reduced emissions from automobile travel… improving the connection between pedestrians and the water can increase interest in walking and biking and help to decrease the pressures of seasonal traffic. The pedestrian connection to the water can be improved physically, with better street, path, and trail connections, and with access points to the water that are open to the public. The connection also can be approached visually, by designing the built environment in ways that preserve the view of the water and encourage residents and visitors to access the waterfront on foot. Pedestrian access to the water must not only be connected to the built environment, but also accommodated in ways that protect natural resources."	Mix land uses and design buildings to foster pedestrian activity and visual access to water Foster a safe and supportive infrastructure for walking, biking, and other non-motorized means of travel	◎ Create *central parking facilities* to serve as park-once locations within walking or shuttling distance of waterfronts or central business districts ◎ Establish a *pedestrian master plan* that supports investment in good sidewalks, narrow streets, crosswalks, bike lanes, on-street parking, street art, and appropriately scaled green infrastructure ◎ Ensure pedestrian safety through *street design standards* and *speed control measures* Provide *maps* for pedestrians, bikers, and "blue trail" users (with tours and points of interest), *informational signage*, and guides to boating storage facilities, racks, and access points ◎ Provide well-maintained pedestrian walkways and bicycle paths
	Expand and manage physical access to the water	◎ *Inventory existing access sites* compared to current and projected demand for access ◎ *Prioritize access needs* by identifying what types of access are needed and their most appropriate location ◎ Provide *attractive and safe pathways* between parking areas and waterfronts, ensuring that the connections are well-lit with adequate signage

Rationale	Development principles	Implementation actions
Element 5: *Foster distinctive, attractive communities with a strong sense of place that capitalizes on the waterfront's heritage*		
"Distinctive features such as tree-lined boulevards, historic buildings, or rows of shops and cafes make neighborhoods and downtown centers places where people want to be... Smart growth approaches reflect the varied interests of community residents, creating a more cohesive community fabric that helps maintain economic vitality...to capitalize on the rich heritage the waterfront provides"	Create an understanding of the community's assets	○ Conduct a *community asset inventory* ○ Write an *ecological history of* the community ○ Incorporate community asset inventories and ecological history into visioning efforts
	Create a community vision for the future	○ Use *visual preference surveys* ○ Conduct *visioning exercises* Incorporate ideas from citizen advisory committees ○ Consider potential short- and long-term impacts of *climate change*
Element 6: *Preserve open space, farmland, natural beauty, and the critical environmental areas that characterize and support coastal and waterfront communities*		
"Natural areas and parks increase neighboring property values, attract businesses and residents, support tourism, offer opportunities for recreation, and provide scenic value. Critical environmental areas provide water and air filtration, groundwater recharge, and habitat. Wetlands provide critical habitat, mitigate flooding, and capture and retain sediments, helping to keep pollutants from washing downstream. Local economies benefit from sport and commercial fishing, recreation, tourism, etc. Protecting the strength and health of waterfront and coastal communities' natural resources requires balancing the needs of the built environment with those of the natural one."	Plan with nature, anticipating dynamic waterfront and coastal processes (e.g., storms, sea-level rise, lake level fall, erosion) and manage ecological systems to be adaptive to changes caused by human activity.	○ Use *green infrastructure assets* to accommodate projected risks from climate change ○ *Protect, restore, and enhance vulnerable shorelines* through rolling easements, living shorelines, buffers and setbacks, or LID stormwater management practices to buffer development against environmental changes
	Protect, maintain, and, where feasible, restore ecological systems, including submerged lands and shore habitat.	○ Use *green infrastructure planning* to identify community and regional environmental assets ○ Use *best management practices* promoting on-site stormwater infiltration, native species, and living shorelines
	The community can identify and prioritize natural areas that should be preserved/restored to protect long-term ecological health and build community resilience.	○ *Community vulnerability assessment*: identify areas that are vulnerable to or that can help buffer communities from natural hazards

Element 10: *Encourage community & stakeholder collaboration in development decisions, ensuring that public interests in and rights of access to the waterfront and coastal waters are upheld*

Rationale	Development principles	Implementation actions
"Successful development requires inclusive planning processes that give community members and other stakeholders a clear voice in the development process. An inclusive planning process is critical for waterfront and coastal communities because of the complex regulatory environment, the diversity of stakeholders, the demand for public access to the water, and the competing interests for use of waterfront resources. What happens on and near the water can enhance property values, support businesses, enhance community resilience to natural hazards, and greatly affect a community's overall quality of life."	Develop an inclusionary process to maximize participation and results	○ Conduct a *stakeholder analysis* ○ Schedule *meetings* to accommodate all stakeholders (including seasonal residents) ○ Conduct *individual and small group interviews* ○ Administer *community surveys* through the mail
	Develop a common understanding among the diverse stakeholders	○ Engage all stakeholders to set goals ○ Conduct *walkability tours and audits* ○ Administer *visual preference surveys* ○ Hold *community visioning exercises* ○ Perform *policy audits* to ensure that plans, codes, and regulations are consistent with community vision
	Use appropriate and transparent meeting and communication techniques	○ Use *charrettes* to resolve complex design issues ○ Use trained meeting facilitators ○ Employ a *communication strategy* to keep all interested constituencies updated and involved ○ Use geographic information systems (GIS) to create *maps depicting alternative development scenarios* ○ Analyze alternative development scenarios using *visualization software*

APPENDIX D – Overview of Local Planning Goals

MUSCATINE COMPREHENSIVE PLAN GOALS RELEVANT TO RIVERFRONT STRATEGIC GROWTH

1. Public facilities should be a model for the private sector in implementing environmental quality programs (Environmental Quality)
2. Reduce environmental impacts related to energy consumption and production (EQ)
3. Work with community partners to improve environmental quality of the community and public understanding of these issues (EQ)
4. Regulate development in the floodplain (EQ + Land Use)
5. Construct a bandshell at Riverside Park that is aesthetically pleasing and consistent with the design of other developed amenities in Riverside Park; funding from non-municipal sources (Parks & Recreation)
6. Expand cold and all-weather amenities and activities (P&R)
7. Streets that create an attractive public realm, further community appearance goals, and act as welcoming and comfortable places for people while safely accommodating vehicles (Community Facilities, Services, & Amenities)
8. Public signage should promote community identity, further community appearance goals and visitor wayfinding (CFS&A)
9. Installation of public art that enhances the aesthetics and quality of life of Muscatine (CFS&A)
10. The City of Muscatine will be in compliance all relevant state and federal stormwater regulations (CFS&A)

KEY GOALS OF THE MISSISSIPPI DRIVE CORRIDOR STUDY

From original letter to Council

1. Traffic safety and calming and may include recommendations that affect direction and flow on 2nd Street as it relates to overall pedestrian and vehicular flow through and along the study corridor
2. Pedestrian linkages between the CBD and the riverfront that address safety, aesthetics, and traffic calming
3. Vehicle safety along the "bluff" area of Mississippi Drive, including recommendations for the future of the "high" sidewalk
4. Potential intersection enhancements at 2nd Street/Mulberry, Mississippi Drive/Mulberry, and Hershey/Green
5. Landscaping and aesthetics along the entire study corridor

Key questions for evaluating recommendations

1. Is this recommendation making the corridor significantly *safe for vehicles and pedestrians?*
2. Is this recommendation significantly *improving the image* of the corridor?
3. Is this recommendation resulting in *less disruption during flooding?*

Study recommendations included

- Traffic calming
- Flood improvements
- Wayfinding enhancements
- Downtown: pedestrian friendly intersections, undergrounding utilities, period lighting, local art
- Gateways and interpretive elements
- Pedestrian and trail corridors
- Lighting and landscaping

APPENDIX E – Field Observation Data

FACILITY	9/7	9/21	9/26	10/1	10/8	10/12	10/15	10/19	10/24	10/27	11/1	11/2	Total	FREQUENCY (%)
Boat launch (new)	44	11	0	3	0	0	0	9	0	0	0	0	67	11.9%
Boat launch (old)	6	0	0	0	0	0	0	0	0	1	1	1	9	1.6%
Splash pool	9	19	0	0	0	0	0	2	0	0	0	0	30	5.3%
Playground	9	34	6	7	3	11	3	5	0	9	2	6	95	16.9%
Basketball court	3	8	0	0	0	0	1	1	0	0	0	0	13	2.3%
Bike trail	8	2	4	8	6	8	0	3	0	7	1	3	50	8.9%
Walking trail	25	3	18	17	6	17	3	5	0	6	3	4	107	19.1%
Benches/picnic tables	3	10	6	1	0	6	0	2	0	0	0	0	28	5.0%
Pearl City Station	10	50	14	0	0	40	0	1	0	3	0	20	138	24.6%
The Riverview Center	2	0	0	0	0	2	0	1	0	2	0	0	7	1.2%
Statue	2	3	0	3	0	0	0	0	0	0	0	1	9	1.6%
Pier	0	0	5	0	0	3	0	0	0	0	0	0	8	1.4%
Total	121	140	53	39	15	87	7	29	0	28	7	35	561	100%
Harbor	14	11	0	22	22	14	8	8	6	3	3	4	115	
Proportion	13.3%	10.5%	0.0%	21.0%	21.0%	13.3%	7.6%	7.6%	5.7%	2.9%	2.9%	3.8%	9.1%	

Summary of facility use.

Facility	ALL VISITS				
	TOTAL	Children (12 & under)	Youth (13-18)	Middle Age (20-60)	Senior Citizen (60-80)
Mississippi Mist	30	50%	20%	30%	0%
River View Center	7	43%	0%	57%	0%
Old Boat Launch	67	6%	73%	21%	0%
New Boat Launch	9	0%	100%	0%	0%
Clammer Statue	9	67%	0%	33%	0%
Pearl City Station	138	18%	39%	31%	12%
Playground	95	64%	3%	33%	0%
Basketball court	13	54%	31%	0%	15%
Pier	8	63%	0%	25%	13%
Biking trail	50	20%	30%	46%	4%
Walking trail	107	7%	26%	49%	19%
Benches and picnic tables	28	4%	7%	36%	54%
Shelters	0	0%	0%	0%	0%
TOTAL	561				

Facility usage by age group.

FACILITY	MOST FREQUENT VISITORS	FACILITY	MOST FREQUENT VISITORS
Mississippi Mist	Children	Basketball court	Children
Riverview Center	Middle Age	Pier	Children
New Boat Launch	Youth	Biking trail	Middle age
Old Boat Launch	Youth	Walking trail	Middle age
"Clammer" statue	Children	Benches and picnic tables	Senior
Pearl City Station	Youth	Shelters	No data
Playground	Children		

Primary users of Riverside Park facilities.

APPENDIX F – Riverfront & Downtown Survey (English)

Riverside Park

Downtown

THE UNIVERSITY OF IOWA
IOWA INITIATIVE
FOR SUSTAINABLE COMMUNITIES

RIVERFRONT AND DOWNTOWN AREA SURVEY

The goal of this survey is to determine Muscatine residents' opinions and uses of the riverfront area. The results will be used by a student group from the University of Iowa to create a strategic growth plan for the area. This survey is anonymous and individuals' answers will not be distributed. Thank you for taking the time to fill out this survey.

1. How often do you visit Riverside Park?
☐ Daily
☐ Once a week
☐ Several times a week
☐ Once a month
☐ Several times a month
☐ Yearly
☐ Never

If you have never been to Riverside Park please skip to question 9.

2. How do you usually get to Riverside Park?
☐ On foot
☐ By bicycle
☐ By car
☐ Public transportation
☐ Other (Please specify) _____

3. Last time you visited Riverside Park what was your main reason for visiting? (Check all that apply)
☐ Physical exercise
☐ Activity for children
☐ Enjoy the river
☐ Use the boating facilities
☐ Eat a meal
☐ Walk dog
☐ Public festival/ event
☐ Private family festival/ event
☐ Other (Please specify) _____

4. What are **the top three facilities** that you use or visit while at Riverside Park?
☐ Mississippi Mist (Splash Pad)
☐ Boat launch
☐ Boat harbor
☐ Walking / biking trail
☐ Playground
☐ Benches / picnic tables
☐ Basketball courts
☐ Pearl City Station / River View Center
☐ Other (Please specify) _____

5. What do you think of parking at Riverside Park?
☐ There is enough parking
☐ There is too much parking
☐ There is not enough parking

6. Overall what would encourage you to visit Riverside Park more frequently? (Check all that apply)
☐ Sport events
☐ Concerts
☐ More picnic areas / benches
☐ More covered picnic areas / benches
☐ More programs for kids
☐ More landscaping and trees
☐ More interactive features
☐ More opportunities for outdoor recreation
☐ Other (Please specify) _____

7. Which picture represents your ideal vision for the Riverside Park area? (Circle all that apply)

1

2

3

4

8. How often do you walk from Riverside Park to Downtown in either direction?

☐ Daily
☐ Once a week
☐ Several times a week
☐ Once a month
☐ Several times a month
☐ Yearly
☐ Never

9. Are you reluctant to walk between Downtown and the park? Why?

_____

_____

10. How safe do you feel walking across Mississippi Drive between Riverside Park and Downtown?

☐ Extremely unsafe
☐ Somewhat unsafe
☐ Somewhat safe
☐ Extremely safe

11. To what extent are Riverside Park and Downtown connected together?

☐ Extremely disconnected
☐ Somewhat disconnected
☐ Connected
☐ Extremely connected

12. What qualities contribute to your answer from 11? (Check all that apply)

☐ Visually
☐ Physically
☐ Activities
☐ Environment

To what extent do you agree with the following statements?

	Disagree	Agree	Strongly Agree
13. The view of Downtown from Riverside Park is visually appealing.	1	2	3
14. I would visit Downtown more, if there were signs in Riverside Park directing me to Downtown restaurants and businesses.	1	2	3

15. Please indicate your gender.

☐ Male
☐ Female

16. Please indicate your age group.

☐ 20 and under
☐ 21-40
☐ 41-60
☐ 61-80
☐ 81 and over

17. Do you live in Muscatine? YES   NO

18. How long have you lived in Muscatine? _____ years

19. Do you work in Muscatine? YES   NO

20. How long have you worked in Muscatine? _____ years

21. How many children are in your household?

Ages 1-12? _____   Ages 13-18? _____

22. Please indicate your ethnicity (check all that apply):

☐ Hispanic or Latino
☐ African American
☐ Asian American
☐ White / Caucasian
☐ Other (Please specify) _____
☐ Decline to answer

Thank you for your answers!

APPENDIX G – Riverfront & Downtown Survey (Spanish)

ENCUESTA PARA EL FRENTE AL RIO Y EL CENTRO

Riverside Park

Downtown

El objetivo de este estudio es determinar la opinión de los residentes de Muscatine y usos de la zona del Riverside Park. Los resultados se utilizarán por un grupo de estudiantes de la Universidad de Iowa para crear un plan de crecimiento estratégico para la zona. Esta encuesta es anónima y su respuestas no se distribuirán. Gracias por tomarse el tiempo para llenar esta encuesta.

1. ¿Con qué frecuencia visita el Parque Riverside?
☐ Diariamente
☐ Una vez a la semana
☐ Varias veces por semana
☐ Una vez al mes
☐ Varias veces al mes
☐ Anual
☐ Nunca

Si usted nunca fui en el parque Riverside por favor vaya a la pregunta 9.

2. Normalmente, ¿Cómo llega al parque Riverside?
☐ A pie
☐ En bicicleta
☐ En carro
☐ Transportation publica
☐ Otro (Por favor especifique) _____

3. La ultima vez que visitó el parque Riverside ¿Cuál era el motivo de su visita? (Círculo todo que correspondan)
☐ Ejercicio físico
☐ Actividad para niños
☐ Disfrutar del río
☐ Utilizar los servicios de barcos
☐ Comer una comida
☐ Pasear al perro
☐ Festivales / eventos
☐ Festival familiar/ privado evento
☐ Otro (por favor especifique) _____

4. ¿Cuáles son las **tres instalaciones** que mas usa o visita, mientras que estan en el parque Riverside?
☐ Mississippi Mist (Fuente de agua)
☐ Lanzamiento de barcos
☐ Puerto de barcos
☐ Sendero para caminar / ciclismo
☐ Parque infantil
☐ Bancos / mesas de picnic
☐ Canchas de baloncesto
☐ Pearl City Station / River View Center
☐ Otro (por favor especifique) _____

5. ¿Qué piensa del estacionamiento en el parque?
☐ Hay suficiente estacionamiento
☐ Hay demasiado estacionamiento
☐ No hay suficiente estacionamiento

6. ¿En general, que los animaría a visitar el parque con más frecuencia? (Círculo todo que correspondan)
☐ Eventos deportivos
☐ Conciertos
☐ Más áreas de picnic y bancos
☐ Más áreas de picnic y bancos cubiertas
☐ Más programas para niños
☐ Más ajardinamiento y árboles
☐ Más equipos para actividad física
☐ Más oportunidades para la recreación al aire libre
☐ Otro (por favor especifique) _____

Por favor miren atras

7. ¿Qué cuadro representa su visión ideal para el área del parque Riverside? (Circulo todo que correspondan)

3

1

4

2

8. ¿Cuántas veces caminan desde el parque hasta el centro en cualquier dirección?

☐ Diariamente
☐ Una vez a la semana
☐ Varias veces por semana
☐ Una vez al mes
☐ Varias veces al mes
☐ Anual
☐ Nunca

9. ¿Le preocupa caminar entre el centro y el parque? ¿Por qué?

_____

_____

10. ¿Qué tan seguro se siente caminando a través de la calle Mississippi entre el parque Riverside Park y el Centro de la ciudad?

☐ Muy inseguro
☐ Un poco de inseguridad
☐ Seguro
☐ Muy seguro

11. ¿En qué medida están conectados el parque Riverside y el centro?

☐ Muy desconectado
☐ Un poco desconectado
☐ Conectado
☐ Muy conectado

---

12. ¿Qué cualidades contribuyen a su respuesta de la pregunta numero 11? (Círculo todo que correspondan)

☐ Visualmente
☐ Físicamente
☐ Actividades
☐ Ambiente

¿Hasta qué punto está de acuerdo con las afirmaciones siguientes?

	Desacuerdo	De acuerdo	Fuertemente de acuerdo
13. La vista desde le centro de la ciudad al parque Riverside es atractiva.	1	2	3
14. Visitaría el Centro de la cuidad más si hubiera letreros en el parque Riverside que me dirigieran a restaurantes y negocios del Centro.	1	2	3

15. Por favor indique su género (sexo).

☐ Masculino
☐ Femenino

16. Por favor, indique su edad.

☐ 20 y menores
☐ 21-40
☐ 41-60
☐ 61-80
☐ 81 y arriba

17. ¿Vive en Muscatine? SÍ   NO

18. ¿Cuánto tiempo ha vivido en Muscatine? _____ Años

19. ¿Trabaja en Muscatine? SÍ   NO

20. ¿Cuánto tiempo ha trabajado en Muscatine? _____ Años

21. ¿Cuántos niños están en su hogar?

Edad 1-12? _____   Edad 13-18? _____

22. Por favor, indique su origen étnico:

☐ Hispano o Latino
☐ Africano Americano
☐ Asiatico Americano
☐ Blanco/ Caucasico
☐ Otro (Por favor específique) _____
☐ No deseo responder

Gracias por sus respuestas!

APPENDIX H – Riverfront & Downtown Area Survey Marketing Materials

RIVERFRONT AND DOWNTOWN AREA SURVEY

Mississippi Riverfront Student Group, University of Iowa School of Urban & Regional Planning

WE WANT TO KNOW WHAT YOU THINK

The Riverfront and Downtown Survey can give you the chance to share your opinion about the Riverfront and Downtown area.

What is the survey about?

This survey will help us understand the community's vision for Riverside Park and its connection to Downtown.

What will be done with the results?

The results will be used by a student group from the University of Iowa to create a strategic growth plan for the Riverside Park and Downtown area.

Ultimately, this survey will help us to write a plan that reflects what Muscatine residents want to see in the riverfront & downtown area.

HOW TO ACCESS THE SURVEY

1. Online

English version: http://tinyurl.com/RiverfrontSurveyENG

Versión en español: http://tinyurl.com/RiverfrontSurveyESP

2. Paper copies available in English and en Español at:

The **Musser Public Library** near the checkout desk

City Hall, Room 220, Community Development

ABOUT THE PROJECT

Our group has been tasked with creating a plan for strategic growth along the Mississippi Riverfront. The city has already achieved many of its major redevelopment goals to create the park we see today. Our plan will build on what's already been done to create a vision for the park and its connection with the downtown as Muscatine moves into the future.

Español

English

THE UNIVERSITY OF IOWA
IOWA INITIATIVE
FOR SUSTAINABLE COMMUNITIES

Two Opportunities to Help Your Community

1. RIVERSIDE PARK AND DOWNTOWN AREA SURVEY

Mississippi Riverfront Student Group, University of Iowa School of Urban & Regional Planning

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   English   *Español*

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2. PEDESTRIAN & BIKE PLAN OUTREACH WEBSITE

Muscatine Connectivity Student Group, University of Iowa School of Urban and Regional Planning

WHAT IS CONNECTIVITY?

This group is focused on creating a pedestrian/bike plan for the city. By increasing the connections between trails, sidewalks, and destinations the added mobility will increase the economic vitality of Muscatine, as well as the health of its residents by increasing the ability to travel by foot or bike.

WEBSITE

We will be posting updates on our website, periodically, for what we are doing. The website address will be posted in the Musser Public Library, and it can also be accessed through the QR code.

The website will also feature an interactive map where you can "pin" your concerns with any specific section of sidewalk or trail or any crosswalk on a map of Muscatine.
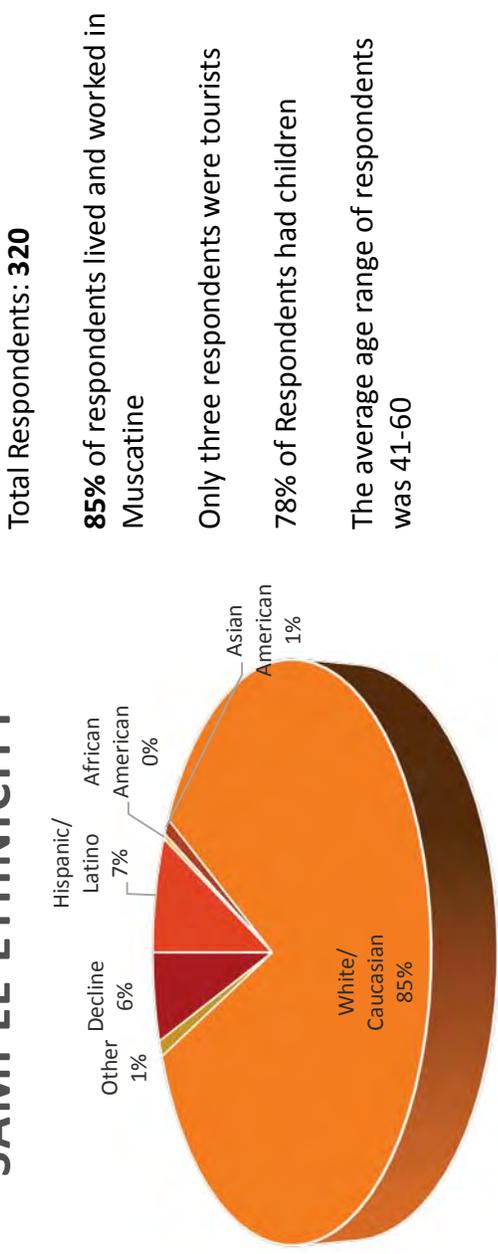
APPENDIX I – Riverfront & Downtown Area Survey Results

COMMUNITY FEEDBACK SUMMARY

Riverfront & Downtown Survey Results | Focus Group Data

1. Demographic Characteristics Sampled

Total Respondents: **320**

85% of respondents lived and worked in Muscatine

Only three respondents were tourists

78% of Respondents had children

The average age range of respondents was 41-60

SAMPLE ETHNICITY

White/Caucasian 85%

Hispanic/Latino 7%

Other 1%

Decline 6%

African American 0%

Asian American 1%

2. Current Usage

OPINION OF PARKING

Respondents liked the amount of parking offered in Riverside Park

ENOUGH PARKING	83%
TOO MUCH PARKING	10%
NOT ENOUGH PARKING	7%

MODE CHOICE
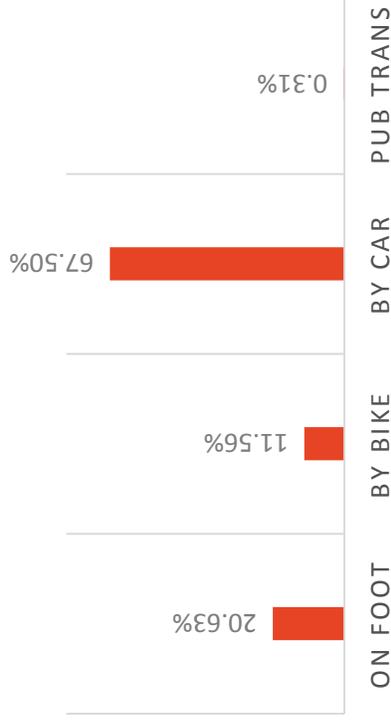
Most people traveled to the park by car.

ON FOOT	BY BIKE	BY CAR	PUB TRANS
20.63%	11.56%	67.50%	0.31%

VISIT FREQUENCY
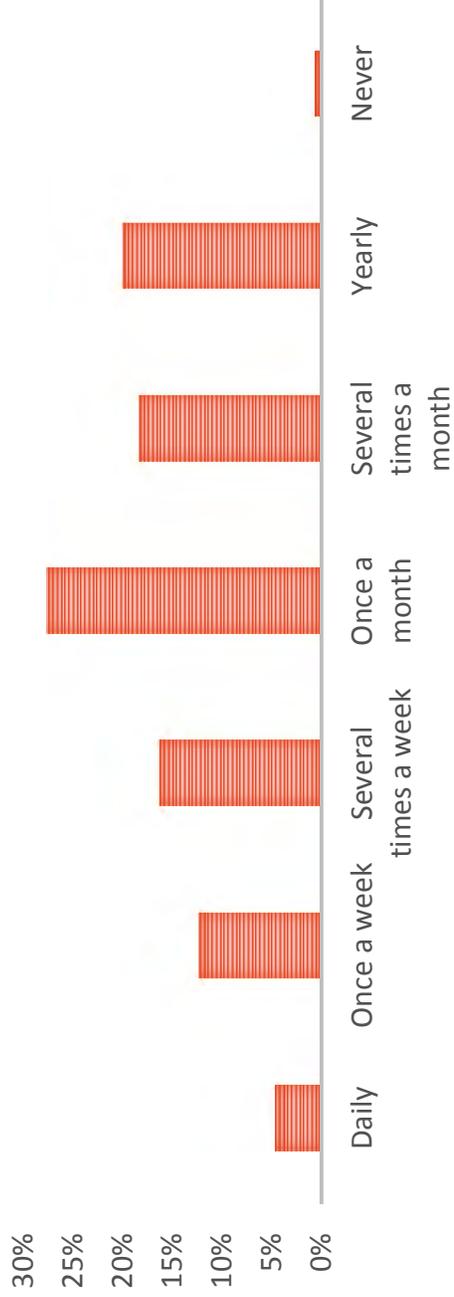
Most respondents visited Riverside Park monthly.

Visit Frequency	Percentage
Daily	~5%
Once a week	~10%
Several times a week	~15%
Once a month	~27%
Several times a month	~17%
Yearly	~20%
Never	~1%

MAIN REASONS FOR VISITING

Reason	Percentage
PHYSICAL ACTIVITY	27.03%
ENJOY THE RIVER	11.31%
USE BOATING FACILITIES	25.80%
EAT A MEAL	3.00%
WALK DOG	4.77%
PUBLIC EVENT	9.36%
PRIVATE EVENT	4.24%
OTHER	9.36%
OTHER: FISHING	2.83%
OTHER: BIRD WATCHING	0.53%
OTHER: PARKING	0.35%
	1.41%
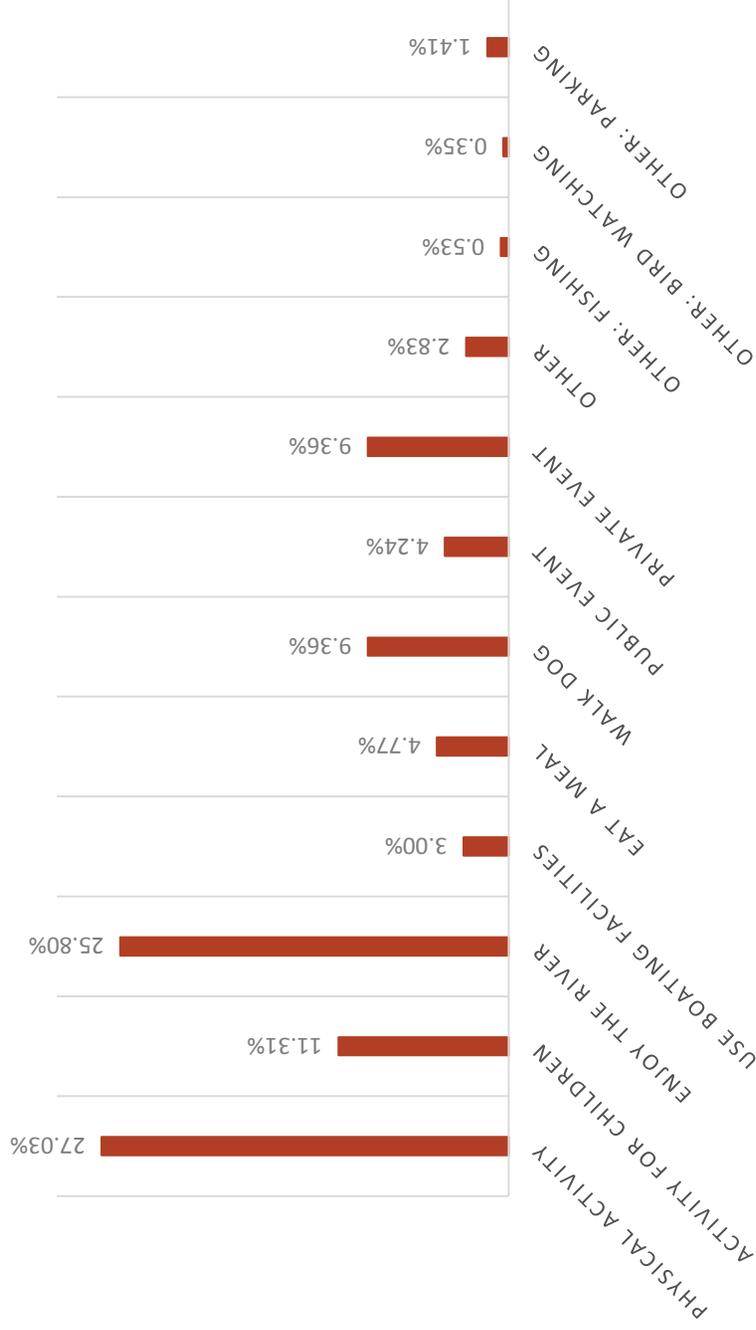
Respondents mainly visited Riverside Park for physical activities, entertaining children, and enjoying the view of the river.

TOP FACILITIES
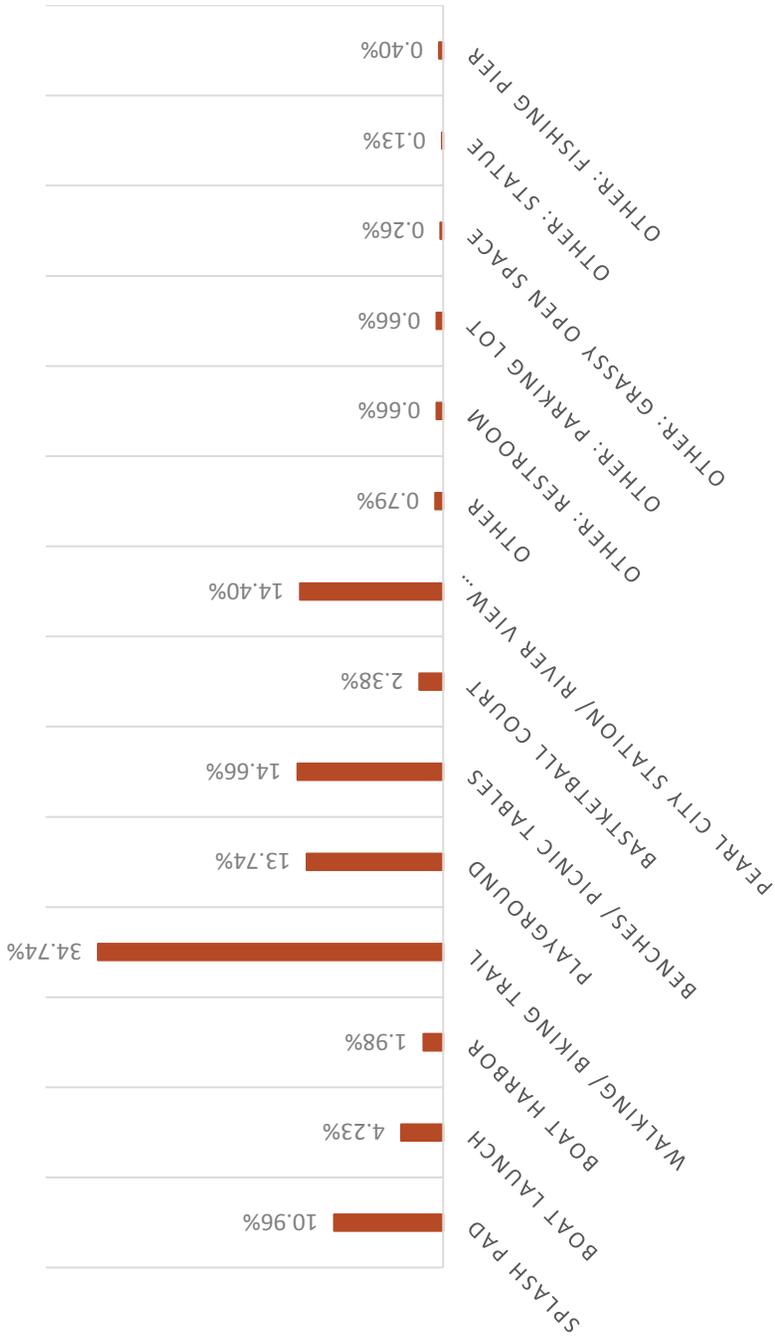
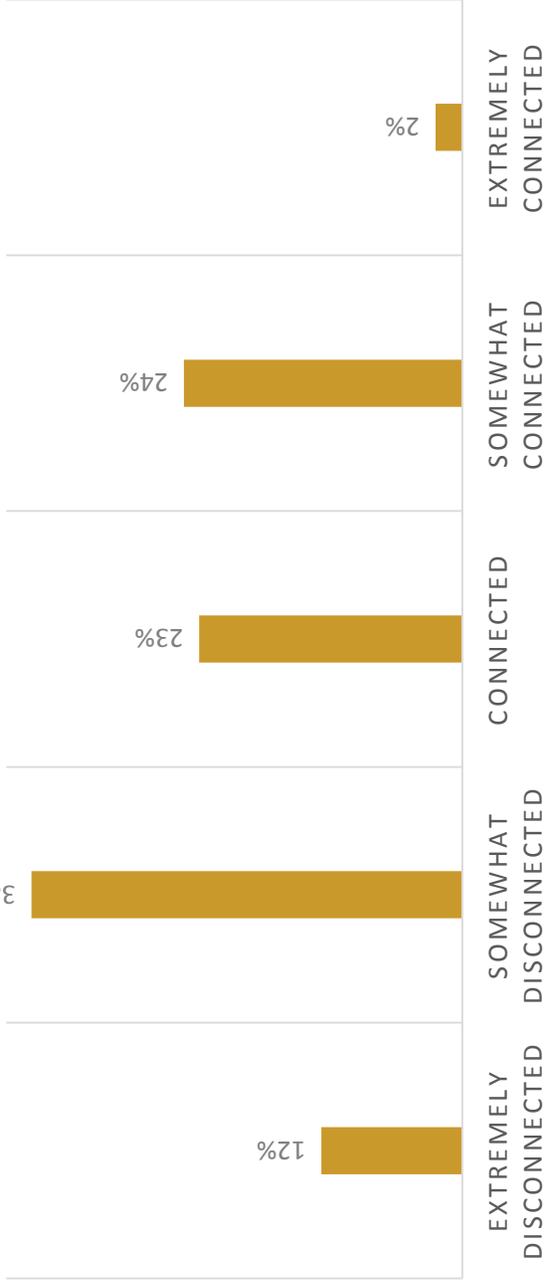| Facility	Percentage
OTHER: FISHING PIER	0.40%
OTHER: STATUE	0.13%
OTHER: GRASSY OPEN SPACE	0.26%
OTHER: PARKING LOT	0.66%
OTHER: RESTROOM	0.66%
OTHER	0.79%
PEARL CITY STATION/ RIVER VIEW...	14.40%
BASKETBALL COURT	2.38%
BENCHES/ PICNIC TABLES	14.66%
PLAYGROUND	13.74%
WALKING/ BIKING TRAIL	34.74%
BOAT HARBOR	1.98%
BOAT LAUNCH	4.23%
SPLASH PAD	10.96%

The biking/walking trail, playground, picnic tables/ benches and Pearl City Station/ Riverview Center were listed as the most commonly used facilities.

FEELING OF SAFETY CROSSING MISSISSIPPI DRIVE

6%

26%

51%

17%

EXTREMELY UNSAFE SOMEWHAT UNSAFE SOMEWHAT SAFE EXTREMELY SAFE
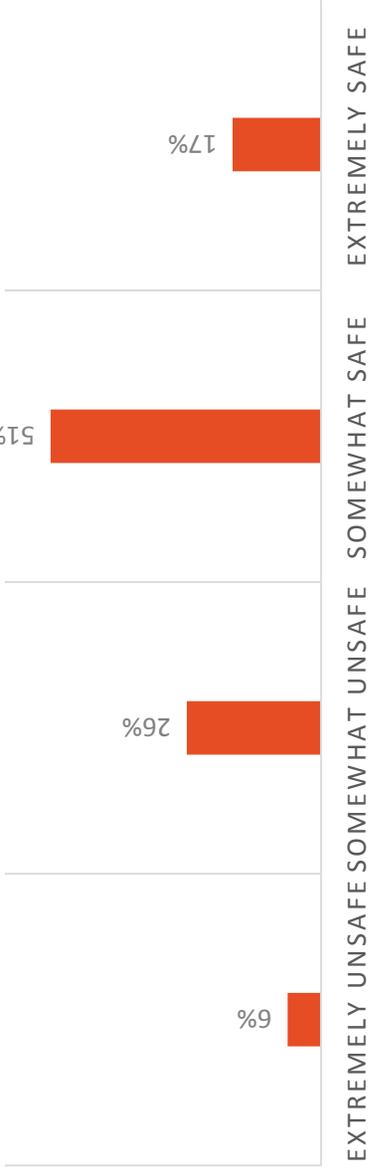
Most respondents did not feel completely safe crossing Mississippi Drive due to the amount of traffic and time to cross.
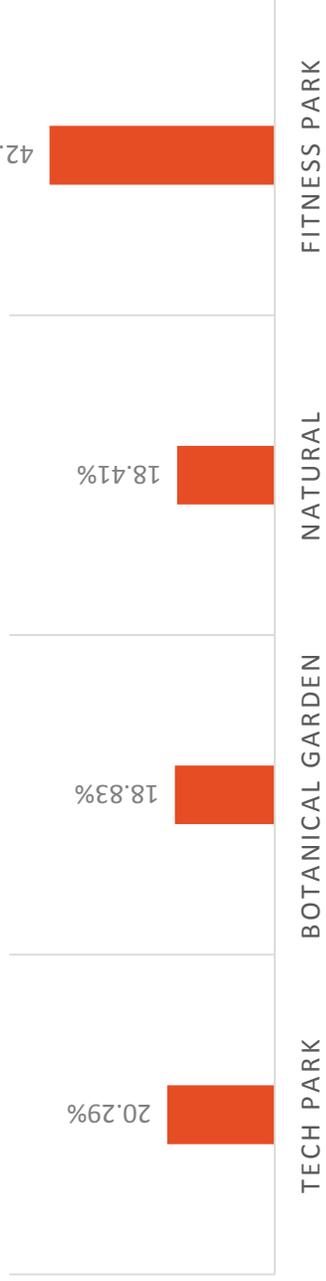
CONNECTION BETWEEN RIVERSIDE PARK AND DOWNTOWN

12%

38%

23%

24%

2%

EXTREMELY DISCONNECTED SOMEWHAT DISCONNECTED CONNECTED SOMEWHAT CONNECTED EXTREMELY CONNECTED

Most residents indicated a disconnection between Riverside Park in the visual appearance, physical connection, and the environment of the two areas.
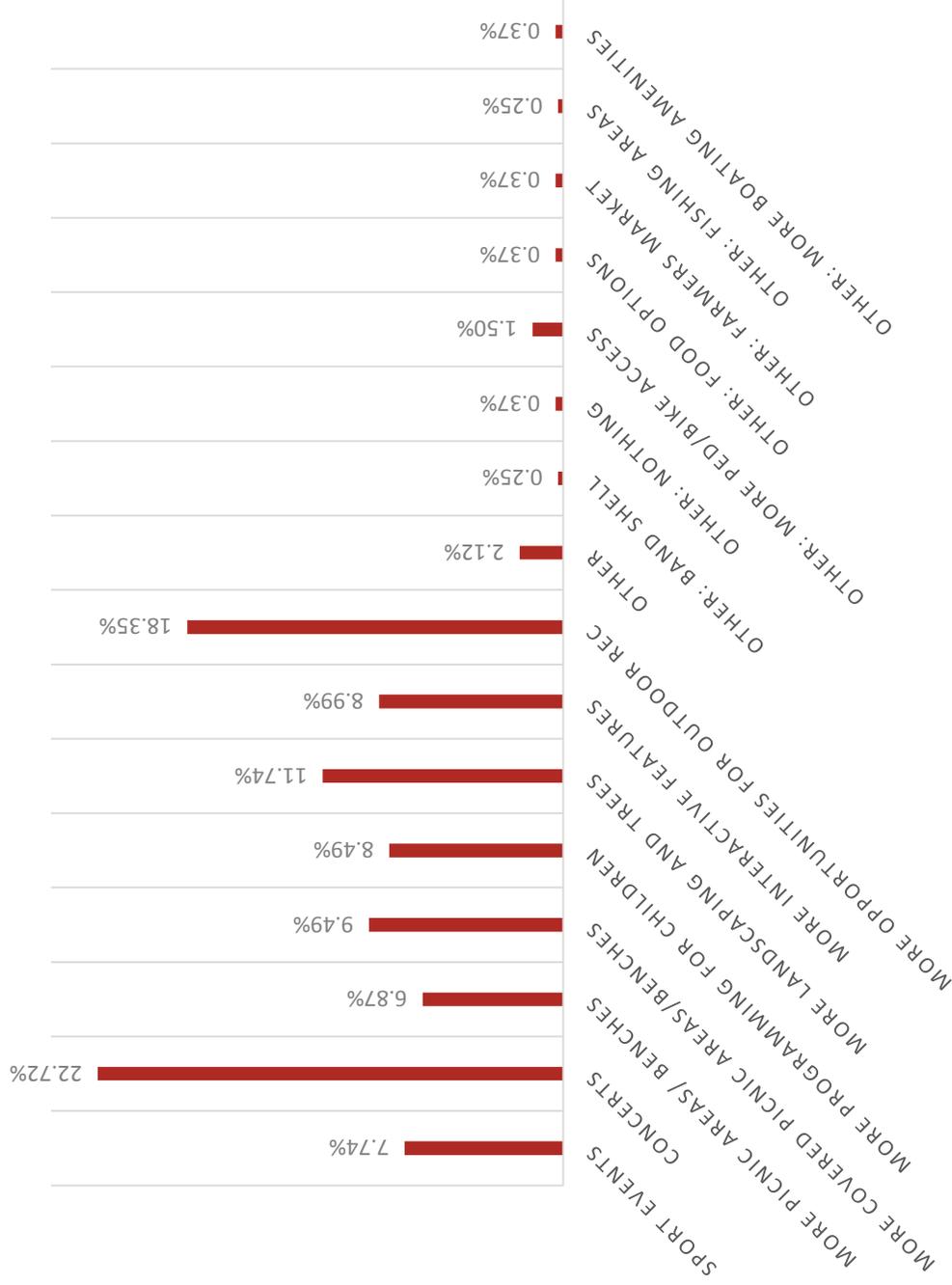
FUTURE PARK THEME

Respondents favored the images that correspond to our Fitness and High Tech Park alternatives.

FITNESS PARK — 42.47%
NATURAL — 18.41%
BOTANICAL GARDEN — 18.83%
TECH PARK — 20.29%

FACILITIES THAT WOULD ENCOURAGE MORE VISITATION TO RIVERSIDE PARK

OTHER: MORE BOATING AMENITIES — 0.37%
OTHER: FISHING AREAS — 0.25%
OTHER: FARMERS MARKET — 0.37%
OTHER: FOOD OPTIONS — 0.37%
OTHER: MORE PED/BIKE ACCESS — 1.50%
OTHER: NOTHING — 0.37%
OTHER: BAND SHELL — 0.25%
OTHER — 2.12%
MORE OPPORTUNITIES FOR OUTDOOR REC — 18.35%
MORE INTERACTIVE FEATURES — 8.99%
MORE LANDSCAPING AND TREES — 11.74%
MORE PROGRAMMING FOR CHILDREN — 8.49%
MORE COVERED PICNIC AREAS/BENCHES — 9.49%
MORE PICNIC AREAS/ BENCHES — 6.87%
CONCERTS — 22.72%
SPORT EVENTS — 7.74%

Respondents also indicated that the top three facilities that could be added to Riverside Park to increase the frequency of their visits are: concert/ performance venue, more outdoor recreation opportunities, and more landscaping and trees.

POPULATION/WORKFORCE GROUP

Demographic: young professionals

FEEDBACK	RELATION TO OUR PROJECT
(-) Lack of restaurant choices, especially outdoor dining	Food carts at Riverfront, additional seating?
(-) Too much emphasis on historic aspects of Muscatine	Potential support for more modern design aesthetic
(-) Lack of retail within walking distance; lack of general retail options	Potentially indicative of demand for walkable downtown area; potential to attract new businesses by improving the area?
(-) Lack of social activities for young professionals	Consistent with survey feedback suggesting more concerts and events on the riverfront
(-) High taxes to pay for Olympic quality soccer field and other recreational infrastructure that is typically only used for elementary school sports and generally underused for the cost	-Willingness to pay for recreational activities -Indicates desire to see expanded uses of existing facilities beyond activities geared toward children
(+) Huge emphasis on trails and park system	Consistent with our observation that Riverside Park is a major community amenity
(+) Need to spread awareness of parks and recreational opportunities	Should promotion be a part of our implementation plan?
(+) Emphasis on healthy living	Support for "Fitness" alternative, relating to Blue Zones
(+) Dubuque and Le Claire considered competing cities with attractive downtowns	Supports importance of this strengthening this area
Reaction to current "Pearl of the Mississippi" branding = indifferent/good not great	Potential support for more modern design aesthetic or strengthening current theme
Blue collar demographic needs to better maintained and marketed to	Is this an important demographic to include in riverfront planning process? Have we been successful in reaching this group?
Signs and billboards to show local restaurants and stores	Support for installation of wayfinding signage (seems to be more for visitors/people new to the community)

CONNECTIVITY GROUP

Demographic: bicyclists

FEEDBACK	RELATION TO OUR PROJECT
Participants expressed desire for parks/rec areas to serve as destinations or hubs for way-finding and connectivity	Supports need to connect park and downtown
Downtown needs mobility to get around	Support for improving pedestrian experience
More private-public partnership; get people interested in this part of the community	Importance of industry leader involvement in community development initiatives
Riverfront & downtown as a highly valued area	Importance of this making this area exceptional/a focal point
More bike racks	Consistent with field observation of limited bike racks available in Riverside Park
Would like to see amenities (benches, water fountains, and restrooms)	Consistent with our observations

APPENDIX J – Public Open House Marketing Materials

RIVERFRONT AREA
PUBLIC OPEN HOUSE

JOIN US at PEARL CITY STATION
SATURDAY MARCH 8, 2014 | 2-5PM
TO VIEW DESIGN IDEAS, SHARE YOUR OPINION,
& ENJOY COMPLIMENTARY REFRESHMENTS

RIVERFRONT AREA OPEN HOUSE

Mississippi Riverfront Student Group | University of Iowa School of Urban & Regional Planning

JOIN US AT RIVERSIDE PARK
Saturday, March 8 2014 | 2-5PM

Pearl City Station

WE WANT TO KNOW WHAT YOU THINK

This fall, over 300 Muscatine residents responded to the Riverfront & Downtown Survey. The Riverfront and Downtown Open House is an additional opportunity to voice your opinion regarding this unique and important part of the city.

Ultimately, our goal is to write a plan that reflects what Muscatine residents want to see in the riverfront & downtown area.

What will take place at the meeting?
We will explain our research process and present our ideas in the form of site plans and 3D models. You will have the opportunity to view and rank different options for the riverfront and provide specific comments.

You can arrive at any time and move through each station at your own pace. Members of the Riverfront Student Group will be present to answer questions and listen to your feedback.

What will be done with the feedback?
Feedback from this open house will be used to create a strategic growth plan for the Riverfront and Downtown area.

ABOUT THE PROJECT

Our group has been tasked with creating a plan for strategic growth along the Mississippi Riverfront. The city has already achieved many of its major redevelopment goals to create the park we see today. Our plan will build on what's already been done to create a vision for the park and its connection with the downtown as Muscatine moves into the future.

THE UNIVERSITY OF IOWA
IOWA INITIATIVE
FOR SUSTAINABLE COMMUNITIES

EVENT INSTRUCTIONS

Please consider all the alternatives before casting your votes!

Select your favorite overall theme

Place your green sticker on the theme you like best: Working Ecosystem, Arts & Industry, or Fitness. You can also make specific comments about each theme on the notepads provided.

Select your favorite features

Place your blue stickers on the individual features you find most appealing. You can mix and match features from different alternatives.

If you think it would be best to leave the riverfront as it is, return your stickers at the final station.

Final station

If you'd like, you can use a red sticker to show how you value riverfront improvements. You will also have another chance to put additional comments in a comment box.

Thank you for sharing your opinion!

THE UNIVERSITY OF IOWA
IOWA INITIATIVE
FOR SUSTAINABLE COMMUNITIES

RIVERFRONT OPEN HOUSE

Mississippi Riverfront Student Group | The University of Iowa

PROJECT DESCRIPTION

Now that the city's initial riverfront redevelopment goals have been met, there is no plan in place to guide future growth. Our task is to develop a plan for riverfront growth that reflects community preferences and highlights the area's unique characteristics.

PROJECT GOALS

- Improve connection between park facilities
- Improve connection between riverfront and downtown
- Develop a strong identity for the area
- Find out what Muscatine residents want to see
- Balance parking and green space
- Decide whether open space should be used

SURVEY RESULTS

Riverfront & Downtown Area Survey, Nov 11, 2013 – Jan 14, 2014

Last time you visited Riverside Park, what was your main reason for visiting?

Most people visit Riverside Park for physical activities, entertaining children, and enjoying the view of the river.
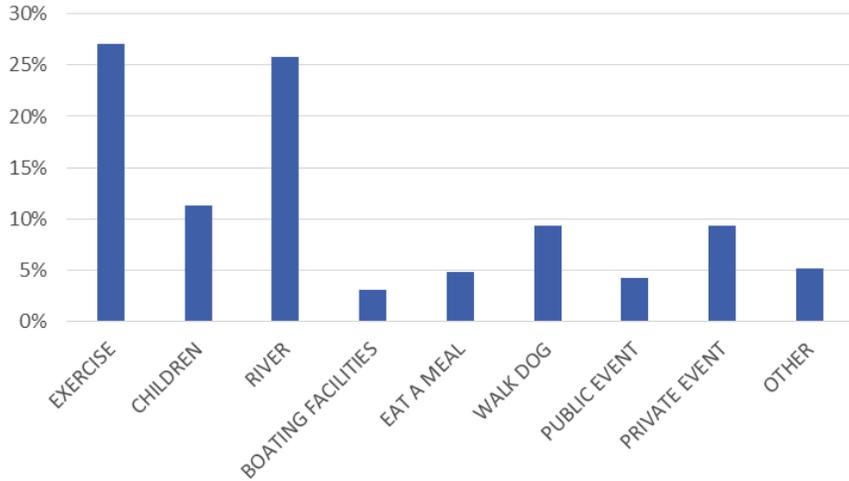

Overall, what would encourage you to visit Riverside Park more frequently?

The top three desired facilities are: concert/performance venue, more outdoor recreation opportunities, and more landscaping and trees.
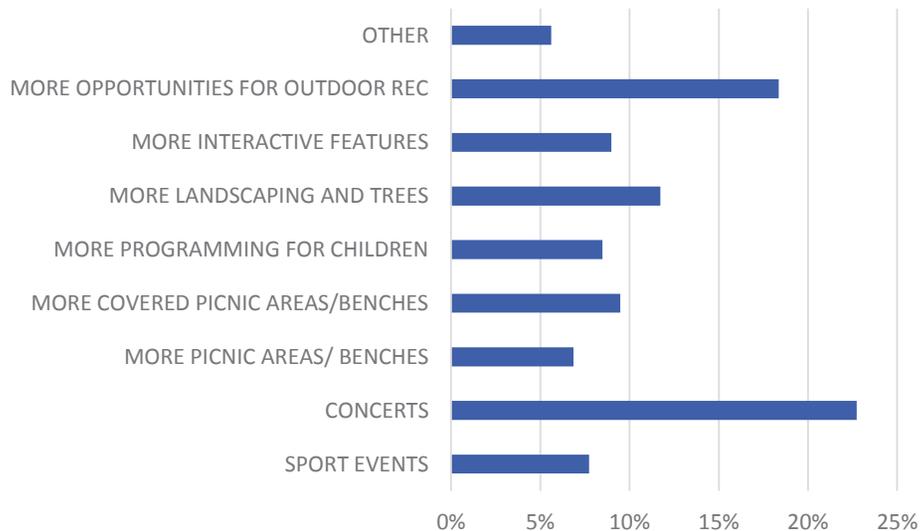
Which picture represents your ideal vision for the riverfront area?

People prefer the images corresponding to our ideas for the Fitness and Arts & Industry alternatives.
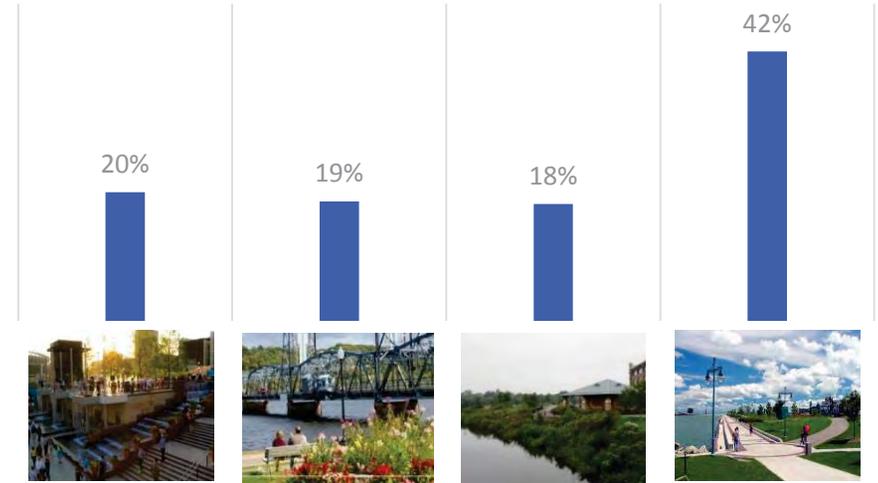
PARKING AT RIVERSIDE PARK

Currently, 24% of the park is dedicated to parking lots. Some of this could be converted into more recreational space. It's up to Muscatine residents to decide which use is more important to the community in this location: park or parking?

PROS	CONS
• Free parking for downtown workers and visitors	• We observed that parking use is about 17-29% on average
• Free parking for riverfront events	• Breaks up activity areas • Potential safety issues
• Free parking/easy access for boat launches	• Takes away from the park-like feel • Increases stormwater runoff

APPENDIX K – Public Open House Results

PUBLIC OPEN HOUSE SUMMARY
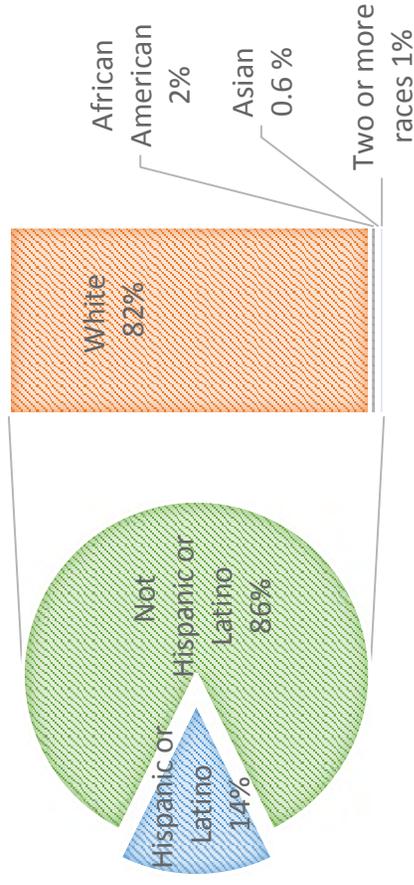Saturday March 8, 2014 | 2-5PM
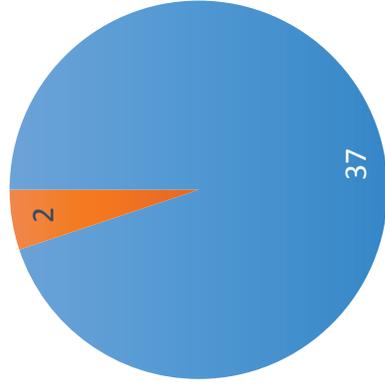
1. Open House Pictures

2. Participant Demographics

48 Muscatine residents and 2 non-residents participated in the Riverfront Open House. Overall, the sample population present at the open house was not very representative of Muscatine's population.
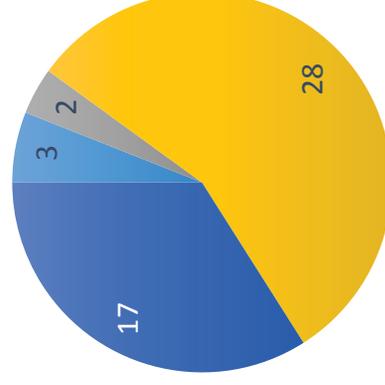
Actual Muscatine Demographics

White 82%

African American 2%

Asian 0.6 %

Two or more races 1%

Not Hispanic or Latino 86%

Hispanic or Latino 14%

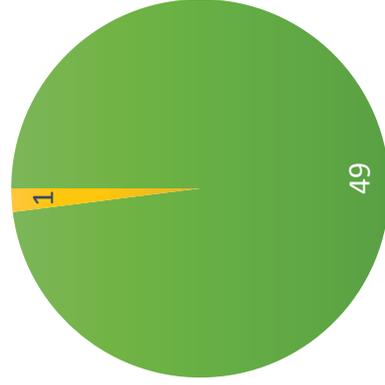## Open House Participant Age

28
17
3
2

■ 0-12 Child ■ 13-20 Teenager ■ 21-30 Young Adult ■ 31-65 Middle Age ■ 65+ Senior

Open House Participant Resident Status

37
2

■ Muscatine Resident ■ Non-Resident

Open House Participant Gender

29
21

■ Male ■ Female

Open House Participant Race/Ethnicity

49
1

■ Caucasian/White ■ African American/Black ■ Hispanic/Latino ■ Asian
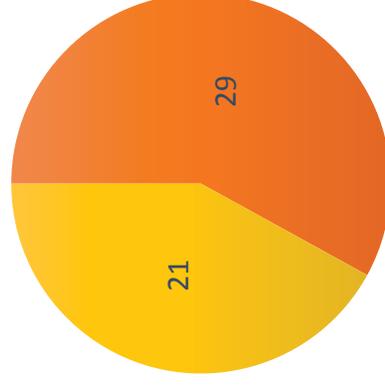
3. Theme Results

The Arts & Industry theme received the most votes (22 out of 50).

Horizontal bar chart showing theme voting results:
- Working Ecosystem (green): ~26%
- Arts and Industry (red): ~44%
- Fitness Riverfront (blue): ~24%
- Do nothing (gray): ~6%

X-axis: 0%, 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45%, 50%
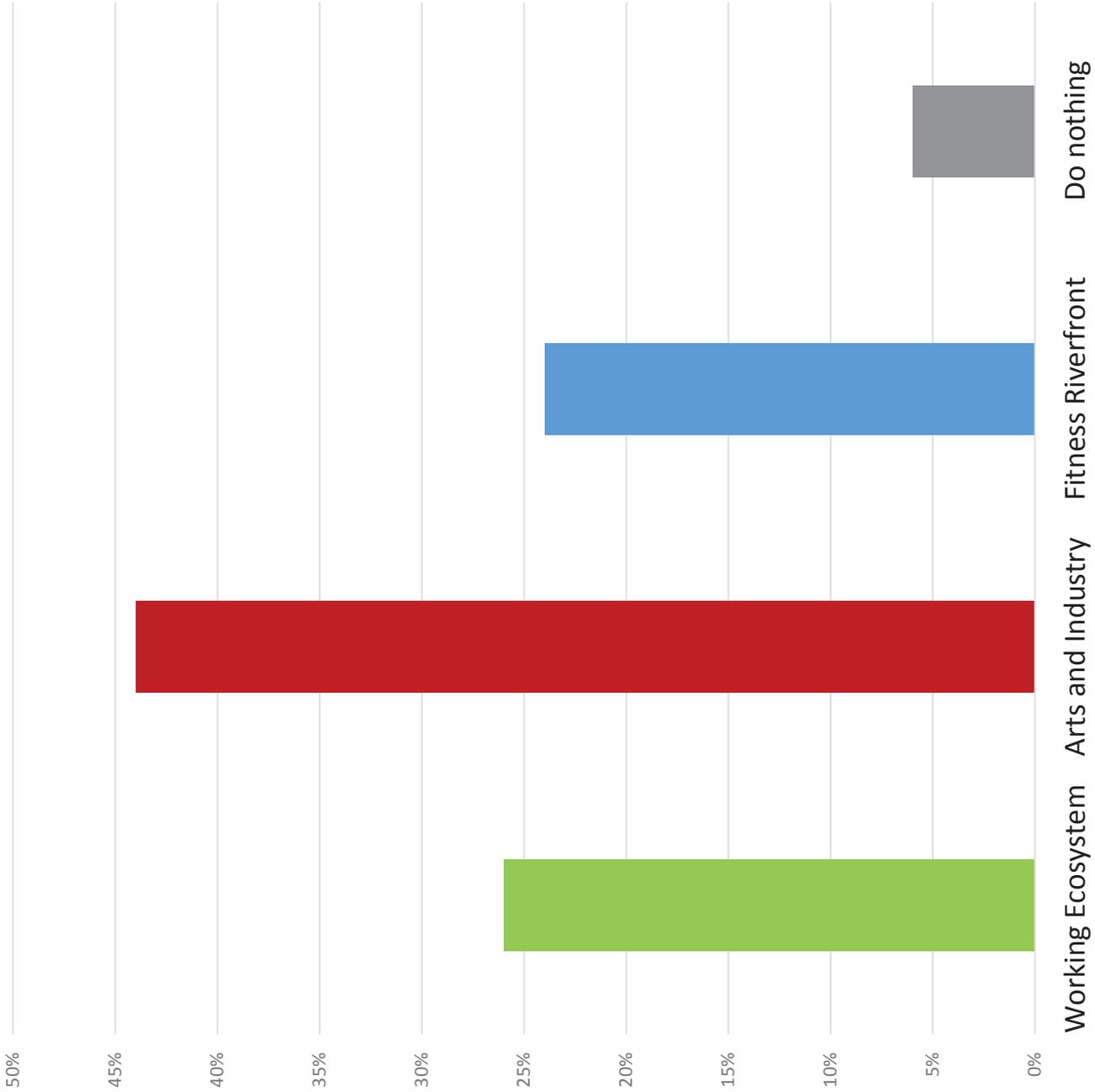
The Farmers Market/Food Carts, Stairs Access to the River, and Amphitheater received the most votes.

n-

Feature	Percentage
Events Tent	
Sports Complex	
Fishing Pier	
Outdoor Fitness Equipment	
Farmers Market & Food Carts	
Outdoor Gallery	
Performance Arts Venue	
Stairs Access	
Food Carts	
Solar Panels	
Native Prairie	
Amphitheater	
Wetlands Boardwalk	
Sheltered Picnic Area	
Expanded Playground	
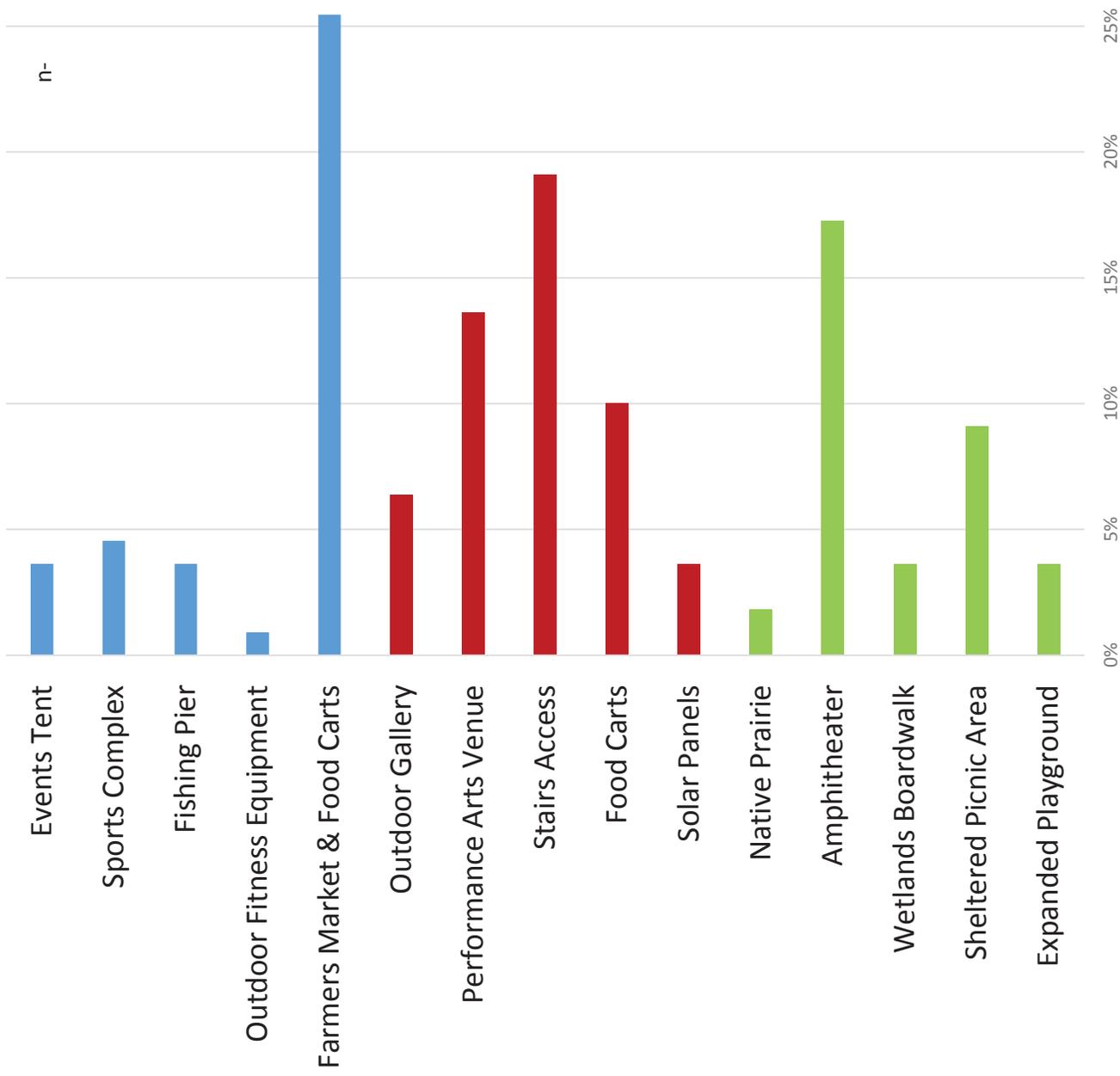
ALTERNATIVE 1: WORKING ECOSYSTEM

- River flood clean up
- Some people ALLERGIC to prairie grass pollens.
- Love adding all these options to enjoy the riverfront more.
- Don't remove basketball court.
- Do have an amphitheater but NOT where basketball court is.
- Prefer the performance arts center to the amphitheater.

ALTERNATIVE 2: ARTS AND INDUSTRY

- Movable food carts
- Prefer Art and Industry, but amphitheater form Alternative 1
- Pedestrian bridge
- Love the stairs access. Great outdoor seating for the boat show!
- With all the engineers in this town, are seeing solar panels.
- Art gallery is fun – adds to community and possibly add arts that children can climb/play on.

ALTERNATIVE 3: FITNESS

- Need more parking for farmers markets, vendors and elderly.

- Thanks for all the great ideas and hard work. All would be wonderful additions to our community.

- I like elements of all. There need more parking for vehicle access.

- Keep existing Pod – flood control - mud removable is a problem.

- Great job! Would like versions with movable parts so we can blend features (A+B of "Fitness" or C+D+E of "Arts" or B of "Eco").

- Don't touch the parking

- The bricks the city offered to be bought and then laid was a good idea to raise money. Move safe parking for guests visiting riverfront to new fun things is important. Like gateway form Iowa Ave into park a lot.

7. Willingness to Pay Results

The Arts & Industry Alternative received the highest "willingness to pay" rating; Working Ecosystem came in second.
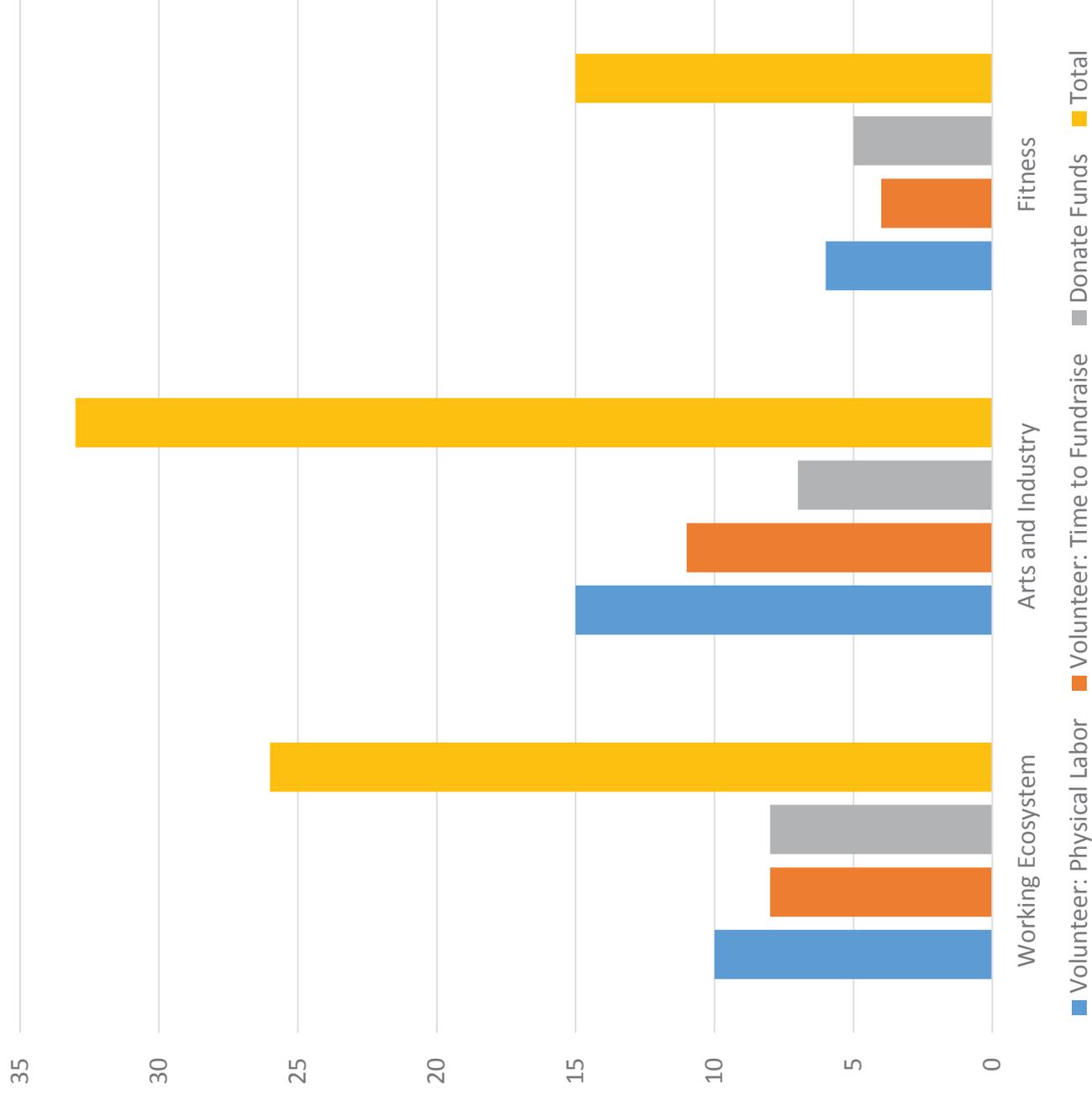
APPENDIX L – Base Cost Estimates

WORKING ECOSYSTEM

MATERIAL	MATERIAL IN RSMEAN	DIMENSION & UNIT					COST PER UNIT						TOTAL ESTIMATED COST	REFERENCE	
		DIMENSION	UNIT	M.S.F.	ACRE	S.Y.	/ACRE	/M.S.F.	/S.F.	/Ea.	/B.C.Y.	/S.Y.		PAGE	DIVISION & LINE NUM.
New grass area	Bent grass sod	420,000	sq ft	420				650			02900-02920-400-1000		273,000	135	
* Wetlands		130,000	sq ft	130	3		1,150						3,450		Urban Waterway
* Native prairie		235,000	sq ft	235					0.06428				15,106		Sourcebook on Natural Landscaping for Local Officials
Permeable pavement	Asphalt-treated permeable base course	240,000	sq ft	240		26,674.29					6.18		164,847	104	02700-02710-200-1000
	Granite chips								0.63				151,200	108	02700-02775-275-1070
Red brick pavement	Grouted, 3/8" joint	88,000	sq ft	88					12.1				1,064,800	109	02700-02780-200-0300
New playground synthetic surface	Latex rbubber system, 3/8"thick, color	14,000	sq ft	14		1,556.00						21.5	33,454	112	02700-02790-500-0150
Boardwalk	Redwood planks, 1"thick,	11,000	sq ft	11					9.95				109,450	108	02700-02775-275-1750
Fiberglass bench	Fiberglass, without back, 4'long	6,000	sq ft	6										125	02800-02850-310-0300
Amphitheater volume	Cedar Rapids comparison	270,000	cu ft												
		26,000	sq ft										1,200,000		Cedar Rapids
Additional levee (surface area)	Stone retaining wall(radom stone)	9,000	sq ft	9					57				513,000	122	02800-02830-800-0800
Wooden pergola structure	Wood fence	12,000	sq ft	12						20			4,000	119	02800-02820-510-0400
		200	sq ft												
New playground set		3	units											127	02880-02880-210-0010
	Climber	3	units							1125			3,375		02880-02880-210-0011
	Hhorizontal mokey ladder	3	units							985			2,955		02880-02880-210-0012
	8 seats	1	units							2545			2,545		02880-02880-210-0013
	Poles	3	units							243			729		02880-02880-210-0014
	See-saw, spring, steel, 2 units	1	units							1092			1,092		02880-02880-210-0015
	Parallel bars	3	units							575			1,725		02880-02880-210-0016
New picnic benches	Benches, 4' long	15	units							505			7,575	125	02800-02870-310-0012
TOTAL COST													3,552,303		

Site work & landscape cost data / RS Means. , Kingston, MA : R.S. Means Co. 2006
* Urban Waterways - Designing sDesigning Stormwater Wetlands,2000for Small Watersheds,Prepared byWilliam F. Hunt, Extension Specialist,Department of Biological and Agricultural Engineering,and Barbara A. Doll, Extension Specialist,North Carolina Sea Grant
* Sourcebook on Natural Landscaping for Local Officials

MATERIAL	MATERIAL IN RSMEAN	DIMENSION & UNIT				COST PER UNIT				TOTAL ESTIMATED COST	REFERENCE	
		DIMENSION	UNIT	M.S.F.	S.Y.	/M.S.F.	/S.F.	/Ea.	/S.Y.		PAGE	DIVISION & LINE NUM.
New grass area	Bent grass sod	200000 sq ft		200		650				130,000	135	02900-02920-400-1000
Permeable pavement	Asphalt-treated permeable base course	280000 sq ft			31,111				6.18	192,266	104	02700-02710-200-1000
	Granite chips						0.63			176,400	108	02700-02775-275-1070
Red brick pavement	Red brick pavement	130000 sq ft		130			12.1			1,573,000	109	02700-02780-200-0300
Basketball court	Basketball 2 goal	9400 sq ft		9.4				5100		5,100	126	02800-02880-100-0100
	Court surfacing				1044				21.5	22,446		
Futsall court	Synthetic grass surfacing	24000 sq ft					9.45			226,800	111	02700-02790-400-0020
* Tent structure		12000 sq ft					30.18			362,160		Retail Information
Wooden pergola structure	Wood fence	12000 sq ft 200						20		4,000	119	02800-02820-510-0400
* New locker room		8000 sq ft				79.6733				637,386		National Association of Home Builders
Basketball bleacher	Metal decking	3500 sq ft					8.1			28,350	255	05300-05310-300-0200
Fiberglass benches	Fiberglass panels (fire retardant)	4000 sq ft					6.5			26,000	284	07400-07420-770-0700
Outdoor gym equipment	Cost replaced by highest standard playground	30 units								16,100	127	02880-02880-210-0270
New picnic benches	Benches, 4' long	16 units						505		8,080	125	02800-02870-310-0012
TOTAL COST										3,408,088		

Site work & landscape cost data / RS Means. , Kingston, MA : R.S. Means Co. 2006

* Horizon Series Non-Retractable Shade Structures, URL: http://www.theparkcatalog.com/horizon-non-retractable-shade-structures/horizon-series-non-retractable-shade-structuresrectangle-design/

* National Association of Home Builders- New Construction Cost Breakdown, ,November 1, 2011, URL:http://www.nahb.org/generic.aspx?genericContentID=169974

MATERIAL	MATERIAL IN RSMEAN	DIMENSION & UNIT				COST PER UNIT				TOTAL ESTIMATED COST	REFERENCE	
		DIMENSION	UNIT	M.S.F.	S.Y.	/M.S.F.	/S.F.	/Ea.	/S.Y.		PAGE	DIVISION & LINE NUM.
New grass area	Bent grass sod	150000	sq ft	150		650				97,500	135	02900-02920-400-1000
Permeable pavement	Asphalt-treated permeable base course	330000	sq ft	330	36667				6.18	226,602	104	02700-02710-200-1000
	Granite chips						0.63			207,900	108	02700-02775-275-1070
Limestone pavement	Limestone pavement	61000	sq ft	61			19.75			1,204,750	108	02700-02775-275-1660
Red brick pavement	Red brick pavement	60000	sq ft	60			12.1			726,000	109	02700-02780-200-0300
Basketball court	Basketball 2 goal							5100		5,100	126	02800-02880-100-0100
	Court surfacing	9400	sq ft	9.4	1044				21.5	22,446	112	02700-02790-500-0150
River stairs	Forms in place, 3 use	57000	sq ft	57			17.3			986,100	207	03100-03110-450-0100
Performance arts venue (bandshell)		3360	sq ft	3.36								
*Tent structure		9000	sq ft	9			30.1769			271,592		Retail Information
Wooden pergola structure		18000	sq ft	18				20		4,000	119	02800-02820-510-0400
	Wood fence	200										
* Solar panels		28000	sq ft	28			91.6667			2,566,667		Solar Energy Statistics
Basketball bleacher	Metal decking	3500	sq ft	3.5			8.1			28,350	255	05300-05310-300-0200
New picnic benches	Benches, 4' long	40	units					505		20,200	125	02800-02870-310-0012
TOTAL COST										6,367,207		

Site work & landscape cost data / RS Means. , Kingston, MA : R.S. Means Co. 2006

* Horizon Series Non-Retractable Shade Structures, URL: http://www.theparkcatalog.com/horizon-non-retractable-shade-structures/horizon-series-non-retractable-shade-structuresrectangle-design/

*Source: U.S. Energy Information Administration, Ecoworld,Date Verified: 6.18.2013

APPENDIX M – Evaluation of Alternatives

WORKING ECOSYSTEM

	Weight			Compatibility	Points possible	Points	Total Points
Public Input	10%	Number of votes	13		10	2.6	0.26
		Total Number of votes	50				
City Vision	15%	Public facilities should be a model for the private sector in implementing environmental quality programs		Yes	1	1	0.90
		Reduce environmental impacts related to energy consumption and production		No	1	0	
		Work with community partners to improve environmental quality of the community and public understanding of these issues		Yes	1	1	
		Regulate development in the floodplain		Yes	1	1	
		Expand cold and all-weather amenities and activities		No	1	0	
		Streets that create an attractive public realm, further community appearance goals, and act as welcoming and comfortable places for people while safely accommodating vehicles		Yes	1	1	
		Public signage should promote community identity, further community appearance goals and visitor wayfinding		No	1	0	
		The City of Muscatine will be in compliance all relevant state and federal stormwater regulations		Yes	1	1	
		Installation of public art that enhances the aesthetics and quality of life of Muscatine		No	1	0	
		Construct a bandshell at Riverside Park that is aesthetically pleasing and consistent with the design of other developed amenities in Riverside Park; funding from non-municipal sources		Yes	1	1	
Constraints	25%	Flooding	Reduces impervious surface area	Yes	1	1	2.00
			New facilities/plantings are flood resistant	Yes	1	1	
			New facilities/plantings need low maintenance after the flood	Yes	1	1	
			New facilities are outside max flood range	No	1	0	
			New facilities are outside average flood range	Yes	1	1	
		Parking	Meets baseline parking requirement	No	1	0	
		Viewshed	Viewshed unblocked	Yes	1	1	
		Historic Character	Compatible with historic character	Yes	1	1	
		Environmental Impacts	Provides wildlife habitat	Yes	1	1	
			Utilizes stormwater BMPs	Yes	1	1	
Economic Feasibility	20%	Implementation Costs	Estimated cost relative to other alternatives	1st	10	6.66	4.33
				2nd	6.66		
				3rd	3.33		
	30%	Maintenance Costs	Estimated cost relative to other alternatives	1st	10	10	
				2nd	6.66		
				3rd	3.33		
Total Points Earned (out of 10)							**7.49**

ARTS & INDUSTRY

	Weight			Compatibility	Points possible	Points	Total Points
Public Input	10%	Number of votes	22		10	4.4	0.44
		Total Number of votes	50				
City Vision	15%	Public facilities should be a model for the private sector in implementing environmental quality programs		No	1	0	0.98
		Reduce environmental impacts related to energy consumption and production		Yes	1	1	
		Work with community partners to improve environmental quality of the community and public understanding of these issues		No	1	0	
		Regulate development in the floodplain		Yes	1	1	
		Expand cold and all-weather amenities and activities		No	1	0	
		Streets that create an attractive public realm, further community appearance goals, and act as welcoming and comfortable places for people while safely accommodating vehicles		Yes	1	1	
		Public signage should promote community identity, further community appearance goals and visitor wayfinding		Partial	1	0.5	
		The City of Muscatine will be in compliance all relevant state and federal stormwater regulations		Yes	1	1	
		Installation of public art that enhances the aesthetics and quality of life of Muscatine		Yes	1	1	
		Construct a bandshell at Riverside Park that is aesthetically pleasing and consistent with the design of other developed amenities in Riverside Park; funding from non-municipal sources		Yes	1	1	
Constraints	25%	Flooding	Reduces impervious surface area	No	1	0	0.75
			New facilities/plantings are flood resistant	Yes	1	1	
			New facilities/plantings need low maintenance after the flood	No	1	0	
			New facilities are outside max flood range	No	1	0	
			New facilities are outside average flood range	Yes	1	1	
		Parking	Meets baseline parking requirement	No	1	0	
		Viewshed	Viewshed unblocked	No	1	0	
		Historic Character	Compatible with historic character	Yes	1	1	
		Environmental Impacts	Wildlife habitat	No	1	0	
			Stormwater BMPs	No	1	0	
Economic Feasibility	20%	Implementation Costs	Estimated cost relative to other alternatives	1st	10	3.33	2.66
				2nd	6.66		
				3rd	3.33		
	30%	Maintenance Costs	Estimated cost relative to other alternatives	1st	10	6.66	
				2nd	6.66		
				3rd	3.33		
Total Points Earned (out of 10)							**4.83**

FITNESS

	Weight			Compatibility	Points possible	Points	Total Points
Public Input	10%	Number of votes	12		10	2.4	0.24
		Total Number of votes	50				
City Vision	15%	Public facilities should be a model for the private sector in implementing environmental quality programs		No	1	0	0.75
		Reduce environmental impacts related to energy consumption and production		No	1	0	
		Work with community partners to improve environmental quality of the community and public understanding of these issues		No	1	0	
		Regulate development in the floodplain		Yes	1	1	
		Expand cold and all-weather amenities and activities		Yes	1	1	
		Streets that create an attractive public realm, further community appearance goals, and act as welcoming and comfortable places for people while safely accommodating vehicles		Yes	1	1	
		Public signage should promote community identity, further community appearance goals and visitor wayfinding		No	1	0	
		The City of Muscatine will be in compliance all relevant state and federal stormwater regulations		Yes	1	1	
		Installation of public art that enhances the aesthetics and quality of life of Muscatine		No	1	0	
		Construct a bandshell at Riverside Park that is aesthetically pleasing and consistent with the design of other developed amenities in Riverside Park; funding from non-municipal sources		Yes	1	1	
Constraints	25%	Flooding	Reduces impervious surface area	Yes	1	0	0.88
			New facilities/plantings are flood resistant	Yes	1	1	
			New facilities/plantings need low maintenance after the flood	No	1	0	
			New facilities are outside max flood range	No	1	0	
			New facilities are outside average flood range	Yes	1	1	
		Parking	Meets baseline parking requirement	No	1	0.5	
		Viewshed	Viewshed unblocked	Yes	1	1	
		Historic Character	Compatible with historic character	No	1	0	
		Environmental Impacts	Wildlife habitat	No	1	0	
			Stormwater BMPs	No	1	0	
Economic Feasibility	20%	Implementation Costs	Estimated cost relative to other alternatives	1st	10	10	3.00
				2nd	6.66		
				3rd	3.33		
	30%	Maintenance Costs	Estimated cost relative to other alternatives	1st	10	3.33	
				2nd	6.66		
				3rd	3.33		
Total Points Earned (out of 10)							**4.86**

APPENDIX N – 11 Step Public Art Planning Guide

Source: St. Louis Regional Arts Commission, *Public Art Practices: A Reference Guide for Developing Public Art Programs and Projects*, 2007 (10-14). http://www.art-stl.com/assets/pdfs/PublicArtGuide.PDF

11 Step Process

AN ELEVEN STEP PUBLIC ART PLANNING OUTLINE
How to Develop and Implement a Public Art Project*

Below is an elementary outline of important steps for planning a public art project. Although this outline is structured in chronological order, it might be necessary to duplicate some steps, change their order or add steps according to your needs.

Two key elements that are crucial to the public art process: Patience and Inclusion

<u>*Patience:*</u> *It is important to decide whether or not a public art project is the best solution for the situation. Public art is not a "quick fix" process. Time and energy must be spent to develop the concept, select the artist/s, and include the community.*

<u>*Inclusion:*</u> *NIMBY stands for Not In My Back Yard! While most public art projects begin with good intentions, many fail because they aren't appropriate for the community where they are installed or they are thrust on the community without warning. Insensitivity to the opinions of a community can condemn a project before it begins.*

1. **Create a Planning Committee**

   A planning committee representing the community is an essential element of successful public art projects. The planning committee should be representative of the community where the art will be installed. Factors to consider include age, cultural background, ethnicity, gender and profession. Potential committee members might include an artist, elected city official, school administrator, teacher, local newspaper staff, a leader from the religious community, business leader, bank official, students, community members, and an official from an anchor business in the community.

   Once the committee has been organized, a chair or co-chairs should be appointed. Next, determine the goals of the committee and a timetable for reaching the goals. It often helps to determine the deadline and work backwards to set intermediate goals. Structure your meeting schedule to meet the goals. Periodically check on group members' continued support of the project goals. Also, the committee should devote time to educate members about contemporary public art possibilities.

2. **Collect Visual Images and Educate the Committee**

   Compile examples of appealing historical and contemporary public art images. This may include slides, photos, brochures, magazines or images from personal travels. Have people knowledgeable in the field of public art conduct slide presentations for those interested. Use these images and presentations to generate concept and budget discussions in committee meetings and to assist in building group consensus.

   In addition, there are National, State and City public art programs across the Nation. Many offer colorful brochures or web pages that describe their programs. With a phone call, you can begin to familiarize the committee to public art projects from across the country.

3. **Determine the Budget**

Use the information gained from your concept research and initial inquiries to create a budget. Consider donations, volunteer and in-kind resources. To start a fundraising plan, use your knowledge of community members and organizations to create a list of people who have a known interest or possible interest in a public art project. Determine who might be the lead donor(s) and how much that person or organization might contribute. Create a "contributors chart" working down from the amount of the lead donors until it meets a major portion of the projected budget.

Budget Items to consider for a public art project:

- Architect/Engineer Expenses
- Artist's Fee (20%)
- Crating/Transportation
- Equipment Rental
- Fabrication Costs
- Hired Labor
- Installation Costs
- Insurance
- Legal Expenses
- Materials
- Miscellaneous Costs
- Photography

- Research Costs
- Specialized Services/
- Subcontractors – electrician, plumbing, etc.
- Storage
- Studio Rent
- Travel/Mileage
- Utilities
- Maintenance
- Special Costs – installation, etc.

The Regional Arts Commission can assist you with budget development.
Contact Roseann Weiss at 314-863-5811 or roseann@stlrac.org for more information.

4. **Establish a Time Line**

Activities to consider when creating a time line are:

- Community Education
- Concept Development
- Creation of the Budget
- Fundraising
- Marketing Plan

- Artist Selection
- Contracts, Insurance
- Creation of Work
- Installation of Work
- Dedication

5. **Determine a Concept for Art Work**

Identify and discuss works of art and concepts that interest the committee. If appropriate, the artist selected can be included as part of the design team for a new building or site. In this case, the design team can work with the committee to develop the concept for art work.

6. **Conduct a Search for an Artist (or Artist Team)**

Determine if artist selection will be by invitation, local search, statewide search, regional search, national search or international search. (Remember that travel costs and a per diem for each artist will come out of the budget.) If artist selection is to be by search, rather than invitation, create a "Request for Proposal" (RFP) and distribute.

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Contact the Regional Arts Commission for information on developing an RFP and how to find mailing lists and periodicals where the RFP can be posted.

7. Negotiate a Contract With the Artist

The contract should include a timeline, copyright agreements, considerations for additional costs, insurance responsibilities and the individual responsibilities of each party involved. Public art projects often have very unique requirements, it is wise to research and gain insight from a number of people to avoid complications.

PLEASE NOTE: Important items for consideration:

- **Insurance** (Is the work insured before, during and after installation? If the artist and/or assistants are working on site, are they covered? If a child climbs on the sculpture and falls during or after installation, who is liable?)

- **Ownership of the work** – i.e. copyrights, moral rights, image ownership, resale royalties, credits, liability, etc.? (See attached article by Laura Danielson, Page 13)

8. Develop a Maintenance/Conservation Program

This tends to be the most overlooked aspect of a public art project. Awareness of the maintenance requirements of a work is vital and the costs should be included in the budget. Personnel should be trained about the appropriate maintenance for each work. Most maintenance, if done regularly, is simple and inexpensive. Neglect is costly.

9. Creation/Fabrication of the Work

After the artist (or artist team) has been selected and explored ideas with the committee, they can begin developing the work. It's a good idea to schedule several dates with the artist for presentations and/or studio visits with members of the committee. This allows everyone involved a chance to gain insight about the artist's concept and methods.

Ideally, at the end of the creation/development process, the selected artist (or artist team) should be invited to present drawings, a written description, a final budget and a model (also known as a "maquette") of their work to the committee. If the committee approves the proposed work and the budget, then a meeting with community members to announce the project is recommended. If the committee doesn't approve the proposed work and/or the budget, then the artist should solicit new ideas and criticisms and work with the committee to decide what changes are appropriate. **It is important for the committee to remember that the artist has been selected for their artistic and professional skills; they should be given as much creative control of the project as possible.**

10. Installation of the Work

After the work has been approved, installation can begin. Depending on the size of a project, installation work may include the artist, the artist and assistant/s, or other contractors.

11. Dedication of the Work

The new artwork is installed! Now it's time to celebrate, thank the people involved, alert the press and dedicate the work!

*Much of the information for this outline is borrowed, with permission, from The Arkansas Arts Council's Public Art Grant Program Planning Manual, by Sally Williams, Director of Public Art.

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APPENDIX O – Native Prairie Landscaping

Source: Iowa State University Extension, *Sustainable Urban Landscapes: Introduction to Iowa Native Prairie Plants*, 2008 (1-8). https://store.extension.iastate.edu/Product/sul18-pdf.

Sustainable Urban Landscapes
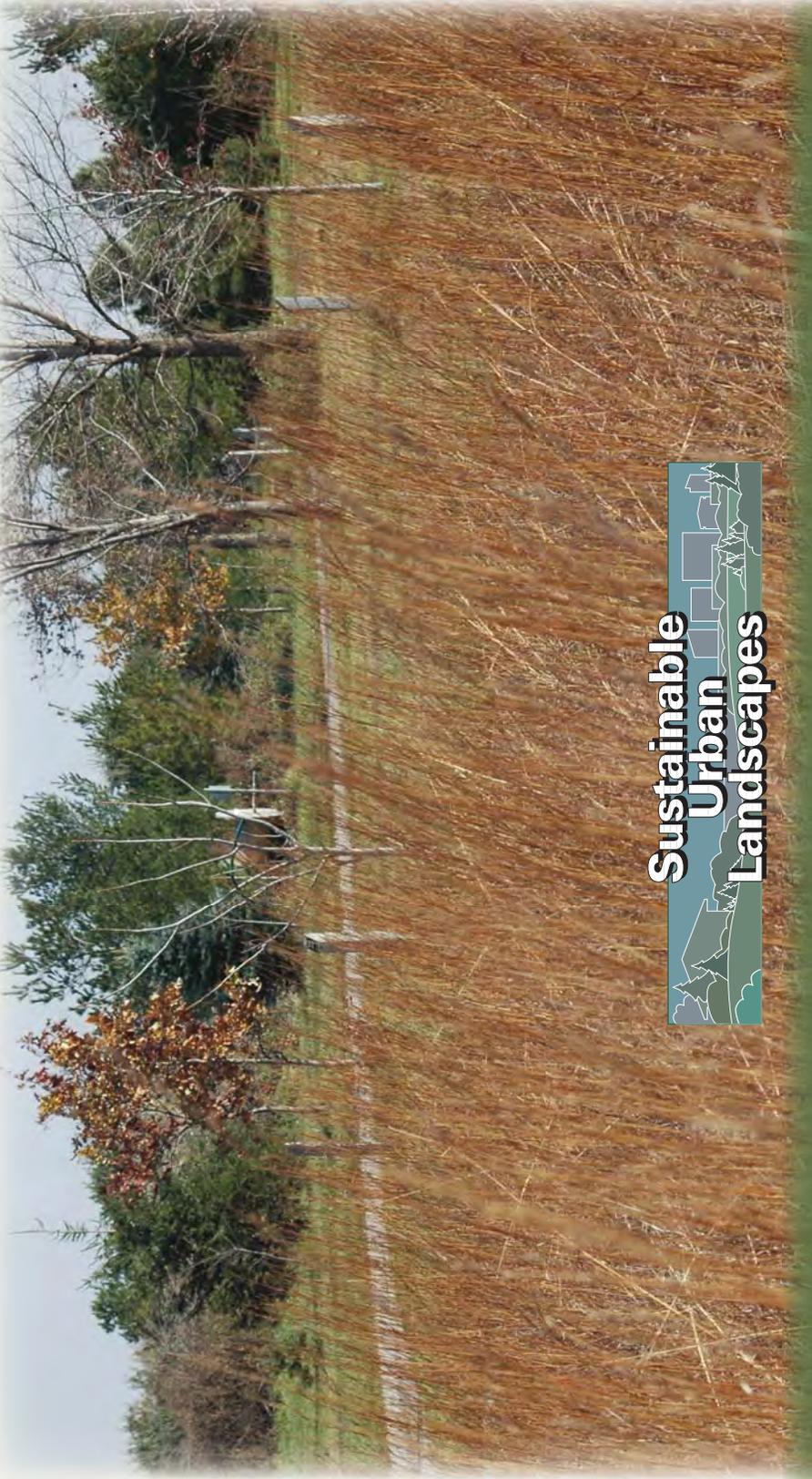
Introduction to Iowa Native Prairie Plants

The Iowa tallgrass prairie developed over the past 9,000 to 10,000 years, after the retreat of the last glaciers. The ecosystem that developed as a prairie consisted of communities of grasses, forbs, insects, and other animals. Prairie communities vary depending on the environment. Plants and animals in these communities adapted and evolved to survive a range of conditions from hot and dry to moist and boggy.

IOWA STATE UNIVERSITY
University Extension

Introduction to Iowa Native Prairie Plants

This publication focuses on the native plants that inhabit prairie communities. "Native plants" are plants that were growing naturally in a particular area before human settlement. Although many native plants are "prairie plants," the focus herein is on growing individual species or combinations of species in a garden or large planting, rather than on prairie construction or restoration.

Prairies are complex ecosystems that blend the topography and soils of an area with plant and animal communities that can live together in a stable relationship. The process can be complex and requires time and patience. Also, it is difficult to develop a prairie ecosystem on a space less than about a quarter acre.

Most people, however, choose to create a natural-looking garden or planting that serves many of the same functions as a prairie, namely, beauty, weed management, wildlife habitat, and the reduction of soil erosion and runoff. When planning a garden of native plants, it is a good idea to visit other gardens that have native plantings or to visit public gardens to see the size, form, and spread of the plants you would like to grow. Local prairie enthusiasts or conservationists organize prairie walks that can be a source of specific information about prairies. A visit to a prairie enables you to see different plants in their natural setting.

There are many advantages to growing native plants:

■ Native plants are well adapted to local conditions. They are vigorous and hardy, so they can survive winter cold, and summer heat, drought and windy conditions.

■ Once established, they require little or no irrigation. No fertilization is needed.

■ They are resistant or tolerant to most insect pests and diseases.

■ A blend of native species provides season-long color and interest.

■ Native species are members of a plant and animal community that balances itself when there is a diverse assemblage of species. This natural balance keeps native plants from becoming invasive.

■ They attract butterflies by serving as host plants for caterpillars and nectar plants for butterflies.

■ Growing native plants is a fun learning process. Each season brings some answers and more questions.

A partial guide for native plants that may be suitable for your landscape can be found on pages 3–6. Note the column listing plant height. Some of the tall natives are not suitable for small spaces without staking individual plants.

TRAER, TAMA COUNTY, IOWA

TRAER, TAMA COUNTY, IOWA

An established urban reconstructed prairie

Iowa Native Prairie Plants—Pictorial Guide

Purple prairie clover
Dalea purpurea

Purple coneflower
Echinacea purpurea

Great blue lobelia and goldenrod
Lobelia syphilitica, Solidago sp.

Spiderwort
Tradescantia ohioensis

Swamp milkweed
Asclepias incarnata

Partridge pea
Chamaecrista fasciculata

Rattlesnake master
Eryngium yuccafolium

Butterfly milkweed
Asclepias tuberosa

Coreopsis
Coreopsis palmata

Iowa Native Prairie Plants
Grasses

Common/Latin Name	Soil Moisture Conditions*	Mature Height	Flower Period	Comments
Big bluestem *Andropogon gerardi*	M	5–7′	Aug.–Sept.	Sometimes known as "turkey foot" by the pioneers. Dominant plant of the eastern tallgrass prairie. Warm-season grass.
Indiangrass *Sorghastrum nutans*	M	3–6′	Aug.–Sept.	The plant forms an attractive mounded clump; excellent specimen plant in perennial gardens; warm-season grass.
Switchgrass *Panicum virgatum*	M	3–6′	July–Aug.	Bright yellow to tan fall color; seed heads are wispy sprays; warm-season grass.
Little bluestem *Schizachyrium scoparium*	DM	2–3′	Aug.–Sept.	Red-brown and russet fall color; specimen plant in perennial gardens; warm-season grass.
Canada wildrye *Elymus canadensis*	M	2–3′	May–June	Distinctive wheat-looking seed head that provides texture to mixed plantings; cool-season grass.
Sideoats grama *Bouteloua curtipendula*	M	8–18′	Apr.–June	Establishes quickly from seed; cool-season grass.
Prairie dropseed *Sporobolus heterolepis*	M/DM	2–3′	August	Beautiful grass for variation in texture and form; warm-season grass.

Forbs

Common/Latin Name	Soil Moisture Conditions*	Mature Height	Flower Period	Comments
Butterfly milkweed *Asclepias tuberosa*	M	2–3′	June–Aug.	Orange to yellow flowers; attracts many butterflies; host plant for monarch butterflies.
Swamp milkweed *Asclepias incarnata*	W	3–5′	June–Aug.	Pale pink to rose colored; smaller and more compact than common milkweed; host plant for monarch butterflies.
Partridge pea *Chamaecrista fasciculata*	M	1–2′	July–Aug.	A showy, annual legume that has bright yellow flowers and dark green foliage.
Cardinal flower *Lobelia cardinalis*	W	2–3′	Aug.–Sept.	Spike of red flowers; requires wet sites; does best along stream edges.
Great blue lobelia *Lobelia syphilitica*	WM/W	2–3′	Aug.–Sept.	Medium blue flowers. More common in natural Iowa habitats than cardinal flower.
New England aster *Aster novae-angliae*	M	2–4′	Sept.–Oct.	Purple or pink. Makes attractive cut flower in the fall; attracts butterflies and moths.
Plains tickseed *Coreopsis tinctoria* Prairie coreopsis *Coreopsis palmata*	DM	1–3′	May–Aug.	Yellow flowers. After flowering, the disc turns brown and produces seeds that resemble ticks, hence its common name. Tickseed is a good nectar source for bees and a valuable plant in the prairie biome.
Pale purple coneflower *Echinacea pallida*	M	2–3′	June–July	Long-lived perennial; resembles daisies with backward, curving pink-purple ray flowers; the flower center contains a prickly raised dome.
Purple coneflower *Echinacea purpurea*	M	2–3′	July–Aug.	A native to far southeast Iowa; grown extensively in home gardens.
Bottle gentian *Gentiana andrewsii*	M	1–2′	Aug.–Oct.	The common name notes that its flowers stay closed when it is blooming. Flowers are vibrant indigo-purple.
Prairie smoke *Geum trifolium*	M/D	1–2′	May–June	Delicate reddish-pink blooms in spring give way to fluffy seed heads that look like puffs of smoke in summer. Native to extreme northeast Iowa.

Common name / Scientific name	Moisture	Height	Bloom	Description
False sunflower or Oxeye *Heliopsis helianthoides*	M/WM	3–5′	July–Sept.	Smaller than most sunflowers; perennial; has interesting opposite-leaved foliage with 1-inch yellow flower heads from midsummer on; can be somewhat aggressive.
Prairie blazing star or Prairie gayfeather *Liatris pycnostachya*	M	1–4′	July–Oct.	The corms served as winter food for early settlers (and rodents). This signature tallgrass prairie plant has gained fame as a lavender cut flower in the florist industry. Pycnostachya means "thick-spiked," referring to the densely packed flower spikes.
Rough blazing star or Rough gayfeather *Liatris aspera*	M/DM	2–3′	July–Oct.	Violet/purple flowers. The flower spikes are larger and more separated along the stem than those of prairie blazing star. It takes longer to establish than its cousin, prairie blazing star.
Leadplant *Amorpha canescens*	DM	1–3′	June–Aug.	Small purple flowers; grayish-white compound foliage on perennial stems.
Shooting star *Dodecatheon meadia*	M/DM	1–2′	May	Will tolerate some shade; native to eastern Iowa. Quite showy in the early season with pale pink to white dramatic flowers.
Golden Alexander *Zizia aurea*	WM/M	1–3′	Apr.–June	Perennial of moist woods, prairie meadows, and thickets; establishes quickly from seed; yellow umbel resembling a more delicate Queen Anne's lace.
Wild bergamot *Monarda fistulosa*	M	1–3′	July–Aug.	Lavender blooms; like all members of the mint family, it has square stems and is pleasantly fragrant.
Gray-headed coneflower or Yellow coneflower *Ratibida pinnata*	M	3–4′	June–Sept.	Yellow flowers. When crushed, the mature head emits an anise fragrance. Easy to establish and showy. Both gray-headed coneflower and black-eyed Susan are great additions to mass plantings because they establish quickly, bloom prominently, and in a few years are replaced by other species as the planting becomes permanent.
Black-eyed Susan *Rudbeckia hirta*	M	1–2′	June–Oct.	Gold flowers. Black-eyed Susan is a great addition to mass plantings because it establishes quickly, blooms prominently, and then in a few years is replaced by other species as the planting becomes permanent. Its life cycle ranges from a sturdy annual to biennial.
Canada goldenrod *Solidago canadensis* and Gray goldenrod *Solidago nemoralis*	M	3–5′	July–Sept.	Common; easy to establish and provides rich golden fall color. Traditionally, and because it is so showy, it is falsely accused of causing human hay fever. (Its pollen is not windborne.)
Stiff goldenrod *Solidago rigida*	M	2–4′	Aug.–Oct.	Yellow flowers. The flowers of this species are in a prominent flat-topped cluster. Before flowering, the plant is erect and subtly attractive, with downy hair on the leaves.
Spiderwort *Tradescantia ohioensis*	M/WM	1–2′	Apr.–July	The plant's form and rich violet flowers are a hidden treat in the prairie planting.
Compass plant *Silphium laciniatum*	M	4–10′	Aug.–Sept.	Yellow, daisy-like flowers; one of the signature plants of the Iowa prairie. Early travelers used the plant's habit of orienting its deeply divided, side-turned leaves due north and south, making it a natural compass.
Purple prairie clover *Dalea purpurea*	M	1–2′	June–Aug.	1–3″ terminal spikes of rose- to magenta-colored flowers that open from the top down. It establishes easily from seed, and will often flower the same season it is planted. Good addition for most urban and non-urban settings.
White prairie clover *Dalea candida*	M/DM	1–3′	June–Aug.	Similar to purple prairie clover, but the white flowers and the divided leaves are larger. It is slower to establish and does not compete very well, especially in wet soil conditions.
Round-headed bushclover *Lespedeza capitata*	M/DM	2–4′	July–Aug.	Common in most Iowa prairies; has silvery green trefoil leaves and clusters of white flowers that turn chocolate brown as they mature.
Wild petunia *Ruellia humilis*	M	8″–1′	June–Aug.	A savannah or woodland-edge plant that has light lavender 1 to 1.5″ flowers on low-growing, dark green plants.
Rattlesnake master *Eryngium yuccafolium*	M/DM	2–4′	July–Aug.	Adds texture and variety to a prairie; yucca-like leaves have soft spiny edges. Years ago it was sometimes considered a remedy for snakebite. (Don't try that at home.)

*W = Wet   WM = Wet Mesic   M = Mesic   DM = Dry Mesic   D = Dry

Iowa Native Prairie Plants—Pictorial Guide

Indiangrass
Sorghastrum nutans

Gray-headed coneflower and wild bergamot
Ratibida pinnata, Monarda fistulosa (pink)

Compass plant
Silphium laciniatum

Little bluestem
Schizachyrium scoparium

Prairie blazing star
Liatris pycnostachya

Cardinal flower
Lobelia cardinalis

Canada wildrye
Elymus canadensis

Sideoats grama
Bouteloua curtipendula

Rough blazing star
Liatris aspera

For more information

Check these additional titles in the series on prairies and native plants at www.extension.iastate.edu/store.

Prairies and Native Plantings as Outdoor Classrooms, SUL 19

References and Resources for Prairies and Native Plantings, SUL 20

Big bluestem (*Andropogon gerardii*)—MESIC, height 5–7 ft. It begins growth in late spring and flowers in late summer. This tall, deep-rooted perennial was the primary grass of the eastern tallgrass prairie that once covered thousands of acres. The seed head is three-branched, resulting in its common name—"turkey foot."

Wild bergamot (*Monarda fistulosa*)—MESIC, height 1–3 ft. This perennial prairie forb blooms between June and August. Its rosy-lavender-colored flowers are attractive to bees and butterflies.

Many native plants have been selectively bred, or even hybridized so that they meet the needs of people. An example is prairie blazing star, *Liatris pycnostachya*. Varieties of blazing star have been selected from nature for their form, flower color, and durability so they fit both landscape needs of homeowners and cut flower needs of florists.

Planting non-local strains near a prairie remnant or a native reconstruction should be avoided because of the potential for genetic contamination. If you are looking for plants that are native to your particular area, you need to find a commercial seed or plant source that is from local ecotypes. Many suggest using seed sources from within approximately a 50-mile radius

Grasses versus Forbs

Grasses typically have long leaves with parallel veins and can be useful in adding dimension to a planting. Several of the tall grasses wave gently in the wind, and they can provide a dash of subtle fall and winter color. Grasses do have flowers, which are generally greenish, yet some have interesting flowering structures that add appeal to the planting. Some grasses, such as Indiangrass, are well suited as stand-alone or clumps of accent plants, whereas others are better suited for filling in group plantings.

Forbs are the broadleaved plants in a prairie and often have showy blooms. Forbs may add color, texture, habitat for wildlife, and even scent to the planting.

of your planting. When ordering or purchasing seed, check with an expert regarding the optimum seeding rate.

Note: So called "wildflower" mixes may contain few native wildflower seeds and may contain many plants native to the United States but not to Iowa.

Local Ecotypes

Plants of the same species will vary considerably, depending on their geographic origin. Just as people have different traits that give them different attributes such as height, hair color, and facial shape, each plant species has a range of genetic variability.

The choice between separate plantings and mixed plantings of forbs and grasses is situation-dependent. Gardeners should consider the intended use of the site. Mixed plantings generally require more space and an understanding of the differences in biology of the plants being used.

Environments for Native Plants

Dry soils are found on well to excessively drained, usually exposed sites. Soils that are thin to bedrock, or are sandy or gravelly and that occur on steep areas are typical. Dry sites are more common on south-facing slopes where it is the warmest and driest during the summer. Characteristics of the plants adapted to these areas include the following:

■ Plants often less than 3 feet in height

■ Leaves that are adapted to conserve moisture (thick surfaces, wilt throughout the day, or other actions to avoid water loss)

Mesic refers to sites that have good drainage, ample seasonally available water, and deep soils. A good description of mesic is moist, yet well drained. The subsoil (below the dark topsoil) is brightly colored, which indicates good drainage.

Wet sites have seasonally high water tables and often occur low on the landscape. Sedges (grass-like plants with triangular stems in cross section) may be a prominent group of species in wet sites, and the topsoil is either coal black to several feet in depth, or the subsoil is noticeably dull gray colored, or both.

Seed and plant collection ethics

Existing populations of native plants need protection. Some human-assisted seed dispersal (harvested seed) is often acceptable without the existing population being damaged, but some seed needs to remain to renew the native stand. ALWAYS get permission from the managers of a native site before harvesting seed, and limit yourself to taking no more than one-third of the seed crop produced. Taking actual plants to transplant to another area is not acceptable, unless construction or other activities on the site will cause the vegetation to be destroyed. Also, some native plants may not survive transplanting. Look for local information and assistance before you engage in collecting forays.

ISU FEEL RECONSTRUCTED PRAIRIE, BOONE COUNTY, IOWA

Pale Purple Coneflower (*Echinacea pallida*)—MESIC, height 2–3 ft. Flowers bloom in June and July. These long-lived perennials resemble daisies, but with backward-curving pink-purple ray flowers; the flower center contains a prickly raised dome.

Introduction to Iowa Native Prairie Plants was originally printed as PM 1956.

APPENDIX P – Stormwater Wetland Construction

Source: North Carolina Cooperative Extension, *Urban Waterways: Stormwater Wetland Construction Guidance,* 2010 (1-11). http://www.bae.ncsu.edu/stormwater/PublicationFiles/WetlandConstruction2010.pdf.

URBAN Waterways

Stormwater Wetland Construction Guidance

Stormwater wetlands perform well in reducing peak flows and pollutant removal when properly designed and constructed. These wetland construction guidelines are based on experience gained at more than 30 sites across North Carolina.

Developers and community planners increasingly use stormwater wetlands to reduce stormwater peak runoff and pollutant loads. Research continues to show that wetlands can remove many contaminants from stormwater. Designs continue to improve, increasing the potential for stormwater wetlands to provide efficient pollutant treatment. In addition, properly designed systems can also provide aesthetic and environmental education amenities to local communities.

Without proper construction planning, equipment, sequencing, and techniques, however, even a properly designed stormwater wetland is likely to fall short of providing maximum benefits and being embraced by a community. Mistakes during construction can also be costly.

Since the mid-1990s, N.C. State University researchers and Cooperative Extension teams have installed more than 30 stormwater wetlands. From this experience, we have developed techniques that can help guide wetland planning and construction. A properly managed construction project is critical to ensuring that the wetland will develop properly and maximize environmental benefits. In fact, the construction process may be more important to wetland development than the site design details. Unlike some other commonly engineered projects,

Stormwater wetlands are thriving ecosystems.

stormwater wetlands are both physical and biological systems. Envisioning wetlands in this way will help designers and construction managers make informed decisions and build effective projects. Creating stormwater wetlands as thriving ecosystems will translate into improved downstream water quality for streams, rivers, and estuaries.

This fact sheet is a companion to *Stormwater Wetland Design Update* (Extension publication AGW-588-12). It was created to provide *general* guidance in the aspects of construction that should be considered for stormwater wetland projects because designs for these sys-

tems often vary considerably. Specifically, we will focus on the importance of construction:

- Planning
- Oversight
- Sequencing
- Practices — including site layout, inlet and outlet installation, excavation techniques, erosion control and bank stability, and wetland planting and establishment

CONSTRUCTION PLANNING

Proper planning will help to get your stormwater wetland construction project off to a smooth start. Apply early for local permits (such as erosion control permits) that may be required to prevent delays in beginning construction. When scheduling construction, keep in mind that the success of any wetland construction will be measured by the establishment and growth of the vegetative community. Think of wetland construction as building a large garden, and coordinate construction with planting in mind. Therefore, take the time during the design phase to set a target construction completion date that will maximize plant growth at the site during the first growing season. Planting early in the growing season will help to protect the new wetland plants from periods of extreme heat and drought, and allow for a full season of growth. For small wetland sites (less than 1 acre), mid-spring to early summer is the ideal time for completing construction and planting. Larger sites that may require longer timetables or a phased planting approach should be planned with greater consideration. In North Carolina, construction during the early fall can be an advantage in coastal areas with shallow water tables. Winter construction can be managed for more complex sites where extra time may be needed to complete earthwork or outlet construction, or both.

Outline the specifics of construction in a guidance document for the project that includes design plans, construction guidelines, existing infrastructure, required construction materials, equipment required, and task sequences. Providing this document to potential contractors and construction staff, coupled with a site meeting to discuss the details of the project, can be very beneficial. This helps to ensure that all partners understand the importance of required tasks, techniques, and sequencing to project success and cost-effectiveness. Meeting on site also gives both the designer or project manager and the contractors the opportunity to ask questions and exchange ideas about the logistical challenges of the proposed stormwater wetland site. Explain carefully that you are not building a typical engineered pond. Making it clear that your intentions are focused on creating a garden-like

Figure 1. Meeting with contractors and stakeholders before construction will help stormwater wetland projects begin smoothly, saving time and money.

condition will help influence the perspective of potential contractors. Open and thorough communication on site goals will help to smooth construction of the stormwater wetland and set the standard for a successful project.

Make sure that all construction materials (i.e., silt fencing, erosion control fabric, seeds, plants, and outlet structures) are delivered on-site with adequate time for

inspection prior to installation. Costly delays can occur if unsuitable materials need to be replaced. Also consider how material excavated during construction will be handled—will it be kept on-site or transported off-site?

CONSTRUCTION OVERSIGHT

The most detailed construction document cannot replace on-site guidance by the stormwater wetland designer or project manager. Constructing a stormwater wetland is a relatively new practice compared to constructing a stormwater detention pond. A stormwater wetland includes plants and zones with multiple elevations, which make wetlands more complex biological treatment systems than detention ponds. What may be viewed as a minor construction mistake in a detention pond could have severe consequences in a wetland.

Either the designer and/or project manager must be on-site to work with contractors to ensure that the stormwater wetland is constructed within specified tolerances. For example, the designer and/or project manager should routinely check the elevations of the internal wetland zones to prevent areas in the wetland from being dryer or wetter than designed. A difference of a few inches can make a significant impact on the type of vegetation that will be established. The condition of wetland subsoils must also be checked frequently during excavation to ensure that compaction matches the design: not overly compacted if the design calls for the wetland to partially infiltrate, or properly compacted if low infiltration is desired. Additionally, contractors and equipment operators often develop ideas during construction that can save the project time.

Figure 2. Get to know your contractors, and listen to their suggestions. Doing so will be beneficial to your project.

Having the designer and/or project manager on-site can facilitate these discussions and implementation of any changes that are beneficial to the project's timetable and success.

CONSTRUCTION SEQUENCING

A plan that outlines the most efficient sequence for constructing the stormwater wetland can save both time and money. In general, a wetlands construction sequence involves the following steps:

1. Site layout

This involves staking out the important features of a wetland on the site based on design drawings. More complex wetlands may require site surveying to establish grade stakes, a wetland perimeter, and the location of internal wetland features (such as pools and shallow water). Large wetlands that involve deep excavations may require multiple stakeouts throughout construction. All existing utilities at the site must be identified and marked *before* any construction activities.

Figure 3. Stake out the wetland perimeter, internal wetland features, and locations of structures prior to excavation. Make sure all existing utilities at the site are located and marked.

2. Erosion control measures

In North Carolina, sites that disturb less than 1 acre are not required to have a sediment and erosion control plan. However, site managers are still required to take measures that will prevent soil from leaving the site, such as installing silt fences and rock check dams at appropriate locations. If you are required to follow an erosion and sediment control plan, put the measures in place at the beginning of the project prior to excavation. Erosion control measures may need to be installed in phases, and a detailed installation schedule will be a

Figure 4. Installation of a silt fence along a stream bank near a new stormwater wetland construction site

part of an erosion control plan. In general, all erosion control measures must be inspected and maintained regularly and after each rainfall.

3. Outlet construction

Several outlet designs are recommended in *Stormwater Wetland Design Update* (AG-588-12) that offer flexibility for maintaining water depth in a stormwater wetland. If inflows can be diverted around the proposed wetland during construction, outlets can be installed at any time. If the proposed wetland has been designed to be "in-line" with stormwater flow, outlet structures should be installed before any other major excavation. Establishing the outlet will give the structure more time to stabilize, and contractors will be able to control site drainage if groundwater seepage or rainfall occurs during construction.

4. Excavation and wetland soil preparation

After the site layout has been staked, erosion control measures put in place, and the outlet installed, excavation of the site can commence. Excavation of the stormwater wetland should begin near the outlet and progress towards the proposed inlet(s) (generally from downstream to upstream). Many stormwater wetlands will require preparation of subsurface soils by compaction or soil additions (such as bentonite) to reduce infiltration. In addition, most sites will require at least topsoil addition, while others may require the incorporation of organic matter to improve vegetation growth.

5. Bank stabilization

As excavation of the site progresses, the banks should be stabilized by seeding with fast-germinating grasses native to your location. Installing lightweight erosion

Figure 5. Stabilize the banks each day following excavation of a stormwater wetland.

control fabric at the end of each day will reduce bank erosion after rainfall events.

6. Inlet stabilization

After site excavation and stabilization, the areas surrounding the inlet and the forebay should be armored to dissipate the stormwater's energy as it enters the wetland. Energy can be dissipated in several ways. The most popular, effective method is to stabilize the inlet with riprap underlain with geotextile fabric. Some stormwater wetlands may have multiple inlets, so be sure to stabilize all of the inlets appropriately.

7. Final surface preparation

If the wetland surface becomes compacted through unavoidable construction traffic or crusted during extended hot, dry weather, tilling or scarifying the surface prior to planting will encourage plant growth. It is important to avoid compaction of the surface while still maintaining proposed grades, so lightweight equipment will be needed to till or scarify. *Strict oversight of grading in this phase is critical to successful wetland development.*

8. Planting

Wetland plants should be planted at the end of construction (ideally in an appropriate season) in the recommended internal wetland zones. Shrubs for wetland banks also are often planted at this time.

9. Water management

The adjustable outlet should be set to maintain an appropriate water level for early vegetation establishment within the wetland, and to provide a source of water during extended droughts.

down orifice protected by a trash rack to reduce clogging. (3) A drainage pipe with valve for emergency or maintenance purposes.

In general, the installation of an outlet structure involves standard engineering practices. Designers should be very familiar with sizing structures; stability calculations; antiseep collars; and standards for berms, compaction, and soils. Prefabricated outlet structures will likely need to be installed with heavy equipment, while other structures can be built in-place. Some excavation is generally required to install the structure at the correct grade. Regardless of size, the outlet structure should be installed on a firm base for stability. Depending on site conditions, a concrete footing, compacted clay, or compacted gravel footing underlain with filter fabric can provide structural stability.

The outlet structure performs as intended when installed on the designed grade and leveled to maximize water level control. For example, a flashboard riser-type control structure that is installed too high would prevent

Figure 8. Examples of outlet structures built on-site (*top*) and prefabricated and delivered to the site (*bottom*)

Figure 6. The soils for this stormwater wetland are properly prepared for water and wetland plants.

Figure 7. Successful vegetation establishment greatly depends on good topsoil condition, plant spacing, and proper water management.

CONSTRUCTION PRACTICES

Well-established project management practices can be employed to help implement successfully each step in the *Construction Sequencing* section. The following construction techniques are critical and unique to stormwater wetlands.

Installation of outlet structures

The outlet structure controls the rate at which water is released from the stormwater wetland and the depth of water retained in the system between rainfall events. Therefore, outlet installation is critical to the success of a stormwater wetland system. *Stormwater Wetland Design Update* (AGW-588-12) recommends structures that include the following components: (1) Elements of a flashboard riser with tongue-in-groove boards to allow for water level adjustments. (2) A downturned draw-

security to your outlet pipe installation. All berm areas should be planted immediately to stabilize the surrounding soils near the outlet.

Downstream of the outlet structure, use riprap to dissipate energy from the stormwater wetland outflow. Riprap will help protect against downstream erosion or back-cuts that might form and threaten the stability of the outlet structure.

Excavation and wetland soil preparation techniques

Techniques employed during excavation of stormwater wetlands can make or break a project from both success and budget standpoints. Problems generally occur when improper equipment is used, excavated soils are handled multiple times, or when the wetland's internal features or banks become too steep or compacted for vegetation establishment. Survey equipment should be available and regularly used during excavation. Laser-level systems are commonly utilized for construction grading

Figure 9. Installation of a large flashboard riser outlet structure

complete drainage of the wetland if needed for maintenance, and one installed too low could experience backwater conditions. An outlet that is not level will lead to preferential flow of water over one side of the structure and reduce the intended accuracy of water level control within the wetland.

The areas and berms surrounding the outlet must be stabilized to prevent erosion and unintended loss of water from the wetlands. Following placement of the outlet structure, soils with low hydraulic conductivity or high clay content should be compacted around the structure to prevent seepage or piping of water around the outlets. Follow engineering standards for soils and mechanical compaction when at all possible. Another option is to pour concrete around the outlet pipes as an antiseep collar. This is an inexpensive way to add
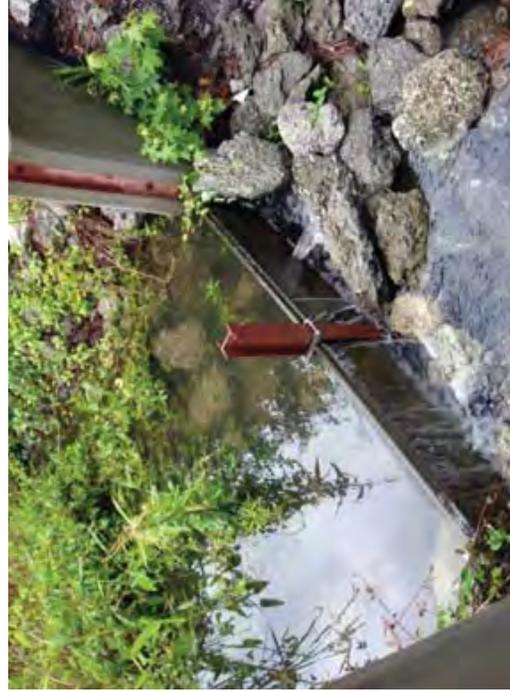

Figure 11. Keep dump trucks moving for off-site transport of soil (top), and keep the excavator operator updated on correct grade to speed construction (bottom).

Figure 10. Armoring downstream of the outlet structure will reduce the potential for erosion that could threaten stability.

and can be operated by one person. It is critical to verify that the design elevations for the wetland are being achieved during excavation. Checking the elevation frequently and relaying them to the equipment operator will help keep the wetland on grade. Surveying as the grading progresses will limit traffic in the wetland, and prevent possible damage to other areas from regrading.

Tracked excavators are preferred over rubber-tired vehicles. This is particularly important on wetter sites. Toothed buckets with a hydraulic thumb are preferred attachments because they can help prevent smearing, which causes excessive compaction, and can also be used to scarify or prep the wetland surface and side-slopes. A hydraulic thumb is most advantageous for removing debris and placing structures. Excavators with swiveling buckets can tilt 45 degrees right or left, helping the operator quickly carve out the wetland's internal features and shape side-slopes. On projects where major excavation is required, using multiple dump trucks to move the soil offsite will minimize the time the equipment operator is idle.

Excavation should begin at the outlet end and continue in the upstream direction. Many sites have good topsoil that is excellent for growing wetland plants. Often, however, designed soil cuts for the wetland expose nutrient deficient subsoil. Therefore, during excavation, the good topsoil should be stockpiled. Where topsoil must be added, the subsurface should be graded to accommodate the intended depth of topsoil addition. Once the subsurface elevations have been finalized, the topsoil can then be added or replaced.

To reduce compaction in small wetlands in the coastal plain designed to interact with groundwater, or at

sites intended to infiltrate some stormwater, the operator should minimize the number of times machinery travels within the excavated wetland area. Plan excavation strategically so that the equipment's weight does not compact the soils where plants will be added. Deep pools are designed to hold water, so compaction in deep-pool areas supports performance. It is best to complete mass excavation, topsoil stockpiling, carving of wetland features (pools and shallow water areas), and topsoil replacement on the first pass with the excavator on high ground, if possible, to avoid putting equipment into the wetland later to finish these tasks.

Several excavation practices help ensure that soils will be suitable for plant establishment. A common technique used in building stormwater ponds is using

Figure 13. Surveying a properly prepared wetland surface.

the excavator bucket to smear and/or compact the soil at the bottom and banks of the pond. Operators ***should not*** use this technique in stormwater wetlands or on wetland banks because the soil may become too compacted for vegetation to establish quickly. The excavator operator should keep the teeth of the bucket down when removing wetland soils or grading banks or internal features – this will keep the soils roughened and loose for improved wetland planting success. See AG-588-17W, *Improving Exfiltration from BMPs*, by Brown and Hunt (2009). The wetland also must be excavated lower than final grade to allow for topsoil replacement. Spread the stockpiled topsoil over the excavated area uniformly, and check the grade. This loose topsoil will settle following rainfall and stormwater inflow, so topsoil elevations 0.1 foot above design grade are acceptable and recommended.

Site stabilization

Chances are that during excavation, or soon thereafter, some rainfall will occur. If left unprotected, loose topsoil will erode along the wetland's banks, costing

Figure 12. If possible, keep the excavator out of the wetland and use the bucket teeth for excavation to keep the wetland soil loose for planting. Remember to stockpile topsoil for replacement!

time and money to repair. Therefore, newly constructed wetland banks should be stabilized at the end of *each* day for best protection against erosion. Smooth by hand-raking, and then seed with a quickly germinating grass or other groundcover appropriate for the local climate and season. Cover the banks with a lightweight erosion control fabric (examples include straw and coconut

Figure 14. Stabilize banks daily with lightweight fabric and seeding to reduce the chance of erosion while the wetland develops.

fibers with biodegradable mesh). This fabric is very inexpensive, easy to install, will allow germination of grass through the fibers, and will degrade quickly.

Wetland banks should be no steeper than a 3H:1V slope. Certain stormwater wetland retrofits require that bank slopes be steeper than recommended to maximize the actual wetland treatment area. For projects with steeper banks, consider tucking the erosion control fabric underneath a berm running along the wetland perimeter, and diverting the runoff into the wetland through a

Figure 15. Two examples of using slope drains for bank stabilization. Surface water generated during larger storms flowing into the wetland is directed into the drains. The drainage reduces erosion that would result from concentrated flow down the banks.

series of adjacent catch basins connected to slope drains. Slope drains can be 4 to 8 inches in diameter and made of corrugated plastic drainpipe. As water is diverted into the catch basins, the water will flow within the plastic slope drains instead of flowing down the steep banks, significantly reducing erosion. As the banks become vegetated, these slope drains may be removed.

Inlet structures

Stormwater wetland designs include a forebay, or large, deep pool near the wetland entrance that slows inflow and allows for sediment deposition. The area surrounding the inlet and the entrance to the forebay should be reinforced with riprap of granite or marl big enough to prevent severe erosion and instability in these areas. Line the target location with a geotextile fabric for additional soil stability before adding the riprap. It is also beneficial to plant vegetation near the inlet, but outside the forebay, at close spacings (i.e., on 12-inch centers)

Planting of a stormwater wetland can be completed with a local planting contractor or with volunteers. Each choice has pros and cons. Experienced contractors cost more than volunteers, but contractors plant with more efficiency and skill. Volunteers will be less expensive, but are generally less skilled and require more oversight and direction. Using volunteers, however, creates an opportunity for a community event that can raise environmental awareness. Also, the volunteers that help to plant a stormwater wetland may embrace the wetland and take pride in maintaining it through the years.

Ideally, wetland vegetation should be delivered within 24 hours of planting. Depending on the supplier, some plant species may arrive in flats, while others may be delivered as bare-root seedlings. Make sure that the plants remain moist and cool between arrival and planting. If the plants are kept on site for longer than 1 day, they will need to be watered.

The wetland soils should be wet before planting. The water could be supplied from recent rainfall, groundwater seepage, or through irrigation. Water can be held within the wetland if the outlet is adjustable and released just prior to planting. The wetland floor should be slightly muddy or have up to 2 inches of standing

Figure 17. Planting a stormwater wetland can be a community volunteer effort.

water. The zones for each wetland plant species should be identified before the volunteer or professional planters arrive. Mark these areas with flagging or with marking paint. In addition, it helps to physically place the flats or bags into their target planting areas. This will not only help speed planting, but will reduce the potential costly mix-ups that occur when species are planted in incorrect zones.

If volunteer planters are used, advertise to the community several weeks in advance through local

Figure 16. Use riprap of granite or marl to slow inflow to the wetland and protect the inlet from erosion.

to encourage fast dense growth that will improve soil stability. If the wetland also receives inflow from other secondary sources, such as subsurface drains, slope drains, or surface water swales, make sure these areas are also protected against erosion.

Planting

Stormwater Wetland Design Update (AG-588-12) gives a comprehensive list of plants that researchers have found to be successful in the various stormwater wetland zones. Planting on 24-inch centers is recommended, although coverage in 1 year can be ensured if the wetland is planted on 12-inch centers. Planting on 36-inch centers is not recommended. Skimping on plants will certainly result in a stormwater wetland that will not perform as designed, particularly in the early years. If the budget for your stormwater wetland project allows, planting at higher densities will improve wetland appearance and performance.

environmental groups, community postings, or local schools. A crew of 10 to 15 volunteer planters can plant a ¼- to ½-acre stormwater wetland over the course of a day with proper oversight and direction. It is a good idea to supply the volunteers with planting tools (shovels, sharp-shooter shovels, dibbles) and disposable work gloves, and have plenty of drinking water on hand. Orient the volunteers to the location and target spacing requirements for the different species of wetland plants. Wetland plants come in a variety of sizes. All plants should be planted with their leaves sticking out of the water. Wetland vegetation should be planted just deep enough to give the plants stability – planting too deep can stress new wetland vegetation in wet conditions. Shallow planting encourages better root growth when the wetland has plenty of water.

Early wetland establishment tips

Once a stormwater wetland has been constructed and planted, it is certainly not time to walk away. The wetland needs to be managed as it is developing. It is particularly vulnerable in its early stages to drought, large storms, and herbivory. Because of these factors, it's a good idea to budget for revegetation or repairs during the project's first year.

Water levels in the wetland should be maintained at 4 to 6 inches during the beginning of the first and second growing seasons because water that is too deep can slow the early plant establishment. Maintain this depth until the plants get taller and more mature and begin to spread across the wetland. Afterwards, normal pool levels within the wetland can be raised slowly until the levels reach the designed depths.

Weather following construction will often dictate plant success and site stability. During periods of below-average rainfall and excessive heat, all of the vegetation needs regular irrigation, so make sure you have a plan to deliver water to the wetland. Water can be pumped to flood the temporary inundation zones from a source outside the wetland, or pumped from deep pools that store some water to a sprinkler system. Make sure that the wetland's banks also receive water regularly, for instance through a temporary sprinkler system using water from in the wetland or an outside source, to help establish the vegetation that will stabilize the banks and prevent erosion.

Sometimes, too much rainfall can be detrimental to a wetland's stability. If heavy rainfall events occur right after a project's completion, even the best erosion control techniques cannot protect against bank erosion from surface water flowing into the wetland. If this hap-

Figure 18. Keep water levels relatively low during early establishment (top), and be prepared to irrigate through flooding or a sprinkler system during a drought (bottom).

pens, the banks may need to be reshaped, reseeded, and matting reapplied. One way to protect against erosion is installing slope drains, as mentioned earlier. Heavy rainfall can also submerge sensitive, young wetland plants. In general, these plants can survive a few days of submergence. However, if continued rainfall is expected or occurs, it may be advisable to lower the water using the emergency valve or by pumping. Early on, think of managing the water level to promote growth just as one would in a home garden.

Waterfowl and burrowing animals can damage plants and berms. These problems are extremely site specific. If you suspect or discover wildlife damage, you will have to discourage the animals from entering the area to protect the wetland. For example, wire strung above a wetland will discourage waterfowl from landing in the wetland and damaging the plants. See also Extension publication AGW-588-07, *Maintenance of Stormwater Wetlands and Wet Ponds*, by Hunt

ners across North Carolina. For a successful stormwater wetland project, it is important to be firm in sticking with the design plan and construction sequencing – short cuts may save time but compromise wetland performance. It is important, however, to consider suggestions from construction contractors, who are usually more familiar with both the potential and the limitations of their equipment and crews, and often have very useful ideas that can also benefit project success.

RESOURCES

Related fact sheets in the Urban Waterways series (AG-588), North Carolina Cooperative Extension Service, N.C. State University:

Hunt, W. F., M. R. Burchell, J. D. Wright, and K. L. Bass. *Stormwater Wetland Design Update* (AGW-588-12). Online: http://www.bae.ncsu.edu/stormwater/PublicationFiles/WetlandDesignUpdate2007.pdf

Hunt, W. F. and W.G. Lord. 2006. *Stormwater Wetland and Wet Pond Maintenance* (AGW-588-7). Online: http://www.bae.ncsu.edu/stormwater/Publication-Files/WetlandMaintenance2006.pdf

Hunt, W. F. and B. A. Doll. 2000. *Designing Stormwater Wetlands for Small Watersheds* (AG-588-2). Online: http://www.bae.ncsu.edu/storm¬water/Publication-Files/SWwetlands2000.pdf

BAE Stormwater Team website: http://www.bae.ncsu.edu/stormwater N.C. State University's clearinghouse for stormwater BMP guidance, including design, construction, and maintenance of stormwater wetlands, bioretention, permeable pavements, water harvesting, and level spreaders.
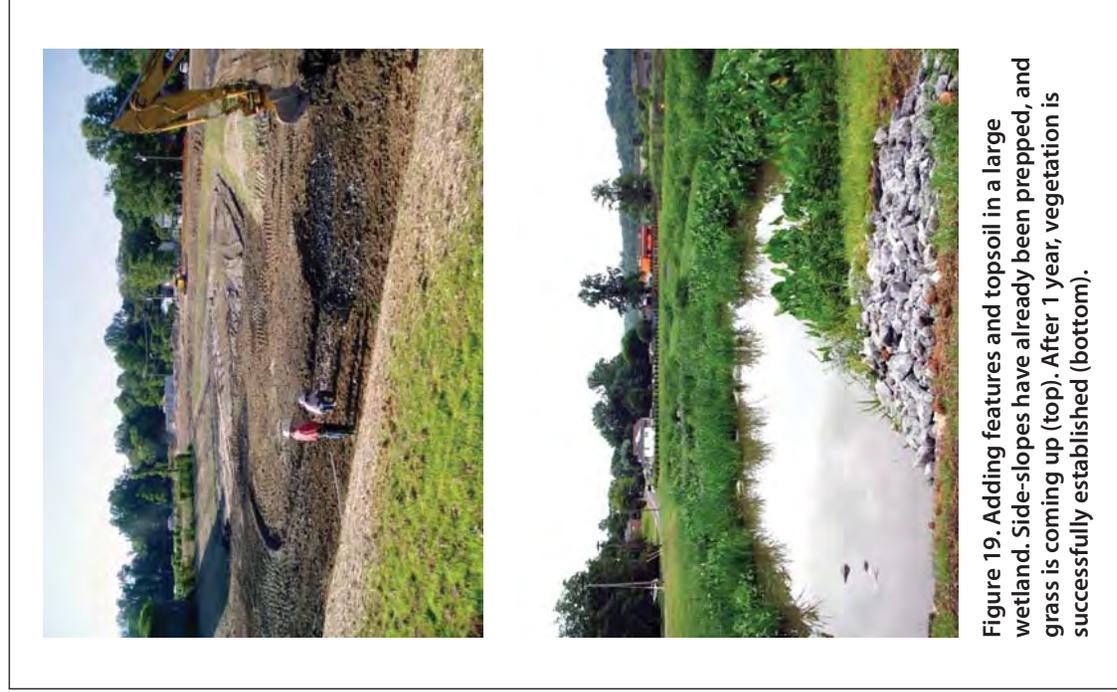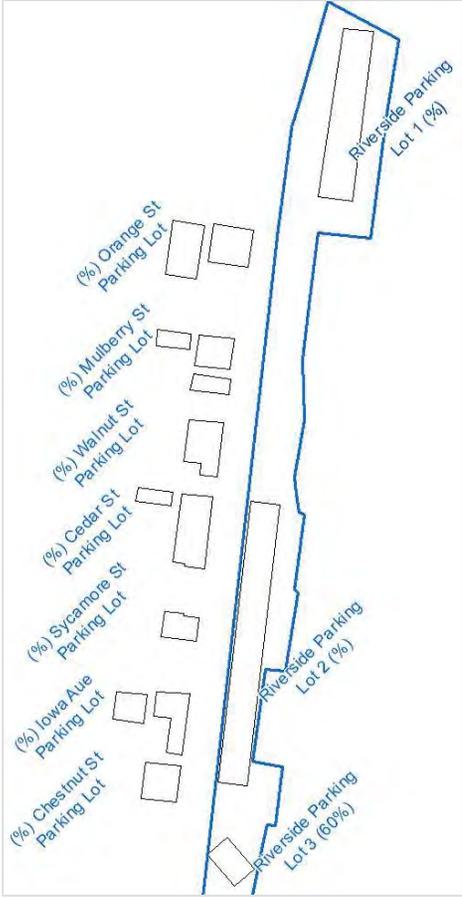
Mature plants beautify a stormwater wetland.

Figure 19. Adding features and topsoil in a large wetland. Side-slopes have already been prepped, and grass is coming up (top). After 1 year, vegetation is successfully established (bottom).

and Lord (2006). If a dense vegetative community is established in the first growing season, plant growth will typically outpace losses from wildlife browsing. In addition, a dense stand or border of tall grasses will help discourage certain waterfowl from making your wetland a permanent home. If you find that wildlife control is necessary, contact your local wildlife control agencies to discuss management of burrowing animals, such as trapping and relocation.

CONCLUSIONS

Stormwater wetlands are important stormwater BMPs that protect water quality. These systems are successful, however, only when properly designed and implemented with care. Proper construction planning saves time and money. Practices discussed and recommended in this factsheet are based on experiences gained through implementing stormwater wetlands with various part-

APPENDIX Q – Parking Observation Template

Date:

Time:

PARKING LOT USAGE

Parking Lots	Total Parking Spaces	Spaces Being Used	% Being Used
Riverside Park Parking Lot 1			
Riverside Park Parking Lot 2			
Riverside Park Parking Lot 3			
Cedar			
Chestnut			
Iowa Ave			
Sycamore			
Walnut			
Mulberry			

LICENSE PLATES SURVEY

	State of Iowa							Other States
	Muscatine	Scott	Cedar	Johnson	Washington	Louisa	Other County	
Riverside Park Parking Lot 1								
Riverside Park Parking Lot 2								
Riverside Park Parking Lot 3								

APPENDIX R – Demographic Information Template

PEOPLE IN RIVERSIDE PARK	Children (12 & under)	Youth (13-18)	Middle Age (20-60)	Senior Citizen (60-80)	Total	Comments
Age groups present						
Ethnicities present						

FACILITY USAGE	Children (12 & under)	Youth (13-20)	Middle Age (20-60)	Senior Citizen (60-80)	Total	
Boat launch (new)						
Boat launch (old)						
Splash pad						
Playground						
Basketball court						
Bike trail						
Walking trail						
Bench/Picnic table						
Pearl City Station						
The Riverview Center						
Statue						
Pier						
Sitting in cars						
Boats in harbor						