United States Environmental Protection Agency

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Greening America's Capitals:

Montpelier, Vermont

Office of Sustainable Communities
Smart Growth Program

GREENING AMERICA'S CAPITALS

Greening America's Capitals is an Environmental Protection Agency program to help state capitals develop an implementable vision of distinctive, environmentally friendly neighborhoods that incorporate innovative green infrastructure strategies. In collaboration with U.S. Department of Housing and Urban Development (HUD), and the U.S. Department of Transportation (DOT) through the Partnership for Sustainable Communities, EPA provides design assistance to help support sustainable communities that protect the environment, economy, and public health and to inspire state leaders to expand this work elsewhere. Greening America's Capitals 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.

EPA chose Montpelier, Vermont, in 2013 as one of the capital cities to receive this assistance, along with Lansing, Michigan; Madison, Wisconsin; and Olympia, Washington.

Find more information about Greening America's Capitals at http://www2.epa.gov/smart-growth/greening-americas-capitals

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EPA

Clark Wilson, Office of Sustainable Communities
Rosemary Monahan, EPA New England

City of Montpelier

Mike Miller, AICP, Director, Planning and Community Development
Kevin Casey, Community Development Specialist

Consultant Team

Carolyn Radisch, AICP, ORW Landscape Architects and Planners
Robert A. White, RLA, ORW Landscape Architects and Planners
Paula Holwerda, LEED-AP, ORW Landscape Architects and Planners
Greg Edwards, PE, Stantec

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Executive Summary

The city of Montpelier, Vermont, requested assistance from the U.S. Environmental Protection Agency (EPA) to create a vision for how bicycle and pedestrian connections in its historic downtown could be strengthened. The city also requested assistance in exploring how green infrastructure could be incorporated into its streets and parking lots to manage and treat stormwater runoff to reduce flooding, improve the water quality of the Winooski River and create more attractive public gathering spaces. Green infrastructure includes a range of natural and built approaches to stormwater management–such as rain gardens, bioswales, and permeable paving–that mimic natural systems by capturing and cleaning stormwater and letting it absorb back into the ground rather than into the storm sewer system or the river.

The city of Montpelier identified five sites on which to explore design concepts that show how the city might achieve its goals of a more pedestrian and bicycle-friendly downtown that is also less likely to flood:

1. **Barre Street from the recreation center to Main Street:** Provide the missing downtown segment to the Montpelier shared-use path that runs along the Winooski River.
2. **Main Street and Barre Street intersection:** Clarify routes for pedestrians, bicyclists, and drivers, and connect the Montpelier shared-use path through the intersection.
3. **Heney and Jacobs parking lots:** Use green infrastructure to reduce runoff into the Winooski River, a strategy that could be a model for other parking lots. Explore options for public access to the river.
4. **Taylor Street from the Winooski River to State Street:** Improve pedestrian connections between State Street and the transit center and shared-use path.
5. **State Street and Main Street intersection:** Improve the intersection for pedestrians, and incorporate green infrastructure into the streetscape.

EPA's design team worked with city and state staff, community members, downtown businesses, and other stakeholders to develop design options for these sites that responded to concerns about and desires for each site. The team also identified potential next steps the city could consider for implementing the options, as well as funding sources that might help pay for improvements.

Introduction

Montpelier's downtown district is compact and eminently walkable, with a strong sense of place conveyed by the historic buildings that open onto its sidewalks, bustling two-lane streets, and small blocks. Glimpses of steepled buildings, the capitol dome, and distant wooded hillsides provide a sense of orientation and a strong flavor of northern New England. The Winooski River runs through the center of the downtown, but there is very little public access to the river, and the expanse of impervious streets, buildings, and parking areas drains directly into the river, causing water quality and flooding problems.

In the last decade, Montpelier made major improvements to strengthen its vital downtown district through several initiatives, including:

- Construction of the Montpelier shared-use path, which parallels the Winooski River east and west of downtown. The central segment of the path through the downtown has not been built yet.
- Revitalization of the Stone Cutters Way industrial area with new grocery store, offices and public space.
- Planning for a downtown transit center, One Taylor Street, which is currently in final design. The transit center is being funded by the Federal Transit Administration, the Federal Highway Administration, and the Vermont Agency of Transportation.

The city of Montpelier requested assistance from the U.S. Environmental Protection Agency (EPA) Greening America's Capitals Program to develop design options for five sites in the downtown. City staff selected these sites to contribute to a greener downtown district by strengthening the city's multimodal network and incorporating landscaping and green infrastructure strategies that manage stormwater runoff and create more attractive public spaces. Green infrastructure includes a range of natural and built approaches to stormwater management—such as rain gardens, bioswales (gently sloped landscape features that remove silt and pollution from stormwater runoff), and permeable paving—that mimic natural systems by capturing and cleaning stormwater and letting it absorb back into the ground rather than into the storm sewer system or the river.

The five sites and the goals for them are:

1 Barre Street from the recreation center to Main Street

Currently, Barre Street is a narrow, two-way street with parking on both sides. The sidewalks are narrow, and the street has little space to accommodate bicyclists. Many bicyclists, pedestrians, and transit riders use Barre Street. The city's primary goal for Barre Street is to explore options to provide the missing segment of the Montpelier shared-use path along this street to connect to the path on the west side of the North Branch and along Stone Cutters Way.

2 Barre Street and Main Street intersection

This intersection is a gateway to the downtown. It is rated a level of service F, which means that it functions very poorly for cars. The intersection also includes access from Stone Cutters Way. In addition, railroad tracks run through the intersection, and driveways for local businesses are very close to the intersection. All of these elements combined make the intersection confusing for drivers, pedestrians, and bicyclists. The city wanted to explore options for establishing clearer routes for drivers, bicyclists, and pedestrians, including extension of the Montpelier shared-use path.

3 Heney and Jacobs parking lots

These lots are on the northwest side of the North Branch of the Winooski River. They periodically flood, and runoff from these lots flows directly into the river. The goal for this area is to develop options for using green infrastructure to reduce runoff and provide a model for retrofitting parking lots throughout the downtown and capitol complex.

4 Taylor Street from the Winooski River to State Street

Taylor Street is one of the gateways to the downtown and connects to the capitol grounds. It is next to the planned multimodal transportation center (One Taylor Street) and also connects to the shared-use path. The goal for Taylor Street is to improve the pedestrian experience and incorporate green infrastructure into the streetscape.

5 State Street and Main Street intersection

This intersection, along with Langdon Street immediately north of State Street, is the heart of Montpelier's downtown. Each street is offset from one another, so movement through the intersections is sometimes challenging for pedestrians and bicyclists. The primary goal for this intersection is to improve the pedestrian experience and to incorporate green infrastructure into the streetscape. Stakeholders requested that the design team look at way to improve the public space in front of the city hall with landscaping and possibly green infrastructure.

Figure 1: Overview of Montpelier focus sites.

Project Site Analysis

The project sites are in downtown Montpelier, a traditional New England town center with a strong historic character created by building and development patterns typical of a late 18th to early 19th century town. The town is compact and organized around the confluence of the Main and North branches of the Winooski River, the railroad, and an irregular grid of streets that runs parallel to the Winooski River and responds to natural features including rivers and hills.

The downtown district is set in a narrow river plain between the Winooski River and surrounding hillsides. Mills and manufacturing businesses grew up along the river banks, particularly after the Vermont Central Railroad started serving the area in 1849. Montpelier was selected as Vermont's state capital in 1805 because of its central location and its residents' support. At that time, Montpelier's population was 1,200 people. Montpelier grew slowly through the 20th century. Today, the city has a population of 7,855 people, giving it the distinction of being the smallest state capital in the United States.

The downtown suffered two significant natural disasters: a fire in 1875 destroyed many downtown buildings, and the Great Flood of 1927 devastated downtown Montpelier. Floodwaters in 1927 measured 12 feet at the intersection of State and Main streets. Montpelier escaped serious damage from Tropical Storm Irene, which devastated many areas of Vermont in August 2011, but was flooded in May of that year. According to a 2014 climate assessment report for the state, Vermont's waters and snowpack are thawing earlier as spring temperatures arrive earlier. Annual average stream flows are increasing as precipitation increases. The likelihood of high stream flows (and therefore flooding) is projected to increase by 40 to 80 percent by the end of the century, particularly in the winter as snow shifts to rain or freezing rain. In contrast to other New England states, Vermont rivers have sustained flow over recent decades in summer months; however, climate projections show increased potential for short-term dry spells this century.[1]

The downtown's character is strongly influenced by the traditional buildings and development patterns of the 19th century town. The town center maintains a bustling feel created by the mixture of activities contained in a compact area. Historic buildings face onto sidewalks providing interest and a sense of spatial enclosure that makes the street attractive for walking. The state capitol and church steeples can be glimpsed throughout the downtown area. For the most part, buildings in Montpelier face away from the river and do not provide public access to it. The Montpelier shared-use path segments that have been constructed east and west of the downtown have begun to open the riverfront to the public.

Figure 2: The Vermont State Capitol on State Street.

Figure 3: Parklet on State Street at the Rialto Bridge that was in place during the summer of 2014. A parklet is a small extension to an existing sidewalk, typically occupying the parking lane, which can be used for a variety of activities.

1 Galford, Gillian, et al, Eds. *Considering Vermont's Future in a Changing Climate: The First Vermont Climate Assessment*. Gund Institute for Ecological Economics. 2014. http://vtclimate.org/publications.

Figure 4: Pedestrians at the senior center on Barre Street.

Figure 5: Children arrive at the child care center on Barre Street.

Land Use

The study sites are located in the heart of Montpelier's downtown district. Main Street and the portion of State Street on either side of Main Street are traditional main streets with mixed-use buildings, ranging from one to four stories, oriented to the street with parking lots behind. Shops and restaurants are on the ground floor, and upper-story uses typically include apartments and offices. The state capitol and state office buildings are on State Street west of Taylor Street. Surface parking lots consume a significant portion of the downtown land, particularly adjacent to the river frontage (see Figures 10 and 11). Barre Street is a predominantly residential street that contains a mixture of retail shops, services, and public uses including a church, day care center, and private school, in addition to a recreation and senior center near its intersection with Main Street. Many pedestrians and bicyclists use the street, and with the Montpelier Senior Activity Center and Montpelier Children's House in the block between Hubbard and Main streets, many seniors and children walk along Barre Street. Affordable housing owned and managed by the Central Vermont Community Land Trust, including housing for seniors and individuals with disabilities, is located along Barre Street as well.

Transportation

Pedestrians: Montpelier enjoys a healthy walking and bicycling culture. Journey to Work Census data[2] from 2009-2013 indicate that 16 percent of Montpelier residents 16 years and older walk to work, which is significantly higher than the state average of 5 percent. The city is preparing a pedestrian and bicycle master plan, *Montpelier in Motion* (anticipated to be adopted in June 2015). This plan will contain specific recommendations for improvements to Montpelier's bicycle and pedestrian system. Montpelier counts the number of pedestrians at several locations in the downtown. The data show that many people walk in Montpelier's downtown district. On weekdays, volumes peak during the noon hour, while on the weekend, the peak pedestrian volumes tend to be spread across several midday hours. Not surprisingly, pedestrian counts collected in 2012 illustrate that pedestrian activity is highest in July and August and lowest in January. The difference is approximately 25 percent. Although lower in the winter, pedestrian counts indicate that many people still walk despite the cold weather.

The five study sites are located in the downtown, an area that is served by sidewalks and the Montpelier shared-use path, which runs along Stone Cutters Way between Granite Street and the Montpelier Recreation Center (approximately a half-mile long) and from Taylor Street to Junction Road (about 1.3 miles west from Taylor Street). To bridge the gap between the path segments between Stone Cutters Way and Taylor

2 United States Census Bureau / American Fact Finder. "*B08101 Means of Transportation to Work by Age: Workers 16 years and over*." 2009-2013 American Community Survey U.S. Census Bureau's American Community Survey Office, 2013. Mar. 13, 2015. http://factfinder2.census.gov/.

Street, pedestrians use the railroad bridge over the North Branch of the Winooski (despite this being illegal). Options for connecting the two lengths of the path were studied in 2002 by the city. Final plans for the segment between Taylor Street and Main Street are currently being developed, leaving only the 800-foot segment between the recreation center and Main Street unresolved (see Figure 1). In addition, an extension of the path south from Granite Street to Gallison Hill Road, approximately 1.6 miles long, has also been designed. Altogether, from Junction Road to Gallison Hill Road, the Montpelier shared-use path will be 3.7 miles long.

Sidewalks are missing on a portion of Taylor Street. This gap is identified as a high priority by the city and residents for improvement because Taylor Street connects the transit center, the Montpelier shared-use path, and the capitol complex (see Figure 8).

Bicyclists: Bicyclists primarily travel in the road in Montpelier. Because the Montpelier shared-use path does not connect through the downtown, it is less useful for bicyclists traveling cross-town. Beyond Gallison Hill Road to the south, buffered bike lanes and bike paths are in various phases of planning and design in Berlin and Barre. Connecting these regional bike facilities to provide a continuous bikeway between Barre and Montpelier would improve bicycling options in Montpelier and the Central Vermont region.

Other than the shared-use path, the city does not have a formal bike network, but the September 2014 draft of the *Montpelier in Motion* calls for bike lanes on:

- Barre Street from the recreation center to Main Street (removing some on-street parking).
- Main Street from Route 2 to just south of State Street.
- Taylor Street from the shared-use path to State Street (removing some on-street parking).

The remainder of Barre, Main, and State streets would be shared routes, designated with “Share the Road” signs and sharrows. A sharrow is a pavement marking indicating that bikes share the road with cars. Sharrows provide a visual path for bicyclists where there are no bike lanes and remind drivers that bikes are to be expected and can use the full travel lane.

Transit Riders: Montpelier has local, circulator, and commuter bus routes run by the Green Mountain Transit Agency, which is operated by the Chittenden County Transit Agency. The bus stop on Main Street just south of Barre Street in front of Shaws grocery store (see Figure 9) is a transfer location that currently accommodates six routes, including the Montpelier Circulator and local and commuter transit routes to Barre, Northfield, and Burlington.

Figure 6: The Montpelier shared-use path on Stone Cutters Way.

Figure 7: A bicyclist negotiates traffic on Barre Street near Main Street.

A new transit center for Montpelier, to be located on Taylor Street, is currently in final design. In addition to the transit center, the project, One Taylor Street, will include private development. Once built, the transit center will be the hub for transit connections in Montpelier. The Main Street location will likely remain as a bus stop, but transfers will occur at Taylor Street.

The area also includes local bus stops in front of the recreation center and senior center on Barre Street.

Intersection Conditions: The intersection of Barre and Main streets is unsignalized and bordered by numerous driveways, a railroad crossing, and bus stops. It has marked crosswalks on Main and Barre streets. Vehicles approaching the intersection from the east on Barre Street are delayed by the absence of adequate vehicle 'gaps' on Main Street that are created when motorists on Main Street stop for pedestrians crossing Main Street providing an opening for traffic on Barre Street to enter the intersection. The 2005 Downtown Circulation Study indicated the intersection's level of service is F, meaning that it performs poorly for vehicles (level of service ratings are only for vehicles and not pedestrians or bikes). For a long-term improvement, the study recommended traffic signalization or a roundabout and suggested a feasibility study. The circulation study also included scenarios implementing the Capital District Master Plan, which represented a full build-out of commercial and state office space and the addition of a Barre Street extension. The new street would extend Barre Street west, across the North Branch, and connect Main Street and Taylor Street.

The intersection of Main, State, and East State streets is a signalized intersection that includes a phase that is only for pedestrian crossings. The Downtown Circulation Study indicated this intersection's level of service is also F. The study recommended extending the right-turn lane on the State Street approach and prohibiting left turns on the southbound Main Street approach during peak periods. Pedestrians are delayed by the exclusive pedestrian phase and might be better served by crossing with cars when possible.

The focus site intersections are not identified as high-crash locations.

Railroad: The downtown is traversed by an active rail line owned by the Washington County Railroad, a private entity. The railroad right of way runs through the Barre Street and Main Street intersection and crosses Taylor Street, two of the Montpelier study sites. The track is used very infrequently; reportedly, approximately once a year a train traverses the area. A railroad employee will typically walk with the train through the downtown to make sure that people and cars are clear of the tracks.

Figure 8: Taylor Street, looking to State Street, at the One Taylor Street site (right).

Figure 9: The current transit hub on Main Street (near Barre Street).

Parking

Parking is a perennial topic of discussion in Montpelier. The state has approximately 2,600 employees in Montpelier and 2,000 parking spaces at its two locations (the capitol complex and National Life Building). During the legislative session, 180 legislators and an estimated 400 lobbyists and advocates also need parking. The state estimates that it is short by approximately 600 spaces for employees at the capitol and National Life complexes.[3] To reduce employee stress related to finding parking and to meet the goals of the Vermont Energy Plan, the state has implemented programs to encourage employees to use alternatives to driving to work, including preferential parking for carpools, guaranteed ride home programs, and reduced transit fares.

The Montpelier Parking Advisory Committee surveyed residents, employees, downtown patrons, and employers in 2013. This survey is not a statistically valid sample, but it gauges perceptions of parking in Montpelier. Overall, the majority of respondents felt that parking in the downtown was in short supply. The most popular suggestions for improving parking included building a parking garage for general use, not providing priority parking for legislators and aides, and providing incentives for using other transportation options.

Stormwater and Flooding

A 2008 Vermont Agency of Natural Resources report noted impaired habitat, aesthetics, and recreational values in the North Branch watershed "…due to pathogens, turbidity, temperature, habitat alteration, and junk from urban stormwater runoff, a CSO [combined sewer overflow], rip-rapped banks, channelization and loss of riparian vegetation."[4] In the downtown area, much of the riverfront is developed with surface parking lots with a narrow vegetative buffer.

Existing stormwater infrastructure in the downtown area is shown in Figure 12. The extent of parking areas and impervious surfaces along the riverfront in the downtown is shown in Figure 13. These diagrams show the river outfalls and the amount of impervious area draining directly into the river, creating water quality problems and contributing to periodic flooding of low-lying properties near the river, particularly parking areas and building basements.

Figure 10: Surface parking lots next to the river.

Figure 11: Heney parking lot, looking toward Elm Street.

3 Obuchowski, Mike, Commissioner, Vermont Department of Buildings and Grounds. "Memo to General Assembly." State of Vermont. Nov. 27, 2012.

4 Vermont Agency of Natural Resources, Watershed Management Division. *Basin 8 – Winooski River Watershed Water Quality and Habitat Assessment Report*. 2008. www.watershedmanagement.vt.gov.

Vermont is projected to experience more extreme precipitation events due to climate change, with annual precipitation increasing by as much as 30 percent. Vermont has experienced an increased frequency of damaging floods in recent years, and this situation is exacerbated by historical development in the floodplain and practices such as bank armoring, channelization, and berm construction that limit a river's access to its flood plain. These practices create more runoff, flooding, and damage to infrastructure and property.[5] Adding green infrastructure to the downtown by converting some impervious areas to stormwater-absorbing landscaped space and widening the buffer next to the river could help decrease runoff and flooding.

5 Pealer, Sacha, and Gwen Dunnington. "Climate Change and Vermont's Waters." Climate Change Adaptation White Paper Series. Vermont Agency of Natural Resources. 2011. http://www.anr.state.vt.us/anr/climatechange/Pubs/AdaptationWP_ClimateChangeandWaterReources.pdf

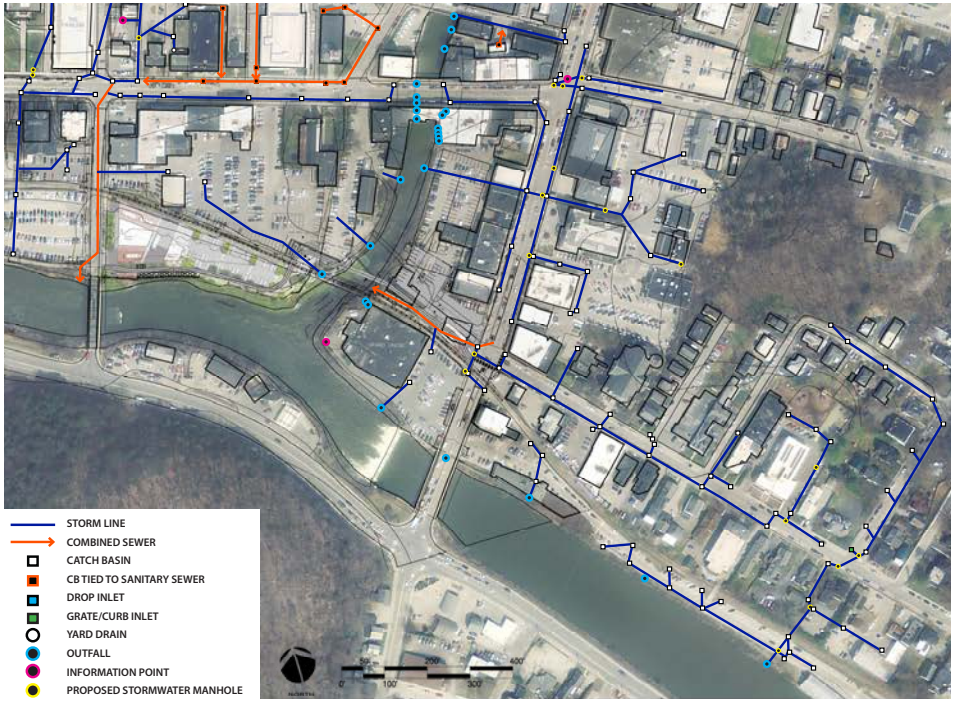

Figure 12: Existing stormwater infrastructure. Source: Vermont Department of Environmental Conservation Stormwater Mapping Project DRAFT 10/14.

Figure 13: Pervious (shown in green) and impervious areas in the downtown.

Public Workshop

The design team held a three-day public workshop in Montpelier on November 5-7, 2014. The workshop included a kick-off public event followed by four focus group sessions covering downtown and Barre Street stakeholders, stormwater, and natural environment, multimodal transportation, and design and placemaking.

The public and stakeholders provided feedback to the project team on the design options for the five sites:

1. Barre Street from the Recreation Center to Main Street

- Participants supported traffic-calming curb extensions with rain gardens at pedestrian crossings on Barre Street. Rain gardens (also known as bioretention or bioinfiltration cells) are shallow, vegetated basins that collect runoff from paved surfaces and allow it to soak naturally into the ground. Many participants wanted to know if green infrastructure approaches would work, especially given the region's clay soils. Technical staff in the environmental focus group replied that sample projects in the city, such as the porous pavers and bioretention in the parking lot of 133 State Street, were working well. The staff also said that green infrastructure techniques were the best approaches for reducing phosphorous, a pollutant of concern in the Lake Champlain Basin (which includes the Winooski River and Montpelier).

- Workshop participants supported a two-way, protected bikeway on one side of Barre Street to provide the central "missing link" of the Montpelier shared-use path. A protected bikeway, also known as a cycle track, is physically separated from motor vehicle traffic and distinct from the sidewalk. Some participants were concerned about the associated loss of 18 parking spaces, especially near the senior center where off-street parking is limited. Other participants felt that separating bicyclists from cars and pedestrians would relieve the stress of driving and parking on this sometimes crowded street. Focus group members recommended a more in-depth parking study to better understand current parking use. A consensus developed to run a pilot of the bikeway in the summer, when bicycling levels are highest and parking demand is lower (the legislative session runs from January through May). Participants also noted the bikeway could convert back to parking in winter or when parking demand is temporarily high, such as during a funeral at St. Augustine Parish. Participants generally agreed that traffic speed was a problem on Barre Street and that the pedestrian environment needed to be improved, especially since many older people and children cross the street to get between the senior center and the recreation center.

Figure 14: Focus group discussion of Greening Montpelier design options.

2. Barre Street and Main Street Intersection

- Participants strongly supported a roundabout at Barre and Main streets to calm and slow traffic, accommodate bike and pedestrian crossings, and create a gateway to the downtown. Technical members of the environment focus group suggested that adding a tank beneath the roundabout that would collect stormwater and reduce peak flows could ameliorate flooding and surcharging of the water treatment plant. Surcharging of the plant occurs when high volumes of stormwater flowing through combined storm and sewer lines flow into the plant, causing it to exceed its capacity and discharge untreated sewage and stormwater into the river.

- An extension of Barre Street across the North Branch of the Winooski River received mixed comments. Some people felt it would distribute traffic better and reduce congestion on Main Street, while others were concerned that it would encourage more driving in Montpelier.

3. Heney and Jacobs Parking Lots

- Participants strongly supported more green space, river access, and a natural river buffer that can help protect the area from flooding. Participants were interested in a festival street concept that connects into Elm Street, but some were concerned

Figure 15: Workshop design options reviewed by stakeholders.

Figure 16: Public comment at the wrap-up presentation.

about losing parking. This concept would need to include a strategy for replacing the lost parking spaces.

4. Taylor Street from the Winooski River to State Street

- Participants strongly supported sidewalks on both sides of the street with rain gardens and bioswales, and identified them as a project for early implementation.

5. State Street and Main Street Intersection

- Participants were interested in a mini-roundabout at State and Main streets and liked the additional green space and better pedestrian connection between Langdon Street and City Center plaza and building. More people questioned a roundabout at this location than at Barre and Main streets. Ultimately, the mini-roundabout was selected as a design option for this intersection because it had several advantages that addressed stakeholder concerns: it can be accommodated within the existing right of way; it allows more space for sidewalks and landscaping with the removal of turn lanes; and it would create less delay for drivers and pedestrians than the existing intersection.

- Participants strongly supported redesigning and reconfiguring space outside city hall to create a social gathering space on Main Street. Participants also liked the idea of making improvements to the alley between 28 and 30 Main Street (next to Capitol Copy), which would make it a more inviting walkway.

Figure 17: Overall concept illustrating how design options for the five focus sites fit together.

Design Options

1. Barre Street from the Recreation Center to Main Street

The design option for Barre Street (Figures 19 and 20) responds to the city's desire to provide the missing central section of the Montpelier shared-use path between the recreation center and Main Street (the path would continue across Main Street and the North Branch and eventually connect with the developed section of the path at Taylor Street). Because many stakeholders expressed concern about the speed of traffic on the street and the difficulty crossing the street, the design includes enhanced pedestrian crossings with landscaped curb extensions (also known as "bulb-outs"). These bulb-outs help calm traffic, shorten crossing distances, making the crossing and pedestrians more visible to drivers, and provide locations for rain gardens that intercept stormwater runoff along the street. Collectively, these improvements make the street safer and more pleasant for bicyclists and pedestrians traveling between the Main Street business district and the state capitol and the larger Barre Street area.

The design includes a protected bikeway (sometimes called a cycle track) along the north side of the street, where few driveway crossings would interfere with bicycle use. The protected bikeway could be on the street and physically separated from motor vehicles by a narrow buffer area and bollards. This design also separates bikes and pedestrians, which is an important consideration at this location because of the many seniors, children and disabled individuals visiting the senior center, child care center, church, and recreation center.

At the senior center and recreation center, the bikeway crosses Barre Street to connect with the developed segment of the path at Stone Cutters Way. This crossing is designed as a raised speed table that brings the street up to the level of the sidewalk and path at the crossing (Figure 18). This design also slows traffic and provides a safer crossing for bikes and pedestrians. With the recreation center and senior center directly opposite each other, the street in this area can be seen as a plaza-like space that is shared by pedestrians, bicyclists, and drivers. To set the crossing off visually from the roadway, and to alert drivers that they should slow down and expect bikes and pedestrians, the raised crossing incorporates special paving and signage. The raised crossing would incorporate gradual slopes that allow transit vehicles, emergency vehicles, and trucks to safely pass. A similar design approach can be used at other crossing locations further east on Barre Street (Figures 21 and 22) to make pedestrian crossings safer and more pleasant for the entire length of Barre Street.

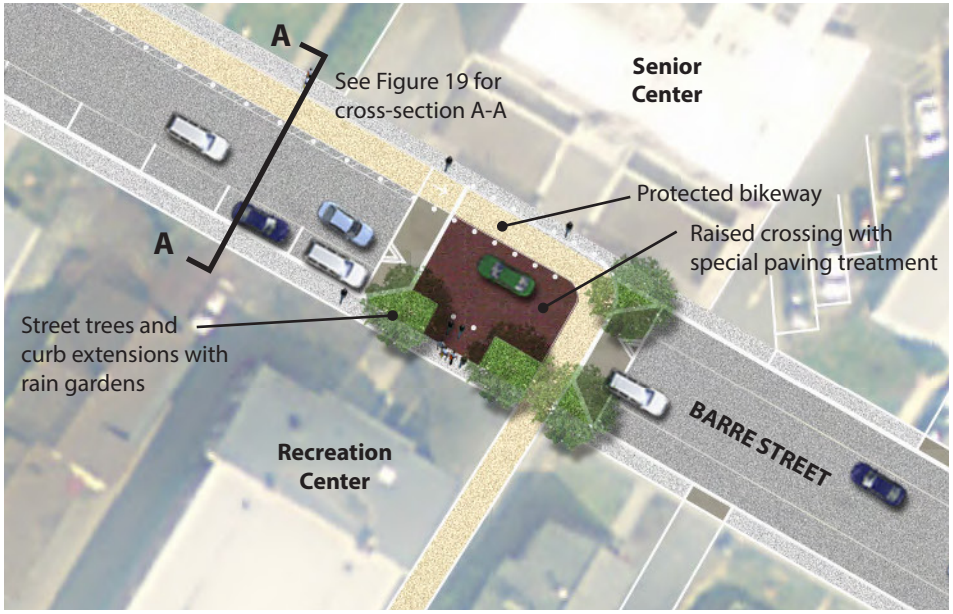

Figure 18: Detail of Barre Street design option at the recreation center, showing the protected bikeway and raised crossing.

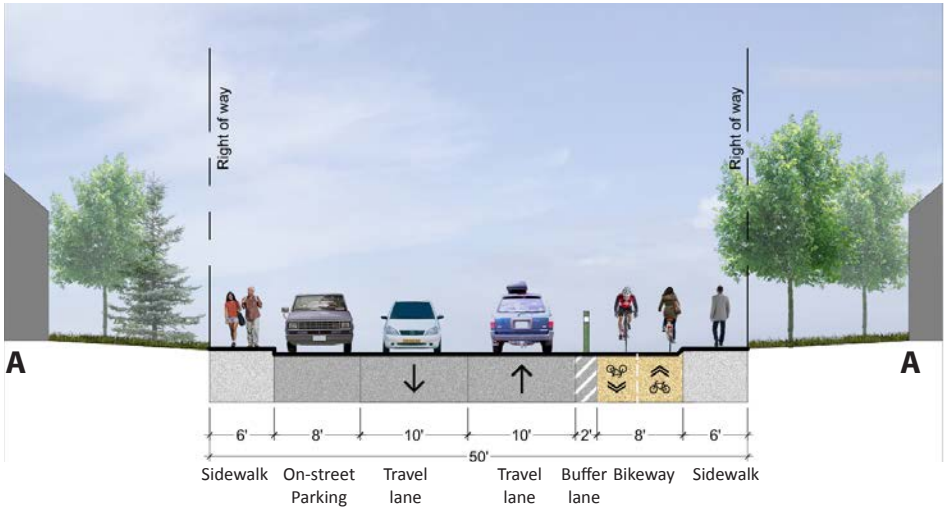

Figure 19: Section through Barre Street with protected bikeway.

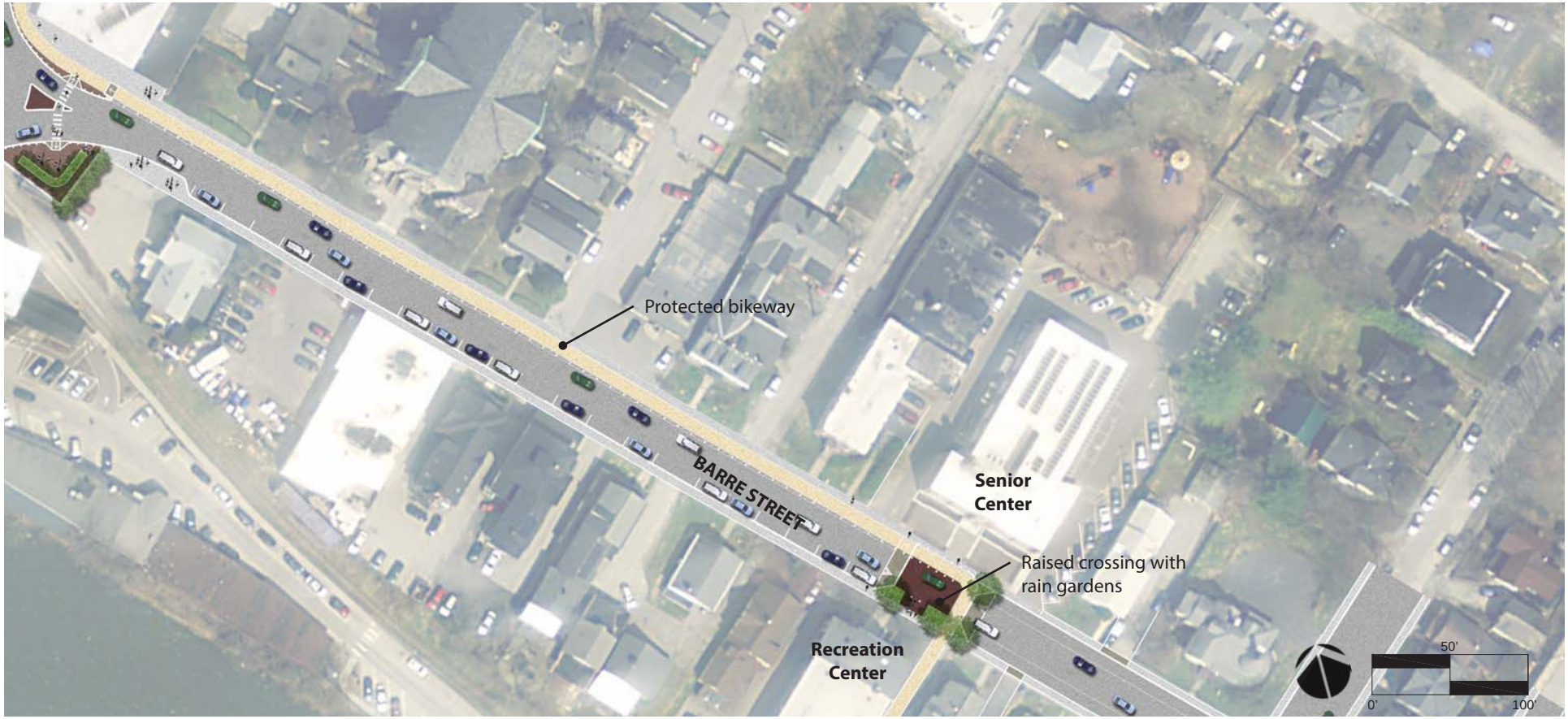

Figure 20: Design option for Barre Street.

Implementation of the protected bikeway could be initially tested as a pilot project during the summer. Design workshop participants suggested that the bikeway could be managed seasonally to use the street space fully and to alleviate concerns about losing parking spaces. In the summer, the bikeway would be in place. In the winter, the bollards would be removed, and the space would be used for on-street parking. With this shared arrangement, bicyclists use the space during warmer months (May to November) when bicycling demand is highest and when parking demands are lower as the state legislature is not in session. The pilot should be evaluated after bicyclists have had the chance to adjust their travel patterns and once the path segment between Main Street and Taylor Street is completed to get the best indication of usage. If the bikeway is successful, it can be made permanent, and the city can explore options for replacing any lost parking.

Figure 21: Plan for a typical enhanced pedestrian crossing with curb extensions and rain gardens.

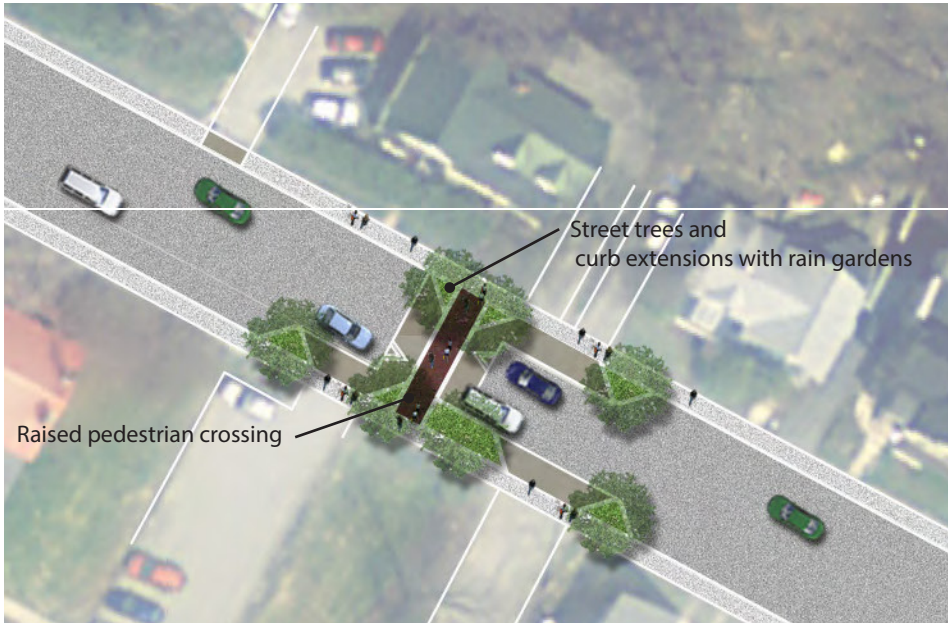

Figure 22: Plan for a typical enhanced mid-block crossing with curb extensions and rain gardens.

Design Example: Indianapolis Cultural Trail

The Indianapolis Cultural Trail is an 8-mile bike and pedestrian path that connects neighborhoods with the capital city's cultural districts and entertainment attractions. The trail has been a driver for new commercial and residential developments that have grown up along its traverse of the downtown.

As the name implies, the trail connects major cultural and entertainment venues. The path is an attractive public space with special paving, stormwater-absorbing landscaping, and public art.

"Before the path arrived, Indianapolis didn't have much of a mainstream bike scene—just streets designed to improve traffic flow. Now, children and the elderly have joined the spandex swarms of longtime cycling enthusiasts. The pathway has connected people with the places they want to go and encouraged physical activity in a state with the eighth-highest obesity rate in the country."[6]

6 Simmons, Andrew. "In Indianapolis, a Bike Path to Progress." *New York Times.* Mar. 4, 2014.

Figure 23: The Indianapolis Cultural Trail links downtown destinations along a linear park with rain gardens. Photo courtesy of city of Indianapolis.

Figure 24: Current conditions on Barre Street at the recreation and senior center.

Figure 25: Design option for Barre Street with a protected bikeway, mid-block crossing and rain gardens.

2. Barre and Main Intersection

During the public workshop, stakeholders strongly preferred a single-lane roundabout at Barre and Main streets. A roundabout at this location could provide a visual and physical gateway to the downtown district that slows traffic and signals the entrance to a slow-speed, pedestrian-oriented district, as several stakeholders desired. Pedestrians need cross only one lane of traffic at a time because pedestrian islands separate travel lanes at each crossing. Vehicles going through the roundabout slow down, which creates a less intimidating environment for pedestrians. Eliminating turn lanes leading up to the roundabout narrows the crossing distances and creates space for other uses, including landscaping and additional on-street parking, which local business people and residents wanted. A single-lane roundabout (in combination with a mini-roundabout) has been built in downtown Manchester, Vermont, and has been a success (see page 26).

Accommodating the roundabout would require the city to negotiate with adjacent property owners. The city plans to remove the M & M Beverage building (redemption center) and construct a building next to the current site that would accommodate the redemption center with other uses. A conceptual design for this building has been developed. The preliminary design for the building would need to be modified slightly to fit a roundabout and sidewalk at this intersection. The dry cleaners building on the southeast corner is a small drop-off facility that could be relocated within a storefront. This property would be needed to accommodate the roundabout.

With the roundabout, bicyclists have the option to ride with traffic, which is slower and would be compatible with more experienced bicyclists. Less experienced riders can use the roundabout like a pedestrian. The design option provides wider sidewalks in anticipation of more pedestrians and

Figure 26: Design option for a roundabout at the intersection of Barre Street and Main Street.

bicyclists using the Montpelier shared-use path. Special paving treatment, such as colored, textured concrete or pavers, can be used to visually connect the path through the intersection, as the city wanted.

Sidewalks and improved pedestrian crossings circumscribe the roundabout. The design option provides wider sidewalks in front of the grocery store and connecting to the transit stop on Main Street. The entry to Shaws grocery store is maintained with an entrance off the roundabout, and the exit to Main Street remains in its current location south of the roundabout. In addition, a pedestrian walkway from the sidewalk to the entrance of the grocery store could be added (by the store owner, if desired).

In addition to wider sidewalks, eliminating the turn lanes allows more places for green infrastructure such as porous paving, street trees, and rain gardens. For instance, on the southeast side of the roundabout, a small pocket park with trees, benches, and a rain garden could be added. The center of the roundabout could include a rain garden to collect runoff and public art to create a more distinctive gateway to the downtown, as many workshop participants desired. Participants in the stormwater and natural environment focus group suggested placing a tank below the roundabout that would capture and store runoff, slowly releasing it into the sewer system. The tank would reduce peak flows that drain into the river while allowing sediment and solids to settle out of the stormwater, thereby improving water quality and reducing peak storm flows that create flooding along the river.

Eliminating the turn lanes also allows more diagonal parking spaces on Main Street, which was a very popular idea with local business owners who attended the workshop. These new parking spaces could be ”back-in” parking spaces, which are safer for bicyclists because drivers can see them better when pulling out of a parking space. This location would be a good place to do a pilot of back-in parking because the traffic is slow.

The design option accommodates the existing rail line, and does not interfere with the infrequent use of the line.

The roundabout configuration anticipates the extension of Barre Street across Main Street. Initially, this extension of Barre Street would serve parking behind Main Street and a parking garage that has been planned for this location. Over the long term, the extension of Barre Street would extend over the North Branch to connect to the shared

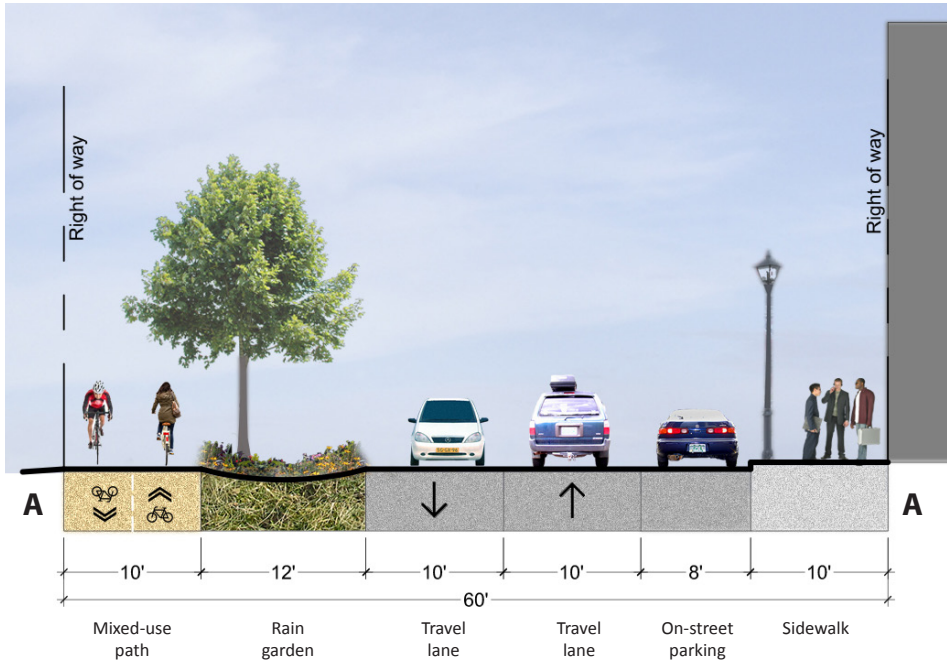

Figure 27: Section through Barre Street extension with the Montpelier path.

street on the Jacobs and Heney lots (see the description of the Heney and Jacobs parking lots design option). A single lane roundabout has been built in downtown Manchester, Vermont, and has been a success (see page 26).

Just north of the intersection is an alley at 28 Main Street that could be designed to be more inviting for pedestrian use, as several stakeholders wanted, through better paving, creative lighting, and perhaps public art. In summer, some café tables could be added to the space.

Figure 28: Current conditions at the intersection of Barre Street and Main Street.

Figure 29: Design option for the intersection of Barre Street and Main Street with a roundabout.

3. Heney and Jacobs Parking Lots

The Heney and Jacobs lots occupy a prime location at the center of the downtown and at the confluence of the north and main branches of the Winooski River. The community strongly supported embracing the river, providing public access to it and adding green space in an area that is currently dominated by paving. The design option for this area provides river access, public space, and additional green space. The parking lots could be converted to a "festival street" sometimes called a "shared street" that is designed to be flexible to accommodate a variety of functions and activities, such as seasonal markets, street fairs, or café seating near the river. With a minor modification at its intersection with State Street and a connection to the Barre Street extension, the shared street can be integrated into the downtown circulation network. In addition to better distributing downtown traffic, this improvement could also allow the opportunity, over time, to provide access to infill development on adjoining parking lots in this area.

A festival street is designed without curbs, changes in grade, lanes, sidewalks, and other conventional street design mechanisms that separate pedestrians, bicycles, and cars. Festival streets have flush curbs and are often paved with unit pavers to create the feeling of a pedestrian space. All transportation modes are mixed in a slow-speed environment. In the summer, for example, the street could be used for outdoor café seating, farmers markets, food trucks, and special events. In the winter, the street could be used primarily for parking.

Figure 30: Design option for the Heney and Jacobs parking lots.

Figure 31: Section through the festival street and North Branch of the Winooski River during a special event.

The extension of Barre Street would provide a more robust downtown street network that could better distribute traffic, potentially alleviating some demand on the State and Main intersection and supporting new infill development in the downtown. Many communities are finding that downtown housing is in high demand, particularly for the millennial generation (18 to 30 years of age), empty-nesters, and retiring baby boomers. Montpelier has the added market of lawmakers as well. More downtown housing in Montpelier, where many uses and activities are within an easy walking distance, would support a more economically and environmentally sustainable city. The current plan to replace the redemption center building would accommodate the extension of Barre Street. In addition, the extension of Barre Street to serve the parking behind Main Street would require removal of the city-owned building at 10 Main Street (shown in Figure 30).

The festival street is designed as a narrow, two-lane, two-way street with parallel parking on both sides. It has no curbs, but paving patterns delineate zones for parking, walking, and driving. Trees provide a canopy of shade over the street. The parking zone can use porous pavers that allow stormwater infiltration.

The design option envisions space along the riverfront being converted to a park with a riverwalk pedestrian promenade, a series of landscaped rain garden terraces, and an overlook at the location of a remnant building foundation, with adjoining stairs providing access to the river. A pedestrian promenade that connects with the Montpelier shared-use path would be constructed along the riverfront. The combination of the river walk, green spaces, and flexible public space that can accommodate special events and downtown gatherings could provide an exciting new focal point that integrates the river into downtown Montpelier.

Figure 32: Current conditions of the Heney and Jacobs lots.

Figure 33: Design option for the Heney and Jacobs lots transformed into a festival street with rain gardens.

4. Taylor Street from the Winooski River to State Street

Taylor Street is a key street in the downtown network for pedestrians and bicyclists. It is one block from the state capitol and the center of the downtown and will be the site of One Taylor Street, a new mixed-use transit center currently in design. It also crosses and is close to the Winooski River. Workshop participants wanted to improve the pedestrian experience along Taylor Street, which has no sidewalks on either side of the street for most of its length. Taylor Street is also a major entrance to the Montpelier shared-use path. The design option for Taylor Street provides sidewalks along both sides of the street connecting to the transit center and the shared-use path, separated from the street by street trees and rain gardens. The travel lanes could be marked with sharrows to indicate that this street is also a bikeway.

A state-owned parking lot is on the west side of the street and has several curb cuts into individual driveways. Representatives from the state were concerned that removing these driveways would require reconfiguring the parking lot circulation and losing too many parking stalls. Therefore, the design option retains the driveways, but the sidewalk would remain at its elevated grade going across the driveways, rather than ramping down to the driveway level. This design is safer for pedestrians, as the sidewalk remains level and drivers sense that they are crossing a sidewalk and must slow down and proceed with caution.

A trailhead with wayfinding signs, benches, and landscaping is at the entry to the Montpelier shared-use path to help visitors and path users navigate downtown Montpelier and destinations along the path. In addition to maps, directions to downtown businesses that cater to the needs of bicyclists (e.g., sports equipment shops and restaurants) would make this a welcoming place for visitors and bicyclists on longer journeys, such as those using the Cross Vermont Trail.

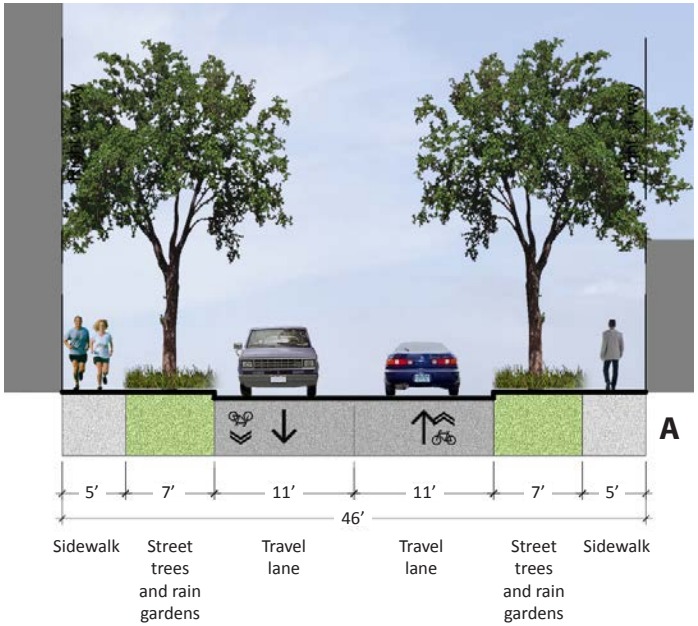

Figure 34: Section through Taylor Street with sidewalks and rain gardens.

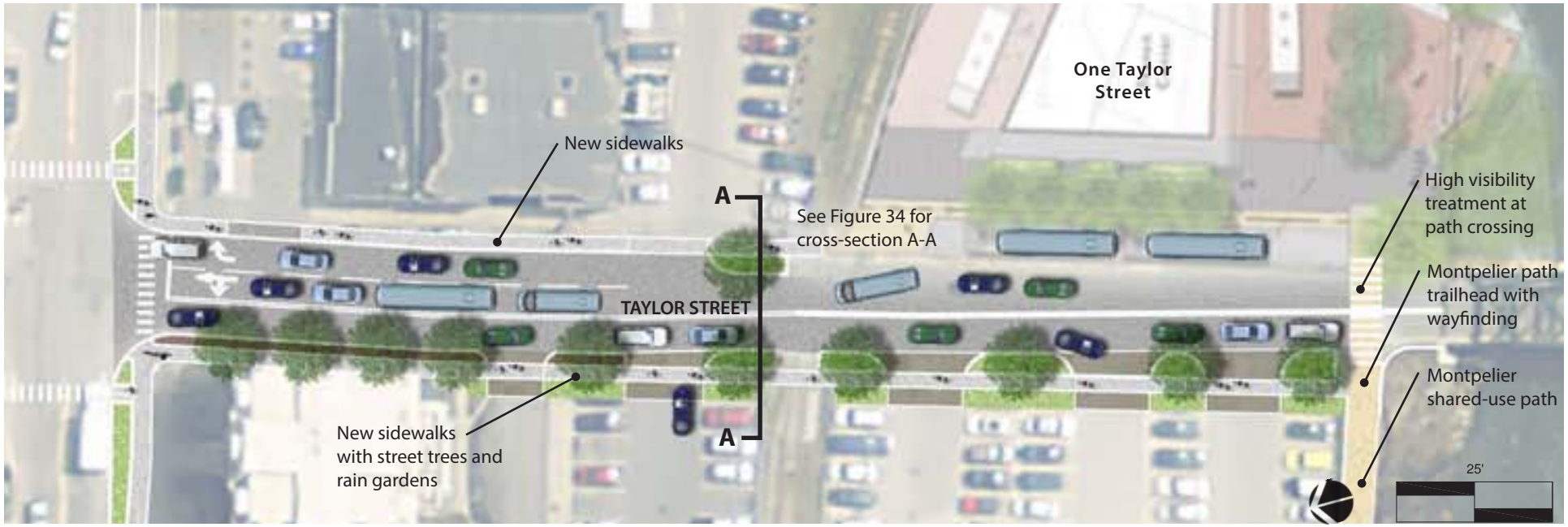

Figure 35: Design option for Taylor Street.

Figure 36: Current conditions on Taylor Street.

Figures 37: Design option for Taylor Street with sidewalks, "sharrows," street trees, and rain gardens.

5. State Street and Main Street Intersection

The design option for the intersection of State Street and Main Street is to reconfigure the intersection using a single-lane mini-roundabout. Almost all workshop participants voiced irritation about this intersection not really working for anyone—vehicles, pedestrians, or bicyclists—because of the complicated signal timing that creates long delays for everyone. The mini-roundabout can fix this problem by allowing a slow and steady flow of traffic. The slower traffic would be more compatible with bicyclists and pedestrians. Pedestrians would have shorter crossing distances because refuge islands in the middle of the street would allow them to wait to cross the next lane of slow-moving traffic. The additional space gained by converting turn lanes to the roundabout configuration allows wider sidewalks and landscaping, including street trees and rain gardens in the curb extensions that capture runoff from the sidewalk and street. Workshop participants liked the additional pedestrian zone at Langdon Street and around the intersection (with the elimination of turn lanes), but some worried this arrangement might cause even longer delays at the intersection.

Elements of the streetscape, such as the center of the roundabout and pedestrian islands, could incorporate porous paving materials, such as unit pavers, to infiltrate more stormwater. The outer ring of the roundabout would have a rolled curb to allow larger trucks and emergency vehicles to mount it if necessary.

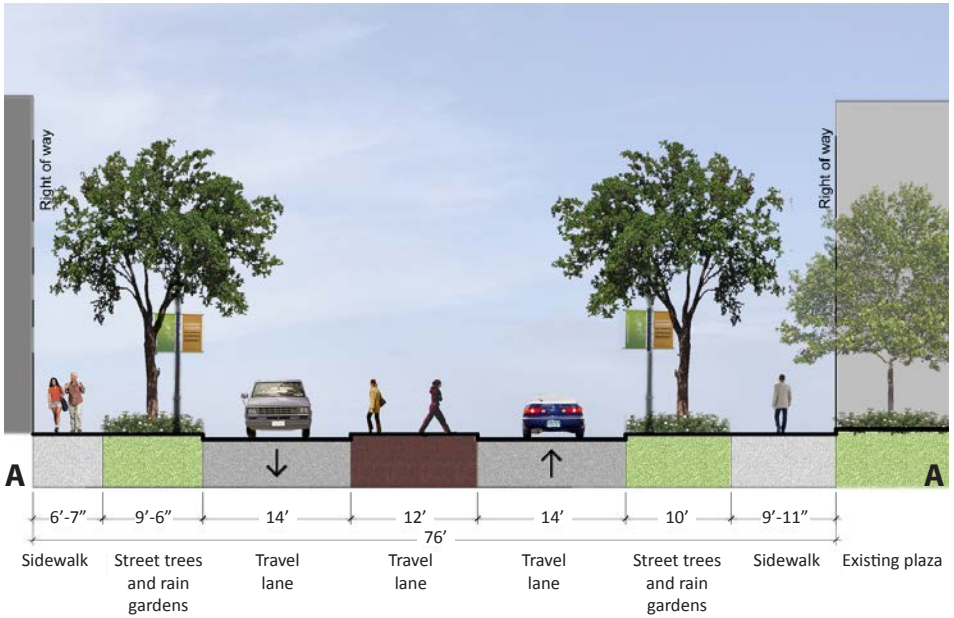

Figure 38: Section through Main Street at the mini-roundabout.

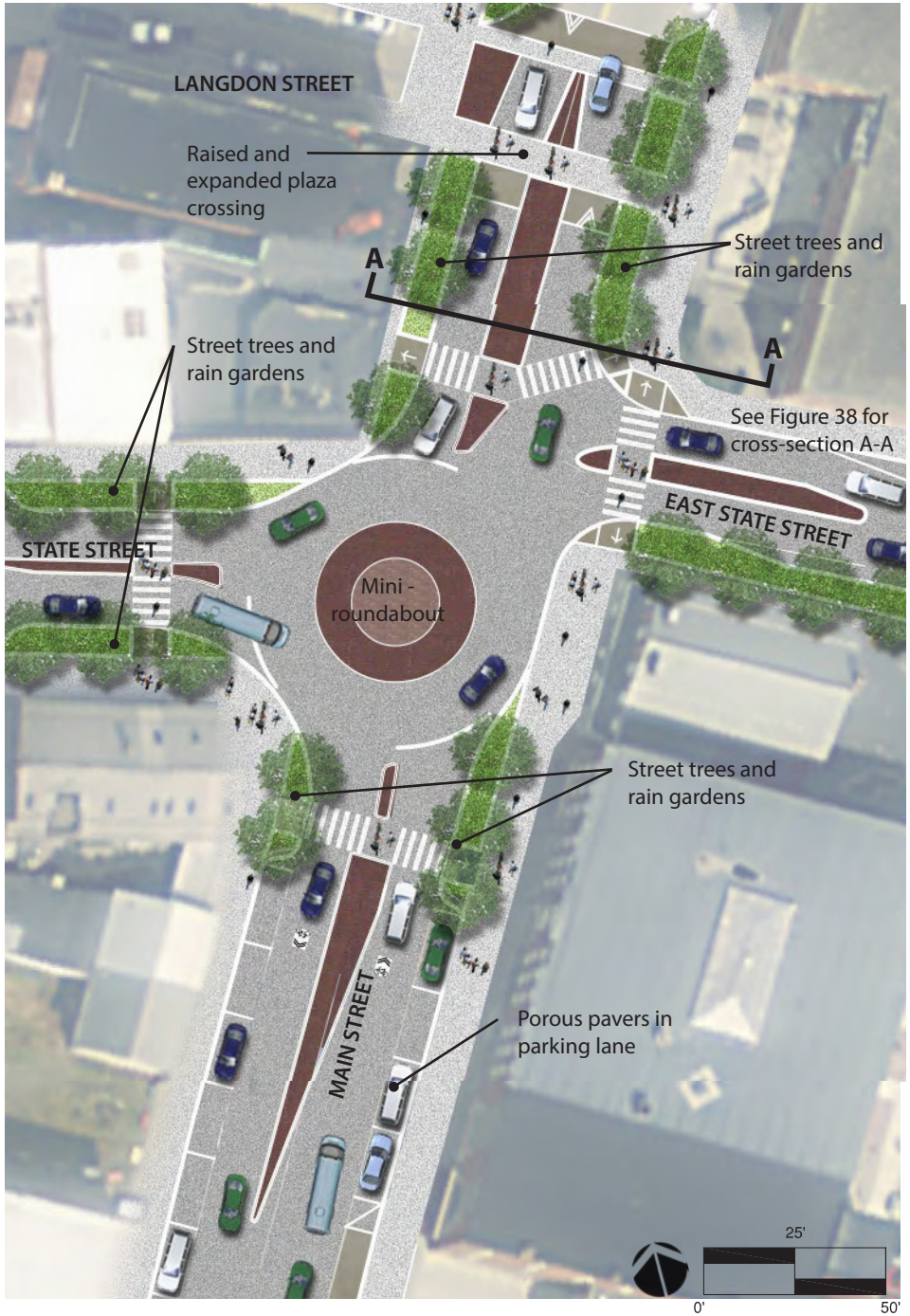

Figure 39: Design option for the State Street and Main Street intersection.

Bikes have the option of riding in the roundabout in the flow of slow-moving traffic or crossing the roundabout like a pedestrian. Main Street would have shared lanes marked with sharrows. Streetscape and public space improvements at the intersection of Langdon Street and in front of the city hall (see Figures 45 and 46) also make the street more pedestrian and bicycle-friendly.

At the intersection with Langdon Street, Main Street would be raised to eliminate curbs and create the sense of a pedestrian plaza linking Langdon Street with the existing plaza at the Vermont Center on the south side of Main Street. This raised crossing would make crossings safer and easier for pedestrians and serve as a gateway to the downtown from the north.

Figure 40: Current conditions at the intersection of State Street and Main Street.

Figure 41: Design option for a mini-roundabout at the intersection of State Street and Main Street.

Design Example: Manchester Roundabouts

Long nicknamed "Malfunction Junction," the intersection of Routes 30/11 and 7A in downtown Manchester, Vermont, was a notorious traffic choke-point going back to the horse-and-buggy era. A pair of roundabouts including a single-lane and mini- were built in 2013 at this complex intersection at the heart of Manchester's village center. The roundabouts have relieved congestion while calming and slowing traffic at the center of town where large numbers of shoppers on foot patronize Manchester's outlet shops and other attractions. The two roundabouts are separated by approximately 150 feet and work together to manage traffic through this historic village center.

The roundabout design included improved sidewalks, enhanced crosswalks, and pavers, railing details, landscaping, and lighting that complement the historic New England character of Manchester's downtown district. The roundabout design allowed additional space for streetscape amenities and made it easier for pedestrians to cross this intersection.

Figure 42: Single-lane (left) and mini- (right) roundabouts in Manchester, Vermont. Photo courtesy of Stantec.

Figure 43: Mini-roundabout in Manchester. Photo courtesy of Stantec.

Figure 44: Single-lane roundabout with enhanced pedestrian crossings, landscaping and lighting. Photo courtesy of Stantec.

Main Street at City Hall

Downtown stakeholders asked the design team for ideas to improve the area in front of city hall to be a more attractive gathering space. They felt that the existing plaza space was not very inviting, as it is dominated by hard paving and is a busy mid-block crossing. In response, the team developed a design option that includes more green space, trees, and wider sidewalks. At this location, the grade of Main Street could be raised to eliminate curbs along the city hall frontage and to create the sense of an extended pedestrian plaza in front of city hall. Wider sidewalks are created here by converting the parking lane on both sides of the street. Currently, city hall has no parking spaces in front, just a striped-out asphalt area. On the opposite side of the street are four parallel parking spaces that could be replaced with the diagonal spaces that would be created if the turning lane were eliminated as part of the roundabout design at the Barre Street intersection (see Figure 26). The plaza in front of city hall could be improved with more landscaping, including rain gardens, and seating. More street trees could be planted on both sides of the street to better define the space and provide shade. The mid-block crossing would be safer with raised street space, textured or colored pedestrian crossings, street trees, and rain garden planters that would all combine to cue drivers to slow down and watch for pedestrians.

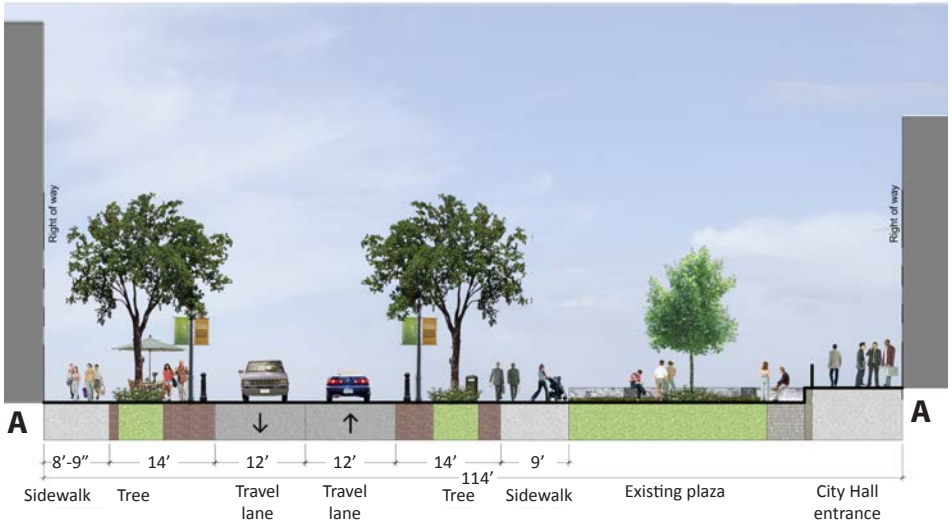

Figure 45: Section through Main Street at Montpelier city hall.

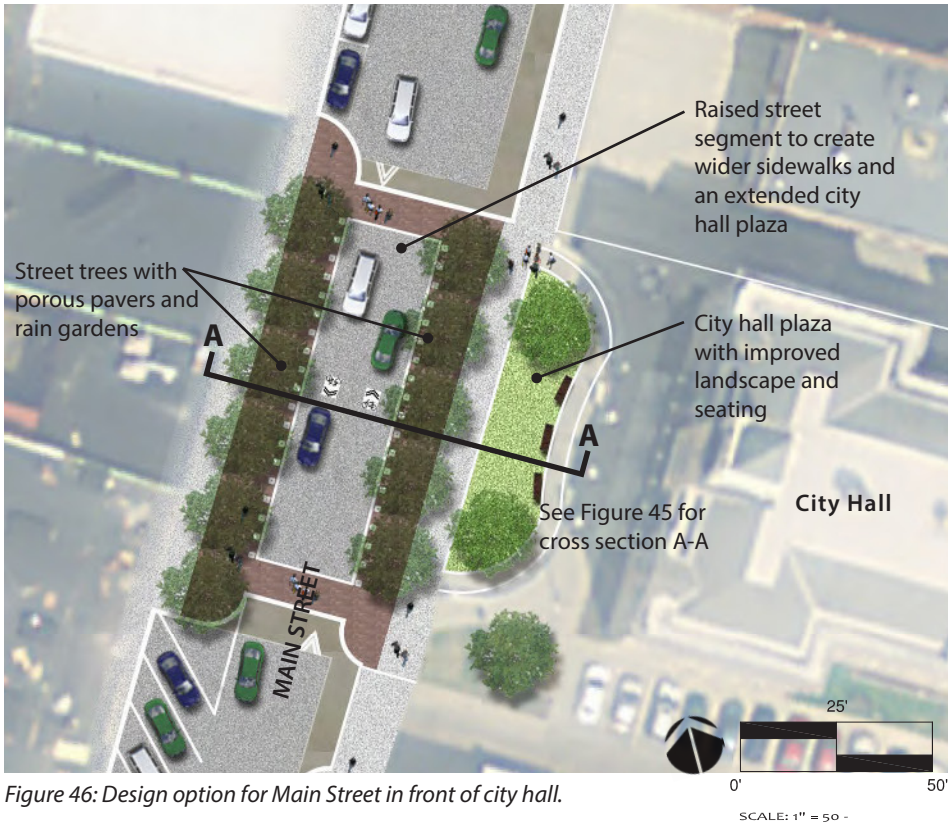

Figure 46: Design option for Main Street in front of city hall.

Next Steps

The design options in this report are a set of capital improvements that could create a greener and more attractive downtown district. The options vary in complexity and cost, and some could be implemented independently, while others depend on other improvements being done first. The team identified specific implementation steps the city could undertake in the near-, mid-, and long-range time frames if it chooses to implement these options, as well as potential funding sources.

Near Term (2015)

Near-term steps focus on actions that can be taken in a short time frame (about six months).

- **Pursue funding for Taylor Street sidewalks and green infrastructure**. Sidewalks on Taylor Street should be implemented, if possible, in tandem with construction of the transit center, which is being funded by the Federal Transit Administration (FTA). FTA funding can be spent on bicycle and pedestrian improvements that connect with transit stations and stops. Specifically, it can be used for pedestrian improvements within half a mile and bicycle improvements within 3 miles of a station or stop. If construction of the transit center costs less than expected, the city and FTA can explore whether remaining funds could be used to pay for sidewalks and other streetscape improvements on Taylor Street. In addition, this project might be a candidate for Transportation Alternatives money. The stormwater landscape elements of the project might be covered through the Downtown Transportation Fund of the Transportation Alternatives grant program, and additional funding for these elements might be available through the Vermont Department of Environmental Conservation or Agency of Natural Resources.

- **Pursue funding for a design and engineering study for the intersection of Barre and Main streets.** After getting community agreement that a roundabout is the preferred solution to the intersection, the next step in implementing improvements is conducting more detailed engineering and design studies of the roundabout and identifying costs associated with construction and purchase of the right of way, including the dry cleaners property. The study could also examine the possibility of having an underground tank to reduce stormwater flows.

- **Provide input on the Greening Montpelier design options to the Stormwater Master Plan process.** The city of Montpelier will be developing a citywide stormwater management plan beginning in 2015. Projects identified in the Greening America's Capitals design options should be included in the master plan. The stormwater master plan could provide design standards for "green street" treatments, such as bioretention planters, stormwater curb extensions, and rain gardens.

- **Plan for a pilot of the two-way protected bikeway.** A more detailed plan for the implementation of the protected bikeway pilot should be developed. The plan would include identifying needed materials such as bollards and signage and an enhanced crosswalk at the path connection through the recreation center. Public outreach and a survey of on-street parking use are other tasks that could help the pilot effort. The two-way protected bikeway pilot could be run in the summer. The Barre Street section would link to a future section of the path from Main Street to Taylor Street that is being funded by the Federal Highway Administration (funding is being spent on acquisition of right of way, design, and construction).

- **Pursue funding for enhanced pedestrian crossings on Barre Street.** Due to the many pedestrians on Barre Street, enhancements to the pedestrian environment should be prioritized, including enhancement of the existing crossings with speed table crossings, landscaped curb extensions, and pavement markings. These improvements could be locally funded or packaged with sidewalk improvements to Barre Street through the Transportation Alternatives program.

Mid-Term (2016-2018)

- **Conduct a design and engineering study for State and Main streets.** The first step in this process might be for city staff and perhaps other interested stakeholders to take a field trip to Manchester, Vermont, to observe the mini- and single-lane roundabouts at Routes 7A and 30/11. This is a complex, irregular intersection at the center of the downtown that has high vehicle and pedestrian traffic because of the surrounding outlet shops. The field trip might help interested stakeholders and the City Council envision how roundabouts can work in a pedestrian-oriented historic village center setting. Following the field trip, the city could conduct the design and engineering study for the intersection.

- **Develop plans for City Hall Park.** The City could develop more detailed design plans and a cost estimate for the city hall park as a first step. Once a plan and cost is developed, funding options can be identified. Funding for enhancement of downtowns, main streets, incorporating green infrastructure, and local fundraising might be a good fit for a project like this.

- **Prepare a downtown parking and management plan**. Loss of parking spaces is a challenge for implementing some design options. Investigating options for expanded parking in the downtown and/or in satellite lots and improved management and use of existing downtown parking could be undertaken in the mid-term time frame.

- **Conduct a design and engineering study for the Barre Street extension.** In conjunction with the downtown parking and management plan, the city could undertake an engineering study to evaluate the potential extension of Barre Street to serve the parking area behind Main Street and potentially cross the river and extend to Taylor Street. The Barre Street extension is a key component in supporting downtown development and better distributing traffic in the downtown.

Long Term (2019 and Beyond)

- **Develop plans for river access and the festival street at the Heney and Jacobs lots**. The festival street would provide an attractive gathering place near the river. Redevelopment of these lots depends on the lost parking spaces being replaced elsewhere in the downtown.

Funding Sources

Potential sources of funding for the design options described in the report include:

Federal Sources

Federal Highway Administration Programs

- **Congestion Mitigation and Air Quality Program:** This program supports transportation projects or programs that will improve air quality and relieve congestion. Funds can be used for new or expanded transportation projects or programs that reduce emissions, including capital investments in transportation infrastructure, congestion relief efforts, operating assistance for new transit services, travel demand management strategies, traffic flow improvement programs that reduce emissions, and bicycle/pedestrian paths. *www.fhwa.dot.gov/environment/air_quality/cmaq/policy_and_guidance/2013_guidance.*

- **Surface Transportation Program:** This program provides flexible funding that states and localities can use for projects to preserve and improve the conditions and performance on any federal-aid highway (Main Street is Vermont State Route 12), bridge and tunnel projects on any public road, pedestrian and bicycle infrastructure, and transit capital projects including intercity bus terminals. *www.fhwa.dot.gov/map21/guidance/guidestprev.cfm.*

- **Recreational Trails Program:** This program provides funds to states to develop and maintain recreational trails and trail-related facilities for both non-motorized and motorized recreational trail uses, including hiking, bicycling, in-line skating, equestrian use, cross-country skiing, snowmobiling, off-road motorcycling, all-terrain vehicle riding, four-wheel driving, or using other off-road motorized vehicles. *www.fhwa.dot.gov/environment/recreational_trails/index.cfm.*

U.S. Environmental Protection Agency

To see current grants available from EPA, visit *www.epa.gov/ogd/competition/open_awards.htm*. EPA offers a Grants 101 Tutorial to help communities and others understand the grant process at *epa.gov/ogd/training/resources_for_communities/epa_grants_101.htm*.

If brownfield sites are involved, EPA has several programs to help eligible entities assess, remediate, and restore brownfield sites to productive use and revitalize neighborhoods, including:

- **Assessment Grant Program:** These grants provide funding to inventory, characterize, assess, and conduct planning and community involvement related to brownfield sites. Grants are for up to $200,000 to address sites contaminated by hazardous substances and up to $200,000 to address sites contaminated by petroleum. *http://www.epa.gov/brownfields/assessment_grants.htm.*

- **Area-Wide Planning Grant Program:** These grants provide funding of up to $200,000 to conduct research, technical assistance, and training that will result in an area-wide plan and implementation strategy for key brownfield sites, which will help inform the assessment, cleanup, and reuse of brownfields and promote area-wide revitalization. Funding is directed to specific areas, such as a neighborhood, downtown district, local commercial corridor, or city block, affected by a single large or multiple brownfield sites. *www.epa.gov/brownfields/areawide_grants.htm.*

- **Revolving Loan Fund Grant Program:** These grants of up to $1,000,000 provide funding to capitalize a revolving loan fund. Revolving loan funds can be used to provide no-interest or low-interest loans and subgrants for cleanup activities at brownfield sites and require a 20 percent cost share on the initial grant award. *www.epa.gov/brownfields/rlflst.htm.*

- **Cleanup Grant Program:** These grants provide funding for recipients for cleanup activities at brownfield sites that they own. Sites can be contaminated by hazardous substances and/or petroleum. Grants are up to $200,000 per site and require a 20 percent cost share. *www.epa.gov/brownfields/cleanup_grants.htm*.

- **Targeted Brownfields Assessments:** These assessments are conducted by an EPA contractor; services include site assessments, cleanup options, cost estimates, and community outreach. Sites for this program are selected regionally once a year. Services are for an average of $100,000. *www.epa.gov/region1/brownfields/programs/targeted.htm.*

To address water quality and green infrastructure opportunities, EPA has several programs to help eligible entities assess properties, carry out projects that incorporate best management practices, and provide outreach and education, including:

- **Nonpoint Source Grants**: Under section 319 of the Clean Water Act, states receive grant money to support a wide variety of activities to reduce nonpoint source pollution. States provide grants to local organizations and governments to carry out projects that reduce sources of nonpoint pollution through best management practices, outreach and education, and new approaches to improve water quality. These grant monies cannot fund activities currently required in a permit. Each state publishes an annual request for proposals for local projects.

- **EPA Urban Waters Small Grants**: EPA's Urban Waters Program supports communities in their efforts to access, improve, and benefit from their urban waters and the surrounding land. The program funds research, investigations, experiments, training, surveys, studies, and demonstrations that will advance the restoration of urban waters by improving water quality through activities that also support community revitalization and other local priorities. EPA is one of the four convening agencies for the Urban Waters Federal Partnership and maintains a website, hosts conference calls, and sponsors an annual Urban Waters Workshop. *www.urbanwaters.gov.*

- **State Revolving Loan Funds**: Stormwater infrastructure projects could be eligible for loans under the state revolving loan fund program. The Clean Water State Revolving Fund Program funds a broad range of projects, from traditional wastewater systems and nonpoint source pollution control to estuary management and projects focusing on water quality. EPA awards funds to states based on a formula. Additionally, state match funds (equal to 20 percent of the federal capitalization grants), state revolving fund loan repayments, interest earnings, and bond proceeds also fund the state's wastewater infrastructure needs.

  Ten percent of each capitalization grant must be used toward a "green project reserve" to fund green projects. Eligible projects can fall into four categories: energy efficiency, water efficiency, green infrastructure, or environmentally innovative projects.

- **Lake Champlain Basin Program (LCBP):** The Lake Champlain Basin Program works in partnership with government agencies from New York, Vermont, and Québec; private organizations; local communities; and individuals to coordinate and fund efforts that benefit the Lake Champlain Basin's water quality, fisheries, wetlands, wildlife, recreation, and cultural resources. The LCBP provides grants to governments and organizations for research and demonstration projects, and education and outreach efforts that further these objectives. Many projects have been funded in the Winooski Watershed. Core funding for the LCBP is through the EPA. *www.lcbp.org.*

State Sources

Vermont Agency of Natural Resources

- **Clean Water State Revolving Loan Fund:** This fund provides loans to municipalities for planning, design, and construction of water infrastructure including stormwater treatment and green infrastructure. Planning and design loans are zero interest loans that range from 5 to 15 year terms, and construction loans are 2 percent loans that may be repaid for up to 20 years. *www.anr.state.vt.us/dec/fed/financial/docs/Final%20-%20CWSRF.pdf*.

Vermont Department of Environmental Conservation

- **Nonpoint Source Grants**: Awarded by the EPA, the Department of Environmental Conservation makes these federal grant funds available on a competitive basis to eligible applicants. Funds are to be used to implement projects that will control, manage, and reduce water pollution from certain priority nonpoint source discharges.

  Eligible types of nonpoint source management and implementation activities fall into five general categories:

  1. Demonstration: Projects that accelerate the adoption of new or innovative nonpoint source controls or technology.
  2. Watershed resource restoration: Projects that protect and restore wetlands, rivers and streams, lakes and ponds, riparian areas, and related aquatic habitats.
  3. Technical or financial assistance: Projects that provide assistance (e.g., project development, training, technology transfer) with the implementation of nonpoint source pollution controls.
  4. Monitoring: Projects that assess the effect of nonpoint source implementation projects on surface or ground water.
  5. Watershed-based planning: In the absence of a watershed restoration plan, efforts that produce a local watershed plan containing, but not limited to, the nine required components designed to reduce nonpoint source pollutant loadings contributing to water quality impairments.

  Ineligible types of activities include financial assistance to individuals, nonpoint source research or general assessment or baseline watershed monitoring, in-lake treatment (e.g., sediment removal, alum treatment, aquatic plant treatment, aeration), and stormwater controls specifically required by a federal stormwater

permit. When the department makes these grant funds available, the maximum amount is usually $45,000. *www.watershedmanagement.vt.gov/grants.htm.*

- **Ecosystem Restoration Program**: Grants awarded under this program are intended to restore and protect rivers, streams, lakes, ponds, and wetlands from unregulated nonpoint source runoff and erosion containing nutrient (e.g., phosphorus and nitrogen) and sediment pollution. The program strongly favors eligible projects that are identified in Tactical Basin Plans and associated river corridor plans or stormwater master plans. Vermont municipalities, regional organizations, nonprofit associations, citizens groups, and state agencies are eligible to receive grants. Individuals, for-profit entities, and federal agencies are not eligible to receive funds directly, but can partner with an eligible project sponsor. Grant amounts vary but typically are between $10,000 and $75,000. *www.watershedmanagement.vt.gov/erp.htm.*

Vermont Department of Fish and Wildlife

- **Vermont Watershed Grants Program**: This program funds projects that contribute to the protection, restoration, and enjoyment of waters. Half of the proceeds from sales of the Vermont Conservation License Plate help fund the program. The Vermont Department of Fish and Wildlife distributes the money for local and regional water-related projects throughout the state. Watershed grants can go towards projects that:

  - Protect or restore fish and wildlife habitats.
  - Protect or restore water quality and shorelines.
  - Monitor fish and wildlife populations and/or water quality.
  - Reduce phosphorus or nitrogen loading and sedimentation.
  - Enhance recreational use and enjoyment of a watershed.
  - Educate people about watershed resources.
  - Identify and protect historic and cultural resources.

  Municipalities, local or regional governmental agencies, nonprofit organizations, and citizens groups are eligible to receive watershed grants for work on public or private lands. Individuals and state and federal agencies are not eligible to receive funds directly, but can be partners on a project. Grants are typically up to $15,000. *www.watershedmanagement.vt.gov/lakes/htm/lp_watershedgrants.htm.*

Agency of Commerce and Community Development

- **Downtown Transportation Fund Grant Program:** This program is intended for projects that revitalize public space; stimulate public investment; and create a sense of place, identity, and pride in Vermont downtowns. One of the goals for local Vermont downtown organizations is to capitalize on the downtown's assets, inspiration, and potential, ultimately creating good public spaces that will promote healthy communities and create a distinctive first impression of the downtown. The grant is a financing tool that helps municipalities pay for transportation-related capital improvements within or serving a Designated Downtown District. Past projects included parking facilities, pedestrian and streetscape improvements, and utility relocation. Established in 1999 and currently funded at $400,000 annually, the program is one of the primary benefits of the Vermont Downtown Program. The applicant must be a "Designated Downtown," which Montpelier's is, and the capital improvements must be in or serving the downtown district. The maximum grant award is $100,000 with a required 50 percent cash or in-kind match. *accd.vermont.gov/strong_communities/opportunities/funding/downtown_transportation_fund.*

Local Sources

- **City of Montpelier Capital Improvements Budget**: The city's annual budget includes funds for maintenance of the town's infrastructure including streets, sidewalks, and stormwater utilities. Some funding from the city's budget might be available to contribute toward the design options in this report.

- **Montpelier Downtown Improvement District:** Montpelier has a Downtown Improvement District, which collects funds from downtown property owners for holiday lighting and decorations and community arts grants that promote the downtown. District funds have been used for benches and landscape improvements. DID funds are limited; $42,000 was raised last year.

- **Tax Increment Financing:** Tax increment financing districts are available in Vermont as a public infrastructure financing tool. Generally, a tax increment financing district is established by a municipality around an area that requires public infrastructure to encourage public and private property development or redevelopment. The property taxes generated by the property values at the time the district was created continue to go to the taxing entities (municipality and state). Currently, state statute prohibits the creation of any further tax increment financing districts in Vermont, but they might be available in the future.

Non-Profit Sources

- **Lake Champlain and Tributaries Restoration Fund.** Established in 2009 as part of a settlement agreement between Central Vermont Public Service Corporation (CVPS) and the Vermont Agency of Natural Resources (ANR), this fund would be a potential source of funds for river buffer restoration and water quality and habitat improvement projects along the Winooski River. Grants typically range from $5,000 to $25,000 and require a 50 percent match. *www.vermontcf.org/Nonprofits/AvailableGrants/LakeChamplainandTributariesRestorationFund.aspx*