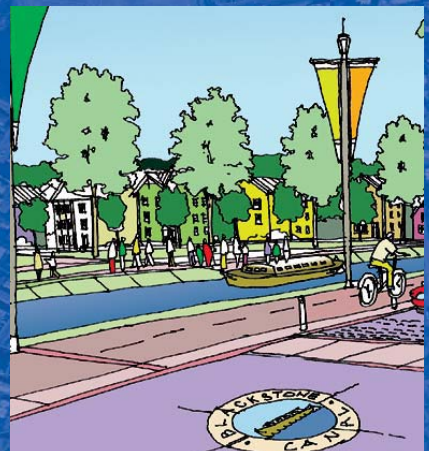
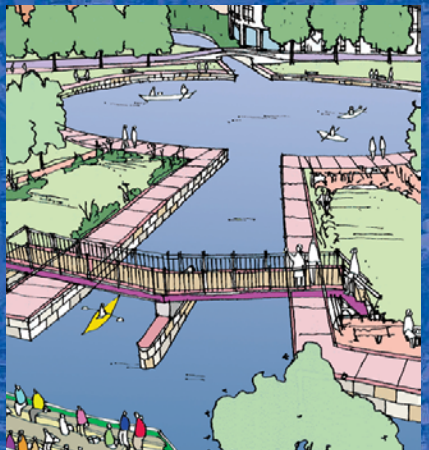
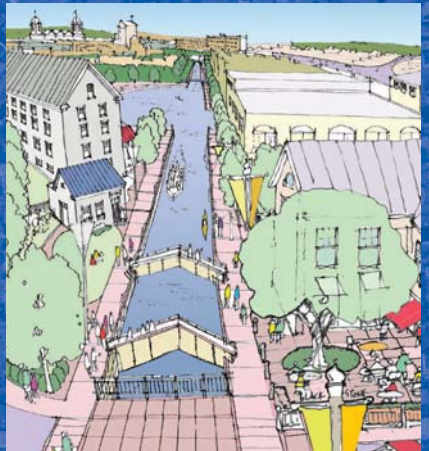
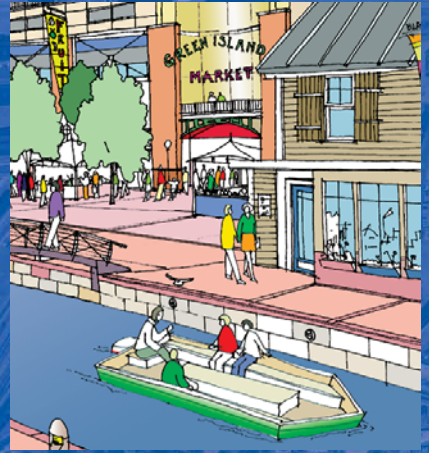


# Free the Blackstone!

A Water Resource-based,  
'Smart-Growth' Urban  
Design Strategy for  
Worcester, Massachusetts

March 2003





# Blackstone Canal Feasibility Study

The City Council of Worcester  
The Honorable Timothy P. Murray, Mayor  
Thomas R. Hoover, City Manager  
Philip J. Niddrie, Chief Development Officer

March 2003

**T**he purpose of this study is to assess the potential impact on the City of Worcester and its neighborhoods, and to expose two of Worcester's most significant natural and historic resources, the Mill Brook and the Blackstone Canal.

The work has involved close communication with the City of Worcester, the Green Island business and residential community and the Blackstone Canal Task Force.

The Plan calls for the integrated implementation of a coordinated set of public and private initiatives that, taken together, will redefine Worcester's historic Canal District, creating a revitalized mixed-use neighborhood and an attractive, water-based urban amenity for the entire city.

A 1878 bird's-eye view of Worcester and the whole of the Canal District.

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# The Opportunity

**W**orcester has a national story to tell. A significant part of that story involves the City's role in the innovation and enterprise that gave birth to the American Industrial Revolution. Recognizing its contribution to this important era in American history, the City of Worcester was made part of the John H. Chafee Blackstone River Valley National Heritage Corridor in 1996.

It was in the late eighteenth century that entrepreneurs first conceived of a canal utilizing the Blackstone River to connect Providence and Worcester. The Blackstone Canal, opened in 1828, helped change Worcester forever, and was the catalyst for the transformation of the City from a shire town to a center of industry. The opening of the canal and the arrival of the railroads in the 1830's brought dramatic growth, and it was the railroads that eventually put the Blackstone Canal out of business in 1848.



Worcester has a decided locational advantage in the heart of New England.



The Canal District, sitting at the head of the Blackstone River National Heritage Corridor and adjacent to major transportation services, is poised to become a new and exciting gateway to the Downtown and all of Worcester.

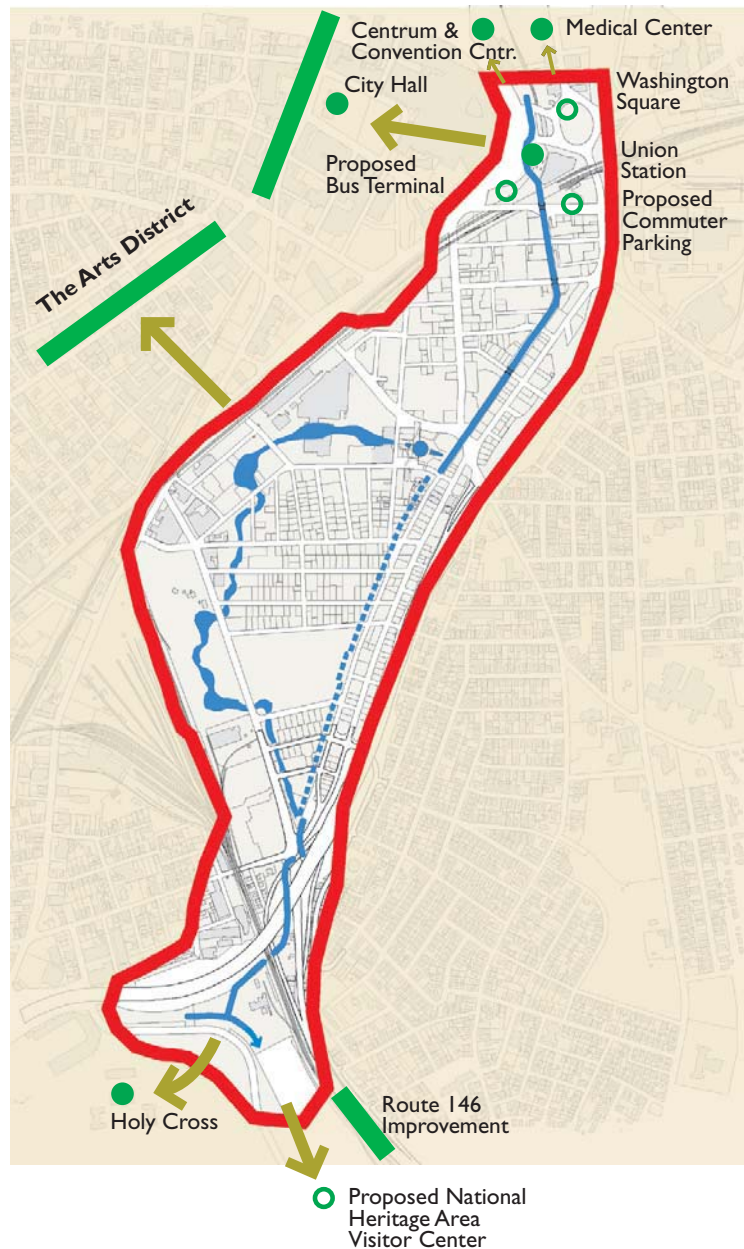
More importantly, the combination of vision, entrepreneurship and access to transportation set the stage for Worcester to come of age as a truly industrial city in the years after the Civil War. The canal and transportation once again can provide the spark to rejuvenate Worcester as we move into the 21st century. In combination with new highway and rail connections, the Blackstone Canal District initiative provides the opportunity to continue a regional tradition of innovation and enterprise and to build a new legacy for future generations.

# The Concept

*"You must dig it up and let it run free once again. 'Free the Blackstone.'"*

David Brower, the first executive director of the Sierra Club, and one of the principal founders of the environmental movement, during his 1992 visit to Worcester, after he was informed that the Blackstone Canal existed, buried under City streets.

## Relationship of Blackstone Canal District to other city initiatives



The Blackstone Canal, which gave birth to this neighborhood, will become the instrument of its revitalization. A recreated canal and Mill Brook will provide a valuable water amenity and a memorable experience for people living, working and visiting the area. It will also serve as the armature for a new type of transit-oriented urban community with an identity that reaches out to the surrounding neighborhoods, institutions and the region.

Worcester's Canal District can become the national model of a 21st Century sustainable community. It has ready access to intermodal transportation, such as the commuter rail at Union Station, the Blackstone River Parkway (Route 146), and bike paths. It also has an abundance of underutilized land ready for reinvestment. With broad support from residents, business owners, and city government, this plan will have a dramatic and positive impact.

Most importantly, the Plan builds on a series of nearby City and institutional initiatives, either implemented or proposed, that reinforce Worcester's urban fabric and quality of life.

## Core Elements

The Plan is grounded in a set of core goals and objectives for the District, established by the Task Force and Community early in the planning process.

1. **Tell the Canal District's story**
2. **Maximize the Canal District's waterfront potential**
3. **Respect the area's historic fabric**
4. **Take full advantage of underutilized parcels of land**
5. **Designate three themed Gateways: Washington, Kelley and Brosnihan Squares**
6. **Establish Kelley Square as a new front door to Worcester and the Canal District**
7. **Organize the Plan around the Canal District's squares, unique settings and water linkages**
8. **Create a pedestrian and bicycle network to and through the Canal District**



Union Station anchors the Northern Terminus area.

### What is Smart Growth?

As defined by the U.S. Environmental Protection Agency, *Smart Growth* is development that "... serves the economy, the community, and the environment." Smart growth invests time, attention, and resources in restoring community and vitality to existing cities and older suburbs. Smart growth principles defined by EPA are consistent with the recommendations of this plan and include:

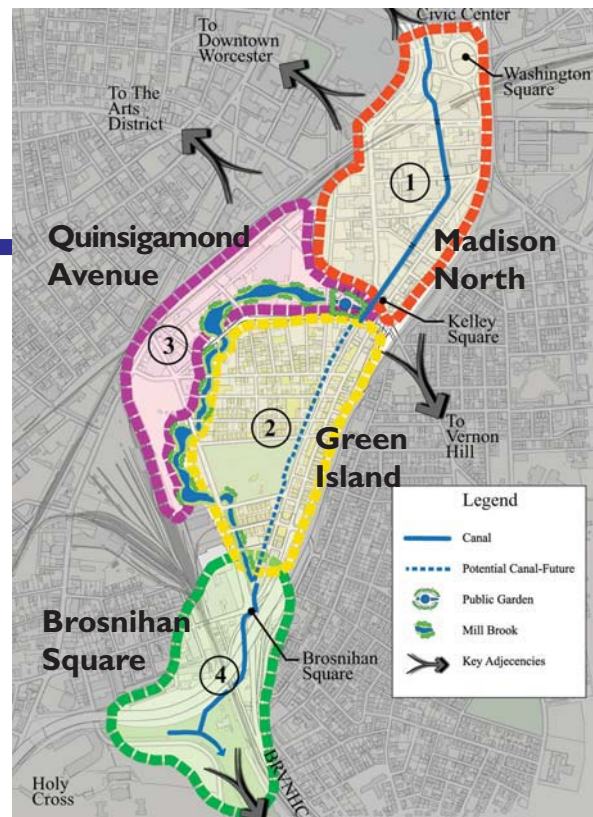
- Mix land uses
- Take advantage of compact building design
- Create a range of housing opportunities and choices
- Create walkable neighborhoods
- Foster distinctive, attractive communities with a strong sense of place
- Preserve open space, farmland, natural beauty, and critical environmental areas
- Strengthen and direct development towards existing communities
- Provide a variety of transportation choices
- Make development decisions predictable, fair, and cost effective
- Encourage community and stakeholder collaboration in development decisions



# The Plan

Based on prior reports, interviews, workshops, field analysis and on-going collaboration with the Blackstone Canal Task Force, as well as a series of public forums, this plan is grounded in a solid understanding of the area's history and its existing conditions. The planning process studied the technical feasibility of daylighting and of re-watering all or portions of the historic Blackstone Canal as it runs through the neighborhood. The market potential of the area has also been analyzed, with and without improvements to the canal.

This Plan, arrived at through a yearlong, community-driven process, establishes a framework for the revitalization of Worcester's Canal District neighborhood. The Plan outlines a vision for this diverse area, from Washington Square to Brosnihan Square, that builds on its unique history, its culture, its strategic location, and the potential water amenity represented by the Mill Brook and the Blackstone Canal. The Plan demands commitment from major public and private ventures and partnerships. The Plan calls for actions that respect and improve the existing neighborhood, its residents, its ongoing businesses and organizations, while re-building the Canal District as a new and vibrant 'smart growth', transit-oriented community. The Plan does not mandate or force specific actions on existing property owners. However, the Plan will serve as an agent for action, inspiration and evaluation of individual initiatives, both public and private, proposed in this community in the future.



## Canal District Sub-areas

### Canal District Sub-areas

The study identified four sectors, each of which has its own set of physical, social, land use and economic characteristics, and consequent issues and opportunities. These are indicated in the diagram above.

#### Sector 1- Madison North

From Washington Square/ Union Station to Kelley Square

#### Sector 2- Green Island

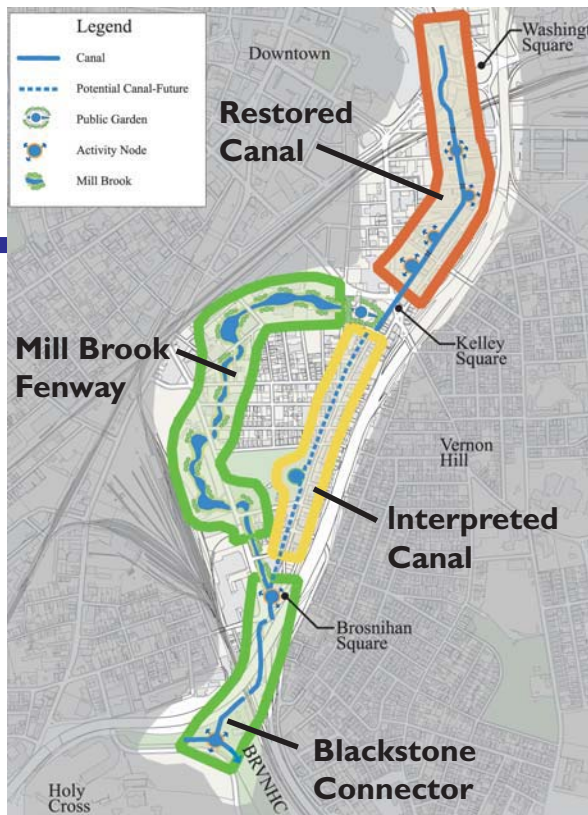
From Kelley Square to Brosnihan Square

#### Sector 3- Quinsigamond Avenue

Wyman Gordon properties and the area west of Quinsigamond Avenue

#### Sector 4- Brosnihan Square

Brosnihan Square to the Middle River



*For any investment of public funds on the Blackstone Canal to have major and lasting economic impact, the project should be of the scale and vision of the original construction project laid out in the early 1800's.*

## Water Segments

### Water Segments

It is recommended that specific treatments of the historic Blackstone Canal and the Mill Brook system, that run through the Canal District, be developed on a sector by sector basis.

#### Sector 1- Restored Canal

Development of a fully re-created canal, with direct public access unto the water surface, as catalyst for major building reuse and new development.

#### Sector 2- Interpreted Canal

Emphasize an interpreted historic Blackstone Canal narrative landscape down Harding Street, through the use of paving, signage exhibits and banners.

#### Sector 3- A Mill Brook Fenway

Recreate and expand the original Mill Brook setting within a 'Fenway-styled' linear park.

#### Sector 4- The Blackstone Connector

Retain a visible water connection all the way to the Blackstone River.

The revitalization concepts for the Canal District are clear. As with any master plan, this one must be dynamic, with easily understandable goals and objectives. The plan must be flexible and encompass social, economic and physical realities. It must be inclusive, particularly regarding its neighbors and public and private stakeholders.

The Plan assumes a unified strategy for the entire Canal District neighborhood, however, the Plan also recognizes inherent differences within this community, and thus subdivides the District into four distinct sectors. Each sector has its own approach for developing and using its water segment, as part of a comprehensive revitalization strategy. These are introduced below and described in greater detail in the next section - A Tour of the Plan.

# A Tour of the Plan

This section describes a vision of what the plan can bring to the Canal District. While this is an illustrative plan, it also responds to the direction given by the participants at the public forums and workshops as well as by the Blackstone Canal Task Force with regard to the following key issues:

- **‘attitude’**- What is the overall programmatic approach to the Canal District and each of the four sectors? Each of the four sectors identified has a special personality and opportunities.
- **‘appetite’**- How extensive should the plan be? This plan takes an aggressive and active position with regard to the programmatic approach of each sector, as well as reaching out and building links to surrounding neighborhoods, facilities and institutions.
- **‘ability’**- What is the real capability of the City of Worcester, working in partnership with a myriad of federal, state and local programs, community groups, local residents, developers, entrepreneurs and business people, to implement this plan? Dramatic changes are proposed.

This is a comprehensive plan that is comprised of many individual initiatives. Some are larger specific projects. At least one major initiative is identified in each area. Others are reasonable public improvements made in the course of the life of a city. Still others are narrowly defined assistance programs designed to improve the neighborhood economy and overall quality of life of the residents. If realized in a coordinated fashion, as seen in the Illustrative Plan to the right, these projects will provide major public benefit and will change this part of Worcester forever.

This tour generally runs north to south, through **Madison North** and **Green Island** (Sectors 1 and 2) to Kelley Square and then west into the **Quinsigamond Avenue** along Lamartine Street and south down Quinsigamond (Sector 3) to **The Brosnihan Square** (Sector 4).

Although the plan will change as it is implemented over a period of time, this vision demonstrates the full potential of this area and suggests ways in which it might be realized.

## Sector Key Plan







# Sector 1: Madison North

**The Major Canal Renewal Area** - A fully re-created boatable canal, as a catalyst for major historic building revitalization and new development.

It is in this northern area where there are significant tracts of underutilized land and buildings lying close to Downtown that a major City-led Redevelopment Initiative could dramatically alter land use and existing zoning regulations to re-create the canal and act as a catalyst for major building reuse and new development.

Key aspects of this strategy include a number of active waterside developments such as the Water Street Marketplace, the Crompton Loom Works and Lock #48 opportunities, a major public parking facility, and coordination with the Union Station/ Washington Square redevelopment.

## Elements of the Plan

The most significant physical aspects of the plan in this sector are summarized as follows:

### The Water

The Plan proposes a recreated, fully watered canal the length of this section, following the historic route of the Blackstone Canal.

Harding Street was built over the original canal from Union Station to Kelley Square. Currently the canal in this sector is being used to convey combined sewage to the wastewater treatment plant. Since it is not feasible to re-route the sewer infrastructure, the re-created canal would lie over the existing utilities within the Harding Street right-of-way. The canal would have sufficient depth to allow for water craft access and recreational use. The water in this sector would become the primary focus for the activities adjacent to the waterway.

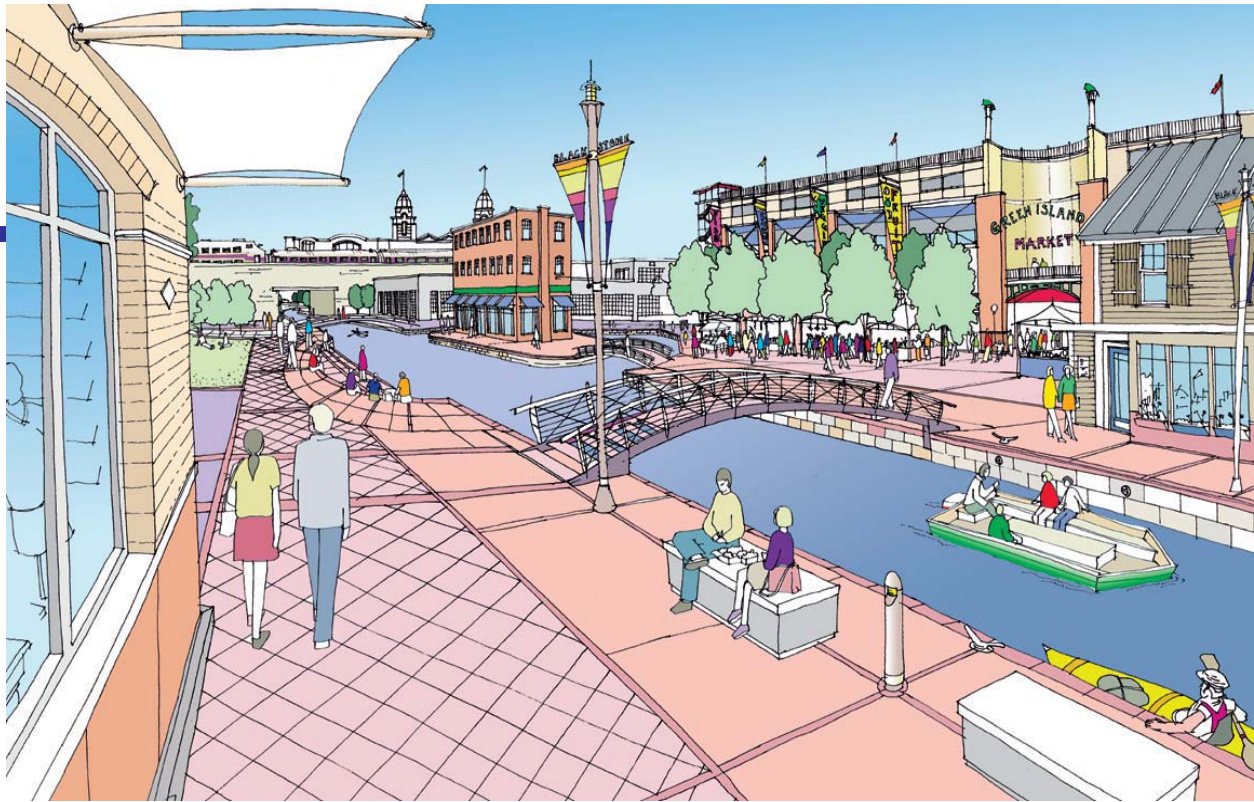


The characteristics of the waterway would vary within this Sector including inlets, pools and locks. Water would flow from an enlarged basin adjacent the Water Street Market Place, past the newly renovated shops and cafes, through the open water area near the Crompton Loom Works, to the recreated Lock #48 just north of Kelley Square.



Northern end of Harding Street





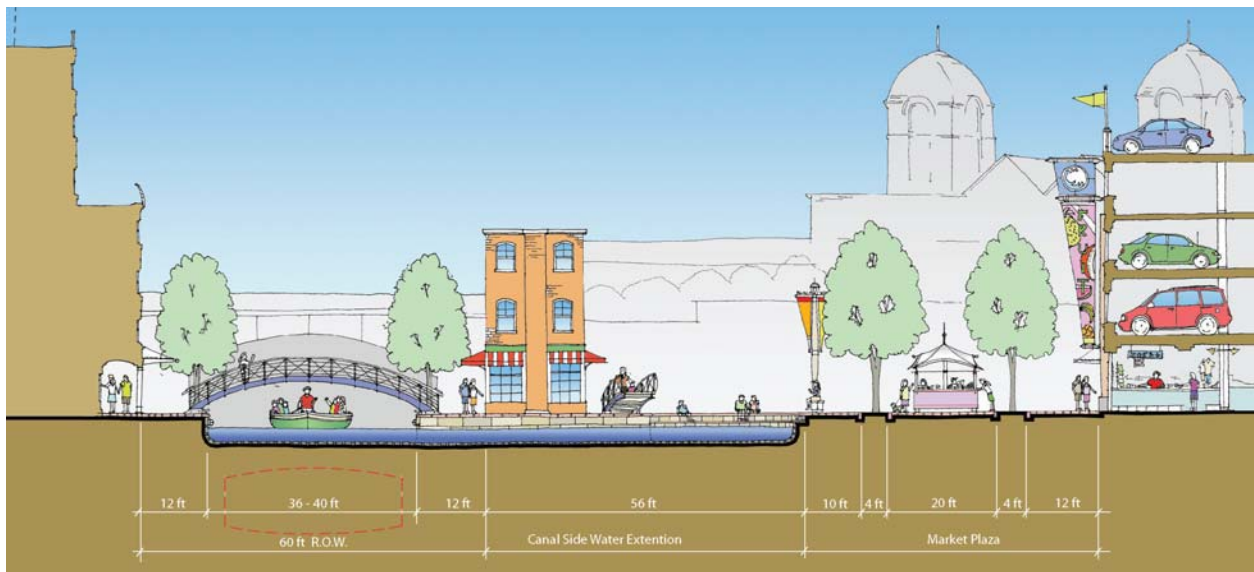
Looking north toward Union Station and the new Water Street Market Place .

### Key Areas

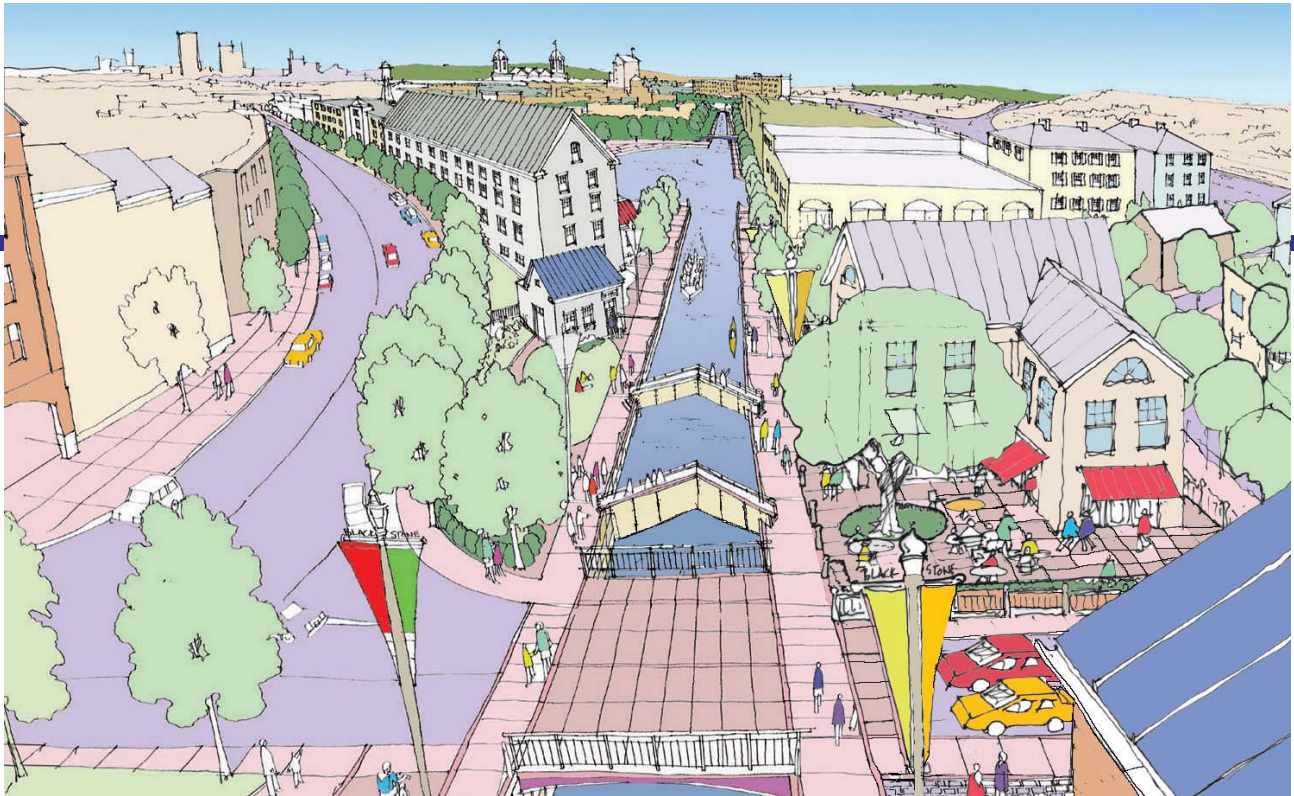
A series of lively public places would line the canal in this Sector.

**The Water Street Market Place** - This is the crowning jewel of the Blackstone Canal Revitalization Plan. It incorporates the Parcel Post property, with ground floor market along pedestrian connections to Union Station and integrated commuter parking.

A new 1200 space parking garage, with ground level stalls and shops, completes this unique canal-side market place. By working with existing market-type businesses, long established in this part of Worcester, this market place would follow the model of Seattle's successful Pike Place Market. The market place could also spill out into nearby existing historic buildings, such as the ground level of the former Heywood Mill and across the canal to the former Patrick Motors site as mixed-use development.



A section through the new Water Street Market Place and Canalside Plaza.



Looking north from Kelley Square past the re-created Lock #48 toward Crompton Loom Works and Pond, with Union Station in the distance

**Washington Square Turning Basin Area-** On the northern edge of the market place next to the elevated railway would be the start of boat tours down to Lock #48 at Kelley Square. A connection would exist between the Canal District with the proposed bus terminal, Union Station, the Worcester Common Outlets Mall, and parking structure, and potentially along a reconstituted Front Street to City Hall and Main Street.

**Presmet and Chevalier Sites-** The canal plan should accommodate their continued operations, as well as other existing businesses along the Canal, while maintaining options for the future redevelopment of this area.

**Crompton Loom Works-** Private mixed-use redevelopment of this historic mill complex would be enhanced by the expansion of the canal way into a larger basin in this area. The plazas on either side of the basin would give existing properties a new front door retail terrace on the water.

**Lock #48 Canal-** On the edge of Kelley Square, a water-filled, but non-operating Lock #48 re-creates the Blackstone Canal's final backwater. A reconfiguration of Madison and Green Streets in Kelley Square could free up land to realize a mixed public/private redevelopment in this important interpretive setting around Lock #48.



Green Street at Crompton Loom Works



### Circulation

The plan components would significantly enhance pedestrian access and circulation within this sector. Expanded sidewalks, crosswalks and pedestrian bridges across the canal would offer an attractive and safe environment for pedestrians and minimize conflicts with motor vehicle traffic. The plan shifts through-traffic from Temple Street to Winter Street and maintains existing traffic flow connections to Grafton Street east of I-290 and north to Washington Square. Through traffic functions on Harding Street would be relocated to Green Street, which has adequate reserve capacity and offers additional opportunities to strengthen connections across Worcester Center Boulevard to downtown Worcester. Vehicle loading functions would be maintained along Harding Street, with off-peak access, to service businesses in this area. Bridge crossings for vehicle traffic would be provided at Franklin Street, Winter Street and Harrison Street.



The Plan allows for a pedestrian-oriented public way along the main Canalway, while meeting the needs of through-traffic, and, via loop-streets, parking and service vehicle circulation.

### Neighborhood Fabric

Water Street and Green Street are important commercial streets where investment in streetscape and parking improvements, coupled with reinvestment incentives, are recommended. Streetscape improvements are also proposed for cross streets leading down to the new canal area.

## Alternative Futures

As stated earlier, there are many ways that the physical plan can be finalized to achieve the overall goals and objectives of this effort. As planning moves to the next level, alternative approaches to specific public improvements in Sector One would include:

### Kelley Square reconstruction to favor

- Madison Street **vs.**
- Green Street

### Canal re-creation as

- Long, open water and navigable water sheets, with several existing cross streets (Pond, Temple, Franklin) closed **vs.**
- Shorter, shallow, block-long water sheets, retaining all existing cross streets

### Harding Street

- Maintained alongside the re-created canal **vs.**
- Eliminated with new 'loop' streets behind canal-side development

### Connections

- Continue the canal, via existing Harding Street tunnel, under the elevated railroad **vs.**
- No canal connection under rail lines

### Public Market/Garage Structure

- Single, large, combined facility, spanning a closed Temple Street **vs.**
- Two separate facilities

These decisions would be made as part of a more detailed Sector One plan, in full cooperation with the City and sector stakeholders.

## Sector 2: Green Island

**Neighborhood Revitalization** - Historic rehabilitation programs are combined with revitalization opportunities for today's residents and neighborhood businesses. Develop an interpretive corridor along Harding Street which would highlight the historic Blackstone Canal alignment.

Green Island - the residential heart of the Canal District - should be treated with respect, focusing City initiatives on preserving and revitalizing the existing physical fabric and improving conditions for today's residents and traditional neighborhood businesses.

The canal would not initially be re-watered in this area, however its historic alignment down Harding Street should be highlighted and interpreted.

### Elements of the Plan

The most significant physical aspects of the plan in this sector are summarized as follows:

#### The Water

Harding Street was built over the original Blackstone Canal, and the Green Island neighborhood, including its commercial spine, was developed independently of the canal. It is recommended that the general approach to the canal in this sector should be to celebrate and interpret the canal, but not to attempt to re-water sections within the original right-of-way along Harding Street. However, if there is support for such action by abutting property owners, this policy could be amended to re-water between Kelley and Grabowski Squares, for example, as part of a public/private partnership.



Typical Three-Decker Street



Grabowski Square (Looking north)

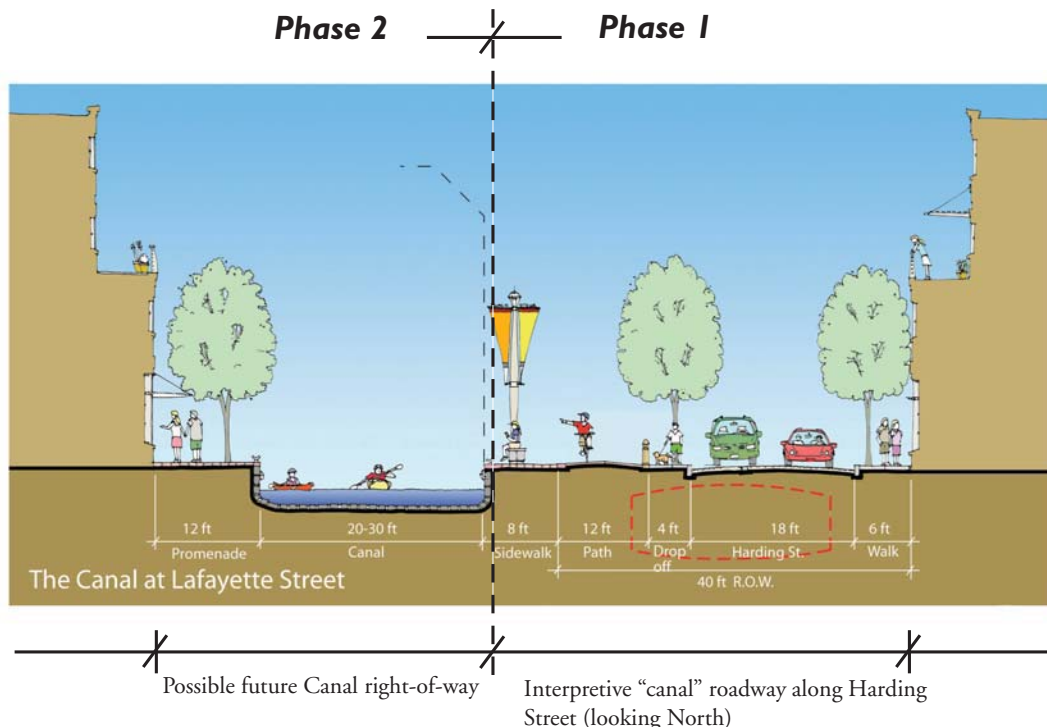




Looking northwest across Harding Street toward the proposed interpretive canal at Crompton Park

An story-telling canal setting would be developed along Harding Street and in Crompton Park linking the proposed Mill Brook fenway back to the interpretive canal across Crompton Park. From there, water re-enters the system and, depending on flow requirements, either recycles or continues southward to the Blackstone River.

Having Crompton Park as the primary neighborhood/ civic area in this sector provides for an opportunity to include interpretive aspects within the park that highlight the early canal era and the history of the Green Island area. With the interpretive canal along Harding Street and interpretive exhibits within Crompton Park, this sector serves as the historic centerpiece of the Canal District.



## Key Areas

These are neighborhood oriented places.

**Grabowski Square-** The Square would be enlarged and refurbished as a neighborhood square. If, in the future, the canal re-creation were extended south into this area, a turning basin could become the focus of revitalization and redevelopment efforts.

**Crompton Park-** The plan proposes an authentic re-creation of a section of the 1820's soft bank canal and a reconstruction of its first boat, the *Lady Carrington*. As the Mill Brook fenway project progresses, one possible way to reconnect the Brook to the Blackstone Canal may traverse the public land of this park.

## Circulation

This sector would incorporate two strategies to accommodate circulation (see *Tech Memo #2: Circulation, and the plan illustration on the facing page*). Between Kelley Square and Grabowski Square, Harding Street can be closed to through traffic with vehicles rerouted onto the nearby Washington Street. This roadway has sufficient excess capacity to serve this function. Madison Street, between Washington Street and a reconstructed Kelley Square, would complete this routing. This segment of Harding Street can be developed as a pedestrian corridor, with a strong connection to new pedestrian amenities at Kelley

Square and cross-street vehicle access at Lamartine and Lafayette Streets.

South of Grabowski Square, vehicle traffic would be maintained on Harding Street as the continuation of Washington Street in a one-way southbound roadway, maintaining the traditional pairing with northbound Millbury Street. Roadside design treatments can include sections of widened sidewalk, bicycle paths and/or angled parking. The travel way would be narrowed to slow vehicle speeds and establish a pedestrian-friendly corridor.

## Neighborhood Fabric

This neighborhood of three-deckers needs intensive attention in terms of rehabilitation assistance, infill housing initiatives and streetscape improvements. The Mill Brook fenway, described in Sector 3, page 16, would define the neighborhood edges to the north and west with a green buffer from larger scale development on the neighboring mixed-use parcels.

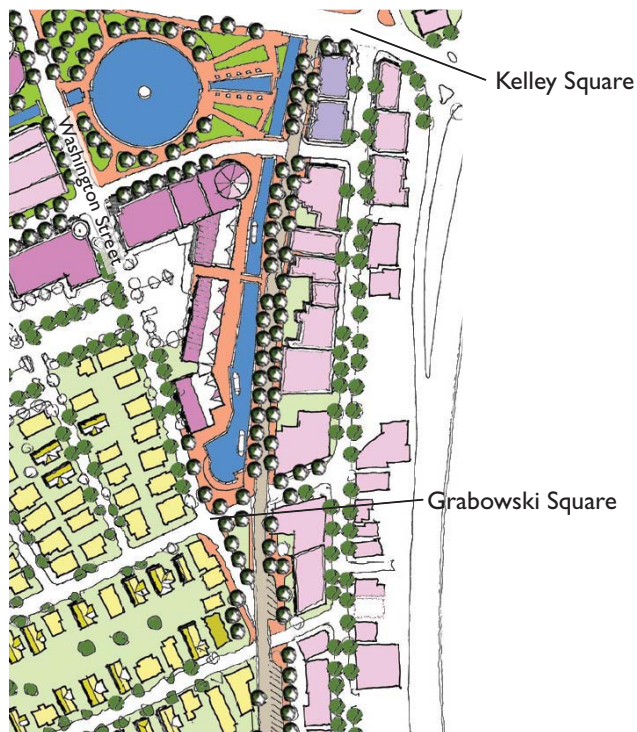
The revitalization effort should be directed at renovation of the outstanding stock of historic three-decker homes, new infill and affordable housing on vacant lots, and neighborhood business assistance programs. Uses such as auto repair and body shops, used car lots and car wash facilities, which are typically not compatible with residential uses, could be encouraged to relocate and zoning should be adjusted to exclude businesses of this type in the future.



Harding Street looking south at Crompton Park



As residential population increases, the City could consider reopening and expanding the former elementary school in this area, or opening a branch library. Millbury Street is an important commercial street where investment in streetscape and parking improvements, coupled with reinvestment incentives, are recommended.



Harding Street between Kelley Square and Grabowski Square can easily be connected to pedestrian orientation by rerouting southbound traffic onto Washington Street.

## Alternative Futures

Alternative approaches to specific public improvements in Sector 2 include:

### Grabowski Square

- Extend the re-watered Blackstone Canal into the Square **vs.**
- Clean-up and enhance existing open space.

### Harding Street

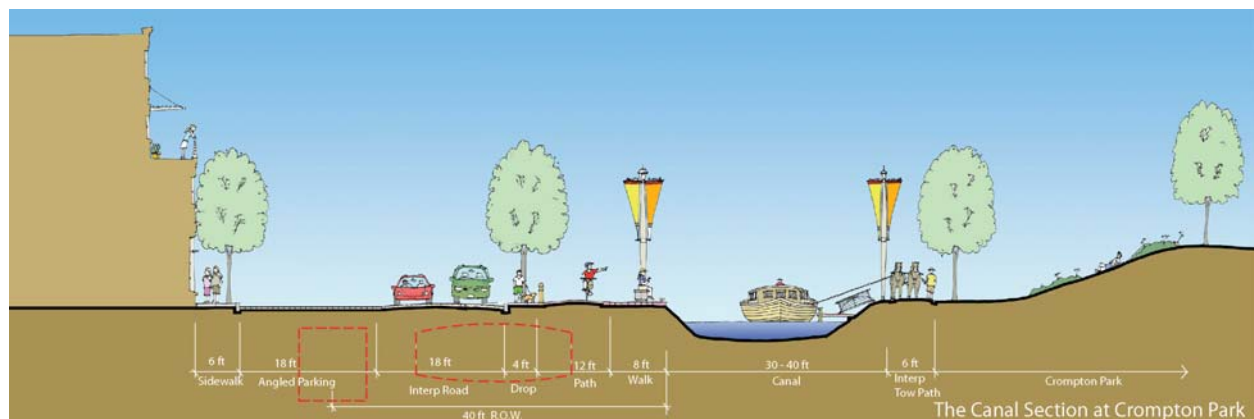
- Rebuild Harding Street with slight alteration to the present configuration, with new street elements and paving patterns that interpret and celebrate the historic canal right of way **vs.**
- Realign and narrow Harding to allow a 12-foot wide multi-purpose (bike and pedestrian) path along the western side of the right of way.

### Crompton Park

- Surface interpretation **vs.**
- Reconstruction of a sample section of the original earth-banked canal alongside Harding Street.

### Mill Brook/Fenway Re-creation

- Traverse the neighborhood through Crompton Park, **vs.**
- Locate along the edge of the Neighborhood and avoid Crompton Park.



Interpretive canal in Crompton Park (Looking South)

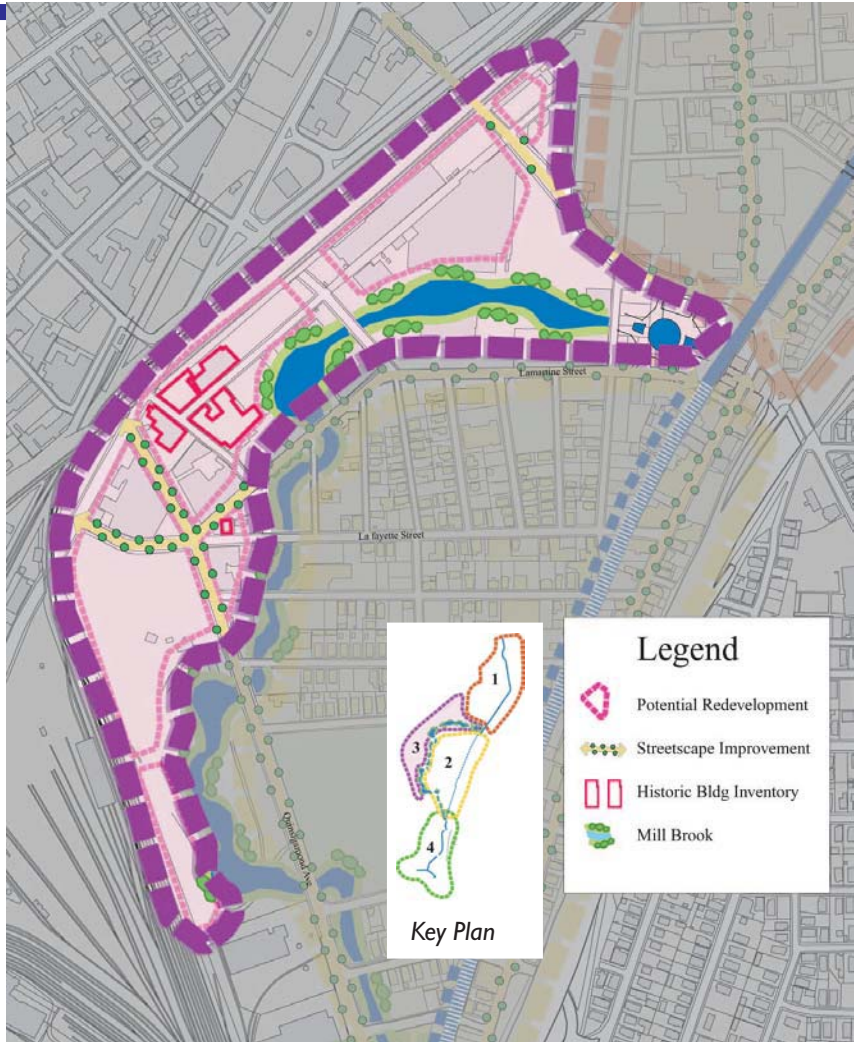
## Sector 3: Quinsigamond Avenue

**Fenway Redevelopment Area** - Establish Kelley Green as an entry to a major 'campus-style' redevelopment within a fenway-styled linear park that follows the route of the original Mill Brook.

Once the proud site of major industries, this part of the Canal District is presently largely abandoned. Given its proximate location to downtown and transportation, its block-sized vacant sites and its limited number of owners, major 'campus-style' redevelopment (residential, corporate or institutional) could happen here.

The water theme could be expanded into this area with the recreation and expansion of the original Mill Brook set within a fenway-styled linear park, paralleling Lamartine Street and Quinsigamond Avenue. This 'river reconstruction' effort might be part of an alternative storm water treatment pilot program, wherein the water is cleansed by natural aeration, sunlight and plant/bacteria filtration. There may be federal funds to support this.

In many ways a redesigned Kelley Square is central to this plan, and can become a dramatic front door to Worcester. It is in the center of the Canal District and could be the keystone to redevelopment and revitalization in all directions.



### Elements of the Plan

The significant aspects of the plan in this sector are summarized as follows:

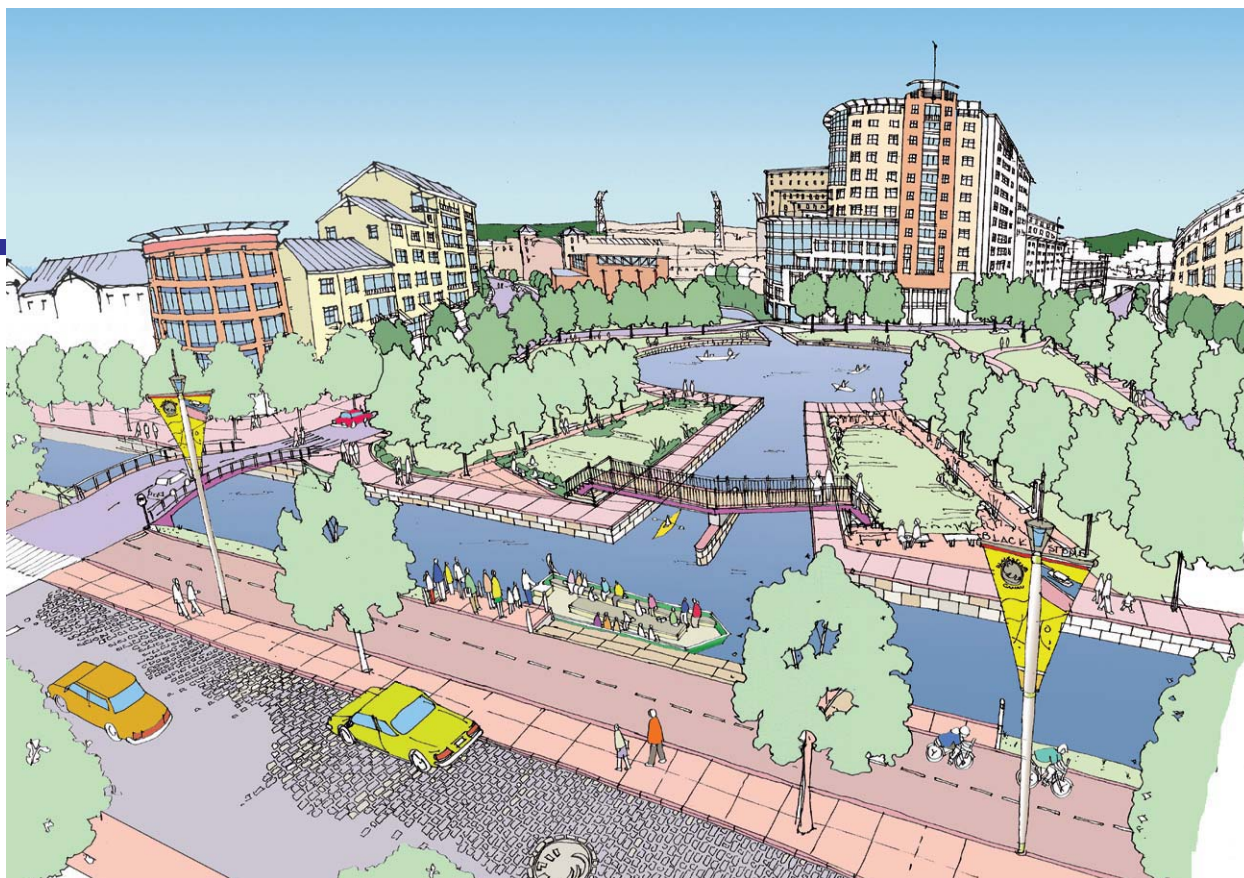
#### The Water

Historically, the Mill Brook meandered through what are now both residential and undeveloped parcels. A naturalistic replication of the Brook is proposed for this sector. In order to replicate the Mill Brook, a naturalistic and meandering water-

way is proposed for this sector. The intent of the Mill Brook fenway is to create an amenity for the neighborhood by providing water and green space. A potential benefit from the natural fenway is treatment of storm water by improving water quality. This could be undertaken using public funds to demonstrate alternative storm water treatments and accelerate private development along its banks. Alternatively, it could

be made an approval requirement for future private development. By providing a natural channel, the fenway can remove total suspended solids, nutrients and other pollutants from the storm water. The intent would be to provide a natural attraction and access to the banks, but not provide water craft access to the waterway itself.





Looking west at the new Kelley Square Green, the centerpiece of the Canal District

### Key Areas

**Kelley Square-** It is around this central location that this master plan is organized and it is in this area that individual sector plans merge to create a renewed and seamless Canal District fabric.

As part of a complete overhaul of this intersection, Kelley Green is envisioned as a block-sized public garden at the very entry to downtown Worcester and in the heart of the Canal District. It is the historical place where the Mill Brook swung west-

ward and the canal continued south to complete its more direct connection to the Blackstone River.

This area could include a segment of the restored canal and celebrate the water heritage of this area through the creation of a large circular basin, a place for year round community activities. Kelley Square and its new open space would serve not only as a new front door to Worcester, but also as the front yard of major new development at its edges. As with Boston's Public Garden, private investment and subsequent rise in property values immediately around the Square would more than underwrite this investment. Lock # 48 sits along the northern edge of the reconfigured Kelley Square.



Kelley Square Intersection Improvements will facilitate vehicular, pedestrian and bicycle traffic through this area



Looking west up Madison with the proposed Kelley Green site at far left





Alternative 1: Redevelopment as residential, institutional or business park (private sector orientation)



Alternative 2: Redevelopment as linear park supporting public uses and social agenda (e.g. multi-purpose sports complex, public school, affordable housing)

**Water Plazas-** The Mill Brook fenway could be configured such that a number of basins are constructed as water amenities at key development locations within this area. As with the basin at Kelley Green, private investment and subsequent rise in property values immediately around this amenity will more than underwrite this investment.

**Southbridge Sargent Manufacturing Historic District -** Redevelopment of this grouping of historic buildings would be integrated into the Quinsigamond Avenue Fenway plan, whether it is for public or private use.



### Circulation

Lamartine Street and Quinsigamond Avenue form the framework for circulation in this area. The circulation plan for this sector is to provide vehicle access along the periphery on Quinsigamond Avenue and to protect local streets to the east within the Green Island neighborhood to achieve slow speeds and a pedestrian environment. An attractive pedestrian path and recreational bikeway could be designed to interlace with the expanded Mill Brook linear park.

### Neighborhood Fabric

With the exception of the Southbridge Sargent Manufacturing District, the area along Lamartine Street and Quinsigamond Avenue is comprised primarily of vacant and underutilized land. Commercial strip development along Madison Street threatens the physical cohesiveness of the Green Island neighborhood today and the core potential of a heritage-based revitalization strategy for the entire Canal District. The potential is highest here for re-knitting these communities together through canal-related public improvements and private development partnerships.

## Alternative Futures

As noted before, there are many ways that the physical plan can be finalized to achieve the overall goals and objectives of this effort. Alternative approaches to specific public improvements in Sector 3 include:

### Mill River Alignment

- A large loop generally north of Lamartine Street and west of Quinsigamond Avenue to encourage redevelopment of the most outlying parcels **vs.**
- A tighter loop within Green Island.

### Redevelopment Strategy

- Public/Private partnership along the Mill Brook Fenway, focused on large scale residential developments and/or a series of corporate and/ or institutional campuses **vs.**
- City/State/Federal partnership to develop a regional linear park, with major public recreation complexes, schools, and mixed use market/ affordable housing development.



Demolition activity on the now-vacant Wyman-Gordon site

## Sector 4: Brosnihan Square

**Blackstone Connector** - A new park at the junction of I-250 and Rte 146 extends the linear park (Fenway) concept all the way to the Middle/Blackstone River, with bike and walking access southward to Quinsigamond Village, the new Visitor Center and Holy Cross.

From Route 146, this area is a gateway to the Canal District with Brosnihan Square at its center. It lies between the Canal District and the Middle and Blackstone Rivers.

A new park setting would beautify this entry area and tie the Canal District and all of Worcester directly into the John H. Chafee Blackstone River Valley National Heritage Corridor.

While a water connection down to the Blackstone River may be problematic, given the need for crossings at Quinsigamond Avenue and the active rail lines in the area, efforts should be made to coordinate the current Route 146/ Brosnihan Square improvements and any future rail upgrades to allow this to happen in the future.

### Elements of the Plan

The most significant aspects of the Plan in this Sector are summarized as follows:

#### The Water

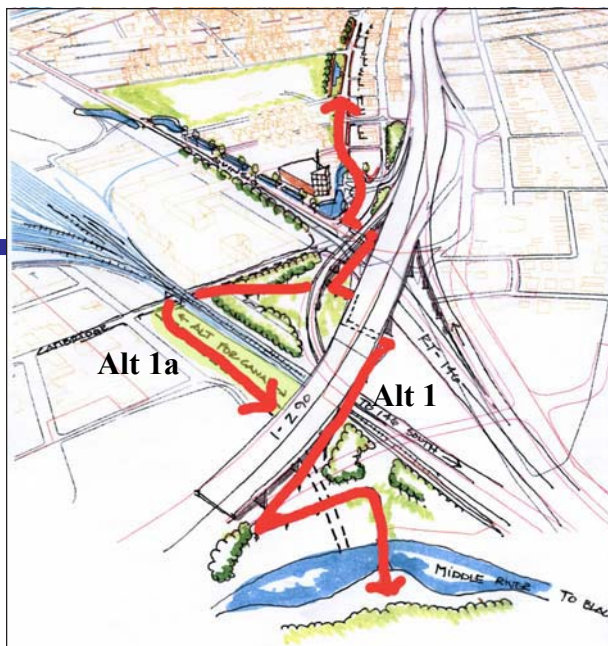
The waterway within this sector is recommended to be a natural channel that provides both aesthetic and water quality benefits. With numerous undeveloped, limited access parcels the potential exists to provide a corridor that highlights the Blackstone Canal and Middle River. Improvements in this area could include recreational activities and amenities, green space, and open water, thereby creating the an attractive entry to the Canal District.



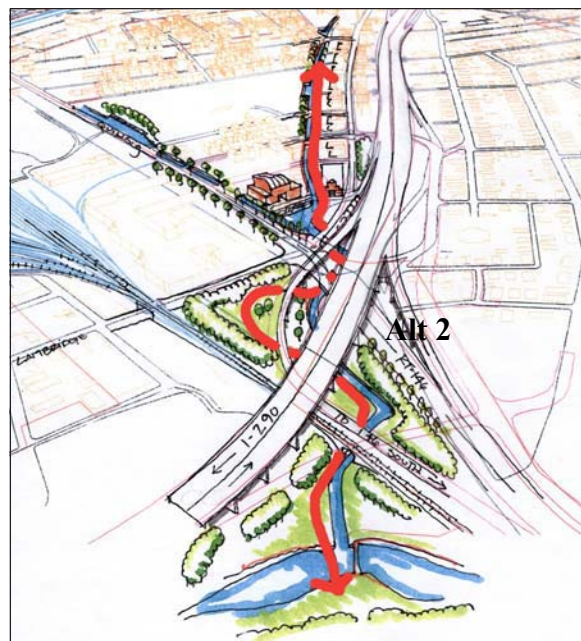
Due to the water surface elevations in the Middle River and the potential for flooding as a result of backwater from the Middle River, it is not recommended to provide a hydraulic connection from the new Mill Brook or Blackstone Canal to the Middle River. What is recommended is to create the appearance of a connection between the two waterways without physically or

hydraulically connecting the two. This could be done by creating waterways on both sides of the railroad and/or Quinsigamond Avenue that are not connected beneath the roadways. This would create the appearance of a connection without creating the potential for increased flooding in the Canal District.





**Alternative 1:** New linear park with outrigger bike/pedestrian path over railroad (looking north) or **Alternative 1a** in new park along Kansas Street via Cambridge Street



**Alternative 2:** New connecting park with canal and multi-purpose path extension under railroad to the Middle/Blackstone River (looking north)

### Key Areas

A new park, constructed as part of the Route 146/ I-290 interchange, as an extension of the Quinsigamond Ave. Gateway would connect the Canal District and Worcester to the Blackstone River, thus completing a vital link of the Blackstone River Valley National Heritage Corridor. A designated bike/ pedestrian link is a critical part of this parkway.

### Circulation

The key circulation objective for this sector is to ensure that adequate and safe pedestrian and bicycle provisions are integrated with the Mass Highway plan for the I-290 interchange. The multipurpose path which is a part of the interchange should provide a seamless transition across Brosnihan Square and into the Canal District. The path's proposed routing and at-grade crossings should be reviewed with regard to their optimal location to increase pedestrian and bicycle activity. In addition, the feasibility of widening the Cambridge Street underpass should be explored.

### Neighborhood Fabric

Limited access highways, arterial streets, and a major railroad right of way define the character of this key entry point to the Canal District. Creation of a greenway park, with a dedicated pedestrian/bikeway link to the Blackstone River Bikeway brings a new image to the area.

## Alternative Futures

Again, there are many ways that the physical plan can be finalized to achieve the overall goals and objectives of this effort. Alternative approaches to specific public bike/pedestrian rail crossing improvements in Sector 4 include:

### Bike/pedestrian rail crossing

- An outrigger bridge on I-290, **vs.**
- Widen the Cambridge Street underpass and acquire park land south of the rail lines, **vs.**
- Connecting the park in conjunction with a re-created canal segment.



Entering the Canal District, looking north at Brosnihan Square.

# Feasibility

Three key questions were asked at the outset of this planning effort.

## **I. What are the key factors that would compel the City to invest time, energy, and money into reinventing this water resource?**

The Top Ten list to the right highlights the opportunities. Taken together, they offer Worcester and its residents a once-in-a-lifetime opportunity to enhance the image and the experience of this often overlooked, but very livable New England city. Key to success is the long range potential created for investment in redevelopment by private and institutional sectors, including: waterside mixed-use and entertainment venues; a major, in-town “Market-Place” next to Union station; infill housing; neighborhood businesses; and large-scale, mixed-use residential, institutional or corporate campus development.





## Worcester's **Top Ten Reasons** for making a major redevelopment commitment to the **Blackstone Canal District**

### **10 The Canal District is at the geographic center of the New England market**

New England continues to be one of the most populous and wealthy regions in the United States and the City should capitalize on this geographic position in every way possible.

### **9 Tap the energy of nearby research and institutional employment centers**

The higher education centers of Boston, Worcester, Providence and New Haven attract international High Tech enterprises, which offer new economic opportunities.

### **8 Use the area's excellent highway accessibility to the advantage of the City**

These include Interstate-290, the Massachusetts Turnpike and soon, the limited access Route 146 connector, with easy on/off access into the District.

### **7 Take advantage of nearby Amtrak and bus service hubs**

The beautifully restored Union Station is on its northern edge, with Bus, Commuter Rail, and Amtrak service to Boston and the nation.

### **6 Make the Canal District a catalyst for strengthening downtown**

Acres of underutilized land and hundreds of thousands of square feet of vacant industrial space lie directly adjacent Downtown, key cultural/convention sites and transportation opportunities.

### **5 Build on the Canal District's proximity to the nationally significant Blackstone Valley Heritage Corridor**

The historic Blackstone Canal and the John H. Chafee Blackstone River Valley National Heritage Corridor link Worcester to Providence.

### **4 Use the water of the Mill Brook watershed and its aquifer to improve the environment**

The area sits in the one place in Worcester where there is ample water to recreate and amplify the historic canal and to create a variety of contemporary water-related settings and experiences, with a focus on environmentally friendly ('green') improvements.

### **3 Create a new "front door" to the City**

The proposed redevelopment of Kelley Square, centered on safer circulation, a new public garden and the historic Blackstone Lock #48, can become part of a dramatic and beautiful 'Front Door' to Worcester, from major points east, south and west, providing a positive first impression.

### **2 Enhance the attractiveness and marketability of adjacent City Initiatives**

Redevelopment will complement and reinforce several other significant current projects, including the Union Station/ Washington Square Redevelopment; The Main Street Arts District; on-going Downtown Initiatives; and the Quinsigamond Village Visitors Center projects.

### **1 Strengthen and reinforce the vitality of the Canal District's walkable, human-scaled neighborhoods**

Over the past 150 years, the residents and business owners in the Canal District neighborhoods have built, protected, and preserved a strong sense of community with a rich multi-cultural heritage. The opportunity to reinforce this heritage and to provide new economic opportunity will have a positive impact on the Canal District and the entire City of Worcester.

## 2. What is the scale of Public Investment?

The Plan will require a substantial and long-term commitment from the City of Worcester and support from the public and private sectors. The conceptual estimate of costs, found in Appendix 4, is summarized in the box to the right by planning sector.

### Investment by Phase

Phasing of this Plan is discussed in the next section: Implementation. Given the size and complexity of this effort, the Plan envisions an early action/start-up period with two implementation phases spanning the next twenty years. The costs are re-summarized below by Phase and Sector, in millions of dollars:

Phase	Yrs.	Sector 1	Sector 2	Sector 3	Sector 4	Total
<b>IA</b>	0-5	22.9	1.0	2.1	4.0	<b>30.1</b>
<b>IB</b>	6-10	11.8	5.1	8.6		<b>25.4</b>
<b>2</b>	11-20		4.2	10.7	4.1	<b>19.0</b>
		<b>34.7</b>	<b>10.3</b>	<b>21.4</b>	<b>8.1</b>	<b>74.5</b>

The amounts shown in these figures include base costs plus 12% for planning, engineering and design, as well as a 25% contingency, appropriate given the twenty-year implementation schedule.

Early Action funding is included in Phase 1a and will be critical to meeting the overall funding needs of the Plan.

### Sector 1: Madison North

Water: Creating the Canal \$ 9.8 Million

Key Areas: Union Street Turning Basin, Water Street Market Place, Crompton Loom Works Yard, Lock #48, and associated plazas. \$ 16.5 Million

Circulation/Parking: \$ 7.9 Million

Other Related Costs: streetscaping and mitigation, and other miscellaneous costs \$ 0.6 Million

### Sector 2: Green Island

Water: Interpretive Segment \$ 4.0 Million

Key Areas: Grabowski Square, the Crompton Park Canal Boat Setting \$ 0.7 Million

Circulation/Parking: \$ 4.5 million

Other Related Costs: streetscaping and mitigation, and other miscellaneous costs \$ 1.1 Million

### Sector 3: Quinsigamond Gateway

Water: Re-create Mill Brook and grassy banks \$ 2.7 Million

Key Areas: Kelley Green and Fenway Water Plazas \$ 6.8 Million

Circulation/Parking: \$ 11.4 Million

Other Related Costs: streetscaping and mitigation, other miscellaneous costs: \$ 0.6 Million

### Sector 4: Blackstone Connector

Water: Connection to the Middle River \$ 0.5 Million

Key Areas: new Connector Park to River \$ 3.8 Million

Circulation/Parking: \$ 3.3 Million

Other Related Costs: streetscaping and mitigation, and other miscellaneous costs: \$ 0.5 Million



### 3. What are the economic benefits to the Canal District, the City and its residents?

Overall the region is strong and can support the level of revitalization described in this plan, if it is properly implemented. In the long term, the region's strength in medical services and research bode well. Recent information suggests that Worcester is becoming an important satellite of the Boston economy.

The Blackstone Canal Revitalization Plan and its related infrastructure rebuilding projects will provide a variety of direct economic benefits estimated as follows at canal build-out:

- New real estate development: \$70 million, of which \$45 million is fully non-subsidized market supportable development
- Temporary Jobs(construction): 687 jobs; salaries \$ 34.4 million
- Permanent Jobs (office and retail)  
Office: 120 jobs; salaries \$ 4.8 million annually  
Retail: 230 jobs; salaries \$ 4.6 million annually
- Job capacity: Office salaries: \$4.8 million annually
- Long-term Retail: 230; salaries: \$4.6 million annually
- Annual new retail expenditures: \$15 million
- Annual direct tax revenue to Worcester: \$1.7 million, with net present value exceeding \$17 million

This effort compares very favorably with a number of other successful waterfront areas developed across the country in the past decade, as seen in the comparables table below.

Benefits of Comparables	Cost	Benefits	
		Economic Impact (\$)	Jobs
Providence , Rhode Island- Riverfront	\$425M	Over \$1 B (direct and indirect)	3000 construction jobs
Indianapolis, Indiana- White River State Park—Indianapolis Waterfront Upper canal revitalization	\$111M	Combined public and private investment over \$669M	Not available
Richmond , Virginia- Richmond Canal Walk	\$500M	Increase in tourism revenue by \$60M over 10 years	6000 jobs
		New tax revenues of \$10M	

There are a number of equally positive “quality of life” benefits for Worcester and its residents, which are not so easily quantified:

- The City obtains a new “Image”, featuring a new waterfront with market place, arrival gateways, and a reputation for advanced thinking in sustainable development;
- The quality of life of new and existing Canal District residents is greatly improved;
- There will be an increase in adjacent property values, with better development opportunities for current business and property owners;
- There will be an increase in taxes paid by properties outside the new development area;
- Services and amenities are improved for all-residents, college students, workers and visitors;
- Other revenue is achieved from improved business operations outside the direct area, including property tax, income tax, use tax, new jobs created in operations and improvements;
- State funds may return to the City, including, education grants which are currently \$211 million per year, and funds from new income tax paid by new residents and employees from jobs created.

At the local, state, and national level, this plan represents an important “smart growth” initiative that reuses, reinforces and protects important natural, historic and cultural resources. It builds on the work of the National Park Service, and the Blackstone River Valley National Heritage Corridor Commission. It complements and completes the redevelopment of the historic Union Station. It represents an important project for transportation improvements and enhancement programs, including Commuter Rail development. The plan takes on, in a rational fashion, important issues of environmental clean-up and alternative sewer treatment strategies. It creates an exciting and walkable urban place.

Earlier generations developed a bold vision and demonstrated a willingness to invest in that vision to build a city with a rich cultural, historical, and entrepreneurial legacy. Is today's city prepared to create a new legacy for future generations?

# Implementation

## Stakeholders

The Rizzo team has held a series of meetings since the project was kicked off in May of 2002. The first two public meetings were well attended by a mix of local residents, business owners, community activist, and City officials. In addition to the large public meetings, the team met with many of the local stakeholders individually and in small groups to get more detailed information about their needs and concerns. Our third public meeting was attended by approximately 100 people. At that time, the team presented the proposed concept plan and went into break out sessions to discuss the ideas in greater detail. The spirit at the break out sessions was upbeat and constructive. Reaction to that meeting was positive, as was noted in the Telegram & Gazette's coverage of the meeting in the following day's paper. Subsequent to the public meetings, briefing sessions were held with the Mayor's Task force on the Blackstone River Valley National Heritage Corridor to discuss coordination with the proposed Visitor Center and possible funding strategies for both projects. Ultimately, it is the commitment of the community and City of Worcester that will realize a successful conclusion to this endeavor.

## Phasing

The plan envisions an early action/start-up period with two implementation phases, spanning the next two decades. Key aspects of each are listed below.

### Phase I

#### **Phase 1a: Early Action (Year 1)- Planning, Coordination and Building Excitement**

- Designate development entity
- Coordinate with current projects
- Undertake detailed Master Plan
- Establish stakeholder agreements
- Land Disposition Agreements
- Select start-up projects

#### **Phase 1b: (Year 2 -10) Implementation of Catalyst Projects**

- Secure Key Funding (Canal/ Market Place/ Kelley Square)
- Establish Canal/Mill Brook programming and design
- Undertake Market Place programming and design
- Select Phase One Projects- Public and active private projects

### Phase Two (Year 10+) Attaining Critical Mass

- Establish Development and Management Agreements
- Implement Phase Two Projects

## Implementation by Sector

As seen in the sub-sector diagram below, each sector may be further subdivided into Redevelopment/Revitalization sub-sectors, generally on a block-by-block basis, considering ownership and physical programmatic factors. Detailed planning and individual projects would be done through a public process, as part of an ongoing Public/Private Partnership initiative.

### Sub-Sector Diagram





## Funding

The public infrastructure improvements envisioned in this plan could be funded by a variety of federal, state and local sources. In general, attention should be paid to:

- Re-examining projects within the area that are already funded, but do not have their programs or designs solidified. These include the transportation and parking improvement projects around each of the three primary squares. On the private sector side, the coordinated redevelopment of the Patrick Motors site, the Heywood property and the former Crompton Loom Works could be advantageous to all.
- Identifying transportation related projects with a strong economic development component, in order to take advantage of emerging “smart growth” opportunities being promoted by the current administration.
- Promoting specific economic development projects, such as the Water Street Market or even a recreation complex, for local and state bonding initiatives. Such projects represent real investment opportunities that should produce sustainable returns on investment.
- Seeking demonstration and alternative technology grants for green projects such as the Mill Brook Fenway.
- Partnering with the private and not-for-profit sectors in realizing public spaces and improvement programs in conjunction with adjacent real estate development.

The City should re-examine its own funding priorities and programs for scheduled improvements within the area, such as educational, cultural, and sports facility siting. The City should also consider the use of innovative zoning and public policy-making to facilitate and insure private development consistent with the study’s master plan.

Funding for the implementing entity, as well as for detailed sector development plans, to be drafted in close collaboration with the sector stakeholders, should be expedited. This is essential to maintaining momentum for this endeavor.

## Key funding programs:

Many important programs could apply directly to this work. A partial list includes:

- The **Federal Highway Administration’s T2 I** funding program for enhancement projects remains one of the chief sources of funds for physical improvements that help support economic development, including canal/waterway re-creation.
- Since the canal is an integral part of the watershed, the **Federal EPA and HUD** have watershed protection programs are able to fund additional studies and some improvement with grants in the \$800,000 range.
- **Local and State Bond Bills**, despite current fiscal constraints, remain a primary funding source for special projects such as the Public Market.
- **Transit oriented development** is an emerging development incentive initiative that should be pursued by the City or the city group that is proceeding with the implementation of the Canal plan.
- **Tax Incremental Financing (TIF)** remains a useful tool in assisting a municipality to undertake a public project to stimulate beneficial development or redevelopment that would not otherwise occur. Taxes generated by the increased property values pay for land acquisition or needed public works.
- **Development incentives** are available for a blend of market and affordable residential development, both of which are key to establishing the long-term sustainability of the area. One important tool in this area is **Federal tax credits**. The key incentive share is that the developer can sell the tax credits, usually at 50% of value, obtain financing up to 100%, and achieve tax-exempt bond financing rates, which are generally lower than average mortgage rates.

With regard to land assembly, municipalities have used a number of strategies short of outright acquisition to insure that individual development is consistent with the Plan. These include block-by-block private owner/developer driven assembly strategies, land swaps, interim tax abatement programs, creation of special districts, equity participation, zoning incentives, to name a few.

An array of funding options is detailed in the appendix under funding in Appendix #3. Given the early planning stages of the project, all options should be considered.

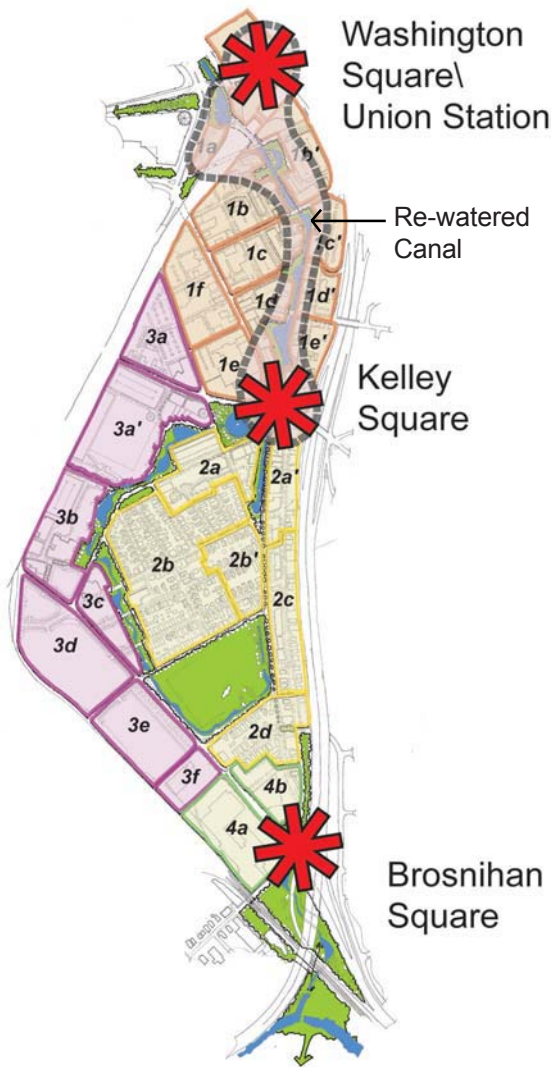
# Action Agenda

Once an interim or permanent Development/Implementing body is agreed upon, **three initial tasks** are clear:

## 1. Detailed Implementation Plan

Develop detailed master plans for each of the four Sectors described above, working in close coordination with each sector's "stake holders".

### Priority Project Areas



## 2. Sector I Focus

Concentrate building and funding efforts on implementing **Sector I: Madison North**, with a major focus on securing public funding for the creation of the full canalway from its northern terminus at Union Station to Lock #48 and Kelley Square. While it is recognized that individual choice and economic conditions will be a significant factor in implementing key parts of the Plan, initial priorities have been established as follows:

- 1) Top priority is the construction of the canal segment from Franklin Street to Winter Street, coupled with the development of the proposed Water Street market and Garage, including the Parcel Post Building and the lower levels and approaches to Union Station, (Parcel 1b).
- 2) Next, coordination of planned transportation improvements north of Franklin Street, including Washington Square and the new bus terminal, including the possible extension of the recreated canal under the elevated railway, through the Harding Street Tunnel into a major terminus closer to the downtown core.
- 3) Finally, extension of the canal from Winter Street southward to the location of Lock #48, the last lock on the original Blackstone Canal, including related street and intersection improvements in the area. This work would be coordinated with improvements to the Kelley Square intersection, and the redevelopment of the historic Crompton Loom Works site.



### 3. Three Key Gateways

Focus attention on three top priority traffic/ parking projects which have been identified and which, individually and together, if properly executed, will enhance the full potential of this urban design opportunity for Worcester. These include proposed or recommended traffic and parking improvements in the Canal District's three "Gateway" squares, identified early in the planning process. Two of these, Washington Square and Brosnihan Square are underway, and thus particularly critical because they have upcoming planning, design and decision making deadlines.

- a) **Kelley Square:** Its redevelopment can give the City a real "Front Door"; bind the Canal District back together; and re-create the District's most significant historic canal area at Lock #48 and the split of the Mill Brook and the canal.
- b) **Washington Square:** Its coordinated redevelopment will reopen direct links between the Canal District and Downtown: provide the parking and destination improvements to realize the deferred dream of Union Station; and create an active Worcester waterfront on par with that found in Providence, Lowell, Indianapolis, or San Antonio.
- c) **Brosnihan Square:** Coordinated planning and design efforts in conjunction with current highway design activity in this area can reconnect Worcester and the Mill Brook directly to the Blackstone River. Its development as part of the linear park that is the Blackstone River Valley National Heritage Corridor will open up biking and footpaths from Worcester to the region.

These are a few first steps.

The way is clear.

**FREE THE  
BLACKSTONE!**



The first voyage of the *Lady Carrington*





# ***Appendices***

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## **Technical Memoranda**

- 1) The Water
- 2) Circulation
- 3) Implementation
- 4) Conceptual Cost Analysis
- 5) Comparable Projects
- 6) Community Liaison Activities





# ***Appendix I***

## ***Tech Memo #I - The Water***

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# Tech Memo #1

**To:** File

**Fr:** Cynthia Baumann, P.E.

**Re:** **Blackstone Canal  
Stormwater Feasibility Analysis**

**Dt:** December 12, 2002  
Revised June 13, 2003

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This memorandum summarizes the analysis that has been completed for the feasibility of water supply for the Blackstone Canal feasibility study in Worcester, MA. The project consists of recreating a portion of the Blackstone Canal and Mill Brook located in the Green Island area of Worcester. It is proposed that the existing closed Mill Brook conduit be daylighted and used for recreation and esthetic benefits. This analysis includes water quality, supply, and storage of water intended to be used within the proposed project. The analysis will be separated and described in four project sectors. The following sections outline several water use options available for each sector of the proposed Canal.

## **Overall Project Assessment**

A comprehensive analysis of the water supply and distribution was performed based on the total volume of water needed for the proposed project. The following summarizes the overall approach for supplying water to the entire system including the recreated canal and fenway area. This will be followed by a description of each project sector and how water is being introduced and provided in that portion of the system.

The hydrologic and hydraulic analysis was based on the following information:

- The headwaters for the tributary area for the Mill Brook conduit is at Indian Lake.
- The annual drawdown of Indian lake is six to seven feet. Based on a water surface area of 200 acres and a drawdown of six feet, the volume of water released during the fall drawdown is approximately 400 million gallons.



- Based on the plan for the Green Island area and a water depth of three feet within the water features, the volume required to fill the proposed water system is 17.2 million gallons.
- Based on a flow rate of 0.5 feet per second in the 40 feet wide by 3 feet deep canal, the flow within the proposed canal is estimated at 27,000 gallons per minute (gpm). The current design includes recycling 2/3 of the flow volume using a pumping system and supplying 1/3 of the flow with new water from storage and withdrawal facilities.
- During the droughts and dry periods it is assumed that the various components of the water system (pumping, storage, recycling and flow conditions within the canal) will operate at approximately 2/3 of the design.
- The analysis for supplying water via groundwater wells was determined not to be feasible due to quantity of water required to fill the water system, the number of pumps required to provide the continual flow within the canal, and the permitting and regulatory requirements associated with such a large groundwater withdrawal system.

The following describes the water supply, storage and quality for the overall project:

#### Water Supply

Due to the urbanization of the Worcester area, water supply was the critical hydrologic issue. The primary source of water for the initial filling of the water system is recommended to be the water from Indian Lake during the fall drawdown. There is sufficient volume of water during the drawdown of Indian Lake to fill the entire water system.

Once the canal is operating, the water level in the canal will be maintained by combining recycled canal water with “new” water. “New” water will be added to the system by four means: treated storm water runoff from the Quinsigamond CSO treatment facility (QCSOTF), flow from the fall drawdown of Indian Lake, pumping from the Middle River to the headwaters of the Green Island water system, and recycling of water that has been treated by the Mill Brook/Fenway.

As part of the supply system, pumping and storage systems have been included at the headwaters (near Union Station), at the beginning of the Mill Brook/Fenway section (near Washington Street), and at the Middle River (near I-290). At the two northern locations it is proposed that flow will be withdrawn from the Twin Box conduit to supply water to the proposed water system. At the Middle River location it is proposed that water will be taken from the Middle River and pumped to storage within the system.

#### Water Storage

In order to provide a constant base flow to the proposed canal, water storage systems are being recommended at the head works (near Union Station) and within the proposed Kelley Green water feature. Water from the twin box conduit, Middle River and Kelley Green will supply water to these storage facilities in order to maintain a base flow in the recreated canal. The water flow within the Mill Brook/Fenway will be maintained by a low flow outlet from Kelley Green. It is recommended that flow through the Mill Brook/Fenway system be discharged to the existing drainage infrastructure near Crompton Park. By utilizing these two storage systems and a recycling system, the amount of new water needed from the supply is minimized.

Table 1 below summarizes the advantages and disadvantages associated with each of the water system components that have been evaluated.

**Table 1      Water System Components Summary**

		<b>Advantages</b>	<b>Disadvantages</b>
<b>Supply</b>	Groundwater	-water quality	-deplete potable supply -permitting issues -source availability
	Storm water	-large quantities	-water quality -storage required -periodic droughts
<b>Storage</b>	Single buried tank and pumping system	-one system	-O&M -large system -difficult installation -large area required -access to system
	Multiple buried tanks and pumping systems	-manageable systems -easier installation -increased water quality	-increased O&M -access to system
	Single above ground tank and pumping system	-simple installation -access to system components	-visibility -siting issues
<b>Quality</b>	Bar racks	-remove large objects	-O&M
	Baffle walls	-remove smaller floatables	-O&M
	Tank sumps	-remove solids	-O&M -requires volume
	Water Quality Chambers	-remove solids	-Large bypass flow

### Water Quality

The concern with collecting and recycling of the canal system water is the quality of the water over a period of time. Floatables and suspended solids can discolor water, impede water ways and make the water esthetically unpleasing. The recommended plan includes water quality measures within the canal system in order to control suspended solids, floatables, and other



pollutants by installation of floatable control devices at storage tank inlets or outlets and solids control measures within storage tank systems. These controls will increase maintenance costs because of the periodic cleaning of the water quality control devices. Some typical water quality control devices include screening, bar racks, baffle walls and water quality chambers. Adding fresh water from the Indian Lake drawdown or from the QCSOTF during wet weather periods will also help improve water quality within the system by providing total flushing of the system annually at a minimum.

The following provides a more detailed description of the hydrologic and hydraulic aspects within each Sector of the project:

### **Sector 1 – Madison North**

Sector 1 which starts at Washington Square south and extends to Kelley Square consists of an open canal system, pools and a recreated lock. Harding Street was built over the original canal from Union Station to Kelley Square. Currently the canal in this sector is being utilized to convey sanitary sewerage to the wastewater treatment plant. Since it is not feasible to reroute the sewer infrastructure, the recreated canal is being proposed over the existing utilities within the Harding Street right-of-way. The canal would have sufficient depth to allow for water craft access and recreational use. The water in this sector becomes the primary focus for the other uses adjacent to the water way.

The characteristics of the waterway would vary along the length by providing inlets, pools and locks. Water will flow from Washington Square under the train tracks, through a small pool near Union Station Market Place, by the newly renovated shops and cafes, through the open water near Crompton Loom Works, to the recreated Lock 48 just north of Kelley Square.

#### Water Supply

The volume of water required to fill and operate Sector 1 can be supplied by water drained from Indian Lake, which is partially drained every year. The quantity of water required to fill this section of the canal system has been determined to be approximately 1.7 million gallons (MG). This assumes a constant canal/river width of 40 feet and depth of 2 feet for 2,870 linear feet with 6 in-line river pools that vary in area with a depth of 2 feet. The quantity of water required to operate the canal system on a daily basis with a constant velocity of 0.5 feet per second is approximately 26 MGD or 17,950 gallons per minute (gpm).

The water used to fill and operate the canal can be provided initially by water from the drawdown of Indian Lake and for the rest of the year by periodic rainfall events. The option to use storm water to supply the canal system would require upstream flow control and recycle pumping. The existing canal and Mill River conduit is located downstream of the Indian Lake and Salisbury Pond. Indian Lake has a flow controlled discharge which feeds water to Salisbury Pond. During storm events rainfall runoff is fed to the Mill River conduit from these two water

bodies. Proper flow control devices could be placed at the headworks of the canal (near Washington Square) to divert the necessary baseflow to the canal system.

Recycling of the canal system water will be necessary during the dry periods of the year when the frequency of storm events are at a minimum. Recycling of the canal system base flow will require water storage and pumping systems to capture and recycle water to upstream discharge locations.

### Water Storage

Water storage and pumping systems can be utilized to minimize the amount of water required to operate the open canal system by recycling the water already in the canal. These tanks can be buried or built above ground depending on the available area and esthetic concerns. Above ground storage is more cost effective than buried tanks due to the structural requirements and installation costs. Buried tanks are beneficial because they do not require ground area and are out of sight.

Pumping systems will be utilized to recycle water to and from the canal system via storage tanks. Pump and water storage options consist of single and multiple pump systems. One option would include a single buried storage tank and pumping system located downstream on the proposed open canal system near Kelley Square and pump stored recycled water to one or several upstream discharge locations. A second option would be to place an above ground tank at the head of the open canal and have a series of pumps recycle water from Kelley Square to the tank. Water from the tank would flow out to the canal by gravity at a controlled rate.

### Water Quality

The concern with the collecting and recycling of the canal system water is the quality of the water over a period of time. Floatables and suspended solids can discolor water, impede water ways and make the water esthetically unpleasing. A solution is to provide water quality measures in the canal system. This can be done with floatable control devices at storage tank inlets or outlets and solids control measures within storage tank systems. These controls will increase maintenance costs because of the periodic cleaning of the water quality control devices. Some typical water quality control devices include screening, bar racks, baffle walls and water quality chambers. Adding fresh water each year from the Indian Lake controlled discharge will also help with the quality of water.

## **Sector 2 – Green Island**

The Green Island sector includes an interpretive canal setting along Harding Street and in Crompton Park. If recreational programs allow and public interest concurs, the proposed Mill Brook/Fenway could link back across Crompton Park to the interpretive canal in Harding Street. If property owners along Harding Street and/or if residents identify the desire to create a canal in



this sector, the canal could be replicated adjacent to Harding Street as a private/public partnership with the abutting property owners.

A second aspect of the conceptual design in this sector incorporates interpretive features in Crompton Park. With the park as the primary neighborhood/civic node in this sector, the opportunity exists to include interpretive aspects that highlight the canal era and historic aspects of the Green Island area. These interpretive aspects within the park would compliment the interpretive canal along Harding Street and allow this sector to serve as the centerpiece for historic Green Island.

#### Water Supply

Within Sector 2, from Kelley Square south to Brosnihan Square, open water is proposed around the west, south and east sides of Crompton Park and a new canal is proposed adjacent to Harding Street from Kelley Square to Grabowski Square. The quantity of water required to fill this section of the canal system has been determined to be approximately 1.1 million gallons (MG). This assumes a constant canal/river width of 30 feet and depth of 2 feet for 2,540 linear feet. The quantity of water required to operate the canal system on a daily basis with a constant velocity of 0.5 feet per second is approximately 19 MGD or 13,470 gallons per minute (gpm).

The water supply for the recreated canal should be tied into Sector 1 to the north. At the downstream end of this canal, water from Sector 2 should either be discharged to the existing Mill Brook Conduit to the south or recycled to the Kelley Green at the headwaters of the Mill Brook/Fenway. Water could be recycled in this sector using the same pumping method mentioned in Sector 1.

#### Water Storage

Water storage is not needed in this section and will be tied to the overall storage for the project. The pumping facilities needed in this Sector are similar to those needed in Sector 1 for recycling of the canal water..

#### Water Quality

Also as with Sector 1, the concern with collecting and recycling of the water is the quality of the water over a period of time. The water quality measures utilized in Sector 1 will serve as the water quality devices for Sector 2.

### **Sector 3 – Quinsigamond Avenue Gateway**

The historic alignment of Mill Brook meandered through the residential and undeveloped parcels along the western edge of Green Island. In order to replicate the Mill Brook, a naturalistic and meandering waterway is proposed for this sector. The intent of the Mill Brook fenway is to create an amenity for the neighborhood by providing water and green space. A potential benefit from the natural fenway is treatment of storm water by improving water quality. By providing a

natural channel, the fenway can remove total suspended solids, nutrients and other pollutants from the storm water. The intent was to provide a natural attraction and access to the banks, but not provide water craft access to the waterway itself.

### Water Supply

The water amenities within Sector 3 begins with a water feature at Kelley Green and then consists of a series of channels and pools of water that would gravity flow from Kelley Square west and then south to Crompton Park. The quantity of water required to fill this section of the canal system has been determined to be approximately 1.3 million gallons (MG). This assumes a constant canal/river width of 30 feet and depth of 2 feet for 2,950 linear feet. The quantity of water required to operate the fenway system on a daily basis with a constant velocity of 0.5 feet per second is approximately 19 MGD or 13,470 gallons per minute (gpm).

Water supply for this sector will be regulated by Kelley Green. The recommended plan includes the addition of storm water at Kelley Green from the Mill River Conduit in Washington Street just north of Lamartine Street. Kelley Green will serve as a storage facility and feed water to the Mill Brook/Fenway as well as to the headwaters of the canal near Washington Square. By recycling water from Kelley Green to the headwaters at Washington Square, a constant flow will be maintained in the canal during the drier months.

### Water Storage

It is not recommended to provide storage within Sector 2 except that within Kelley Green. Two options exist for at the downstream end of Sector 3 near Crompton Park; a pumping system could be installed to supply the headwaters at Washington Square with treated storm water or the water from the Mill Brook/Fenway can be discharged to the existing storm water conduit in Harding Street and conveyed to the Blackstone Canal within the existing infrastructure.

### Water Quality

Kelley Green at the headwaters of Sector 3 serves as a water quality facility by allowing sediment to settle out of the storm water. Also, the natural components of the fenway (vegetation, pools, riffles, etc) provide water quality treatment and polishing of the storm water. As a result, Sector 3 does not include any structural water quality measures.

## **Sector 4 – Blackstone Connector**

The waterway within this sector is recommended to be a natural channel that provides both recreational and water quality benefits. With numerous undeveloped, limited access parcels the potential exists to provide a natural corridor that highlights the Blackstone Canal and Middle River. Improvements in this area could include recreational activities and amenities, green space, and open water, therefore creating the gateway to the Green Island area.



Due to the water surface elevations in the Middle River and the potential for flooding as a result of backwater from the Middle River, it is not recommended to provide a hydraulic connection from the new Mill Brook or Blackstone Canal to the Middle River. What is recommended is to create the appearance of a connection between the two waterways without physically or hydraulically connecting the two. This could be done by creating waterways on both sides of the railroad and/or Quinsigamond Avenue that are not connected beneath the roadways. This would create the appearance of a connection without creating the potential for increased flooding in the Green Island area.

### Water Supply

Sector 4, which goes from Crompton Park south to the Middle River, is the last sector of the project. Beginning with at Brosnihan Square, water flows south to discharge into the Middle River. The quantity of water required to fill this section of the canal system has been determined to be approximately 0.7 million gallons (MG). This assumes a constant canal/river width of 30 feet and depth of 2 feet for 1,560 linear feet. The quantity of water required to operate the canal system on a daily basis with a constant velocity of 0.5 feet per second is approximately 19 MGD or 13,470 gallons per minute (gpm).

Water supply in this sector may be provided by the discharge from Sector 3 or from pumping from the Middle River. The main concern with this sector is the physical connection to the Middle River. Based on the water surface elevations in the Middle River, it is not recommended that the newly created channel in this Sector be hydraulically connected across the railroad and Quinsigamond Avenue. If a connection is made, flooding may increase within the Green Island area due to the higher water surface elevation in the Middle River. The appearance of a connection can be made by proposing water on either side of Quinsigamond Avenue without having a physically connection under the roadway.

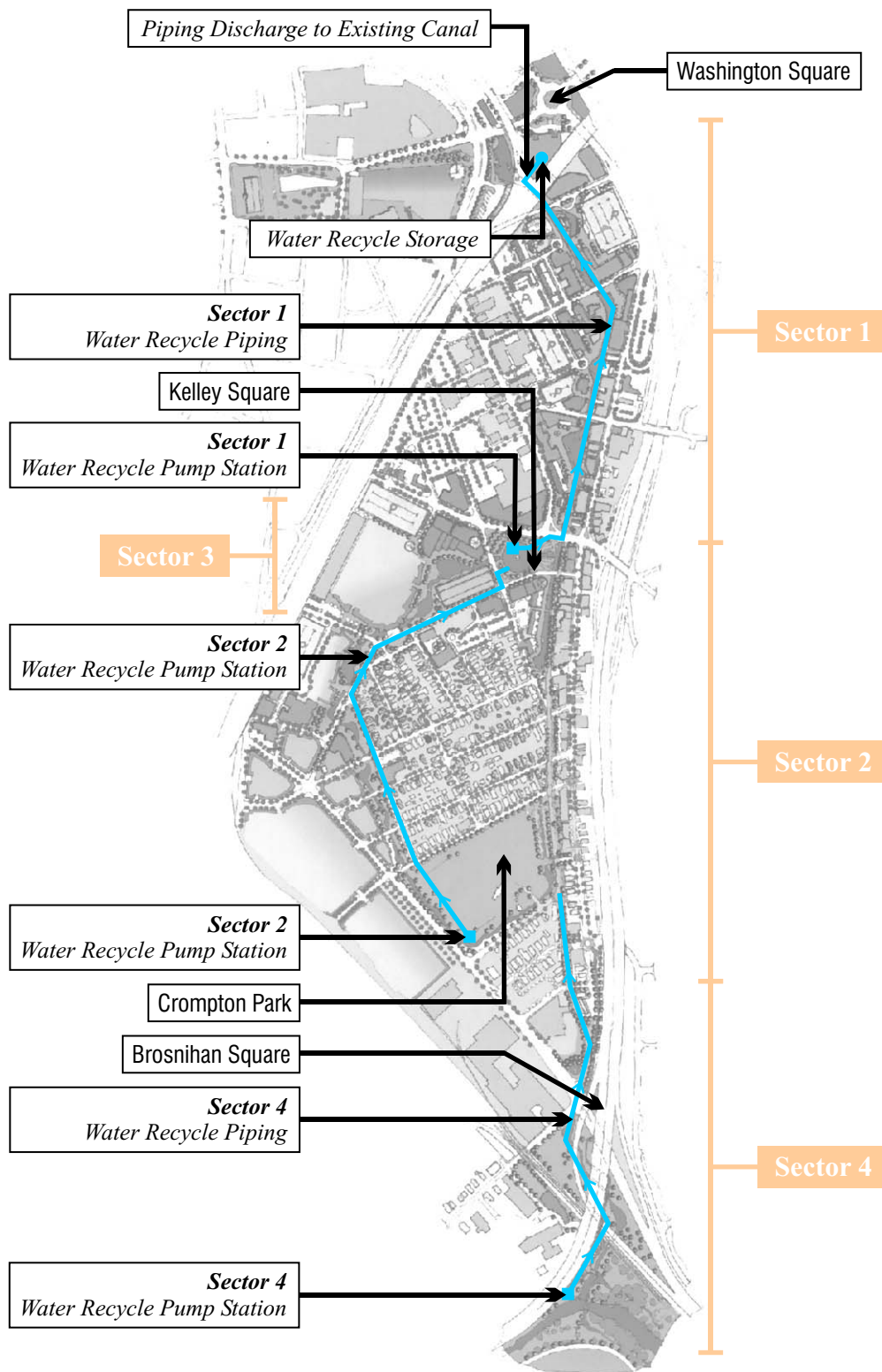
Based on this, the lower portion of the water within this section can be connected to the Middle River, allowing the river to backflow into the channel. The newly created water features north of Quinsigamond Avenue could either be supplied by the flow from the Mill Brook/Fenway or pumped water from the Middle River.

### Water Storage

As with the other Sectors, water storage may consist of water storage tanks and a pumping system to recycle the water up to Brosnihan Square. Water may be taken from the Middle River and pumped up to Brosnihan Square where it can then be recycled within the northern portion of this sector.

### Water Quality

The only water quality measures required in this sector are those associated with the Middle River pumping facility, which may be similar to those used in other sectors. At the beginning of Sector 4 there is a water fountain that may be used for water quality purposes as well, the sediment in the water may be filtered out before being recycled into the fountain and the mixing incurred by the fountain will help with water quality.



Not To Scale

Blackstone Canal Feasibility Study  
Worcester, Massachusetts





## ***Appendix 2***

### ***Tech Memo #2 - Circulation***

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## Tech Memo #2

**Fr:** Barry M. Pell, P.E.

**Re: Blackstone Canal  
Transportation and Circulation Study  
Worcester, MA**

**Dt:** June 11, 2003

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The transportation and circulation plan is intended to support the land use plan in function and scale. The specific land use types, densities and configurations vary within each of the four plan sectors and warrant transportation solutions tailored to each sector's needs.

Integrating the entire area is the provision of a through spine in the north-south direction. This function is currently provided by the one-way pair Millbury and Water Streets (northbound) and Harding Street (southbound). It is a basic assumption of the traffic analysis that this north-south spine function should be retained. Alternatives were analyzed for vehicle capacity to replace the southbound through function on Harding Street. These alternatives included making Millbury Street/Water Street two-way, relocating Harding Street traffic to another street(s) in the study area, and relocating traffic to a street outside of the study area.

Millbury Street has a travelway width of approximately 33 feet with sidewalks averaging approximately six feet width. On-street parking is allowed on both sides of the street. The existing street width is inadequate for two-way traffic flow and parking on both sides of the street. If the street were modified for two-way traffic flow, either of two actions would be required; namely (1) remove parking on one side of the street, or (2) widen the pavement and narrow the sidewalk by four feet. Both of these alternatives are contrary to the objective to encourage greater retail/restaurant business and pedestrian activity along Millbury Street/Water Street. Moreover, if Millbury/Water Streets are to continue to provide northbound travel, the southbound capacity should be located at a reasonable (one to two-block) distance within the study area to retain clarity and convenience of through function for motorists. The alternative to Harding Street must also have sufficient reserve capacity to absorb this added function.

As noted in the Existing Conditions Report, the existing roadways and intersections in the study area nearly all carry volumes well below their available capacity. The relocation of the southbound through traffic function from Harding Street analyzed the magnitude of this reserve capacity compared to traffic on Harding Street as well as future growth associated with the urban design plan and other development. The assessment resulted in three recommendations through the study area:

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1. **Washington Square to Kelly Square.** The Harding Street southbound volume will be relocated to Green Street between Winter Street and Kelley Square. Winter Street is presently two-way except in the one block west of Grafton Street. There is adequate width and capacity for Winter Street to provide the westbound connection between Grafton Street and Green Street. The intersection at Grafton Street beneath Interstate 290 (I-290) would be reconfigured to provide a direct link to/from Grafton Street east of I-290 and Winter Street for access into the study area.
2. **Kelley Square to Grabowski Square.** The Harding Street southbound volume will be relocated to Washington Street. Madison Street, the connecting roadway between Kelley Square and Washington Street, has sufficient width and capacity to accommodate this expanded function. At Grabowski Square, Washington Street will merge with Harding Street. This relocation of the Harding Street through traffic function will only be necessary in conjunction with development of a canal segment south to Grabowski Square.
3. **Grabowski Square to Brosnihan Square.** In this segment, there is no suitable alternative roadway to divert southbound traffic. Harding Street will continue to serve this role, although the 26-foot width can be narrowed by 8 feet with the elimination of on-street parking.

Also noted in the Existing Conditions Report is the prominence of Kelley Square as the chief gateway to the study area. A comprehensive analysis of traffic operations at Kelley Square is beyond the scope of this study; however, there are elements which should be part of the design. These include signalization (with pedestrian controls), shortening pedestrian crossings and prohibiting curb parking within the Square. Eliminating the southbound entry and exit legs of Harding Street will provide the necessary reduction of turning movements and simplify signalization. Two functional options will require additional study; namely (Option A, Figure 2) directly aligning the through movement via Green Street with Madison Street east or (Option B, Figure 3) retaining the direct through alignment of Madison Street. Both alignments are feasible, although the latter scheme will provide more convenient transition for southbound traffic from Green Street to Washington Street.

## Sector 1

With the basic transportation framework in place, specific street configurations and capacity will be responsive to land use recommendations within each sector. In Sector 1 (north of Kelley Square), major development opportunities on both sides of Harding Street, between Franklin Street and Gold Street, will generate new vehicle trips and significant pedestrian activity. Structured parking will be warranted to accommodate this demand and is proposed in a 1200-space garage south of Franklin Street between Grafton Street and Harding Street. This location will provide vehicle access at the sector's outer edge on Grafton Street to minimize vehicular intrusion. It will offer efficient pedestrian connections on the Harding Street canal side within reasonable 1200 feet (5 minute) walking distance to proposed market attractions as well as to Union Station.

The grid pattern of streets in Sector 1 will be retained. However, proposed changes include eliminating the through traffic role of Temple Street, and making Franklin Street one-way from Worcester Center Boulevard to Grafton Street. These directional controls are shown in Figure 4.

As noted above, Winter Street will play a more significant traffic role connecting between Grafton Street and Green Street.

Vehicular bridge crossings of the proposed Harding Street canal will be located on Franklin Street, Winter Street and Harrison Street. Vehicle bridges will have one travel lane in each direction, with two eastbound lanes on one-way Franklin Street. Additional pedestrian bridges at three locations across the canal will knit together the canal amenities with parking and other development sites in Sector 1.

Vehicle loading functions will be maintained along both sides of Harding Street with off-peak access, as necessary, to facilitate businesses which rely on this service. Servicing of Harding Street businesses would also be accommodated by proposed two-way loop roads (depicted on the Illustrative Plan) on the west side of the canal connecting to Green Street. The roadway plan for Sector 1 will also serve to reconnect the area for vehicles and pedestrians to Union Station and across Worcester Center Boulevard to downtown Worcester. This can be accomplished by street widening, sidewalk construction and traffic signal phasing and timing modifications.

## **Sector 2**

This sector is principally comprised of low to medium-density residential development. Traffic generated by this area is relatively low, and the closely spaced street grid provides significantly excess capacity. Redevelopment opportunities (and parking) are recommended along the northeast edge of the sector, where vehicle traffic can be accommodated via Washington Street and Millbury Street to/from Madison Street and Kelley Square. Lamartine Street will serve as a through connection with a proposed bridge crossing of the canal at Harding Street. This traffic routing will separate vehicle patterns away from the residential neighborhood.

In conjunction with the Green Island revitalization program, traffic calming measures should be considered along residential streets to reduce speeds, discourage through traffic, and promote safety for residents. Such measures could include street narrowing at intersections, raised crosswalks, and pedestrian signals.

As noted above, Harding Street will be retained for southbound traffic south of Grabowski Square; however, the vehicle travelway can be narrowed. Roadside design treatments can include sections of widened sidewalks, bicycle paths and/or angled parking.

## **Sector 3**

The Urban Design plan identifies the sector's redevelopment potential along Quinsigamond Avenue. This roadway offers substantial excess capacity to accommodate redevelopment traffic. Traffic access and parking functions should be configured along the Quinsigamond Avenue and Lamartine Street corridors, which are located on the edge and outside of the Green Island residential neighborhood. Lamartine Street is recommended for two-way operation to accommodate this new traffic demand, while Lafayette Street should be designed to discourage through traffic. The five-legged intersection of Quinsigamond Avenue, Lamartine Street and Lafayette Street should be reconfigured to enable this modified street function.

The proposed Mill Brook linear park will pass beneath (with culverts) Lamartine Street and residential neighborhood streets without interfering with traffic flow along these streets. Bikeway and pedestrian paths along the linear park will have mid-block crosswalks at street crossings, which can be raised to sidewalk level to focus motorist attention and reduce speeds along these residential streets.

## **Sector 4**

The key traffic element in this sector is the MassHighway plan for the I-290 interchange and the ramp connections at Brosnihan Square. The MassHighway plan provides a more direct traffic connection between the south on Route 146 and two-way Quinsigamond Avenue, which will facilitate access to and from the redeveloped parcels in Sector 3. However, the current MassHighway plan also eliminates the I-290 eastbound off-ramp and westbound on-ramp at Brosnihan Square. Removal of these highway connections will place greater importance on the I-290 interchange at Kelley Square for Study Area access. The redesign for Kelley Square should include these relocated traffic volumes.

A significant component of the MassHighway plan is the multi-use bicycle and pedestrian path through Brosnihan Square. This path should provide an efficient and safe connection between the Blackstone River Valley National Heritage Area and Green Island. The Urban Design plan depicts this path with pedestrian bridge crossings of the Middle and Blackstone Rivers.

## **Conclusion**

The study area circulation system is intended to serve a wide range of users – residents, employees, shoppers and visitors. Each sector's roadway network is configured to establish a functional hierarchy distinguished by an emphasis on adequate capacity and efficiency for the major roads and traffic volume and vehicle speed constraints for the residential neighborhood streets.

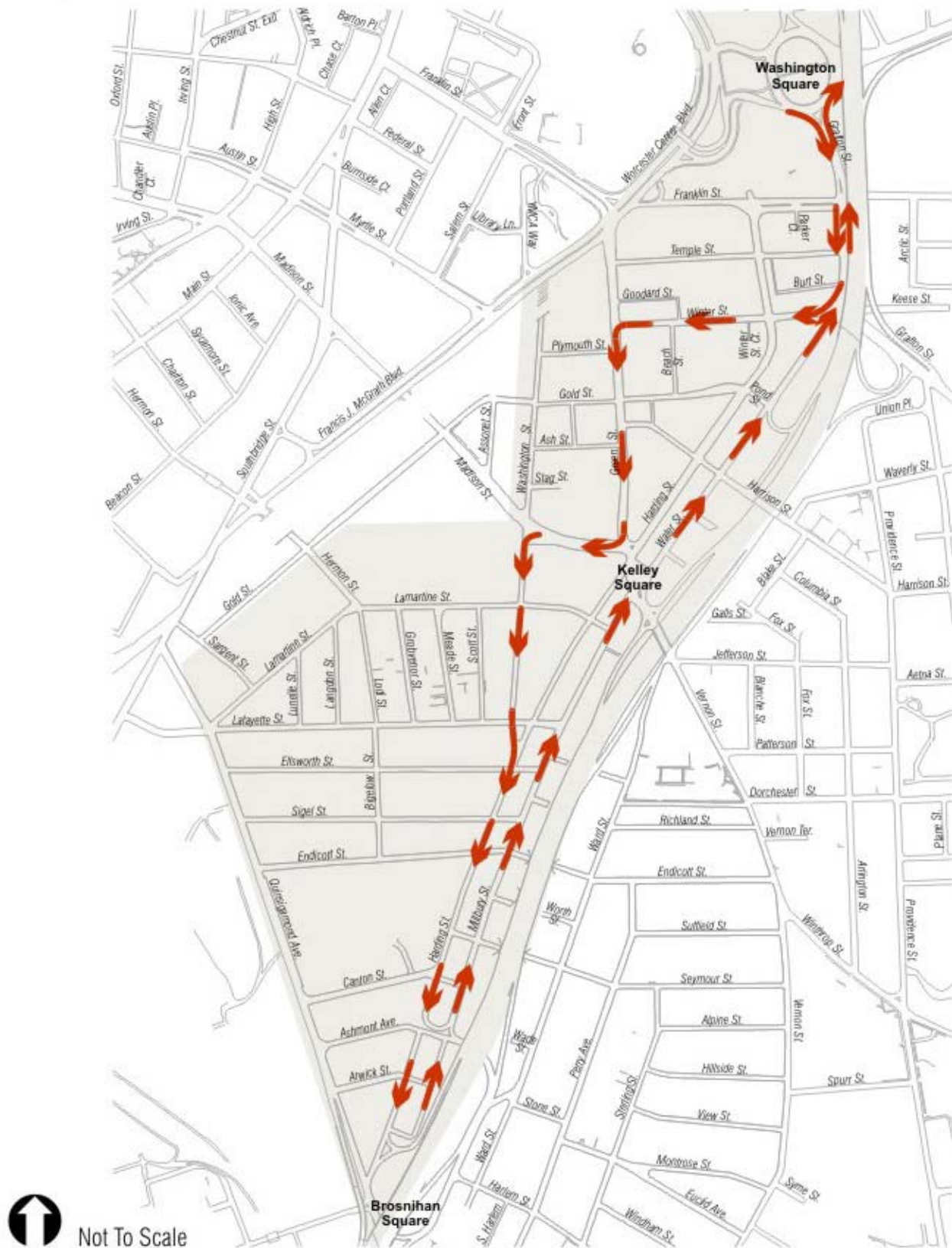
This functional arrangement includes the location of parking garages and lots for efficient access to/from the major roads. The result will be sufficient roadway capacity to accommodate new traffic generated by development parcels, while creating pedestrian friendly zones, especially along the canal, Mill Brook and within Green Island, which eliminate or minimize conflicts with motor vehicles.

Integrating the sector roadway plans is the overall spine comprised of Millbury, Water, and Grafton Streets in the northbound direction and Grafton, Winter, Green, Madison, Washington, and Harding Streets in the southbound direction. Kelley Square is at the heart of this system and will require major reconstruction to fulfill its gateway role. The spine roadway system will also enable opportunities to reinvigorate or strengthen connections beyond the study area boundaries – to Union Station on the north, Front Street and downtown Worcester on the west, the Blackstone River Valley National Heritage Area on the south, and the Vernon Hill neighborhood on the east whose traditional connections were served by construction of Interstate 290. These connections, which reach out beyond the study area boundaries, will not only entail roadway improvements for vehicles but also pedestrian paths and sidewalks and bicycle routes and bikeways which offer an attractive and safe access alternative.



The roadway spine will also be the conduit for public transit bus service providing internal links and external connections and access opportunities. Bus stops will be located which are responsive to redevelopment destinations and concentrations of pedestrian visitor activity along the canal.

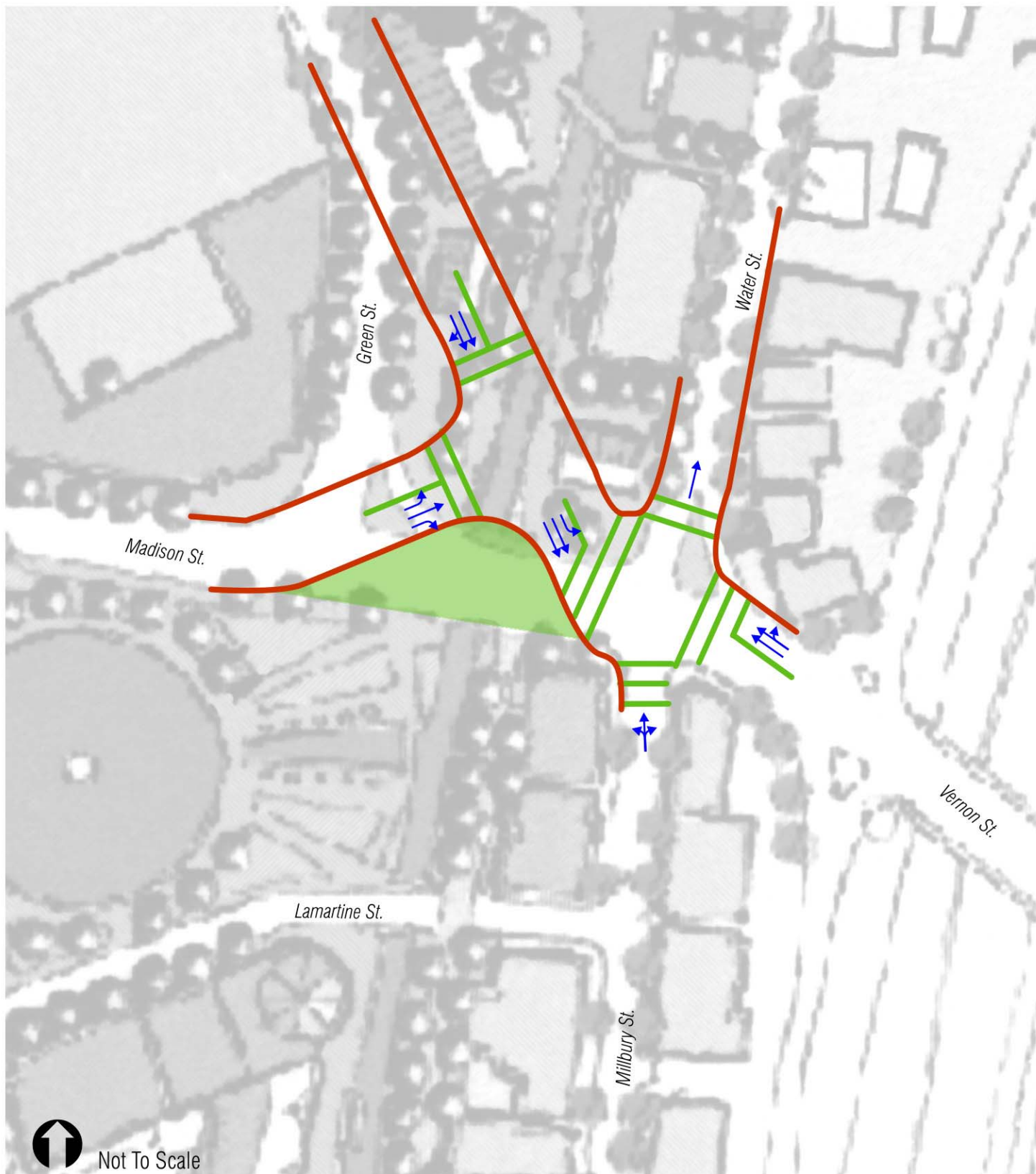
In summary, the transportation network has been scaled and tailored to meet the future needs of users in each sector of a revitalized study area. As one component of the urban design blueprint, the circulation plan will strengthen the links between the study area and adjoining districts to reestablish the area as a vibrant constituency of the city of Worcester.



Blackstone Canal Feasibility Study  
Worcester, Massachusetts

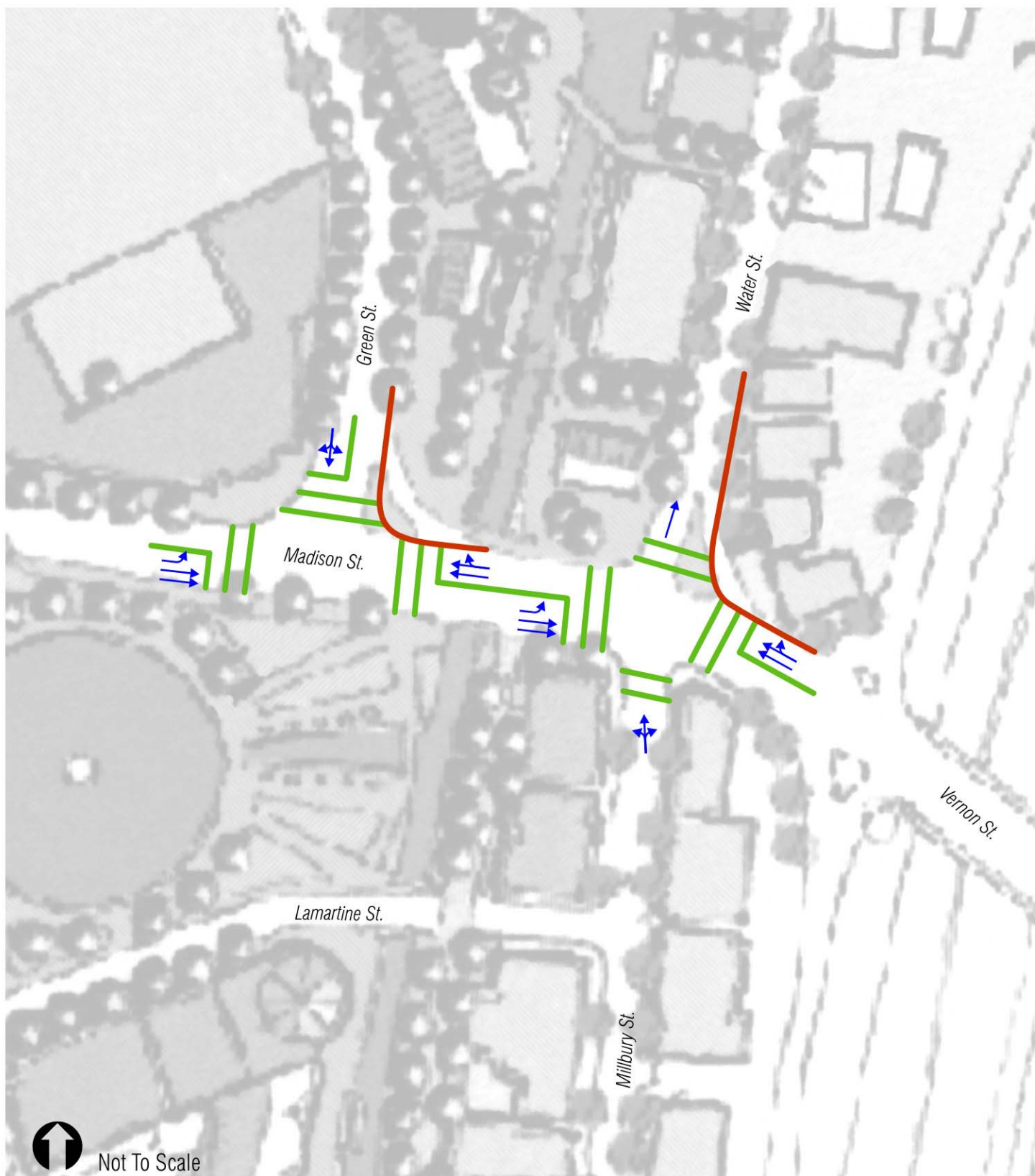
Study Area  
Primary Circulation

Figure 1

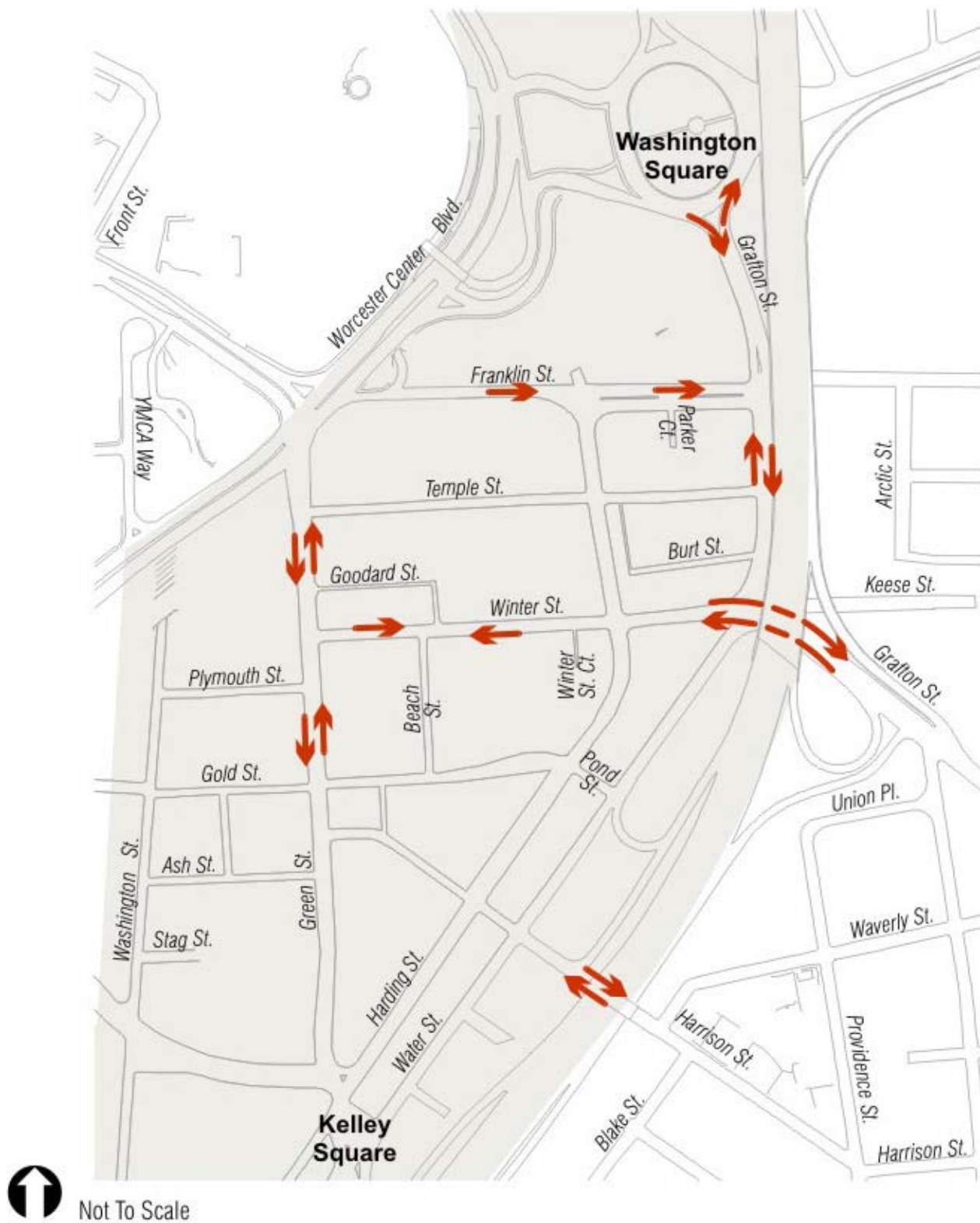


Blackstone Canal Feasibility Study  
Worcester, Massachusetts





Blackstone Canal Feasibility Study  
Worcester, Massachusetts



Blackstone Canal Feasibility Study  
Worcester, Massachusetts

Primary Street Controls

Figure 4

# ***Appendix 3***

## ***Tech Memo #3 - Implementation***

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# Tech Memo #3

**To:** File

**Fr:** David Williams, The Williams Group

**Re:** **Blackstone Canal Feasibility Study  
Implementation**

**Date:** May 28, 2003

The following section has been prepared by The Williams Group (TWG) Real Estate Advisors as members of The Rizzo Associates team. Information presented is based on existing data and projections for the Green Island neighborhood and nearby competitive locations. The analysis will focus on potential direct positive impacts to Green Island based on currently estimated market supportable development that will take place assuming the redevelopment of the canal, daylighting and other landscaping elements that will create a critical mass of urban recreation. The benefits or positive impact analysis are centered on real estate development benefits, tax and city revenue benefits, immediate employment benefits, tourism benefits and soft impacts, which are positive but difficult to calculate based on the broad assumptions to date.

Summary of benefits:

*The estimated positive economic impact from Canal and related infrastructure rebuilding projects based on a public cost of approximately **\$75 Million** would include a variety of benefits, including some that can be estimated and calculated and others that are clear benefits but less easily presented in terms of dollars.*

A summary of some direct benefits that can be calculated include:

- ♦ Estimated real estate development: \$69M of which \$44M is non subsidized market supportable development
- ♦ Annual direct tax revenue to Worcester: \$1.7M, net present value of annual tax is over \$17M
- Temporary Jobs(construction): 687 jobs; salaries \$ 34.4 million
- ♦ Permanent Jobs (office and retail)
  - Office: 120 jobs; salaries \$ 4.8 million annually
  - Retail: 230 jobs; salaries \$ 4.6 million annually
- ♦ New retail expenditures: \$15M

Detailed presentation of these benefits can be seen in Tables 1, 2, 3 and 4.

Estimated positive economic impacts that were not calculated include, but are not limited to:

- ◆ State funds returned to the City, including:
  - Education grants which are currently \$211M per year, which go directly to local schools (from \$800M in taxes to the state generated by local development)
  - Funds from new income tax paid by new residents and employee from jobs created
- ◆ Soft impacts
  - Improvement of quality of life of new and existing residents
  - Creation of an attractive environment for residents, visitors, students, employees and all those indirectly and directly affected by the Canal redevelopment
  - Increase in adjacent property values—increase in taxes paid by properties outside new development area
  - Improvement of services to all residents
  - Other revenue achieved from improved business operations outside direct area include property tax, income tax, use tax and new jobs created in operationsImprovement of Green Island and City image that is sustainable.

Development benefits (refer to Table 1) were derived by taking the total amount of the development program that was estimated to be supported by the market analysis, and calculating the cost of creating the development. The market supportable development is over \$44 M in private investment alone.

The overall program includes \$69M in development including multifamily residential, office, retail, sector 2 subsidized development, and parking. The total program includes nearly 550,000 sf of new development, which is larger than most major regional malls, as a reference. Considering the limited amount of new development in Worcester in recent years, this would be a tremendous economic and psychological boost to the city.

It is assumed in all cases that the public sector is not the developer or operator of any of the program elements included in this benefits calculation.

In addition to development benefits, employment benefits (refer to Table 2) were calculated for the same program. Benefits calculated included new construction jobs to create the development as well as the major new employment centers that would generate new office and retail jobs. It is assumed that most office workers would be full-time, and retail would be predominantly part- time.

Based on a development value of \$69M, it is expected that over 680 construction jobs may be created based on an estimate that 50% of the development would not be in material, but in services from direct labor to professional services. When the development is finished these jobs are complete.

In addition, it is expected, based on 30,000 sf of new office supportable, that 120 new office positions would be created and 230 part-time retail positions, creating almost \$10,000,000 per year in new salaries that will be taxable at the state and federal levels. Of course, trickle down benefits would be achieved by the income tax levied on salaries, but there is no rate that the City retains for itself based on current information and research.

Tourism impact (refer to Table 3) is the most difficult to estimate. Nevertheless, it is expected that from the regional population and traffic on the Massachusetts Turnpike (I-90) and I-290, a percentage of people will stop and visit the canal if it is well advertised and contains attractive visitor information centers, cultural elements, as well as shopping and food service.

Based on a projected overall traveling population of 50 million and a 1% capture with average spending of \$25/trip, a total of \$12.0 M of additional retail and food dollars are expected to be created. Overall, it is expected that at full development \$15M in spending with an annual tax value of almost \$800,000 in state sales tax will be achievable. Spending and visitation will add State coffers as well as contribute to a vibrant neighborhood, contribute to supporting retail and service jobs, and have an indirect benefit of many times the direct spending within the development area.

Finally, the most tangible benefits are tax revenue (refer to Table 4) created by the development of real property, personal use property tax and parking excise tax that goes to the City. Property is estimated to be valued at 20% over development cost creating an annual benefit of almost \$1.8M.

Property use tax is estimated at \$84,000 per year and parking excise tax from autos is expected, from new residents, to contribute \$26,000. Overall, the net present value of these benefits is estimated to be over \$17M.

A summary of all of these benefits is graphically depicted in Table 5.



**Table 1**  
**Development Benefits**

Development benefits represent both market supportable and subsidized development that is estimated to be produced by the public investment to redevelop the Canal. Development is based on estimated market support in today's market by use category.

Market Supportable Development	Total New Development Area	Office sf	Multi family residential sf	Retail sf					Parking Garage
				Other retail	Food	Entertainment	Service	Cultural	
Phase I--Washington Square	457,000	30,000	90,000	17,000	5,000	2,000	3,000		310,000
Phase II Crompton Millworks	67,500	30,000	27,000			2,500	3,000	5,000	-
Sector 2 Rehabs--subsidized projects (1) (2)		facades 50	100 120						
Phase III Lock 48 Mixed use development	20,000		-	10,000		2,500	5,000	2,500	-
<b>Grand Total</b>	<b>544,500</b>	<b>60,050</b>	<b>117,220</b>	<b>57,500</b>					<b>310,000</b>
Subsidized Development	195,633								
	\$ 24,700,000								
Market Supportable Development	\$ 44,046,900								
Total Development Dollars Invested	\$ 68,746,900	\$ 8,105,500	\$ 37,266,400	\$ 6,325,000					\$ 17,050,000
Budget estimate in 2002\$/sf	\$ 126.26	\$ 110.00	\$ 120.00	\$ 110.00					\$ 55.00

(1) currently no market support , but may have future support with rebuilt area

(2) units, not sf

**Phasing of Real Estate Direct Impact**

Years	Cumulative Direct Real Estate Impact
1-5	\$ 10,312,035
5-10	\$ 27,498,760
10-20	\$ 68,746,900

**Table 2**  
**Employment Benefits**

Construction jobs created are the number of jobs created based on the estimated development from Table 1, of over 500,000 sf of new building. Long term jobs represent jobs created in the portions of the development that represent office and retail space.

	Development Value	# of workers	Ave. salary	Total salaries	Assumption	factor
<b>Construction Jobs</b>	\$68,746,9000	687	\$50,000	\$34,373,450	50% of development value is in labor costs	50%
<b>Long Term jobs in mixed use development</b>	<b>Type</b>	<b>Square foot # of workers</b>	<b># or workers</b>	<b>Total salaries</b>	<b>Total salaries</b>	<b>assumption</b>
	Office workers	30,000	120	\$40,000	\$480,000.00	250 sf/worker
	Retail part time workers	57,500	230	\$20,000	\$4,600,000.00	250 sf/worker
Note: indirect impact to Worcester via state income and sales taxes						

**Table 3**  
**Tourism Benefits**

Tourism benefits represent the impact that visitors would directly have in terms of spending that would be achieved in the new development described in Table 1. Tourism impact is derived from traffic to casinos, with the attempt being to capture a percentage of this traffic. In addition, we analyzed the traffic along I-290, I-90 and I-395 regardless of destination and made an estimate of traffic that may come the destination. Benefits are not representative of all benefits and suggest only a sampling of potential direct benefits form new development.

	annual traffic I-290, I-90	ave. spend	capture factor	tourism value	assumption
<b>Tourism Impact</b>	50,000,000	\$25	1%	\$12,500,000	Retail and food \$spent
<b>Retail Sales Expenditures</b>	<b>estimated sales \$/sf/year</b>	<b>sf</b>	<b>value</b>	<b>Annual tax value</b>	<b>State sales tax rate</b>
	\$275.0	57,500	15,812,500	790,625	5%

Note: City does not receive any sales tax revenue but receives grant and other returns from state inc. \$200,000,000 education grant which may increase with arguably additional revenue from Worcester.

**Table 4**  
**Revenue Benefits**

Revenue benefits describe those benefits that primarily include tax benefits to the city or state that are estimated to be created based on the estimated development benefits of over 500,000 sf. Estimated privately owned property would, for example, be assessed, then taxed on a yearly basis. The yearly benefits were considered an annuity and an over net present value was calculated to estimate the total impact from various tax revenues.

	sf	development investment	assessed value	annual tax value
Retail Property	57,500	\$ 6,325,000	\$ 7,590,000	\$ 122,654
Commercial Office Property	60,050	\$ 8,105,500	\$ 9,726,600	\$ 305,804
Commercial Parking Property	310,000	\$ 17,050,000	\$ 20,460,000	\$ 643,262
Residential Property	117,220	\$ 37,266,400	\$ 44,719,680	\$ 722,670
<b>Total</b>	<b>544,770</b>	<b>\$ 68,746,900</b>	<b>\$ 82,496,280</b>	<b>\$ 1,794,391</b>

note: assumed that all property is privately owned

Personal Use Property	544,770			\$ 84,336
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note: 2002 Worcester tax revenue analysis shows that personal use tax is apprx. 4.7% of all property tax revenues combined

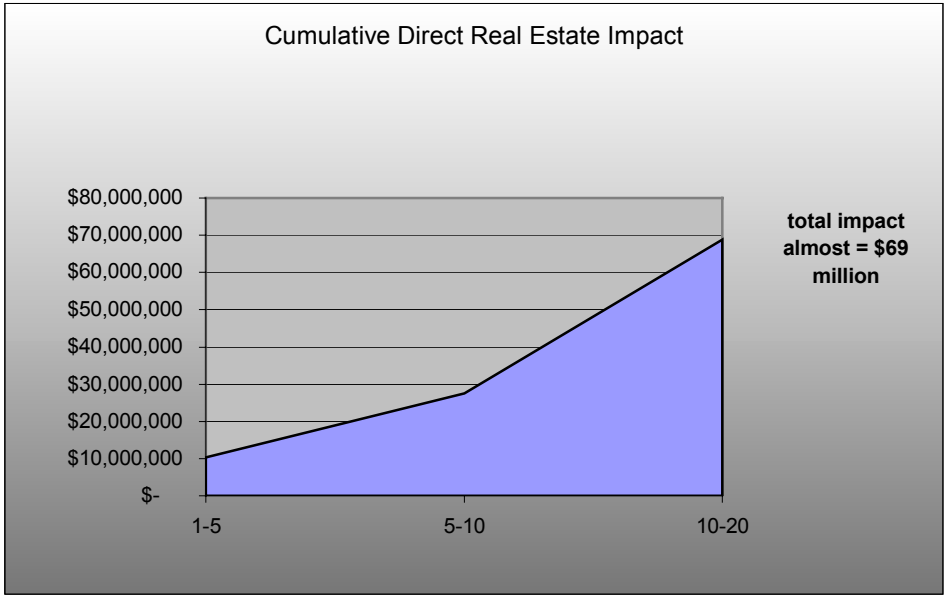
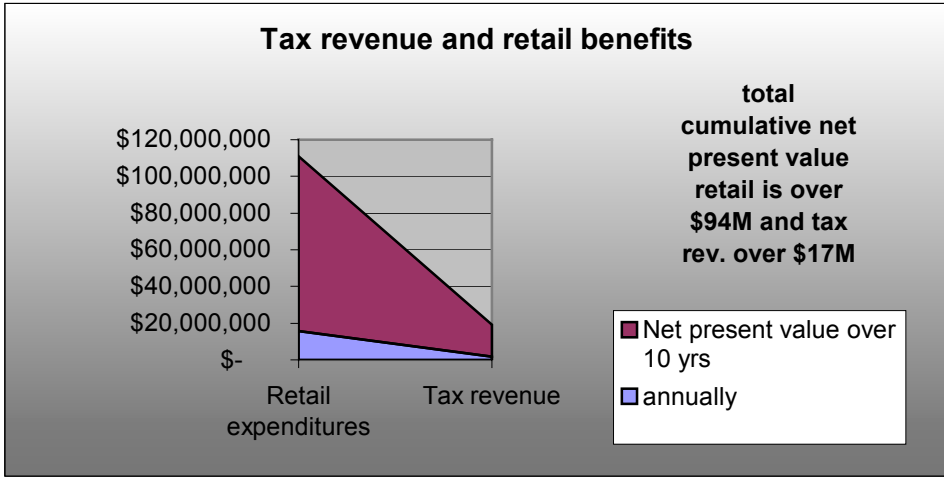
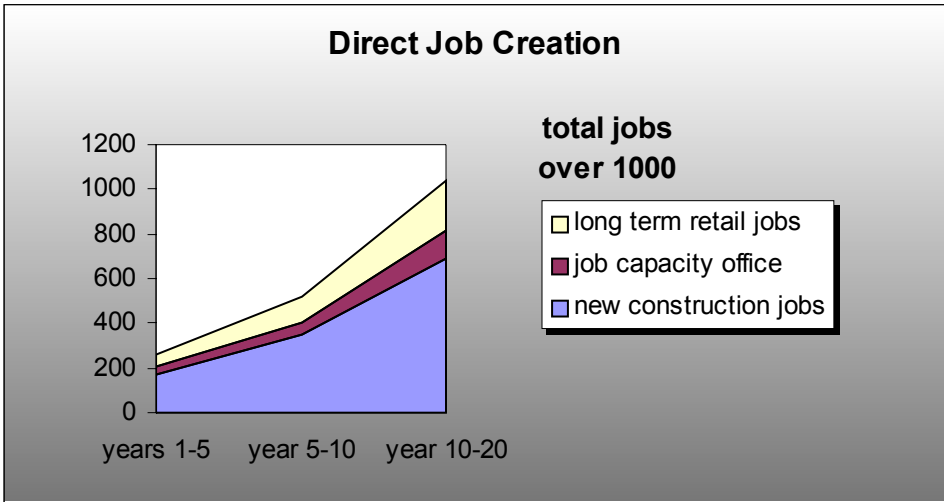
	# of residences	ave value of car	Assessed value	annual tax value
Parking Excise Tax	130	\$ 8,000	\$ 1,040,000	\$26,000

**NPV (net present value of revenue)** **\$17,313,321**

**Assumptions**

Taxes	Rate	Per
State Sales Tax	5.00%	\$ 1
State Income Tax	5.00%	\$ 1
Retail Property Tax	16.16	\$ 1,000
Residential Property Tax	16.16	\$ 1,000
Commercial Property Tax	31.44	\$ 1,000
Personal Use Tax	31.44	\$ 1,000
Automobile Tax	\$25	\$ 1,000
Hotel/Motel Tax	4%	\$ 1

**Table 5....Total Benefits and Benefit Graphs**





## **Funding**

The funding strategy will involve a joint public and private initiative in order to create both the \$75M initial investment and the subsequent additional development. The goal is to match funding initiatives at the public level with the program that has the widest market support or the program infrastructure elements that are required to meet the base project demands. We have found that at this time of limited public funds available that the two most important aspects of public funding are an understanding of:

- Largest sources of public funds—transportation related funds
- The Means to get the most public support—lobbying

The best way to acquire funding is to focus on transportation and to lobby at all levels. Since most funding begins at the federal level and then is allocated to each state, it is essential to have local support for projects at the state listening level.

A marketing plan and strong public benefit analysis will aid the lobbying effort. In Tables 5 and 6 we have categorized the major funding sources by federal, state, local and private sector initiatives. Table 6 has detail as to the size of funding and the agency that sponsors the funding.

**Table 6**  
**Funding Strategy**

## Blackstone Canal Project Funding Strategy

### **Federal Funding Initiatives**

- Additional TEA 21 funding
- TEA 21 Direct Federal Credit
- Federal matching thru TEA 21
- EPA Public Works and Development Facilities Program
- CDAG grant funds
- CDBG Funding Sources
- Home Ownership Incentives
- Federal Highway Rehab grants
- Brownfield Grants
- National Parks Service Assistance
- Public works grants
- Transit Grants
- Federal mortgage insurance
- Federal income tax credits
- National Park Service Historic Landmarks

### **State Funding Initiatives**

- Highway enhancement funds
- TIF development district
- Industrial Revenue Bonds
- Tax exempt bond financing (residential)
- Job creation and tax incentives
- Developer matching funds
- Enterprise Zone tax credits
- Open Space Grants
- Predevelopment Assistance

### **Local Funding Initiatives**

- Property tax abatements
- Cost sharing for public portions
- Creation of special districts
- Land lease or land cost write-down
- Developer matching funds
- Site assembly and clearance
- Equity participation
- Land Swap
- Regulatory relief
- Land or building exchanges
- Development right transfers
- Lease guarantees
- Density bonuses
- Road and access improvements
- Clear zoning impediments

### **Private Sector Initiatives**

#### **Conceptual**

- Assemble development team
- Site capacity and access testing
- Architectural theme, features and "flagship" core image components
- Alternative use concepts
- Mixed-use synergy
- Zoning constraints and parking requirements
- Environmental issues

#### **Financial**

- Target market support
- Competition, capture rate, lease-up and targeted user preferences
- Construction costs
- Financing options and investment objectives
- Predevelopment feasibility
- Capital requirements
- Public/Private financing opportunities

#### **Implementation**

- Investment agenda
- Civic approvals/stakeholders
- Marketing plan and strategy
- Target potential and major anchor tenants
- Pre-leasing and marketing

Above is a list of potential initiatives that may assist in the redevelopment of the Canal, encouraging private development, assisting public development and making sites more attractive. Further investigation by the client will be required to ascertain all funding applicability and availability.

**Table 7**  
**Funding by Physical Improvement Area**

Physical Improvement Area	Sponsor	Goal	Contact	Average size
Transportation infrastructure plus 20% of construction in Restoration and rehabilitation including trails, easements, bike paths, etc.	T21 Federal government	Improvement of infrastructure and economic development	<a href="http://www.fhwa.dot.gov">www.fhwa.dot.gov</a>	Varies; until 2003
Related to watershed protection—water and sewer facilities, ports, aquaculture, Brownfields	Public Works and Development Facility Federal EPA	Economic Development and business expansion	202 482 5268 EPA Regional Office	\$ 850,000
Home ownership	HUD	Encourage home ownership	Local HUD office	Varies, direct to borrower
Acquisition and development of Property	HUD Watershed Protection CDBG	Development of viable communities; economic development	202 708 3587 Local HUD office	\$800,000—formula grants could be higher
Residential development	Federal Low income tax credits	To encourage development of affordable and low income housing	Local HUD office	NAP- tied to tax exempt bond financing
Residential development	Federal mortgage Insurance	To encourage affordable development and home ownership	Local HUD office	Insurance only
Highways, rail, coasts, etc.	Transit Grants/ Federal Highway Rehab grants	Encourage clean up and job creation	<a href="http://www.dot.gov">www.dot.gov</a>	Formula based—average Mass. was \$2.7 M
Brownfield clean up and job creation	US EPA	Anti crime, maintenance, rehabilitation, public-private sharing	<a href="http://www.epa.gov">www.epa.gov</a>	\$500,000
Parks; historic buildings	Federal National Park Service		202 565 1200	\$500,000 but can vary
Highways	•Highway enhancement funds along with federal dot	•Highway enhancement funds along with federal dot	<a href="http://www.dot.gov">www.dot.gov</a>	NAV

**Table 7- Continued**

<b>Physical Improvement Area</b>	<b>Sponsor</b>	<b>Goal</b>	<b>Contact</b>	<b>Average size</b>
Stimulate commercial and residential development	•TIF development district (State)	•TIF development district (State)	<a href="http://www.State.ma.us">www.State.ma.us</a>	varies
Business development and expansion for manufacturing	•Bond financing by State	•Bond financing by State	<a href="http://www.State.ma.us">www.State.ma.us</a>	Over \$300,000
Predevelopment financial assistance for all types of income producing projects	•Predevelopment Assistance Program (State)	•Predevelopment Assistance Program (State)	<a href="http://www.State.ma.us">www.State.ma.us</a>	
Residential development	•Tax exempt bond financing (residential) State with fed coordination	•Tax exempt bond financing (residential) State with fed coordination	<a href="http://www.State.ma.us/mobd/finance_services.html">www.State.ma.us/mobd/finance_services.html</a>	Depends on fed. insurance
Residential development	•Tax exempt bond financing (residential)	Reduction of financing costs	<a href="http://www.State.ma.us/mobd/finance_services.html">www.State.ma.us/mobd/finance_services.html</a>	Depends on fed. insurance
Job creation for manufacturing	•Investment Tax credits	Encourage business expansion	<a href="http://www.state.ma.us">www.state.ma.us</a>	varies
Commercial development	•Developer matching funds	Encourage development	Local state representative	varies
New business formation	•Enterprise Zone tax credits	Encourage business expansion	<a href="http://www.state.ma.us">www.state.ma.us</a>	varies
Open spaces	•Research and Development tax credits •Open Space Grants from Mass. Office of Environmental Affairs and US EPA for Brownfield	Redevelopment of abandoned brownfields and to support community development	State office of coastal zone management	State up to \$30K, EPA average \$950,000 for Mass.



# ***Appendix 4***

## ***Tech Memo #4 - Cost Analysis***

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# Tech Memo #4

**To:** File

**Fr:** John Shields, AIA

**Re: Blackstone Canal  
Conceptual Cost Analysis  
Worcester, MA**

**Dt:** May 9, 2003

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In an effort to better understand the scope and reach of this Plan, Rizzo Associates and ICON architecture have developed the following conceptual cost estimate, based on their own experience in projects and facilities of this type and size.

The estimate is organized on a sector by sector basis. In addition, this analysis suggests and quantifies a funding phasing plan, per the Project Team's understanding of the expressed priorities of the Blackstone Canal Task Force.

It is understood that the phasing strategy will constantly evolve, and should be reviewed on a quarterly basis, or more frequently, as priorities shift and as implementing opportunities arise.

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## Conceptual Cost Analysis

Critical Canal District Investment Projects

Prepared by:  
Rizzo Associates, Inc.  
ICON architecture, inc.

Estimate of Costs		Sector 1 Madison North			Sector 2 Green Island			Sector 3 Qinsigamond Ave			Sector 4 Brosihan Square		
Project Categories	Unit	Quantity	Unit Price	Total	Quantity	Unit Price	Total	Quantity	Unit Price	Total	Quantity	Unit Price	Total
<b>1. Water</b>													
1.01 Site Prep/ Utilities	CY	620	\$16	9,920	420	\$16	6,720	620	\$16	9,920	190	\$16	3,040
Crushed Stone	CY	620	\$16	9,920	420	\$16	6,720	620	\$16	9,920	190	\$16	3,040
Class B Trench Excavation	CY	4,790	\$8	7,200	3,200	\$8	4,800	4,790	\$8	7,200	1,600	\$8	2,400
Water Crossings (8'-24") (removed and relayed)	LF	900	\$30	27,000	600	\$30	18,000	900	\$30	27,000	300	\$30	9,000
Sewer Crossings (removed and relayed)	LF	1,200	\$53	63,600	800	\$53	42,400	1,200	\$53	63,600	400	\$53	21,200
Electrical Crossings (removed and relayed)	LF	300	\$5	1,500	200	\$5	1,000	300	\$5	1,500	100	\$5	500
Gas Crossings (removed and relayed)	LF	300	\$20	6,000	200	\$20	4,000	300	\$20	6,000	100	\$20	2,000
Canal way/ Fenway													
Water Way (Base, Bottom, Sides)	SF	137,760	\$35	4,821,600	20,640	\$35	722,400	35,400	\$35	1,239,000			
Cap	SF	2,850	\$50	142,500	1,720	\$50	86,000	2,950	\$50	147,500			
Fenway Brook (20ft wide Average)	LF				800	\$150	120,000	800	\$100	80,000	800	\$100	80,000
Closed Culvert	LF				400	\$100	40,000	100	\$100	10,000			
Water Node Upgrades (Docks, fountains etc.)													
Union station Turning Basin	LS	1	\$50,000	50,000									
Market place Basin	LS	1	\$50,000	50,000									
Crompton Loom Works Basin	LS	1	\$50,000	50,000									
Lock 48 Restoration	LS	1	\$75,000	75,000				1	\$100,000	100,000			
The Basin at Kelley Square	LS				1	\$50,000	50,000						
Grabowski Square Turning Bain	LS				1	\$50,000	50,000						
Crompton Park Canal Section	LS												
System Hydraulics													
Subsurface Storage Tank	EA	2	\$764,000	1,528,000	2	\$764,000	1,528,000						
Stormwater Pumps (2000 GPM)	EA	9	\$10,000	90,000	7	\$10,000	70,000	7	\$10,000	70,000	7	\$10,000	70,000
Recirculation Pumping System	LS	1	\$100,000	100,000	1	\$100,000	100,000	1	\$100,000	100,000	1	\$100,000	100,000
Piping	LS	1	\$100,000	100,000	1	\$100,000	100,000	1	\$100,000	100,000	1	\$100,000	100,000
Subtotal Water				\$7,132,240			\$2,950,040			\$1,971,640			\$401,180
													\$12,455,100
<b>2. Nodes</b>													
2.01 Sector 1: The Water Street Market Place													
Public Market Building	SF	60,000	\$150	9,000,000									
Market Place Plaza	SF	60,000	\$20	1,200,000									
Washington Square Turning Basin	SF	20,000	\$20	400,000									
Sector 1: Lock #48/ Crompton Layover Basin	SF												
Flagg Pond Place	SF	9,000	\$20	180,000									
The Yard at Lock #48/ Layover Basin	SF	22,500	\$20	450,000									
Historic Structure Reconstruction	LS	1	\$500,000	800,000									
Sector 2: Grabowski Square	SF				12,000	\$20	240,000						
Sector 2: Crompton Park "Lady Carrington" Place	LS				1	\$250,000	250,000						
Sector 3: Fenway Banks	SF							240,000	\$8	1,920,000			
Sector 3: Fenway Nodes	EA							40,000	\$16	640,000			
Sector 3: Kelley Green	SF							120,000	\$20	2,400,000			
Sector 4: Brosnahan North Side	SF										40,000	\$16	640,000
Sector 4: Brosnahan South Side	SF										150,000	\$12	1,800,000
Sector 4: Middle River North Side	SF										40,000	\$8	320,000
Subtotal Nodes				\$12,030,000			\$490,000			\$4,960,000			\$2,760,000
													\$20,240,000
Subtotal All Sectors													

Blackstone Canal/ Green Island Revitalization Plan  
**Conceptual Cost Analysis**  
Critical Canal District Investment Projects

Prepared by:  
Rizzo Associates, Inc.  
ICON architecture, inc.

Estimate of Costs										
Project Categories			Sector 1		Sector 2		Sector 3		Sector 4	
	Unit	Quantity	Unit Price	Total	Quantity	Unit Price	Total	Quantity	Unit Price	Total
3. Circulation & On-Street Parking (Harding & Fenway)										
3.01	Site Prep/Utilities									
	Unclassified Excavation	CY	\$112	127,560	4,780	\$112	57,360	8,190	\$112	98,280
	Pavement Excavation (assume all paved)	SY	\$3	38,250	5,730	\$3	17,190	9,830	\$3	29,490
	Class I Bituminous Concrete Pavement	TON	\$76	28,880	250	\$76	19,000	380	\$76	28,880
	Bitumen for Tack Coat	GAL	\$3	90	20	\$3	60	30	\$3	90
	Sawcutting Bit Conc (at ends of excavation)	LF	\$1	64	60	\$1	48	60	\$1	48
	Traffic and Street Sign Removed and Reset	EA	\$100	4,000	48	\$100	4,800	20	\$100	2,400
	Police Detail	LS	\$300,000	300,000	1	\$300,000	300,000	1	\$300,000	300,000
3.02	Specialty Pavement Roadways and Sidewalks									
	30' Width (w/ Brk. Sidewalk & Cobbles)	LF	\$570	1,254,000	2,200	\$570		400	\$725	290,000
	38' Width (w/ Brk. Sidewalk & Cobbles)	LF	\$725	1,450,000				300	\$180	54,000
	30' Wide Brick Rdway	LF						4,500	\$27	121,500
	12" Bikeway (Brick)	LF								
	12" Bikeway (Bit Conc)	LF								
3.03	Bridges and Culverts									
	Bridges (traffic) (30L x 40W)	EA	\$750,000	2,250,000	1	\$750,000	750,000	4	\$750,000	3,000,000
	Bridges (pedestrian) (30L x 12W)	EA	\$200,000	800,000	1	\$200,000	200,000	5	\$200,000	1,000,000
	Railroad Crossing Pedestrian	LS								
	Brook Culvert Street Crossings	EA						7	\$200,000	1,400,000
3.04	Key Intersection Upgrades									
	Lamarine-Lafayette-Quinsi							1	\$250,000	250,000
	Kelley Square							1	\$1,000,000	1,000,000
3.05	Misc Roadway & Traffic Signal Infrastructure	LS	\$400,000	400,000	1	\$300,000	300,000	1		
3.06	Streetscaping									
	Street Trees	EA	\$800	80,000	100	\$800	80,000	160	\$800	128,000
	Interpretive Exhibits (assume 8 each sector)	EA	\$5,000	60,000	12	\$5,000	60,000	12	\$5,000	60,000
	Bollards	EA	\$650	52,000	50	\$650	32,500	50	\$650	32,500
	Lighting/Banners	EA	\$2,500	150,000	80	\$2,500	200,000	80	\$2,500	200,000
Subtotal Circulation/ Parking				\$5,740,844	\$3,274,958				\$8,294,788	
4. Other Related Costs									Subtotal All Sectors	
4.01	Sector Streetscaping									
	Street Trees	EA	\$800	120,000	150	\$800	120,000	150	\$800	120,000
	Lawns, ground cover and shrub plantings		\$12	120,000	40,000	\$12	480,000	10,000	\$12	120,000
	Lighting/Banners	EA	\$2,500	125,000	50	\$2,500	125,000	50	\$2,500	125,000
	Benches, Trash Bins, Misc	EA	\$1,000	50,000	50	\$1,000	50,000	50	\$1,000	50,000
Subtotal other Related Costs				\$415,000	\$775,000				\$415,000	
Sector Subtotals				\$25,318,084	Sector 2				Sector 3	
Planning, Design and Contingency (PDC)									Subtotal All Sectors	
	Detailed Master Plans	%	2.0%	506,362		2.0%	149,800		2%	118,157
	Engineering/Architecture	%	10%	2,531,808		10%	749,000		10%	590,784
	Escalator and Contingency	%	25%	6,329,521		25%	1,872,500		25%	1,476,960
SubTotal PDC				\$9,367,691	Sector 2				Sector 3	
									Subtotal PDC All Sectors	
									Sector 4	
									Subtotal PDC All Sectors	
									\$20,112,219	
TOTAL COSTS				\$34,686,775	\$10,261,297				\$8,093,738	
									Sector 4 Total	
									Grand Total	
									\$74,469,567	



## Conceptual Cost Analysis

Prepared by:  
Rizzo Associates, Inc.  
ICON architecture, inc.

12:54 PM 5/9/2003

Phasing					
PHASE 1: Sector 1 and the Three Squares					
Phase 1a: The Water Street Market Place (Year 1-5)					
	% this Phase	Total	% this Phase	Total	% this Phase
1. Water	40%	2,852,896	10%	295,004	197,164
2. Nodes	95%	11,428,500	10%	49,000	496,000
3. Circulation/ On-Street Parking (Harding & Fenway)	40%	2,296,338	10%	327,496	829,479
4. Other Related Costs	40%	166,000	10%	77,500	41,500
		\$16,743,733.6		\$748,999.8	\$1,564,142.8
	Sub Total				
	Detailed Master Plan	334875	14980	31283	58417
	Engineering/Architecture	1674373	74900	156414	292083
	Contingency	4185933	187250	391036	730207
	Subtotal Design and Contingency	\$6,195,181		\$277,130	\$578,733
	Total Phase 1a	\$22,938,915		\$1,026,130	\$1,080,707
	Total Phase 1a	\$22,938,915		\$2,142,876	\$4,001,536
	Total Phase 1a	\$22,938,915		\$2,142,876	\$4,001,536

Phase 1b: Second Tier Priority Projects (Year 6-10)									
			% this Phase	Total	% this Phase	Total	% this Phase	Total	% this Phase
<div><div></div><div></div><div></div><div></div></div>	1. Water		60%	4,279,344	10%	295,004	40%	788,656	
	2. Nodes		5%	601,500	10%	49,000	40%	1,984,000	
	3. Circulation/ On-Street Parking (Harding & Fenway)		60%	3,444,506	90%	2,947,462	40%	3,317,915	
	4. Other Related Costs		60%	249,000	50%	387,500	40%	166,000	
<div></div>	Sub Total			\$8,574,350.4		\$3,678,966.2		\$6,256,571.2	
	Detailed Master Plan	2.0%	171487		73579		125131		
	Engineering/Architecture	10%	857435		367897		625657		
	Contingency	25%	2143588		919742		1564143		
Subtotal Design and Contingency				\$3,172,510		\$1,361,217		\$2,314,931	
Total Phase 1b				\$11,746,860		\$5,040,184		\$8,571,503	
								Total Phase 1b. \$	25,358,546

[illegible]

# ***Appendix 5***

## ***Tech Memo #5 - Comparables***

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# Tech Memo #5

**To:** File

**Fr:** David Williams, The Williams Group

**Re:** **Blackstone Canal Feasibility Study  
Comparable Projects**

**Dt:** May 3, 2003

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This section will describe comparable redevelopment projects. It is assumed that these stories will have some relevance to the Blackstone Canal District.

All of the projects are in areas that are either on the waterfront or canals, in former mill towns on river waterways, and were underutilized properties requiring capital improvement and investment. The story of these projects may provide additional vision for the future of the Blackstone Canal District. A matrix in Figure 6.15 of the Existing Conditions Report compares various redevelopment projects. Photos of various projects show the kind of vibrancy that could be recreated for Blackstone Canal District.



**Providence, RI** has a very successful downtown waterfront. The revitalization included a new class-A office building, an enclosed shopping mall, and many small retail shops. For public attractions, there is a skating rink and Mall of Roses park. Gondolas can be rented for waterborne tours and regular festivities include light shows and cultural events.

## **The Plan**

- Incorporation of past into its future
- Large public works project to stimulate economic development
- Providence Place mall
- New rail station

## **The Impact**

- Over \$1Billion in new investment (direct and indirect impact)
- 3000 construction jobs
- Striking skyline and attractive downtown for residents and tourists
- Downtown waterfront and river recreation
- Abandoned freight yard converted to an amphitheater
- New office buildings and restaurants
- Several top rate hotels

## **The Costs**

- **Cost: Total \$425M**
- Financing for mall: \$112 M in forgone city sales and property tax
- \$42M in State and federal funds
- \$260M in loans to build and \$11 M loan to purchase property

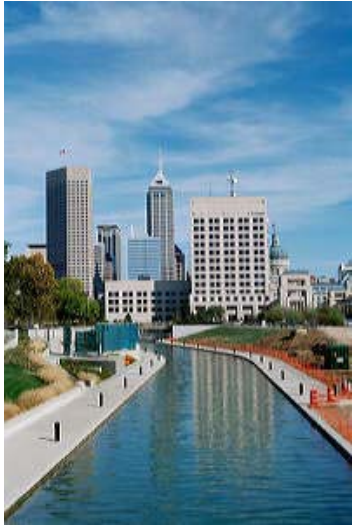
## **Contact: R. Mark Davis**

Chief Executive Office

Tel: 401-751-7979

[rmdavis@heritageharbor.org](mailto:rmdavis@heritageharbor.org)





**White River State Park, Indianapolis, IN,** This Indianapolis Waterfront Upper canal revitalization project draws over 2 million people a year to visit the Park attractions. There are beautiful waterways, lush lawns and tree-lined boulevards connecting all that White River State Park has to offer. The Park has cultural, educational and recreational attractions including the NCAA Hall of Champions, Indianapolis Zoo, the Eiteljorg Museum of American Indians and Western Art and the Congressional Medal of Honor Memorial are just a few of the attractions in the Park.

#### **The Plan**

- Opened up underutilized land in rundown neighborhoods and long the historic canal.
- Created a new civic space in a semi round basis 160' x 200' and added walkways, wall, lighting, planting and etc.
- Boat launching and mooring was accommodated.
- Lighting was essential to making image of safety.

#### **The Impact**

- \$669M in public and private investment
- Sparked new residential development along the canal
- New Indiana state museum, white river gardens, Eiteljorg Museum of native American culture
- Walkway along the canal with bridges
- Amphitheater
- IMAX theater
- NCAA hall of champions
- Visitor center
- Cafes for lunch

#### **The Costs**

**Park construction cost** Total \$111M--- \$52M in federal funds and \$59M in other funds

**Contact:** White River State Park 317-233-2434  
**<http://www.ai.org/whiteriver/home01.html>**



**Canal Walk, Richmond, VA, This is a 1 ¼ mile** corridor in downtown Richmond along the formal Haxall canal and the James River and Kanawah canal. The former canal is mostly intact, but was realigned due to adjacent highway and subsurface conditions.

#### **The Plan**

- Expects 6000 jobs, increase in tourism revenue by \$60M over 10 years, new tax revenues of \$10M
- Partnered with NPS Civil war Visitor center at Tredegar ironworks site, outdoors movies and shows, adjacent shopping and entertainment at Shockoe slip district
- Loft housing
- Restaurants, offices and new shops
- 10 large sites available for development

#### **The Impact**

- New development under contract incl. Retail and 4 floors of office in old freight house
- Another parcel underdevelopment in the old hydroelectric plant for 160 upscale apartments, office and parking

#### **The Costs**

\$500M

Partially financed with federal sewer overflow system funds for \$30M and corporation charges adjoining property owner special tax

**Contact: Richmond Riverfront Corporation**

**(804) 648-6549**

**<http://www.richmondriverfront.com/canalwalk.shtml>**

## OTHER COMPARABLE EXAMPLES



**Lowell, MA**, Converting various mill buildings into museums and other attractions revived Lowell, Massachusetts, under the direction of the Lowell Historic Canal District Commission, the mills. Lowell National Historical Park, one of 387 units of the National Park Service, preserves and interprets the history of the American Industrial Revolution in Lowell, Massachusetts. The park includes historic cotton textile mills, 5.6 miles of power canals, operating gatehouses, and worker housing. Turn-of-the-century trolleys operate March through November.

Contact: Public Information Officer  
978-275-1705



**Savannah, GA** has restored the historic waterfront and added over 100 unique shops and galleries, restaurants, nightspots, and inns and hotels. Festivals are held year-round. Today, the City Market is thriving once again. People come to meet, to do business and to talk of the day's events. And yes, there are still horse-drawn carriages.

Contact: Marcie at 912.232.4903  
<http://www.savannahgeorgia.com/>



**Alexandria and Arlington, VA** are two distinct communities across the Potomac River from Washington, D.C. Old Town Alexandria's history stretches back to 1699 and has hundreds of restored buildings, homes, churches, and taverns. Visitors walk along cobblestone streets and visit a revitalized waterfront. Arlington, Virginia is a more contemporary town and has many major attractions including: Arlington National Cemetery, the U.S. Marines Corps War Memorial and the Pentagon. In the Roslyn section, just across the bay from Georgetown, is the Museum, which offers a behind-the-scenes look at the news business.

Contact: Dawn Campbell, Business Manager  
703.838.4565  
<http://www.torpedofactory.org/>





### **Indianapolis Waterfront Upper Canal Revitalization Project, Indianapolis, IN**

opened up the under-utilized urban land in rundown neighborhoods and along the historic old canal. A new open civic space was created in a semi-round basin, about 160 feet by 200 feet. The open space is accented by walkways, walls, lighting and plantings and has created a multi-purpose civic space. The basin's edges accommodate boat launching and mooring. Specialty lighting has played a role in making the space safe at night for jogging and walking and has added to the vibrancy of the downtown. Residential development was built along the canal to make use of the public park amenity.



**Erie-Mohawk Canal System, NY** has been redeveloped as the Syracuse Inner Harbor. There is an amphitheater pavilion, interpretive displays, a creek walk, marina and charter boat operations, restaurants and retail shops, waterfront housing and a waterfront promenade.



**Pawtucket, RI** is a former textile community with a population of about 73,000. The area has many historic buildings documenting the early history of the textile industry. These include the Slater Mill (1793), birthplace of American industry, the Sylvanus Brown House (1758), an early skilled worker's home; and the Wilkinson Mill (1810), which houses an authentic 19th century machine shop. A reconstructed 16,000 lb. water wheel (c.1826) is in operation. Demonstrations of operating early textile machinery and hand spinning and weaving are regularly scheduled.

**Contact: The Blackstone Valley Visitor Center**

171 Main Street, Pawtucket, RI 02860

401-724-2200

<http://www.tourblackstone.com>





**River Walk, San Antonio, TX**, the nonprofit Paseo del Rio Association was founded in 1969 to promote and support the San Antonio River Walk to be the number one tourist attraction in Texas. The River Walk is recognized as a key element of the city's character, visitor industry and its economy.

The major theme is preservation of the River Walk's character and ambiance, as well as the enhancement of the San Antonio River's environmental integrity.

Contact: **Richard Terrell**, CEO & Executive Director  
(210) 227-4262  
<http://thesanantonioriverwalk.com>

## COMPARABLE MARKETS



**The Pike Place Market, Seattle, WA** is a nine-acre historic district which hosts nine million visitors each year who come to experience the unique sites and sounds of Seattle's downtown public market. Helping to make up the Market experience are more than 100 farmers, 150 craftspeople, nearly 300 commercial businesspeople and 50 performers. But the Market is much more than a Seattle attraction. It also provides a home to 500 residents, most of whom are low-income seniors, as well as a variety of services for the needy.

Contact: Daniel Lieberman, Executive Director,  
(206) 682-7453  
<http://www.pikeplacemarket.org/>



**The Reading Terminal Market, Philadelphia, PA** has everything from homemade falafel, to caviar to Amish pretzels freshly rolled and baked all day long. Local specialties from over 80 vendors include scrapple, cheese steaks, chocolate-covered pretzels, Black Angus steaks, smoked hams and Basset's Ice Cream, where you can still sit at the original marble counters and people-watch. The market is open Monday through Friday, 8am to 6pm.

Contact: **General Manager:** Paul Steinke  
215-922-2317  
<http://www.readingterminalmarket.org/>



**River Market, Little Rock, AR** is a carefully crafted, intentional, and diverse medley of owner-operated shops, stalls, and/or day-tables existing to fill a public purpose and reflecting that which is distinctive about a community while meeting its every day shopping needs.

Located in the heart of Little Rock's new River Market District, the River Market is an exciting public food market that will entice your senses with its relaxing entertainment and rich cultural experiences. Located in the Downtown Little Rock's Riverfront Park, adjacent to the River-fest Amphitheatre, at 400 President Clinton Avenue, Little Rock.

**Contact:** Office 501-375-2552  
<http://www.rivermarket.info/>



**Riverfront Market, Wilmington, DE** is a bustling public market tucked in an historic warehouse on the banks of the Christina. The Market occupies a beautifully restored historic warehouse, which features vaulted ceilings, heavy timber construction and exposed brick walls.

Inside, the Market boasts a European-style marketplace, with local farm goods and casual café seating. Vendors occupy the ground floor of the building, where they sell fresh produce, meats, seafood, baked goods, flowers, coffee, pasta, sushi, Thai foods, gourmet treats and more. A second-story balcony provides seating for visitors. Vendors and products include:

- Seasonal fruits and farm-picked produce
- Fresh bread, specialty coffees and decadent pastries
- An ocean of fresh seafood
- Choice cuts of meat and poultry from the local butcher
- Prepared foods like deli sandwiches or Japanese, Thai and Italian specialties
- Home made ice cream
- Butcher shop and bake shop
- Fresh produce market

Contact: TJ Healy  
 (302) 425-4454  
<http://www.riverfrontwilmington.com/>

# ***Appendix 6 - Tech Memo #6***

## ***Community Liaison Activities***

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# Tech Memo #6

**To:** File

**Fr:** Daniel R. Benoit

**Re:** **Blackstone Canal  
Transportation and Circulation Study  
Worcester, MA**

**Dt:** March 12, 2003

## Overview

At the beginning of the study, Rizzo reviewed documents prepared by others regarding the community participation and commentary that has been developed since 1992. A significant volume of work has been developed over the past 10 years. It helped to establish baseline data for the Rizzo Team.

## Documents reviewed

- Final Environmental Impact Report (Union Station)
- Union Station Urban Revitalization Plan
- Union Station Area Development Implementation Strategy
- Green Island Neighborhood Planning Initiative
- Quinsigamond Village Neighborhood Planning Initiative
- Franklin Science Park Redevelopment Study
- Blackstone River Valley National Heritage Corridor Commission 10 Year Plan

## Community Outreach

The Rizzo team's initial public meeting was held on May 1, 2002. Approximately 75 people attended the meeting at the PNA Club on Millbury Street. A mix of local residents, business owners, community activist and City officials were present.

The purpose of the meeting was to introduce the Rizzo Team and to give a brief outline of the scope of work. The Project overview focused on providing the information necessary to achieve the following three goals:

- Revitalize the Neighborhood
- Create a dramatic new Gateway into the City
- Preserve, enhance and interpret Worcester's Canal Era



## Summary of May 1st Meeting Comments:

- Excellent opportunity to “uncover” some of Worcester’s history
- Extend study to Washington Square
- Find Solutions for Kelley Square
- Minimize impact on existing businesses and residents
- Preserve historic structures
- Project can be a catalyst for economic development and tourism
- Recognize the original canal basin on Thomas Street
- Bikeway is powerful quality of life tool
- Integrate with Quinsigamond Village
- Coordinate with Mass Highway at Brosnihan Square

Following Rizzo’s initial meeting, the team engaged in a series public outreach of meetings and interviews. Our first meeting was a walking tour of the area north of Kelley Square with local real estate broker Phil Reid. Mr. Reid has a unique perspective of the area and is one the key people involved in raising the city’s awareness of the Blackstone Canal and its importance to the development of the city of Worcester. Following this tour the team met with representatives of the Worcester Historic Museum and the Blackstone Valley Nation Heritage Corridor Commission. This session coupled with information from Preservation Worcester gave the team a detailed understanding of Worcester’s history as it relates to the canal and its industrial heritage, hi-liting the ebb and flow of the development of the Green Island Area.

Next, a series of meetings was held with interested community groups and individuals to discuss their concerns and provide groups with an opportunity and a forum to further comment on the proposed scope of work. These where:

- Blackstone River Valley National Heritage Corridor
- Blackstone River Valley Chamber of Commerce
- Worcester Department of Public Works
- Canal District CDC
- Canal Task Force
- Madison North Business Association

Jim Condon	Table Talk
Neil Smith	Goldstein Scrap Metal
Seth Derderian	Joseph Lock & Safe
Rick Spokis	International Brake
Paul Wasgatt	Insurance
George Segal	Fairway Beef
Steve Westerman	Westerman Restaurant Supply
Peter Wyatt	Worcester Gear Works
Ron Brooks	Wyman- Gordon
Jim Patrick	Patrick Motors
Selim Lahoud	Heywood Building
Bill Bibeau	Charlie’s Surplus

Comments varied between public and private groups. Public groups tendes to be supportive of the proposed public improvements while private property owners were concerned with issues of access to property, eminent domain takings and loss of business. Many of the Madison North Business Association were skeptical of the City’s ability to find funding for the proposed scope of

work. An other concern was the implementation of the proposed plan. Many of the stakeholders that we spoke with have been involved in previous attempts the City has made to revitalize this area of the City and have been disappointed with the lack of results. The privately held Wyman Gordon Company was contacted for input into our process. While their land is outside of our study area, the development of that property will have lasting impact on the study area. The Company owns approximately 25 acres of land in the Green Island area. The existing buildings on the site are being razed and an environmental cleanup will be undertaken so that the site can be marketed by Wyman Gordon. Therefore, we felt it was extremely important to suggest some compatible re-use in our study.

A second public meeting was held on June 19, 2002 at the PNI Club to review the team's Existing Conditions report. Approximately 55 people attended this meeting. The following is a summary of the June 19<sup>th</sup> Meeting:

To much focus on Green Island neighborhood. This is a national story.

What was the origin of this study? How was it funded?

What is the cost of implementing this proposal?

Is there enough water for a canal?

Does this study look at treating storm water?

What is the exact location of the Canal?

Preliminary development concepts were then developed and presented to the Blackstone Canal Task Force. Input was received from various participants in the process and a draft Vision Plan was then developed which incorporated the concerns expressed by the community. A series of follow-up meetings was scheduled with the community group to present the draft vision plan. Comments and reactions were received and modifications were incorporated into the final draft of the plan.

Our third public meeting was held on October 17, 2002 at the PNI Club with approximately 75 to 100 people in attendance. The Team lead by John Shields of ICON presented the proposed concept plan to the group and then went into a break out session to discuss the plan in more detail with the group. The groups were asked to respond to three basic questions regarding the five sectors of the plan. 1.) What do you like? 2.) What are you concerned about? 3.) What would you do first? The following is a summary of those sessions:

What do you like?

- Historic Markers

- Encourages investment/renovation of existing storefronts and housing

- Fenway concept

- Bike path

- All areas are unique and have their own charm

What are you concerned about?

- Need to maintain affordable housing

- Preserving historic structures

- Flooding
- Keeping the Canal clean
- Eminent domain takings
- Deterioration of business district
- Adequate supply of water to canal
- Impact of wider I-290

What would you do first?

- Open Canal from Washington Square to Kelley Square
- Canal segment at Crompton Park
- Brosnihan Square because of 146 project
- Kelley Square reconfiguration

Reaction to the public meeting was generally positive as was noted in the Telegram's coverage of the meeting in the following day's paper. The Editorial in the Sunday Telegram also was supportive of the concept. Saying that they were skeptical with the concept at first, they now feel that the project has the potential to revitalize the neighborhood. Lastly, on October 24, 2002 the paper ran a full color page of the plan, renderings and photos stating that those who attended the meeting were generally impressed by the design.

Subsequent to the public meeting, briefing sessions were held with the Mayor's task force on the Blackstone to discuss coordination with the Blackstone Visitors Center and look at possible funding packages for the projects. The team also met with Congressmen McGovern to discuss possible funding. Also, members of the team have met with Worcester's DPW Traffic Department and Sewer Department to discuss the implications of the proposed concept plan.

#### Continuing Outreach

The Team continues to meet with the Blackstone Canal Task Force to refine the final document. Also, a meeting with the architects for Union Station is being arranged to coordinate issues around the proposed bus port location for the station.





# Acknowledgements and Credits

## Acknowledgments

**This Plan has been prepared for the City of Worcester, Office of Economic Development. The Blackstone Canal Task Force, comprised of stakeholder agencies and concerned citizens selected by an open public process by the City of Worcester, supervised the work and provided policy direction for the Plan.**

Allen Fletcher, *Task Force Chairman*  
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Barbara G. Haller, *Worcester City Council*  
Paul Clancy, *Worcester City Council*  
Paula Buonomo, *Office of Congressman McGovern*  
Debra Lockwood, *Executive Director, Canal District CDC*  
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Robert Largess, *Green Island Business Owner*  
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Lee Dillard Adams, *Deputy Regional Director, Massachusetts DEP*  
William Wallace, *Executive Director, Worcester Historical Museum*  
Jill DuPree, *Holy Cross College*

Appreciation is expressed to the many citizens and officials who assisted the Blackstone Canal Task Force and the Project Team in the data collection, review of work in progress and attendance at the many informal sessions and the Public Meetings. Special thanks to involved members of the Madison North Business Association: Rick Spokis, Neal Smith, George Sigel, Seth Derderian, Paul Wasgatt and Steve Westerman. Their suggestions and opinions were of critical importance in shaping the final recommendations.

The work was funded by the Massachusetts Highway Department, and the U.S. Department of Transportation Federal Highway Administration. Important assistance was provided by the National Park Service, through their ongoing involvement in the John F. Chafee- Blackstone River Valley National Heritage Corridor, which includes this project area within its boundaries.

Special assistance in preparation of the Plan was provided by the Canal District Community Development Corporation, who provided meeting space and coordinated community liaison activities, including a series of Public Meetings. Sincere thanks to Deborah Lockwood, Executive Director and Lorraine Laurie, Community Outreach Coordinator .

*The opinions, findings and conclusions in this publication are those of the authors and not necessarily those of the Massachusetts Highway Department, the Commonwealth of Massachusetts, the U.S. Department of Transportation Federal Highway Administration, the Department of the Interior, or the National Park Service.*

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