

United States Environmental Protection Agency

JUNE 2017
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GREENING AMERICA'S COMMUNITIES

MAKING THE GRANDVIEW AVENUE CORRIDOR GREEN AND COMPLETE

MUSCATINE, IOWA

Smart Growth
GREENING AMERICA'S COMMUNITIES

Office of Sustainable Communities
Smart Growth Program

Greening America's Communities is an EPA program to help cities and towns develop an implementable vision of environmentally friendly neighborhoods that incorporate innovative green infrastructure and other sustainable design strategies. EPA provides design assistance to help support sustainable communities that protect the environment, economy, and public health and to inspire local and state leaders to expand this work elsewhere.

Greening America's Communities will help communities consider ways to incorporate sustainable design strategies into their planning and development to create and enhance interesting, distinctive neighborhoods that have multiple social, economic, and environmental benefits.

Muscatine, Iowa, was chosen in 2016 as one of six communities to receive this assistance along with Brownville, Texas; Columbia, South Carolina; Honolulu, Hawaii; Multnomah County, Oregon; and Oklahoma City, Oklahoma.

More information is available at
https://www.epa.gov/smartgrowth/greening-americas-communities





TABLE OF CONTENTS

v EXECUTIVE SUMMARY

06 INTRODUCTION

08 WORKSHOP DESCRIPTION

09 EXISTING CONDITIONS

15 DESIGN OPTIONS

36 NEXT STEPS & FUNDING

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EXECUTIVE SUMMARY

The city of Muscatine, Iowa, requested assistance from the U.S. Environmental Protection Agency (EPA) through its Greening America's Communities Program to create a cohesive vision for Grandview Avenue, the city's southern gateway. The city wants to transform this street and the surrounding corridor, rarely explored on foot, into a model for how to improve pedestrian and cyclist safety and comfort; and use green infrastructure strategies such as swales, stormwater planters and permeable paving to manage stormwater runoff. As a part of this project, city staff members hope to make the Grandview Avenue corridor a more inviting entrance to the community and a more attractive neighborhood for economic development all while addressing stormwater and localized flooding concerns.

The report includes a description of the three-day workshop held January 2017 in Muscatine to engage stakeholders, residents, business owners, and community members in a process that outlined goals for the project and developed design options that respond to those goals. The report also outlines opportunities and challenges that informed the design options for several key locations. The city chose these locations based on their potential to help area businesses and residents, as well as their capacity to illustrate the transformative potential of green and complete streets.

Through the interactive design workshop, the EPA team presented design options that could improve the safety and comfort of pedestrians and bicyclists, such as sidewalks, a roundabout, medians to slow traffic, and light fixtures. Additionally, a trailhead that connects to the Running River Trail System, an outdoor classroom, and a small public park have been proposed. The design options also include integrated green stormwater infrastructure components such as stormwater swales with native plantings, improvements to Brier's Ditch, permeable pavement, and street trees. These various improvements will reduce flooding along Grandview Avenue, improve water quality, and make the street more pleasant and inviting for all.

INTRODUCTION

Grandview Avenue acts as the southern entrance into the city of Muscatine, a community situated along the banks of the Mississippi River in southeastern Iowa. The focus section of the avenue stretches for about 2.2 miles from the edge of Muscatine to its core business area. Despite no longer being a state controlled highway or serving as the main thoroughfare through town, Grandview Avenue is still the primary transportation corridor for southern Muscatine and a major gateway into the city. Land use along the corridor transitions from rural uses at the intersection with the U.S. Highway 61 bypass to light commercial and industrial uses shortly thereafter. It ultimately transitions to more commercial and residential uses at the northern end as the avenue approaches Muscatine's downtown.

The revitalization of the Grandview Avenue corridor has been deemed one of the community's most important. Over the years, both population and commercial activity along the corridor have declined (the highest commercial vacancy rates for Muscatine are in this corridor). Stormwater management infrastructure is also underdeveloped and inadequately manages runoff along the avenue. Currently there are only roadside ditches in the southern three quarters of the corridor to collect runoff.

The city of Muscatine requested assistance from the U.S. Environmental Protection Agency's (EPA's) Greening America's Communities Program to transform Grandview Avenue into a green and complete street by:

- Improving pedestrian, bicycle, and vehicular routes to better serve the corridor residents, visitors, and businesses.
- Creating identifiable gateways throughout the corridor to enhance public identity and boost local economic vitality.
- Incorporating green infrastructure elements and other stormwater management practices to help reduce flooding and improve water quality.

The city's request focuses on a portion of Grandview Avenue running from the U.S. Highway 61 Bypass north to Franklin Street. As the project area transitions from south to north, the corridor section gradually changes from rural to urban. The design team was selected and hired by the EPA and was tasked with developing design options for five specific focus areas along the project corridor:

1. Intersection of Grandview Avenue, U.S. Highway 61, U.S. Highway 61 Bypass, and Dick Drake Way
2. Intersection of Grandview Avenue, Houser Street, Sampson Street, and Mittman Road
3. Grandview Avenue at Brier's Ditch
4. Grandview Avenue and Oregon Street/Warren Street Intersection
5. Grandview Avenue block between Bond Street and Franklin Street

The Greening America's Communities design team worked with city staff, local business owners, residents, and other stakeholders to assess the existing conditions of the corridor and develop design options to create a strong connection between the Grandview Avenue corridor and the community of Muscatine. Community concerns included the lack of adequate pedestrian and bicycle connections between existing trail systems and Grandview Avenue, a lack of community identity in this portion of town, stormwater runoff and subsequent water pollution and localized flooding, and general unattractiveness along this portion of Grandview Avenue. The design options envisioned, developed, and refined by the design team and community stakeholders seek to address these concerns. These options, which include new walking and cycling trails, crosswalks, landscaped medians, street trees, stormwater swales, stormwater planters (planters that are in the sidewalk and - with or without a tree - that can be designed to collect runoff), and more attractive wayfinding elements will help the city achieve its goals for the Grandview Avenue corridor.

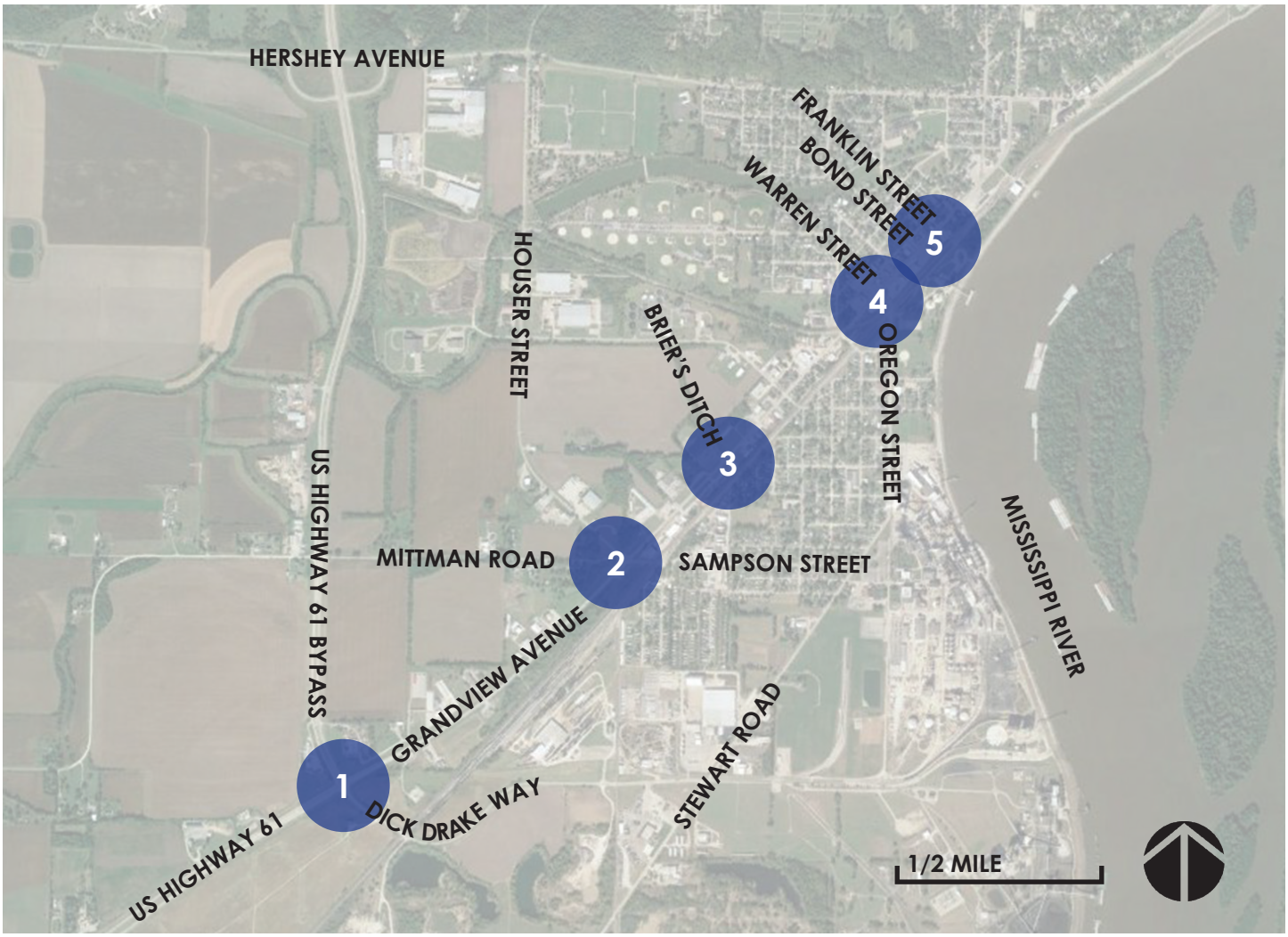


Figure 1: Focus Area Locations

1. *Intersection of Grandview Avenue, U.S. Highway 61 Bypass, U.S. Highway 61, and Dick Drake Way*
2. *Intersection of Grandview Avenue, Houser Street, Sampson Street, and Mittman Road*
3. *Grandview Avenue at Brier's Ditch*
4. *Grandview Avenue and Oregon Street / Warren Street intersection*
5. *Grandview Avenue block between Bond Street and Franklin Street*

WORKSHOP DESCRIPTION

The city of Muscatine hosted a three-day design workshop in early January 2017. The design team held one public meeting and four focus group meetings with different groups of stakeholders. Each group discussed different aspects of the vision and priorities for the five focus areas.

The first stakeholder group meeting discussed the unique challenges of focus site one, the intersection of Grandview Avenue, U.S. Highway 61 Bypass, U.S. Highway 61, and Dick Drake Way. Meeting attendees included Iowa DOT staff, property and business owners adjacent to the focus area, as well as city employees. Priorities determined for the area included:

- Create a more visually appealing intersection and entrance into the community.
- Increase traffic flow through intersection and make space for cars waiting to travel down Dick Drake Way while it is blocked at the train crossing.
- Improve ease of travel for pedestrians and cyclists by connecting the avenue to the city's existing multi use trail.
- Adequately manage and store stormwater runoff.

The second stakeholder group meeting focused on the economic development potential of the Grandview Avenue corridor. Participants included the owners of businesses located along Grandview Avenue as well as city employees. Priorities for the area included:

- Create a clear visual identity for the Grandview Avenue corridor.
- Improve traffic flow.
- Provide safe walking and cycling infrastructure to attract pedestrians and cyclists.

The third stakeholder group meeting focused on green infrastructure, landscaping, and ecological sustainability in the project area. Meeting participants included EPA and city staff. Priorities for the area included:

- Manage stormwater runoff and reduce pollutants.
- Provide green infrastructure design options that are easily maintainable.
- Improve the appearance of the corridor.

The fourth stakeholder group meeting focused on multimodal transportation along the Grandview Avenue corridor. Meeting participants included school staff, a local bicycle shop owner, the head of the local transit provider, and city staff. Priorities identified for the area included:

- Safer conditions for walking and cycling.
- Easily navigable routes and stops for bus drivers.
- Increased wayfinding and identity along the corridor for all users.
- Off-street parking for parents at the school bus stop.

EXISTING CONDITIONS

City staff and neighborhood partners selected Grandview Avenue as the project area for the Greening America's Communities program because it includes a mix of assets and challenges that make it desirable for investments and improvements that can benefit the community, the local economy, and the environment. The focus section of the avenue stretches for about 2.2 miles from the edge of Muscatine to its core business area. Despite no longer being a state controlled highway or serving as the main thoroughfare through town, Grandview Avenue is still the primary transportation corridor for southern Muscatine and a major gateway into the city.

The southernmost intersection of this corridor is the project's first focus area. At this intersection, U.S. Highway 61 becomes Grandview Avenue with U.S. Highway 61 Bypass to the northwest and Dick Drake Way to the southeast (Figure 2). The intersection is signalized from all directions. U.S. Highway 61 and the U.S. Highway 61 Bypass are both four-lane roads, each with an additional turning lane near the intersection. Grandview Avenue is also a four-lane roadway here with an additional turning lane. However, Grandview Avenue quickly transitions into a two-lane road just northeast of this intersection. Dick Drake Way is a two-lane road with a turning lane near this intersection. Close to the intersection, on Dick Drake Way, there is a railroad crossing that is blocked frequently throughout the day. With Dick Drake Way being only two lanes, there is often not enough room to accommodate backed up cars during these times. When a train goes

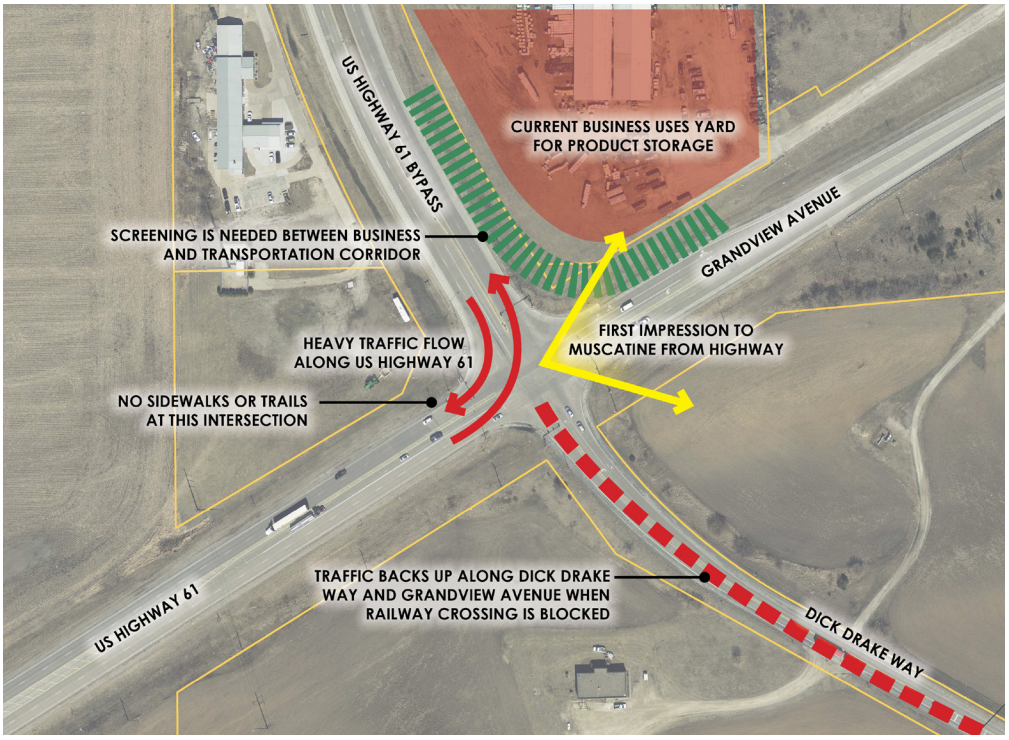


Figure 2: Focus site one existing conditions analysis.



Figure 3: Existing conditions photos of focus site one.

through, vehicles are regularly backed up into the intersection and along the three other roads. This is especially true of U.S. Highway 61 to the southwest. Other than when traffic backs up due to the train crossing, this intersection manages existing car traffic well.

Despite being a major gateway into the city of Muscatine, there is nothing indicating that this intersection is an entrance to the city. The 200' wide right-of-way has unkempt grass ditches with no trees. There is no vegetation or fencing to block adjacent properties from view (Figure 3, previous page). Without such screening, a storage yard for an adjacent business is one of the first things visitors see when entering Muscatine.

The second focus area is the next intersection moving northeast along Grandview Avenue. The geometry of this intersection is unique as five different roads all meet near this signalized intersection (Figure 4). Grandview Avenue runs one lane each direction while Sampson Street crosses from the east and becomes Houser Street northwest of Grandview Avenue. About 160' away from Grandview Avenue, Mittman Road runs into Houser Street creating a t-intersection. The railway continues to run parallel along the south side of Grandview Avenue. Once again, backed up cars are an issue when trains block Sampson Street about 300' east of the intersection.

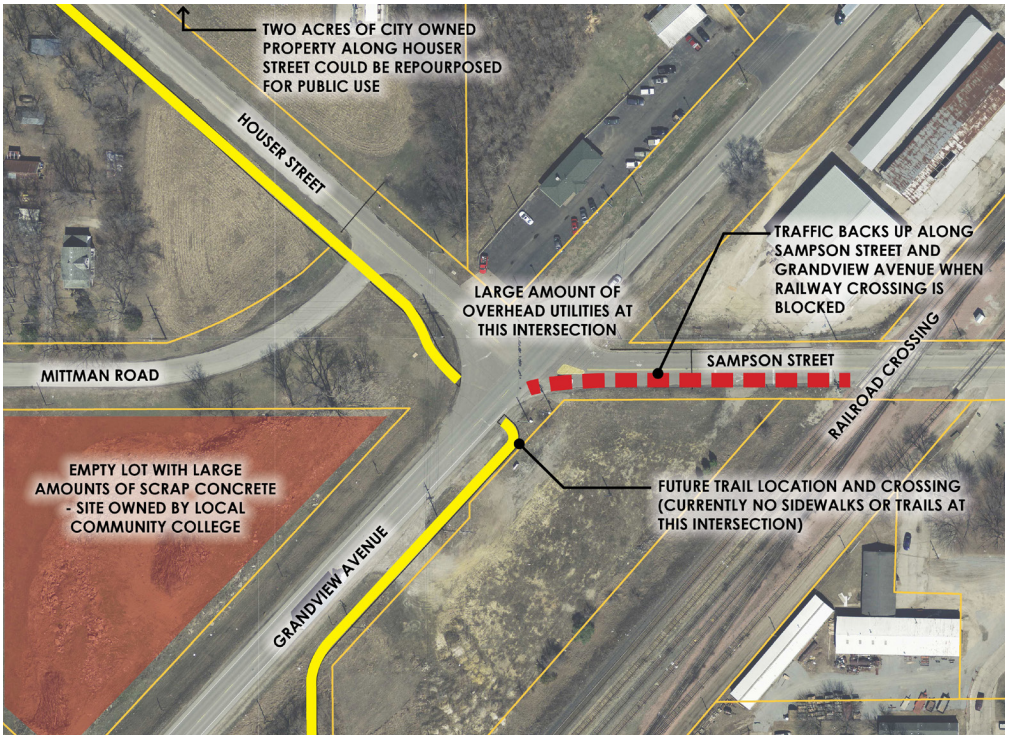
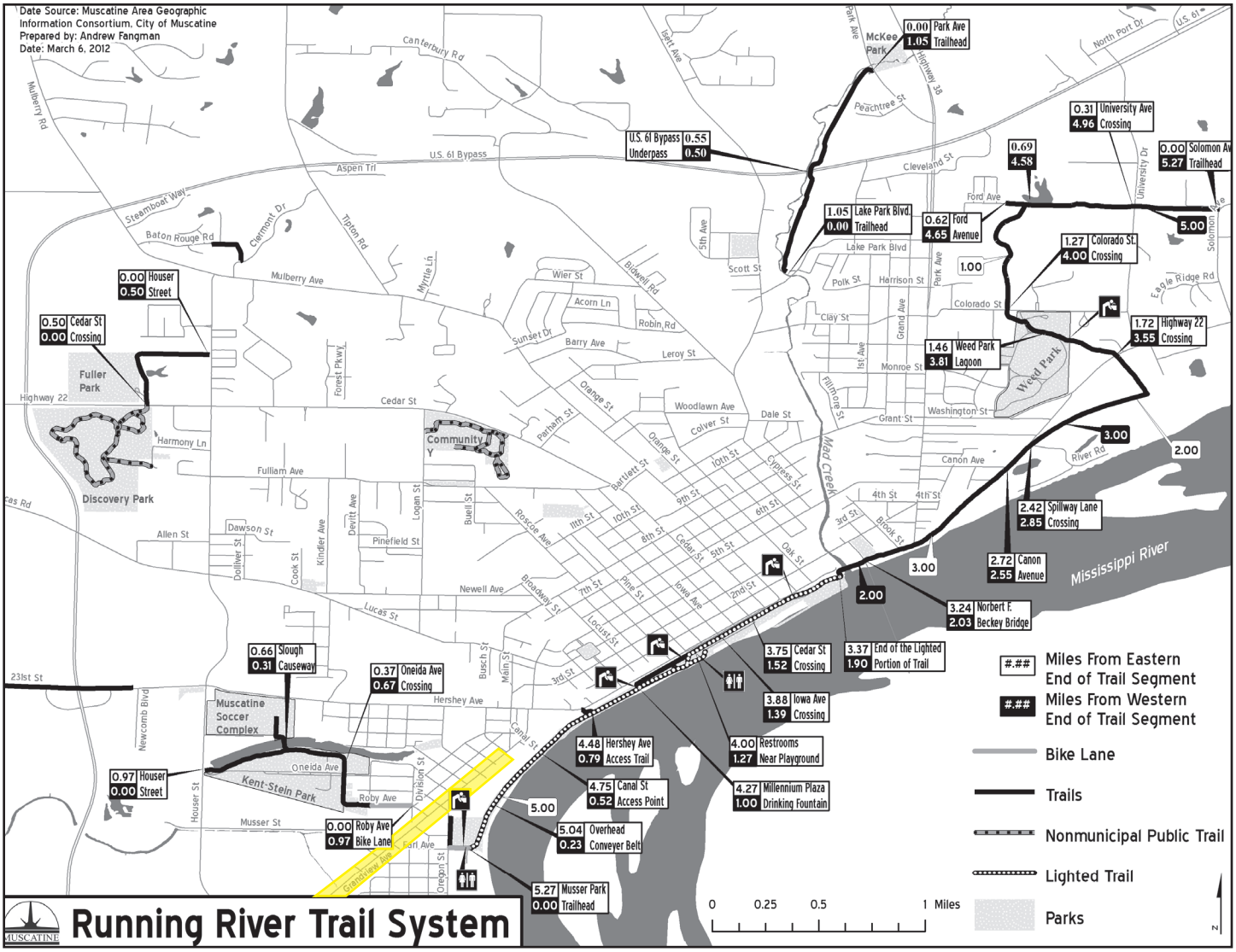


Figure 4: Focus site two existing conditions analysis.



Figure 5: Existing conditions photos of focus site two.


Date Source: Muscatine Area Geographic Information Consortium, City of Muscatine
Prepared by: Andrew Fangman
Date: March 6, 2012
Running River Trail System
Miles From Eastern End of Trail Segment
Miles From Western End of Trail Segment
Bike Lane
Trails
Nonmunicipal Public Trail
Lighted Trail
Parks
0 0.25 0.5 1 Miles
0.00 Park Ave
1.05 Trailhead
0.31 University Ave
4.96 Crossing
0.00 Solomon Ave
5.27 Trailhead
U.S. 61 Bypass
0.55
Underpass
0.50
0.69
4.58
1.05 Lake Park Blvd.
0.00 Trailhead
0.62 Ford
4.65 Avenue
1.27 Colorado St.
4.00 Crossing
1.00
1.72 Highway 22
3.55 Crossing
1.46 Weed Park
3.81 Lagoon
0.00 Houser
0.50 Street
0.50 Cedar St
0.00 Crossing
3.00
2.00
2.42 Spillway Lane
2.85 Crossing
2.72 Canon
2.55 Avenue
3.24 Norbert F.
2.03 Beckey Bridge
3.37 End of the Lighted
1.90 Portion of Trail
3.75 Cedar St
1.52 Crossing
3.88 Iowa Ave
1.39 Crossing
4.00 Restrooms
1.27 Near Playground
4.27 Millennium Plaza
1.00 Drinking Fountain
4.48 Hershey Ave
0.79 Access Trail
4.75 Canal St
0.52 Access Point
5.04 Overhead
0.23 Conveyer Belt
5.27 Musser Park
0.00 Trailhead
0.66 Slough
0.31 Causeway
0.37 Oneida Ave
0.67 Crossing
0.97 Houser
0.00 Street
0.00 Roby Ave
0.97 Bike Lane
Mississippi River
Weed Park
Fuller Park
Discovery Park
Community Y
Kent-Stein Park
Muscatine Soccer Complex
Mud Creek
Mulberry Rd
Canterbury Rd
Aspen Trl
Steamboat Way
Baton Rouge Rd
Clermont Dr
Tipton Rd
Mulberry Ave
Highway 22
Cedar St
Fulliam Ave
Harmony Ln
Allen St
Dawson St
Pinefield St
Newell Ave
Lucas St
Hershey Ave
Oneida Ave
Roby Ave
Musser St
Houser St
Newcomb Blvd
23lst St
Cas Rd
Park Ave
Peachtree St
Cleveland St
Ford Ave
Lake Park Blvd
Polk St
Harrison St
Clay St
Colorado St
Monroe St
Washington St
Grant St
Canon Ave
River Rd
Eagle Ridge Rd
North Port Dr
University Dr
Solomon Ave
Park Ave
Grand Ave
1st Ave
5th Ave
Scott St
Wier St
Acorn Ln
Robin Rd
Barry Ave
Leroy St
Sunset Dr
Myrtle Ln
Bidwell Rd
Forest Pkwy
Orange St
Parham St
Woodlawn Ave
Colver St
Dale St
Bartlett St
Cook St
Kindler Ave
DeWitt Ave
Logan St
Buell St
Roscoe Ave
Broadway St
Pine St
Iowa Ave
Locust St
Busch St
Main St
Canal St
Division St
Grandview Ave
Fort Ave
Oregon St
Filmore St
Bypass St
Oak St
Cedar St
Brook St
Highway 38
Isett Ave
Division St
Houser St
Dollliver St
Devitt Ave
Cook St
Kindler Ave
Logan St
Buell St
Main St
Busch St
Division St
Oregon St
Grandview Ave
Fort Ave
Canal St
Broadway St
Roscoe Ave
Parham St
Orange St
Bartlett St
Bypass St
Filmore St
Mud Creek
Weed Park
Eagle Ridge Rd
Solomon Ave
University Dr
North Port Dr
U.S. 61
Highway 38
Isett Ave
Park Ave
Peachtree St
Cleveland St
Ford Ave
Lake Park Blvd
Polk St
Harrison St
Clay St
Colorado St
Monroe St
Washington St
Grant St
Canon Ave
River Rd
Eagle Ridge Rd

The right-of-way is 112’ wide along Grandview Avenue at this intersection. There are businesses very close to the intersection to the north and northeast. The car dealership directly north of this intersection has a driveway that is accessed from the middle of the intersection, creating a safety hazard for drivers and pedestrians (Figure 5, page 10).

The open space west of this intersection is owned by the local community college. Previous discussions between city and college leaders indicates that there is an opportunity for a partnership and development to benefit the public. There are plans for the city’s Running River Trail System (Figure 6, previous page) recreation trail to cross Grandview Avenue at this intersection, bringing more pedestrians and bicyclists to this part of the avenue.

The third focus area is the segment of Grandview Avenue near Brier’s Ditch. At this location, the Grandview Avenue right-of-way narrows from 112’ to 60’ wide. The 112’ wide section of this area demonstrates a typical rural segment of Grandview Avenue with business driveways scattered haphazardly along both sides of the road (Figure 7). There are no trails or sidewalks along this portion of the corridor and buildings are set back relatively far from Grandview Avenue. Most of these buildings serve commercial and light industrial purposes.

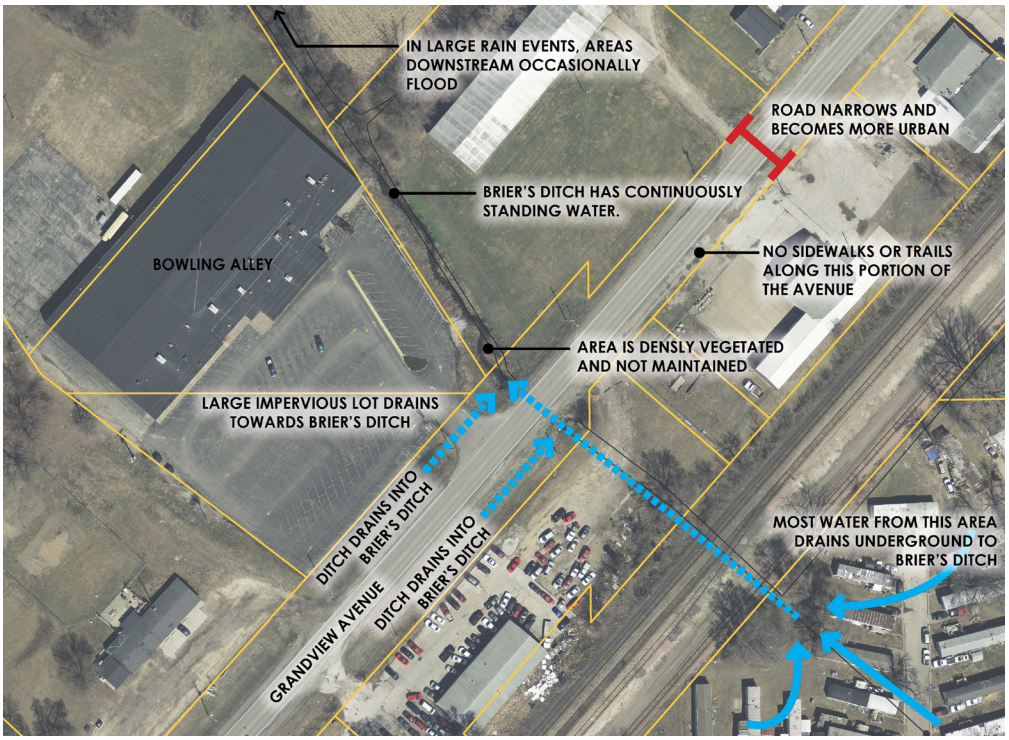


Figure 7: Focus site three existing conditions analysis.



Figure 8: Existing conditions photos of focus site three.

Brier's Ditch acts as the most significant stormwater feature along the entire length of Grandview Avenue. The ditch runs perpendicular to Grandview Avenue and gathers water from a large portion of the Grandview Avenue corridor and from a culvert running under the roadway and railway from neighborhoods east of the adjacent railway. Brier's Ditch is currently heavily vegetated and not maintained. There is almost always standing water in the ditch, which is highly visible from Grandview Avenue and is generally visually unappealing (Figure 8, previous page).

Moving further northeast along Grandview Avenue, the intersection of Grandview Avenue and Oregon Street/Warren Street is the fourth focus area (Figure 9). Here, Grandview Avenue has transitioned back to four lanes and continues to run parallel to the railroad tracks. This proximity to the railroad causes traffic on Oregon Street to often back up onto Grandview Avenue when trains are present. This is a major intersection in Muscatine with traffic counts of about 9,200 vehicles daily. Much of this traffic consists of large trucks. There are driveways within 50' of the intersection in every direction. The excessive driveways result in confusing traffic patterns and hazardous conditions for pedestrians and bicyclists. There are no landscaped areas or street trees in this portion of the Grandview Avenue corridor. The lack of vegetation creates harsh conditions for people, poor stormwater management, and an unattractive intersection (Figure 10).

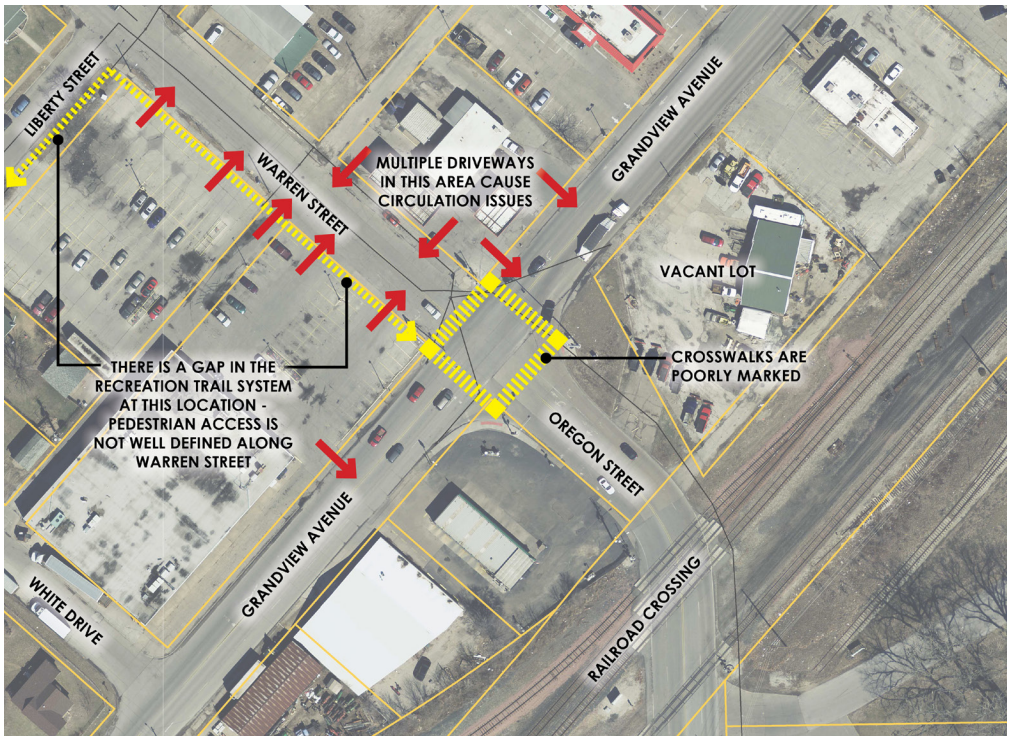


Figure 9: Focus site four existing conditions analysis.



Figure 10: Existing conditions photos of focus site four.

The only grocery store on the south end of Muscatine is located on the west corner of this intersection. However, narrow sidewalks, multiple driveways, and a lack of sidewalks or trails along Grandview Avenue prevent residents from walking or cycling to it safely. This area is the only gap in the otherwise complete Running River Trail System (Figure 6, page 11). Nearly 1,000 residents living south of the railroad tracks have no safe way to walk or bike across the tracks and access the shopping and educational facilities in this area.

The fifth and final focus area is located further northeast along Grandview Avenue. The site consists of the block-long stretch between the Bond Street and Franklin Street intersections and includes a vacant city-owned lot located southeast of the Franklin Street intersection (Figure 11). This portion of right-of-way is 60' wide with four lanes of traffic, two lanes running each way. The site is typical of the more urban portions of Grandview Avenue. Many buildings have no setbacks and driveways rarely line up with one another. There is no landscaping nor are there street trees within the right-of-way. A lack of vegetation or other pervious surface prevents stormwater from being properly managed in this part of Muscatine (Figure 12). Narrow sidewalks and multiple vehicle access points along Grandview Avenue create hazardous conditions for pedestrians and bicyclists alike.

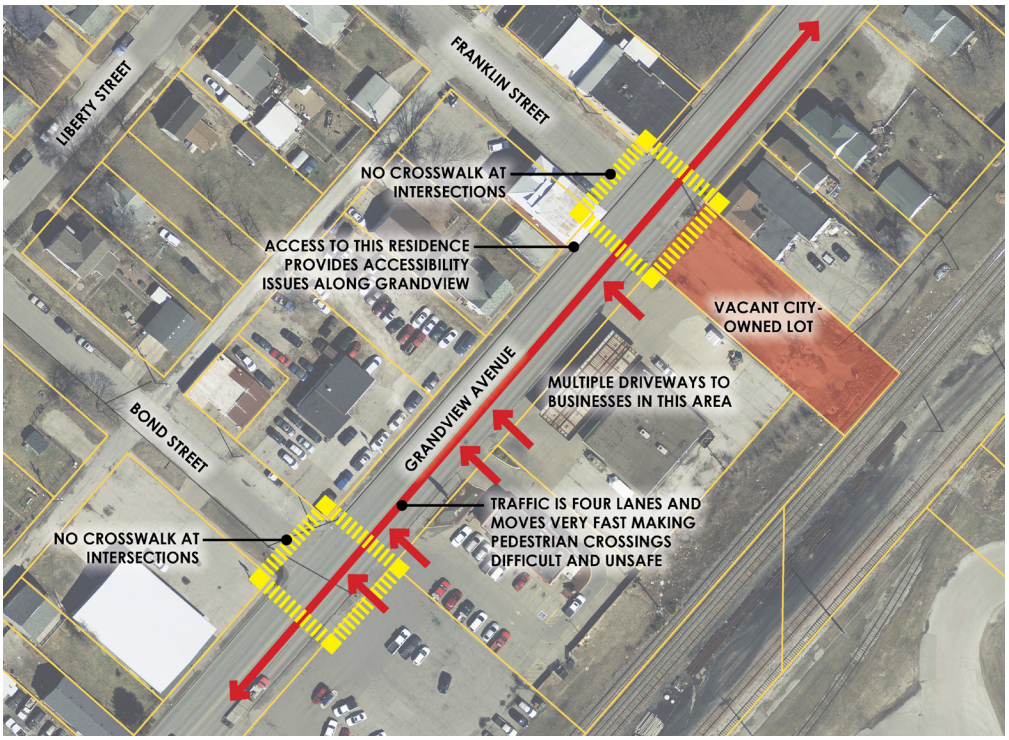


Figure 11: Focus site five existing conditions analysis.



Figure 12: Existing conditions photos of focus site five.

DESIGN OPTIONS

The design options respond to the challenges and build on the assets described in the Existing Conditions section of this report and incorporate feedback received from the workshop participants. The city of Muscatine chose these focus sites because of their challenges with traffic flow, way finding, storm water management, and their potential to set the tone for a safer, more aesthetically pleasing, and economically vibrant Grandview Avenue corridor.

Key ideas that informed the design options and responded to community concerns included:

- Improve pedestrian, bicycle, and vehicular routes to better serve Grandview Avenue residents, visitors, and businesses.
- Create identifiable gateways along the avenue to enhance its sense of place and encourage local economic development.
- Incorporate green infrastructure elements and other stormwater management practices to help reduce flooding and improve water quality.

FOCUS SITE ONE:

INTERSECTION OF GRANDVIEW AVENUE, US HIGHWAY 61, US HIGHWAY 61 BYPASS, AND DICK DRAKE WAY

The intersection of Grandview Avenue, U.S. Highway 61, U.S. Highway 61 Bypass, and Dick Drake Way acts as the southernmost entrance into the city of Muscatine. While the intersection functions well in terms of traffic flow, city staff and workshop participants felt that much can be done to improve the visual appearance of the area and make it a more attractive entry to the city. As the design option shows, the wide right-of-way could allow for native plantings, drainage swales, and trees to be placed along both sides of Grandview Avenue. These design elements could filter and store excess stormwater while adding visual interest and screening to the intersection.

The wide right-of-way could also allow for a landscaped center median along the entire rural portion of Grandview Avenue. The central median could add visual interest as well and pervious surfacing that would allow even more stormwater to be stored and filtered on site. The center median area could be reverted to a turning lane at intersections. The design option also shows a lane added for eastbound traffic along Dick Drake Way to accommodate cars backed up by the trains that cross Dick Drake Way and routinely block traffic.

The large amount of hard surfacing in the middle of the intersection could be enhanced with a decorative paving pattern in the form of the city of Muscatine's logo. Along with a new and impressive welcome sign located east of the intersection, these elements could give Grandview Avenue an identity and could make a positive first impression on visitors entering the community of Muscatine.

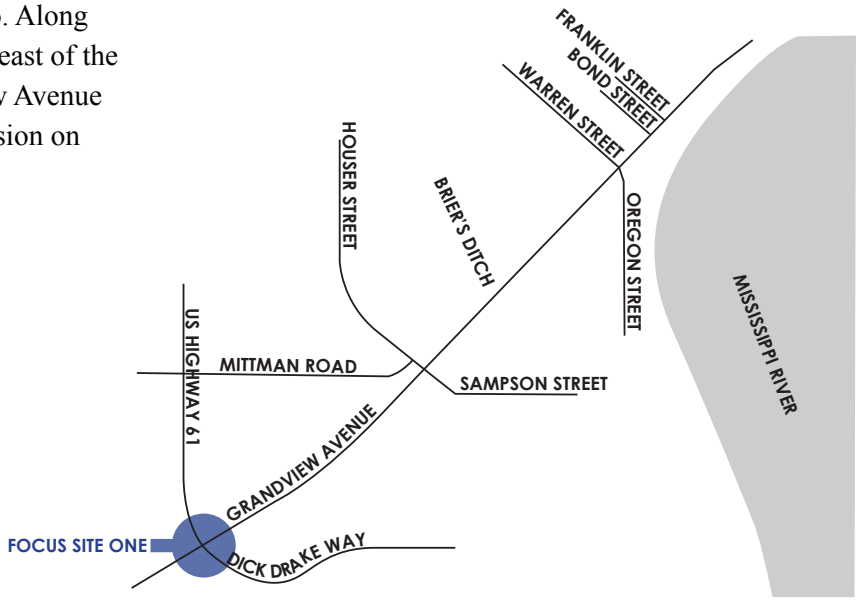


Figure 13: Context map showing the location of focus site one.



Figure 14: Current condition of focus site one. Looking northeast along Grandview Avenue.



Figure 15: Design concept for focus site one. The perspective shows a signalized intersection with specialty paving, a new city of Muscatine welcome sign, landscaped medians, street trees, and evergreen tree screening to adjacent property owners.

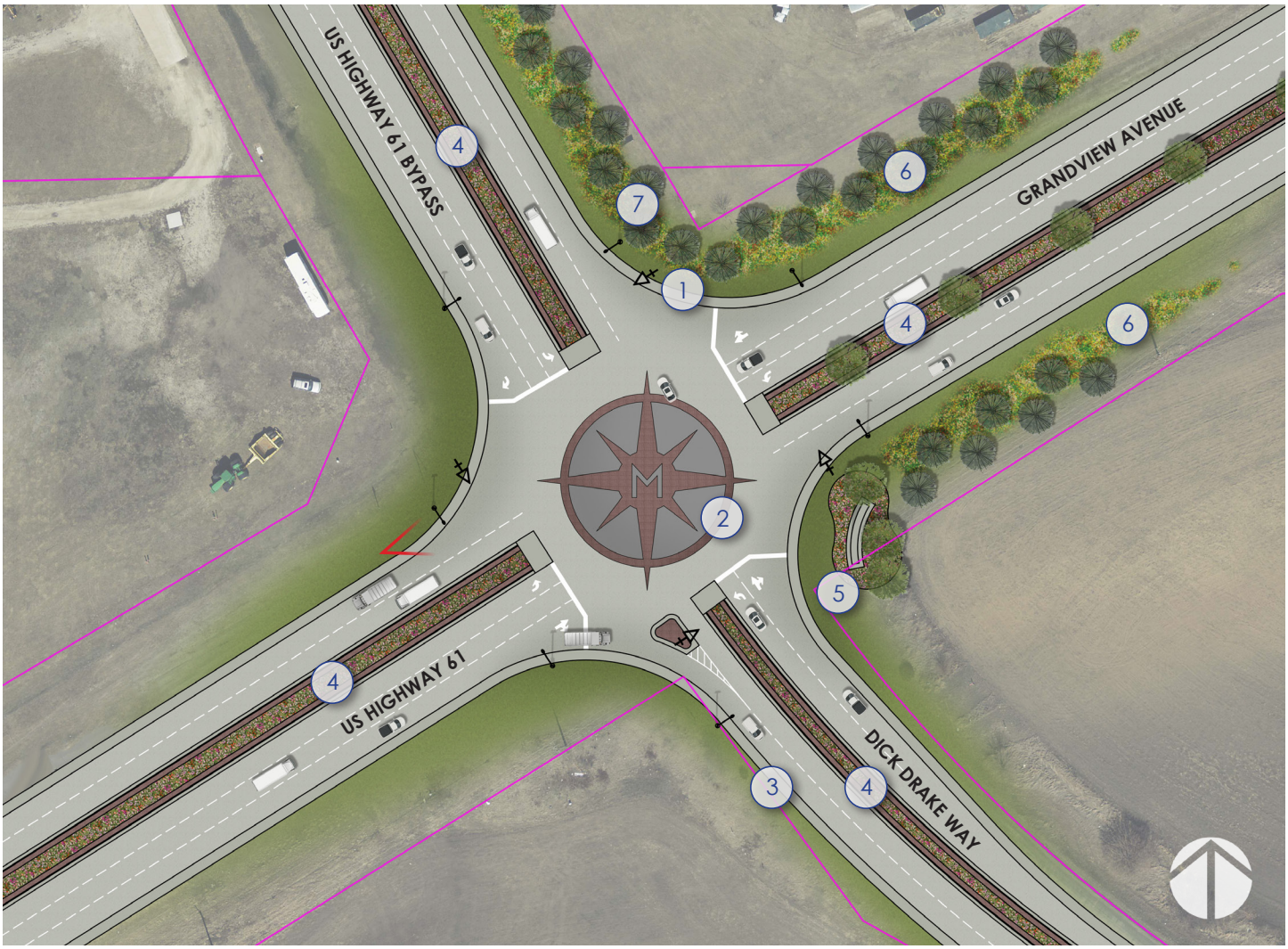


Figure 16: This plan shows the design concept for focus site one.

LEGEND:

- Concrete paving
- Specialty paving
- Landscape area
- Native plantings
- Street light symbol
- Traffic light symbol
- Location of before/after rendering (Figures 14 and 15, previous page)

DESIGN COMPONENTS:

1 **Traffic Signals**
Intersection keeps its traffic lights.

2 **Specialty paving**
Muscatine's logo added using specialty paving to better identify this intersection as the southern gateway to Muscatine.

3 **Travel lanes**
No change to the number of lanes except for an additional travel lane going south on Dick Drake Way to provide space for backed up cars when the railroad crossing is blocked.

4 **Medians**
Medians added to slow traffic entering Muscatine and make the entry to the city more attractive. A paver splash pad is added to the back of the curb to protect plants from salt used on the roadways in the winter.

5 **Entry sign**
Entry sign with lighting and landscaping to welcome drivers to Muscatine.

6 **Stormwater swales**
Native plantings added along the roadside to capture stormwater runoff and filter out pollutants.

7 **Tree screening**
Evergreen trees added at the northeast corner of the intersection to screen the outdoor storage area of the adjacent business.

FOCUS SITE TWO:

INTERSECTION OF GRANDVIEW AVENUE, HOUSER STREET, SAMPSON STREET, AND MITTMAN ROAD

The intersection of Grandview Avenue, Houser Street, Sampson Street, Mittman Road, and a business driveway is an unconventional intersection and city staff and workshop participants find that it is somewhat confusing and hazardous to navigate. Furthermore, participants wanted to see better bicyclist and pedestrian connections in this area especially since this location could be a critical link in the city's trail system.

The design option shows how the intersection could be converted into a roundabout style intersection. Designated right-turn lanes create additional space for cars backed up along Grandview Avenue when trains block Sampson Street. Formalizing the intersection will also remove direct access from the parking lot on the north side. Medians, stormwater swales, native plantings, and street trees along Grandview Avenue increase on-site stormwater storage and filtering while also adding visual interest and a sense of identity along the avenue. The center area of the roundabout could be used for decorative plantings and wayfinding signage, making this intersection an extension of the southern entrance into the city of Muscatine.

This portion of Grandview Avenue could be connected to the city of Muscatine's overall Running River Trail System by adding trails along both sides of Grandview Avenue. Marked and signalized crosswalks could help pedestrians and bicyclists travel through the intersection more safely. At the corner of Grandview Avenue and Sampson Street, there could be wayfinding signage for pedestrians and bicyclists. Along Mittman Road, near Houser Street, the trail head could be expanded to include a picnic shelter, parking lot, drinking fountain, bike fixing station, benches, bike racks, and wayfinding signs. These design elements together could work to bring pedestrians and bicyclists to the area and ultimately draw increased business to the Grandview Avenue corridor.

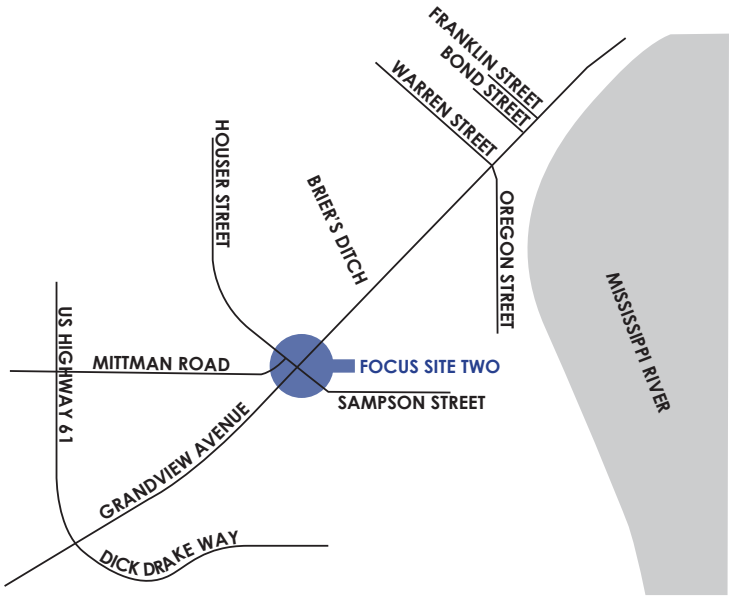


Figure 17: Context map showing the location of focus site two.



Figure 18: Current condition of focus site two. Looking north along Grandview Avenue.



Figure 19: Design concept for focus site two. The perspective shows a roundabout style intersection with landscape medians, street trees, a paver splash pad, designated right-turn lane onto Sampson Street, and monument signage/sculpture at the center of the roundabout.

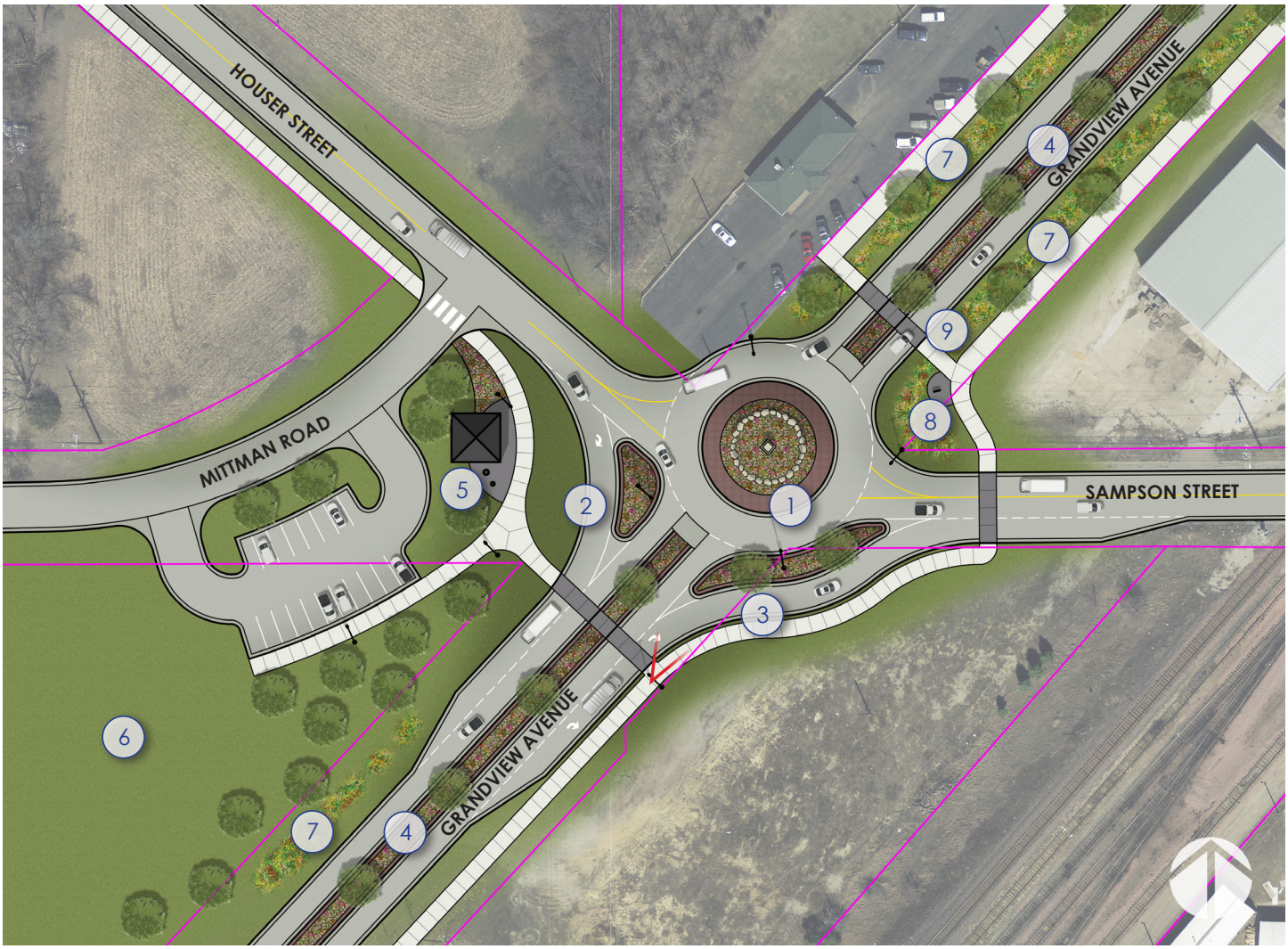


Figure 20: This plan shows the design concept for focus site two.

LEGEND:

- Concrete paving
- Colored concrete
- Sidewalk
- Specialty paving
- Landscape area
- Native plantings
- Street light symbol
- Location of before/after rendering (Figures 18 and 19, previous page)

DESIGN COMPONENTS:

1 **Roundabout**
Intersection is reconfigured as a roundabout with central area having a roll-up apron (allowing larger trucks to turn more easily), along with limestone boulders and landscaping could serve as another landmark drawing visitors into Muscatine.

2 **Right turn lane**
A designated right turn lane added to accommodate southbound traffic from Houser Street.

3 **Lane added**
A designated right-turn lane and additional travel lane going east on Sampson Street to provide space for backed up cars when the railroad crossing is blocked, as it is multiple times per day.

4 **Medians**
Medians added to slow traffic entering Muscatine and to make the entry to the city more attractive. A paved splash pad at the back of curb protects plants from salt used on the roadways in the winter.

5 **Trailhead**
Trailhead expanded to better serve users of the existing Running River Trail System and encourage them to visit Grandview Avenue. Trailhead could include a parking lot, shelter, trail system signs, benches, drinking fountain, trash receptacles, bike racks, and a bike fixing station.

6 **Outdoor classroom**
Property currently owned by the local community college could be used as an outdoor classroom.

7 **Stormwater swales**
Stormwater swales using native plantings added along the roadside to capture stormwater runoff and filter out pollutants.

8 **Signage kiosks**
Trail system signage kiosks could be added at various points along the trail to provide wayfinding help and community information.

9 **Warning lights**
Hand activated crosswalk warning lights at trail crossings to improve visibility and safety of pedestrians and cyclists.

FOCUS SITE THREE:

GRANDVIEW AVENUE AT BRIER'S DITCH

The segment of Grandview Avenue near Brier's Ditch is typical of the rural southern portion of Grandview Avenue. It is a busy two-lane road with a wide right-of-way and many private driveways along both sides of the avenue. Brier's Ditch is an important drainage way that collects stormwater from eastern neighborhoods and a large portion of the Grandview Avenue corridor. Stormwater enters Brier's Ditch through ditches and an underground culvert system that drains water from east of the railroad tracks. The ditch is easily visible from Grandview Avenue and is densely vegetated, not maintained, and often contains polluted standing water. City staff and workshop participants felt that the site should be made more visually appealing to drivers, bicyclists, and pedestrians. They also felt that the site should function better as a stormwater management system as well as a circulation route.

The design option shows how traffic speeds could be managed using an extra-large circular median often referred to as an "eyebrow." By bending out the two lanes of traffic and creating a curve in the road (like an eyebrow shape), traffic has to slow down. This "eyebrow" is especially well-suited to this location as the avenue transitions here from a wide rural roadway to a narrower more urban section. Landscaped medians could be added in this area to provide street trees, shade, pervious surfacing, and visual appeal along Grandview Avenue. The center area of the "eyebrow" could contain public art and further create an identity for Grandview Avenue. Landscaped gullies with boulders or other damming structures could store and treat stormwater along the sides of Grandview Avenue, reducing flooding further north in Brier's Ditch. Brier's Ditch itself could be made more visually appealing by creating rock banks that contain native perennials and shrubs that are easily maintained and filter and retain runoff.

Adding a signalized pedestrian crosswalk would slow traffic and create a safer environment for pedestrians and bicyclists to cross Grandview Avenue. Trails have been added along both sides of Grandview Avenue, connecting the Running River Trail System to Grandview Avenue. These trails would promote pedestrian and bicycle traffic in the area which could provide an economic boost to the corridor.

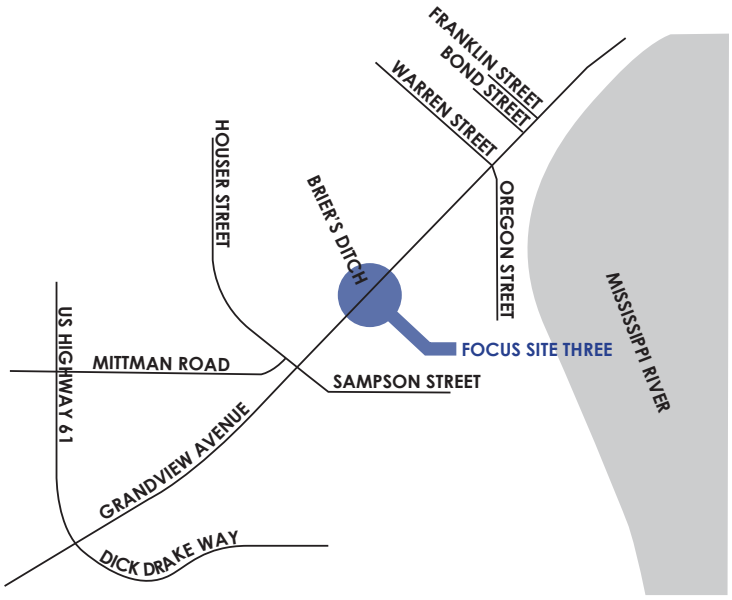


Figure 21: Context map showing the location of focus site three.



Figure 22: Current condition of focus site three. Looking southwest along Grandview Avenue.



Figure 23: Design concept for focus site three. The perspective shows curved traffic lanes around the landscaped extra-large "eyebrow" median featuring a sculpture, trails on both sides of Grandview Avenue, street trees, stormwater swales with native plantings, and an upgraded Brier's Ditch.

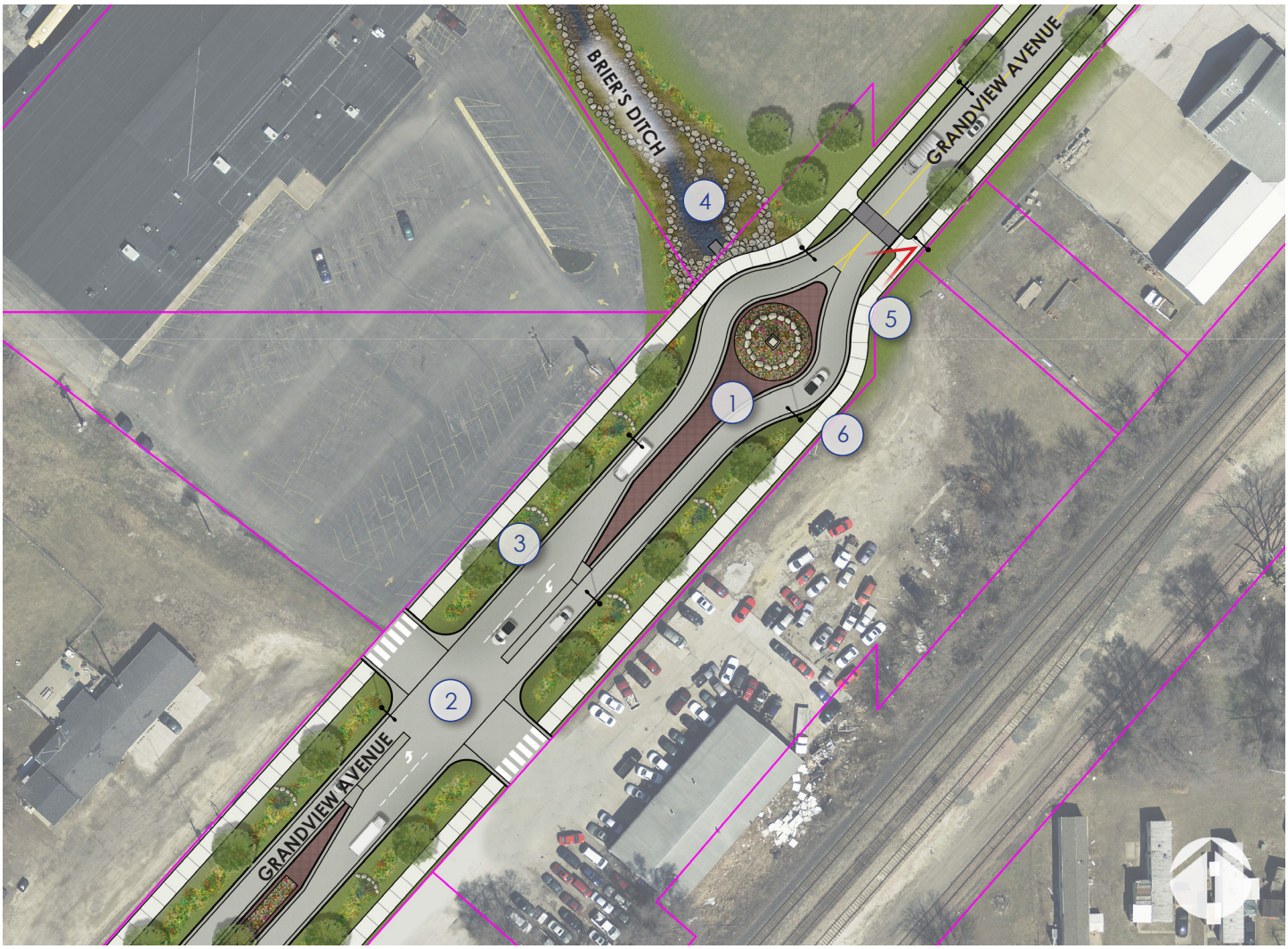


Figure 24: This plan shows the design concept for focus site three.

LEGEND:

- Concrete paving
- Colored concrete
- Sidewalk
- Specialty paving
- Landscape area
- Native plantings
- Street light symbol
- Location of before/after rendering (Figures 22 and 23, previous page)

DESIGN COMPONENTS:

1 **Traffic calming median**
An oblong paved median (sometimes referred to as an "eyebrow") is added to the center of the avenue to slow traffic entering downtown and to accommodate landscaping and public art (a giant button is shown here because Muscatine was once the world's largest manufacturer of buttons).

2 **Driveways are consolidated**
Unorganized business driveways are consolidated and aligned into four-way intersections to provide a safer environment for drivers, bicyclists, and pedestrians. Left turn lanes are added into the center medians to provide improved access.

3 **Stormwater swales**
Native plantings are added along the roadside to capture stormwater runoff and filter out pollutants.

4 **Brier's Ditch enhancements**
The existing Brier's Ditch is improved with limestone boulders, river rock, and native plantings to improve its appearance and stormwater management functions.

5 **Trail**
A trail along both sides of the entire roadway becomes a sidewalk on both sides of the street with a hand activated pedestrian crossing warning light at the crosswalk.

6 **Lane transition**
The avenue transitions from a three-lane section with trails and a center median/turn lane to a two-lane section with a sidewalk down both sides as the avenue approaches downtown Muscatine.

TYPICAL RURAL SECTION:

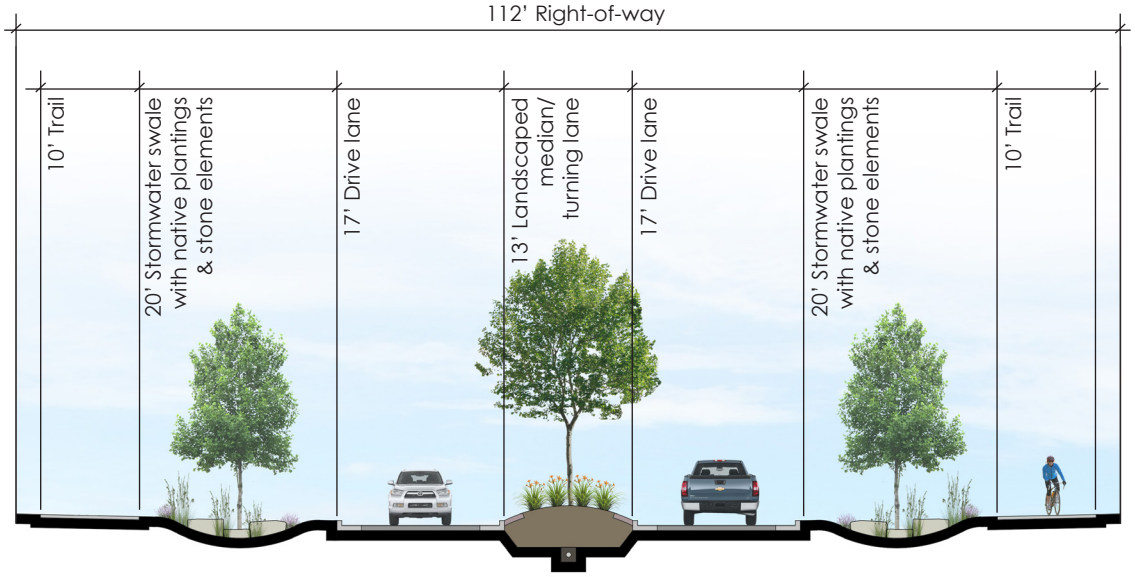


Figure 25: Typical rural section of what Grandview Avenue could look like with stormwater swales, native plantings, a landscaped median, and recreation trails.

FOCUS SITE FOUR:

GRANDVIEW AVENUE AND OREGON STREET / WARREN STREET INTERSECTION

The intersection of Grandview Avenue, Oregon Street, and Warren Street is a major intersection in Muscatine. The four-lane intersection accommodates a lot of traffic, including many semi-trucks and other large vehicles. Despite a lack of pedestrian infrastructure at this point on Grandview Avenue, a fair number of people walk to the neighborhood's only grocery store which is located at the northwest corner of this intersection. Busy car traffic and frequent business driveways create a hazardous environment for pedestrians. City staff and workshop participants felt that the intersection should be made more visually appealing and safer for pedestrians and bicyclists. They also felt that traffic routes should be made safer and more easily navigable.

This design option offers increased pedestrian safety with signalized pedestrian crosswalks, landscaped medians, and consolidated business driveways. Landscaped medians and stormwater planters along Grandview Avenue could help to better manage the corridor's stormwater by capturing, storing, and treating runoff on site. The landscaped areas could also add to the visual appeal of the area while giving the corridor a more distinct and attractive identity.

The avenue is reduced to two-lanes throughout this portion of the corridor with turning lanes provided where necessary, including an isolated right-turn lane from Oregon Street. Isolating the turning lane and pushing it out towards the edge of the right-of-way allows for a central landscaped median and a safer crossing for pedestrians. The reduced travel lane widths would make it easier for pedestrians to cross Grandview Avenue while allowing for landscaping along either side of the avenue.

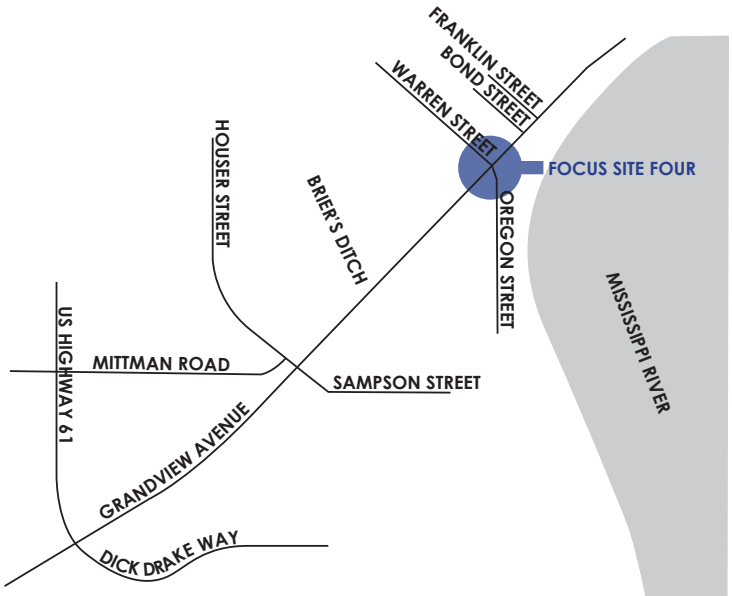


Figure 26: Context map showing the location of focus site four.



Figure 27: Current condition of focus site four. Looking northeast along Grandview Avenue.



Figure 28: Design concept for focus site four. The perspective shows fewer travel lanes at this signalized intersection, stormwater landscaping on both sides of Grandview Avenue, a landscaped island at Oregon Street, pedestrian crosswalks, street trees, and a paver splash pad.



Figure 29: This plan shows the design concept for focus site four.

LEGEND:

- Concrete paving
- Colored concrete
- Sidewalk
- Specialty paving
- Landscape area
- Native plantings
- Street light symbol
- Traffic light symbol
- Location of before/after rendering (Figures 27 and 28, previous page)

DESIGN COMPONENTS:

1 **Signalized intersection**
The intersection remains signalized. Specialty paving is added to improve visibility of the crosswalks.

2 **Left-turn lane**
Designated left-turn lane added to accommodate south-bound traffic turning onto Oregon Street.

3 **Right-turn lane**
Designated right-turn lane added to accommodate north-bound traffic turning right onto Oregon Street and to manage backed up traffic when trains cross, as occurs multiple times per day.

4 **Driveways consolidated**
Business driveways consolidated and aligned into four-way intersections to improve safety for vehicles, bicyclists, and pedestrians.

5 **Median**
Designated right-turn lane added to accommodate frequent right-turns onto Grandview Avenue. Landscaped median added to make crossing the street easier and safer for pedestrians.

Light fixtures
6 New light fixtures added to improve safety and visual appeal.

7 **Stormwater planters**
Stormwater planters with street trees added to provide more shade for pedestrians and to capture and treat stormwater.

8 **Sidewalk**
Widened sidewalks on both sides of Grandview Avenue as the street becomes more urban and approaches downtown Muscatine.

FOCUS SITE FIVE:

GRANDVIEW AVENUE BLOCK BETWEEN BOND STREET AND FRANKLIN STREET

The block of Grandview Avenue between Franklin Street and Bond Street is typical of the northern, more urban portion of Grandview Avenue with a 60' right-of-way and businesses and driveways lining the street on both sides. Narrow sidewalks exist in the limited space between the street and the buildings, which in many cases sit right next to the right-of-way. There are minimal street plantings and trees in this section of the avenue. City staff and workshop participants felt that the site should be made more visually appealing to attract more visitors and businesses. They also felt that traffic should be slowed and pedestrian crossings added to make this area safer for visitors.

The design option shows how green infrastructure such as stormwater planters could add visual appeal, slow traffic, and make walking safer and more comfortable here. The added pervious surfaces of the landscaped areas would also better manage stormwater runoff by storing and filtering water on site.

The design option shows how dropping Grandview Avenue down to two lanes in this area could create more spaces for pedestrians and green infrastructure. Consolidating business driveways, and reducing the number of driving lanes causes drivers to slow down and proceed more cautiously, which makes the street safer and more comfortable for pedestrians. Uniquely colored crosswalks along with decorative bollards adds special design elements that create an identity for Grandview Avenue and further improve the walking experience.

At the northern end of this block of Grandview Avenue, there is an underutilized dead end right-of-way between the avenue and the railroad tracks to the southeast. Repurposing this public space for pedestrians and bicyclists to use and enjoy could help increase the pedestrian traffic in this area of Muscatine. In turn, this could support existing businesses and entice new ones to the Grandview Avenue corridor.

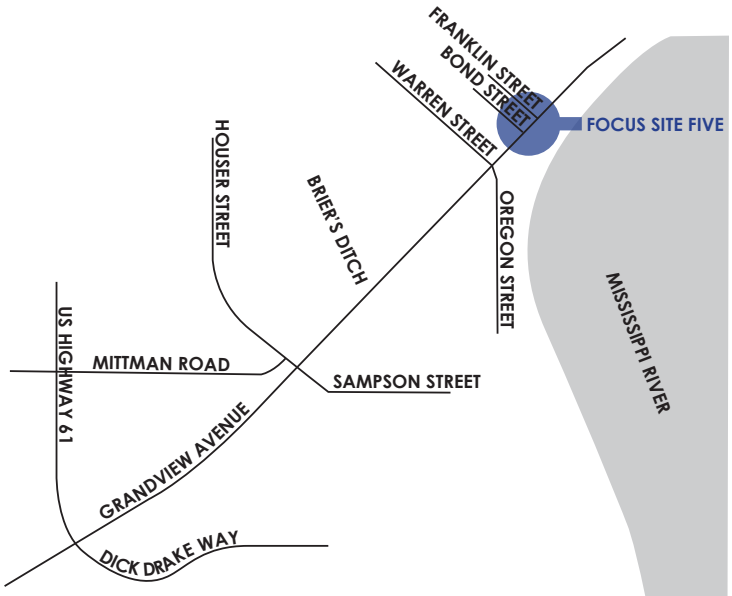


Figure 30: Context map showing the location of focus site five.



Figure 31: Current condition of focus site five. Looking northeast along Grandview Avenue.



Figure 32: Design concept for focus site five. The perspective shows Grandview Avenue tapered to two-lane traffic, stormwater landscaping, street trees, special crosswalk paving, widened sidewalks, and decorative bollards and street lighting.

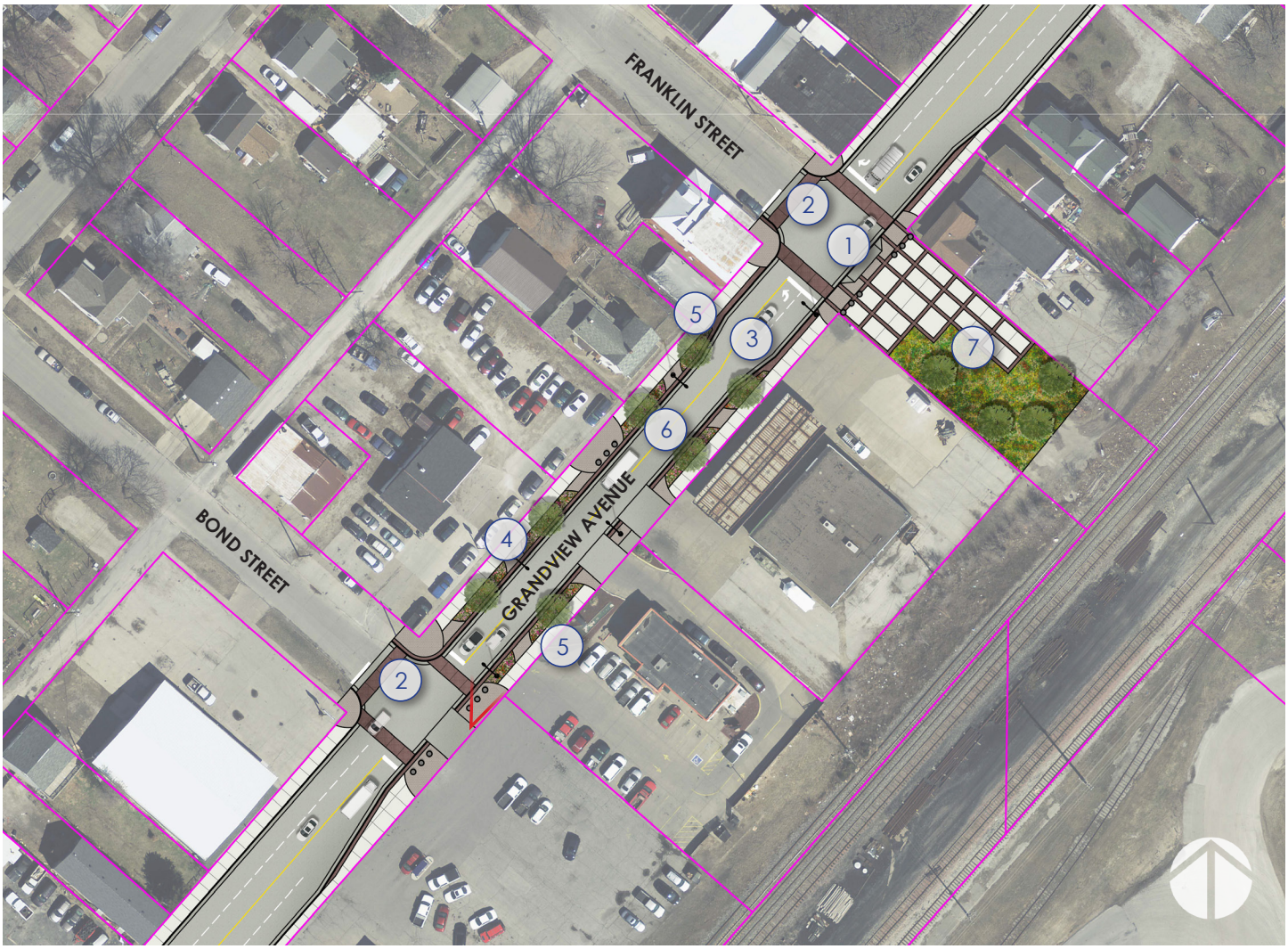


Figure 33: This plan shows the design concept for focus site five.

LEGEND:

- Concrete paving
- Colored concrete
- Sidewalk
- Specialty paving
- Alternate specialty paving
- Landscape area
- Native plantings
- Street light symbol
- Location of before/after rendering (Figures 31 and 32, previous page)

DESIGN COMPONENTS:

1. **Driveways consolidated**
   Business driveways are consolidated and aligned into four-way intersections to improve safety for vehicles, bicycles, and pedestrians.

2. **Specialty paving**
   Specialty paving used on crosswalks to improve their visibility and create an identity for Grandview Avenue.

3. **Left-turn lane**
   Designated left-turn lane added.

4. **Light Fixtures**
   New light fixtures added to improve safety and visual appeal.

5. **Stormwater planters**
   Stormwater planters with street trees added to provide more shade for pedestrians and to capture and treat stormwater.

6. **Two-lane traffic**
   Two lanes of traffic are replaced by additional sidewalk space, street trees, and green infrastructure landscaping.

7. **Public open space**
   Dead end street converted into a public open space with pervious paving and green infrastructure plantings (vehicular access to adjacent businesses is still possible).

TYPICAL URBAN SECTION:

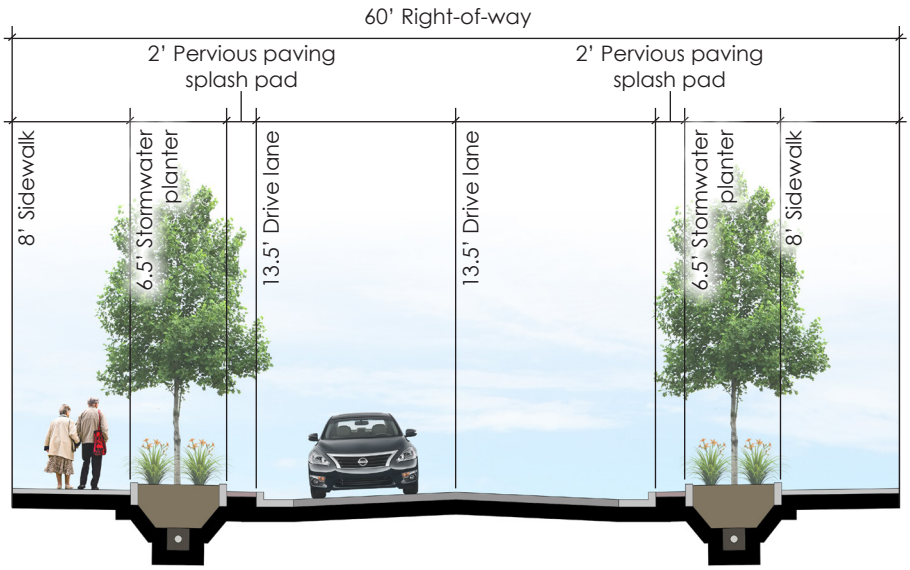


Figure 34: Typical urban section of what Grandview Avenue could look like with two travel lanes, stormwater planters, and widened sidewalks.

NEXT STEPS & FUNDING SOURCES

The design options presented in this report could serve as a catalyst to help the city of Muscatine make improvements using funds previously allocated for these types of projects. These improvements could create a more cohesive vision of green and complete streets and public spaces throughout the community. This chapter includes options for near- and long-term next steps that the city and its key partners could take to achieve their stated goals. This chapter also notes potential funding sources that were identified and discussed during and after the design workshop.

NEAR-TERM (2017 to 2020)

- **Complete an environmental impact assessment.** Measuring the anticipated effects on the environment of a proposed project is an important first step in the planning process of the project. The city has already begun this step for the Grandview Avenue corridor.

- **Conduct further design, engineering studies, and phasing work for Grandview Avenue.** Further design and analysis could help the city and stakeholders reach an agreement on a preferred design concept, cost estimate, and phasing for Grandview Avenue. This could include all or some of the features identified in the design options.

- **Implement native plantings in underutilized city property and parks.** The city could identify any vacant or underutilized city property, right-of-way, and park space for native planting areas that would filter and store stormwater runoff and reduce maintenance costs.

- **Further develop design documents for the first phase and/or all of Grandview Avenue.** The city can implement green infrastructure, roadway, and pedestrian improvements as a part of the Grandview Avenue improvement project. The city could undertake more detailed design and preparation of construction documents to implement the improvements. Funding for this project has already been identified within the city's current budget.

- **Conduct further design and engineering studies including cost estimates for Brier's Ditch.** If funding could be identified, further design and analysis could help the city and stakeholders reach an agreement on a preferred design concept, cost estimate, and phasing for the Brier's Ditch area. This could include all or some of the features identified in the design options.

- **Construct first phase and/or all of Grandview Avenue improvements.** Funding has been identified for improvements to the Grandview Avenue corridor. Once design is completed the city could move forward with construction of the first phase or all the proposed corridor improvements.

LONG-TERM (2021 to 2025)

- **Develop design standards and a maintenance plan for complete and green streets.** The city can develop design standards and a maintenance plan for complete and green streets to facilitate the implementation of the Grandview Avenue design options and other concepts that will come from developing policies and plans in this corridor and elsewhere in the community. Several standard and guidance documents are available online, but two resources in particular could be helpful to Muscatine: The Institute of Transportation Engineers' *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach*[1] and the city of Philadelphia Water Department's *Green Streets Design Manual*[2]. The Philadelphia Water Department also has a

good maintenance manual for green infrastructure: Philadelphia Water Department's *Green Infrastructure Maintenance Manual Development Process Plan*[3]. EPA has a Green Infrastructure Wizard[4] that is a searchable database of EPA resources related to green infrastructure. Search queries are based on who the user is and what information is being sought.

- **Develop policies for storm water management on private property.** The city could provide incentives to developers and land owners who manage and treat storm water on site through green infrastructure techniques and limit their use of the city's storm water system. These ordinances could also provide disincentives to developers that do not work towards reducing their stormwater impact.

- **Expand green infrastructure implementation to other community projects.** City staff could continue to discuss newly identified projects or new funding opportunities that will allow phased implementation of green infrastructure elements throughout the community.

- **Conduct further design and engineering studies and analyses for the intersection of Grandview Avenue, U.S. Highway 61 Bypass, U.S. Highway 61, and Dick Drake Way.** During the workshop, stakeholders liked the idea of utilizing a roundabout for this intersection in the future. Further design and analysis could help the Iowa DOT (IADOT) and city reach an agreement on a preferred design concept, cost estimate, and feasibility of a roundabout at this intersection. The city and IADOT could work together to identify funding and define the scope for a more detailed design and engineering study for the area.

- **Review and update complete and green streets operations and maintenance plan.** The operations and maintenance plan should remain current with best practices and be regularly updated with information gathered from staff feedback, community input, and monitoring of implemented green infrastructure strategies.

FEDERAL FUNDING SOURCES

- **EPA's Clean Water Act Section 319 Grants** are directed to demonstration projects that reduce nonpoint source pollution, can be used only for items not required under a stormwater program, and are subject to state priorities. Green infrastructure elements of the design concepts could be eligible for funding through this program. [5]

- **EPA's brownfield grants and technical assistance** give communities and other stakeholders resources to assess and clean up properties where actual or potential presence of a hazardous substance could complicate reuse. Grants can also be used for green infrastructure planning. Sites in the project area could be eligible for this assistance. [6]

[1] Institute of Transportation Engineers. Designing Walkable Urban Thoroughfares: A Context Sensitive Approach: An ITE Recommended Practice. 2010. http://www.ite.org/css/online/index.html.

[2] Philadelphia Water Department. "Green Streets Design Manual." 2014. http://www.phillywatersheds.org/img/GSDM/GSDM_FINAL_20140211.pdf.

[3] Philadelphia Water Department. "Green City, Clean Waters." http://phillywatersheds.org/what_were_doing/documents_and_data/cso_long_term_control_plan. Accessed Mar. 16, 2017.

[4] EPA. "Green Infrastructure Wizard." http://www2.epa.gov/communityhealth/green-infrastructure-wizard. Accessed Mar. 16, 2017.

[5] EPA. "Clean Water Act Section 319." http://water.epa.gov/polwaste/nps/cwact.cfm. Accessed Mar. 16, 2017.

[6] EPA. "Brownfields and Land Revitalization." http://www.epa.gov/brownfields. Accessed Mar. 16, 2017.

- **Green Project Reserve**, part of the EPA's Clean Water State Revolving Fund, is a water quality financing resource that helps communities meet the goals of the Clean Water Act. Nonpoint source pollution control and green infrastructure projects can be eligible for funding through this program. [7]

- **EPA's Office of Water** has grants and other funding programs, including the **Section 106 Water Pollution Control** (to establish ongoing water pollution control programs). [8]

STATE FUNDING SOURCES

- **REAP Grants** distributed by the **Iowa Department of Natural Resources (DNR)** invest in the enhancement and protection of the state's natural and cultural resources. These grants can be used for city parks and open space, county conservation, private/public open space acquisition, conservation education programs, historical resource development programs, roadside vegetation, and soil and water enhancement. [9]

- **Iowa Green Streets** by the **Iowa Economic Development Authority (IEDA)** works with communities to sustain and enhance quality of life by program-integrated technical and financial assistance encouraging sustainable community practices. [10]

- **IEDA** administers the federal **Community Development Block Grants (CDBG)** to develop viable communities by providing suitable living environments and expanding economic opportunities. These grants can be used to fund facilities such as water and sewer facilities and community buildings; and economic development. [11]

COMMUNITY AND OTHER FUNDING SOURCES

- Muscatine can **initiate a Capital Improvements Program** to make improvements to the Grandview Avenue corridor. The city can build on these planned improvements to respond to the issues identified through the Greening America's Communities project.

- A **Grandview Avenue corridor business association** or special improvement district could be created to help fund, manage, and maintain stormwater infrastructure, landscaping, lighting, and other streetscape improvements. The properties and/or businesses that would contribute to the improvement district will depend upon the specific boundary and improvements of the district.

- The city could explore **public-private partnerships** for planting and maintaining street trees and green infrastructure such as a volunteer street tree management or stewardship program. Volunteers could include master gardeners, the general public, and/or students.

[7] EPA. "Green Project Reserve." http://water.epa.gov/grants_funding/cwsrf/Green-Project-Reserve.cfm. Accessed Mar. 16, 2017.
[8] EPA. "Water Pollution Control (section 106) Grants." http://www2.epa.gov/water-pollution-control-section-106-grants. Accessed Mar. 16, 2017.
[9] Iowa DOT. "REAP Grants" http://www.iowadnr.gov/Conservation/REAP/REAP-Grants. Accessed Mar. 16, 2017.
[10] IEDA. "Iowa Green Streets" https://www.iowaeconomicdevelopment.com/Community/green. Accessed Mar. 16, 2017.
[11] IEDA. "Community Infrastructure and Services" https://www.iowaeconomicdevelopment.com/CommunityDevelopment/CDBG. Accessed Mar. 16, 2017.

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