City of Grand Rapids Bicycle Plan

Draft Recommendations

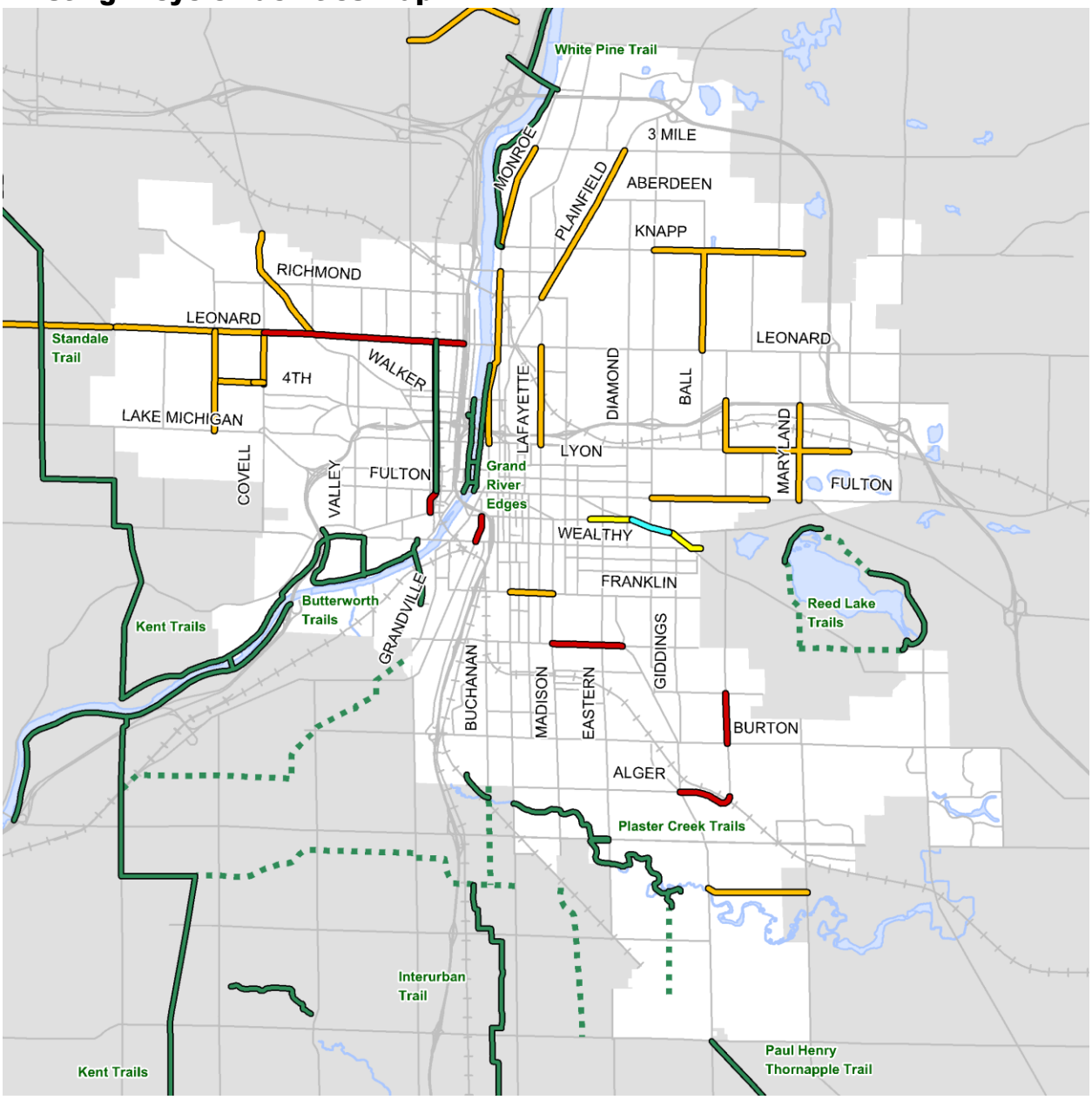
November 29, 2010

Summary

This document was produced by the Greenway Collaborate, Inc. for the City of Grand Rapids to assist with the City of Grand Rapids Bicycle Plan. After evaluating the City of Grand Rapids proposed bike facilities system and phasing approach, TGC developed a Framework Plan to help layout a vision for the bicycling system that illustrates what can be accomplished in the near-term via Neighborhood Connector Routes, Near-term Bike Lanes and Off-Road Trails.

Document Contents:

Existing Bicycle Facilities Map



There are a variety of bicycle facilities that already exist. However they are many short segments that do not connect and the system lacks a complete network across the city.

Existing Bicycle Facilities:

- Bike Lanes
- Planned Bike Lanes for Fall 2011
- Shared Lane Markings
- Paved Shoulder/ Edge Stripe
- Bike Routes
- Shared-use Path and Trails

Evaluation of Proposed Bike Lanes

Due to a lack of detail in the GIS database provided by the city, it was difficult to assess how realistic the bike lane system proposed by the city was. There is not a consistent correlation between the road width, the number of lanes and where bike lanes are proposed. To get a better feel for the feasibility of bike lanes, additional analysis was conducted using the existing data provided by the city. Each analysis took the total road width, then subtracted out the space required for the number motor lanes indicted to determine the amount of space that remains for bike lanes and/or on-street parking. Given that the width of motor vehicle lanes is variable, three scenarios where addressed:

Scenario 1: evaluates the potential for bike lanes if the travel lanes are narrowed to 11'

Scenario 2: evaluates the potential for bike lanes if the travel lanes are narrowed to 10.5'

Scenario 3: evaluates the potential for bike lanes if the travel lanes are narrowed to 10'

The viability of each scenario depends on the context roadway. 10' lanes are acceptable on most Collectors, Minor Arterials and slower speed streets in the downtown area. But on higher speed roadways with a significant percentage of heavy vehicle traffic, wider motor vehicle lanes may be desirable. Also, compromises in preferred motor vehicle and bike lane widths are often made in order to establish contiguous networks.

Another issue with the database is that it is not clear were on-street parking currently exists. The database makes mention of parking constraints under the "BIK_FAC_1" field, but it does not indicate if the parking is on one or both sides. So for each scenario, the potential near-term bike lanes are categorized in regards to the presence of on-street parking on one or both sides of the street. For the purposes of the analysis, on-street parking was assumed to be 7' wide. Only a few street segments have the potential to support bike lanes and on-street parking on both sides. For most street segments there is only enough room for the motor vehicle travel lanes and bike lanes.

Please note that a more detailed study would have to be done to determine if it is a desirable tradeoff to remove on-street parking to add bike lanes in the near-term. Issues such as the impact to the pedestrian level of service, parking utilization and adjacency of commercial activity all should be taken into consideration when looking at removing on-street parking.

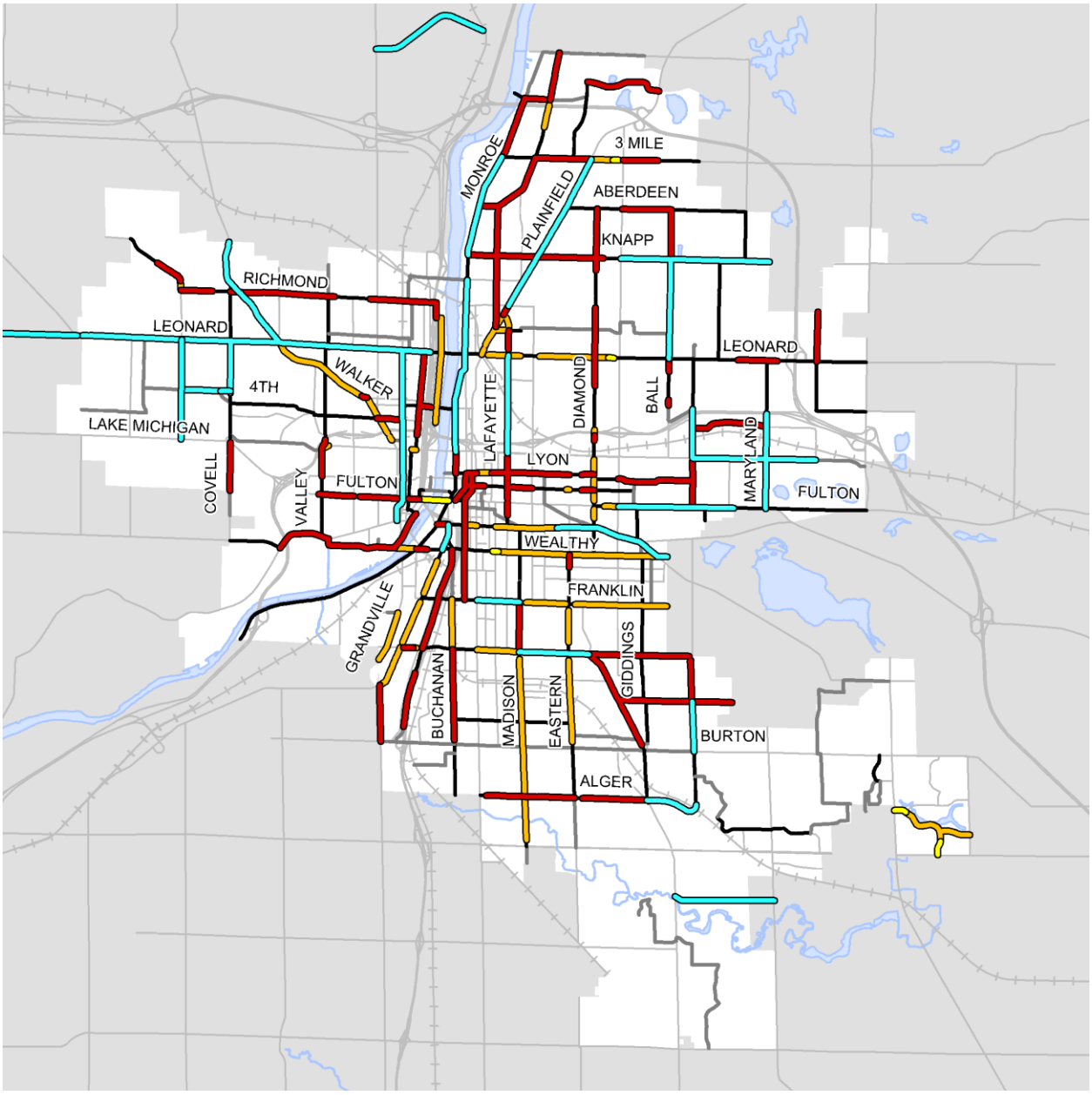
Please refer the Appendix for more details on how the data was calculated.

One-way Bike Lanes:

There are a few cases (both existing and proposed in the city's database) where there is a bike lane on only one-side of a two-way street. While these situations need to be evaluated on a case-by-case basis, there are some significant issues with this practice. Specifically, there is likely to be a greater incidence of wrong-way travel in the bike lane. This sets up the potential for more automobile and bicycle crashes as motorists are not expecting bicycles traveling opposite the flow of traffic.

There are cases where this is an appropriate solution. There have been cases where we have proposed a bike lane on one side of a street going up a steep grade and a shared-use-arrow on the opposite side of the street going downhill, especially when the downhill section is adjacent to on-street parking. On mostly level grades it is often better to use shared-use-arrows on both sides of the street.

Scenario 1: Travel Lanes Narrowed to 11’



This map displays the opportunities to add bike lanes to the major roads if the travel lanes are narrowed to 11’ feet wide.

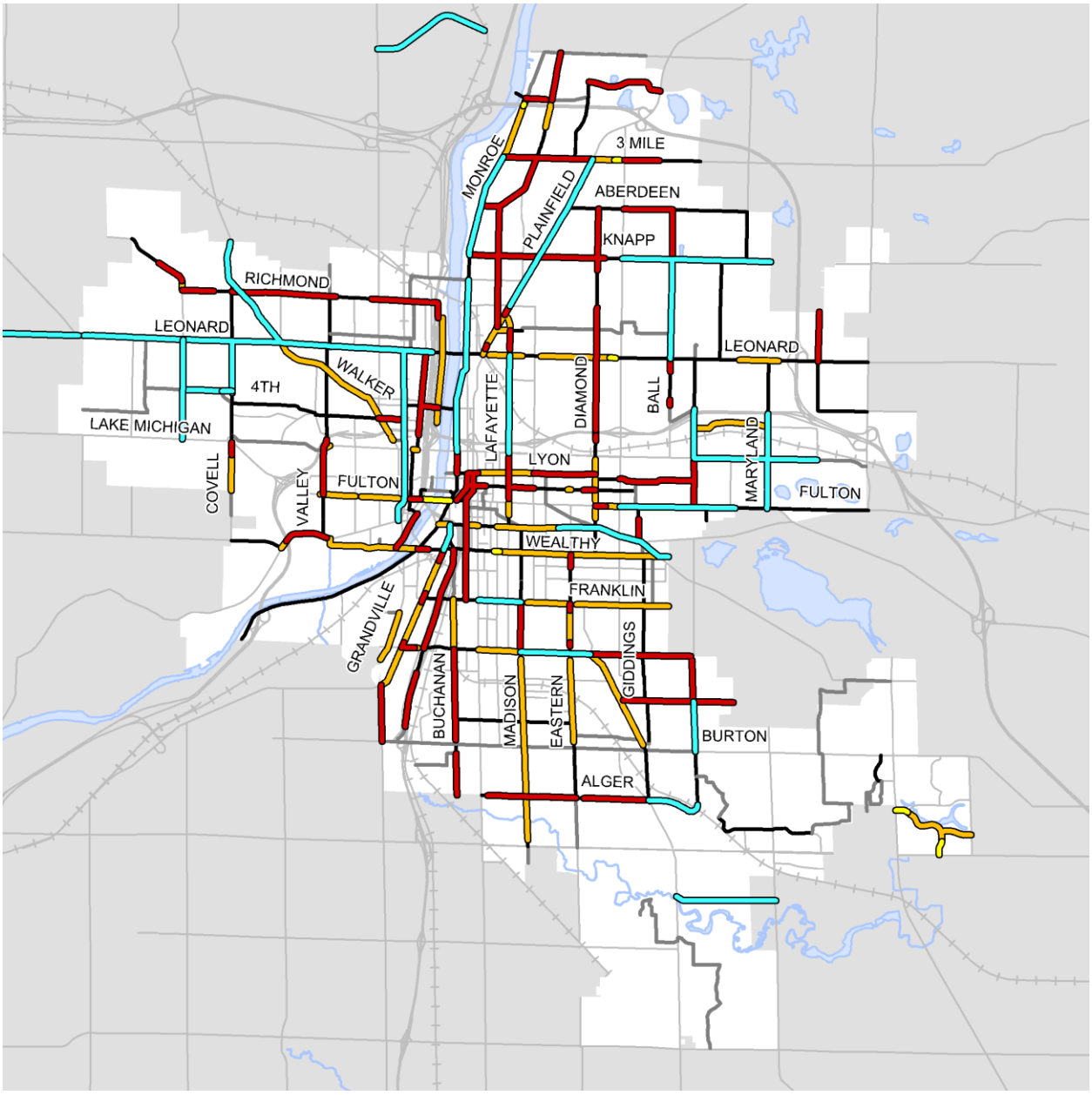
Near-term Bike Lanes Opportunities through Lane Narrowing:
(assuming 11' lanes with 7' parking)

- On-street parking on both sides of the street
- On-street parking on one side of the street
- No On-street parking

Other:

- Existing Bike Facilities
  (Paved Shoulder, Bike Lane, Share lane Marking ect.)
- Long Term Bike Lanes
- Insufficent Data

Scenario 2: Travel Lanes Narrowed to 10.5’



This map displays the opportunities to add bike lanes to the major roads if the travel lanes are narrowed to 10.5’ feet wide.

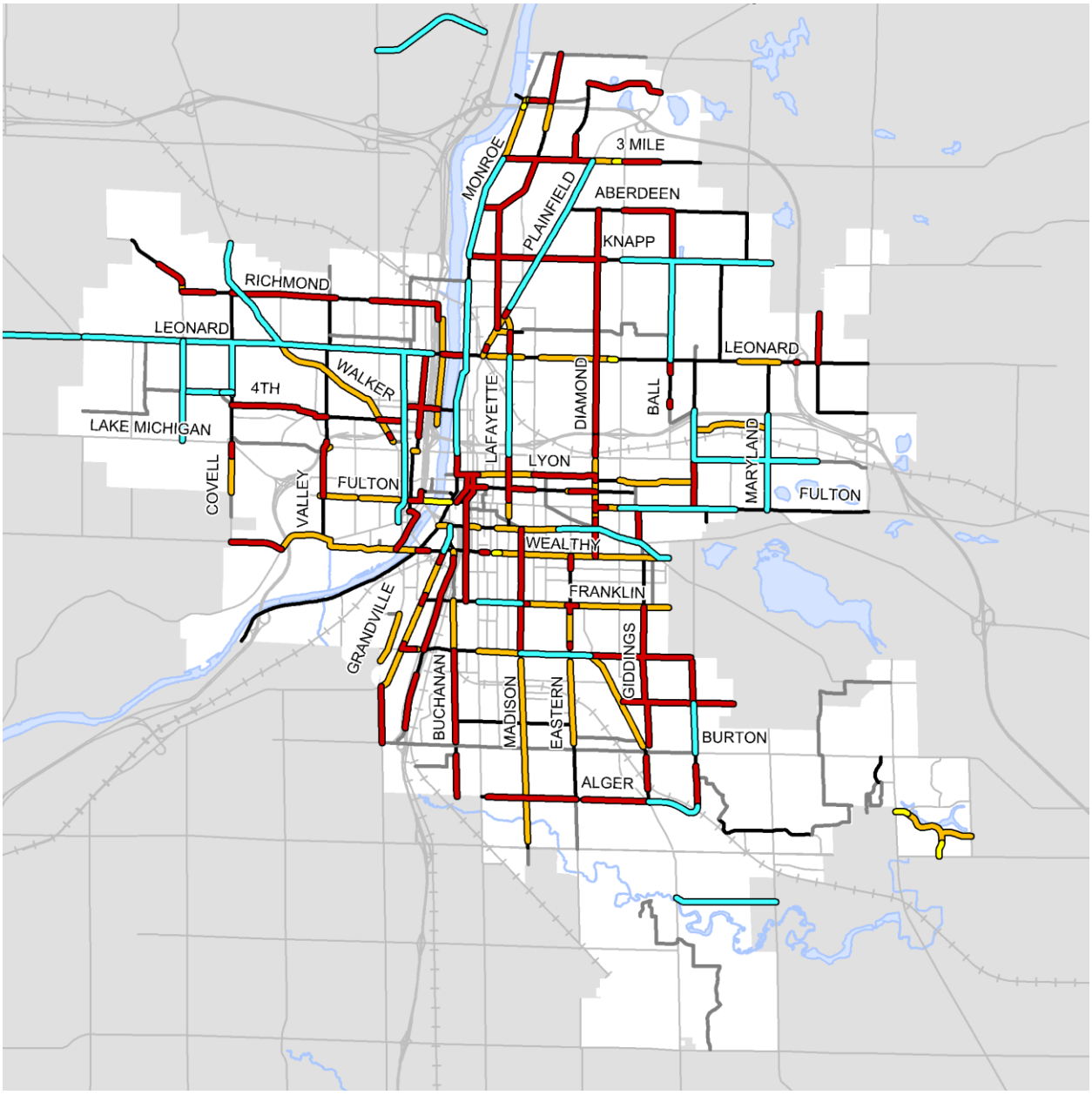
Near-term Bike Lanes Opportunities through Lane Narrowing:
(assuming 10.5' lanes with 7' parking)

- On-street parking on both sides of the street
- On-street parking on one side of the street
- No On-street parking

Other:

- Existing Bike Facilities (Paved Shoulder, Bike Lane, Share lane Marking ect.)
- Long Term Bike Lanes
- Insufficent Data

Scenario 3: Travel Lanes Narrowed to 10’



This map displays the opportunities to add bike lanes to the major roads if the travel lanes are narrowed to 10’ feet wide.

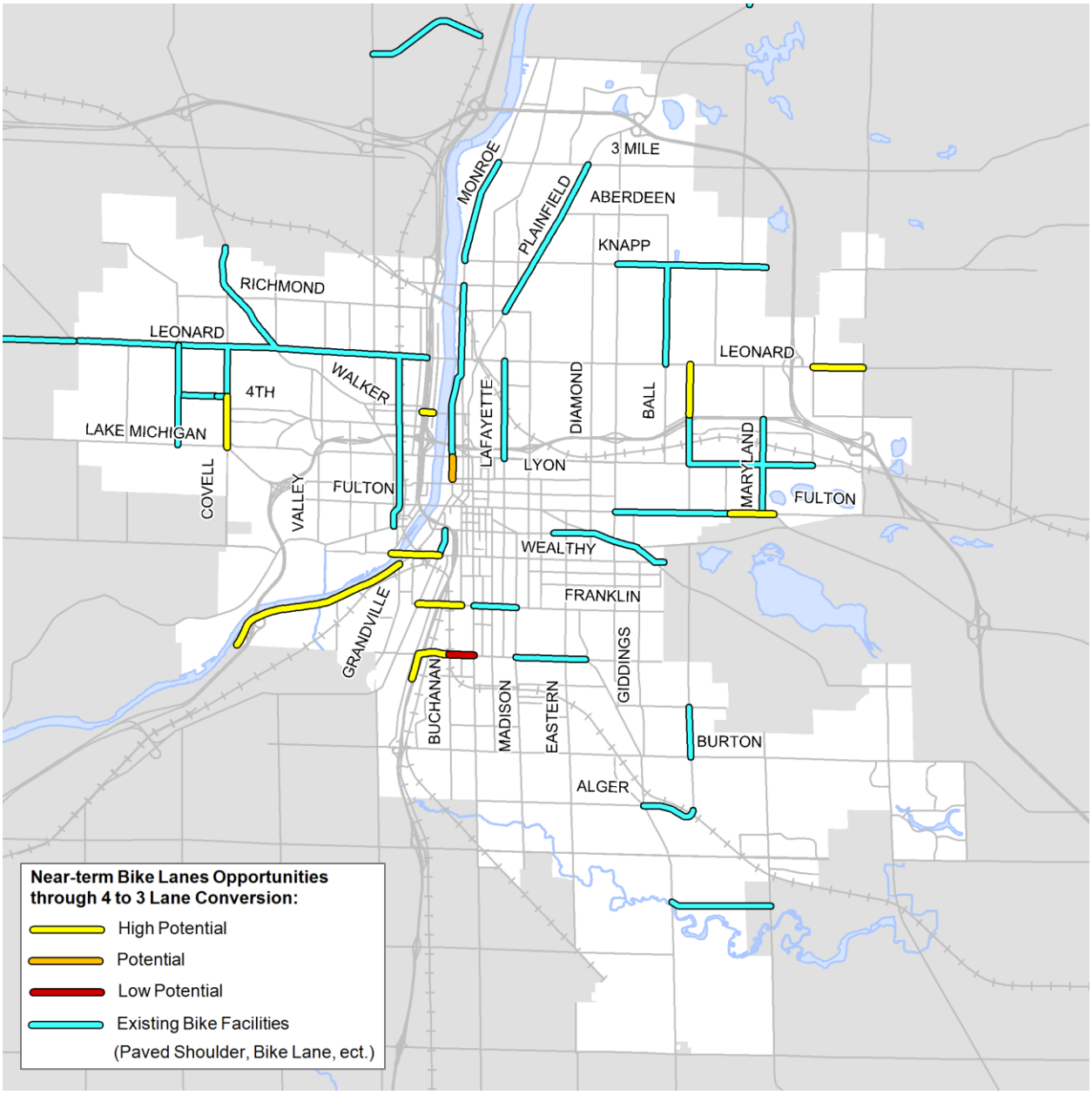
Near-term Bike Lanes Opportunities through Lane Narrowing:
(assuming 10' lanes with 7' parking)

- On-street parking on both sides of the street
- On-street parking on one side of the street
- No On-street parking

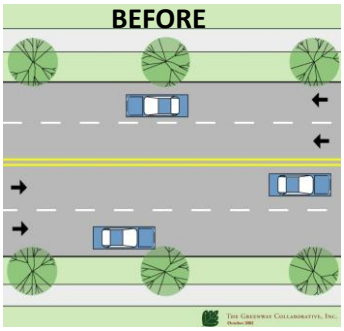
Other:

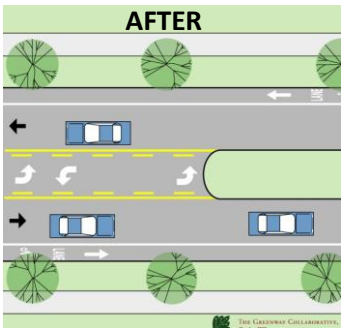
- Existing Bike Facilities (Paved Shoulder, Bike Lane, Share lane Marking ect.)
- Long Term Bike Lanes
- Insufficent Data

Potential 4 to 3 Lane Conversions

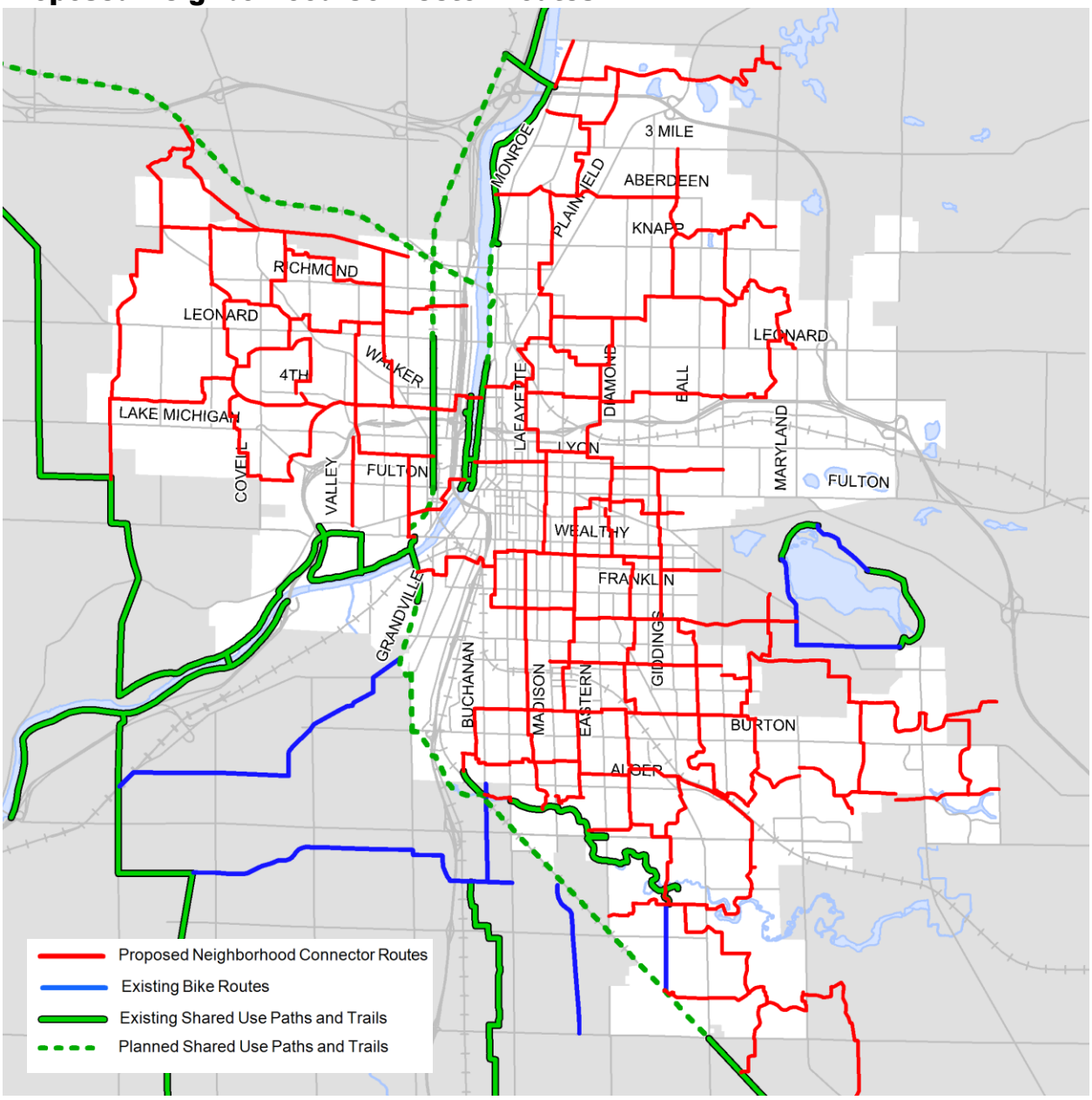


Based on an analysis of the existing 4-lane roadways in the City, there is potential to add bikes to some roadways by reducing the lanes from 4 to 3 lanes. In general, 3-lane roads are safer for all users and they provide opportunities for raised medians and crossing islands.



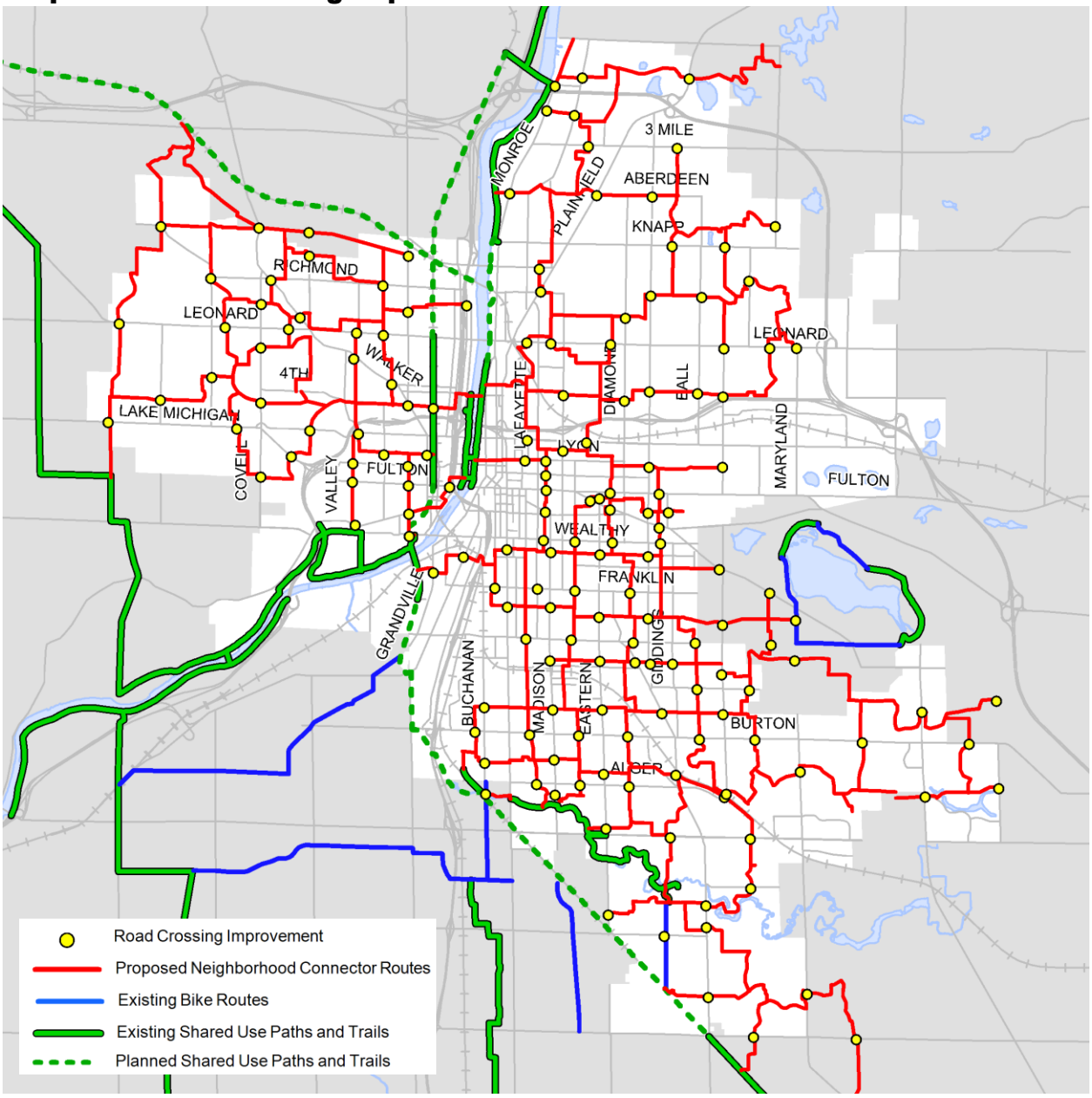


Proposed Neighborhood Connector Routes



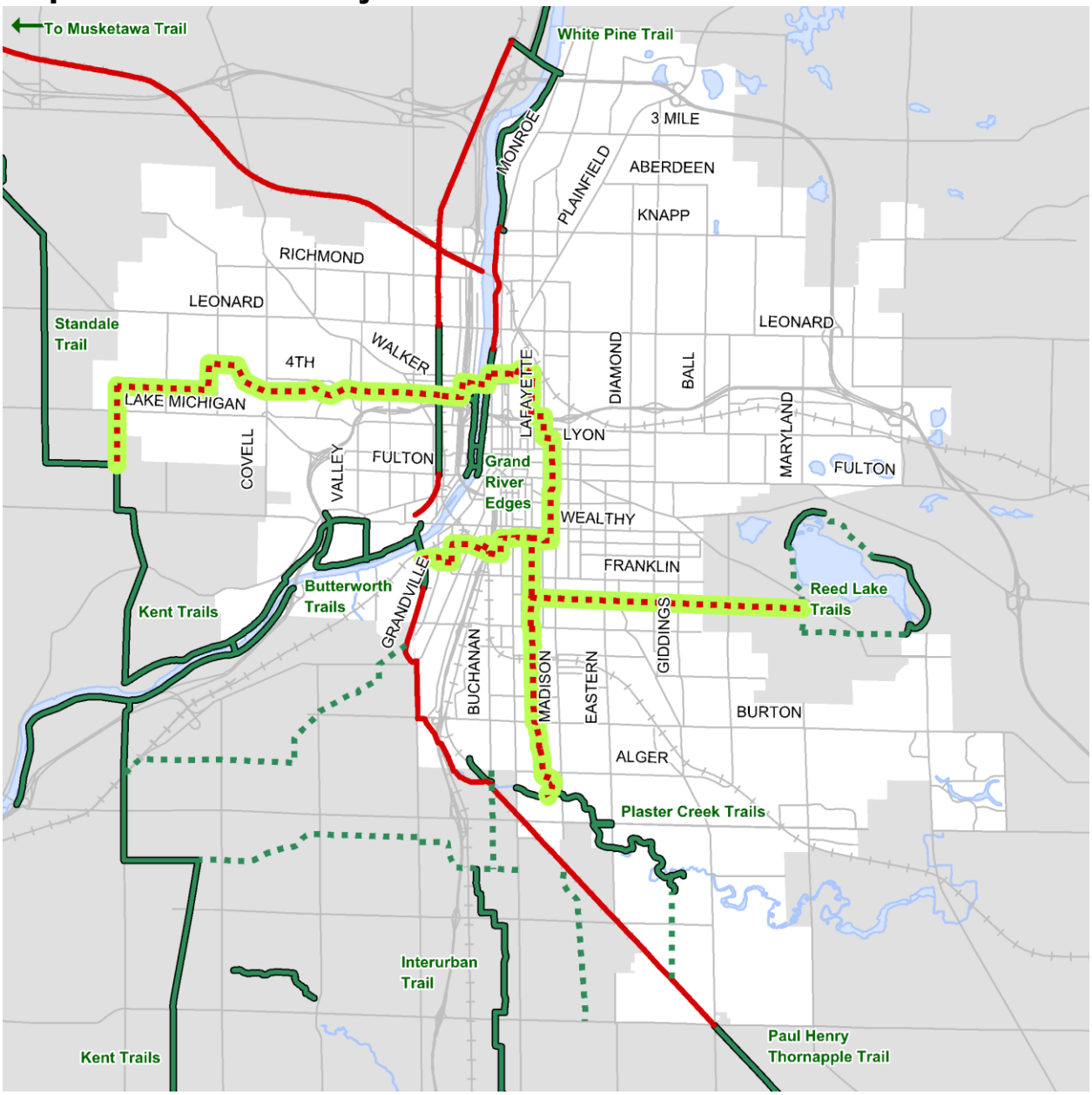
Neighborhood Connector Routes provide an alternative to the major roadways. They connect to key destinations, such as schools and parks, across the city. The routes incorporate low speed and low volume local roads and short connecting pathways. By implementing wayfinding signage and traffic calming techniques, these routes make daily walking and bicycle trips to work or to the store a safe and comfortable option for a wide spectrum of the population. They also provide recreational opportunities by connecting local neighborhoods to regional trails and they provide opportunities for safe routes to school. Please refer to the Appendix for more information on Neighborhood Connector Routes.

Proposed Road Crossing Improvements



Road Crossing Improvements should be provided when a neighborhood connector intersects a primary roadway. Road crossing improvement may be as simple as signage and pavement markings or may include crossing islands or hybrid pedestrian beacons. A more detailed study is required at each location to determine the specific type of improvement that is necessary.

Proposed Urban Greenways



The Proposed Urban Greenways are enhanced Neighborhood Connectors. They provide connections to the existing major trails through the City of Grand Rapids. The routes are located on local, low volume, low speed roadways that are easy to navigate for most bicyclists. These routes would be signed and would incorporate amenities such as traffic calming, street art and rain gardens.

Hub and Spokes

The Proposed Urban Greenways are based on a Hub and Spokes System. There is a loop in the downtown with three routes that connect to major trails on the outskirt of town. The Proposed Urban Greenways provide a framework to help link bicyclists to regional trails, the downtown, transit, shopping, commercial and the Medical Mile.

The Loop

The loop provides a downtown hub that all of the regional trail connections feed into. It is located on 6th St, Mason St, Fairview Ave, Coit Ave, Hastings St, Lafayette Ave, Crescent St, Prospect Ave, Logan St, Ionia Ave, Pleasant St, Rumsey St, Chestnut St, and Straight Ave and incorporates the newly implemented Seward Street Urban Bike Path. River crossing are located at Newberry Road and Oxford Street Trail.

West Route

This route connects Downtown Grand Rapids with the Standale Trail and Kent Trails to the west. This route is located on Maynard Ave, Burritt St, 7th St, Tremont Blvd, and 4th St.

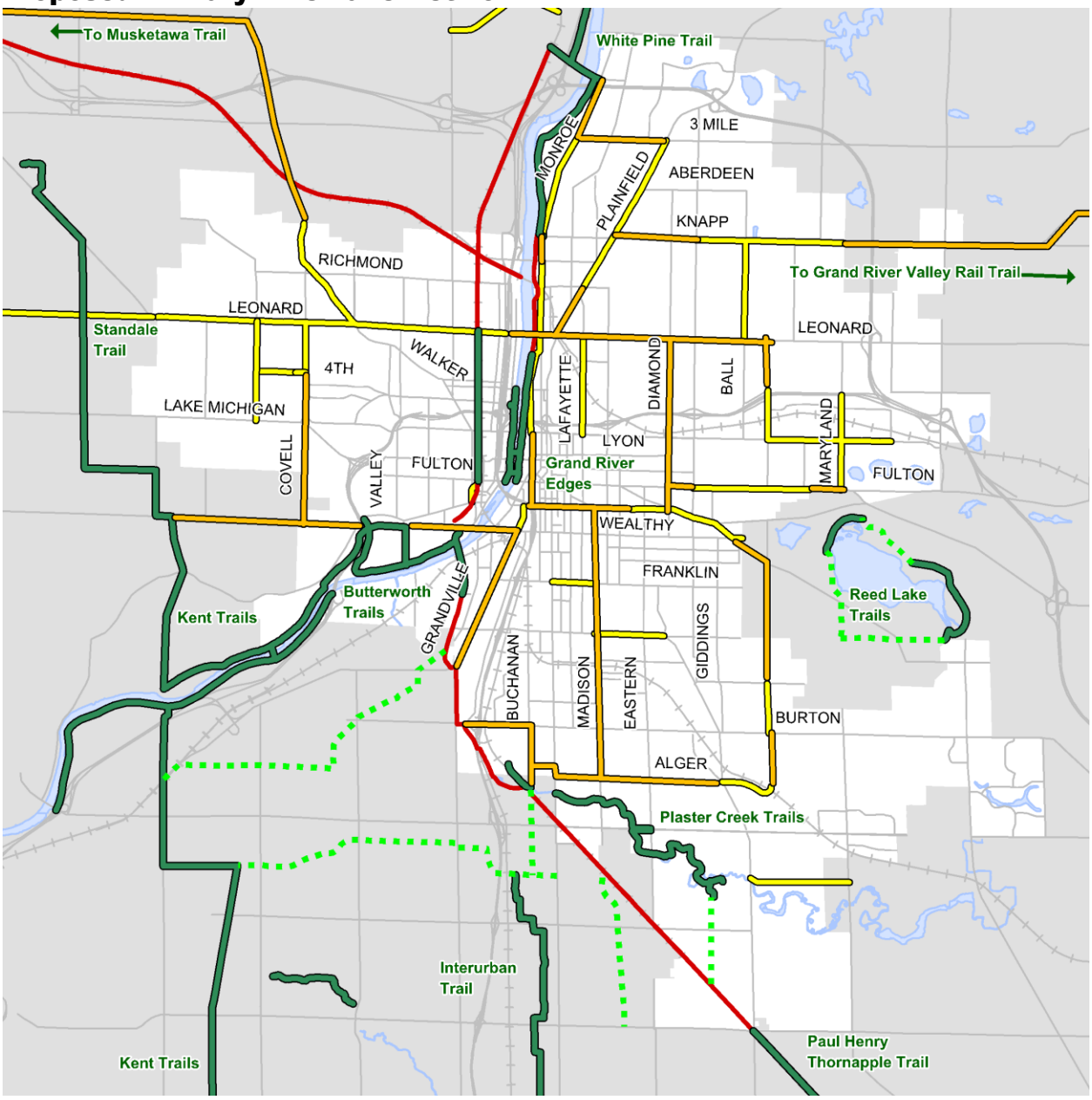
East Route

This route connects Downtown Grand Rapids with East Grand Rapids and the Reed Lake Trails to the east. This route branches off the South Route is located on Delaware St, Alexander St, and Argentina Dr.

South Route

This route connects Downtown Grand Rapids to the Interurban Trail, Plaster Creek Trail and Paul Henry Thornapple Trail to the south. This route is located on Jefferson Ave.

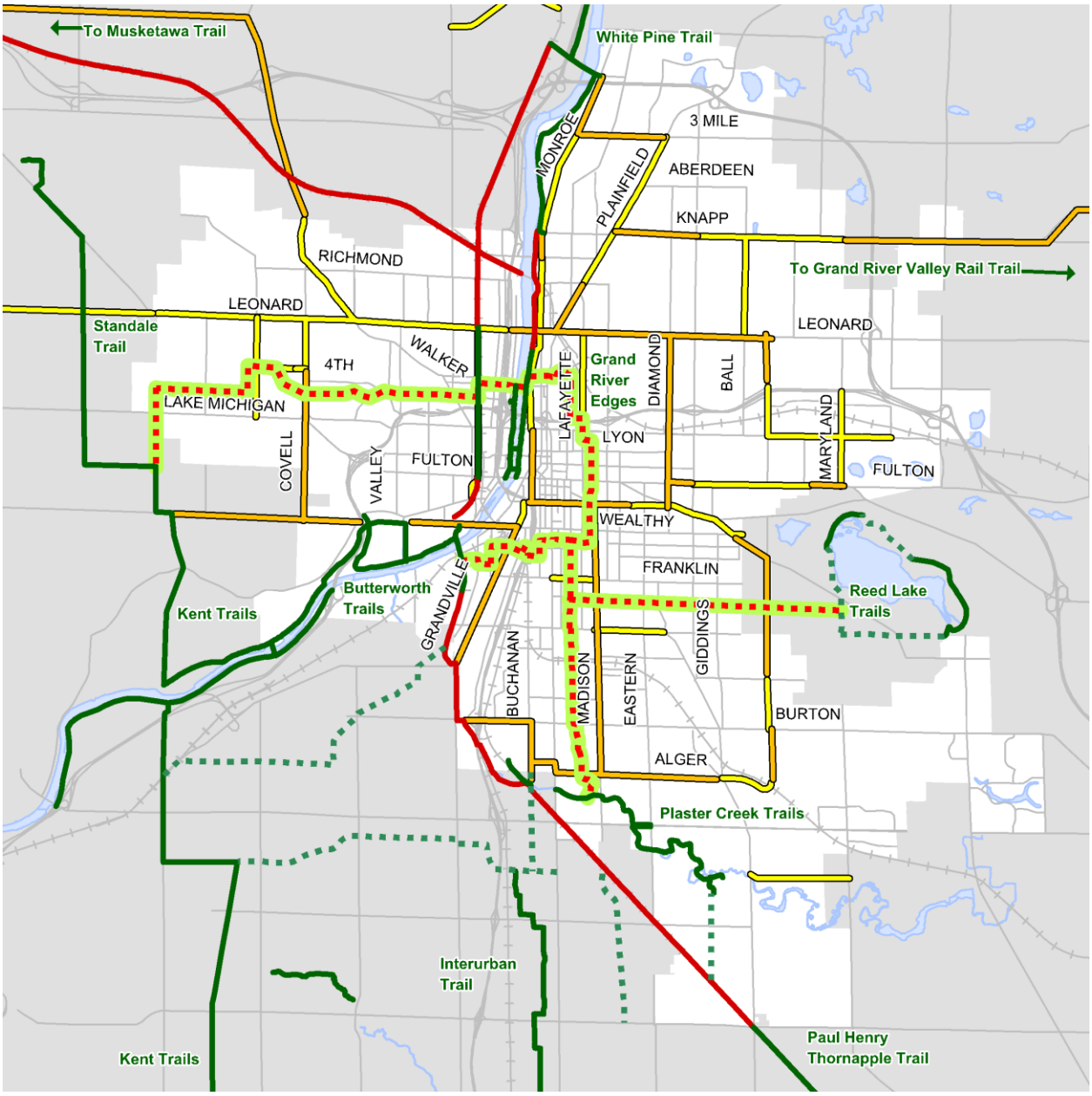
Proposed Primary Bike Lane Network



There are a variety of bike lanes and paved shoulders that already exist in the city; however they are short, sporadic segments that do not provide a complete network across the city. The Proposed Primary Bike Lane Network is a way to help prioritize bike lane implementation. It provides a framework for future bike lane development to build from. The vast majority of the Proposed Primary Bike Lane Network can be implemented in the near-term with bike lanes and shared lane markings.

- Proposed Primary Bike Lane Network
- Planned Shared Use Paths and Trails
- Existing Bike Routes
- Existing Shared Use Paths and Trails
- Existing Bike Lanes/Paved Shoulders

Framework Plan



Together, the Proposed Urban Greenways and the Primary Bike Lane Network provide a backbone to the City's non-motorized transportation system.

- Proposed Urban Greenway Connections
- Proposed Primary Bike Lane Network
- Planned Shared Use Paths and Trails
- Existing Bike Routes
- Existing Shared Use Paths and Trails
- Existing Bike Lanes/Paved Shoulders

Appendix

Metadata

The following is a list of GIS data created by the Greenway Collaborative and its attributes.

TGC_Crossing_Improvements
Location of where road crossings improvements are needed.

TGC_NC_Potential_Routes
Lines identify Potential Neighborhood Connector Routes. Points identify issue areas, where an easement may be needed or a pathway need to be built to complete the route.

TGC_NC_Potential_Routes
Lines identify Potential Neighborhood Connector Routes. Points identify issue areas, where an easement may be needed or a pathway need to be built to complete the route.

TGC_Urban_Greenway_Connections
Lines identify the proposed connection (excludes existing facilities).

TGC_Primary_Bike_Lanes
Lines identify the proposed segments of primary bike lanes (excludes existing facilities).

TGC_Potential_Bike_Facilities
This data base was created based on the Potential_Biike_Facilities database that the city created. The Potential_Biike_Facilities database had duplicate columns of information, making the file too large for TGC to edit. Please note that due to the large size of the city database, when creating the TGC_Potential_Bike_Facilities database TGC had to remove the duplicate columns so they could edit the information. The following additional fields were created by TGC:

Field (TGC)	Description
TGC Parking BL Width	Width for parking and bike lanes: # lanes * 12’ – Road Width
TGC Scenario 1 BL Width	Assumes 11’ Travel Lanes and calculates the room left for Bike Lanes and On-street Parking: Road Width –(# lanes*11’)
TGC Scenario 1 Rating	Near term bike lane opportunities based on a travel lane width of 11’, on-street parking width of 7’ and the degree of on-street parking
	A Rating – on-street parking on both sides: Scenario 1 BL Width > or equal to 28’
	B Rating – on-street parking on one side: Scenario 1 BL Width < 28’
	C Rating – no on-street parking: Scenario 1 BL Width < 17’
	D Rating – Long term Bike Lanes: Scenario 1 BL Width <10’
TGC Scenario 2 BL Width	Assumes 10.5’ Travel Lanes and calculates the room left for Bike Lanes and On-street Parking: Road Width –(# lanes*10.5’)
TGC Scenario 2 Rating	Near term bike lane opportunities based on a travel lane width of 10.5’, on-street

	parking width of 7’ and the degree of on-street parking
	A Rating – on-street parking on both sides: Scenario 2 BL Width > or equal to 28’
	B Rating – on-street parking on one side: Scenario 2 BL Width < 28’
	C Rating – no on-street parking: Scenario 2 BL Width < 17’
	D Rating – Long term Bike Lanes: Scenario 2 BL Width <10’
TGC Scenario 3 BL Width	Assumes 10’ Travel Lanes and calculates the room left for Bike Lanes and Parking: Road Width –(# lanes*10’)
TGC Scenario 3 Rating	Near term bike lane opportunities based on a travel lane width of 10’, on-street parking width of 7’ and the degree of on-street parking
	A Rating – on-street parking on both sides: Scenario 3 BL Width > or equal to 28’
	B Rating – on-street parking on one side: Scenario 3 BL Width < 28’
	C Rating – no on-street parking: Scenario 3 BL Width < 17’
	D Rating – Long term Bike Lanes: Scenario 3 BL Width <10’
TGC Pot4to3Lane	Potential 4 to 3 lane conversions
	High Potential – < 15,000 ADT
	Potential – 15,000 to 17,500 ADT
	Low Potential - 7,5000 to 20,000 ADT
TGC Existing	Existing On Road Bicycle Facilities as of Fall 2011
	4 Foot Shoulder (not designated as a bike lane with pavement marking and signage)
	Bike Lane (designated as a bike lane with pavement markings and signage)
	Bike Lane Fall (supposed to be implemented by Fall 2011)
	Edge Strip (not designated as a bike lane with pavement marking and signage and may be less than 5’)
	Sharrow (Shared Lane Marking)
TGC Notes	Additional notes

Neighborhood Connector Overview

Neighborhood connector routes are designated routes that are primarily located on low speed, low traffic volume local roads and connecting pathways. They link neighborhoods to parks, schools and downtowns. Signs provide wayfinding by noting direction and distance to key destinations. Generally, neighborhood connector routes begin as guided routes and as their popularity grows and opportunities arise they can be developed to incorporate additional amenities, such as traffic calming measures, rain gardens and public art. The following sections describe the different types of elements that can be applied to a neighborhood connector route.

Bike Route Signs and Wayfinding

Bike route signs and wayfinding techniques can be used to established guided and named routes along a neighborhood connector route.

Route Characteristics

Routes signed as a Bike Route should be roads that have a relatively high Quality/Level of Service for bicyclists. The route should not have any known hazards to bicyclists and should be maintained in a manner that is appropriate for bicycle use. While many local roads may meet these criteria, the key is that the road is part of a specific route to a particular place. Obvious routes need not be marked. Bike Routes should be used judiciously to identify obscure routes to key destinations that avoid travel along major roadways.

Where a bicycle route on a local road intersects a busy multi-lane primary road and continues on the other side of the road, a traffic signal or appropriately designed mid-block crossing should be provided.

Bike Routes generally do not include specific bicycle improvements such as Bike Lanes. Bike Lane pavement markings and signs already indicate that a road segment is designed to specifically accommodate bicycles. Bike Route signs are to be used where no obvious bicycle facility exists yet the route is advantageous to bicyclists. Thus road segments with Bike Lanes should generally not be marked as a Bike Route, except where the bike route uses these facilities as short connectors to continue the route.

Bike Route Guide Signs

The most basic bike route signs are Bike Route Guide Signs (shown to the right). These are used on designated bike routes to inform bicyclist of changes in direction and the distance to the next destination. Bike Route Guide Signs are placed at changes in direction of designated bike routes. Not every bicycle facility will necessarily be designated a bike route. Bike routes should be used where the signage would help direct a bicyclist to a key destination that may not be obvious.

D1-1c
MUTCD 2009

Bike Route Identification Signs

Some bike routes are significant enough to warrant a name or numerical designation. Typically these are key connectors between off-road trails or used to help delineate a trail that incorporates many different facility types. Bike Route Identification Signs (shown to the right) establish a unique identification for a bike route. These signs are typically used with auxiliary plaques that indicate the direction of travel and any changes in direction of the route.

M1-8a
MUTCD 2009

Bicycle and Pedestrian Boulevards and Neighborhood Greenways

Bicycle and Pedestrian Boulevards and Neighborhood Greenways are Neighborhood Connectors that function as premium bicycle and pedestrian routes. They create an attractive, convenient and comfortable environment that is welcoming to all cyclists and pedestrians. Bicycle and Pedestrian Boulevards and Neighborhood Greenways are a great way to navigate through a city, where arterial and collector roads may be undesirable to bicyclist and pedestrians. They can also function as an extension of an off-road trail, creating a smooth transition between two trail systems.

Bicycle and Pedestrian Boulevard Design Elements

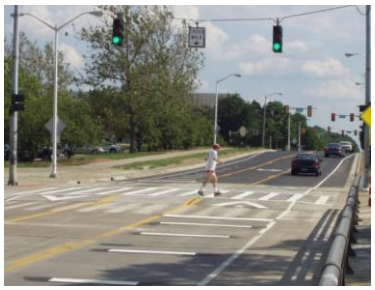
Bicycle and Pedestrian Boulevards are located on low-volume and low-speed streets that have been optimized for bicycle and pedestrian travel through special treatments that allow through movement for bicyclist and pedestrians while discouraging similar through trips by non-local motorized traffic. Bicycle and Pedestrian Boulevards can take many forms. Special treatments such as traffic calming and traffic reduction, signage and pavement markings and intersection crossing treatments all help to optimize these routes for cyclists.

The following are some example of treatments that can be used to develop a Bicycle and Pedestrian Boulevard:

Pavement Markings
Identifies this route as a Bicycle Boulevard

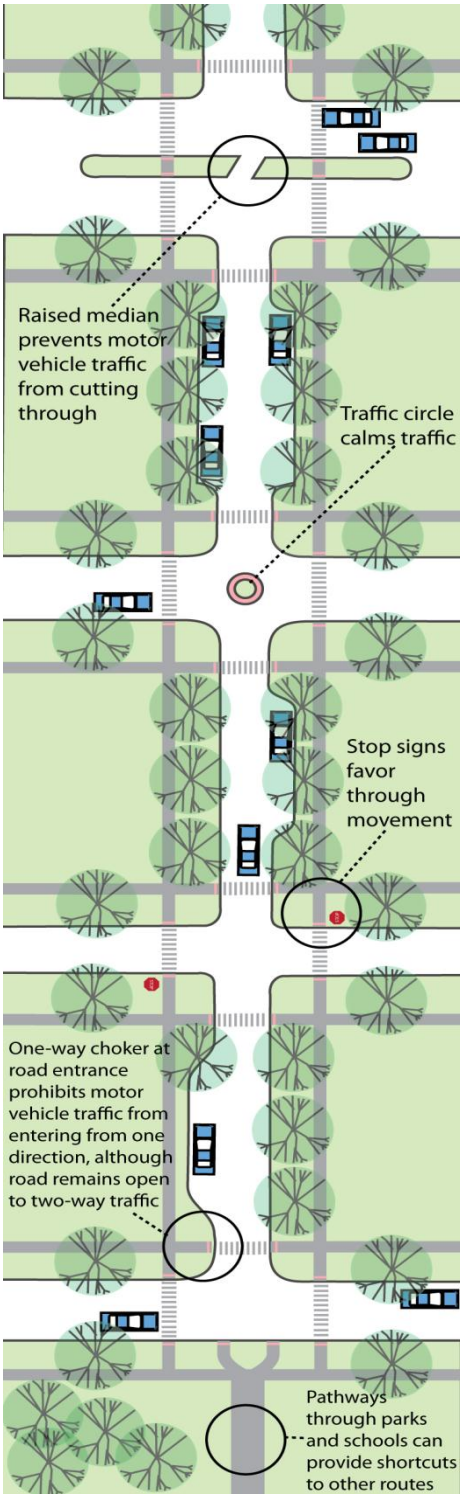
Traffic Reduction
Restricts motorized vehicles while allowing bicycle traffic

Traffic Calming
Mini Traffic Circles help reduce speed at intersection without stopping



Traffic Calming
Speed Tables help to reduce speed and enhance the crosswalk

Fig. 9.9A.
Each corridor needs to be specifically tailored to its needs by selecting the appropriate mix of design elements.



Neighborhood Greenway Design Elements
Neighborhood Greenways incorporate all the elements of bicycle boulevards but take the concept to the next level.

They typically incorporate sustainable design elements such as:

- rain gardens
- bio-swales
- native plantings

They should incorporate pedestrian amenities such as:

- art installations
- benches
- interpretive sign
- community vegetable gardens
- ornamental gardens

They may take on many different looks from avant-garde to traditional.

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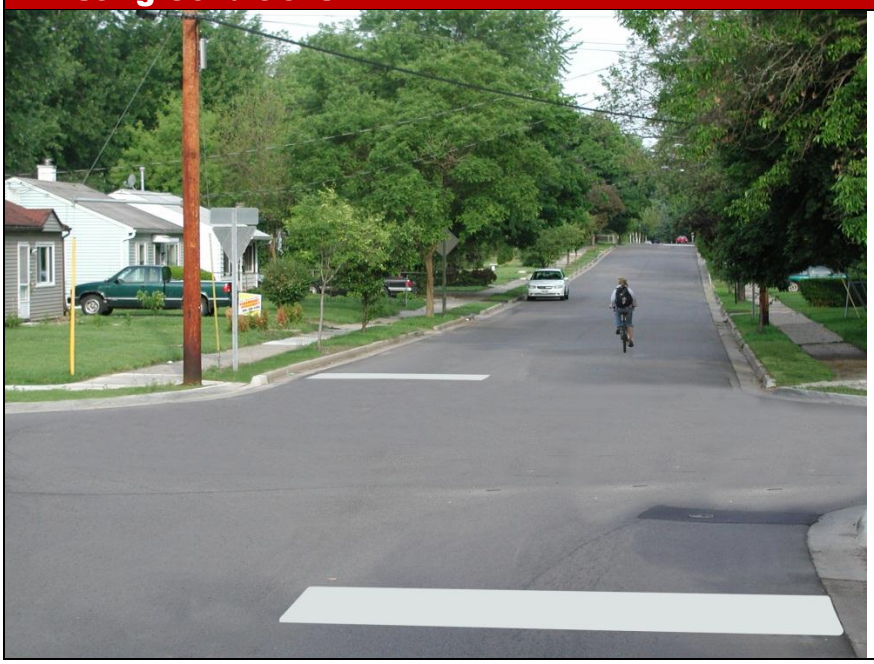
Neighborhood Connector Routes Implementation

Neighborhood connector routes, for the most part, utilize existing roadways and pathways in a community. When it comes to implementation, many of these routes can be accomplished in the first phase by simply adding some signage and wayfinding to designate them as a route. As the route grows in popularity, or when funding becomes available, other elements such as traffic calming, rain gardens and street art can be incorporated. However, before any routes are established always make sure there are safe road crossing in place where a neighborhood connector route intersects a major roadway. The following is an example of how a neighborhood connector route could be implemented over time.

Existing Conditions



Local Roadway in a Residential Neighborhood

- Low speed
- Low traffic volumes
- Majority of bicyclists feel comfortable riding their bicycle in the street.

This could essentially be any road in a residential neighborhood.

First Phase

Designate as a Neighborhood Connector Route

- Map out Neighborhood Connector Routes
- Add wayfinding signage to route
- Provide safe road crossings especially where a neighborhood connector route meets a major road

Providing safe crossing at major roads and signage that directs bicyclists and pedestrians to major destinations is essential to this phase.

Implementation of Connector Pathways
Due the existing road network, many times neighborhood connector routes require off-road pathways to continue a route where a roadway ends. These pathways are critical to the success of the network because they generally link up isolated neighborhoods and provide key connections to get to major destinations such as schools and parks. Many times these types of pathways are funding and opportunity based. When available, it is recommended that these pathways be implemented along existing right-of-way or semi or quazi-public areas first because they tend to provide the least resistance.

Second Phase

Add Traffic Calming Elements to Create a Bicycle and Pedestrian Boulevard

- Mini Traffic Circles
- Orient Stop Signs for bicycle movement
- Medians
- Curb Extensions and bump outs
- Chicanes

When restricting vehicle access down the street it is important to maintain bicycle access to continue through.

Third Phase

Establish the route as a Neighborhood Greenway

- Rain gardens/Bio-swales
- Permeable pavement
- Unique bike route identification sign with name and optional custom logo
- Art Installations