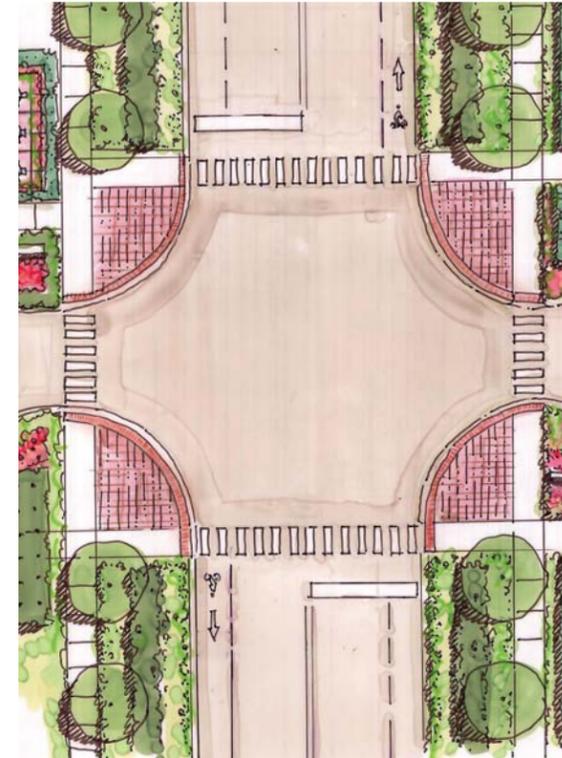


# TRAILS AND PATHWAYS MASTER PLAN

CITY OF TROY, MICHIGAN





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# TRAILS AND PATHWAYS MASTER PLAN

CITY OF TROY, MICHIGAN

OCTOBER 2009

The Troy Trails and Pathways Project is a comprehensive plan to establish a network of recreational, multi-use trails that connect people to important destinations in a safer, greener and a more accessible way appropriate for all users. The plan shall guide planning, development, management and operations of existing and future bicycle and pedestrian transportation that fits into the fabric of the City of Troy and also makes regional connections. It is designed to be a flexible document that will change and grow, incorporating new treatments as appropriate.

**Prepared by:**

Hamilton Anderson Associates, Inc.  
The Greenway Collaborative, Inc.

**For the City of Troy Parks and  
Recreation Department in Partnership with:**

Trails and Pathway Committee  
City of Troy Planning Department  
City of Troy Traffic Engineering  
North Woodward Community Foundation



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## TRENDS

- People have an increased interest in healthy lifestyles.
- People are seeking alternative modes of transportation as energy prices rise and resources are depleted.
- Progressive communities currently have or are developing non-motorized transportation systems.
- Trails are sought after amenities in desirable communities.



Communities the world over are recognizing the viability of non-motorized transportation modes. While walking has gained popularity and recreational cycling is still the primary use of bicycles in this country, the number of people walking and biking to work and other activities has been steadily increasing since the early 1970s. Nationwide, people are recognizing the energy efficiency, cost effectiveness, health benefits and environmental advantages of non-motorized travel. The emphasis now being placed on non-motorized transportation requires its consideration in all phases of transportation planning, new roadway design, roadway reconstruction capacity improvement, transit projects and off-road amenities.

This plan outlines a strategy for people to enjoy newly created plazas in places formerly occupied by speeding traffic; safely negotiate through pedestrian friendly streetscapes in school zones, senior districts, and the areas around transit stations; and ride in protected bicycle lanes. Trails offer opportunities for walkers, runners, bikers, roller bladers and skiers to exercise, improve health, reduce stress, enjoy the outdoors and view wildlife.

Any non-motorized system should create a hierarchy of amenities ranging from a network of signed bike routes and dedicated bike lanes on roads, to off-road paths and bus connections. The network should seamlessly link bicycle, pedestrian, vehicular and mass transit systems to adjacent communities and recreation systems.

The Troy Trails and Pathways Master Plan establishes and promotes a network of recreational, multi-use paths connecting people to destinations in a safer, greener, and more accessible way. These paths also connect to other trail systems in Southeast Michigan. Regionally, the pathway will add to the developing Michigan trail system, helping to implement a larger recreation model for Southeast Michigan, and will encourage the State's economic plan that identifies ecotourism as a future revenue source. Locally, the trail will enable non-motorized, sustainable travel opportunities throughout the City.

# PLANNING PROCESS

A sound foundation for the Trails and Pathways Master Plan began as a collaboration between the City of Troy, Troy Trails & Pathways Committee (TTC), and the North Woodward Community Foundation (NWCF). A volunteer committee worked to establish a mission statement, vision statements and preliminary ideas for action from which the design team was able to build.

The community's vision was a pathway network plan that would identify development strategies that connect residential neighborhoods to parks, schools, shopping areas, dining, recreation and work centers. This network would then link to non-motorized systems in adjacent communities so users could easily walk or bike to nearby regional non-motorized corridors.

To transform these early ideas into a guiding document for the City's pathways system, the City of Troy engaged the consulting team to continue a highly participatory process, assess all reasonable alternatives, design a final plan and build momentum for implementation. A work plan was developed exploring ways to improve recreation opportunities and incorporate environmental enhancements while honing a sense of community identity. The health and safety of the area's residents was the primary consideration in all design decisions.

The work plan included the following tasks:

- Pre-design
- Inventory and Analysis
- Programming and Strategic Approach
- Final Master Plan

## PRE-DESIGN

A project kick-off meeting was held with city staff, and key representatives of the Troy Trails and Pathways Committee (TTC) to further define the work plan, discuss general goals, transfer background information, discuss and refine the project schedule, and establish communication lines.

Existing documents were obtained and reviewed. A working list of additional needs was developed along with a process for communication with the City and TTC.

Research was conducted regarding issues that could affect the master plan such as:

- Bicycle users and facility types
- Intersection Safety
- Complete Streets
- Engaging Public Space
- Bringing Green to a Greenway
- Trends or projections that would affect the feasibility and/or development of a trail system, including all applicable codes and laws (i.e., ADA, etc.).
- Zoning and /or other City ordinance and /or code changes necessary to complete the plan.
- Sensitive areas and concerns that may have an impact on this plan and its implementation.

The Team reviewed the TTC's goals and objectives and classified them into a usable matrix from which they were able to organize their progress.



## Existing Conditions

The photos above show the variety of road and pathways systems in Troy. They range from highway overpasses, to neighborhood streets, to off road trails. These varying conditions will require different design solutions to effectively equip the City with a viable non-motorized transportation system.



## INVENTORY AND ANALYSIS

A base map for testing greenway design concepts was produced using information and aerial photographs provided by the City and/or Oakland County.

Site visits were conducted to review the physical conditions of the project area and survey the City's public corridors. The survey identified elements affecting character, roadway rights-of-way opportunities and constraints, potential connections to pathways outside of the City and potential linkages to community destinations such as parks and recreation facilities, historic landmarks and cultural attractions. Field observations included the following:

- Existing traffic lights
- Existing ROW planting types and condition
- On-street parking locations, existing street widths and condition
- Potential for "greening" the pathways and trails
- Potential locations for interpretive signage, kiosks and wayfinding amenities
- Priority travel routes, travel zones, origins, and destinations
- Identification of primary road segments that are candidates for the addition of bike lanes through lane narrowing, 4 to 3 lane conversions and paving of shoulders.
- Intersections and crossings such as condition, spacing, potential for improvement
- Desirable and undesirable views
- Institutional, commercial, and recreational assets, schools, parks, anchors, amenities, historic markers and other points of interest or destinations
- Recreation opportunities
- Block size
- Sidewalk condition and potential off-road trails

## PROGRAMMING AND STRATEGIC APPROACH

A day/evening-long workshop with the TTC and key City of Troy department heads was held. The site analysis documents prepared in the analysis phase were used to generate discussion and guide decisions.

### Programming

Based on input gained during the first workshop, the consulting team conceptualized preliminary program and pathway opportunities. These early efforts solidified fundamental project goals and objectives and began to establish parameters to separate strategic alternatives into categories of immediate and phased implementation. Preliminary documents included the following considerations:

- Bike Route and Bike Boulevard Preliminary Routes – identification of proposed routes and improvements to enhance and/or modify the existing bike route system and establish some routes as bike boulevards
- Off-Road Trail Preliminary Routes – Identification of preliminary routes for the off-road trail system
- Complete Street Recommendations – Recommendations for the primary road segments including road modifications to incorporate bike lanes, mid-block crossing islands, sidewalk enhancements, landscape, lighting and site amenities.

### Strategic Plan

In addition to programming, the consultant team provided the following tools/strategies to systematically move the plan forward:

- Priority routes and improvements
- Prioritization Matrix – prioritization of all elements of the preliminary plan based on existing facilities, the existence of adjacent alternative routes, relative demand, safety concerns and street resurfacing plans. Improvements were classified into near-term, mid-term and long-term proposed improvements.
- General Cost Opinions – Order of magnitude cost estimates for all proposed elements of the plan were identified
- Phased Capital Program – cost estimates were coordinated with the prioritization matrix

## FINAL MASTER PLAN

A final document was prepared outlining the process and final vision for the Troy Trails and Pathway Master Plan. The document is a tool to help the City reach its non-motorized transportation goals. It contains:

- Brief description of the planning process
- Predesign research findings
- Assessment of opportunities and constraints of existing and future paths
- Proposed Phases of implementation
- Cost estimates for development
- Performance evaluation tools and instruments for use by the City to determine levels of success
- Potential funding sources.
- Phased capital program – a phased and prioritized multi-year capital development plan with suggested implementation strategies to finance the plan.

A Final Review Meeting was held to present the draft document to designated city officials and others to obtain final input.

The Final Pathways Master Plan presented here includes all revisions as required by the City and key stakeholders.

# PREDESIGN

## BICYCLE USERS

In order to best accommodate bicycle traffic and create appropriate transportation linkages it is important to consider different types of users and the types of pathways they prefer.

Bicycle users fall into various categories based on their comfort level in relation to the various facilities as well as the level of frequency that they bike. Bicycle user types include the following:

### Strong and Fearless

- Less than 1% of the population
- Biking is primary form of transportation
- Feel comfortable biking on any road regardless of condition

### Enthusied and Confident

- About 7% of population
- Frequent rider
- Prefer designated facilities such as bike lanes

### Interested but Concerned

- About 60% of population
- Occasional rider
- Prefer local roads and trails

### No Way, No How

- About 33% of the population
- Do not bike, but use sidewalks, crosswalks and trails and will benefit from improved facilities



**Strong and Fearless**



**Enthusied and Confident**



**No Way, No How**



**Widened Sidewalk in a Neighborhood**



**Widened Sidewalk in an Urban Space**



**Local Road Biking**



**Traditional Bicycle Lane**



**Bicycle Lane Along a Transit Route**



**Bicycle Lane Striping**



**Trail Network Biking**

## **FACILITIES**

The types of bicycle pathways that will be considered are the following:

- Bike Lanes
- Shared Path
- Local Roads
- Trails

### **Bicycle Lanes**

Bicycle lanes are used by the “strong and fearless” and “enthused and confident” riders. These facilities are located within the roadway and are dedicated for bicycle traffic only. Bicycle lanes are designated by a thick white striped line, painted bicycle icons and bike lane signage. Riders using bicycle lanes travel along side traffic in the same direction. Lanes are typically located in the outside or right lane of the direction of travel, but may also exist between automobile traffic lanes and bus/transit lanes in denser urban areas. Bicycle lanes create good visibility for a cyclist by allowing them to travel along the same route as automobiles.

### **Widened Sidewalks**

Widened sidewalks offer another alternative for the “strong and fearless” and “enthused and confident” riders. These facilities are typically shared by cyclists and pedestrians but are not officially designated as bicycle facilities. Sidewalks are typically ten feet wide or greater in order to allow pedestrians and cyclists to comfortably pass side by side. Planted turf areas are positioned between the roadway and widened sidewalk to buffer users from roadway traffic.

### **Local Roads**

Low traffic volumes and reduced speeds on local roads provide a facility for “interested and concerned” riders to feel comfortable. These roads do not have designed bicycle facilities, yet still allow the rider to cycle alongside of traffic. Wayfinding signs are an important element to help strengthen key linkages, since no other designations clearly mark the way.

### **Trails**

Off road trails serve as another facility for the “interested and concerned” rider. These trails may be either paved or gravel and have little interaction with vehicular traffic. Trails are typically reserved for recreational use rather than for transit, but can provide excellent linkages between City parks and other key destinations.

Wayfinding signs are also an important element to these facilities.

**PATHWAY SAFETY**

Creating safe travel routes for non-motorized transportation is an essential element for a successful pathway plan. The geometric design of a street intersection is integral to how motorists, bicyclists and pedestrians behave on them. Geometry also affects a street's economic, community and environmental impact. The following design features can help slow automobile traffic and improve pedestrian and automobile awareness while beautifying spaces.

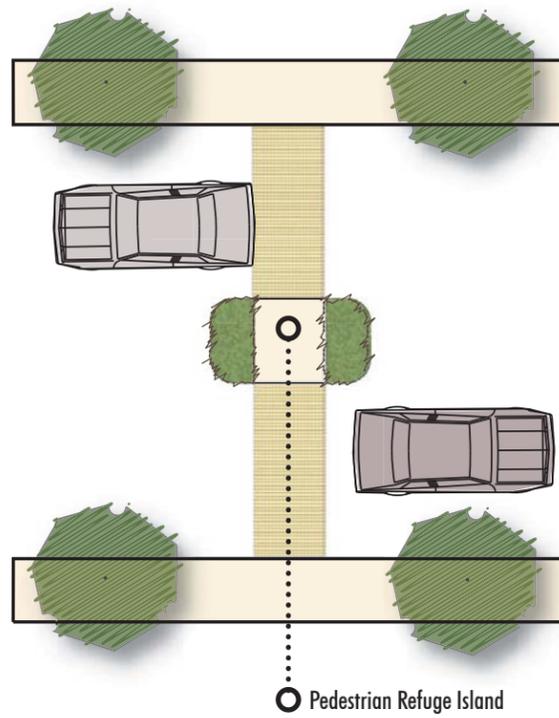
**Crossing Islands**

Pedestrian refuge islands are an excellent way to reduce the length a pedestrian has to cross on wide streets. Islands offer a resting place for pedestrians, allowing them to cross only one direction of traffic if time does not permit a full width crossing.

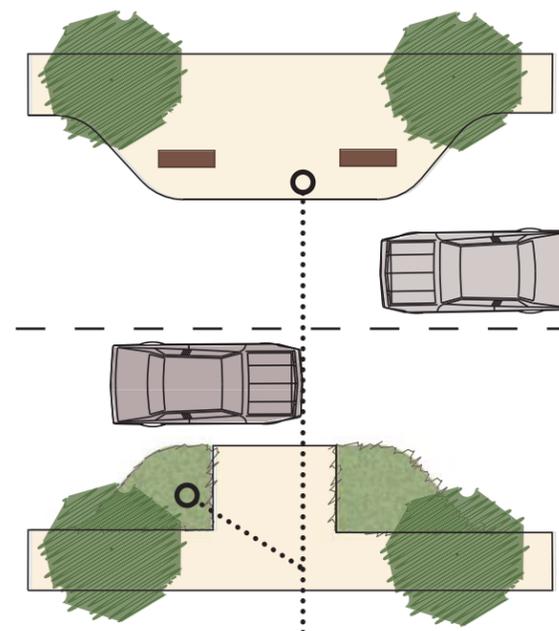
Offset crosswalks can further enhance safety offered by refuge islands. These treatments are designed so crosswalks are split by a median with an offset on either side of the median. This forces pedestrians to face oncoming traffic before turning again to complete the roadway crossing. Offset crosswalks are particularly useful for non-signalized and midblock crossings.

**Bulb-Outs**

Bulb-outs are curb extensions used to narrow the road and widen the sidewalk at intersections and midblock crossings. Bulb-outs not only improve driver awareness, but create better visibility for pedestrians by opening views to the street that might otherwise be blocked by parked cars. When appropriate these areas can be planted to reduce impermeable, heat absorbing asphalt and increase storm water infiltration capacity.



○ Pedestrian Refuge Island



○ Bulb-outs create opportunities for seating and landscaping



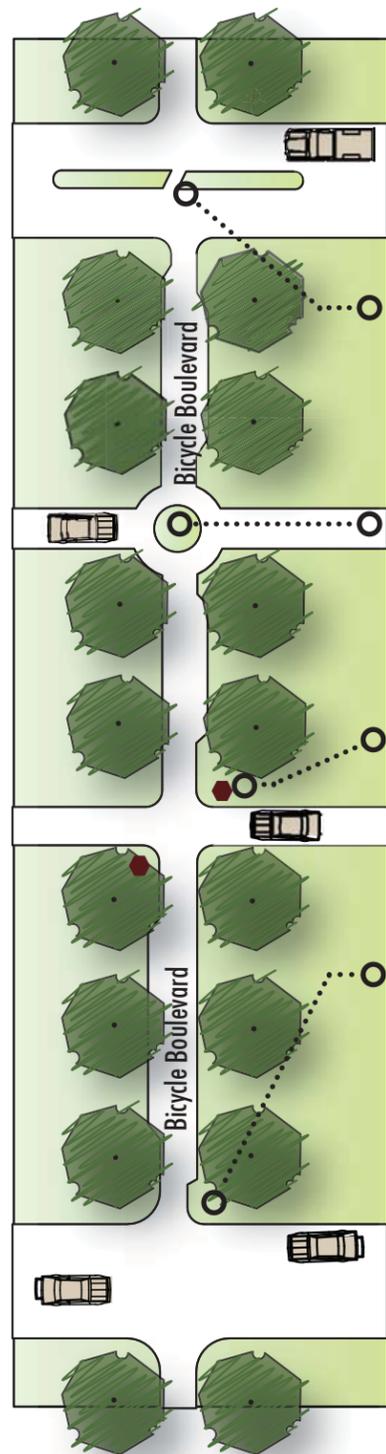
**Crossing Island - Pedestrian Refuges**



**Crossing Island - Off Set Crosswalks**



**Bulb-Outs**



Raised median prevents motor vehicle traffic from cutting through

Traffic circle calms traffic

Stop signs favor through movement on bike boulevard

One-way choker at road entrance prohibits motor vehicle traffic from entering from one direction, although road remains open to two-way traffic

**Bicycle Boulevard Containing Additional Traffic Calming Measures**



**Bicycle Boulevards**



**Traffic Calming Circles**



**Chicanes**



**Pedestrian Beacons**

## Bicycle Boulevards

A bicycle boulevard is a shared roadway which has been optimized for bicycle traffic. In contrast with other shared roadways, bicycle boulevards discourage cut-through motor vehicle traffic, but typically allow local motor vehicle traffic. They are designed to give priority to cyclists as through-going traffic.

Bicycle boulevards are designed to offer the advantages of cycling on shared arterial roadways that experienced cyclists typically value, combined with the advantages of bicycle paths that appeal to would-be, inexperienced, or young riders. Thus, bicycle boulevards can be beneficial to both types of cyclists. Experienced cyclists can enjoy lower traffic without significant increases in trip time. For less experienced cyclists, bicycle boulevards can serve as “stepping stone” facilities that help them move from bicycle paths and trails to shared roadways.

Several traffic calming mechanisms can be used along a bicycle boulevard to limit automobile traffic. These include, medians with cut throughs wide enough for cyclists to travel, traffic circles, bulb-outs and stop signs for boulevard crossing traffic only.

## Traffic Calming Circles

Traffic calming circles are islands typically located in the center of an intersection to slow vehicular traffic by interrupting the traditional street grid. Not only do traffic circles vary the scale of wide streets, they create additional areas for beautification and stormwater management.

## Chicanes

Chicanes create S-shaped paths for traffic flow and can be either mid-block curb extensions or curb islands. Like bulb outs and calming circles, chicanes slow vehicular traffic and add space for landscaping and stormwater management but with alternate rather than aligned geometries. The unique geometry created by chicanes makes them amenable to one-way and two way roads.

## Pedestrian Beacons

Pedestrian beacons are typically used at intersections where there is no signalization. Flashing lights call attention to pedestrian crosswalks where signage or other design treatments are deemed insufficient, crash rates indicate the possibility of a special need, or to provide supplementary warning of a midblock or uncontrolled school crosswalk. The flashers can be activated passively or with pedestrian push buttons.

## CREATING COMPLETE STREETS

“Complete Streets” are roadways designed to accommodate safe access for all users. Pedestrians, bicyclists, motorists and transit riders of all ages and abilities are able to safely move along and across Complete Streets to school, work, play or to run errands. Complete Streets principles and concepts have been and continue to be adopted nationwide at state, county, metropolitan planning organization, and city levels.

Adopting a complete street approach to transportation planning is a critical way to create a safer, greener, and more accessible transportation network. This approach treats non-motorized and motorized transportation equally within the street environment, ultimately creating a more balanced transportation system accessible to all users.

Important elements include:

- Sidewalks
- Bicycle lanes
- Wide shoulders
- Plenty of well designed and well placed crosswalks
- Crossing islands in appropriate midblock locations when block lengths are long
- Bus pullouts or special bus lanes
- Raised crosswalks
- Universal design such as barrier free ramps and audible crossings
- Pedestrian activated intersections
- Sidewalk bulb-outs
- Street trees, planter strips and ground cover, staggered parking, and other ‘traffic calming’ techniques that tend to lower speeds and define an edge to travel ways
- Center medians with trees and ground cover
- Reduction in numbers of driveways
- On street parking and other visual speed reduction methods, when properly designed to accommodate bicycles
- Innovative stormwater techniques
- Wayfinding and signage
- Site amenities such as benches, resting areas, trash receptacles, bus stops, news stands, pedestrian scaled lighting
- Public art



### Shared Streets

- Traffic calming elements
- Transit rider amenities
- Bicycle racks in parking lane



### Reclaimed Unused Space

- Artistic plazas
- Landscaped medians



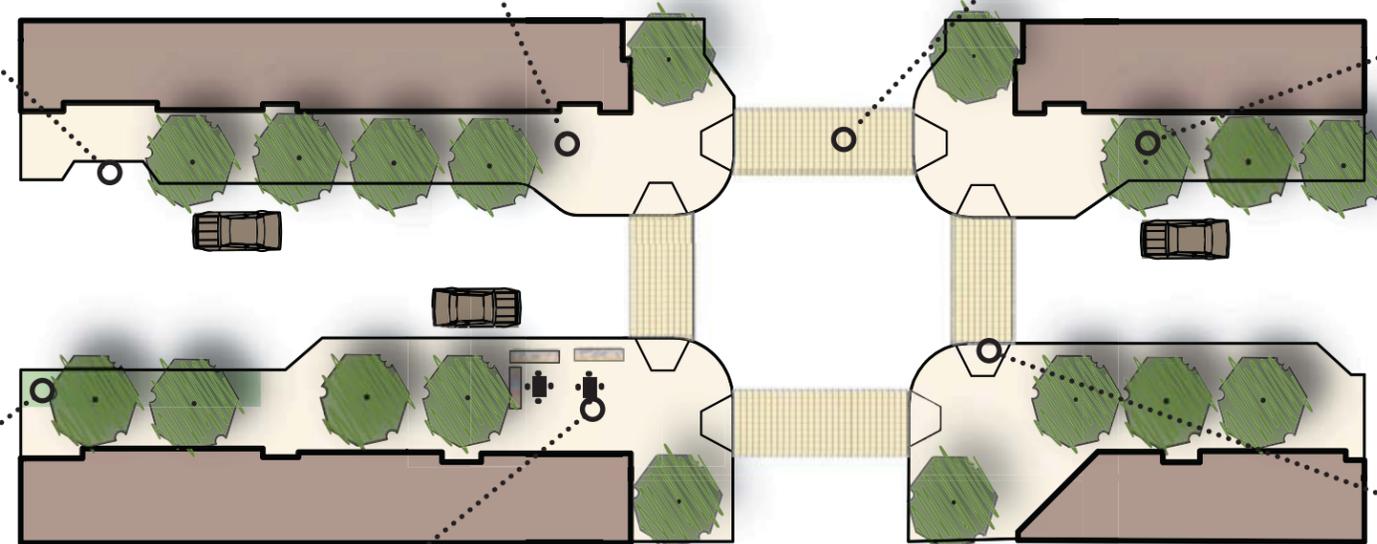
### Pedestrian Safety

- Shorter crossing distances
- Visible pedestrian crossings
- Activated intersections



### Landscape Improvements

- Medians
- Crossings
- Along Pathways



### Environmentally Sensitive

- Stormwater management planting areas
- Permeable pavement
- Urban forests/Street greening



### Public Space Elements

- Safe public seating and site furnishings
- Pedestrian oriented lighting
- Wayfinding signage



### Universal Design

- Sidewalk ramps
- Accessible pedestrian signals



**Bike Racks/Storage**



**Wayfinding Signage**



**Trailheads**



**Pavement Markings**



**Regulatory Signage**



**Seating**

### **Engaging Public Space**

Creating engaging public spaces is an important element for Complete Street design. As a pathway system grows, users will demand more amenities. Small seating areas placed periodically along the pathway system allow people opportunities for resting and gathering; these spaces make users feel comfortable and are recognized as a "place". This in turn reduces vandalism and trash accumulation as more people are invested in the "space". Other site furnishings such as bicycle racks, wayfinding signs, trash receptacles, and public art further strengthen functionality and vitality of the pedestrian realm.

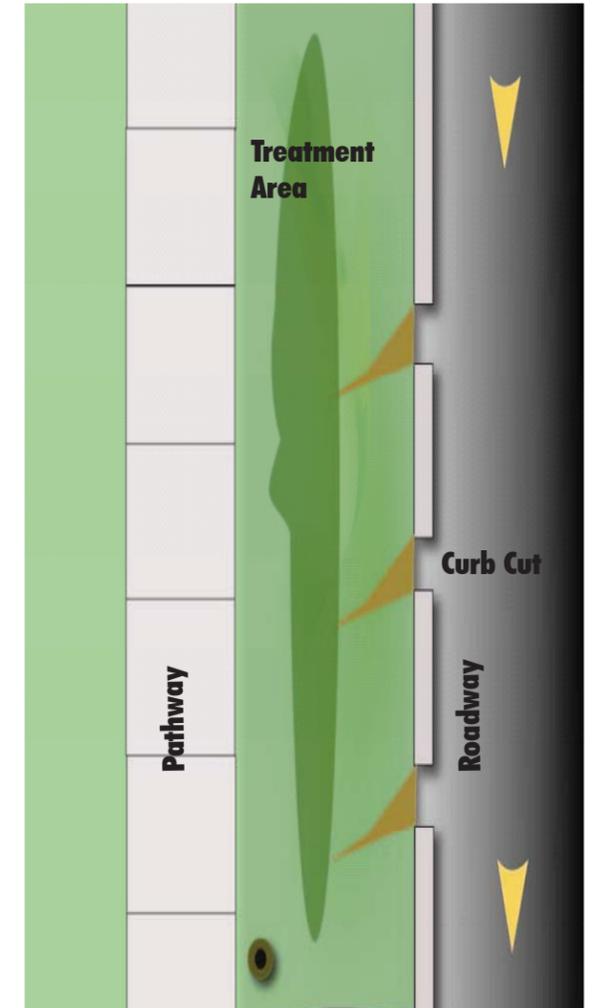
Public art is especially important for unifying spaces, adding visual interest and creating high quality public spaces along a greenway.

These images highlight creative bicycle storage, wayfinding techniques, trailheads and markers, and seating found along a greenway system.

### Bringing Green to a Greenway

Promoting low impact design by providing ecological stormwater management tools is relatively easy and cost effective. Not only do components such as permeable pavement, infiltration planters, and rain gardens help to slow, store and treat stormwater runoff, they enhance traffic calming elements and beautify the pedestrian experience. Where opportunities arise, combining green stormwater initiatives with art and educational signage should be considered to strengthen the sustainability of the pathway network and educate people on the value of ecologically responsible development.

These images highlight innovative ways to incorporate stormwater management techniques into a greenway system. Many ideas are very simple and can be easily incorporated into existing systems.



**Innovative Stormwater Techniques**

## Goals

1. Provide safe, accessible and convenient bicycling and walking facilities to support and encourage increased levels of bicycling and walking.
2. Work with stakeholders to plan and promote a safe, sustainable, non-motorized transportation network that links the people and places of Troy and the surrounding region.
3. Move people and goods safely.

## Action

### Planning

- Develop bikeway and walkway systems that are integrated with other transportation systems and neighboring communities.

### Implementation

Create a safe, convenient and attractive bicycling and walking environment.

### Education

Proactively communicate with residents about the benefits of trails and pathways

### Safety

Create education programs that improve bicycle and pedestrian safety.

## Strategies and Tasks

### Planning

- Integrate bicycle and pedestrian facility needs into all planning, design, construction and maintenance activities of the City of Troy and other transportation providers. Adopt a “complete street” approach to transportation planning.
- Provide financial and technical assistance for bikeway and walkway projects on local streets.
- Adopt design standards that create safe and convenient facilities to encourage bicycling and walking.
- Adopt maintenance practices to preserve bikeways and walkways in a smooth, clean and safe condition.
- Plan more sidewalks, shared paths, bicycle lanes and bicycle routes and bicycle parking facilities throughout the City.
- Design connections between City uses such as schools, parks and commercial and institutional uses, and adjacent communities.
- Expand bicycle parking facilities.
- Coordinate with neighboring communities.
- Give trails a high priority during budget process.
- Align City planning and building codes and public works policies with growth in demand for trails.
- Create coherent and harmonious streetscapes.
- Provide the greatest possible value to the public.
- Contribute to a healthier and more sustainable environment.
- Create a vibrant public realm with high quality public spaces.
- Accommodate all street users, giving priority to the most energy saving, and space efficient modes.

### Implementation

- Retrofit existing roadways with paved shoulders and / or bike lanes to accommodate bicyclists, and with sidewalks and safe crossings for pedestrians. Develop shared use paths where appropriate. Include street furniture, lighting, plantings and art where applicable.
- Provide uniform signing and marking of all bikeways and walkways.
- Align City planning and building codes and public works policies with growth in trails.
- Assign significant dollar amounts to the trails capital fund every year.
- Provide easy access to trail network.
- Accept Pathway Master Plan.

### Education

- Monitor and analyze bicyclist and pedestrian crash data to formulate ways to improve bicyclist and pedestrian safety.
- Publish bicycling and walking maps and guides that inform the public of bicycle and pedestrian facilities benefits and services.
- Develop a promotional program and materials to encourage increased usage of bicycling and walking. (completed)
- Create informational web page (completed).

### Safety

- Develop bicycling and walking safety education programs to improve skills and observance of traffic laws, and promote overall safety for bicyclists and pedestrians.
- Develop safety education programs aimed at motor vehicle drivers to improve awareness of the needs and rights of bicyclists and pedestrians.

## GOALS AND OBJECTIVES

Prior to the selection of the Consultant Team, the Troy Trails Committee completed extensive work to determine their needs and desires for a trail system in their City. The Consultant Team took this information and organized it into three categories:

Goals:

- What the Committee wants to accomplish.

Action:

- How the Committee can accomplish their goals.

Strategies and Tasks:

- Specific obtainable tasks.

The information began to sort itself out in other ways also. The Actions and Strategies fell into four major categories:

Planning:

- Tasks that involve further planning and design.

Implementation:

- Tasks that can be implemented now without further planning.

Education:

- Tasks related specifically to educating the community about the pathway system and the benefits of its use.

Safety:

- Tasks that relate specifically to pathway and user safety.

By breaking down the Goals and Objectives, the tasks become manageable bits that can be broken off and accomplished. Similar tasks can be tackled jointly.

# ANALYSIS

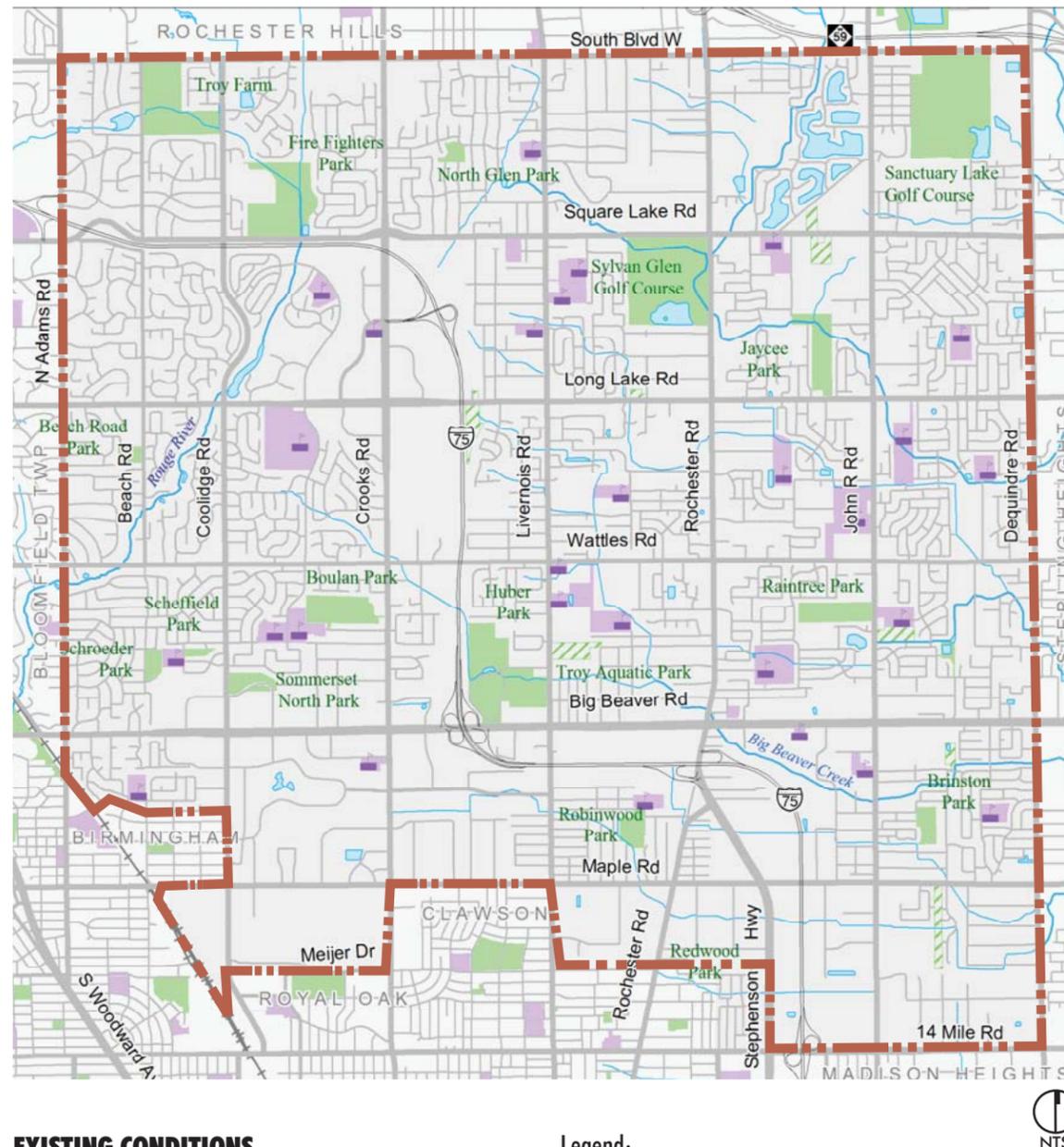
## HISTORY OF DEVELOPMENT

Pioneers emigrating from New York established the community of Troy in the early 1800s, where it prospered as a farming township for over 100 years. Commercial and industrial development began shortly after World War II bringing with it intense residential growth. Troy, incorporated as a City in 1955, is now a culturally diverse community of over 81,000 residents.

Recreational amenities include the Stage Nature Center, Family Aquatic Center, Community Center, two public golf courses and fourteen neighborhood/community parks. More than 12,000 students are enrolled in twelve elementary schools, four middle schools and two traditional and one non-traditional high school.

The City is a vibrant business and technology center recognized for its civic spirit and quality of life. Located in the busy northern Detroit suburbs, Troy's approximately 5,700 businesses employ 125,000 people. Troy is a target for new and expanding businesses in Oakland County with seven million square feet in retail space, 18 million square feet of office spaces and 20 million square feet of manufacturing/engineering space.

But the City of Troy currently has a limited number of trails and pathways for walkers, runners, bikers and skaters. Realizing the significant health, economic, recreational, and environmental benefits that come with trail development, Troy City officials are taking an aggressive approach by creating a state-of-the-art non-motorized network. This document is intended to guide planning, development, management, and operations of existing and future bicycle, pedestrian and recreational transportation infrastructure within the City.



## EXISTING CONDITIONS

Troy is a traditional built-out suburb bounded on all sides by municipalities: Rochester Hills (N), Sterling Heights (E), Birmingham and Bloomfield Twp. (W) and Clawson, Royal Oak and Madison Heights (S). The proposed pathway system should connect Troy's interior to the surrounding communities and regional trail systems. It is transected by arterial Mile Roads that create a strong grid pattern infilled with neighborhoods.

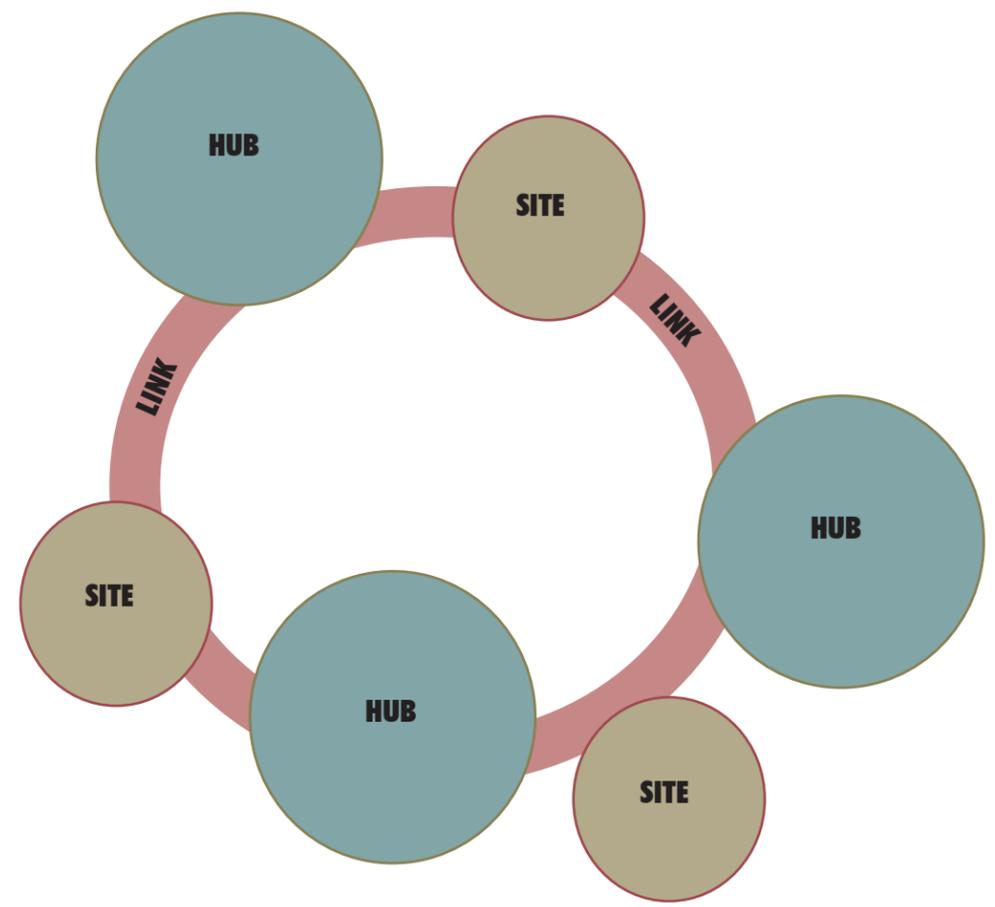
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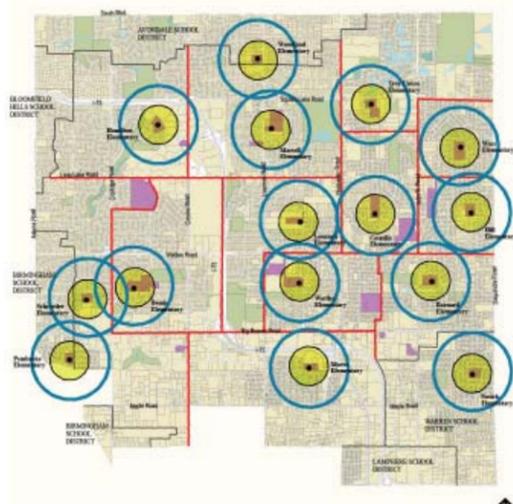
- Schools
- Freeways
- Arterials
- Collectors
- Local Roads
- Railroads
- City of Troy
- Water
- Parks and Recreation
- Proposed City Parks
- Educational Facility



## FABRIC VS. LOOP PATHWAY SYSTEMS

The graphic below illustrates the common "loop" strategy for pathway systems. Traditionally, destinations within a pathway system will be spread out with the path acting as a connector between destinations. The Composite Destination Analysis graphic shows that Troy's destinations are relatively evenly distributed throughout the City, requiring a more gridlike or "fabric" pathway system that provides multiple ways to move through the grid to the various destinations.

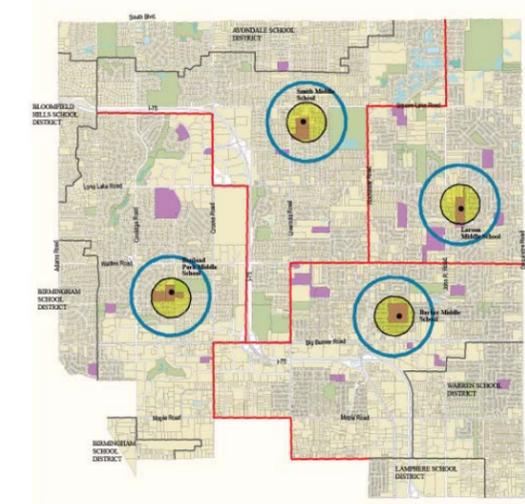




### Elementary Schools

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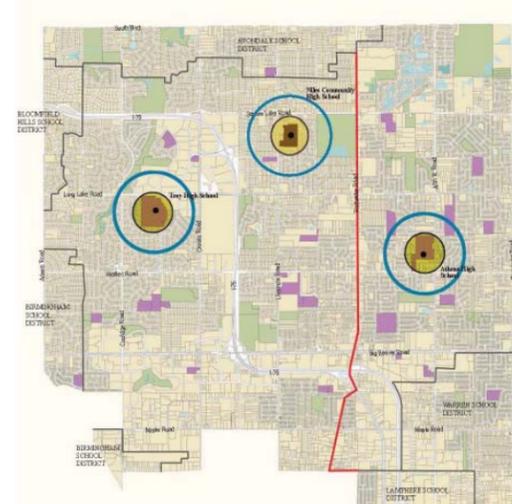
- Biking Draw Area 8 min. - 1/2 mile
- Walking Draw Area 8 min. - 1/4 mile
- School District Limits



### Middle Schools

Legend:

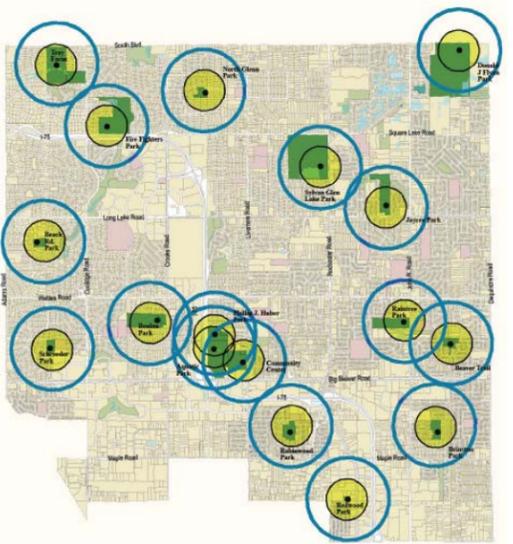
- Biking Draw Area 8 min. - 1/2 mile
- Walking Draw Area 8 min. - 1/4 mile
- School District Limits



### High Schools

Legend:

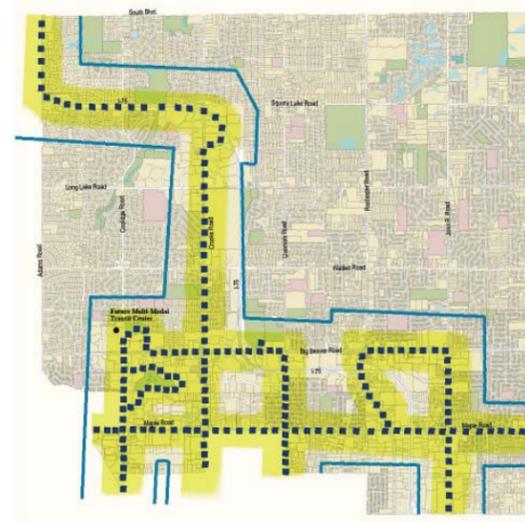
- Biking Draw Area 8 min. - 1/2 mile
- Walking Draw Area 8 min. - 1/4 mile
- School District Limits



### City Parks

Legend:

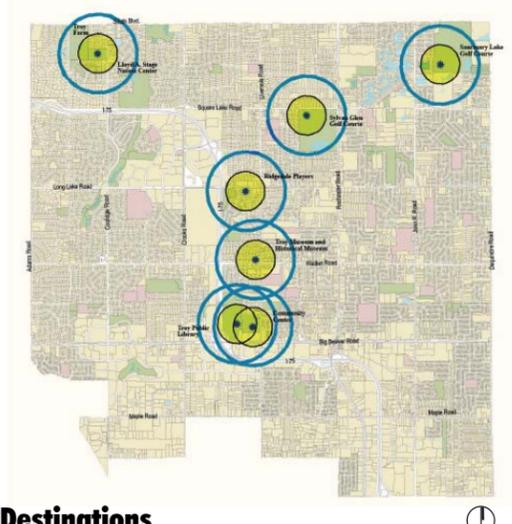
- Biking Draw Area 8 min. - 1/2 mile
- Walking Draw Area 8 min. - 1/4 mile



### Transit Routes

Legend:

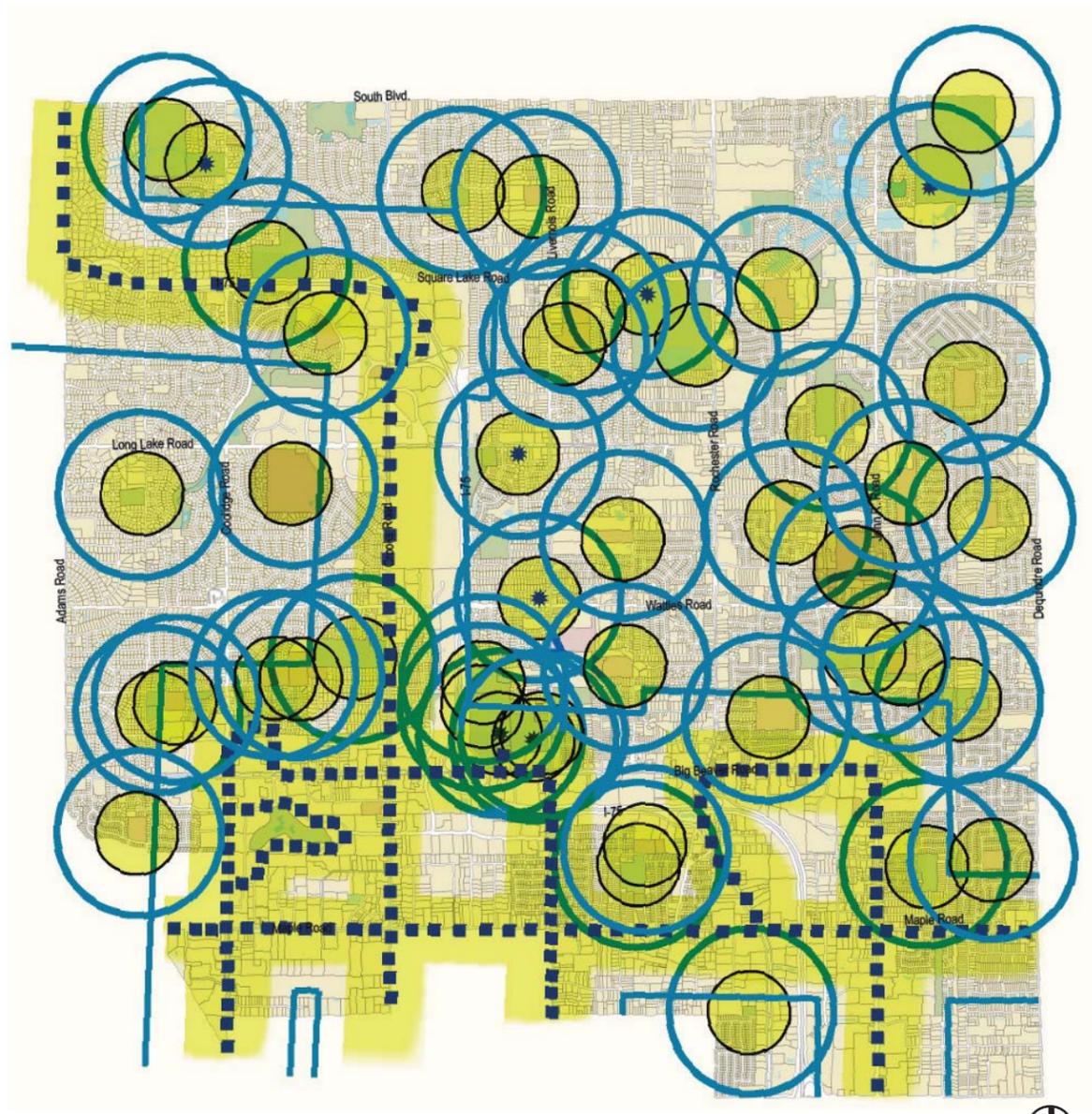
- Biking Draw Area 8 min. - 1/2 mile
- Walking Draw Area 8 min. - 1/4 mile
- SMART Bus Route



### Destinations

Legend:

- Biking Draw Area 8 min. - 1/2 mile
- Walking Draw Area 8 min. - 1/4 mile



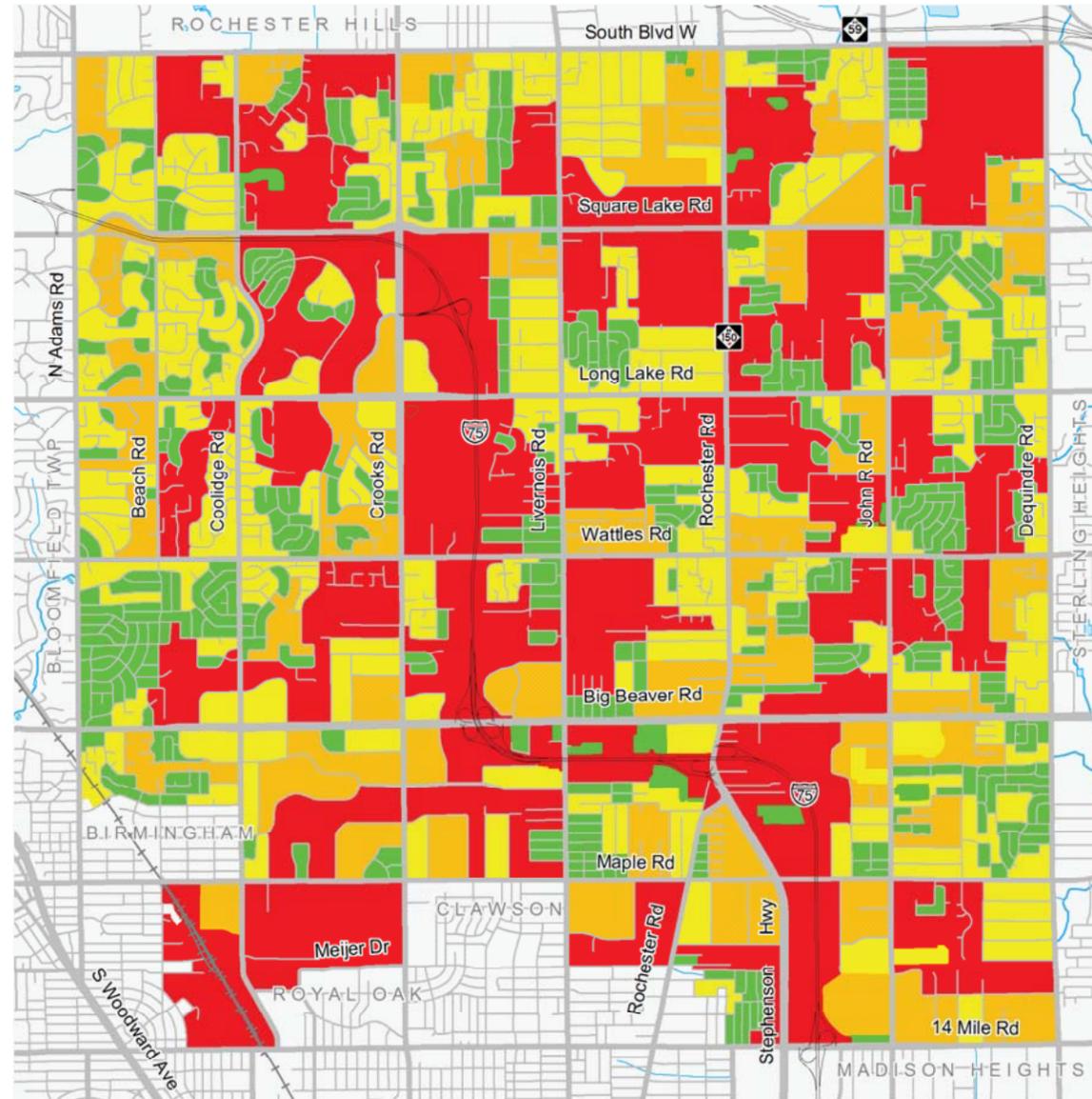
### COMPOSITE DESTINATION ANALYSIS

The large plan illustrates that Troy destinations are evenly dispersed throughout the City. Therefore a "fabric" network of paths rather than a "loop" system common in more rural areas will be necessary.

Legend:

- Bike Draw Area 8 min. - 1/2 mile
- Walking Draw Area 8 min. - 1/4 mile
- SMART Bus Route



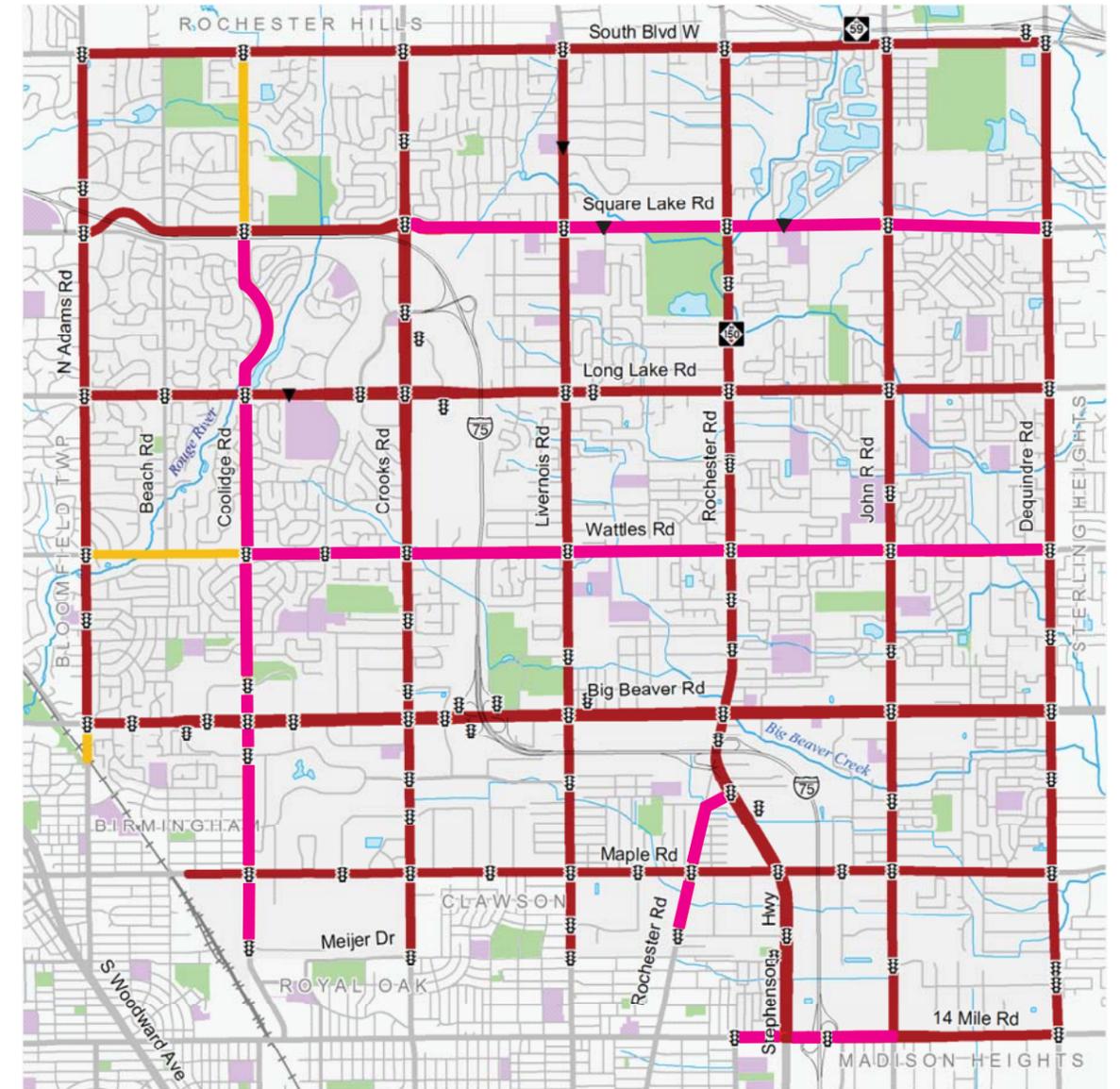


**BLOCK SIZE**

Block size is an excellent measurement of directness of travel. Blocks under 15 acres permit relatively direct travel between destinations. Greater block sizes create nondirect routes of travel and do not conveniently connect pedestrians to their destination.

**Legend:**

- Block Size in Acres
- 100 to 513
  - 50 to 100
  - 15 to 50
  - 0 to 15



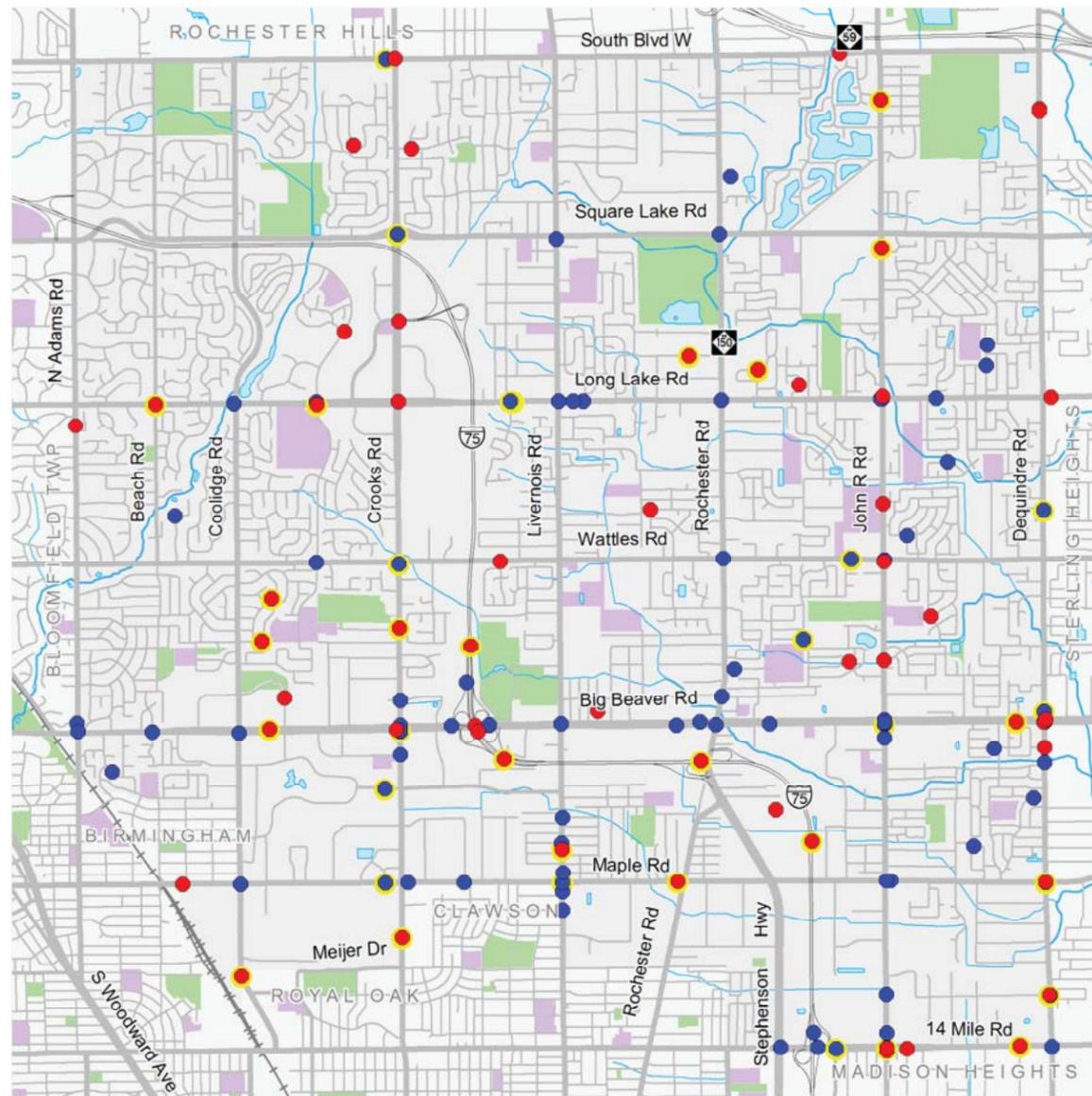
**ROAD CROSSING DIFFICULTY**

Road crossing difficulty is a measurement of how difficult a person would typically find it to cross a road at an unmarked mid-block crosswalk. It is based on the number of lanes, speed and average daily traffic. Grades of A (easiest to cross) through E (most difficult to cross) generally apply. However, since no roads are easy to cross within the City of Troy, only grades C through E are applicable.

**Legend:**

- Road Crossing Difficulty (Speed No. Lanes & ADT)
- C - moderately difficult to cross
  - D - very difficult to cross
  - E - extremely difficult to cross
  - Signalized Intersection





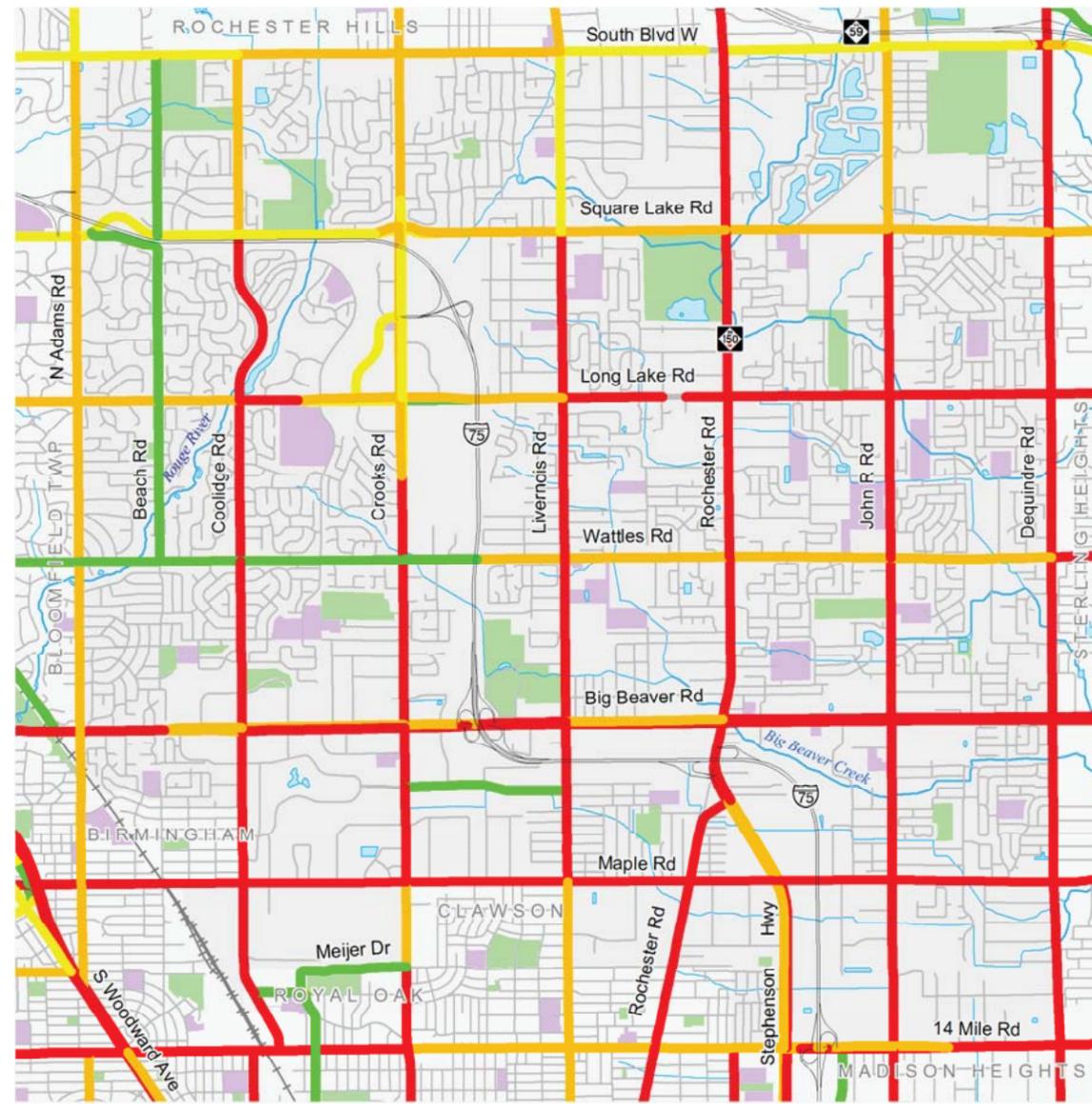
### BICYCLE AND PEDESTRIAN CRASH SITES

Crashes involving pedestrians and bicyclists appear to be concentrated along arterial roadways, specifically near high traffic areas. Fatal and severe injury crashes have been highlighted in yellow.

#### Legend:

Bicycle & Pedestrian Crashes 2002 - 2007

- Pedestrian
- Bicycle
- Fatal or Serious Injury Pedestrian Crash
- Fatal or Serious Injury Bicycle Crash



### IN-ROAD BICYCLING CONDITIONS

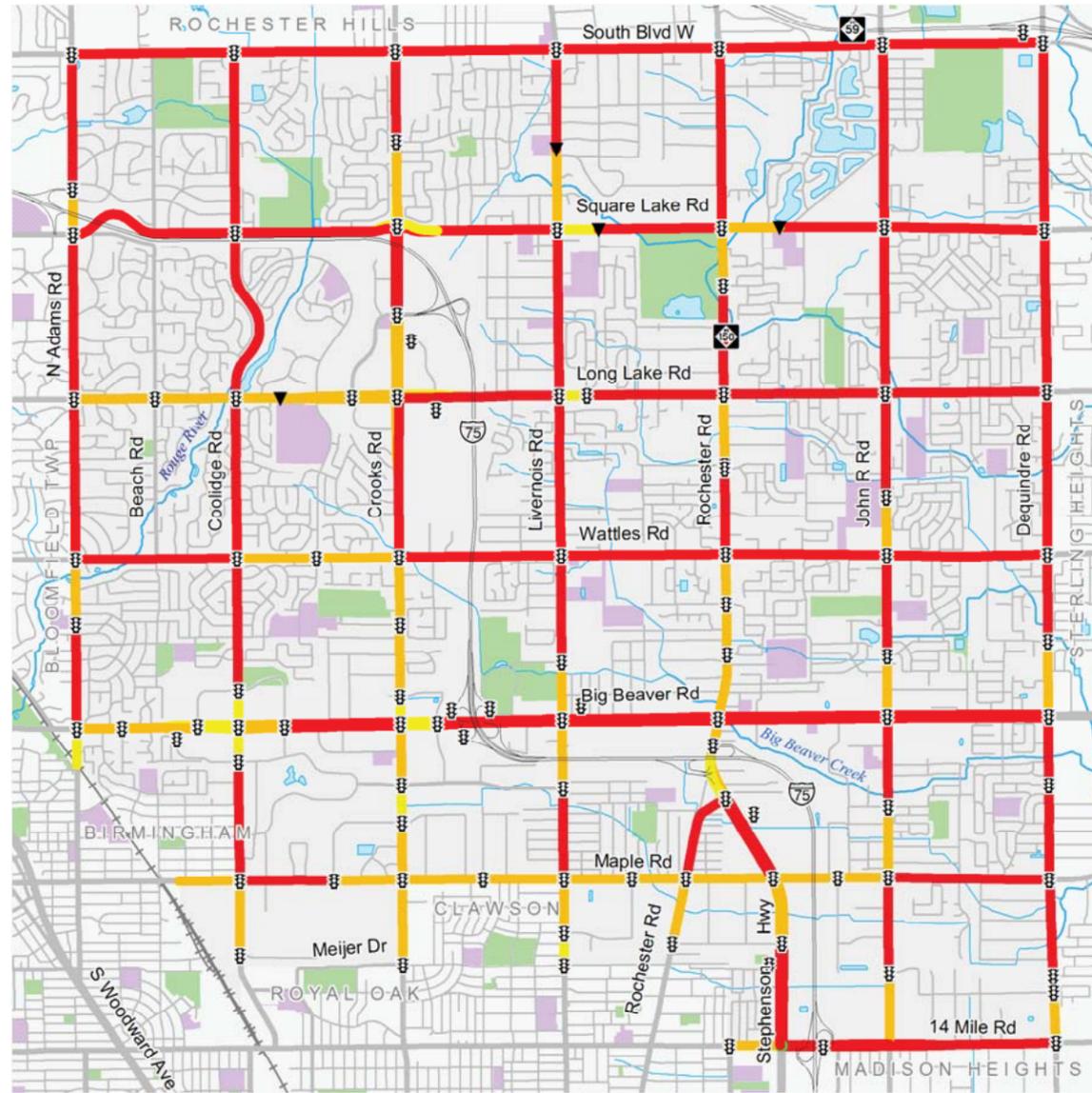
At this time there are no in-road bicycle facilities such as bike lanes or paved shoulders. Such facilities improve the quality of the bicycling experience on busy roads as typically cyclists feel most comfortable along roads with less traffic. However, it should be acknowledged that roads with higher traffic volumes are the most common transportation corridors and that cyclists will most likely continue to use them.

#### Legend:

In-Road Bicycling Quality  
(Average daily Traffic Volumes per Vehicle)

- A 0 to 5,000 - high potential for bike facilities
- B 5,000 to 10,000 - moderate potential
- C 10,000 to 15,000 - less potential
- D 15,000 to 102,000 - not currently ideal for bike facilities



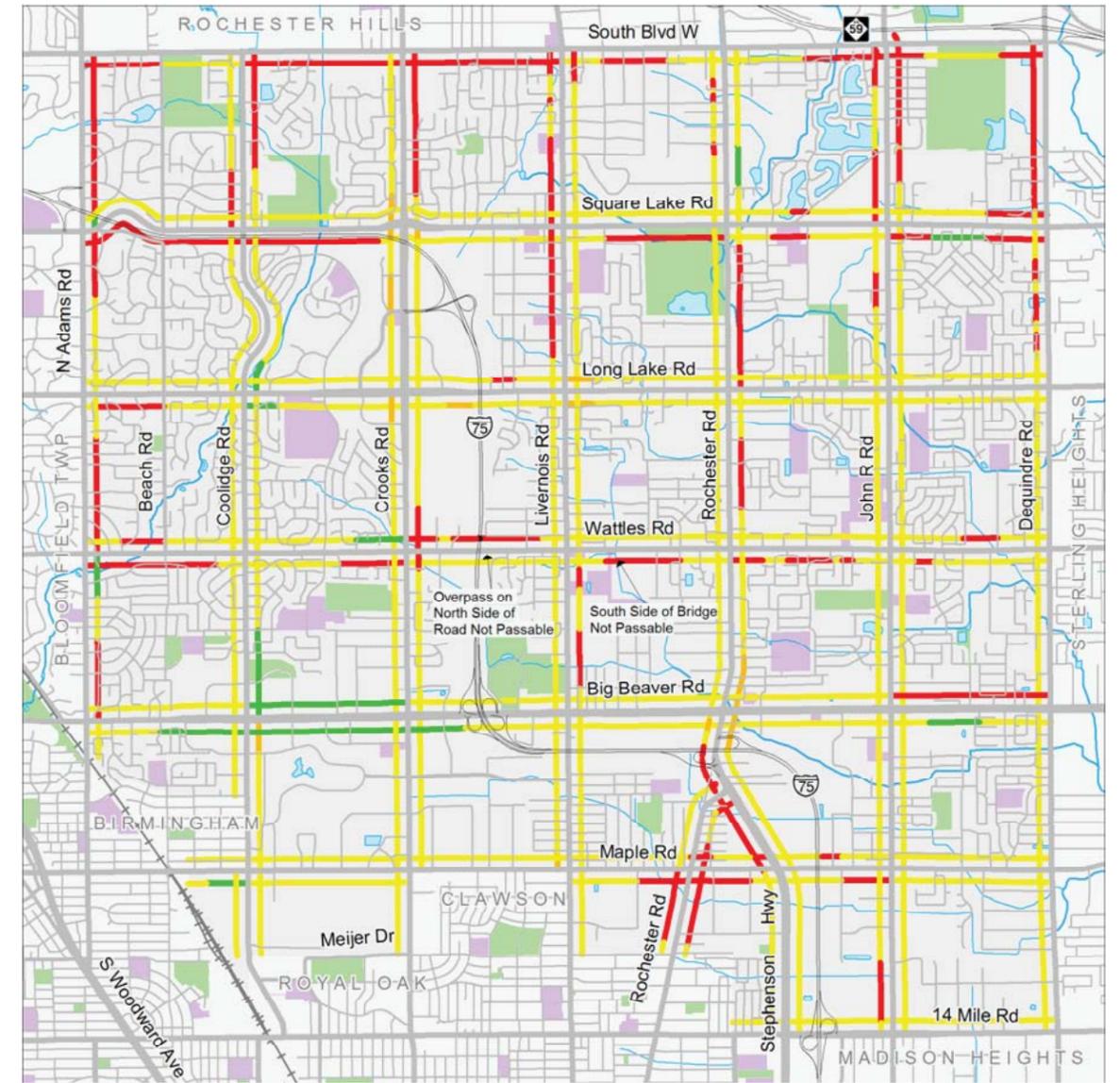


### CROSSWALK SPACING

Crosswalk spacing is a key factor in directness of travel. Most pedestrian trips for personal business (like walking to the store) are about half a mile long. Where there is demand to cross the road and crosswalk spacing is over an eighth of a mile apart, mid-block crossings are likely to occur.

#### Legend:

- Distance Between Crosswalk
- █ 0 to 1/8 Mile (currently none)
  - █ 1/8 Mile to 1/4 Mile
  - █ 1/4 Mile to 1/2 Mile
  - █ Over 1/2 Mile
  - Signalized Intersection



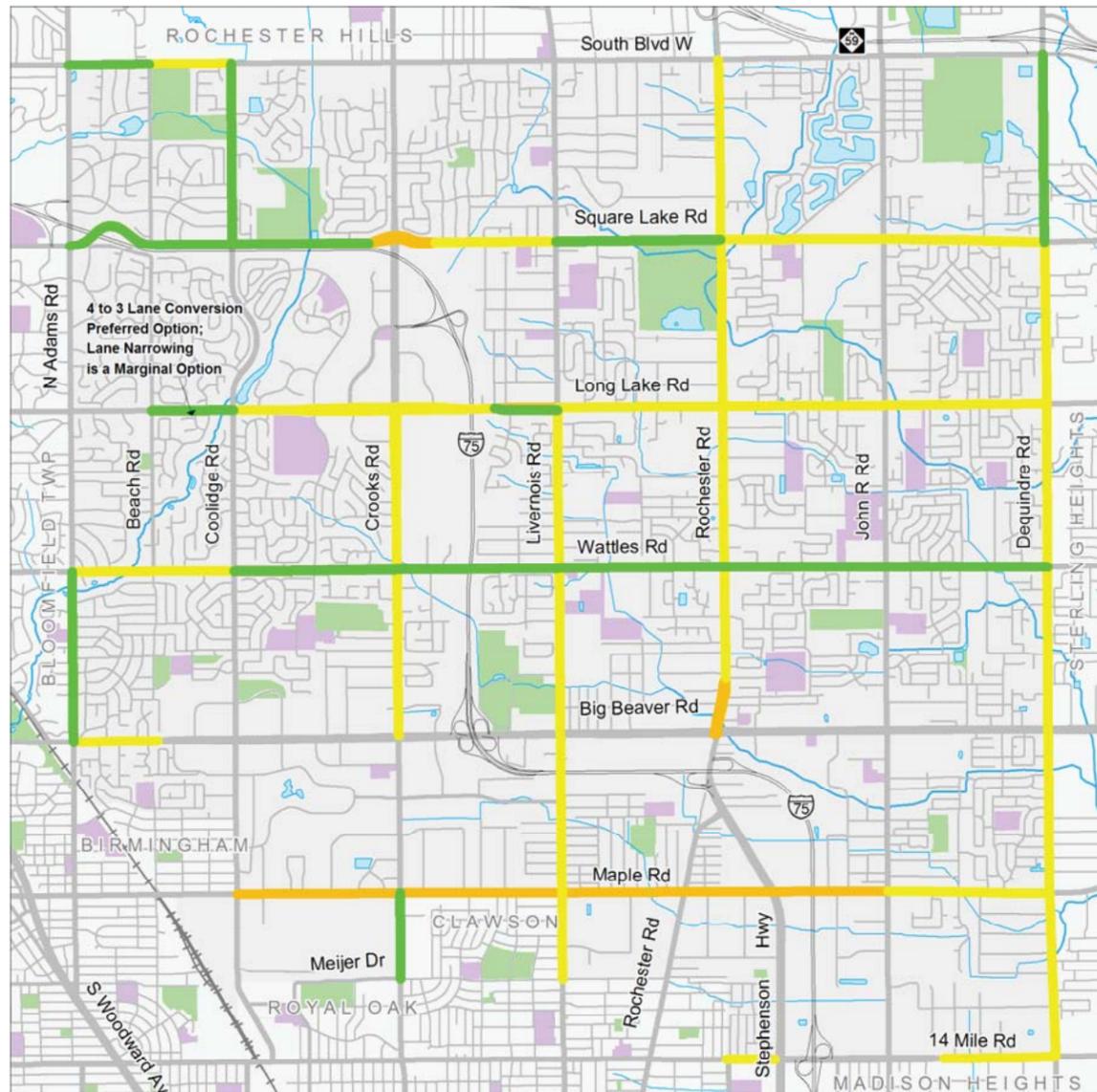
### EXISTING SIDEWALK QUALITY

A key factor to pedestrian comfort on a sidewalk is the degree of separation from the roadway. Buffers such as lawn extensions, and vertical elements such as trees and light poles increase pedestrian comfort level.

#### Legend:

- Sidewalk Rating:
- █ A Buffered from Roadway with Vertical elements
  - █ B Buffered from Roadway
  - █ C Adjacent to Roadway
  - █ D No Sidewalk but Passable
  - █ E Not Passable



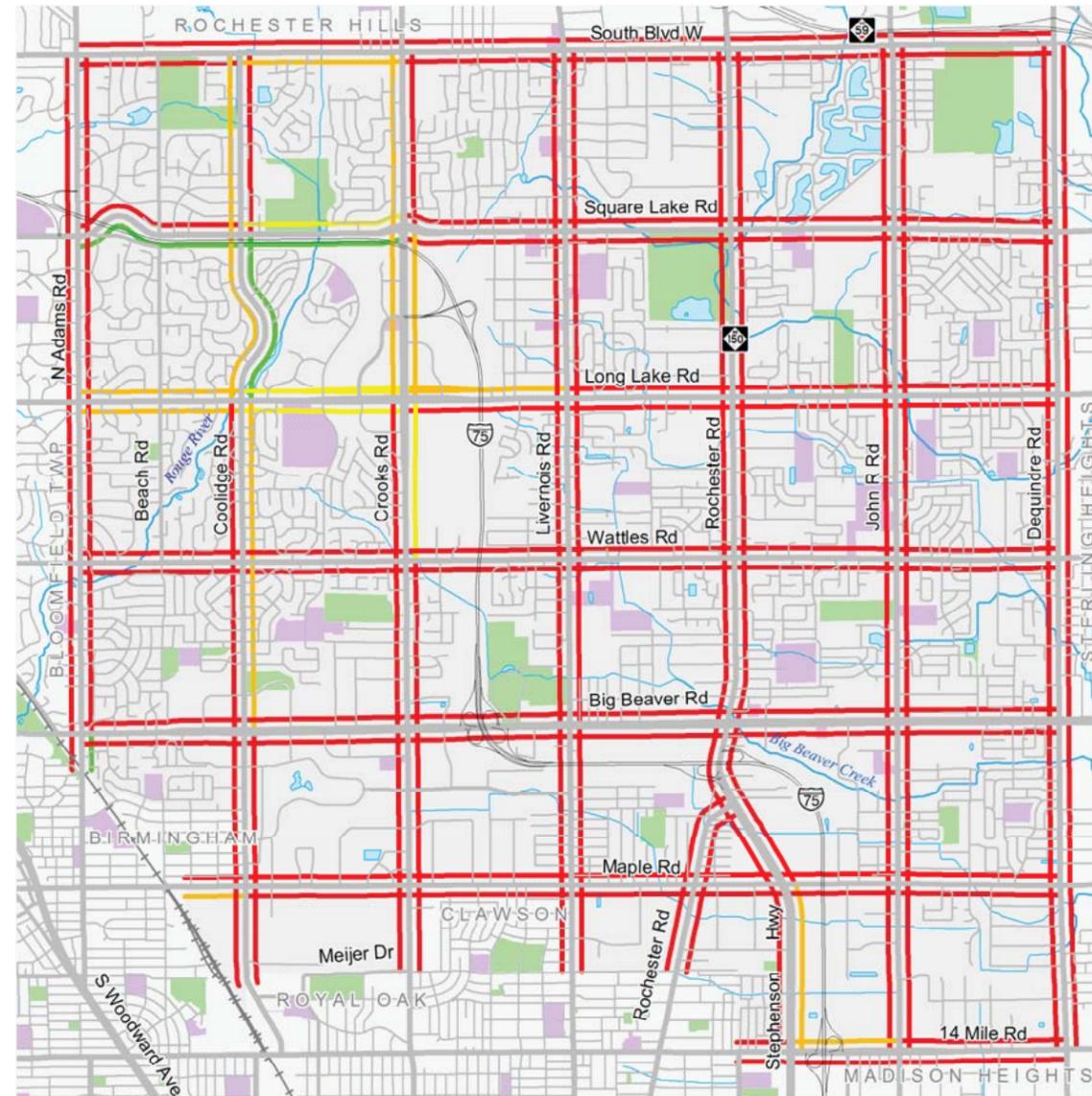


### POTENTIAL ROADWAY CONVERSIONS TO BIKE LANES

The ability to convert a road to include a bike lane is influenced by both average daily traffic and the geometry of the existing roadway. High potential conversions are roads with Average Daily Trips (ADT's) below 15,000 VPD and where an eleven foot (min.) motorized travel lanes can be maintained with the addition of a bike lane. Moderate potential conversions allow for motorized lanes to be reduced to between ten feet and eleven feet. Marginal potential conversions result in travel lanes less than ten feet wide.

#### Legend:

- Potential Road Conversions to Add Bike Lanes
- █ High Potential
  - █ Moderate Potential
  - █ Marginal Potential



### POTENTIAL SIDEPATH SUITABILITY

The AASHTO Guide for the Development of Bicycle Facilities generally considers sidewalks undesirable as shared-use paths due to conflicts between bicycles and motorists where a pathway intersects with driveways and roads. Sidepaths refer to routes uninterrupted for long distances by driveways and roads and that provide safe and convenient road crossing opportunities to destinations. This map outlines the potential for sidepaths.

#### Legend:

- Driveway Crossing per Mile
- █ 0 to 2
  - █ 2 to 4
  - █ 4 to 8
  - █ 8 to 49



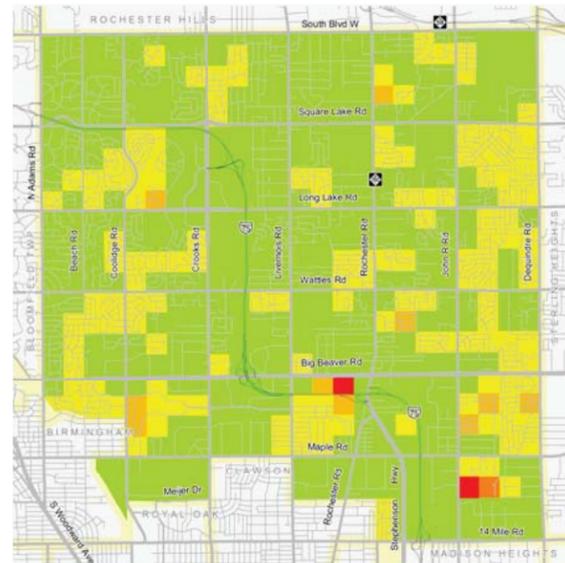
## RELATIVE DEMAND ANALYSIS COMPONENTS

A relative demand analysis determines the relative amount of pedestrian traffic in an area.

Movement is generally greater in areas with high population densities, near important commercial and educational areas and along major transit routes. Therefore, these components were considered when considering the first layer of analysis.

Factors such as sidewalk quality, distance between crosswalks, road crossing difficulties and block size, which were outlined in existing conditions further dictate pedestrian movement.

Several components were considered as a part of this analysis. These include: population density, educational facility locations, land use diversity, and nearness to major transit routes.



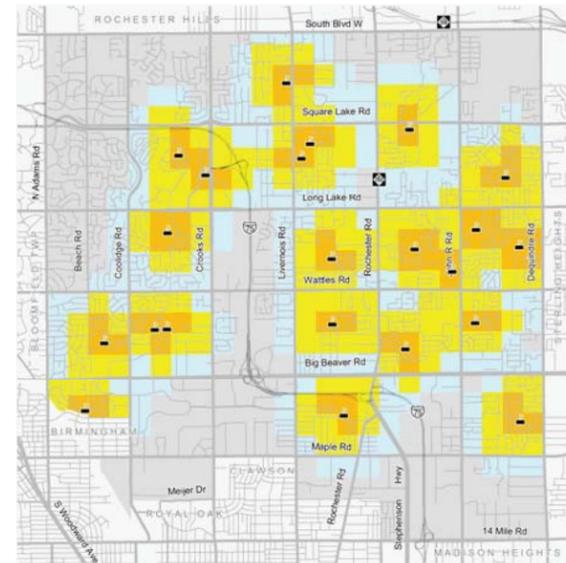
**Population Density**



Legend:

Population Density (Persons per Acre)

- 15 to 21.8
- 10 to 15
- 5 to 10
- 0 to 5



**Educational Facilities**

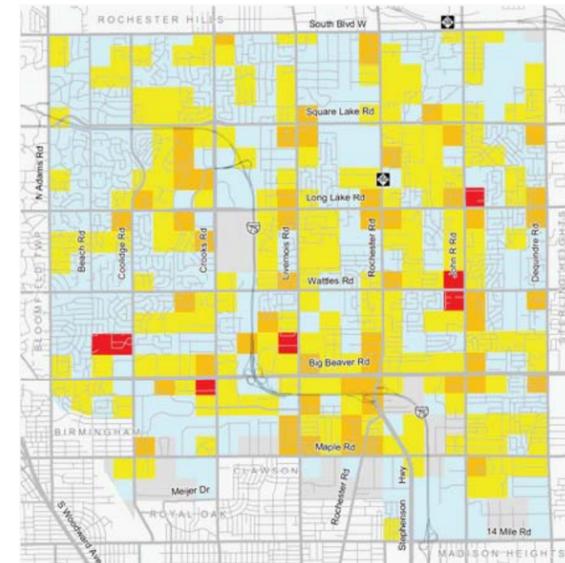


Legend:

■ Public School

Potential Pedestrian Traffic

- High
- Moderate
- Low
- Very Low



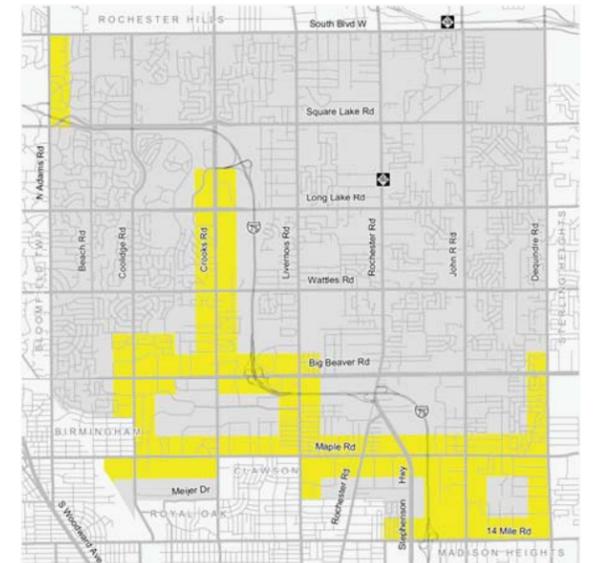
**Land Use Diversity**



Legend:

Land Use Diversity (Unique Types of Land Uses per Square)

- 4 types
- 3 types
- 2 types
- 1 type
- 0 types

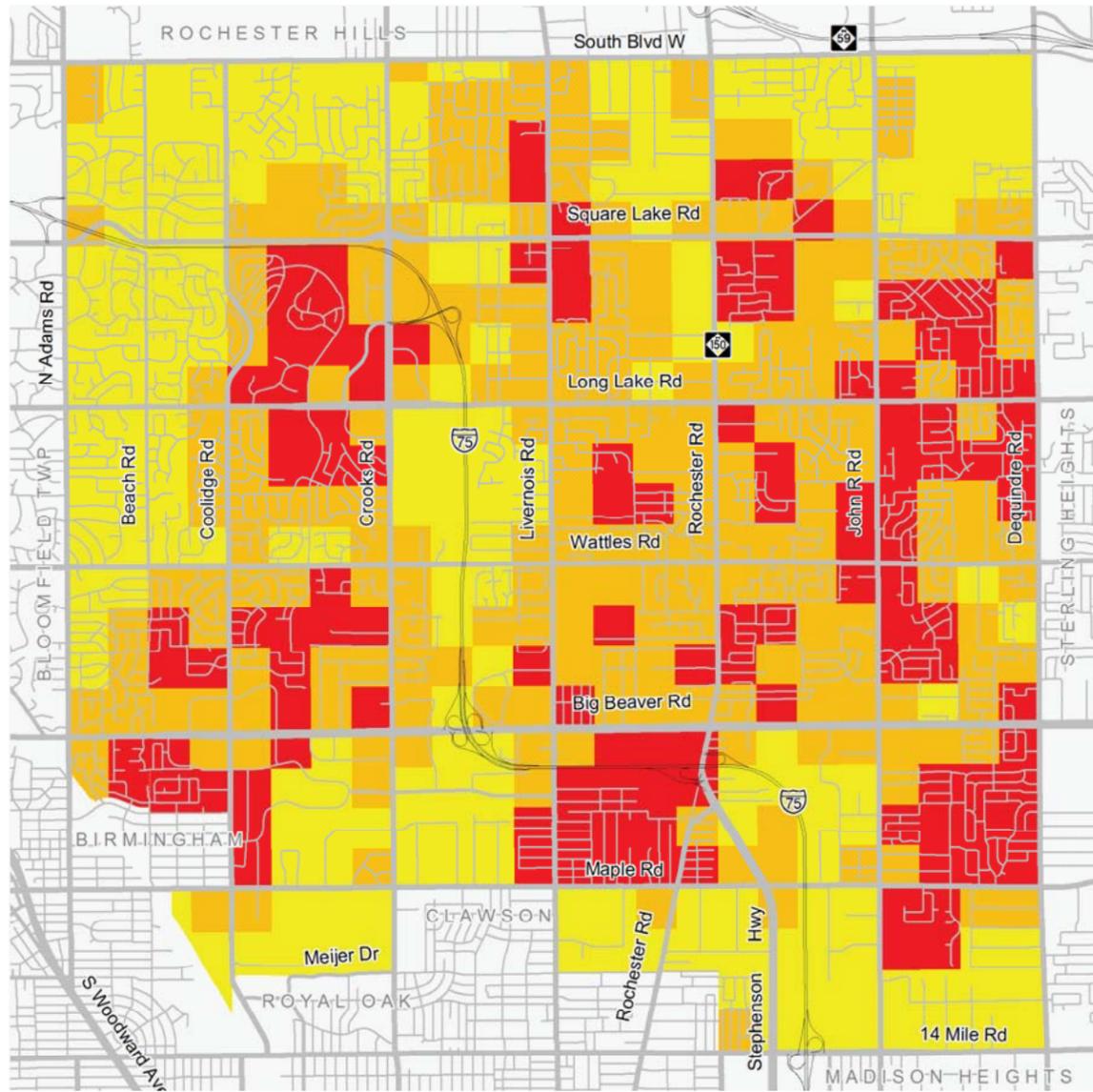


**Transit Routes**



Legend:

■ Public Bus Routes

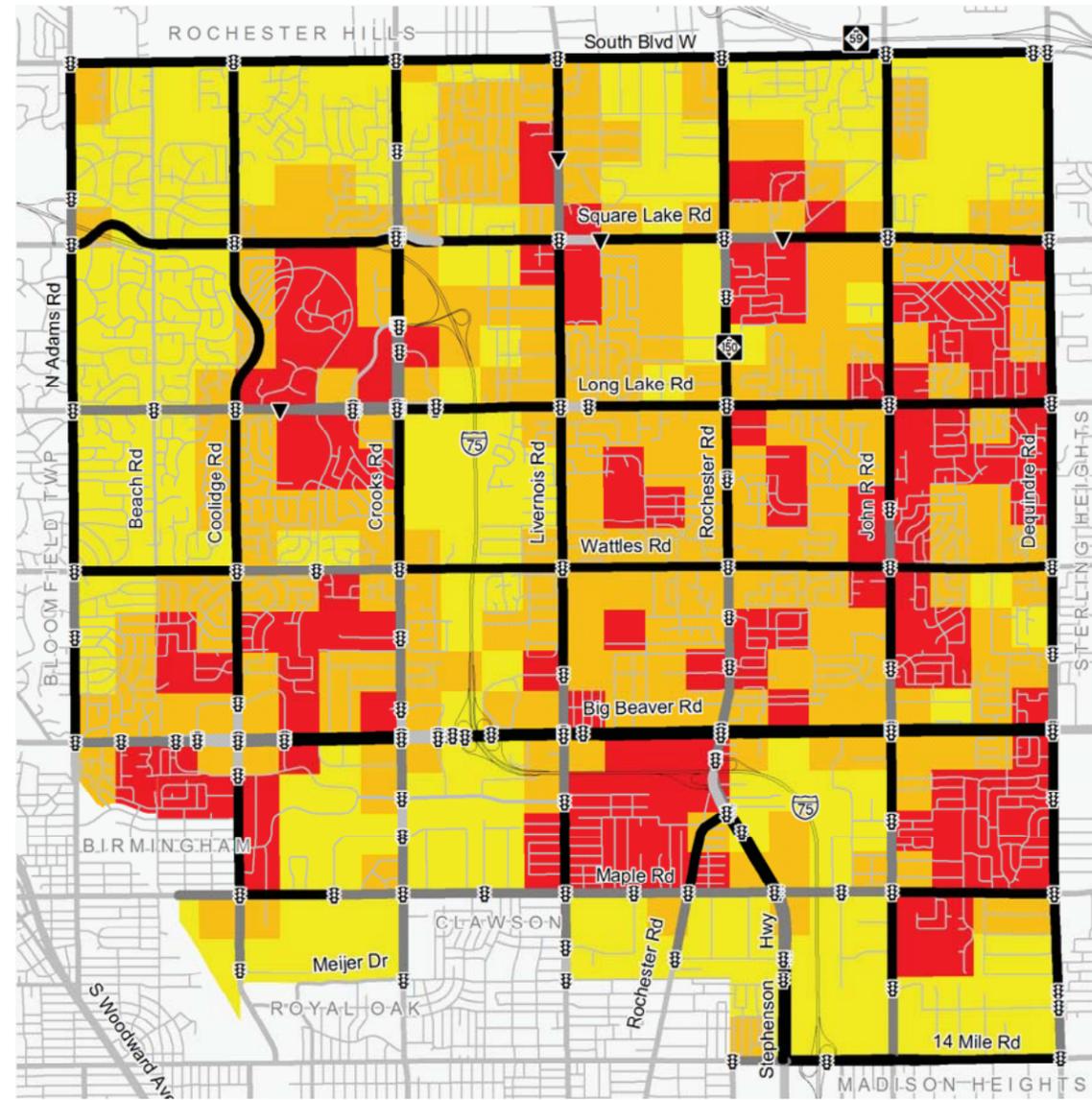


### COMPOSITE RELATIVE DEMAND ANALYSIS

According to the demand analysis, higher pedestrian traffic areas seem to be located near and or around existing educational facilities, although moderate to heavy demand is evident throughout 70% of the City.

#### Legend:

- Relative Demand
- Lowest Demand
  - Moderate Demand
  - Highest Demand



### CROSSWALK SPACING

A greater number of crosswalks are required in areas where there is a higher movement of pedestrian traffic. This map overlays the distance between crossings on Mile Roads and the demand analysis to determine where crosswalk improvements are needed.

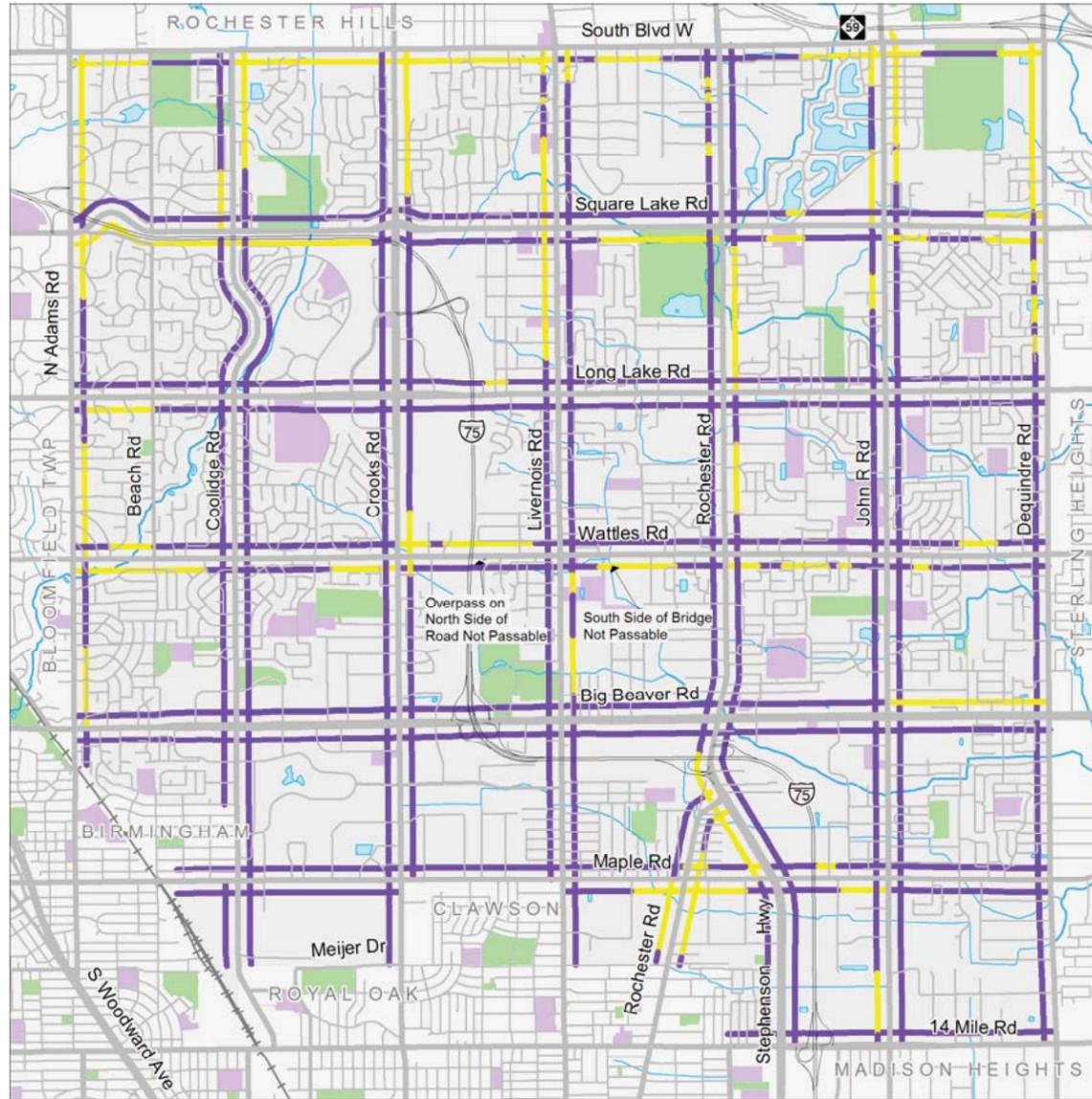
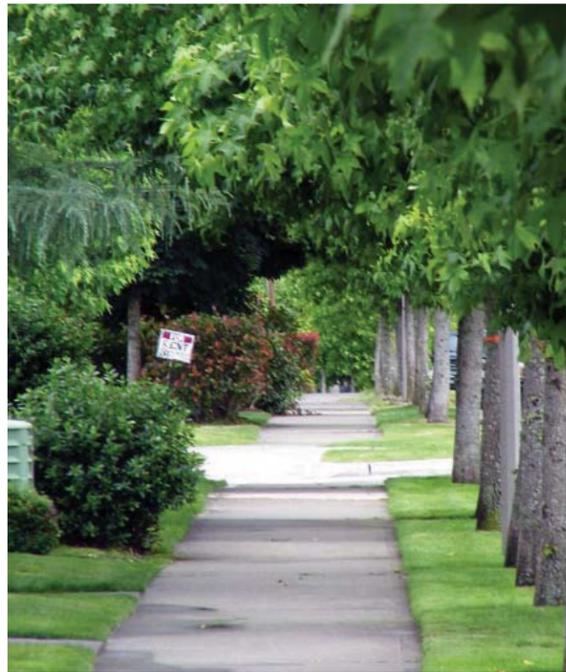
#### Legend:

- |                          |   |
|--------------------------|---|
| Signalized Intersection  |   |
| Mid-Block Crosswalk      |   |
| <b>Crosswalk Spacing</b> |   |
| 1/8 Mile to 1/4 Mile     | <b>Relative Demand</b>  |
| 1/4 Mile to 1/2 Mile     |   |
| Over 1/2 Mile            |   |
|                          | <span style="display: inline-block; width: 10px; height: 10px; background-color: yellow; border: 1px solid black; margin-right: 5px;"></span> Lowest Demand   |
|                          | <span style="display: inline-block; width: 10px; height: 10px; background-color: orange; border: 1px solid black; margin-right: 5px;"></span> Moderate Demand |
|                          | <span style="display: inline-block; width: 10px; height: 10px; background-color: red; border: 1px solid black; margin-right: 5px;"></span> Highest Demand     |



# PROGRAMMING

The proposed pathway plan was developed with input gleaned from pre-design and analysis efforts including extensive input from the City and the TTC. Each of the following plans represents one facet of the entire plan detailing bike route, sidewalk, roadway and crossing improvements.

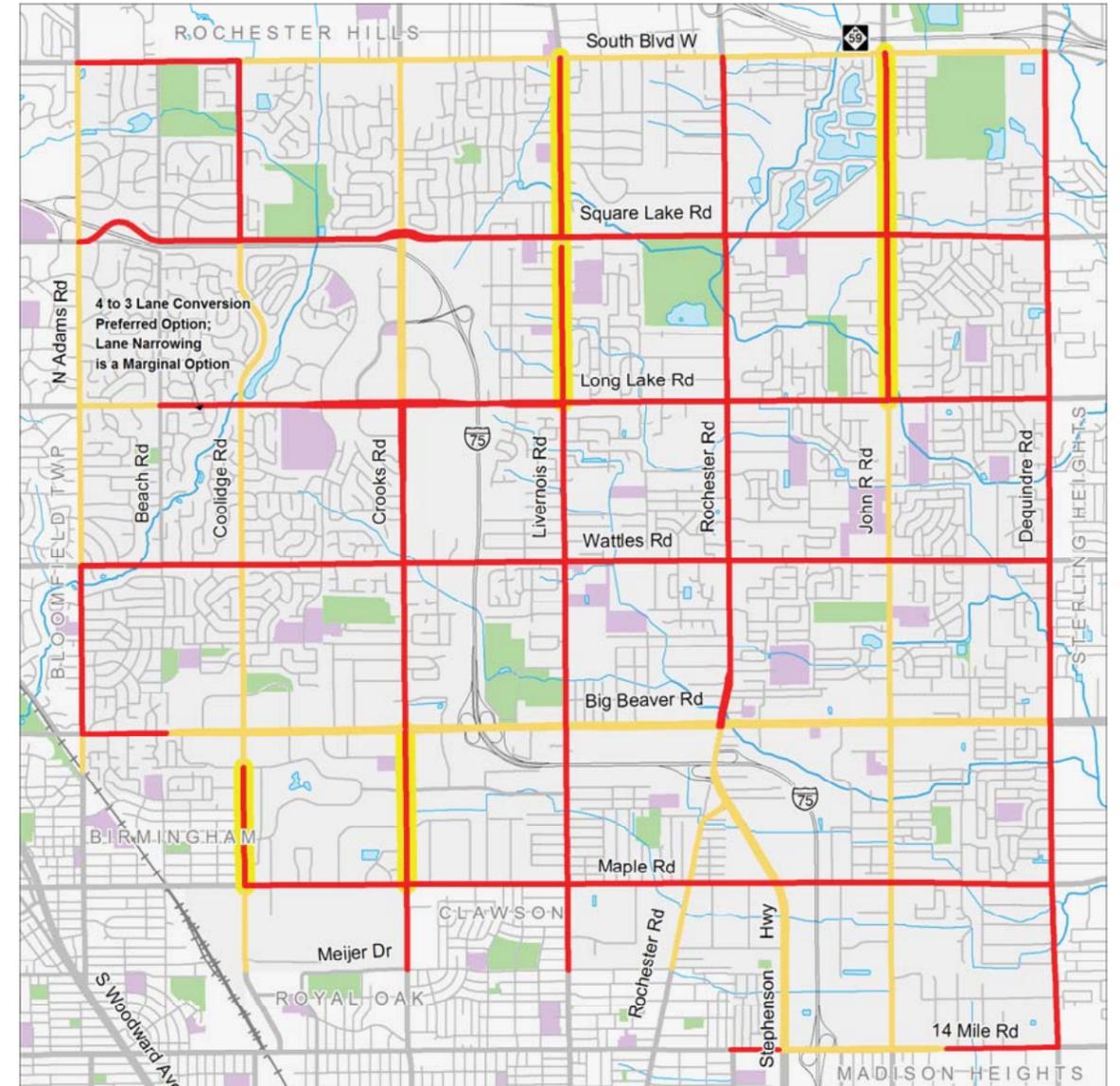


## SIDEWALK IMPROVEMENTS

Sidewalks should be built on both sides of all primary roads. Sidewalks should be a minimum of six feet wide along collector roads and eight feet wide along primary roads. Where large volumes of bike traffic are anticipated, the sidewalks should be widened to ten feet to accommodate bicyclists not comfortable riding in the roadway. The sidewalks though should not be signed or designated as bicycle facilities. Wherever possible a planned buffer should be provided between the sidewalk and the roadway.

### Legend:

- Existing Sidewalk
- Proposed Sidewalk



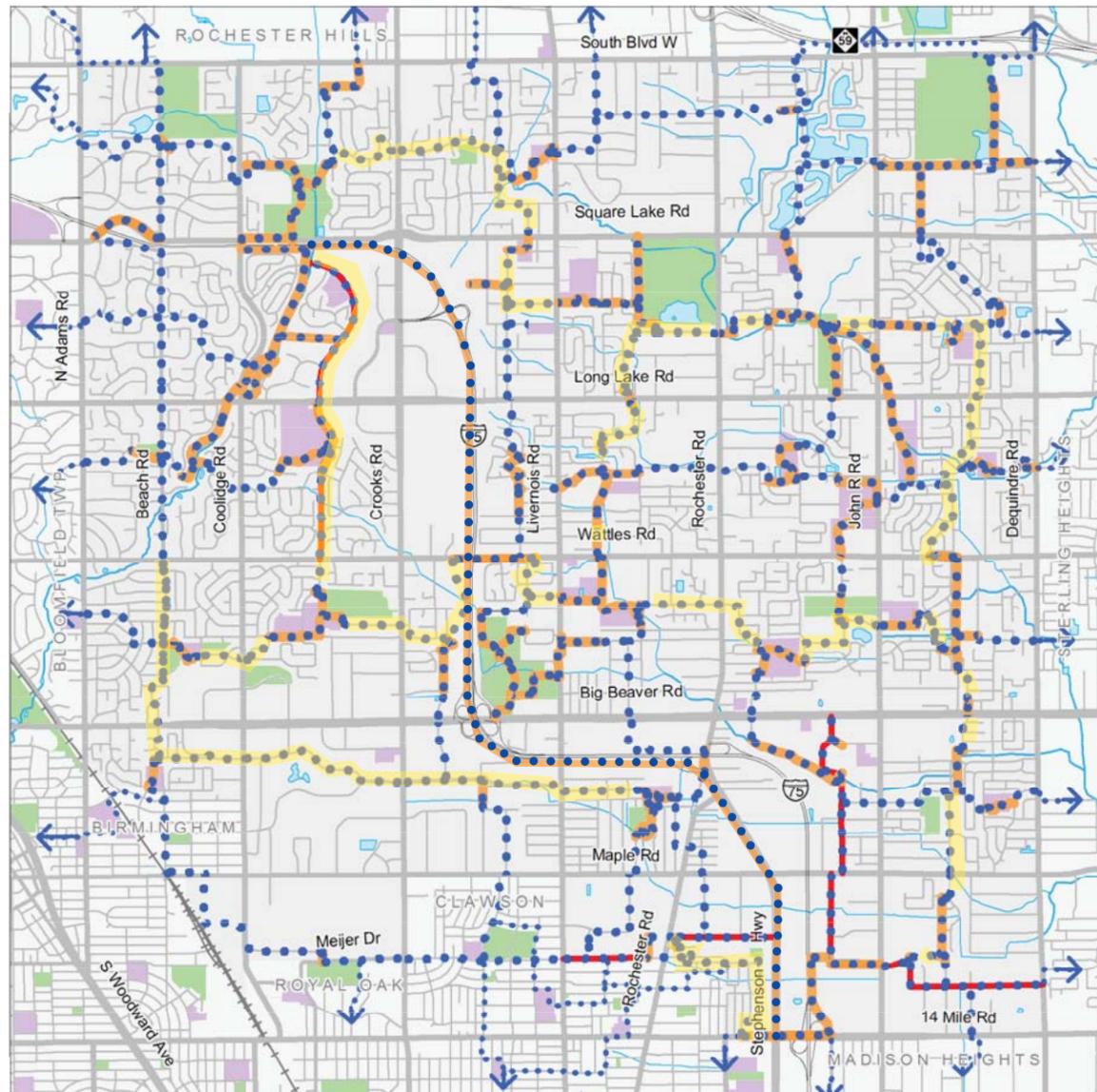
## MAJOR ROAD FACILITIES (BIKE LANES)

Eventually bike lanes should be constructed along all primary roads. Based on several factors that were previously outlined, it was determined that 60% of primary roads have the potential to be converted in the near future. Since road resurfacing projects allow for simpler conversions, roadways currently slated for reconstruction should be considered the earliest bike lanes added to the transportation system.

### Legend:

- Near Term Bike Lanes
- Long Term Bike Lanes
- Road Reconstruction Project





NTS

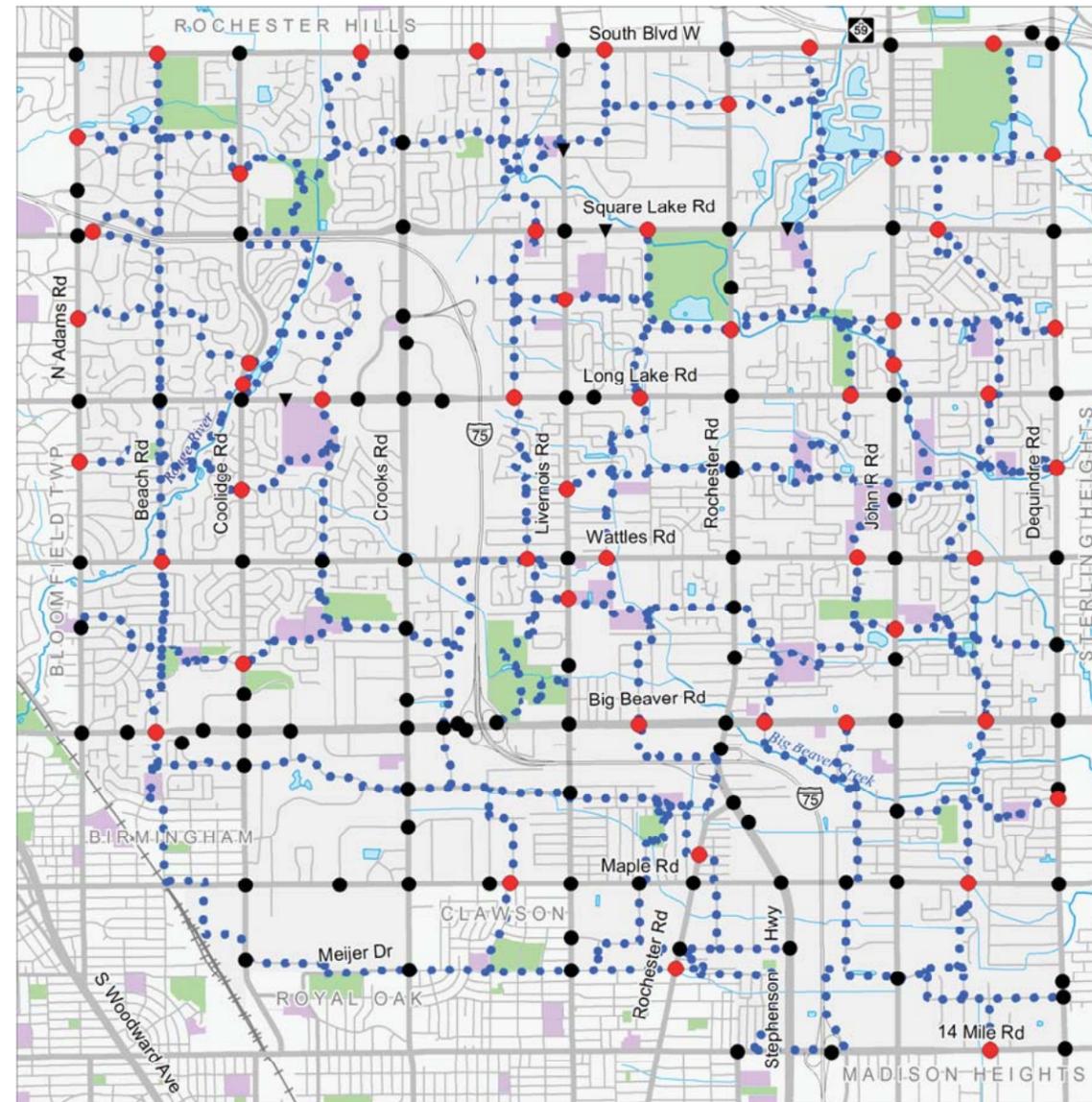
### MINOR ROAD AND OFF ROAD BIKE FACILITIES

The bike route system helps bicyclists and pedestrians navigate through the local neighborhoods to the schools and parks without having to travel busy arterial roads. The bike route system is a combination of shared-use paths, bike lanes and local roads.

Long term planning for I-75 improvements should include shared use path development.

#### Legend:

- Bike Route
- Shared Use Path
- Bike Lanes
- Bike Boulevards



NTS

### ROAD CROSSING IMPROVEMENTS

Road crossing improvements are recommended where the bike routes intersect primary roads wherever existing crosswalks do not exist. The crossing improvements may be unsignalized mid-block crossings that include elements such as Crossing Islands and Rectangular Rapid Flash Beacons. Where unsignalized crossings are not appropriate, Hybrid Pedestrian Signals should be considered.

#### Legend:

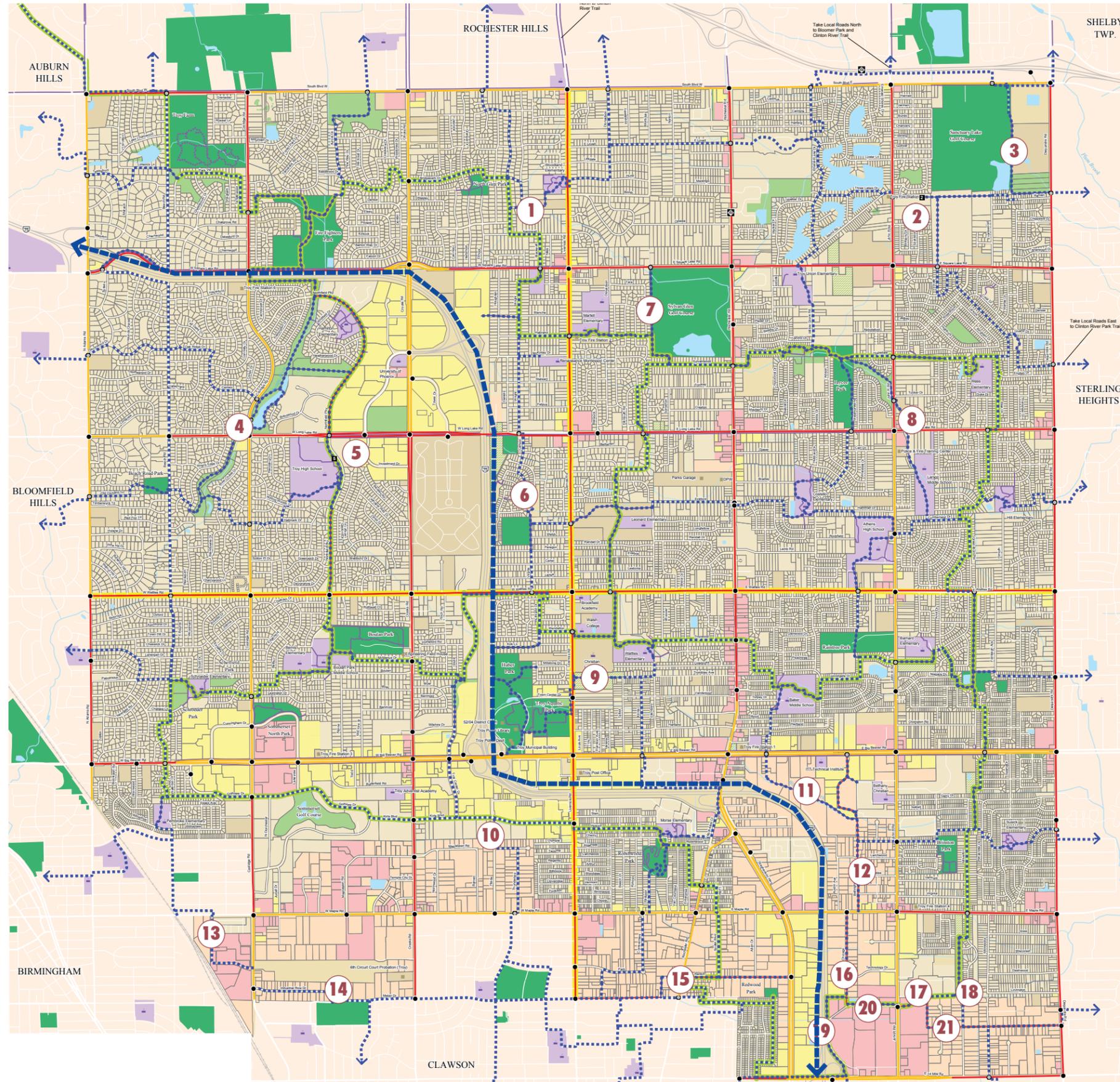
- Road Crossings**
- Signalized Road Crossings
- ▼ Unsignalized Midblock Crossing
- Road Crossing Improvements
- Bike Route

## CITY OF TROY PATHWAY PLAN

The Plan at right represents the cumulative design based on preliminary plans and the desires of the City of Troy and the TTC. The plan illustrates routes, destinations, crossings and future improvements.

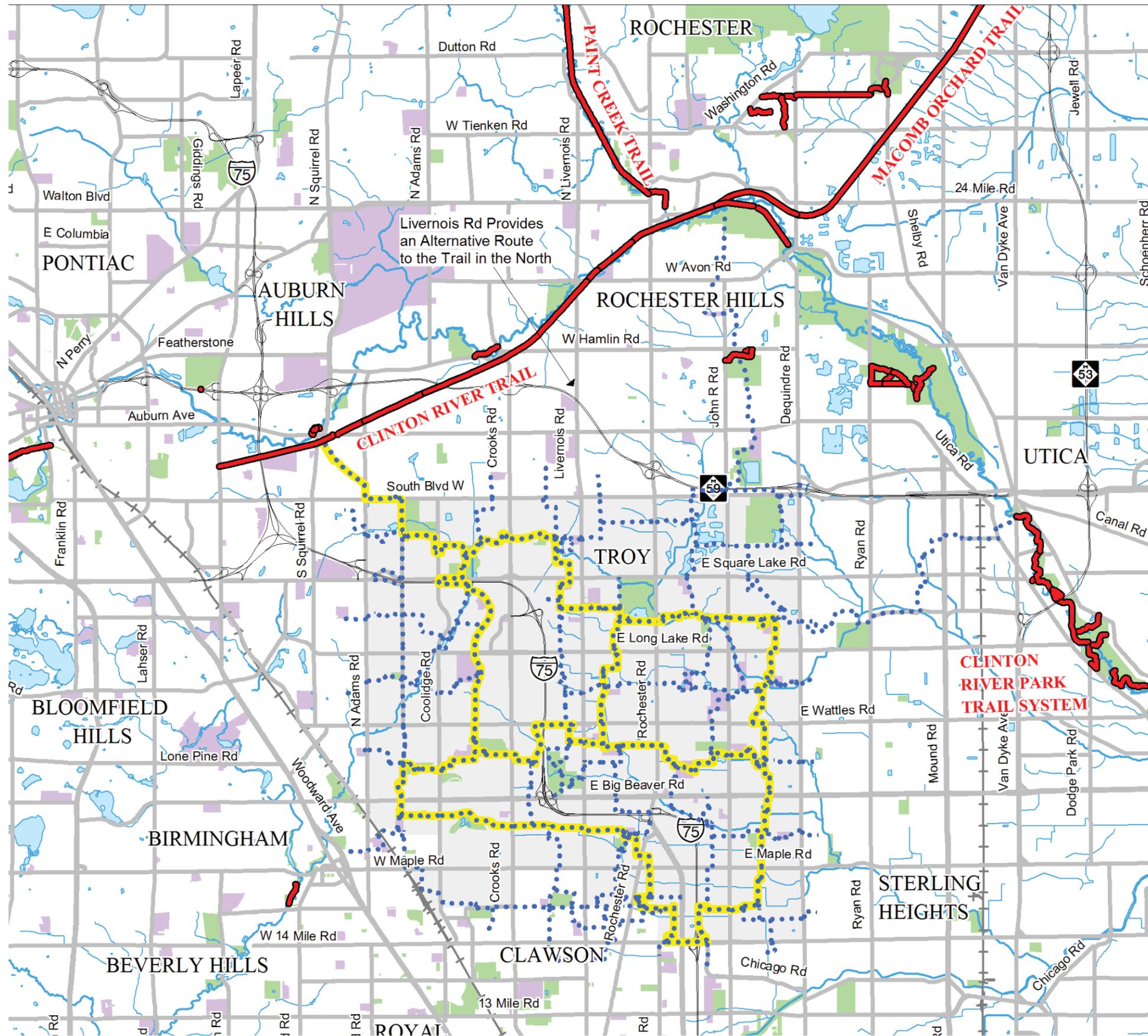
Below is a list of desired and potential projects, in no particular order of significance, to implement the Troy Pathway Trail Plan keyed numerically on the plan.

1. Desire to create pathway between Fredmor Drive and Woodland Elementary School through private property.
2. Boardwalk through wetland area.
3. Desire to create pathway segment along hospital.
4. Desire to create off-road trail segment through church property and neighborhood greenspace.
5. Add sidepath along west side of Northfield Parkway through the High School property.
6. Desire to use existing private pathway.
7. Desire to create pathway along the boundary of Sylvan Glen Golf Course.
8. Desire to create off-road trail segment through neighborhood greenspace and church property.
9. Potential to add pathway through proposed City Park.
10. Desire to create pathway between Kirts Boulevard and Heide Road through private property.
11. Desire to create pathway along creek through private property.
12. Potential to add bike lanes.
13. Coordinate route with future transit center.
14. Desire to create pathway through empty lot.
15. Desire to create pathway between Rankin Road and Elmsford Drive through private property.
16. Potential for four to three lanes conversion on Chicago Road to include bike lanes.
17. Desire to create pathway through private property between Elliot and Lovington Roads.
18. Desire to create pathway to Executive Drive through private property.
19. Desire to add sidepath on west side of Oakland Mall Service Drive.
20. Potential for sidepath along north side of Chicago Road.
21. Potential for three to two lane conversion to include bike lanes.



### Legend:

- Existing Non-Motorized Facilities**
  - Shared Use Paths
  - Regional Trails
  - Nature Trails
- Potential Non-Motorized Facilities**
  - Bike Route
  - Near Term Bike Lane
  - Long Term Bike Lane
  - Priority Bike Route / Bike Boulevard
  - Priority Complete Street / Green Street
- Existing Land Use**
  - Municipal Areas
  - Recreation Areas
  - Private Open Space
  - Proposed New City Park
  - Water
  - Parcel
- Places of Interest**
  - Educational facility
  - Governmental Facility
  - Commercial
  - Industrial
  - Office
  - Residential
  - Public / Open Space
- Road Crossings**
  - Existing Signalized Crossings
  - Road Crossing Improvements



**BIKE ROUTES RELATIVE TO REGIONAL TRAIL SYSTEM**

The map at left illustrates how the Troy pathway system can connect to the regional trail system .

**Legend:**

- Bike Route
- Priority Bike Route
- Regional Trails



Not to Scale

## COMPLETE STREETS ILLUSTRATIONS

The sketches on the following pages illustrate what proposed improvements may look like at specific areas in Troy. Pathways are accentuated by new signage, landscaping, site furnishings and lighting.

These efforts make the pathways and trails attractive resulting in increased walking, running and biking and ultimately in improved overall health in the community. Complete streets increase property value, boost civic pride by creating spaces that promote "ownership" and greater use; and they benefit the environment by reducing carbon dioxide emissions and negating urban heat island effects, while sustainable stormwater management techniques improve water quality.



### Rain Gardens and Site Amenities at Coolidge Road and South Boulevard

Bioswales along pathways allow water from the road and the trail to drain from the paved areas into rain gardens planted with shrubs, perennials and grasses that tolerate fluctuating water levels. Decorative trench drains, where necessary collect and direct stormwater runoff to the bioswales lining shared use paths. The planting beds slow, treat and allow stormwater to infiltrate, while creating a vegetative buffer between the pathway and road. Educational signage helps the public understand the process encouraging buy in and support.

Trees planted along the road and by the trail frame the path, creating pedestrian scale and framing the street. The colorful banded accents added to the path illustrate branding potential for specific trail routes.

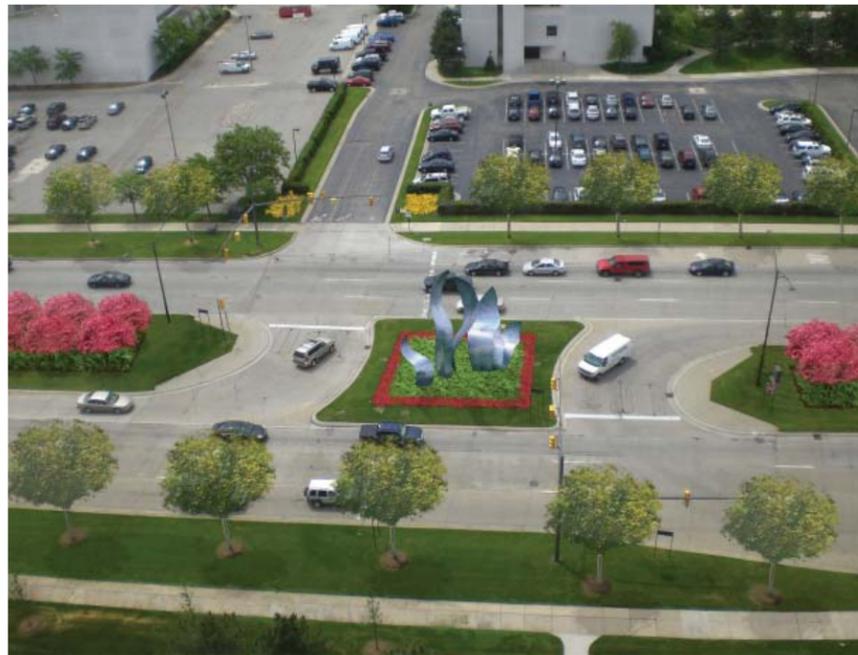


**Improvements along Big Beaver**

Big Beaver Road offers many opportunities for improving the non-motorized experience that can be used throughout Troy. This page illustrates several conditions that are significantly improved through the use of Complete Street design. At left, artist elements are highlighted by colorful plantings. This brings beauty and interest to this shared pathway. Trees create canopy and a pedestrian scaled space.



The sketch at right shows how artistic elements and plantings brighten an otherwise barren boulevard space; plantings add scale, color and mass.



Widened sidewalks lined with plantings, shown above, help to buffer pedestrians from non-motorized traffic. Trees define and beautify the space and provide shade for users.



Both non-motorized and motorized traffic facilities are enhanced with textural plantings as shown at left. These not only buffer pedestrians from busy roadway traffic, but they also help mitigate some of the CO2 effects caused by automobiles and reduce heat island effect while framing the street and calming traffic.





### Walks and Plantings at Troy High School

Adding walks, shade trees and plantings along school routes promote safe pedestrian access to schools, while reducing traffic and carbon footprints, increasing socialization, safety and exercise and enhancing the student experience. Green initiatives and educational signage along these paths are particularly beneficial to promote ecological stewardship in younger people.



### Off-Road Path at Community Recreation Center

Colorful plantings surround this seating area to create a mini public place for gathering and resting along the pathway. What once was an uneventful pathway is transformed into a lively pedestrian experience.

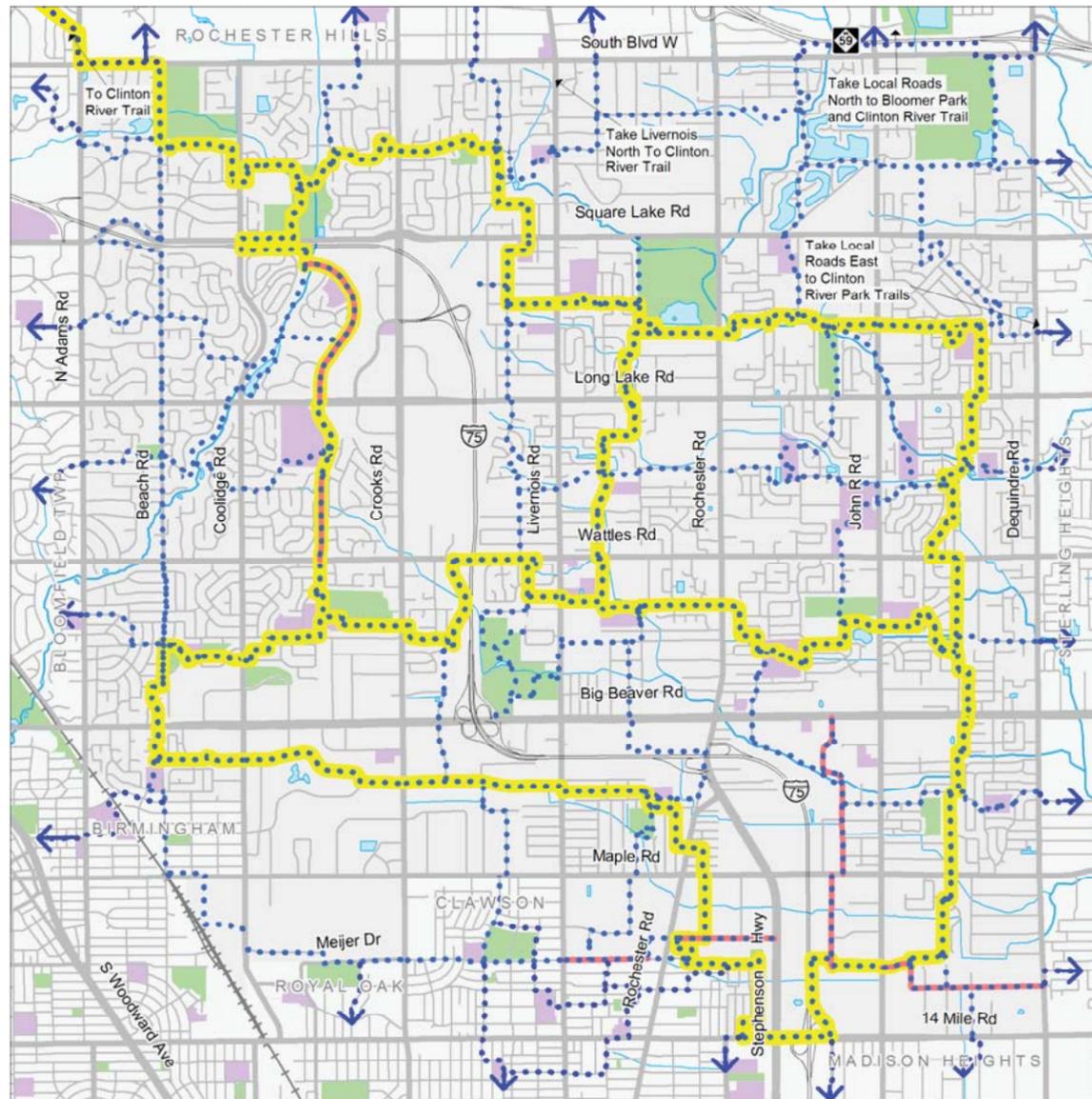


## STRATEGIES

The maps at left illustrate priority projects for the Troy Pathway System. These are the areas of the plan that present the best initial opportunities for development based on location, destination or scheduled construction.

The Capital Improvement Plans shown in the appendix show priority projects that are planned to be undertaken within approximately ten years depending on the availability of funding.

Improvements to the pathway system can be integrated into these Capital Improvement Projects with a minimum of extra effort.

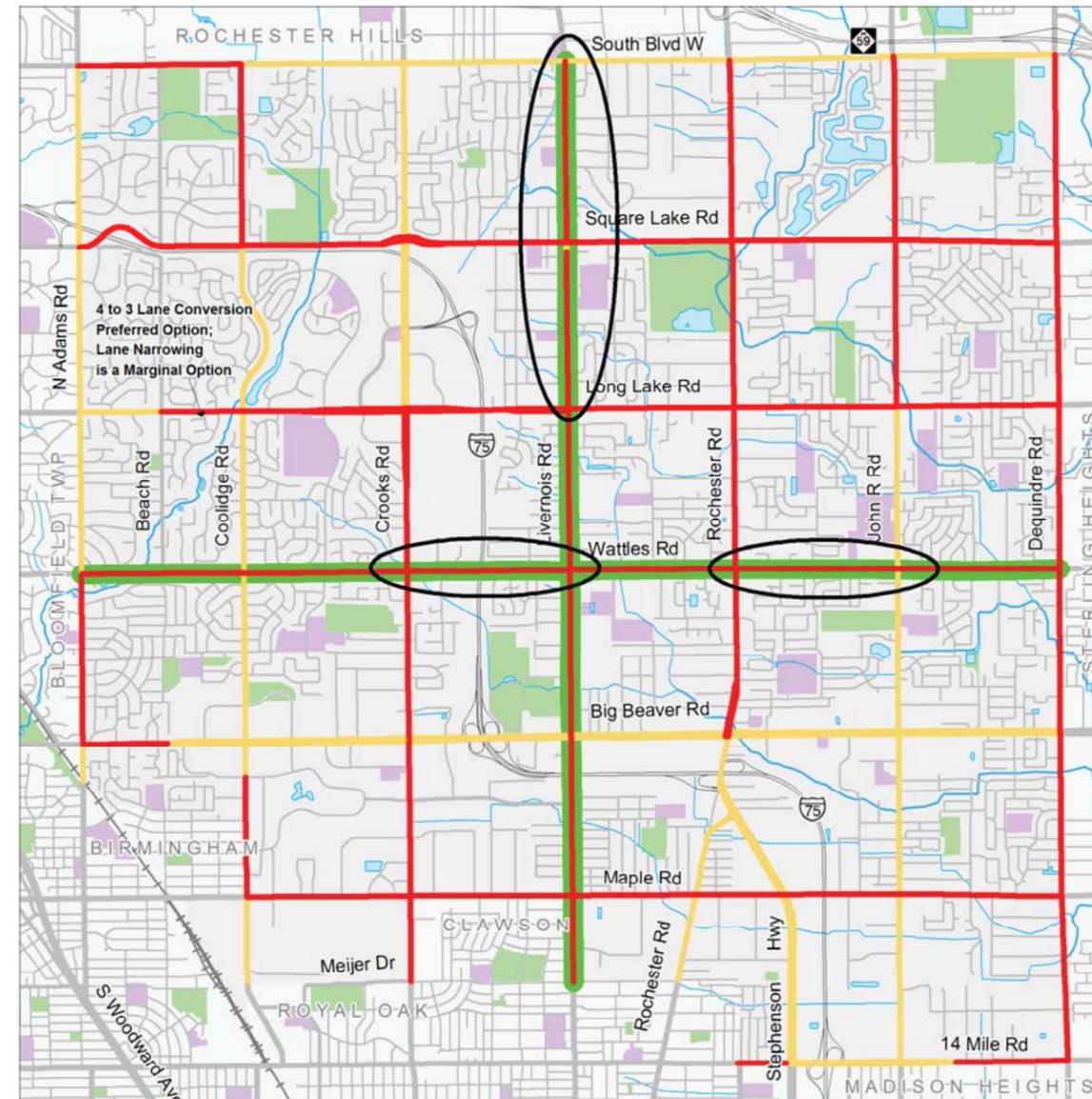


### PRIORITY BIKE ROUTES NEIGHBORHOOD GREENWAYS

The priority bike routes were selected based on their location, relative demand and connections to major destinations and regional trails. These priority bike routes may be enhanced to become neighborhood greenways through the incorporation of traffic calming measures, green street elements, wayfinding and beautification efforts.

#### Legend:

- Bike Route
- Priority Bike Route
- Bike Lanes



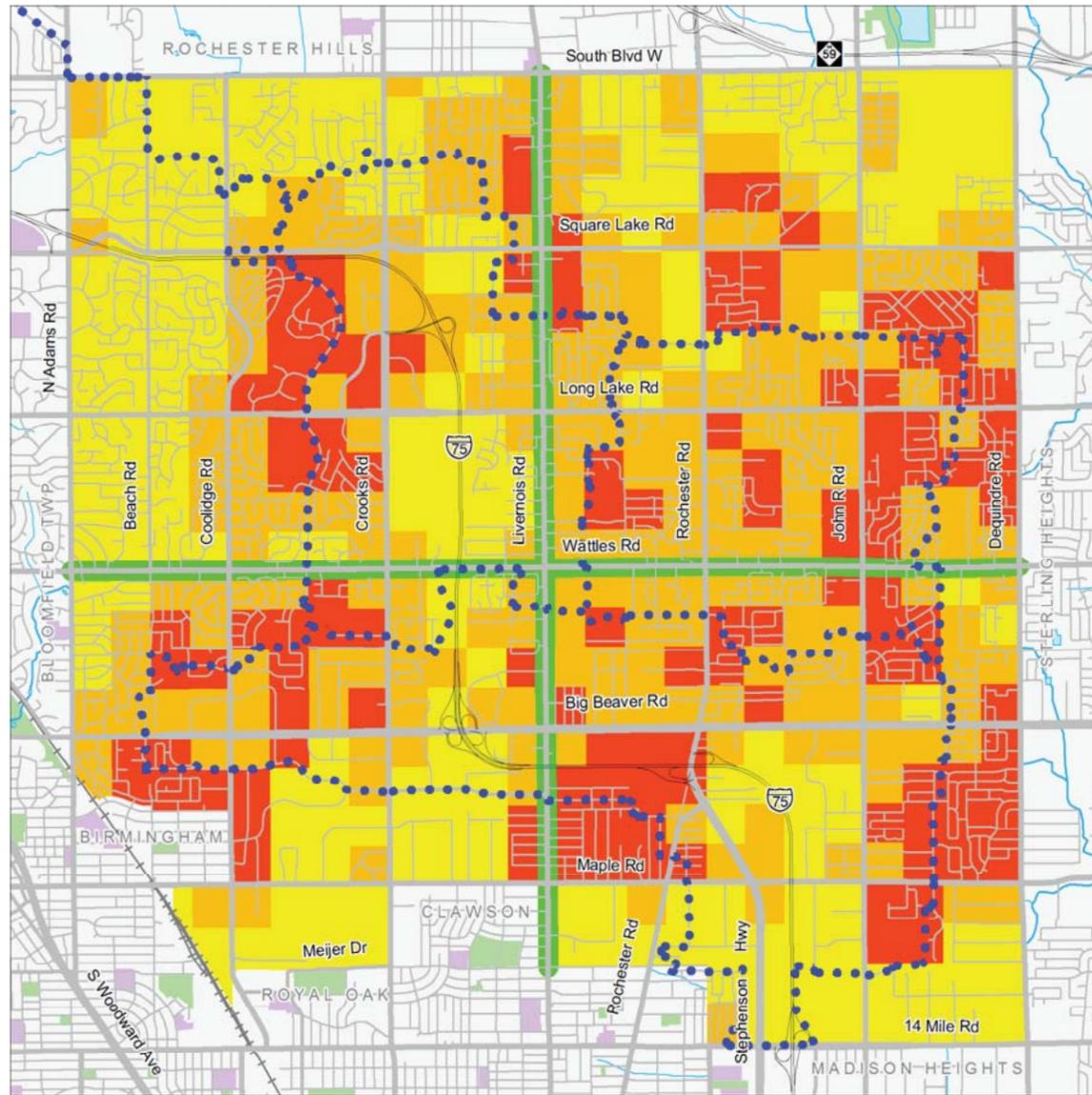
### PRIORITY COMPLETE STREETS

Wattles Road and Livernois Road are both identified as high priority corridors due to their centralized location and near term potential. The road segments circled above are planned road construction projects where immediate implementation should take effect.

#### Legend:

- Near Term Bike Lanes
- Long Term Bike Lanes
- Priority Complete Street/Green Street





**PROPOSED PRIORITY ROUTES RELATION TO RELATIVE DEMAND**

The proposed priority bike routes/neighborhood greenways and priority complete streets/green streets related to the relative demand analysis are illustrated above.

**Legend:**

- Relative Demand
- High Demand
- Moderate Demand
- Lowest Demand
- Priority Bike Route
- Priority Complete Street / Green Street



**VEGETATION, BMP's and DRAINAGE**

Designs for planted area, stormwater source controls and Best Management Practices (BMP's) within public ROW's are still being designed and being tested. Because these treatments may ultimately revert to agencies for ongoing maintenance, the appropriate agencies should be consulted early in the process so all treatment are technically viable and maintainable. Path construction, infrastructure and Complete Street construction should be coordinated to avoid damage to underlying infrastructure and minimize costs.



**CITY OF TROY NON-MOTORIZED MASTER PLAN - Project Progress Matrix**

<b>Project Description</b>								
Comprehensive list - 2009 City of Troy Non-motorized Master Plan								
Primary Roads Complete Streets / Green streets	Estimated Cost	Idea	Approved Concept	Partial Funding in Place	Construction Drawings Complete	Construction Funding in Place	Construction In Progress	Complete
<b>Priority Bike Lanes on Primary Roads</b>								
● Livemois - South Blvd. to Long Lake	\$ 57,500.00							
● Livemois - Long Lake to Meijer Dr.	\$ 96,000.00							
● Wattles - Crooks to Livemois	\$ 27,150.00							
● Wattles - Rochester to John R	\$ 27,150.00							
● Wattles - Remainder	\$ 108,500.00							
<b>Priority Sidewalks on Primary Roads</b>								
● Livemois - South Blvd. to Long Lake	\$ 109,900.00							
● Livemois - Long Lake to Meijer Dr.	\$ 271,500.00							
● Wattles - Crooks to Livemois	\$ 211,200.00							
● Wattles - Rochester to John R	\$ 253,400.00							
● Wattles - Remainder	\$ 79,900.00							
<b>Priority Plantings on Primary Roads</b>								
● Livemois - South Blvd. to Long Lake	\$ 545,450.00							
● Livemois - Long Lake to Meijer Dr.	\$ 907,300.00							
● Wattles - Crooks to Livemois	\$ 256,100.00							
● Wattles - Rochester to John R	\$ 256,100.00							
● Wattles - Remainder	\$ 1,024,300.00							
<b>Priority Special features on Primary Roads (furniture/art/shelters)</b>								
● Livemois - South Blvd. to Long Lake	\$ 24,500.00							
● Livemois - Long Lake to Meijer Dr.	\$ 2,242,500.00							
● Wattles - Crooks to Livemois	\$ 1,259,000.00							
● Wattles - Rochester to John R	\$ 1,259,000.00							
● Wattles - Remainder	\$ 39,000.00							

**PRIORITY MATRIX**

The chart at left and below illustrate priority projects for the Troy Pathway System. These are the areas of the plan that present the best initial opportunities for development based on location, destination or scheduled construction.

An electronic matrix has been provided to the City to help them plan and chat pathway work. The matrix is intended to be a living document that is continually updated to record progress.

These costs are included for general budgeting and order of magnitude purposes only. Specific projects would be subject to more detailed estimates. Implementation is intended to be incremental, occurring over many years as funding and logistic opportunities present themselves. Additional information regarding costs in the matrix are included in the Appendix.





Priority Bike Routes		Idea	Approved Concept	Partial Funding in Place	Construction Drawings Complete	Construction Funding in Place	Construction In Progress	Complete
<b>Priority Bike Routes - Street Crossing Improvements</b>								
Northwest Loop and spur (complete)								
● South Blvd. West	\$	10,700.00						
● Coolidge Rd.	\$	11,200.00						
● Square Lake Rd.	\$	8,900.00						
● Long Lake (east)	\$	11,100.00						
● Long Lake (east)	\$	11,200.00						
● Livemois Rd. (north)	\$	10,400.00						
● Livemois Rd. (south)	\$	10,700.00						
● Wattles Rd. (east)	\$	10,700.00						
● Wattles Rd. (west)	\$	10,600.00						
Northeast Loop (3 sides)								
● Rochester Rd.	\$	10,200.00						
● John R (north)	\$	11,000.00						
● John R (south)	\$	10,500.00						
● Long Lake Rd.	\$	10,800.00						
● Wattles Rd.	\$	10,700.00						
South Loop (remaining route)								
● Big Beaver Rd. (east)	\$	19,500.00						
● Big Beaver Rd. (west)	\$	10,800.00						
● Coolidge Rd.	\$	36,200.00						
● Rochester Rd.	\$	10,700.00						
● Maple Rd.	\$	19,800.00						

Priority Bike Routes		Idea	Approved Concept	Partial Funding in Place	Construction Drawings Complete	Construction Funding in Place	Construction In Progress	Complete
<b>Priority Bike Routes - Shared Use Paths</b>								
Northwest Loop and spur (complete)								
● Fire Fighter's Park	\$	12,000.00						
● Square Lake Rd. (east & west)	\$	7,000.00						
● Sylvan Glen Golf Course and spur to west	\$	26,000.00						
● North and south of Wattles Rd.	\$	11,200.00						
● Wattles Road at I-75	\$	2,900.00						
● Boulan Park	\$	11,000.00						
● Northfield Pky. at High school	\$	227,600.00						
Northeast Loop (3 sides)								
● Gibson Drain Crossing east of Rochester Rd.	\$	5,500.00						
● Gibson Drain at Jaycee Park	\$	5,700.00						
● East of John R. Rd.	\$	9,000.00						
● Along Wattles Rd. and south to Beaver Trail Park	\$	9,300.00						
● Barnard Elementary School	\$	4,600.00						
South Loop (remaining route)								
● Spencer Drain crossing	\$	11,200.00						
● John R Rd. to Stephenson Hwy.	\$	10,400.00						
● Robinwood Park	\$	31,700.00						
● Schroeder Park and Elementary School	\$	10,450.00						

**PUBLIC PARTICIPATION - MEETING MINUTES**

The following are meeting minutes from the public meetings held March 25, 2009 and June 11, 2009.



THE GREENWAY COLLABORATIVE, INC.

**Troy Pathways Plan- Public Workshop Map Notes**

Troy Community Center- June 11, 2009

A public workshop was held on June 11, 2009 at the Troy Community Center. During this workshop participants were given the opportunity to record comments and suggestions regarding the preliminary pathways plan. The following is a list of comments received during this event.

**Map 1**

Contacts: Peter Pez 248-879-2446  
Mike McCarty 248-528-1273

Notes:

- Beach Road Should be a Priority Bike Route, Connecting up to Grey Road and the Clinton River Trail
- Potential for Trail Along South Edge of I-75 between Northfield Pkwy and Beech Road
- Woodland Elementary Surrounded by a Fence
- Part of the Path Marked by the Bike Route Exists South of Woodland Elementary
- Desire to Continue Bike Route Along South Edge of Sylvan Glen Golf Course and Make More Connections to Sylvanwood Road.
- There may be Opportunity to access Public/Quasi Public Property off of a Dead-End Road on Church Hill Drive near the Intersection of Long Lake Road and Rochester Rd.
- Greenspace near Jayce Park has a fence around it. However, it may be removed if slope issues can be addressed.

hamiltonanderson

meeting minutes

Hamilton Anderson Associates  
1435 Randolph Suite 200 Detroit, Michigan 48226  
p 313 964 0270 f 313 964 0170  
www.hamilton-anderson.com

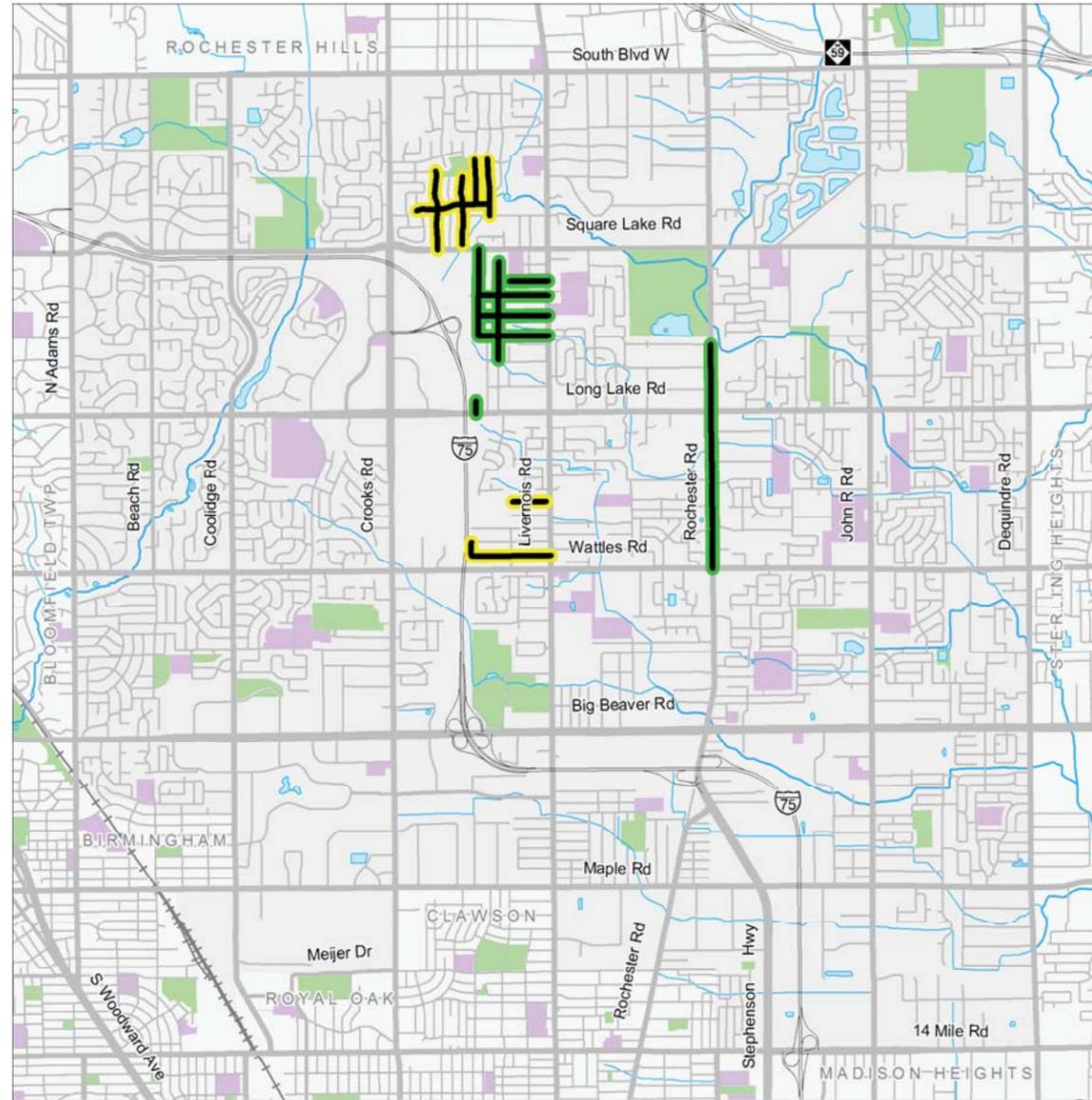
03.25.09	Troy Pathway Master Plan
Meeting Date	Project Name
6:30 pm	28232.00
Meeting Time	Project Number
Troy Community Center	Sam Lovall
Meeting Location	From
Kick off mtg.	04.01.09
Subject	Date
See attached sign-in sheet. Carol Anderson	Carol Anderson, Norm Cox
Attendees	Distribution

Item	Description	Action	Due
1	Hamilton Anderson (HAA) – Introduction and background of HAA presented by Sam Lovall.		
2	Greenways Collaborative (GC) – Introduction and background of GC presented by Norm Cox.		
3	HAA and GC requested the Troy Trails and Pathways Committee (see attached) introduce themselves and share why they are on the committee.		
4	Reasons for committee involvement- Walking, walking dogs, like the outdoors, like to find new ways around town, safety, dislike of traffic, preserving greenspace, mountain biking, back packing, urban trail, required transportation, the trails don't connect, need to travel without getting into the car, off road trails, running, roller blading, observed trails all over the US, recreation and transportation.		
5	Each chairperson of the 4 sub-committees then presented regarding the following topics; 1. Funding, 2. Outreach, 3. Routes, 4. Lights, Surface, Signage, and Zoning.		
6	Funding- Funding strategies were discussed – MDNR Trust Fund, MDOT Enhancement, city funds etc.		
7	Outreach- PR. Presentations were made to City Counsel. Brochure was prepared.		
8	Routes- The "Candidate Trail Map" was presented along with trail types, short term goals and long term goals.		
9	Lights, Surface, Signage, and Zoning – Lighting documents show what needs to be lit, could use alternative energy. Ordinance – need updating to reflect sidewalk/bike facility needs. Signage – Wayfinding, branding, could be an amenity for the city having economic value.		
10	An updated project schedule was presented that includes all		

The above minutes are Hamilton Anderson Associates' understanding of the issues discussed. If any of these items are not consistent with your understanding, please respond within five (5) business days of receipt, otherwise these minutes will become the official record of the project.

**CAPITAL IMPROVEMENT PROJECTS**

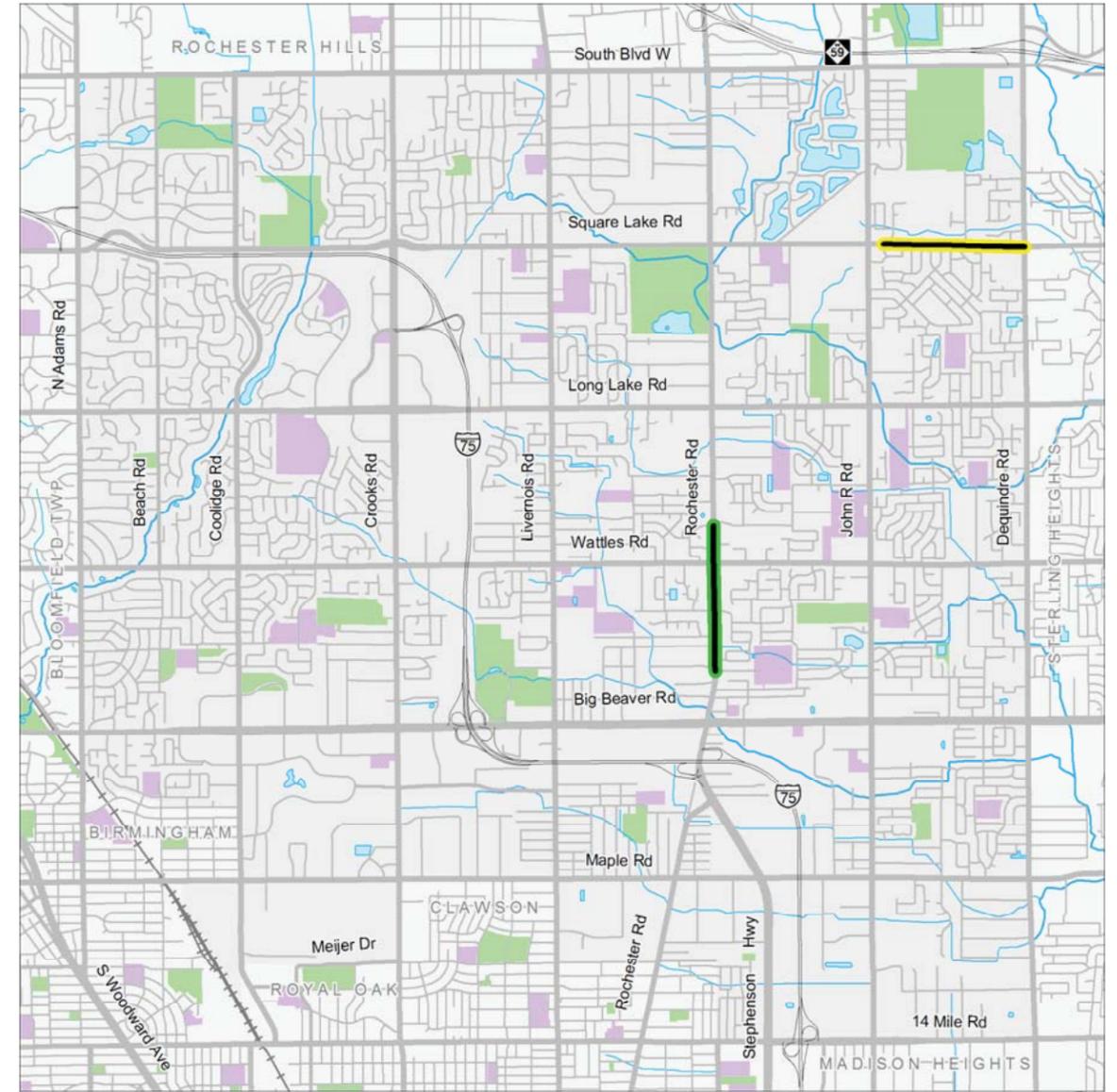
The following maps indicate Capital Improvement Projects scheduled to be completed in the next ten years.



**6 Year CIP - Water**

**Legend:**

- Type
- Resurfacing
- Proposed Date
- 0-2 years
  - 2-6 years

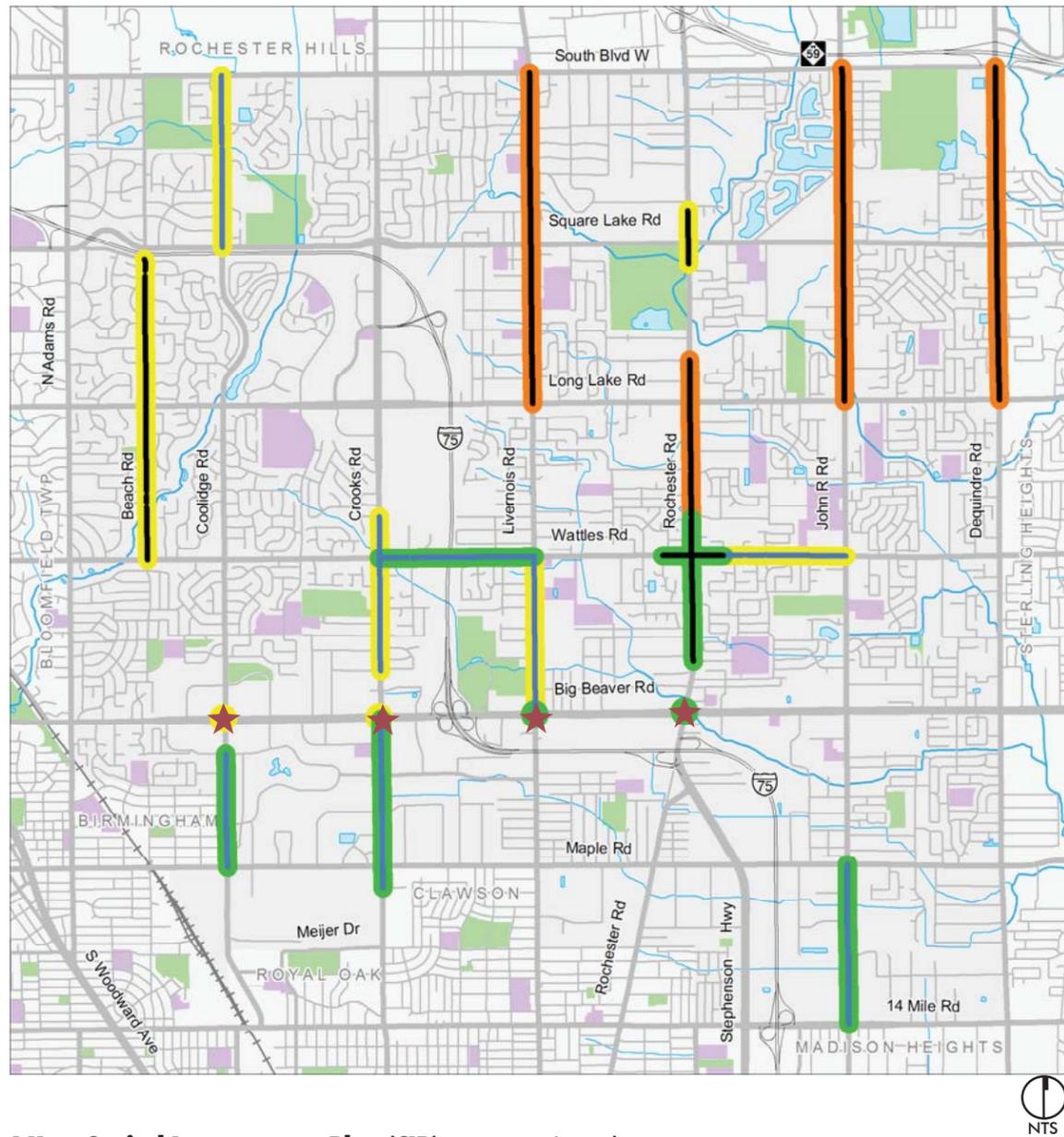


**6 Year CIP - Drains**

**Legend:**

- Type
- Resurfacing
- Proposed Date
- 0-2 years
  - 2-6 years

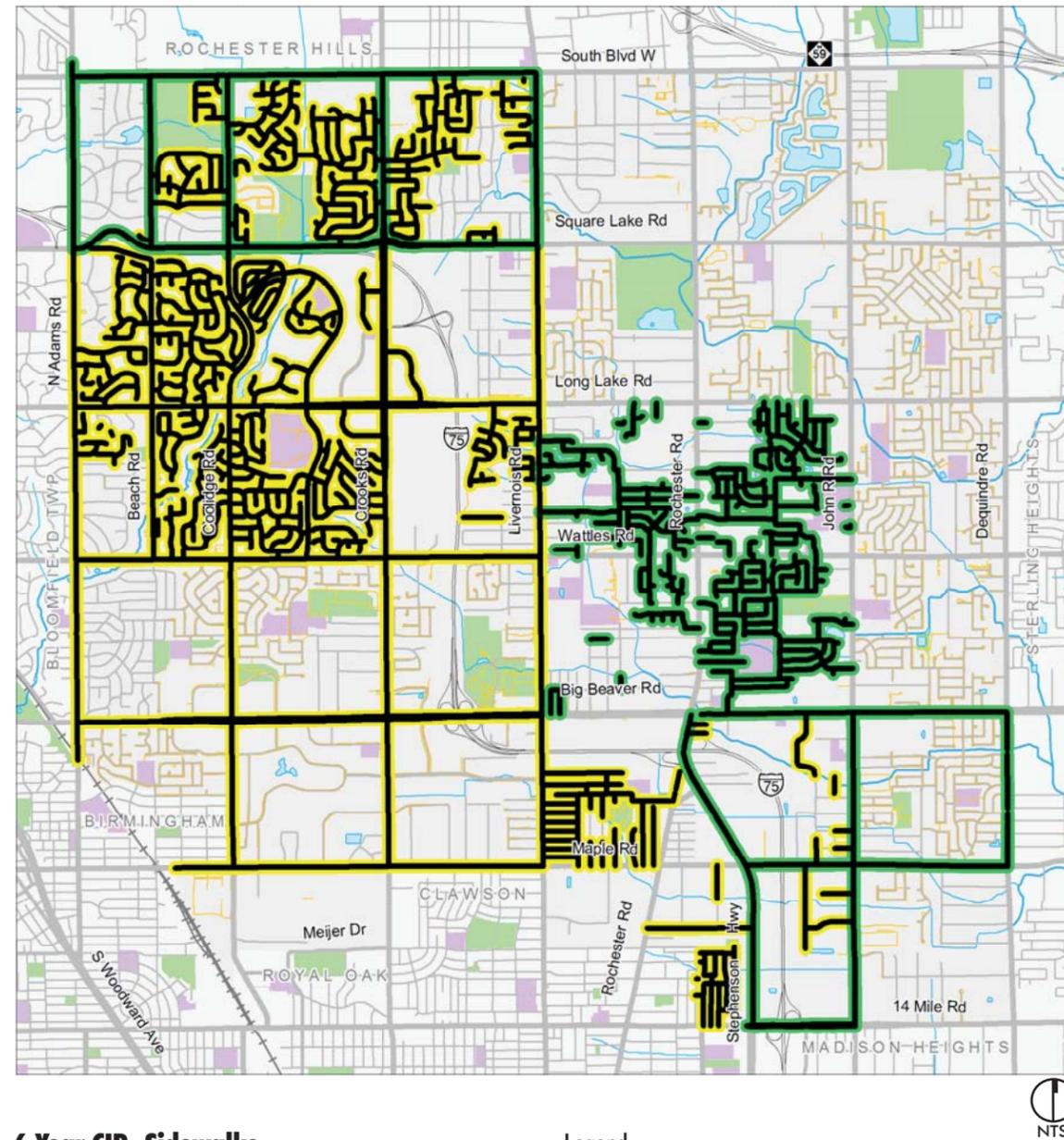




**6 Year Capital Improvement Plan (CIP)  
Major Roads**

**Legend:**

- Type
- Overlay
  - Reconstruction
  - ★ Intersection Enhancement
- Proposed Construction Date
- 0-2 years
  - 2-6 Years
  - 6+ Years



**6 Year CIP -Sidewalks**

**Legend:**

- Type
- Resurfacing
- Proposed Date
- 0-2 years
  - 2-6 years

**COST ESTIMATES**

General magnitude of costs for improvements were generated to aid in setting budgets for implementation. The costs were divided into three main categories: Complete Streets, Shared Use Paths and Street Crossings. Each main category is then broken in to smaller items. Assumptions about how costs were determined are included.

These costs are included for general budgeting and order of magnitude purposes only. Specific projects would be subject to more detailed estimates.

**City of Troy Trails and Pathway Master Plan**

Preliminary Estimate - October 2009

**PRIMARY ROADS - COMPLETE STREETS / GREEN STREETS**

	Length (Miles)
Livernois - South Boulevard to Long Lake	2.1
Livernois - Long Lake to Meijer Dr	3.5
Wattles - Crooks to Livernois	1.0
Wattles Rochester to John R	1.0
Wattles - Remainder	4.0

**Bike Lanes**

	Total Cost
Livernois - South Boulevard to Long Lake	\$57,506
Livernois - Long Lake to Meijer Dr	\$96,000
Wattles - Crooks to Livernois	\$27,120
Wattles Rochester to John R	\$27,120
Wattles - Remainder	\$108,480
	<b>\$316,226</b>

	Item	Qty.	Unit	Unit Cost	Amount
Livernois - South Boulevard to Long Lake	Pavement Marking,	22493	lft	\$2	\$44,986
Livernois - Long Lake to Meijer Dr	4" white	37414	lft	\$2	\$74,828
Wattles - Crooks to Livernois		10560	lft	\$2	\$21,120
Wattles Rochester to John R		10560	lft	\$2	\$21,120
Wattles - Remainder		42240	lft	\$2	\$84,480
Livernois - South Boulevard to Long Lake	Pavement Marking,	8	ea	\$250	\$2,000
Livernois - Long Lake to Meijer Dr	4" white	14	ea	\$250	\$3,500
Wattles - Crooks to Livernois		4	ea	\$250	\$1,000
Wattles Rochester to John R		4	ea	\$250	\$1,000
Wattles - Remainder		16	ea	\$250	\$4,000
Livernois - South Boulevard to Long Lake	Bike Lane Sign	8	ea	\$250	\$2,000
Livernois - Long Lake to Meijer Dr		14	ea	\$250	\$3,500
Wattles - Crooks to Livernois		4	ea	\$250	\$1,000
Wattles Rochester to John R		4	ea	\$250	\$1,000
Wattles - Remainder		16	ea	\$250	\$4,000
Livernois - South Boulevard to Long Lake	Wayfinding	2.13	ea	\$4,000	\$8,520
Livernois - Long Lake to Meijer Dr	Signage, Complete	3.54	ea	\$4,000	\$14,172
Wattles - Crooks to Livernois		1	ea	\$4,000	\$4,000
Wattles Rochester to John R		1	ea	\$4,000	\$4,000
Wattles - Remainder		4	ea	\$4,000	\$16,000

**City of Troy Trails and Pathway Master Plan**

Preliminary Estimate - October 2009

**Assumptions**

- Existing road geometries support bicycle lanes without having to widen/reconstruct roads
- Bicycle lanes are located on both sides of the road
- Bicycle lane symbols shall be placed on each side of the road, two per mile on each side of the road
- Bike land signs include the cost of the sign, u-shaped post and foundation
- Bike lane placement shall be two per mile on each side of the road
- Way finding signage, complete includes the cost of the sign, post and post foundation. Pricing assumes that signage will be decorative in comparison to traditional regulatory signage
- Wayfinding signage shall be estimated as one for every two miles in each direction

**Sidewalk Gaps**

	Item	Qty.	Unit	Cost/Mile	Total Cost
Livernois - South Boulevard to Long Lake	4" Sidewalk Complete	1.73	mile	\$190,000	\$109,900
Livernois - Long Lake to Meijer Dr	4" Sidewalk Complete	0.7	mile	\$190,000	\$271,500
Wattles - Crooks to Livernois	4" Sidewalk Complete	0.9	mile	\$190,000	\$211,200
Wattles Rochester to John R	4" Sidewalk Complete	0.75	mile	\$190,000	\$253,400
Wattles - Remainder	4" Sidewalk Complete	2.38	mile	\$190,000	\$79,900
					<b>\$925,900</b>

**Assumptions**

- 4" Sidewalk Complete includes installation of 6' wide, 4" thick concrete sidewalks and 4" granular base
- Cost per mile prices were estimated using Wisconsin, New York and Virginia Dot Trailway Cost Estimates

**Plantings**

	Total Cost
Livernois - South Boulevard to Long Lake	Plantings, Complete \$545,450
Livernois - Long Lake to Meijer Dr	\$907,291
Wattles - Crooks to Livernois	\$256,080
Wattles Rochester to John R	\$256,080
Wattles - Remainder	\$1,024,320
	<b>\$2,989,222</b>

## City of Troy Trails and Pathway Master Plan

Preliminary Estimate - October 2009

	Item	Qty.	Unit	Cost/Mile	Total Cost
Livernois - South Boulevard to Long Lake	Native Street Trees	562	ea	\$750	\$421,740
Livernois - Long Lake to Meijer Dr		935	ea	\$750	\$701,514
Wattles - Crooks to Livernois		264	ea	\$750	\$198,000
Wattles Rochester to John R		264	ea	\$750	\$198,000
Wattles - Remainder		1056	ea	\$750	\$792,000
Livernois - South Boulevard to Long Lake	Large Native Shrubs	1125	ea	\$60	\$67,478
Livernois - Long Lake to Meijer Dr		1871	ea	\$60	\$112,242
Wattles - Crooks to Livernois		528	ea	\$60	\$31,680
Wattles Rochester to John R		528	ea	\$60	\$31,680
Wattles - Remainder		2112	ea	\$60	\$126,720
Livernois - South Boulevard to Long Lake	Perennial plantings	2812	ea	\$20	\$56,232
Livernois - Long Lake to Meijer Dr		4677	ea	\$20	\$93,535
Wattles - Crooks to Livernois		1320	ea	\$20	\$26,400
Wattles Rochester to John R		1320	ea	\$20	\$26,400
Wattles - Remainder		5280	ea	\$20	\$105,600

### Assumptions

1. Plantings, Complete includes trees, shrubs, and perennials.
2. Tree quantities were estimated for a 40' O.C. placement for 75% of the roadway
3. Shrubs and perennials will not be consistently placed along each stretch of roadway.
4. Shrubs shall be placed at 10' O.C for 50% of road length in each direction
5. Perennials shall be placed at 2' O.C. for 25% of the road length in each direction
6. All costs are slightly elevated to consider placement of topsoil and mulch

### Special Features

	Total Cost
Livernois - South Boulevard to Long Lake	\$24,500
Livernois - Long Lake to Meijer Dr	\$2,242,500
Wattles - Crooks to Livernois	\$1,259,000
Wattles Rochester to John R	\$1,259,000
Wattles - Remainder	\$39,000
	<b>\$4,824,000</b>

## City of Troy Trails and Pathway Master Plan

Preliminary Estimate - October 2009

	Item	Qty.	Unit	Cost/Mile	Total Cost
Livernois - South Boulevard to Long Lake	Benches	8	ea	\$750	\$6,000
Livernois - Long Lake to Meijer Dr		14	ea	\$750	\$10,500
Wattles - Crooks to Livernois		4	ea	\$750	\$3,000
Wattles Rochester to John R		4	ea	\$750	\$3,000
Wattles - Remainder		16	ea	\$750	\$12,000
Livernois - South Boulevard to Long Lake	Bike Racks	1	ea	\$500	\$500
Livernois - Long Lake to Meijer Dr		2	ea	\$500	\$1,000
Wattles - Crooks to Livernois		0	ea	\$500	\$0
Wattles Rochester to John R		0	ea	\$500	\$0
Wattles - Remainder		2	ea	\$500	\$1,000
Livernois - South Boulevard to Long Lake	Trash receptacles	8	ea	\$1,000	\$8,000
Livernois - Long Lake to Meijer Dr		14	ea	\$1,000	\$14,000
Wattles - Crooks to Livernois		4	ea	\$1,000	\$4,000
Wattles Rochester to John R		4	ea	\$1,000	\$4,000
Wattles - Remainder		16	ea	\$1,000	\$16,000
Livernois - South Boulevard to Long Lake	Lighting	0	ea	\$7,000	\$0
Livernois - Long Lake to Meijer Dr		311	ea	\$7,000	\$2,177,000
Wattles - Crooks to Livernois		176	ea	\$7,000	\$1,232,000
Wattles Rochester to John R		176	ea	\$7,000	\$1,232,000
Wattles - Remainder		0	ea	\$7,000	\$0
Livernois - South Boulevard to Long Lake	Art Pieces	1	ea	\$10,000	\$10,000
Livernois - Long Lake to Meijer Dr		4	ea	\$10,000	\$40,000
Wattles - Crooks to Livernois		2	ea	\$10,000	\$20,000
Wattles Rochester to John R		2	ea	\$10,000	\$20,000
Wattles - Remainder		1	ea	\$10,000	\$10,000

### Assumptions

1. Special Features, Complete includes elements such as benches, trash receptacles, and art elements
2. Benches shall be placed on each side of the road, two per mile
3. Bike Racks will be placed near busy corners, near popular destinations. Bike rack estimates shall be 1 bike rack for every three miles, on each side of the road
4. Trash receptacle shall be placed on each side of the road, two per mile
5. Lighting shall be estimated in non-residential areas only, at 60' O.C., each side of the road
6. Art pieces shall highlight important gateways. Additional pieces shall considered in nonresidential areas

## City of Troy Trails and Pathway Master Plan

Preliminary Estimate - October 2009

### PRIORITY BIKE ROUTES - INTERSECTION IMPROVEMENTS

	Total Cost
<b>Northwest Loop and Spur Complete</b>	\$73,999.00
South Boulevard (at Beach Road)	\$10,660.00
Coolidge Road (at Red Maple Drive)	\$11,160.00
Square Lake Road (at Coolidge Highway)	\$8,900.00
Long Lake (at Belzair Drive)	\$11,092.00
Long Lake (at Northfield Parkway)	\$11,156.00
Livernois Road (at Habrand Drive)	\$10,336.00
Livernois Road (at Wendelton Road)	\$10,692.00
Wattles Road (at Tallman Drive)	\$10,660.00
Wattles Road (at Northfield Parkway)	\$10,546.00
<b>Northeast Loop and Spur Complete</b>	\$ 53,139.00
Rochester Road (at Sylvanwood Drive)	\$10,156.0
John R (at Laurel Drive)	\$10,972.0
John R (at North Lake Drive)	\$10,508.0
Long Lake Road (at Blair Drive)	\$10,792.0
Wattles Road (Forsyth Drive)	\$10,708.0
<b>South Loop and Spur Complete</b>	\$77,068.0
Big Beaver Road (at Cedar Crest Drive)	\$19,424.0
Big Beaver Road (at Beach Road)	\$10,792.0
Coolidge Road (at Golfview Drive)	\$36,196.0
Rochester Road (at Troywood Drive)	\$10,656.0

	Item	Qty	Unit	Cost/Mile	Total Cost
<b>NW</b>	South Boulevard (west)	Ramps,	4 ea	\$25.00	\$100.00
	Coolidge Road	Complete	4 ea	\$25.00	\$100.00
	Square Lake Road		4 ea	\$25.00	\$100.00
	Long Lake (east)		4 ea	\$25.00	\$100.00
	Long Lake (west)		4 ea	\$25.00	\$100.00
	Livernois Road (north)		4 ea	\$25.00	\$100.00
	Livernois Road (south)		4 ea	\$25.00	\$100.00
<b>NE</b>	Wattles Road (east)		4 ea	\$25.00	\$100.00
	Wattles Road (west)		4 ea	\$25.00	\$100.00
	Rochester Road		4 ea	\$25.00	\$100.00
	John R (north)		4 ea	\$25.00	\$100.00
	John R (south)		4 ea	\$25.00	\$100.00
	Long Lake Road		4 ea	\$25.00	\$100.00
	Wattles Road		4 ea	\$25.00	\$100.00

## City of Troy Trails and Pathway Master Plan

Preliminary Estimate - October 2009

	Item	Qty	Unit	Cost/Mile	Total Cost
<b>S</b>	Big Beaver Road (east)	Ramps,	4 ea	\$25.00	\$100.00
	Big Beaver Road (west)	Complete, Cont.	4 ea	\$25.00	\$100.00
	Coolidge Road		4 ea	\$25.00	\$100.00
	Rochester Road		4 ea	\$25.00	\$100.00
	Maple Road		4 ea	\$25.00	\$100.00
<b>NW</b>	South Boulevard (west)	Curb and Gutter	50 lf	\$16.00	\$800.00
	Coolidge Road		50 lf	\$16.00	\$800.00
	Square Lake Road		lf	\$16.00	\$0.00
	Long Lake (east)		50 lf	\$16.00	\$800.00
	Long Lake (west)		50 lf	\$16.00	\$800.00
	Livernois Road (north)		46 lf	\$16.00	\$736.00
	Livernois Road (south)		46 lf	\$16.00	\$736.00
<b>NE</b>	Wattles Road (east)		46 lf	\$16.00	\$736.00
	Wattles Road (west)		46 lf	\$16.00	\$736.00
	Rochester Road		50 lf	\$16.00	\$800.00
	John R (north)		50 lf	\$16.00	\$800.00
	John R (south)		48 lf	\$16.00	\$768.00
	Long Lake Road		50 lf	\$16.00	\$800.00
	Wattles Road		50 lf	\$16.00	\$800.00
<b>S</b>	Big Beaver Road (east)		40 lf	\$16.00	\$640.00
	Big Beaver Road (west)		50 lf	\$16.00	\$800.00
	Coolidge Road		80 lf	\$16.00	\$1,280.00
	Rochester Road		46 lf	\$16.00	\$736.00
	Maple Road		100 lf	\$16.00	\$1,600.00

## City of Troy Trails and Pathway Master Plan

Preliminary Estimate - October 2009

	Item	Qty.	Unit	Cost/Mile	Total Cost	
<b>NW</b>	South Boulevard (west)	Concrete Walk	240	sf	\$3.00	\$720.00
	Coolidge Road		420	sf	\$3.00	\$1,260.00
	Square Lake Road			sf	\$3.00	\$0.00
	Long Lake (east)		400	sf	\$3.00	\$1,200.00
	Long Lake (west)		400	sf	\$3.00	\$1,200.00
	Livernois Road (north)		200	sf	\$3.00	\$600.00
	Livernois Road (south)		288	sf	\$3.00	\$864.00
	Wattles Road (east)		288	sf	\$3.00	\$864.00
	Wattles Road (west)		250	sf	\$3.00	\$750.00
	<b>NE</b>	Rochester Road		72	sf	\$3.00
John R (north)			360	sf	\$3.00	\$1,080.00
John R (south)			216	sf	\$3.00	\$648.00
Long Lake Road			300	sf	\$3.00	\$900.00
Wattles Road			288	sf	\$3.00	\$864.00
<b>S</b>	Big Beaver Road (east)		500	sf	\$3.00	\$1,500.00
	Big Beaver Road (west)		300	sf	\$3.00	\$900.00
	Coolidge Road		480	sf	\$3.00	\$1,440.00
	Rochester Road		276	sf	\$3.00	\$828.00
	Maple Road		552	sf	\$3.00	\$1,656.00
<b>NW</b>	South Boulevard (west)	Pav't Markings,	60	lf	\$4.00	\$240.00
	Coolidge Road	Crosswalk	50	lf	\$4.00	\$200.00
	Square Lake Road			lf	\$4.00	\$0.00
	Long Lake (east)		48	lf	\$4.00	\$192.00
	Long Lake (west)		64	lf	\$4.00	\$256.00
	Livernois Road (north)		25	lf	\$4.00	\$100.00
	Livernois Road (south)		48	lf	\$4.00	\$192.00
	Wattles Road (east)		40	lf	\$4.00	\$160.00
	Wattles Road (west)		40	lf	\$4.00	\$160.00
	<b>NE</b>	Rochester Road		60	lf	\$4.00
John R (north)			48	lf	\$4.00	\$192.00
John R (south)			48	lf	\$4.00	\$192.00
Long Lake Road			48	lf	\$4.00	\$192.00
Wattles Road			36	lf	\$4.00	\$144.00
<b>S</b>	Big Beaver Road (east)		96	lf	\$4.00	\$384.00
	Big Beaver Road (west)		48	lf	\$4.00	\$192.00
	Coolidge Road		144	lf	\$4.00	\$576.00
	Rochester Road		48	lf	\$4.00	\$192.00
	Maple Road		96	lf	\$4.00	\$384.00

## City of Troy Trails and Pathway Master Plan

Preliminary Estimate - October 2009

	Item	Qty.	Unit	Cost/Mile	Total Cost	
<b>NW</b>	South Boulevard (west)	Ped. Beacons	2	ea	\$4,000.00	\$8,000.00
	Coolidge Road		2	ea	\$4,000.00	\$8,000.00
	Square Lake Road		2	ea	\$4,000.00	\$8,000.00
	Long Lake (east)		2	ea	\$4,000.00	\$8,000.00
	Long Lake (west)		2	ea	\$4,000.00	\$8,000.00
	Livernois Road (north)		2	ea	\$4,000.00	\$8,000.00
	Livernois Road (south)		2	ea	\$4,000.00	\$8,000.00
	Wattles Road (east)		2	ea	\$4,000.00	\$8,000.00
	Wattles Road (west)		2	ea	\$4,000.00	\$8,000.00
	<b>NE</b>	Rochester Road		2	ea	\$4,000.00
John R (north)			2	ea	\$4,000.00	\$8,000.00
John R (south)			2	ea	\$4,000.00	\$8,000.00
Long Lake Road			2	ea	\$4,000.00	\$8,000.00
Wattles Road			2	ea	\$4,000.00	\$8,000.00
<b>S</b>	Big Beaver Road (east)		4	ea	\$4,000.00	\$16,000.00
	Big Beaver Road (west)		2	ea	\$4,000.00	\$8,000.00
	Coolidge Road		8	ea	\$4,000.00	\$32,000.00
	Rochester Road		2	ea	\$4,000.00	\$8,000.00
	Maple Road		4	ea	\$4,000.00	\$16,000.00
<b>NW</b>	South Boulevard (west)	Signage	2	ea	\$250.00	\$500.00
	Coolidge Road		2	ea	\$250.00	\$500.00
	Square Lake Road		2	ea	\$250.00	\$500.00
	Long Lake (east)		2	ea	\$250.00	\$500.00
	Long Lake (west)		2	ea	\$250.00	\$500.00
	Livernois Road (north)		2	ea	\$250.00	\$500.00
	Livernois Road (south)		2	ea	\$250.00	\$500.00
	Wattles Road (east)		2	ea	\$250.00	\$500.00
	Wattles Road (west)		2	ea	\$250.00	\$500.00
	<b>NE</b>	Rochester Road		2	ea	\$250.00
John R (north)			2	ea	\$250.00	\$500.00
John R (south)			2	ea	\$250.00	\$500.00
Long Lake Road			2	ea	\$250.00	\$500.00
Wattles Road			2	ea	\$250.00	\$500.00
<b>S</b>	Big Beaver Road (east)		2	ea	\$250.00	\$500.00
	Big Beaver Road (west)		2	ea	\$250.00	\$500.00
	Coolidge Road		2	ea	\$250.00	\$500.00
	Rochester Road		2	ea	\$250.00	\$500.00

## City of Troy Trails and Pathway Master Plan

Preliminary Estimate - October 2009

	Item	Qty.	Unit	Cost/Mile	Total Cost
<b>NW</b>	South Boulevard (west)	2	ea	\$150.00	\$300.00
	Coolidge Road	2	ea	\$150.00	\$300.00
	Square Lake Road	2	ea	\$150.00	\$300.00
	Long Lake (east)	2	ea	\$150.00	\$300.00
	Long Lake (west)	2	ea	\$150.00	\$300.00
	Livernois Road (north)	2	ea	\$150.00	\$300.00
	Livernois Road (south)	2	ea	\$150.00	\$300.00
	Wattles Road (east)	2	ea	\$150.00	\$300.00
	Wattles Road (west)	2	ea	\$150.00	\$300.00
	<b>NE</b>	Rochester Road	2	ea	\$150.00
John R (north)		2	ea	\$150.00	\$300.00
John R (south)		2	ea	\$150.00	\$300.00
Long Lake Road		2	ea	\$150.00	\$300.00
Wattles Road		2	ea	\$150.00	\$300.00
<b>S</b>	Big Beaver Road (east)	2	ea	\$150.00	\$300.00
	Big Beaver Road (west)	2	ea	\$150.00	\$300.00
	Coolidge Road	2	ea	\$150.00	\$300.00
	Rochester Road	2	ea	\$150.00	\$300.00
	Maple Road				

### Assumptions

1. Intersection improvements shall include pedestrian refuge islands, concrete sidewalk, concrete ramps, pedestrian signage and beacons, and relocation of existing stop and yield signage.
2. Concrete ramps with elevated domes shall be placed at every intersection.
3. Curb and gutter quantities shall include cost of saw cutting the existing road to place concrete curb and gutter to construct pedestrian refuge islands. Dimension of the refuges are a minimum of 8' wide and 15' long
4. Concrete sidewalk placement shall consist of 6' wide, 4" thick concrete sidewalk placed within the pedestrian refuge
5. Pedestrian beacons (walk/don't walk) will be placed at every intersection.
6. Signage shall be placed at every intersection
7. Coolidge and Maple Road include two crossings. The existing median, shall be considered the pedestrian refuge

## City of Troy Trails and Pathway Master Plan

Preliminary Estimate - October 2009

### PRIORITY BIKE ROUTES - SHARED USE PATHS

	Length (miles)
<b>Northwest Loop and Spur Complete</b>	
Fire Fighter's Park (South Blvd to FF Park)	2.20
Square Lake Road (FF Park to Coolidge Hwy)	1.30
Sylvan Glen Golf Course (FF Park to Sylvan Golf Course)	4.74
North and South Wattles (Sylvan Golf Course to Troywood Dr)	2.04
Wattles I -75 (Virgilia Dr to 3 Oaks Dr)	0.52
Boulan Park (Troywood Dr to Northfield Dr)	2.00
Northfield Parkway (Square Lake Rd to Boulan Park Middle School)	2.24
<b>Northeast Loop and Spur Complete</b>	
Gibson Drain crossing east of Rochester Road (Sylvan Golf Course to Willow Grove Drive)	1.01
Gibson Drain at Jaycee Park (Willow Grove Drive to Jaycee Park)	1.01
East of John R Road (Jaycee Park to Forge Dr)	1.65
Along Wattles Road and South To Big Beaver Trail Park (Raintree Park to Troywood Dr)	1.75
Barnard Elementary (Forge Dr to Raintree Park)	0.9
<b>South Loop and Spur Complete</b>	
Spencer Drain Crossing (Barnard Elementary to Milverton Rd)	2.03
John R Road in Stephenson Highway (14Mile/Stephenson Hwy to Milverton)	1.92
Robinswood Park (Golfview Drive to 14 Mile Rd)	5.79
Schroeder Park and Elementary School (Boulan Park to Cedar Ridge Dr)	1.94
	<b>Item</b>
<b>NW</b>	Fire Fighter's Park Square Lake Road Sylvan Glen Golf Course North and South Wattles Wattles I -75 Boulan Park Northfield Parkway
<b>NE</b>	Gibson Drain crossing east of Rochester Road Gibson Drain at Jaycee Park East of John R Road Along Wattles Road and South To Big Beaver Trail Park Barnard Elementary
<b>S</b>	Spencer Drain Crossing John R Road in Stephenson Highway Robinswood Park Schroeder Park and Elementary School
	Ramps, Complete

## City of Troy Trails and Pathway Master Plan

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	Item
<p><b>NW</b> Fire Fighter's Park Square Lake Road Sylvan Glen Golf Course North and South Wattles Wattles I -75 Boulan Park Northfield Parkway</p> <p><b>NE</b> Gibson Drain crossing east of Rochester Road Gibson Drain at Jaycee Park East of John R Road Along Wattles Road and South To Big Beaver Trail Park Barnhard Elementary</p> <p><b>S</b> Spencer Drain Crossing John R Road in Stephenson Highway Robinswood Park Schroeder Park and Elementary School</p>	Concrete Sidewalk
<p><b>NW</b> Fire Fighter's Park Square Lake Road Sylvan Glen Golf Course North and South Wattles Wattles I -75 Boulan Park Northfield Parkway</p> <p><b>NE</b> Gibson Drain crossing east of Rochester Road Gibson Drain at Jaycee Park East of John R Road Along Wattles Road and South To Big Beaver Trail Park Barnhard Elementary</p> <p><b>S</b> Spencer Drain Crossing John R Road in Stephenson Highway Robinswood Park Maple Road</p>	Signage
<p><b>NW</b></p> <p><b>NE</b></p> <p><b>S</b></p>	Traffic Calming

## City of Troy Trails and Pathway Master Plan

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### Assumptions

1. Concrete sidewalks are generally located along all bike route paths. Sidewalks where shared use path are indicated, shall be widened to 10 to fill small gaps and strengthen ramp connections. Approximately 5% of the length of the pathway is estimated for sidewalk
2. Ramps shall be placed at all trail crossings, approximately 10 ramps per mile
3. Wayfinding signage shall be placed one on each side of the road, every mile. Signage shall include sign, post and foundation
4. Traffic calming such as traffic circles, refuges and bicycle boulevards shall be estimated, one for every three miles. It is estimated that a traf. each and shall include concrete curb and gutter, intersection reconstruction, signage and plantings
5. Square footage for Northfield Parkway is higher, due its designation of a shared use path (10' width)