



SPRING 2016



Mayor Byron W. Brown

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The concepts presented in this report (or in an illustration) will need to be investigated in more detail before any funding commitments are made. Undertaking additional engineering, public engagement or other follow up work will be based upon funding availability.

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Thank you to the over 250 public participants who engaged with this planning process through public comment forms, interviews and three public meetings held July 30 and Dec 4, 2014 and May 21, 2015.







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# CHAPTER ONE

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## EXECUTIVE SUMMARY





## CAN A BICYCLE BE AN AGENT OF CHANGE?

Dear Fellow Citizens:

In early Buffalo, around the turn of the century, it was legions of bicycle riders that championed the cause for paved streets – placing Buffalo on the forefront of American cities.

Because of the freedom and independence offered by a bike, women's rights pioneer Susan B. Anthony went so far as to say the bicycle had "done more to emancipate women than anything else in the world".

More than a century later, communities that have invested in cycling infrastructure, including Buffalo, have seen a tremendous return in commerce, in new residents, in tax dollars, in the health of residents, and in greater engagement at the community level.

In Buffalo, children throughout our city have learned, and continue to learn, valuable life skills through a number of effective bicycle programs. We've watched our youth gain confidence, and develop critical thinking and math skills – all by taking part in bicycle programs through partnerships such as Recycle-a-Bike and GObike Buffalo.

Indeed, a bicycle can be an agent of change – and has been – time and time again.

This spirit of change is alive and well in Buffalo today. Our city is in the midst of a transformation that will be felt for generations to come as we continue to build on the strong economic foundation we have carefully constructed over the past decade, furthering my mission of reclaiming our place among the great cities of the United States. Investment in the City is higher than it's been in decades, and the fruits of this investment have visibly changed our City's skyline and have impacted every neighborhood. Since 2012, Buffalo has experienced \$5.5 billion in economic development activity, which is expected to create over 12,000 new jobs by 2018.

## BICYCLE MASTER PLAN VISION

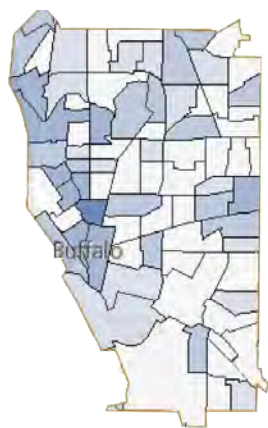
The Vision for the Buffalo Bicycle Master Plan Update is to make Buffalo a world-class bicycling community. Bicyclists' needs will be integrated into the City's projects, policies, and programs. Planning, implementation, and maintenance of roadway, public works, and transit projects will include improvements to accommodate bicyclists of all abilities. A well-connected bicycle infrastructure network will improve safety, the environment, public health, and quality of life for residents, visitors, and businesses. A bicycle friendly Buffalo will be a more affordable, economically competitive, and sustainable city.



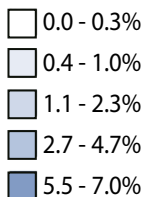
This significant economic transformation is happening as our city continues to diversify, opening up a wonderful opportunity to build Buffalo as we further enhance our city's rich ethnic and cultural communities. We have many talented people from across the globe. Our ethnically diverse citizenry makes Buffalo unique, and adds to the richness of our city. Together, we are working hard to promote diversity, inclusion and equity to ensure that our growing prosperity reaches every city resident.

In many ways, the changing face of Buffalo is the changing face of America. As detailed in the League of American Bicyclists report, *The New Majority, Pedaling Towards Equity*, people across the nation are taking to bikes in unprecedented numbers. Some ride for fun, exercise and to save money. Others ride for convenience and to benefit the environment.

Whatever the reason, what we are seeing across the country is that the fastest growth in ridership is coming from populations of color. In just ten years, bicycle ridership among Hispanic and Latino residents increased by 50%. Ridership increased by 80% among Asian Americans and 100% by African Americans.



#### % of Buffalo Residents Bicycling to Work



Although some of our most diverse neighborhoods in Buffalo also have our highest ridership levels, the overall ridership rate for people of color in our city lags behind that of the total population. Prior to this Bicycle Master Planning effort – and despite the fact that neighborhoods of color have, on average, less access to automobiles than other neighborhoods – many of these same neighborhoods have lacked the resources and infrastructure to make riding a bicycle a safe and attractive option. Research consistently shows that 60% of people would ride more often if these facilities were available to them.



60% interested  
but concerned



By setting an ambitious but achievable goal of building out 300 new miles of bicycle network in the next 10 years, our new Bicycle Master Plan sets us on an accelerated course to overcome these challenges and make Buffalo a great cycling city for all of its residents. The ridership in Buffalo has already benefited from my continued commitment to add new bicycle facilities each year. By the end of 2016, we will have added over 90 miles of bike lanes as the bicycle quickly becomes a mode of choice for residents in every neighborhood throughout our city. With this plan in place, we continue to recognize Buffalo's rich cycling history while we look forward to an even richer cycling future.

U.N. Secretary General Ban Ki-moon once likened the ability to make progress together to the act of riding a bicycle, stating, "You stay upright and move forward so long as you keep up the momentum". Together, we will continue to build on the positive changes we've achieved in Buffalo, adding more momentum and picking up the pace. Today, we have many facilities in place, but still plenty of more places to go in this city. Let's ride there together.

Byron W. Brown  
Mayor, City of Buffalo



## INTRODUCTION

The Bicycle Master Plan Update provides a blueprint for the expansion of Buffalo's existing bicycle network, and outlines steps to implement it in a phased approach. The recommended network of bike facilities (See page 1-6) will serve to further Buffalo's focus on improving the city's livability by making bicycling a safe, viable and attractive mode of transportation. The plan leverages Buffalo's radial grid street pattern to propose a complete and connected network of on-street bikeways to complement the existing greenway trails. This network will connect the many destinations within the City to places where people live, learn, work and play.

A bicycle facility "typology" was assigned for all of the streets that were included in the Master Plan's designated bicycle network. The typologies are based upon the presumed "types of bicyclists" that would be comfortable riding upon the street after the plan's recommended improvements had been implemented. The types of bicyclists were derived from empirical research that has shown that people typically fall into one of four categories related to bicycling: 1) Strong and Fearless, 2) Enthused and Confident, 3) Interested but Concerned, or 4) 'No Way, No How'. These categories served as the guiding principle for the plan, and emphasis was placed on identifying routes that catered to the majority of people that would bicycle if dedicated facilities were provided, known as the 'Interested but Concerned' group of riders. Descriptions of these categories are provided in the plan, and the distribution of the four-types of bicyclists is illustrated in the graphic below.

## PLANNING PROCESS

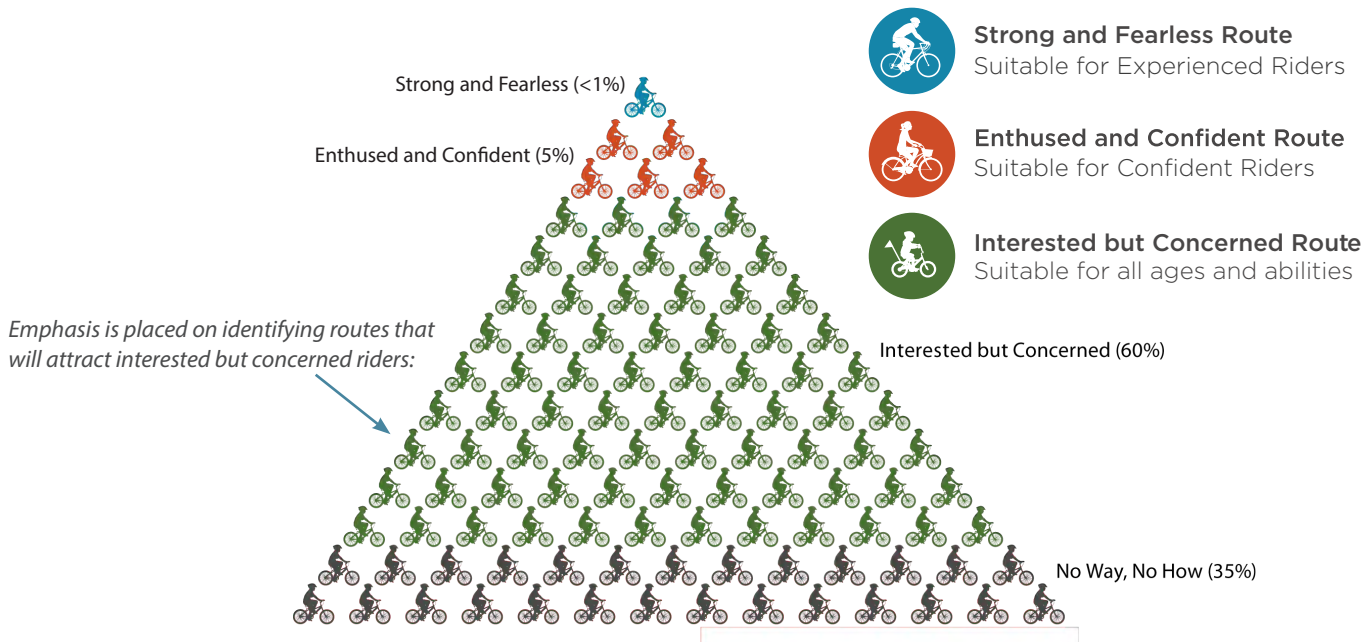
The planning process included initial plan development by the steering committee, study consultants Alta Planning + Design (in collaboration with Wendel and Mustard Seed), GObike Buffalo, and the City of Buffalo, combined with extensive and diverse public outreach campaign. Outreach efforts included the following communications strategies:

- Public Survey (see [Appendix C](#) for summary)
- Public meeting input (July 30 and Dec 4, 2014 and May 21, 2015)
- Stakeholder meetings (six throughout process)
- GObike text message survey (see [Appendix C](#) for survey results)
- Online comments and e-mails
- Regional and local governmental input
- Outreach to Block Clubs

Public feedback informed the plan recommendations and the selection of eleven catalytic projects, which were determined to be critical to the overall bicycle network. The planning team's efforts were guided by project goals established collectively at the beginning of the planning process.



## BICYCLE NETWORK DESIGNATIONS





## DIVERSITY AND INCLUSION

As Buffalo continues its significant growth by focusing on becoming a City of Opportunity for all people, we are committed to diversity, inclusion and equity. These core concepts, embraced throughout our community, have been weaved into our new Buffalo Bicycle Master Plan from start to finish, and builds on other large efforts that have been ongoing in our City, including the Buffalo Opportunity Pledge – an initiative supported by thousands of residents who signed the pledge to work toward a more diverse, inclusive and equitable community.

The League of American Bicyclists 'The New Majority Report' notes that, "As the cycling community becomes increasingly diverse, funding for the transportation infrastructure that makes bicycling safe must be applied more equally across our communities". The project team in Buffalo took this to heart and developed a plan that promotes bicycling infrastructure for the benefit of all City residents. The outreach process set out to seek the input of underrepresented bicyclists through direct outreach by a minority owned company, Mustard Seed, which specializes in public outreach efforts. The result is a final report that provides the City with the tools that it needs to serve the diversity that exists, and is growing in our City in a way that builds connections to job opportunities, recreational events, civic involvement and other resources that will set the foundation for a better future for all residents.

## GOALS

The stakeholder committee, comprised of representatives from various public agencies, community/

advocacy groups and private-sector representatives, identified prioritization factors for the Bicycle Master Plan Update. Based on the identified factors, the team outlined ten project goals, ranked below in order of importance as determined by the stakeholder committee:

1. **Safety:** Improve the comfort and safety of a wide range of bicyclists, ranging from children to the elderly (8-to-80 bicyclists). Aspire to reach zero pedestrian and bicyclist deaths on an annual basis
2. **Create Complete Streets:** Help to improve accessibility for all modes of transportation, not just bicyclists
3. **Revitalization/Economic Development:** Enhance the ongoing revitalization of Buffalo, and creates new economic development opportunities.
4. **Connectivity to Existing Bicycle Facilities:** Add to Buffalo's bicycle network by connecting directly to existing shared use paths or other bicycle facilities
5. **Accessibility to Underserved Communities:** Provide a viable means of transportation to traditionally underserved communities by connecting residents to Live, Learn, Work, and Play destinations
6. **Create Linkages to Destinations:** Provide linkage to transit stations and/or key commercial, night-life, cultural, or open space destinations
7. **Improve Safe Routes to School:** Create safer off-road and on-street bicycle connections to schools for students of all ages
8. **Complement the City's Reconstruction or Repaving List:** Incorporate dedicated bicycle improvements into the City's current list of recon-

Photo rendering of the Main Street Catalyst Project, which would include a cycle track, a facility designed to be comfortable for bicycle riders of all ages and abilities





struction, repaving, or restriping projects

9. **Political + Community Support:** Recommend improvements that have wide support among 1) elected officials, 2) City staff, 3) bike advocates, and 4) community groups to ensure that recommendations are politically viable and endorsed by the community
10. **Cost + Engineering Challenges:** Identify projects that offer few engineering challenges and are of relatively low cost so that the network can be expanded rapidly (e.g. a street wide enough to accommodate bicycle facilities within the existing right-of-way)

## Catalyst Projects

- A: Elmwood Ave Cycle Track
- B: Parkridge Ave Neighborhood Bikeway
- C: Kensington & Fillmore Intersection
- D: Delavan Ave Cycle Track
- E: Main St Cycle Track
- F: Virginia St Bike Lanes
- G: Utica St Neighborhood Bikeway
- H: Niagara St Cycle Track
- I: Jefferson Ave Shared Lane Markings
- J: Broadway 5-Point Intersection
- K: Church St Cycle Track

## RECOMMENDATIONS

This plan recommends the addition of 300 miles of bikeways to be implemented over ten years. If plan recommendations are constructed according to this schedule, Buffalo will become one of the most bikeable cities in the United States. In order to support the general network recommendations, the plan also includes key design details and cost estimates for 11 catalyst projects

that will jump-start the functionality of Buffalo's bicycle network. These projects are shown at right, and are detailed in the Catalyst Projects chapter. Through stakeholder collaboration and continued commitment by the City, the plan's vision and recommendations can become reality.



Interested but Concerned: Protected Facilities

34 mi



Interested but Concerned:  
Neighborhood Bikeway

92 mi



Enthusied and Confident

102 mi



Strong and Fearless

72 mi

*Lane miles of facilities in the proposed network by type*



*A variety of bike facilities are proposed that would be comfortable for the majority of bicyclists*



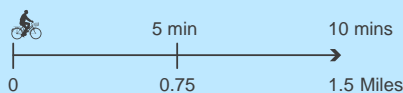
# BUFFALO BICYCLE NETWORK MAP

## PROPOSED FACILITIES

- TIER 1: Interested but Concerned (path/protected facility)
- TIER 1: Interested but Concerned (neighborhood bikeway)
- TIER 2: Enthused and Confident
- TIER 3: Strong and Fearless
- Route for Future Study

## EXISTING FACILITIES

- Bike Lane
- Shared Lane Marking
- Shared Use Path
- Bike/Ped Overpass
- Contra-Flow Bike Lane (existing & proposed)

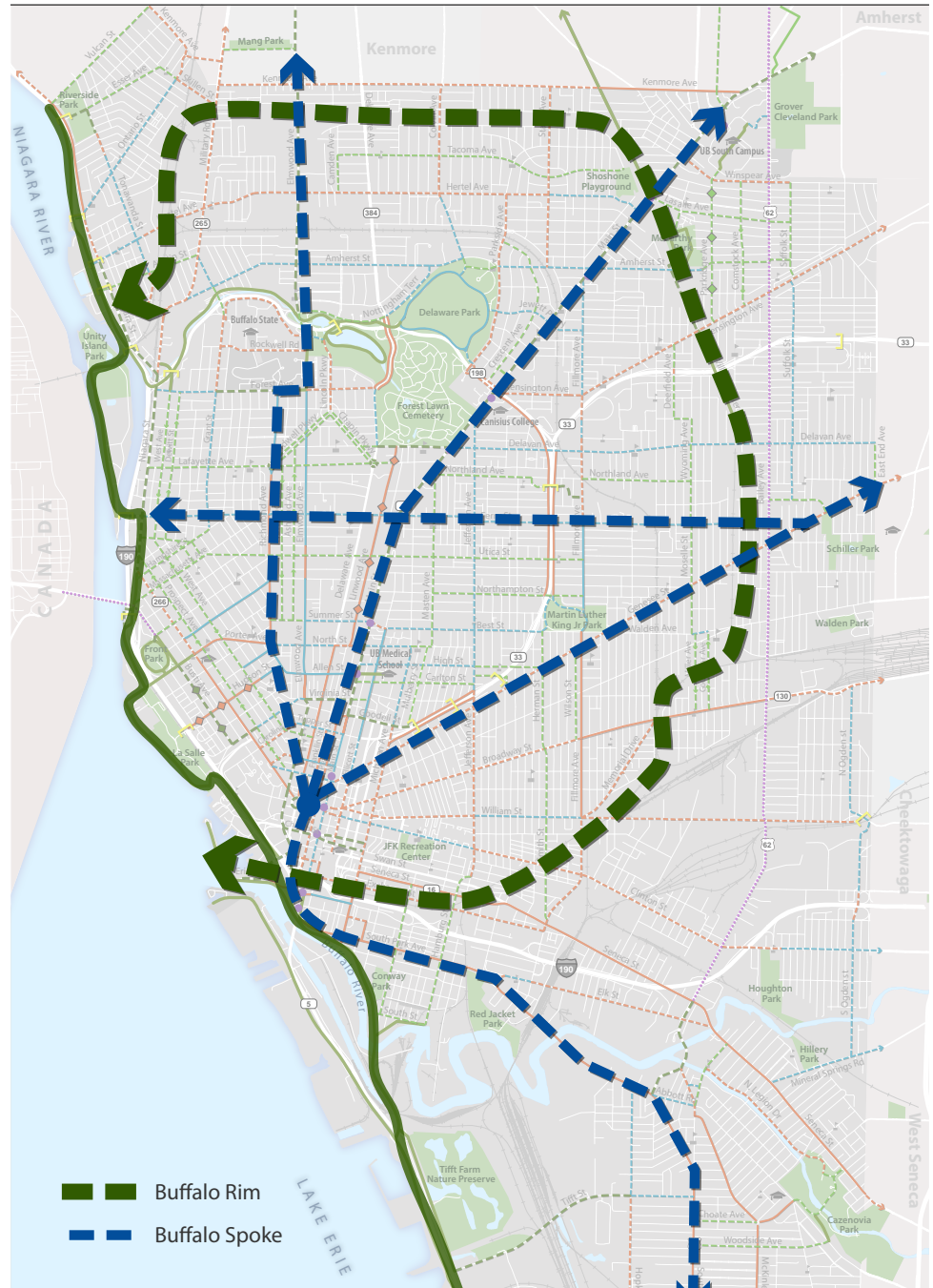


## CONCLUSION

The completion of the Bicycle Master Plan Update is the first of many key steps that need to occur to realize the plan's objectives. As the network is implemented, studies should also be undertaken to identify opportunities to convert Buffalo's many rail corridors into multi-use trails. A long-range vision for the city is to create a 'rim-and-spoke' network where a connected system of multi-use trails would serve as the rim of the network, and key bikeway corridors would serve as the spokes connecting the rim to the downtown hub. The visionary diagram below, if implemented, would place Buffalo's on-street bikeway and greenway trail network on par with other world class systems.

With collaboration, foresight, and strong community participation, every mile of the proposed network can be built. Implementing the bicycle network will benefit those who already bike in Buffalo, as well as those who will choose to bicycle once comfortable, connected facilities are available. The network will also make bicycling a more-accessible and safe mode of transportation for those who do not have access to a vehicle.

Cities throughout North America are in competition with each other for talent and employers, and increasingly people are choosing to live in places that are walkable, bikeable and offer many amenities. The completion of this network will compliment other initiatives aimed at increasing Buffalo's population, and help to retain and attract valuable workers by making Buffalo a more desirable city in which to live, work and recreate. Overall, a more bike friendly Buffalo will be a harbinger to a more sustainable, liveable and prosperous Buffalo.



*Rim-and-Spoke vision for the Buffalo Bicycle Network*





Introduction

Existing Plans +  
Policies Summary

BFC Application  
Summary

Existing  
Conditions Analysis

Gap Analysis

BUFFALO BICYCLE MASTER PLAN

# CHAPTER TWO

## EXISTING CONDITIONS





## INTRODUCTION TO ANALYSIS

This chapter identifies the Vision and Goals for the Bicycle Master Plan Update. It includes summaries of pertinent existing plans and policies and a review of the City's Bike-Friendly Community application to the League of American Bicyclists<sup>1</sup> (LAB). In addition, this section of the plan contains a review of existing bicycling conditions in the city.

In order to increase Buffalo's bronze level Bicycle Friendly Community (BFC) rating, it is important to understand how Buffalo has achieved this accomplishment and the challenges in the network that currently keep the City from a higher ranking. Also, to propose a comprehensive "Five E's" approach--Engineering, Education, Encouragement, Evaluation, and Enforcement--it is critical to examine

<sup>1</sup> The League of American Bicyclists is a national bicycling advocacy organization that promotes and administers the Bicycle Friendly Community, Bicycle Friendly Business, and Bicycle Friendly University programs.

the existing environment, demographics, and ongoing programs for bicyclists. The area's geographic and demographic characteristics significantly affect the everyday transportation decisions made by bicyclists, pedestrians, transit riders, and motorists.

A comprehensive approach was implemented consisting of research, fieldwork, Geographic Information Systems (GIS) analysis, existing plan review, and Stakeholder Committee meetings. A BikeSpace analysis was used to determine which streets could accommodate dedicated bicycle facilities, and a bicycle network gap analysis is also included in this technical memorandum. The existing conditions identified in this report will ultimately serve to inform the recommendations in the final Bicycle Master Plan Update.



**BUFFALO CAN BECOME  
A WORLD CLASS  
BICYCLING CITY**





## EXISTING BICYCLE FACILITIES

In recent years, Buffalo has implemented a range of bicycle facilities throughout the city:



*Elmwood Ave Cycle Track*



*Bike Lanes on Main St*



*Bike Lane on Fillmore Ave*



*Sharrows on Ellicott St*



*Contra-Flow Bike Lane on Hudson St*



*Shared Use Path along Scajaquada Creek*

## SUMMARY OF EXISTING PLANS & POLICIES

The City of Buffalo, like many cities in the 1950's-60's, became part of the national trend of highway building in an effort to increase the economic vitality of their downtowns. In Buffalo, motorists benefited from this improved access, but neighborhoods became disconnected and some historically significant buildings were replaced with surface parking lots. The city's transportation system became oriented towards moving motor vehicles more efficiently and fast. To advance this policy, some streets were widened. Investments in infrastructure specific to bicycling, walking, and public transit was reduced as well.

After decades of planning for motor vehicle traffic, the national urban planning objectives have shifted to local, community driven projects that improve livability, walkability, and make cities more bike friendly. "Complete streets" that accommodate all modes of travel are being constructed around the country in order to improve the economic vitality of cities. Buffalo has embraced this concept through the adoption of its Complete Streets policy and other recent efforts that will make Buffalo a better place to live, learn, work, and play.

A summary of relevant plans pertaining to the bike master planning effort are provided below.

### QUEEN CITY HUB: A REGIONAL ACTION PLAN FOR DOWNTOWN BUFFALO

This planning effort led by the City began in 1994 as a visioning process to outline the future of Downtown Buffalo. Over the next 10 years, five summits were held to refine the vision and determine actionable strategies to implement the vision. The planning processes incorporated an extensive public involvement process, including: interviews, public hearings, and public meetings. Committees were established through the planning process to implement priority projects. **Of the 15 projects, 12 have been completed.** One emphasis of the plan was improving access to downtown so that everyone could, "drive and park, ride the train or bus, cycle, and especially walk in order for everyone to take advantage of everything Downtown has to offer."

### REGIONAL BIKEWAY IMPLEMENTATION PROGRAM (1998)

The goal of this plan developed by the Niagara Frontier Transportation Committee (now GBNRTC) was to create a range of strategies and cost estimates to create a network of dedicated bicycle routes throughout the Niagara Frontier region. The report produced a Bicycle Network Master Plan for Buffalo, which was adopted

## BUFFALO'S HISTORY OF RECENT PLANNING EFFORTS





by the City's Common Council in 1998. The plan recommended facilities so that, when the network was built-out, most of the city's residents would live within one half-mile of an on-road bicycle facility.

The first section of the plan showcases the Bicycle Master Plan for the City of Buffalo. To develop the network, the plan developed Bicycle Level of Service (BLOS) scores based on roadway comfort levels (using grades "A," most comfortable, to "F," least comfortable) for many of the city's major roadways. The BLOS maps were to be used by planners to help identify areas in high need of improvements, and prioritize projects. Of important note was that **75% of all road segments within the city of Buffalo received a score of "D" or worse, mainly due to high traffic volumes and constrained rights-of-way.** The report also recommended treatments to improve the BLOS scores for the city's routes, including the installation of bike lanes, wide curb lanes, and paved shoulders.

#### GREENWAY SYSTEM IMPLEMENTATION PLAN (1998)

This plan developed by the City created a compelling vision for expanding the three main 'spokes' of Buffalo's greenway system, including the Riverwalk, the Buffalo River Greenway, and the Outer Harbor Greenway. **The vision of the plan was to create a series of pathways that would connect activity centers throughout the city to downtown and encourage people to stay in the area.** A central feature of the improved Greenway network would be a plaza, called the 'Commons' or 'Village Green,' which would be located in the Inner Harbor, creating a strong connection between the links that comprised the greenway system. Nine goals for the greenway system were identified in the plan, and are summarized below:

1. Increase access to the waterfront
2. Reduce traffic congestion
3. Increase recreational opportunities
4. Increase economic development
5. Connect to local destinations
6. Connect and improve Olmsted park network
7. Increase educational opportunities
8. Enhanced quality of life and health for human and wildlife communities
9. Enhance environmental sustainability of area

The plan identified physical barriers in creating a connected network of greenways, as well as property acquisitions that would need to be made to route the trails. Detailed cost estimates for the full build out of the greenway system were also provided.

#### BUFFALO COMPREHENSIVE PLAN - QUEEN CITY IN THE 21ST CENTURY (2006)

The City of Buffalo's comprehensive plan, adopted in 2006, serves to guide development of the city over the next 20 years. **Smart Growth principles are the foundation of the plan,** and through the implementation of strategic planning efforts Buffalo can "fix the basics, build on assets." Broadly the plan has several focus areas, including the economy, the community, the environment, infrastructure, financial capacity and control, and planning and zoning. The plan is to be reviewed and revised every five years to ensure its continuing relevance. These focus areas are organized according to the following themes:

1. Delivering quality public services
2. Maintaining public infrastructure



*The Greenway System Implementation Plan identified several zones within Buffalo's Greenway System and created phased strategies to create connections*



3. Transforming Buffalo's economy
4. Reconstructing the schools
5. Rebuilding neighborhoods
6. Restoring the Olmsted, Ellicott, and waterfront systems
7. Protecting and restoring the urban fabric

In terms of transportation, the plan notes that of the 675 miles of roads within the city's limits, 210 are eligible for federal aid. The remaining **465 miles of road are maintained with city funds** and the lack of municipal funds available to upkeep the roads has led to some deterioration of the network. **Vehicle miles traveled increased city wide from 16 million in 1984 to 19 million in 1999.** The Niagara Frontier Transportation Authority provides transit service for the city through its subsidiary NFTA Metro, and the system carries 94,000 passengers daily. There has been an increase in ridership in recent years. Key transportation goals for the master plan include:

- Improve regional mobility and accessibility
- Support existing and future economic development activities
- Improve transportation and land use coordination
- Preserve existing infrastructure
- Improve quality of life for all residents

There is not much of an emphasis in the plan on improving non-motorized transportation access. Some long term transportation priorities identified in the plan include: neighborhood traffic calming measures, pedestrian and bicycle amenities, and streetscape improvements. The plan notes that bicycling is increasing in popularity as a mode of transportation, and more dedicated bicycle facilities should be constructed. Specifically, the Regional and Urban Design Guide Principle #8 states that, "Buffalo supports the continuing development of public transit and expanded bicycle facilities on the waterfront, through the Olmsted parks and elsewhere" and that children should be able to walk and bike to school.

#### **BICYCLE AND PEDESTRIAN MASTER PLAN FOR ERIE AND NIAGARA COUNTIES (2008)**

The Greater Buffalo-Niagara Regional Transportation Council developed this master plan in November of 2008. The plan's primary goal was to "make walking and bicycling integral parts of daily life in the region" by recommending projects, programs and policies for a ten-year period. It **includes over one hundred actions and recommendations with a time table of expected completion.** Sections of the report included chapters on

enhanced street design for walking and bicycling, bike parking, transit connections, education and marketing programs, enforcement efforts, crash analysis and an implementation plan.

The plan is the third in a series of other bicycle and pedestrian planning efforts, the first of which was produced in 1981 and helped to create a unified vision for bicycling and walking in Buffalo-Niagara. This plan was updated in 1998 with the introduction of a Bicycle Level of Service (BLOS) score for the region's road network, and a Regional Bikeway Implementation Program, that resulted in a network of routes that would best serve cyclists and connect them to activity generators.

**The BLOS scores for the city were updated in the 2008 plan, and existing and proposed bicycle routes in Buffalo were mapped as well.** The 2008 Bicycle and Pedestrian Master Plan serves as the foundation for the Buffalo Bicycle Master Plan Update, and provides goals and performance measures to create improved walking and biking connections in the city and throughout the region.

#### **THE BUFFALO OLMSTED PARK SYSTEM: PLAN FOR THE 21ST CENTURY (2008)**

This plan, produced by the Buffalo Olmsted Parks Conservancy, provides a comprehensive summary of the existing conditions of the Olmsted Parks System, which includes six major parks, multiple parkways, circles, and small spaces, and was placed on the National Register of Historic Places in 1982 as a cultural landscape. The plan then makes recommendations for each individual component of the system to restore the parks and parkways to their original grandeur. The restoration projects are planned over a 20-year horizon and are estimated to cost \$252.5 million. The improvement of the parks should not be seen as an expenditure of capital funds with little return, but rather an investment in community assets that provide a place to recreate, improve air and water quality, and moderate temperatures.

Several **urban development projects aimed at improving automobile access in the City have drastically affected the appeal of the park system and interrupted non-motorized circulation.** These projects include:

- The Humboldt Parkway was demolished to make room for the Kensington Expressway
- Martin Luther King, Jr. Park lost valuable parkland with the construction of the Kensington Expressway

- Delaware Park was split in two with the construction of the Scajaquada Expressway
- A large portion of Gala Water (now called Hoyt Lake) in Delaware Park was lost with the construction of access roads to the Scajaquada Expressway
- Both Riverside and Front Parks were separated from the water—their raison d'être—with the construction of the New York State Thruway
- Front Park lost parkland and the “borrowed” green space from Fort Porter, and was cut off from the city with the construction of the Peace Bridge and its access roads
- Cazenovia Park lake was abandoned and eventually eliminated
- All of the six major parks have been altered from “natural landscapes” with the profusion of single-use facilities such as baseball diamonds, tennis courts, and golf courses

The plan incorporated a thorough public involvement process, and **polled over 28,000 park users** to determine why they like to use the Olmsted Parks. “Walking, strolling, or running” were the most popular activity, and “relaxing, socializing, and picnicking” were a second favorite. In total, 71% of park goers activities were unstructured, including activities such as biking, roller blading, special events, programming, and the activities highlighted above.

**Fixing the basics of the park is the short-term priority,** including rehabilitating landscape and vegetation, operations and management, paths and trails, recreational opportunities, branding, and providing amenities such as water, rest rooms, and benches.

### COMPLETE STREETS POLICY AND POLICY BRIEF (2008)

The City of Buffalo adopted a Complete Streets Policy in 2008. The policy states that in all new construction, reconstruction, street maintenance, public works, and park projects shall include bicycle and pedestrian facilities. The intent of the provision of these facilities is to provide safe access for all roadway users, including persons with disabilities, pedestrians, bicyclists, motorists, and transit riders. The Policy also requires that the City of Buffalo Bicycle and Pedestrian Advisory Board shall review street construction projects. In only the following circumstances should bicycle and pedestrian facilities not be provided during the aforementioned street projects:

- Bicyclists are prohibited by law. If this is the case, alternate accommodations shall be made in the same transportation corridor



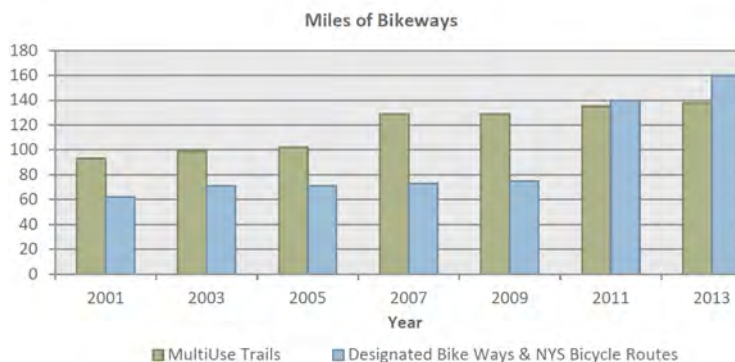
The six restored Olmsted parks are shown at the same scale in this image to demonstrate their comparative size.

1. Delaware Park - 368 Acres
2. South Park - 168 Acres
3. Cazenovia Park - 196 Acres
4. Martin Luther King Jr. Park - 51 Acres
5. Riverside Park - 37 Acres
6. Front Park - 26 Acres

- If anticipated use is low, and the cost of the bicycle and pedestrian accommodations exceeds 20% of the larger project
- If the existing right-of-way does not provide space for bike facilities or sidewalks, the Commissioner shall explore alternatives to providing accommodations, including lane reconfiguration, paved shoulders, signage, traffic calming, education and enforcement
- Or, if the provision of bicycle and pedestrian facilities constitutes a threat to the health, safety and/or welfare of pedestrians, bicyclists and/or motorists
- The policy also notes that Bicycle and Pedestrian facilities shall be planned, developed and maintained in accordance with guidelines adopted by USDOT, NYSDOT and AASHTO, or other guidelines approved by the City of Buffalo

Justification for the adoption of the Complete Streets Policy is provided in the Complete Streets Policy Brief. The brief notes that historically, walking and biking maintained a much higher percentage of overall transportation mode choices that they do today. One of the primary reasons for the decline in choosing these two modes has been a decline in safety. **In NYS, the leading cause of injury, hospitalization, and death among five-to-nine year olds is being struck, as pedestrians, by motor vehicles.** Youth (ages 5 to 17) also represent a disproportionate amount of bicycle/motor vehicle injuries and fatalities (61.6%) and pedestrian/motor vehicle injuries and fatalities (25.7%) when compared to this age groups percent composition (only 25%) of the total NYS population.

**In 2003, New York State spent \$6.1 billion in medical expenditures related to obesity, and complete streets**



*The miles of bikeways in the Buffalo-Niagara Region have steadily increased over the past decade (source: GBNRTC)*

can counter this staggering figure by making active transportation more appealing. The brief also notes that non-motorized transportation will contribute to a reduction in greenhouse gasses and fuel consumption if, as a result of the construction of complete streets, motor vehicle trips are replaced with bicycle and pedestrian trips. Complete streets will enhance the economic vitality of the community; by promoting walkable, bikeable shopping experiences. Lastly, as the general NYS population ages and baby-boomers reach retirement age in large numbers, complete streets will provide older people with the opportunity to age in place.

#### 2040 METROPOLITAN TRANSPORTATION PLAN (MAY 2014)

GBNRTC's The Long-Range Transportation Plan serves as the guiding document for the Buffalo/Niagara metropolitan region, and ensures that the region is in compliance with federal transportation planning regulations. The plan covers all modes of transportation, including roads, bicycles and pedestrians, transit, freight, air, and water. The report notes that **the number of bikeways and multiuse trails has increased over the past decade, from 60mi to 75mi for bikeways and 90mi to 135mi for trails.**

GBNRTC also collects BLOS data biannually, and **over the same period average BLOS scores in the region have improved.** The report notes that NFTA has shown a commitment to intermodal transportation, allowing bicycles on all of their rail cars at all times and equipping over 50% of their busses with bike-on-bus racks. Often, cities with successful bike mode shares have good transit systems, as the two modes are complements to each other. In Buffalo, transit ridership has risen since 2000, but dropped slightly in the past two years. One of the goals of the plan is to increase Mobility and Accessibility by offering a more balanced transportation system that provides modal choices. Transportation options should be specially enhanced for the transportation disadvantaged in the community. Non-motorized modes, which by their nature are affordable, should be expanded. Generally, the LRTP emphasizes the importance of planning for all modes, and notes the economic, environmental and social benefits that will be gained by providing diverse transportation options.

#### BUFFALO GREEN CODE: LAND USE PLAN (2011)

Buffalo's Land Use Plan was the first component of the on-going Buffalo Green Code planning process. The land-use plan set the stage for the subsequent Buffalo Unified Development Ordinance, a form based code that was oriented at regulating the appearance of buildings to ensure consistency and attractiveness of the built



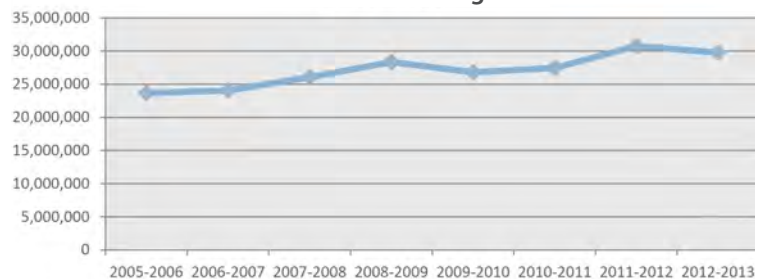
environment, rather than the building's use. The overall intent of this zoning overhaul being to create more desirable places in Buffalo to live, learn, work and play.

Buffalo's existing land use pattern positions the city well to become a bicycle friendly community. Many neighborhoods--especially in the central core of Buffalo--are compact, dense and full of a mix of uses. **Buffalo has a person per square mile density of 6,436 making it more dense than Milwaukee, Denver and Portland, OR.** Also, due to the density, walking, cycling and public transportation are all viable modes of transportation.

The report notes that in 2009, **"13% took transit to work, 6% walked, and 1% biked. These are among the highest rates of non-car commuting in the nation."** Additionally, 30% of Buffalo's residents do not have a personal vehicle. Though this may not be due to choice, it represents a significant portion of the population that would benefit from increase bicycle access for transportation. The plan highlights several goals related to land use, the economy, environment, and demographics. Goals and objectives related to bicycling are highlighted below:

- Embrace Mayor Brown's Mobility Project by continuing to install bicycle facilities as part of routine roadway construction projects
- Continue installation of bicycle racks in neighborhood centers through ongoing implementation of Mayor Brown's Commercial District Bicycle Rack Program
- Protect rail-to-trail opportunities and incorporate vacant rail corridors into greenway plans where appropriate
- Revisit policies that give undue preference to automobile use at the expense of transit, such as minimum parking requirements.
- Support a robust transit system by focusing compact neighborhood development and employment density in areas with high transit accessibility
- Support the Complete Streets Policy
- Support plans for the Safe Routes to Schools and Safe Routes for the Elderly
- Support planning initiatives for the Niagara River Greenway, Buffalo River Greenway, Black Rock Channel Greenway, the DL&W (The Del) Greenway and Outer Harbor Greenway

**NFTA Total Passengers**



*Transit Ridership, a mode that supports bicycle transportation, has increased in recent years, but dropped off in 2013*

### CHILDREN'S HEALTH: A GROWING NEED TO INCORPORATE PHYSICAL ACTIVITY INTO THE DAILY LIVES OF YOUTH (2012)

This report produced by the University at Buffalo's Food Systems Planning and Healthy Communities Lab highlights many statistics that are relevant to the Bicycle Master Plan. The report notes that about 30% of households in Buffalo do not have access to a vehicle, and students who live within these houses need to walk, bike, or ride a bus to get around. **Almost all elementary school students (90%) are bussed to school;** the remaining 10% walk or bike to school. High school students are bussed on NFTA buses, and are provided with passes to ride along the routes to and from school.



*The Buffalo Greencode is a plan that holistically serves to guide all planning and development decisions in the city, emphasizing sustainable solutions to the city's growth*

Overall, physical activity levels among students are low: **71% of students do not get the recommended minimum 60 minutes of physical activity a day.** 21% of middle school students and 18% of high school students reported not being physically active any day of the week. 40% of 6-12 graders did not belong to any sports team in their school or community during the past 12 months. As a result of this inactivity, **25% of Buffalo City School District students are overweight or obese.** The report discusses the barriers to active living for children, including the risk of being struck by a vehicle while walking and biking, and high crime rates. **Youth were involved in a disproportionate amount of pedestrian and bicyclist accidents with motor vehicles from 2010-11** as 26.5% of accidents involve youth, while only 22% of city residents are youth.

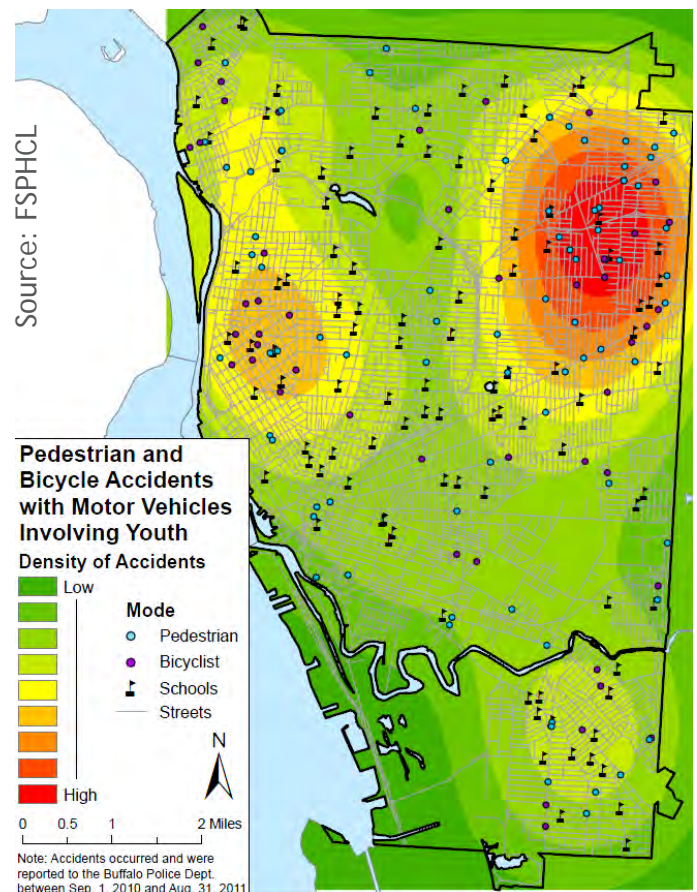
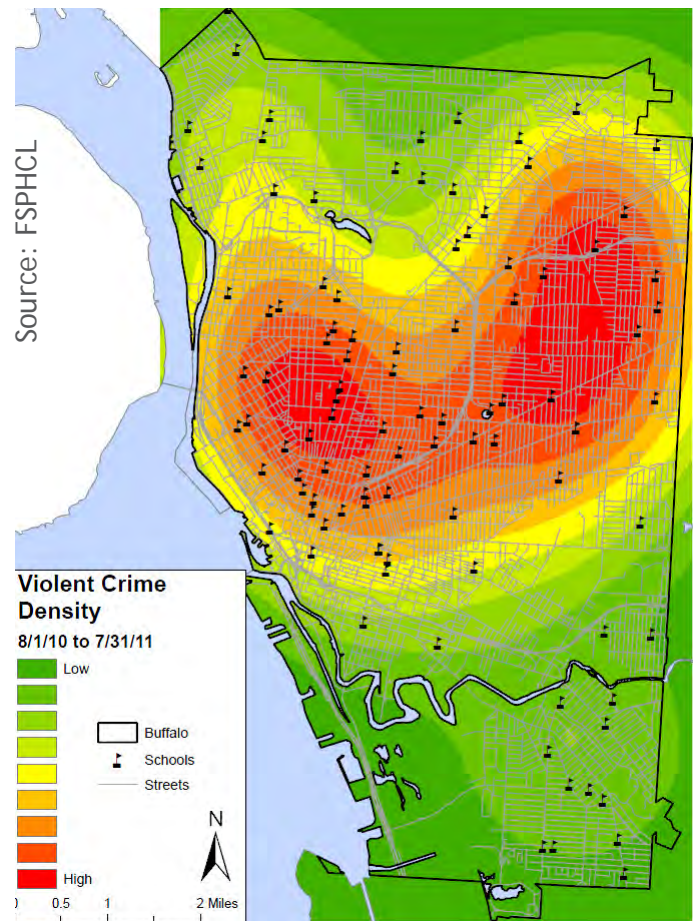
According to the report Buffalo's youth bear a disproportionately high burden of poverty, which impacts their ability to be physically active. Poor families may not have enough money to pay for children's community sports league fees and to purchase transit passes for children to travel to games or practices. Compared to wealthier families, poor families more often live in high-crime areas with unsafe traffic conditions, impacting the safety of outdoor physical activity.

#### LOCAL WATERFRONT REVITALIZATION PROGRAM (2014 DRAFT)

The local waterfront revitalization program includes several strategies for improving Buffalonian's access to their waterfront. The transportation components of the priority projects are outlined below:

##### Niagara Street/Great Lakes Seaway Trail Streetscape Project

Niagara St, a designated segment of the Great Lakes Seaway Trail National Scenic Byway, links many destinations along Buffalo's waterfront and is envisioned to become the primary waterfront transportation corridor for the city. Currently, conditions of the roadway



*Children in Buffalo should be able to walk and bike to school, but barriers exist, such as high-crime areas and the risk of getting struck by a vehicle*



are not conducive to non-motorized transportation; the right-of-way is wide and there are few traffic calming measures. Vehicle speeds along the roadway “regularly exceed the posted speed limit by 15 mph or more”<sup>2</sup>. The plan for this roadway calls for streetscape improvements, dedicated bicycle and pedestrian facilities, and improved transit access and beautification. All these efforts are aimed at sparking redevelopment along the corridor and improving non-motorized access. Construction on the street began in fall 2014.

### Scajaquada Expressway Boulevard Project

The project goal is to convert the Scajaquada Expressway into an at-grade, landscaped boulevard. Other project objectives include making the expressway a complete-street through the installation of bike and pedestrian accommodations, and overhauling the streetscape of the corridor to traffic calm the roadway. The expressway, which currently divides Delaware Park and rich cultural resources north and south of the road, would become a multi-modal corridor that enhances, rather than detracts from, the surrounding areas.

### Niagara St./ Virginia/Carolina I-190 Interchange Gateway Project

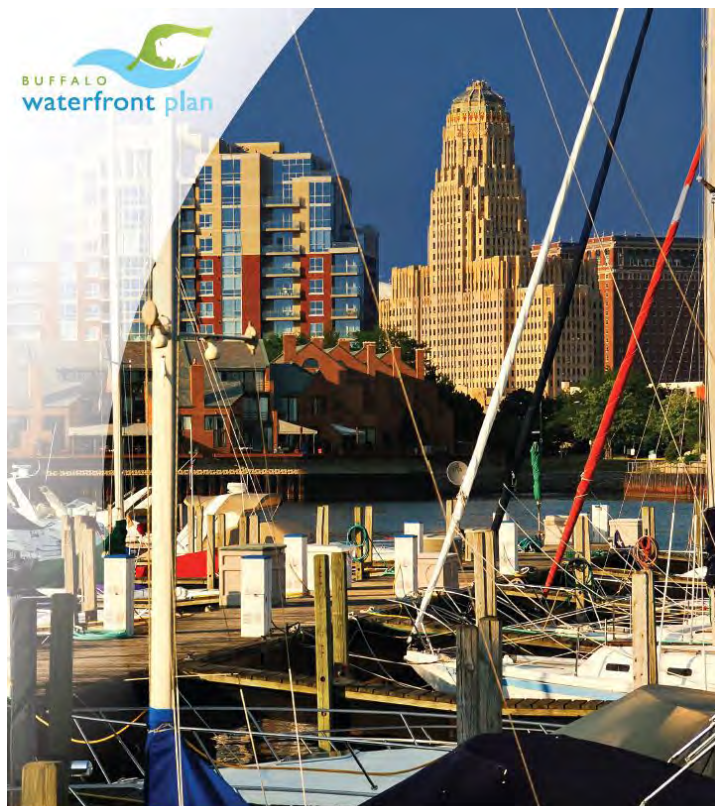
The interchange would be reconstructed to minimize its visual impact on the surrounding neighborhood. Improved connections would be made to the waterfront via Virginia and Carolina Streets. The project also recommends the removal of the on-ramp from Virginia Street. The on-ramp area then could be adaptively re-used as a development parcel. Pedestrian crossing enhancements would be included as well.

### Erie Street Waterfront Connection

Project involves the realignment of Erie Street to provide direct access between Main Street and the waterfront. The reconstruction would provide new development sites close to the waterfront, and provides a key opportunity to convert underpass barriers into gateways. Pedestrian access and safety through the corridor would also be enhanced.

### Cars on Main Waterfront Connection

Auto traffic has not been permitted on Main Street since 1982, and like most downtown pedestrian malls around the country, the lack of auto traffic has negatively impacted local businesses along the street. The proposed plan seeks to reopen Main St to two-way vehicular traffic to spur retail activity and economic development. (The 500 and 600 blocks were completed in 2015.)



### Local Waterfront Revitalization Plan

Public Review Draft  
City of Buffalo  
Mayor Byron W. Brown  
Office of Strategic Planning  
Brendan R. Mehaffy

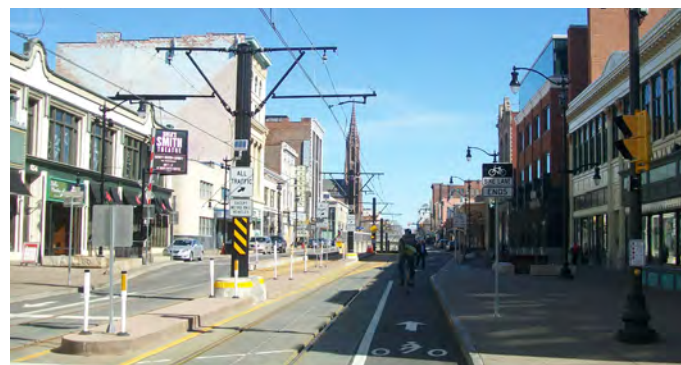


### Perry Street/Cobblestone Connector

Make streetscape improvements to enhance the impression visitors to Buffalo have of the city, as this corridor is the primary gateway to Canalside and the First Niagara Center.

### Ohio Street Reconstruction

Reconstruction project will fill a gap in the walking/ bicycling network with a multi-use path between Michigan Ave and Fuhrmann Boulevard. (Completed in 2015.)



*Main Street was recently reopened to vehicles*

<sup>2</sup> Buffalo Local Waterfront Revitalization Program, Transportation Project, TI. Niagara Street/Great Lakes Seaway Trail Streetscapes Project, pg 41





*The Scajaquada Expressway will be reconstructed in the future, although funds have yet to be dedicated to the project. The rendering above shows one proposal to make the limited access highway a boulevard.*

### ONGOING STREET CONSTRUCTION PROJECTS:

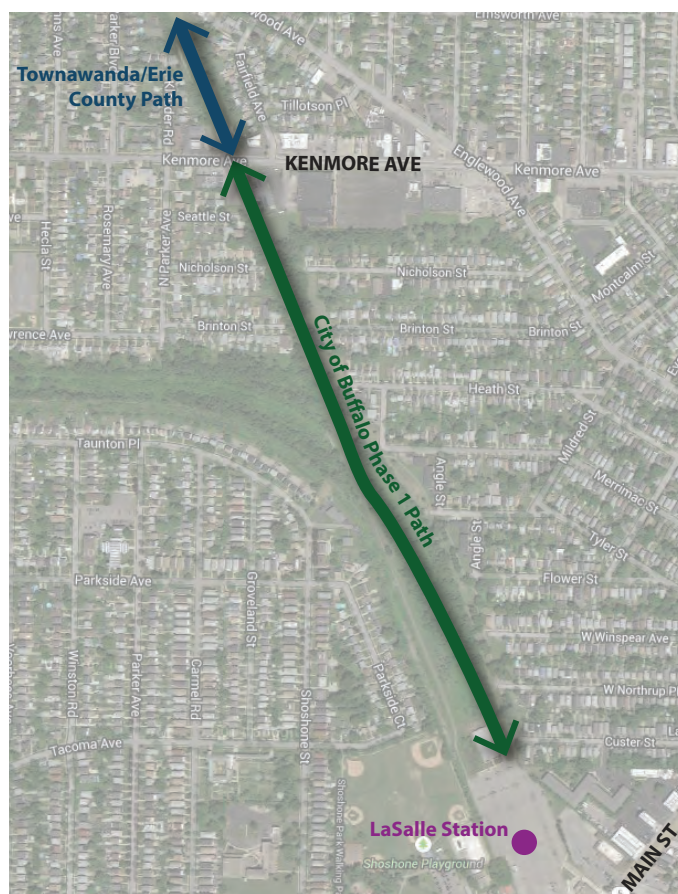
There are three street construction projects which are planned or under construction in Buffalo, including:

#### Kenmore Avenue Reconstruction

The City of Buffalo and Erie County are progressing on the reconstruction of Kenmore Avenue between Main Street and Fairfield Avenue. Kenmore Avenue (CR 307) travels from Grand Island Boulevard (NYS Route 324) at its western terminus to Main Street (NYS Route 5) at its eastern terminus and is 5.5 miles long. The portion between Main Street and Starin Avenue is the first phase of the reconstruction project, and is 1.3 miles long. Enhancements will be made to improve safe travel for vehicles and pedestrians, and traffic signals and geometric improvements to the roadway is being made to make the traffic flow more efficient. Improvements will include new five foot bike lanes on each side for the project corridor. Construction is now underway.

#### North Buffalo Rails to Trails Project

A shared-use path is being built along the former rail corridor from Main St to the city line at Kenmore Ave. From there, the path will connect to the City of Tonawanda's rail-trail project, set for 2015 as well.



*Mayor Brown announces the Kenmore Avenue Reconstruction project in the summer of 2013*

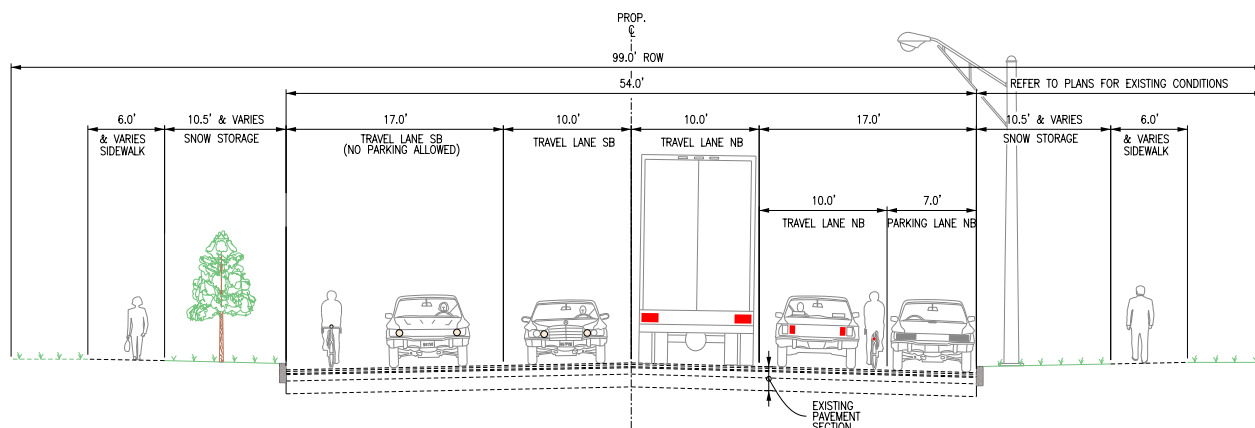
*The shared used path will connect LaSalle Station to the proposed Townawanda/Erie County Path*





## Niagara Street Gateway

The Niagara Street Gateway project is a rehabilitation of Niagara Street, between S. Elmwood and Porter. Minor pavement widening, milling/asphalt overlay, street lighting, traffic signal replacements (Carolina, Georgia, and I-190 and Virginia Street), as well as pedestrian and bicycle facility improvements will improve this important gateway to the downtown business district. There will also be a landscape feature and other amenities (signage, etc.) to highlight this corridor as a gateway. Construction is underway.



*The graphic above shows the existing cross-section of Niagara St, which does not currently have dedicated space for bicyclists. The proposed street reconfiguration will provide bike lanes and improved street-scaping treatments.*



**OTHER PLANNING EFFORTS:****Recent Neighborhood Urban Renewal Plans:**

- 2002 Michigan Ave Preservation Area URP
- 2003 Union Ship Canal Redevelopment Area URP
- 2005 Genesee Village URP 2016
- 2005 Seneca Babcock Redevelopment Project URP
- 2005 Union Ship Canal Redevelopment Area URP Amendment
- 2005 Urban Homestead Program
- 2006 Downtown Urban Renewal Project Phase IV URP
- 2007 Pratt Willert Revitalization Area URP Amendment

**ONGOING PLANNING EFFORTS + INITIATIVES:****Elmwood Ave Wayfinding Pilot Project Proposal**

This 2014 effort has been led by the City's Bicycle and Pedestrian Advisory Board, with help from the Elmwood Village Association, GObike Buffalo, and the City of Buffalo. The pilot project aims to improve bike accessibility to Elmwood Village's many businesses and destinations through bicycle wayfinding signage. After a one-year period, the program will be assessed to determine if there is an increased use in dedicated bike routes, increased awareness among bicyclists, and if any safety improvements were registered.

**Buffalo Green Code: Unified Development Ordinance**

Buffalo's Unified Development Ordinance is the city's first comprehensive zoning rewrite since 1953, and codifies the land use policies of the Comprehensive Plan and Buffalo Green Code planning documents. The intent of the code is to ensure that development is consistent, and that buildings complement rather than detract from one another. It is a form based code, emphasizing the importance of regulating the form of the building and allowing multiple uses within districts. This helps to create a more varied and diverse built environment, which in turn lends itself to walkability and bikeability. There are specific provisions identified in the code that relate to bicycle infrastructure. These provisions are highlighted below:

- Multi-use paths must be provided when new development is constructed alongside the shore to provide linear access for bicyclists and pedestrians (5.3.3, Section B)
- Minimum bicycle parking spaces must be provided at all new development sites that meet certain requirements. The code also specifies the percentage of long and short term parking that must be provided (8.2.1)

- Descriptions and standards are provided for short and long term bicycle parking
- Bicycle Parking must conform to the standards in the Bicycle Parking Design Guide produced by the Association for Bicycle and Pedestrian Professionals
- Any development over 50,000 square feet, except within the D-S, D-C, D-IL, and D-IH zones, must submit and make good faith efforts to implement a transportation demand management (TDM) plan aimed at reducing single occupancy vehicle trips; strategies must be identified to reduce vehicle miles traveled by site users, and promote alternate modes of transportation, including walking, bicycling, ridesharing and transit; modal share objectives should be stated to gauge performance of the TDM program
- All public and private vehicular rights-of-way must be complete streets, designed for safe, comfortable, and convenient movement both along and across rights-of-way by people of all ages and abilities, using multiple modes, and consistent with the City's complete streets policy

**Buffalo BikeShare**

Currently, there is a bike share pilot program that includes 40 bikes scattered throughout the University Buffalo south campus, in Elmwood Village, Allentown and in downtown Buffalo. The fleet of "Smart Lock" bikes are owned and maintained by the Shared Mobility Inc. non-profit. The program has experienced only modest levels of use, but there is interest in expanding the system to include more bicycles and potentially bike share stations in strategic locations throughout the city.



*Buffalo BikeShare program incorporate "Smart Lock" bikes that can be locked at bike racks throughout the city.*

## BUFFALO'S BICYCLE FRIENDLY COMMUNITY APPLICATION

The League of American Bicyclists' (LAB) Bicycle Friendly Community Application identifies strengths in the City of Buffalo's bicycling program and reveals some areas for improvement. Within the City's Office of Strategic Planning or Public Works, Parks and Streets, there is not a dedicated Bicycle and Pedestrian Coordinator. Buffalo has a Bicycle and Pedestrian Advisory Board that meets one or more times a month, and is comprised of 12 board members. GObike Buffalo's director acts as the chair for the Bike/Ped Advisory Committee. GObike Buffalo is a very active advocacy group, that acts as a contractor to the City for services and programs.

Based on the application, the City's most significant achievement was the Mayor's commitment to adding 10 miles of on-street bicycle facilities per year. In order to develop the network, the City in collaboration with GObike Buffalo funded this bicycle master planning effort.

The city adopted a Complete Streets Policy in 2008. This policy included many positive statements that required that bicycle and pedestrian facilities be incorporated into construction projects. The policy also required that the Pedestrian and Bicycle Advisory Board review all plans before implementation. In addition to this Policy, Buffalo also has streetscape design guidelines that outline specific treatments appropriate for streets based upon their context.

### BIKE PARKING

A City-wide ordinance requires that bicycle parking be provided at all new building developments. The amount and location of the parking (indoor/secure vs. short term) depends on the type and size of the building. The bicycle parking rack selection and installation process must conform with APBP standards.

- At the time of application, there were 2000 bike parking spaces in Buffalo
- 75% conformed to APBP standards
- 30% were on street bicycle corrals
- 1-5% were Bike Lockers

### BIKES ON TRANSIT

At the time of the application, 51-75% of NFTA busses were equipped with bike-on-bus racks. According to NFTA, in 2013 up to 88% of all buses are equipped with front-mounted racks with the capacity to carry up to two bicycles. The NFTA's goal is to increase that to 100% as older buses without racks are retired and all new models include them.

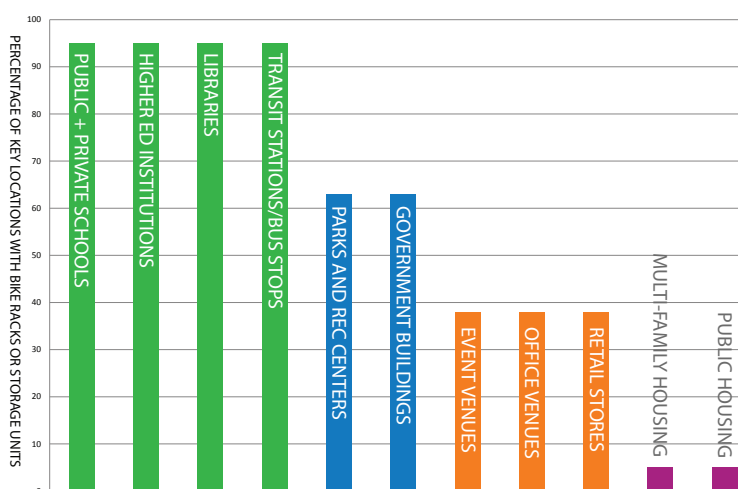


### BICYCLE FACILITIES

At the time of the application, the shared-use path network totaled 14 miles within city limits. Bike lanes totaled 13.5 miles, with two miles of contra-flow bike lanes and an additional 10 miles planned. Shared lane markings totaled 5.8 miles with 31 miles planned. There are no bike boulevards, no signed bike route. 1-25% of arterial streets had bike lanes or paved shoulders and 100% of shared-use paths were open to bicyclists.

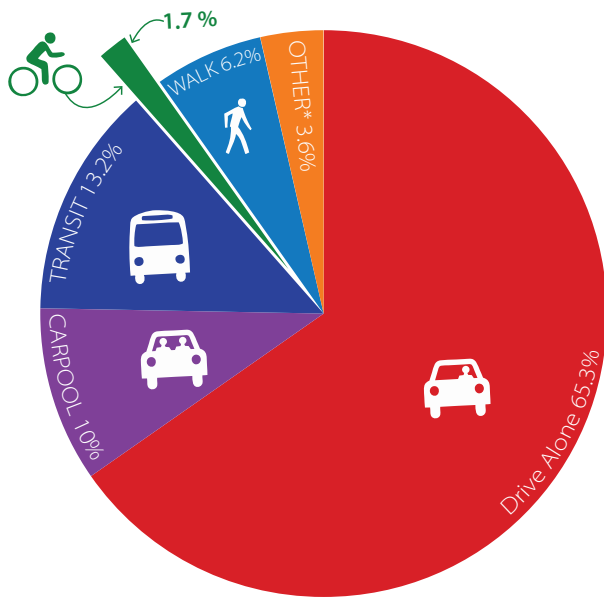
### MAINTENANCE

The maintenance policies include street sweeping, snow clearance, and pothole maintenance. Complaints are submitted online, through a city hotline, and shared are monthly BPAB meetings. Shared-use paths are swept annually, vegetation maintenance is done quarterly, but paths are frequently not cleared of snow during the winter and routine maintenance of the trails' surface is inconsistent.



The chart above shows the percentages of bike racks in Buffalo by location type. These numbers are averages for the location type (source: BFC Application)





Above is the City of Buffalo's 2014 mode split. From 2000-2010 the City's bike mode share increased from 0.4 to 1.7% (source: CTPP 2000; 2006-2010 ACS)

### SAFETY

According to the LAB application, there are no special accommodations for bicyclists at intersections, such as bicycle signals or bike boxes (bike signal has been added at the intersection of Linwood and North St.) There is no formal Safe Routes to School program in place in the City. Children are being taught safe bicycling skills through youth bike clinics or rodeos.

GObike Buffalo has spearheaded several efforts to educate motorists and bicyclists to share the road safely. These efforts include Share the Road educational videos aired on community website and local TV channels, distributing a community newsletter/magazine article, updating a newspaper column/blog on bicycling, and dedicating a bike page on community website. When Shared Lane Markings (sharrows) were first installed in the city, GObike Buffalo procured extensive local media coverage on the purpose of sharrows.

Separate courses on traffic skills, cycling skills, and commuter classes are each offered biannually for bicyclists. At the time of the application, there was one League Cycling Instructor in the City, and there had been at least one League Cycling Instructor seminar in the past two years. Bicycle maintenance classes and workshops are offered frequently all year round.

The City and GObike Buffalo have led efforts to ensure that the education programs reach traditionally underserved populations. They have partnered with various refuge organizations and parole assistance groups for bicycle giveaways that include safety instructions. They have also partnered with public schools on Safe Routes to School and Recycle-A-Bicycle programs. GObike Buffalo

created the GO Buffalo campaign, which consisted of a large marketing push to encourage safe commuting by bicycle, as well as walking and public transit. The program included the use of radio, television and public transit ads, as well as outreach during various public events and an extensive canvassing effort to alternative modes. This effort was funded by a Jobs Access Reverse Commute grant.



In 2009, Mayor Byron W. Brown announced that the Buffalo Police Department would enhance police bicycle patrols city-wide

### ENCOURAGEMENT

To promote National Bike Month, the City has publicly supported the event, organized community rides and a Mayor-led and Council-led ride, aired videos promoting bicycling on community websites and television channels, published a guide to Bike Month events, created a Bike Month website, organized commuter breakfasts, organized a summer street closure event, provide bike valet at events, and organize a bike to school day, promote bicycle-themed festivals, and lead public education campaign related to cycling. Promotions for these events have reached an estimated 9% to 10% of the community. Bike to Work day is another actively promoted encouragement campaign, reaching 26% to 50% of the community. There are also Bicycle Benefits promotions which are granted by local businesses for commuters.

Bicycling is promoted year round through community and charity rides, videos aired on TV and posted online, summer streets events, bike races, commuter events, guides to commuter events, bike valet parking, bike to school days, bike themed festivals, public education campaigns, and host community celebrations and rides each time a bicycle project is completed.

Signature cycling events in Buffalo have included: SkyRide, Ride for Roswell, Wheel to Reel, Tour de Farms, Bike Pageant, Biketoberfest, Bike to School Day, Play Streets, Cyclists, Larkinvillle Criterion, Bike to the Bisons, Ride for Missing Children, Campus Wheelworks Collective rides, Midnight Bikeride, Slow Ride Buffalo, and Tour de Cure.

Several cycling organizations have been created in the area, including Recreational Bike Clubs, Mountain Bike Clubs, Friends of the Trail Groups, Racing Clubs/Teams, – and Bicycle Co-ops. At the time of the application, there were seven specialty bike retailers in the City; facilities in the area include a velodrome, cyclocross course, and pump tracks as well as a skatepark that allows bikes. The City supports these events through the provision of in-kind funding (police presence and road closures). Visit Buffalo Niagara, a local tourism board, offers bicycles during events for out of town participants and organizes bicycle tour of local gardens. There are several bike clubs in the city, including: The Angry Bees, The Niagara Bicycle Club, UB Bicycle Club, The Lazy Randonneur Club, Cogragation, Campus Wheelworks Collective, Buffalo Bicycling Club. There are five bike shops in the City, and 10 in the Buffalo Metro area.

There are other bicycling ammentiiies in the community, including themed loop rides around the community, a skate park that bicyclists always have access to, and a small bike-sharing program. This system has 75 publically available bicycles available at 25 locations around the City.

The City has one LAB Bicycle Friendly Businesses, GObike Buffalo, and one LAB Bicycle Friendly University, University at Buffalo. It is worth noting that SUNY Buffalo State is in the process of developing a Bicycle Master Plan for their campus.

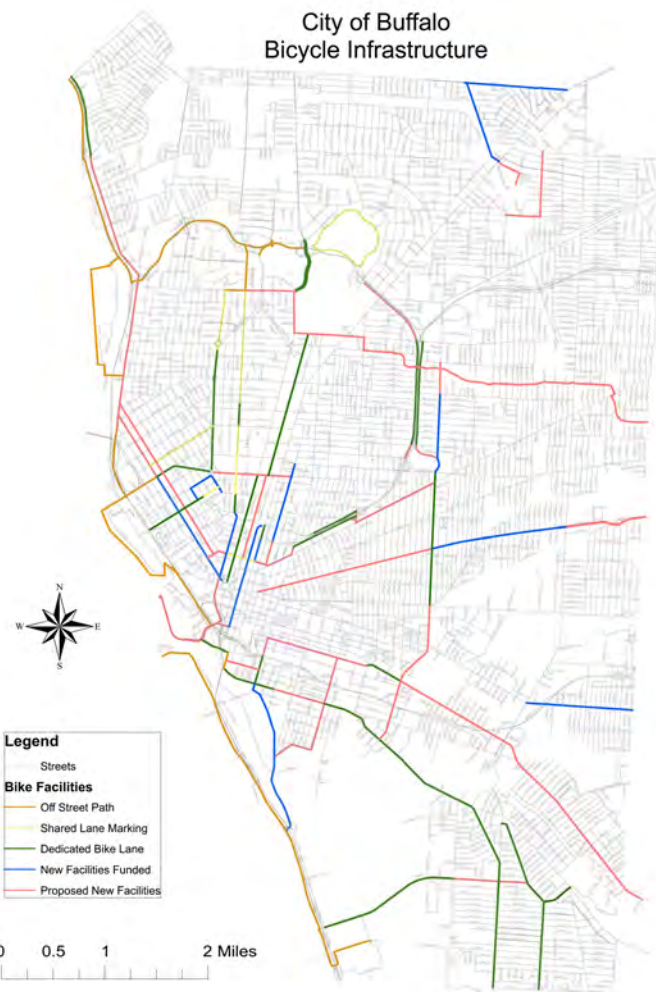
Youth recreation programs have included Recycle a Bicycle, community Cycling Center, and a program called Teen Treks.

### MAPS

There is an online bicycle map available that details existing bicycle infrastructure by type, public restrooms and other amenities, as well as a printed version of this map. There is also a printed greenways and trails map.

### ENFORCEMENT

According to the LAB application, the City has not identified a law-enforcement point person to interact with bicyclists, and no specific education is provided



*The City of Buffalo has a map which displays existing bicycle facilities*

to police officers regarding bicycling traffic law. Enforcement campaigns targeted at improving cyclist safety include helmet, bicycle light, and bicycle lock giveaways, and share-the-road campaigns. Police do report crash data and report potential traffic hazards to the city.

### EVALUATION AND PLANNING

At the time of the application, approximately 1% of residents were commuting by bike.

The latest Bicycle Plan was developed in 1998 and very few of the recommendations identified in the plan were implemented. The ongoing Bicycle Master Planning effort's goal is to implement a minimum of 10 on-street miles of bicycle facilities per year.

As part of the Buffalo Green Code, a system of metrics is going to be established to evaluate the performance

of bicycle and pedestrian programs and infrastructure improvement starting in January 2014.

### FINAL OVERVIEW

According to the application, the three primary reasons the City should be designated as a Bicycle Friendly Community include:

- “With a strong advocate push and a rapidly growing cycling community, Buffalo has grown leaps and bounds over the last several years becoming a regional leader in bicycle friendly communities and home to a very strong bicycle community”
- “Through a partnership between advocates and the City, a progressive Bicycle Master Plan and Green Code are being developed and on-street facilities are being added at a minimum of 10 miles per year with a focus on connectivity”
- “Flying Bison Brewing Company’s most popular line of beer, Rusty Chain, is a benefit for GObike Buffalo and works to educate the community about the benefits of bicycling”

The three aspects most in need of improvement include:

- A complete network of connected on-street bicycle facilities, under the guidance of a bicycle master plan (in progress)

- Increased buy-in and commitment from the City of Buffalo, including increased staff focus on bicycling, increased enforcement and education of law enforcement, etc
- More advanced bicycle facilities, such as bicycle boxes, and protected bicycle lanes

### LEAGUE OF AMERICAN BICYCLISTS’ (LAB) FEEDBACK ON BUFFALO’S APPLICATION

The following list describes the feedback Buffalo received when it submitted the application to be designated a Bike Friendly Community in the Summer of 2013.

- Create a new bicycle master plan; set target for trips made by bike
- Extend the amount of time the Bicycle & Pedestrian Coordinator spends on BFC efforts
- Although it is commendable that this position is currently held by an advocacy organization, a formal Bike and Ped Coordinator position should be established within city government.
- Provide bicycle facilities on collectors and arterials
- Develop a system of Bicycle Boulevards
- Ensure that there is dedicated funding for Bicycle Master Plan recommendations
- Expand public education and safety campaigns for motorists
- Improve bicycling education for bicyclists of all ages

Additional Recommendations to Promote Cycling:

### ENGINEERING

- Training for city staff (engineers, planners, law enforcement) on accommodating bicyclists
- Consider passing an ordinance that would require larger employers to provide end-of-trip amenities (ie bike parking and showers)
- Implement traffic calming measures and reduce neighborhood street speeds to 25mph
- Conduct road diets where appropriate, and use street width gained to install bicycle facilities
- Install a bicycle wayfinding system
- Improve the maintenance of on and off-road infrastructure. Increase frequency of sweeping, address potholes, and conduct routine snow removal after storms.



*In 2013 Buffalo was designated a Bronze Level Bicycle Friendly Community by the League of American Bicyclists. The City’s long term goal is to achieve platinum level designation*





- Develop a connected network
- Improve accommodations for bicyclists at intersections
- New and improved facilities should conform to best practices and guidelines (AASHTO, NACTO etc.)

## EDUCATION

- Expand bicycle education for children and youth
- Consider creating a Bicycle Ambassador program
- Offer cycling skills classes, Traffic Skills 101 classes and bike commuter classes more frequently
- Host a League Cycling Instructor (LCI) seminar to increase the number of certified LCIs in Buffalo.
- Start a share-the-road motorist education program

## ENCOURAGEMENT

- Continue to expand encouragement efforts during Bike Month, and during Bike to Work day and Bike to School day
- Continue to encourage a variety of social and family-friendly bicycle-themed community events year round
- Encourage businesses to promote cycling in the workplace by becoming members of the Bicycle Friendly Business Program

## ENFORCEMENT

- Invite a police officer to become an active member of the bicycling advisory committee
- Educate officers on the “Share the Road” message and traffic law as it related to cyclists and motorists, and ask police officers to implement their education in the community by citing bicyclist and motor vehicle infractions
- Pass more laws which protect cyclists, including a penalty for failing to yield to turning cyclists, penalties for motor vehicles that door cyclists, and make it illegal to park or drive in the bike lane

## EVALUATION/PLANNING

- Monitor bicycle usage by analyzing U.S. Census’ Journey to Work data.
- Conduct yearly bicycle and pedestrian counts at key locations in the city to gauge demand and use of existing facilities
- Adopt of bicycle level of use to be achieved by a specific time frame (ie 5% of residents by 2020; 10% by 2030)
- Implement a community-wide motor vehicle trip reduction program or ordinance

## EXISTING CONDITIONS ANALYSIS

The analysis of existing conditions has been divided into two sections: Current Conditions and System Gap Analysis. Current Conditions includes a description of existing and proposed bicycle facilities, while the System Gap Analysis inventories missing links in the on- and off-street bicycle pedestrian network and/or challenges to creating a complete bicycle network.

## CURRENT CONDITIONS

Alta conducted an analysis of current conditions based on field work, online resources, and through the examination of GIS data, aerial imagery, and on-line mapping websites.

Buffalo’s bicycle facilities include an extensive shared-use path system along the eastern bank of the Niagara River and the shores of Lake Erie. The trail system totals 14 miles as of Summer 2013. This trail system is optimally positioned within a larger regional network. Buffalo is the western terminus of the Erie Canalway Trail, a multi-use trail consisting of over 260 miles of built trail, and 100 more miles of planned trail, that connects Buffalo in the west to Albany in the east following the historic Erie Canal route.

In addition to the trail network, the City of Buffalo contains a small but growing network of on-street bike lanes (approximately 20 center line miles and growing). Bike lanes have been striped along Richmond Ave, Porter Ave, Hudson St, Delaware Ave, Red Jacket Pkwy, McKinley Pkwy, South Park Ave, Tifft St, Seneca St, Fillmore Ave, Cherry St, BFNC Dr, Humboldt Pkwy, Linwood Ave and portions of Elmwood Ave. Shared Lane Markings (5.8 miles total) have also been applied on some of the city’s streets, including Connecticut St, Richmond Ave, Elmwood Ave and W Chippewa St. The City also has two miles of contra-flow bike lanes.

## SYSTEM GAP ANALYSIS

Alta conducted a qualitative system gap analysis based on field observations, existing planning documents, and through the examination of GIS data and aerial imagery. The analysis includes existing trail and on-street networks and includes Corridor Gaps, Spot Gaps, Challenging Intersections, Infrastructural Barriers, and Land Use Gaps that are particularly challenging for bicyclists and pedestrians. This analysis provides an understanding of which areas have the greatest need for improvements, which areas can benefit most from strategic investment, and which areas pose the greatest challenges to further developing a bicycling network.

While the riverfront trail network in Buffalo is fairly comprehensive, and there is a growing on-street bicycle network, critical gaps remain.







## EXISTING CONDITIONS MAP

### CORRIDOR GAPS

These gaps are missing links of significant length where bicycle facilities are desired but do not exist, or are not adequate based on existing or future demand. They may correspond to a street corridor or a desirable route connecting popular destinations.

According to the preliminary existing conditions analysis, significant east/west Corridor Gaps occur along Hinman Ave to Amherst St, Forest Ave to Delavan Ave, and along Best St and Seneca St among others. North/south gaps exist along Ontario St, Elmwood Ave, Niagara St, Bailey Ave, and Delaware Ave.

### SPOT GAPS

Intersections that function well for bicyclists are critical in creating a comfortable cycling network, and poorly designed intersections represent significant gaps.

There are spot gaps scattered throughout the city. The spot gaps identified on the map are those gaps located along corridors where there is current or latent bicycling demand. These gaps are point-specific locations lacking facilities or other treatments to accommodate safe and comfortable travel for bicyclists. Major spot gaps include Niagara Square, the intersections of Niagara St and Forest Ave, Kenmore Ave and Main St, Seneca St and Bailey Ave. There are also gaps along corridors that currently interrupt the flow of cyclists. These include where Main St crosses the Scajaquada Expressway, Delaware Ave at Chapin Parkway and Elmwood Ave through Delaware Park.

### INFRASTRUCTURAL BARRIERS

These barriers include highways, some arterial streets and rail lines that hinder movement by pedestrians and bicyclists either physically or psychologically.

Major road barriers include the Scajaquada Expressway, I-190, and Route 33. Rail corridors that pose barriers are located in North West Buffalo, East Buffalo between Delavan and Seneca, and South Buffalo east of Tifft Farm Nature Preserve.

### LAND USE BARRIERS

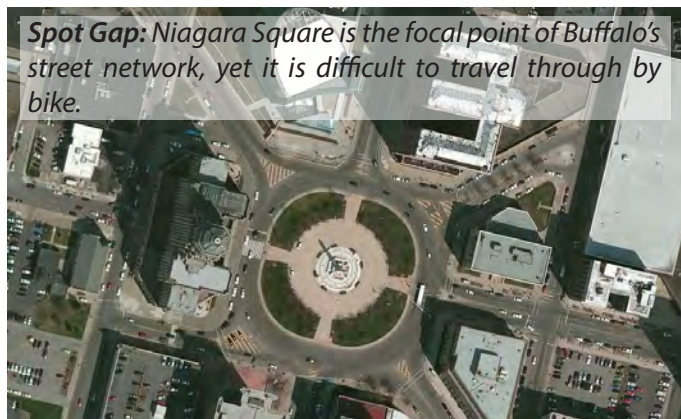
Parking lots, vacant/abandoned properties, and other post-industrial land-uses can be unattractive, cause security concerns, and create an unfriendly environment for bicycling.

The land use barriers in Buffalo include rail yards in south Buffalo and East Buffalo and surface level parking lots downtown.

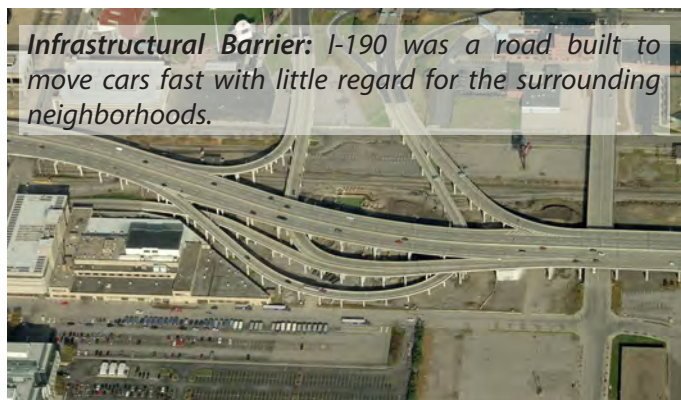
**Corridor Gap:** Delaware Ave is a critical corridor in Buffalo's bike network, but Delaware Ave in North Buffalo is currently not suited to comfortable bicycle travel



**Spot Gap:** Niagara Square is the focal point of Buffalo's street network, yet it is difficult to travel through by bike.



**Infrastructural Barrier:** I-190 was a road built to move cars fast with little regard for the surrounding neighborhoods.

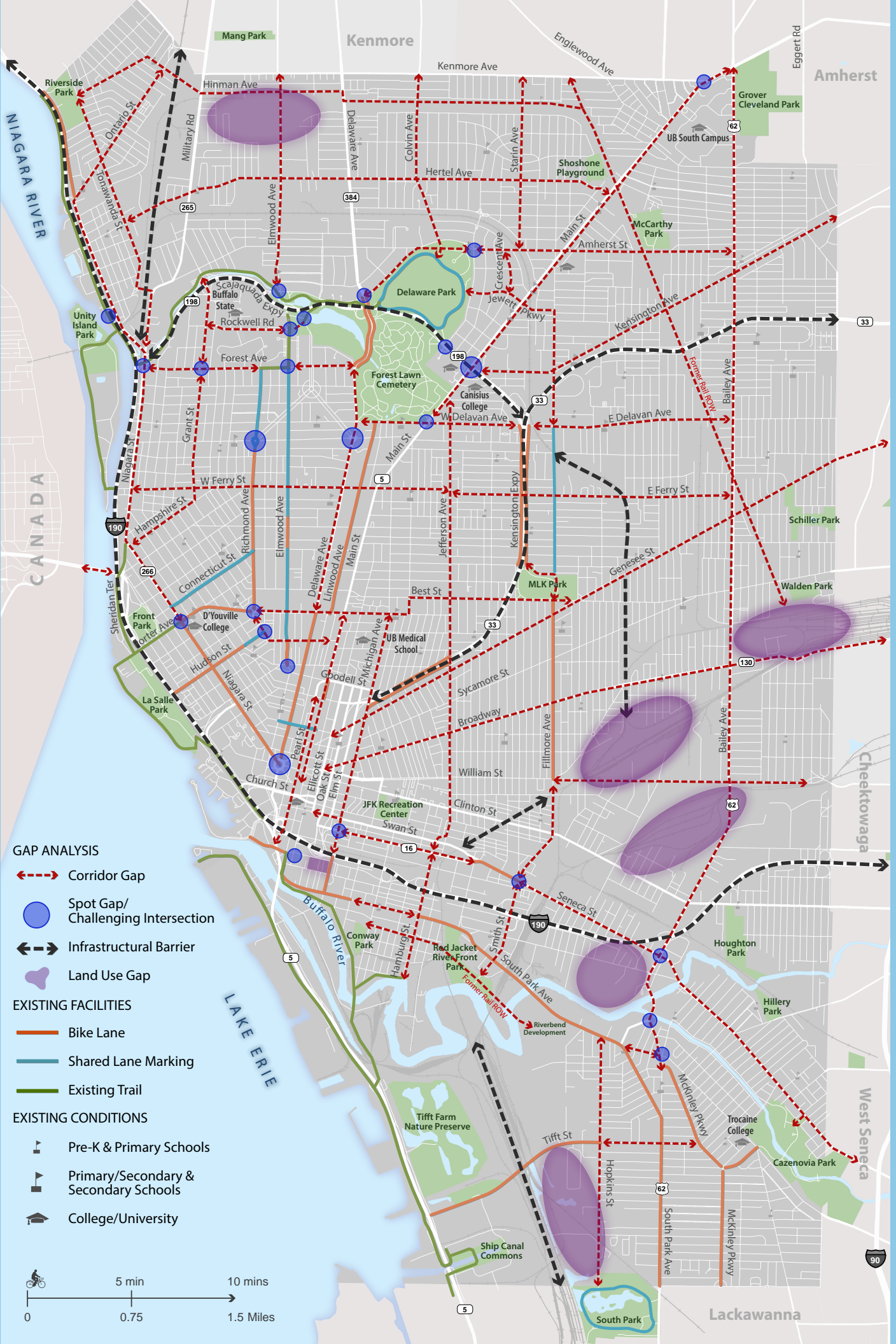


**Land Use Barrier:** Vestiges of Buffalo's heritage as a freight city can be seen in its many large rail yards



Photo Sources: Bing Maps









## BIKESPACE ANALYSIS MAP

Using GIS data provided by the City and GBNRTC, Alta developed the BikeSpace analysis map. The purpose of the map and analysis process was two-fold. The first objective was to identify the streets within the City that could accommodate bicycle facilities within the existing right-of-way without altering the current lane configuration. The second objective was to identify four-lane roads in the City that would be good candidates for conversion from a four-lane road to a two-lane road with a center turning lane. This lane reduction is known as a “road-diet”. This analysis provides a snap-shot of lower-cost enhancements that could be made to Buffalo’s bicycle network with little interruption to current traffic patterns. A summary of this analysis is provided below.

### LANE WIDTH AVAILABILITY

The BikeSpace analysis mapped the roads in the City of Buffalo that had excess road-width (beyond the standard 11 foot wide travel lane) available that could potentially be converted into dedicated bicycle facilities. Streets that were too narrow (less than five feet total excess width available) to accommodate bicycle facilities were omitted from the analysis. The remaining road sections were categorized into one of four groups depending on the amount of excess pavement width available. The four groups were: 6-9 feet, 10-14 feet, 15-18 feet, 18+ feet. Generally, a more protected bicycle facility could be installed on streets with more excess street-width available. For example, with 10 feet excess width, two standard bike lanes could be striped along the street; with 15 feet excess width, a two-way cycle track could be installed or a buffered bike lanes. This exercise is helpful in identifying the “low-hanging-fruit” in the City’s street network, or those roadways that could accommodate a bicycle facility without lane narrowing, street reconstruction or removal of parking.

#### 18+ Feet Available

Streets with 18+ feet available could accommodate a generous protected bicycle facility, such as a cycle-track or buffered bike lanes. Protected facilities encourage less experienced cyclists to bike, and therefore are the ideal treatment when conditions are present to accommodate them. There are 5.9 miles of road with 18+ feet excess street-width available, including sections of William St between Fillmore Ave and the City line to the east, and along Bidwell Parkway and Chapin Parkway south of Delaware Park.

#### 15-18 Feet Available

Streets with 15-18 feet available could accommodate a standard protected bicycle facility, such as a cycle-track or buffered bike lanes. There are 3.4 miles of road with 15-18 feet excess street-width available, including portions of Main St, Delaware Ave, and Franklin St downtown.

#### 10-14 Feet Available

Streets with 10-14 feet available could accommodate a standard bike lane and a more protected buffered bicycle lane. There are 11.8 miles of road with 10-14 feet excess street-width available, including a portions of Kenmore Ave, Niagara St, Amherst St, Lincoln Pkwy, Ganson St and Seneca St.

#### 6-9 Feet Available

Streets with six-to-nine feet excess width available cannot accommodate bicycle facilities as they are now, but are considered ‘threshold streets.’ The threshold of 10’ excess street-width that needs to be reached to install bicycle facilities could be achieved through the creative reallocation of the street’s cross-section. Reallocation options include narrowing travel lanes to the 10’ minimum, and/or reducing the parking lane width to the seven foot minimum, and/or removing parking. There are 16 miles of road with six-to-nine feet excess street-width available, including portions of Abbott Rd, Seneca St, Clinton St, William St, Ellicott St and Washington St downtown, Kensington Ave, Olympic Ave, Elmwood Ave, Forest Ave, Nottingham Terr, and Kenmore Ave.

### ROAD DIETS

Many roads in the Buffalo were built to accommodate higher traffic volumes than actually travel on these streets today. The number of lanes along these streets can therefore be reduced while still maintaining acceptable levels of traffic flow. In recent years, “road diets” or conversions of four lane roads to two lane roads with a center turn median and bike lanes, have become commonplace. This lane reconfiguration tends to traffic calm corridors and increases the amount of excess street width available that can be converted to dedicated bicycle facilities. The traffic volumes along four-lane roads are the primary criteria used to determine if a road-diet is appropriate, along with signal density.<sup>1</sup>

- Streets with less than 15,000 annual average daily traffic (AADT) are very good candidates for road-diets. Congestion will likely not increase if the number of lanes is reduced;
- 15,000 – 18,000 AADT are good candidates, in that the number of lanes can be reduced without increasing congestion significantly. Trade-offs need to be analyzed;
- 18,000 – 20,000 ADT could be candidates, but individual traffic studies need to be conducted to determine if congestion will increase, and if the increase in congestion is acceptable;
- More than 20,000 ADT may be candidates, but congestion and vehicle delay will increase so trade-offs need to be considered

<sup>1</sup> Going on a Road Diet. Tan, Carol. Federal Highway Administration. 2011



When determining if a road diet is appropriate, trade-offs need to be weighed. Fewer lanes may increase congestion, but this may be offset by improved non-motorized access. In addition to traffic volumes, other factors need to be weighed as well, including: signal density, number of collisions, vehicle speeds, freight usage, bus stops and routing, and access. Project goals should be identified and engineering judgment should be exercised prior to the implementation of a road diet. The traffic volumes for the four-lane roads in Buffalo were mapped, and the results of this analysis are displayed on the BikeSpace map. Final determination requires engineering analysis that takes into account multiple factors in addition to AADT.<sup>2</sup>

### Less than 15,000 AADT

Roads with volumes less than 15,000 AADT include portions of South Park Ave, Seneca St, Perry St, North and South Division St, Broadway, Elmwood Ave, Niagara St, Jefferson Ave, Genesee St, Kensington Ave, E Amherst St, Parkside Ave, Hertel Ave, and Kenmore Ave.

### 15,000 - 18,000 AADT

Roads with volume between 15,000 - 18,000 include lower portions of Bailey Ave only.

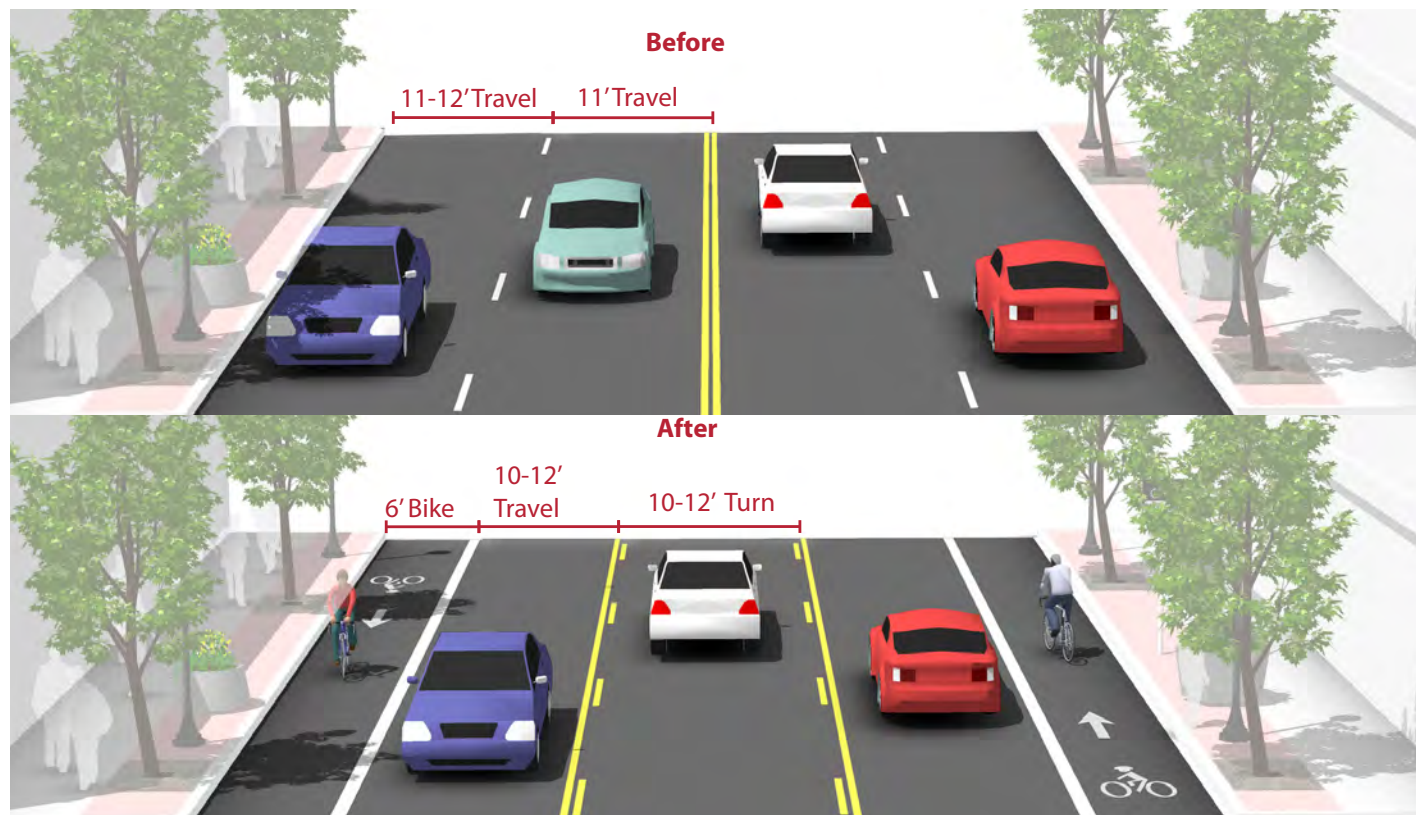
### 18,000 – 20,000 AADT

Roads with volumes between 18,000 – 20,000 AADT include portions of Main St, Hertel Ave, Bailey Ave, Elmwood Ave, lower Delaware Ave, Tonawanda St, and Seneca St.

### More than 20,000 AADT

Roads with volumes greater than 20,000 AADT include portions of Delaware Ave, Elmwood Ave and Main St.

*Road Diet: The graphic below shows a typical four lane to two lane with center turn lane ‘road diet’ lane reconfiguration. The reduction of one travel lane creates excess lane width that can be converted into dedicated lane space for bicyclists.*



<sup>2</sup> Data for the analysis was provided by NYS DOT via the NYS GIS Clearinghouse. This data file includes traffic volume data for the 35,000+ traffic count stations throughout New York State for the year 2012. These traffic count stations cover the entire length of New York's Interstate Highways, United States Highways, and State Highways, as well as most significant local routes. Traffic counts are taken at short-count stations for 2-7 days, once every 3-6 years, to collect data that allows for extrapolation to annual traffic estimates.





# BIKESPACE ANALYSIS MAP

TOTAL CURB-TO-CURB  
WIDTH AVAILABLE FOR  
BICYCLE FACILITY

- 6 - 9 feet
- 10 - 14 feet
- 15 - 18 feet
- 18 + feet

AADT VOLUMES ON 4-LANE,  
ROAD DIET CANDIDATES

- < 15,000
- 15,000 - 18,000
- 18,000 - 20,000
- > 20,000

EXISTING FACILITIES

- Bike Lane
- Trail



5 min

10 mins

0

0.75

1.5 Miles



## CRASH ANALYSIS MAP

To help understand where improvements to bicyclist safety are needed, bicyclist and motorist crash data were mapped. The data was gathered through NYSDOT's Accident Location Information Service (ALIS) Database. The crashes analyzed occurred between February 2011 and December 2013, representing about three years of crash data.

On the following page, two visuals are provided that display crashes involving motor vehicles and bicyclists in the City of Buffalo. The first map displays the location where the crashes occurred. This is a cluster map, and is helpful in communicating where there are clusters of crashes in the City. Clearly, there are some areas and corridors that have a higher frequency of bicycle/motor vehicle crashes. These include East Buffalo, between Delaware Park and Downtown, Bailey Ave, Genesee St, Broadway, Main St, Hertel Ave, Kensington Ave, and South Buffalo. This map shows that crashes tend to occur at intersections, and emphasize the fact that within bicycle networks, intersection enhancements need to be prioritized.

The second map displays those roads that were located within 0.1 mile of a bicycle and motor vehicle crash. This graphic is helpful in identifying the streets that crashes tend to occur on and near. This map will inform network-planning recommendations so that streets with a high crash risk are addressed.



### Know the Hand Signals



LEFT TURN



STOPPING



RIGHT TURN

### ANATOMY OF BIKE SAFETY FEATURES



### Safety Tips

- Check your bike before riding it.
- Always wear a helmet.
- Don't wear loose clothing, as it can get caught in the bike's chain, gears, or brakes.
- Clip your pants to avoid getting them caught in the bike's parts.
- Wear reflective gear, especially when riding at night.
- Take less-traveled routes so you won't have to compete with dangerous traffic.
- Ride in a straight line on the right side of the road.
- Ride near the curb, but stay a car door's width away from parked cars.
- Ride in the same direction as traffic flow.
- Obey traffic signs and signals, including stop lights and stop signs.
- Don't assume that drivers can see you.
- Obey the two-second rule. When the car in front of you passes a fixed object, begin counting. If you get to that object before you count to two, you're following too closely.
- Be careful when riding in wet or snowy weather.



*Reporting bicycle/motor vehicle crashes is imperative to documenting where crashes occur, and provides invaluable information that can be used to inform corridor and intersection design. Many cities now issue wallet sized cards to help cyclists correctly report accidents (source: bostonbikes)*

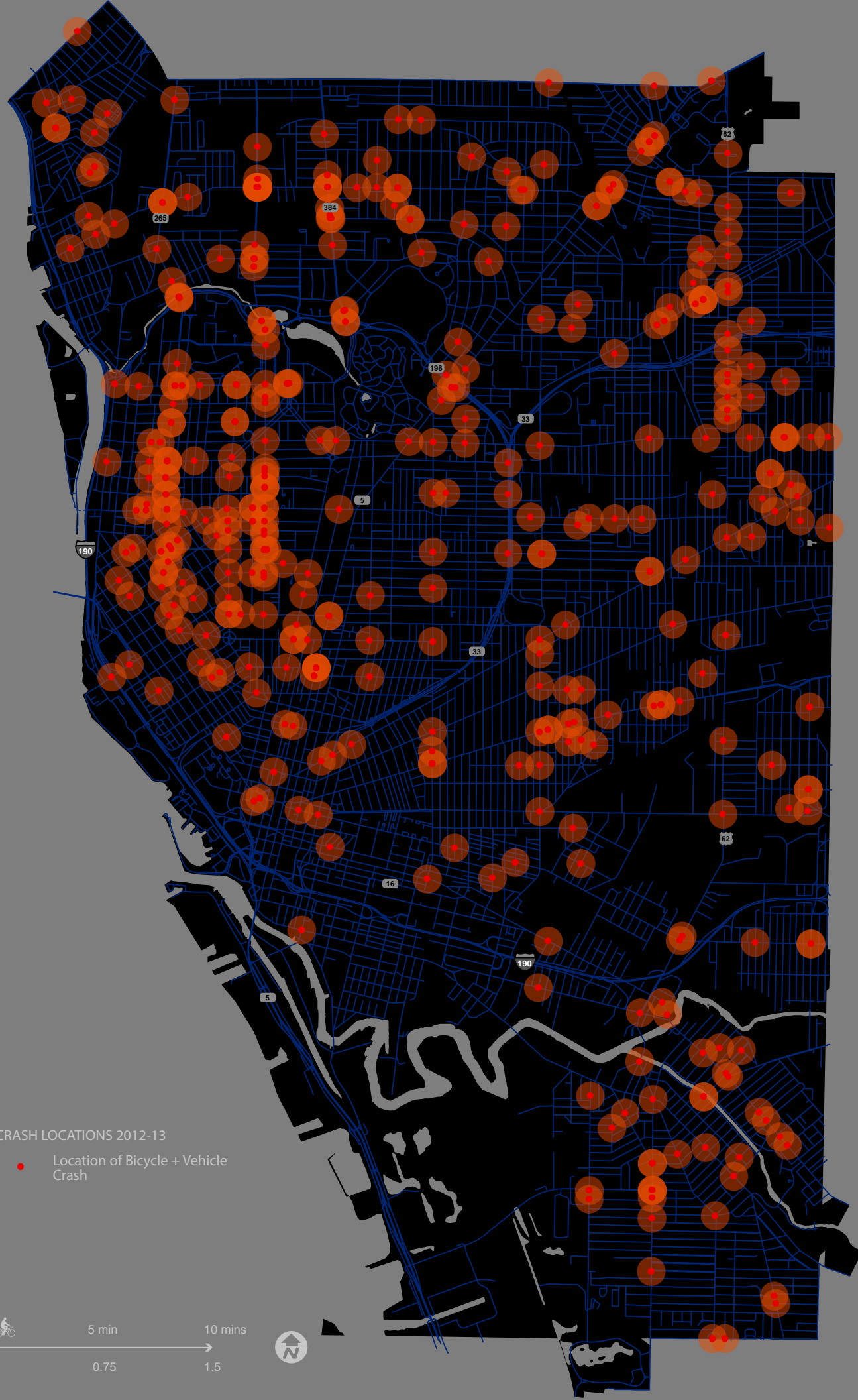
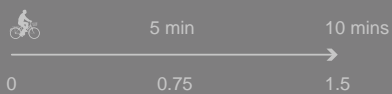




# CRASH DENSITY MAP

CRASH LOCATIONS 2012-13

● Location of Bicycle + Vehicle Crash



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Planning the  
Network

Types of Bicyclists

Developing the  
Network

Existing  
Conditions Analysis

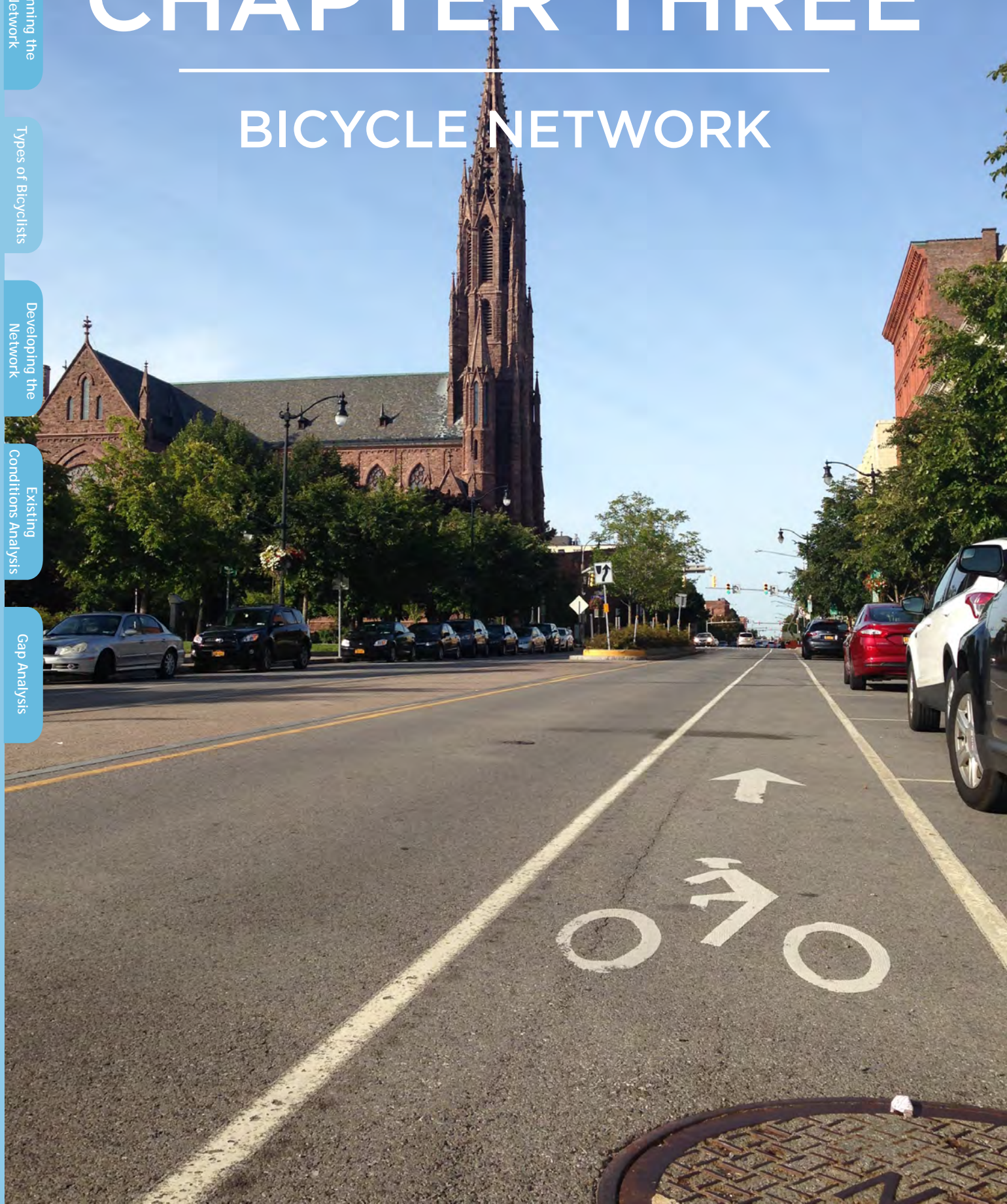
Gap Analysis

# CHAPTER THREE

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## BICYCLE NETWORK

BUFFALO BICYCLE MASTER PLAN





## PLANNING THE BICYCLE NETWORK

The proposed city-wide bicycle facility network is the result of a collaborative planning process that involved a combination of technical analysis and extensive public input. The overarching objective in developing the network was to identify desirable bikeway corridors and recommend a facility type for these routes, creating a feasible bicycle network that fulfilled the vision of this Bicycle Master Plan: *to provide a safe and connected bicycle network throughout the city, thereby increasing the livability of Buffalo's neighborhoods as more people ride their bicycles for all trip purposes.* A parallel objective was to provide facilities in the network for all types of bicyclists. This process is described in more detail in the blue box below.

The proposed bicycle network was updated iteratively throughout the development of the plan. As draft

networks were prepared, they were shared with the public and stakeholders, and the network was refined until it reflected the community's vision for a bikeable Buffalo. The following list indicates the several channels of communication which informed the final network recommendations:

- Public Survey (see [Appendix C](#) for summary)
- Public meeting input (July 30 and Dec 4, 2014 and May 21, 2015)
- Stakeholder meetings (6 throughout process)
- GObike Text Message Survey (see [Appendix D](#) for survey results)
- Online Comments and Emails
- Regional and Local Governmental Input
- Neighborhood Groups Outreach
- Six stakeholder meetings

Throughout the remainder of this plan, icons are used to represent one of three 'types of bicyclists'. The types of bicyclists are described in detail in this chapter. These categories served as the basis for the development of the bicycle network recommendations, in that the categories define the facility recommendations. Each facility type serves one or more of the types of bicyclists. The icons are shown at right for reference.



**Interested but Concerned Route**  
Suitable for all ages and abilities



**Enthused and Confident Route**  
Suitable for Confident Riders



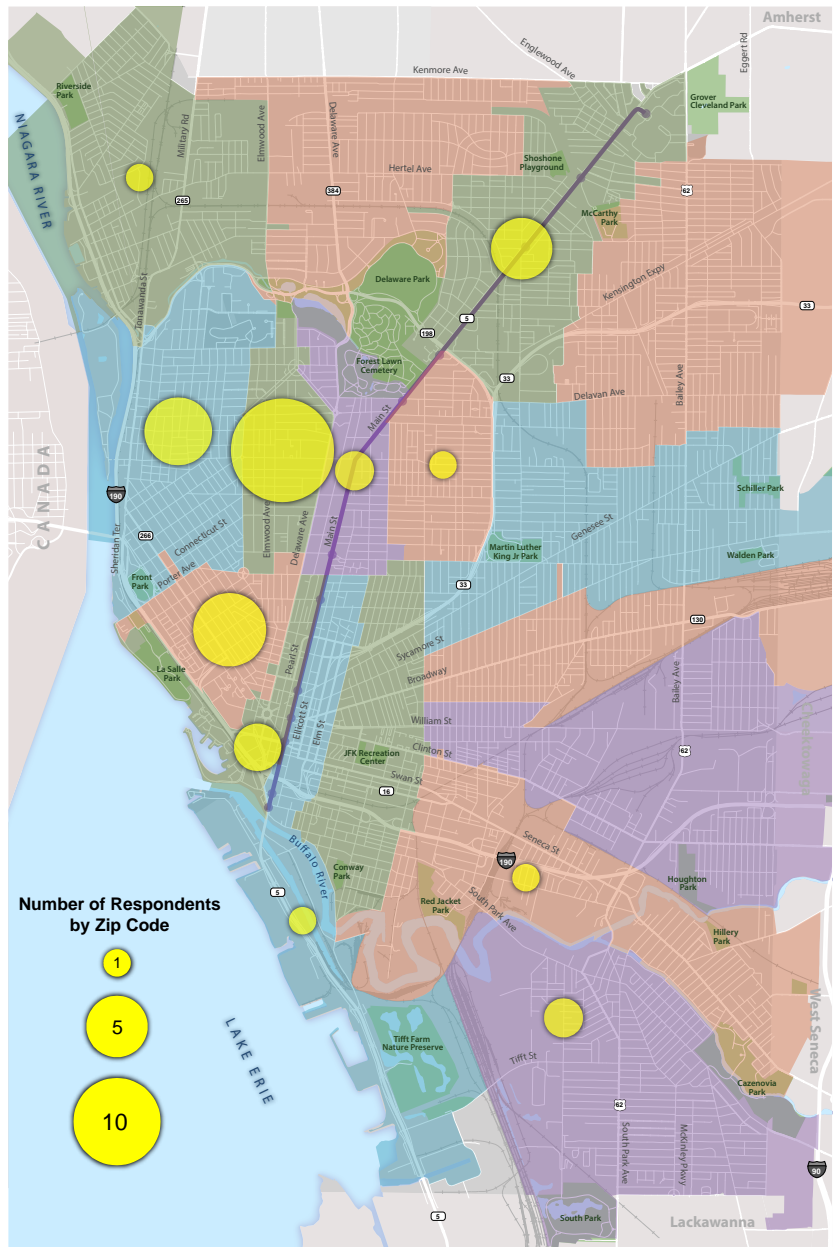
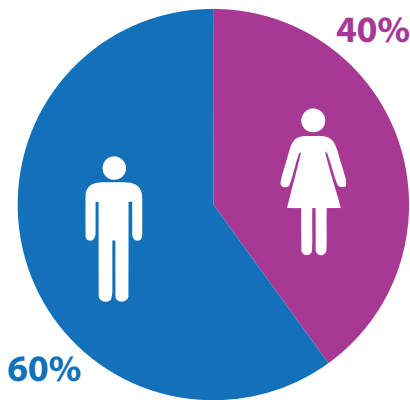
**Strong and Fearless Route**  
Suitable for Experienced Riders



## PUBLIC INPUT

The recommended Bicycle Network is a reflection of the community's desire for a more bikefriendly Buffalo. Through communications with residents, business owners, stakeholders and other interest groups, the planning team was encouraged to develop a feasible network that would elevate the status of bicycling in Buffalo. Every effort was taken to engage a wide range of stakeholders to ensure that the plan recommendations were a reflection of the community's vision for a more bikable Buffalo. The graphics on this page summarize the "what/where/who" feedback collected via a survey distributed early in the project.

At the first public meeting on July 30, 2014, over 50 attendees completed a survey. The gender breakdown of respondents was:



Number of survey respondents by Zip Code. Colored shapes represent different zipcodes.

Survey respondents were also asked to record their zip code so the planning team could understand where feedback was coming from. The **map above, at right**, displays the different zip codes in the Buffalo (colored shapes), and the proportion of respondents by zip code (yellow circles). In total, 21 zip codes were recorded, nine of which were located outside of the city limits.

Respondents were also asked to identify the three streets that needed the most improvement for bicyclists. As shown in graphic at right, Main, Delaware, and Elmwood were the top three streets listed. Cumulatively, a total of 150 roads and intersections were recorded.<sup>1</sup>



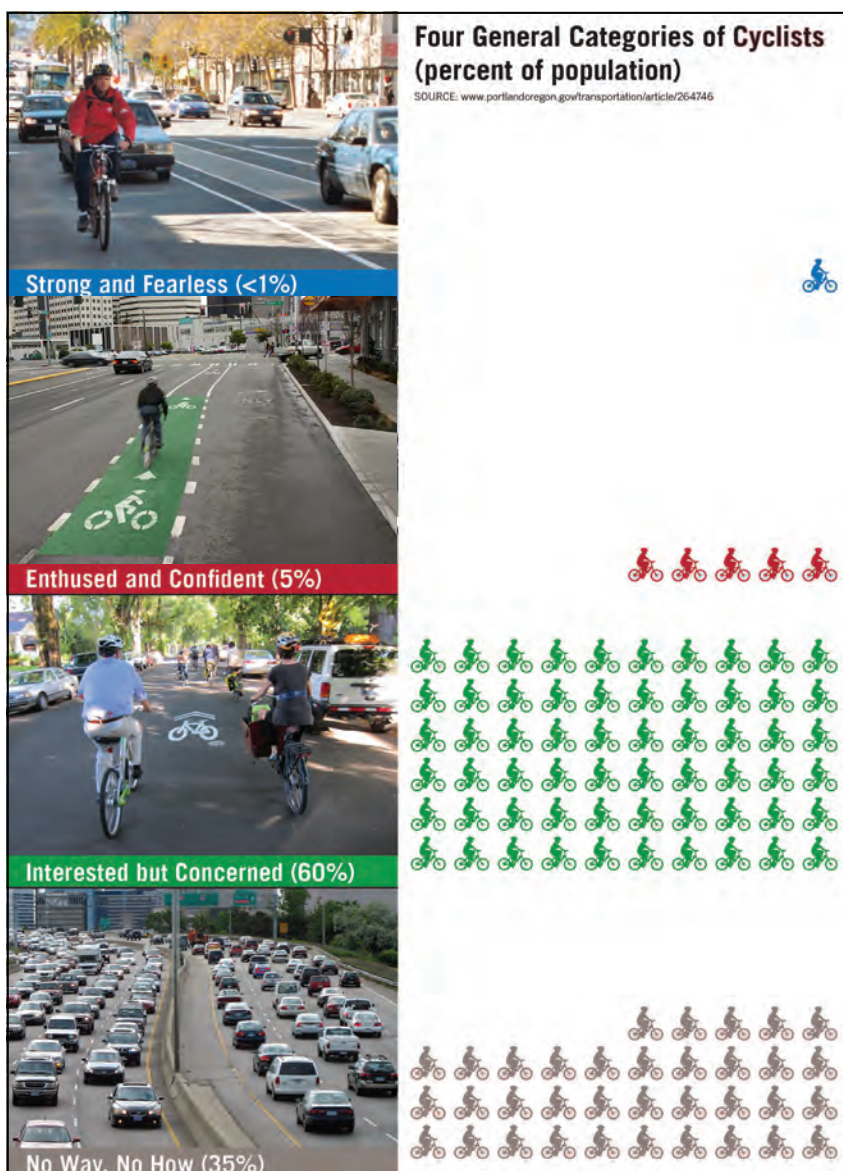
<sup>1</sup> Duplicates are included in the count of 150 roads

## TYPES OF BICYCLISTS

The guiding principle for this plan was to develop a bicycle network that provided facilities for all ‘types of bicyclists.’ Rather than designate facilities in the network by facility type, proposed facilities were coded according to the type of bicyclist that would be comfortable biking upon them. Bicycle infrastructure should accommodate as many user types as possible, and the proposed Buffalo Bike Network includes separate or parallel facilities where practicable to provide a comfortable bicycling experience for the greatest number of people.

The bicycle planning and engineering professions currently use several systems to classify the population, which can assist in understanding the characteristics and infrastructure preferences of different bicyclists. The most conventional framework classifies the “design cyclist” as *Advanced*, *Basic*, or *Child*.<sup>2</sup> A more nuanced understanding of the US population as a whole is illustrated in the figure below. Developed by planners in Portland, OR,<sup>3</sup> and supported by data collected nationally since 2005, this classification provides the following alternative categories to address varying attitudes towards bicycling in the US. Although a scientific poll has not been conducted to categorize comfort levels of bicyclists or potential bicyclists in Buffalo, the demographic profile of the community and anecdotal evidence suggests that this categorization is also applicable to the city.

- **Strong and Fearless** (less than 1% of population) – Characterized by bicyclists that will typically ride anywhere regardless of roadway conditions or weather. These bicyclists can ride faster than other user types, prefer direct routes and will typically choose roadway connections — even if shared with vehicles — over separate bicycle facilities such as shared use paths.
- **Enthusied and Confident** (5% of population) - This user group encompasses bicyclists who are fairly comfortable riding on all types of bikeways but usually choose low traffic streets or shared use paths when available. These bicyclists may deviate from a more direct route in favor of a preferred facility type. This group includes all kinds of bicyclists such as commuters, recreationalists, racers and utilitarian bicyclists.
- **Interested but Concerned** (approximately 60% of population) – This user type comprises the bulk of the population and represents bicyclists who typically only ride a bicycle on low traffic streets or multi-use trails under favorable weather conditions. These bicyclists perceive significant barriers to their increased use of cycling, specifically traffic and other safety issues. These people may become “Enthusied & Confident” with encouragement, education and experience.
- **No Way, No How** (approximately 35% of population) – People in this category do not ride bicycles for a variety of reasons: they may lack the physical ability to do so or simply do not enjoy riding a bicycle. Some do not because of extreme concern about personal safety. Its unlikely that those within this group will ever ride.



2 Roger Geller, City of Portland Bureau of Transportation, Four Types of Cyclists. 2009  
3 FHWA, Selecting Roadway Design Treatments to Accommodate Bicycles, Publication No. FHWA-RD-92-073. 1994





## DEVELOPING THE NETWORK

The bicycle network was developed through an iterative process. Public input recorded at the July 30th public meeting was combined with information collected through several stakeholder committee meetings in the Fall of 2014. This feedback was combined with data collected through site visits and GIS mapping, Buffalo's existing Bicycle Network Map, and recommendations included in other plans. All of this information was synthesized to develop the **Gap** and **BikeSpace Analysis** maps, which served as the foundation for the network recommendations. After these maps were presented publicly, work began on developing the bicycle network recommendations.

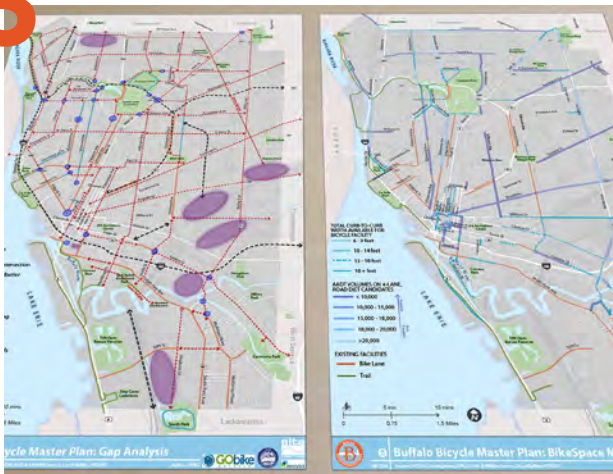
### 1 FIRST PUBLIC MEETING



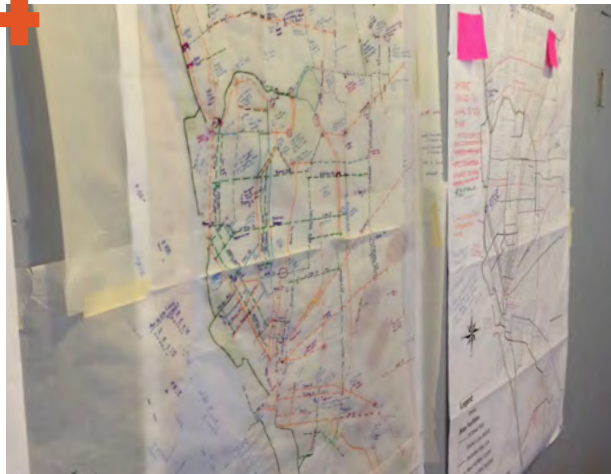
### 2 STAKEHOLDER ENGAGEMENT ROUNDS



### 3 GAP + BIKESPACE ANALYSIS



### 4 NETWORK DEVELOPMENT



### 5 PUBLIC WORKSHOP



### 6 FINAL NETWORK





To develop the network, desire lines between activity generators were identified. Streets that provided access between the generators were studied to determine if they could be dedicated as a bikeway connection. Key streets were designated as bikeway links, and the most appropriate facility type was identified based upon the street's width, traffic volume and roadway context. An initial network map was presented publicly at the Dec 4, 2014 workshop. Afterwards, the network was again revised to include important connections identified by the public.

Consistent with the guiding principle of this planning effort proposed facilities were coded according to the type of bicyclist that would be comfortable biking upon them. Overall, the network was developed so that it would provide access for all types of bicyclists. The graphic below displays the tiers of facilities that comprise the network, each of which accommodates one or more of the types of bicyclists. The network map is displayed on the subsequent page.

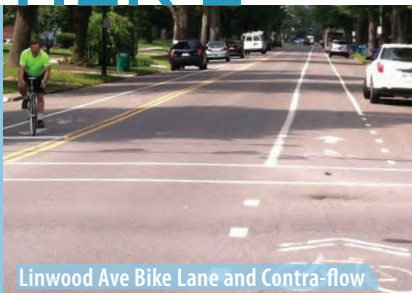
## TIER 1 Interested but Concerned PROTECTED FACILITY



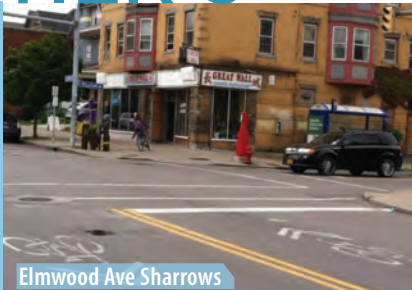
## TIER 1 Interested but Concerned NEIGHBORHOOD BIKEWAY



## TIER 2 Enthused and Confident



## TIER 3 Strong and Fearless





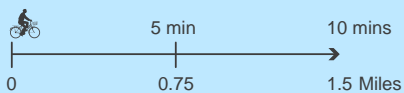
# BUFFALO BICYCLE NETWORK MAP

## PROPOSED FACILITIES

- TIER 1: Interested but Concerned (path/protected facility)
- TIER 1: Interested but Concerned (neighborhood bikeway)
- TIER 2: Enthused and Confident
- TIER 3: Strong and Fearless
- Route for Future Study

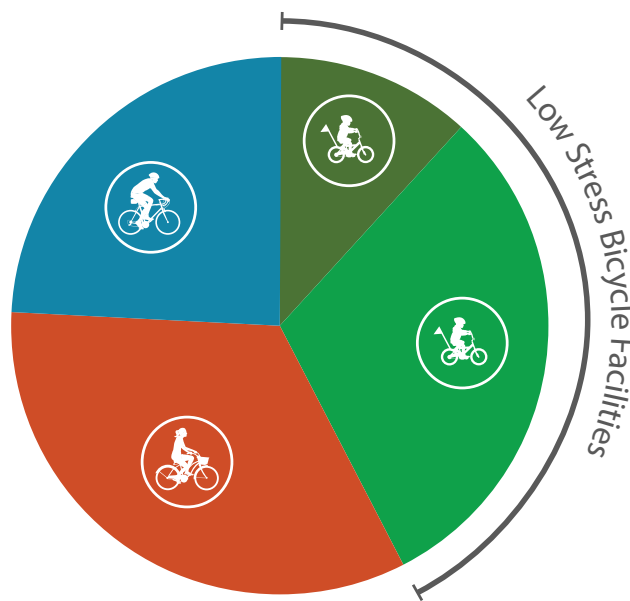
## EXISTING FACILITIES

- Bike Lane
- Shared Lane Marking
- Shared Use Path
- L Bike/Ped Overpass
- ◇ Contra-Flow Bike Lane (existing & proposed)



## VISUALIZING THE NETWORK

One of the primary goals of the Buffalo Bicycle Master Plan Update was to create a range of facilities that would serve all different types of bicyclists. The team carefully analyzed desire lines in the city, and identified streets that could accommodate bicycle facility improvements. Where a desire line existed, and if a street could not accommodate a higher order facility (e.g. protected facility or bike lane), a shared lane marking treatment was recommended. Although this type of facility is designed primarily for the strong and fearless type of bicyclist, shared lane markings help to identify streets as links in the overall bike network, and communicate to drivers to be cognisant of the presence of bicyclists. The graphics below help to visualize the proportion of facilities recommended in this plan by tier, and the types of bicyclists that will be served by the improvements. The lane mileage totals include the Mayor's annual commitment of 10 lane miles per year of bicycle facilities.



Composition of the proposed network by facility type



Interested but Concerned: Protected Facilities

34 mi



Interested but Concerned:  
Neighborhood Bikeway

92 mi



Enthused and Confident

102 mi



Strong and Fearless

72 mi

Lane miles of facilities in the proposed network by type



## RIM-AND-SPOKE VISION

The emphasis for this Buffalo Bicycle Master Plan Update is the development of a long-range plan for a city-wide, on-street bicycle network. Trails are critical links in any city's bicycle network, and existing and proposed trails were an important consideration in the creation of this plan. Through conversations with the public and stakeholders, it became apparent that the near-term focus for trail infrastructure should be placed on improving conditions along the city's existing trails, rather than proposing the construction of new ones.

It is important to recognize that Buffalo does have many rail corridors that could be adaptively repurposed into rail trails. A long term vision for the city is presented at-right to create a rim-and-spoke network --where a connected system of multi-use trails would serve as the rim of the network--and key bikeway corridors would serve as the spokes connecting the rim to downtown. The visionary diagram at right, if implemented, would place Buffalo's on-street bikeway and greenway trail network on par with other world class systems.

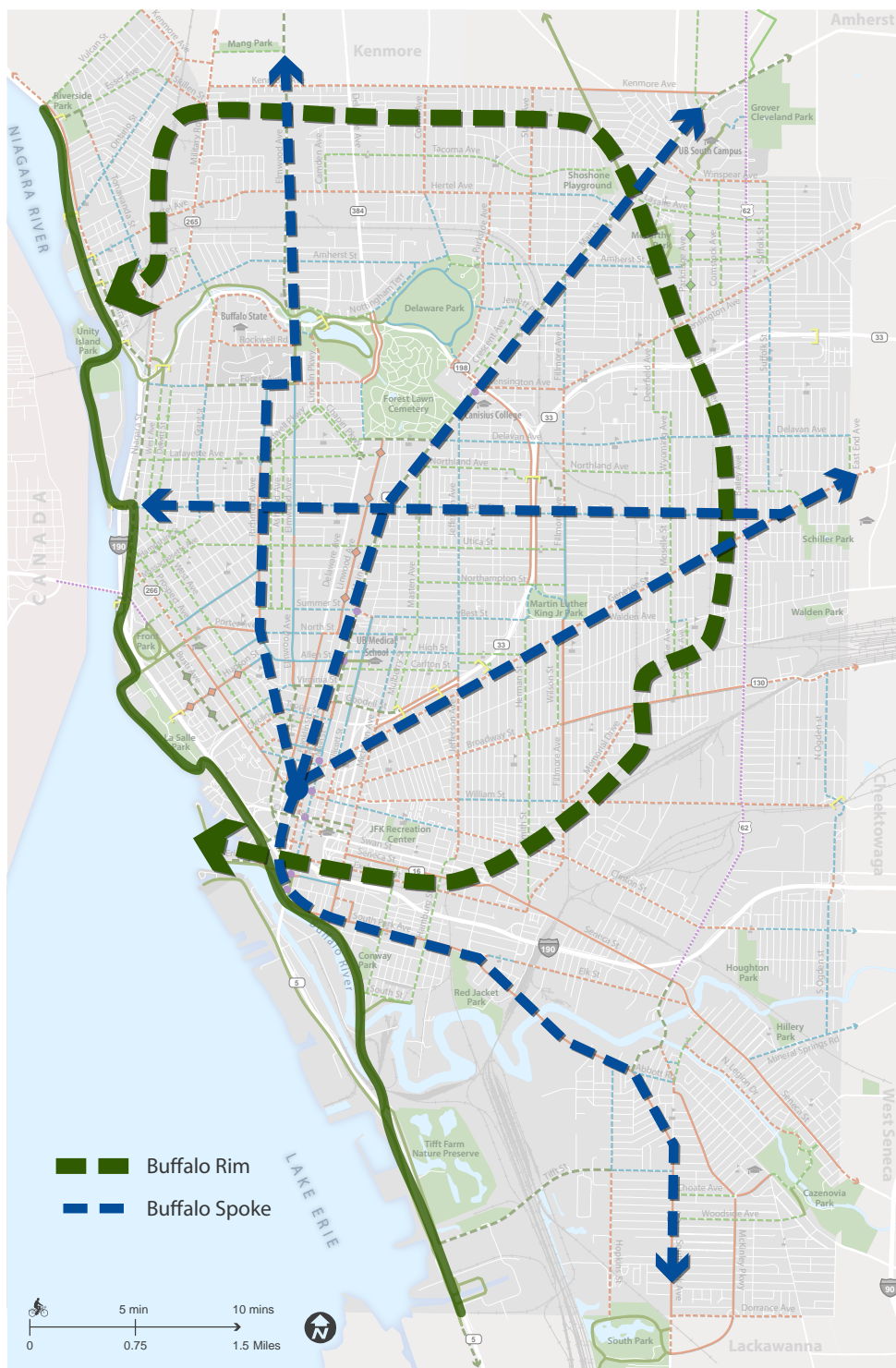
It is important to present this vision in this plan as a desirable future option, and to emphasize that future studies should consider the feasibility of implementing the rim-and-spoke vision.

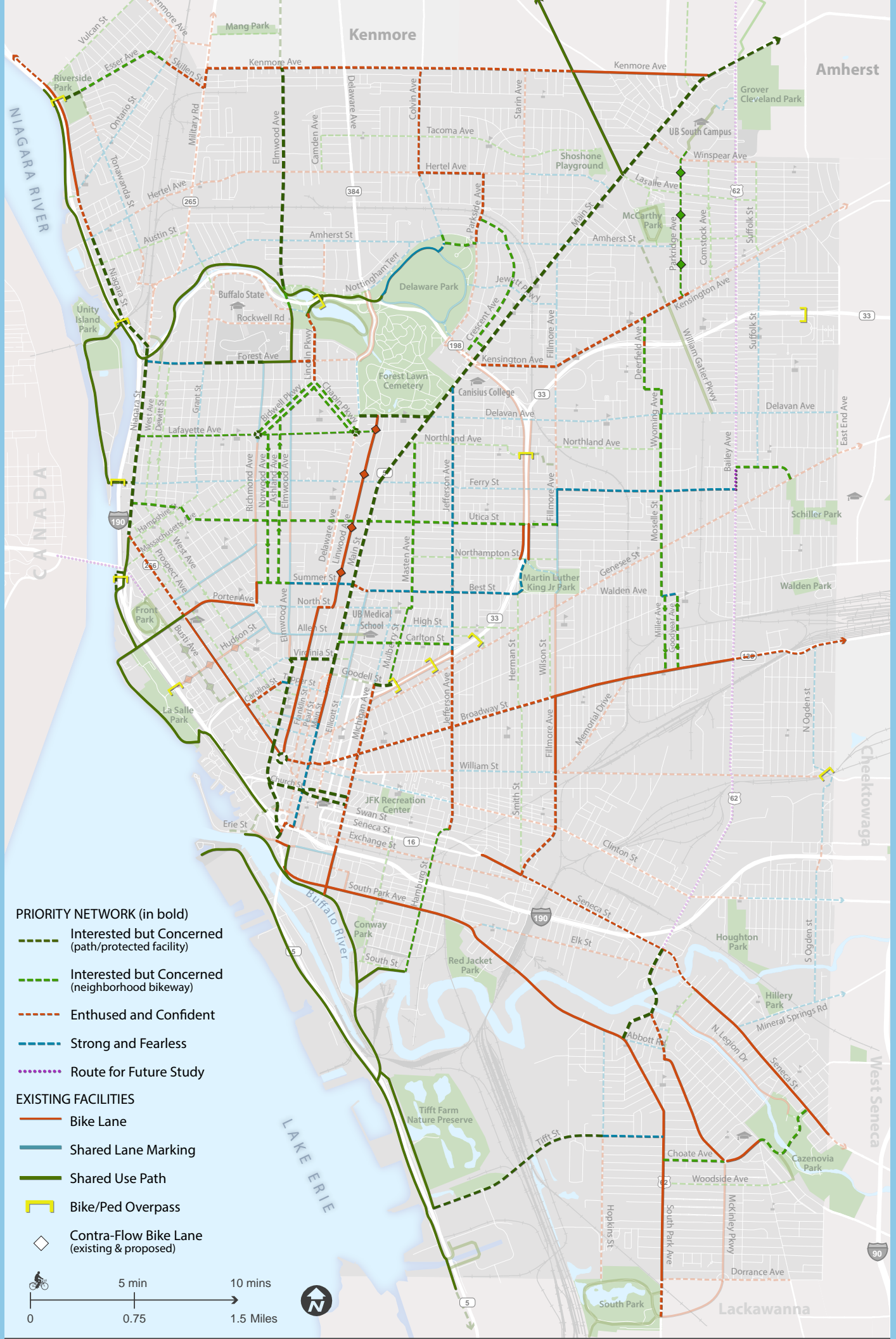
## PRIORITY NETWORK

It is recognized that Buffalo's bike network will be implemented in phases, with some routes identified as higher priorities than others. The planning team combined multiple input sources, including public and stakeholder feedback, to identify the routes that comprise the **Priority Network**. These routes were selected because they fill critical gaps in the existing network, and would provide connectivity to and from Buffalo's major activity generators, including Downtown, neighborhoods, academic institutions and Buffalo's cultural

centers. Due to their importance, the implementation of the Priority Network (displayed on pg 3-9) should be prioritized.

In the following chapter, several smaller links within the Priority Network are identified as Catalyst Projects. These projects were selected because they present particularly challenging design issues that would need to be overcome in order to create a connected Priority Network for the City of Buffalo.







## BICYCLE INFRASTRUCTURE WINTER MAINTENANCE

All of the facilities recommended in the Bicycle Network Map will require year-round maintenance. Buffalo experiences long winters with heavy snow falls. For bicycling to become a viable mode of transportation in Buffalo, accommodating bicycles during the winter months needs to become a City priority. Winter biking maintenance best practices are elaborated upon in [Appendix E](#), where specific details are provided for maintaining bicycle facilities during winter months. General recommendations are included in this section.

The winter maintenance of bikeways and infrastructure (ie: bike racks) should be a planned, regular activity within the city. Bicycles have different winter needs than motor vehicles—for example, less weight and tire surface area means they are more sensitive to snow and ice—and winter roadway maintenance programs

should have specialized practices to respond to these needs.

Given Buffalo's winters, the City should prioritize safe conditions for bicyclists year round. There are different strategies and equipment; however, thoughtful roadway design and a strategic bikeway snow removal and de-icing program that includes snow removal prioritization are key to the safe and comfortable accommodation of bicyclists in the winter. Many separated bicycle facilities are recommended in this plan, and Buffalo should adopt policies which ensure these facilities are made safe for bicyclists year round. Cities around the country that have extensive bicycle networks and also contend with harsh winters have established best practices for the maintenance of separated bicycle facilities that Buffalo can draw from.



Chicago, IL: Small plows/bob-cats clear cycle tracks that are separated from the roadway by bollards. Alternatively, delineator posts can be removed during winter and larger plows clear cycle track and painted buffer areas to the curb



Cambridge, MA: Despite historic volumes of snow in 2015, Cambridge prioritized snow removal on City cycle-tracks using a small bob-cat style plow



Hamilton, ON: Two-way cycle tracks in Hamilton are routinely cleared of snow using plows (source: Norma Moore)



In winter, bicyclists require accessible bike parking. Covered bike parking should be provided at key locations, and property owners and the City should collaborate to ensure clearing of snow

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Introduction

Catalyst Projects  
A-K

# CHAPTER FOUR

## CATALYST PROJECTS

BUFFALO BICYCLE MASTER PLAN





## CATALYST PROJECTS

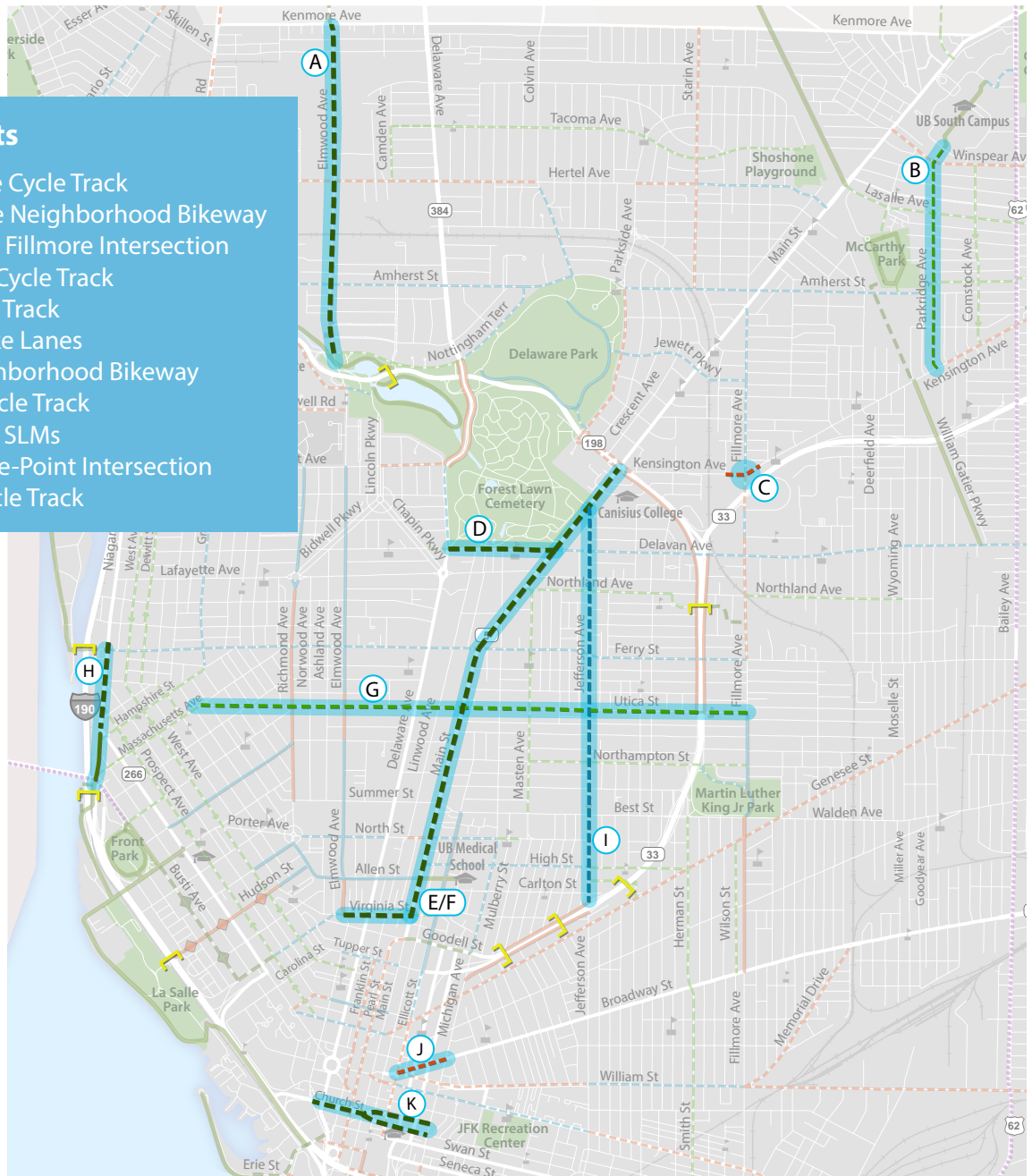
Eleven high priority catalyst projects which will provide critical bikeway connections were identified. This chapter provides design details and cost estimates for the eleven projects. Criteria used to select them include:

- Connections to existing bike facilities
- Opportunity to induce new riders immediately
- Linkage to key destinations
- Equal distribution between east and west side neighborhoods
- Clear support from stakeholders and community members

To determine the appropriate solutions to improve bicycle access for the eleven projects, the consultant team combined field investigation, traffic and GIS research, and innovative bicycle facility design methodologies to produce feasible solutions to the project challenges. The proposed designs will ensure improved comfort and safety for bicyclists along these key connections. The project cut-sheets included in this chapter present detailed information about the proposed facility designs. Each project includes a summary, street cross sections, detailed drawings of key intersections, and in some instances, 3-D photo renderings to help imagine how the future facility would appear. Planning level cost estimates for the projects are provided as well.

### Catalyst Projects

- A: Elmwood Ave Cycle Track
- B: Parkridge Ave Neighborhood Bikeway
- C: Kensington & Fillmore Intersection
- D: Delavan Ave Cycle Track
- E: Main St Cycle Track
- F: Virginia St Bike Lanes
- G: Utica St Neighborhood Bikeway
- H: Niagara St Cycle Track
- I: Jefferson Ave SLMs
- J: Broadway Five-Point Intersection
- K: Church St Cycle Track



The map at right shows the distribution of the 11 Catalyst Projects.

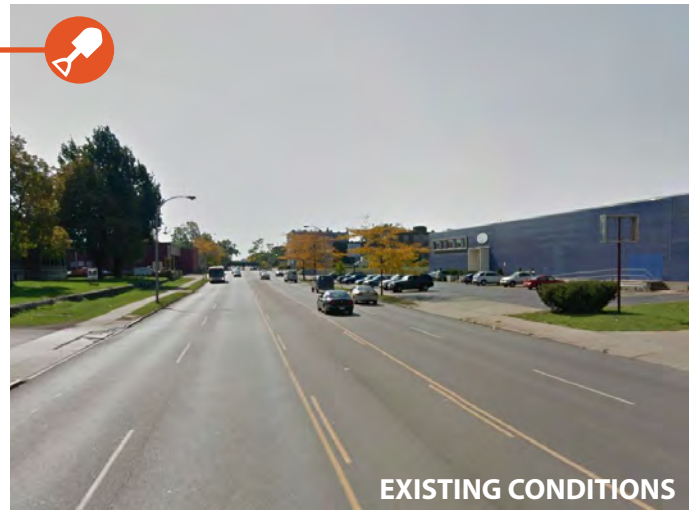


## A: ELMWOOD AVE

This project will create a critical north/south bikeway connection between Delaware Park /SUNY Buffalo State and the proposed bicycle facility enhancements along Elmwood north of Buffalo in Tonawanda. Currently, the five-lane street is an auto-oriented corridor with no bicycle accommodations. Traffic volumes along the length of the project range from 18,000 vpd to more than 20,000 vpd. Within this range, most four or five lane roadways are able to accommodate a reallocation down to three lanes, one in each direction with a center turn lane and right turn lanes at signalized intersections. This provides the spaces for one-way cycle tracks on both sides of the street, and various enhancements at intersections.

### EXISTING ISSUES

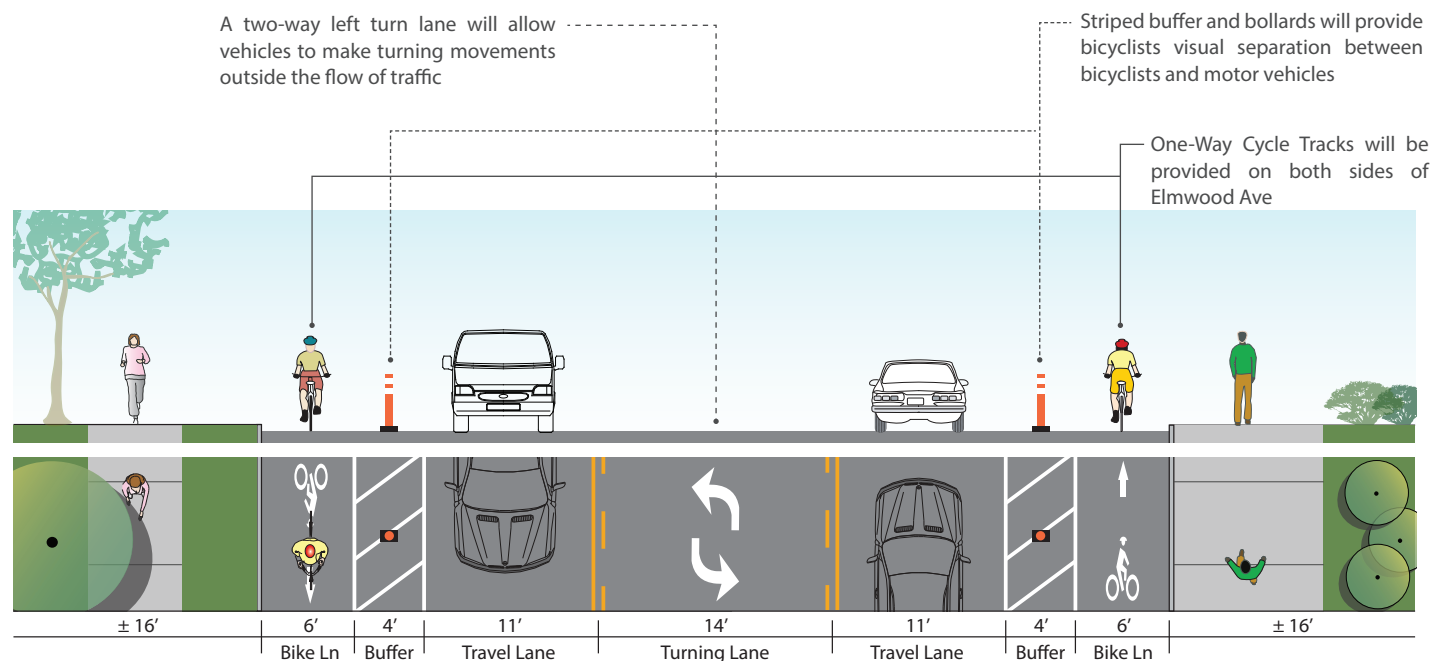
- High traffic volumes and lack of dedicated facilities create an uncomfortable bicycling environment
- No convenient north/south bikeway connection exists between SUNY Buffalo State/ Delaware Park to Tonawanda
- The lane-reduction concept for Elmwood maintains Delaware Avenue as the primary motor vehicle route from Amherst Street and the Delaware Park area of Buffalo to Tonawanda



### WHY IT'S IMPORTANT

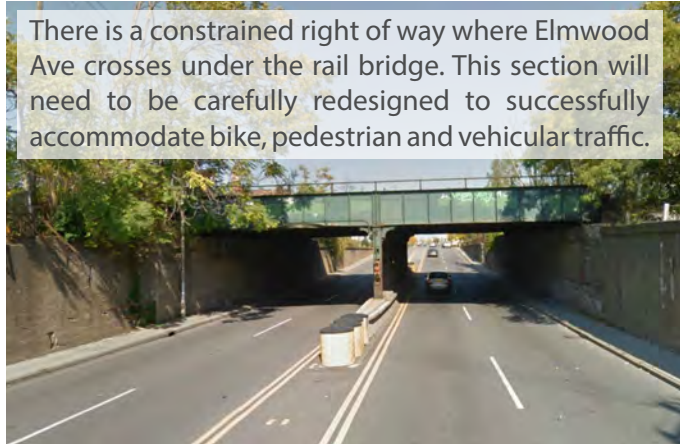
- Will provide safe and convenient bikeway connection between Tonawanda and points north of Buffalo to SUNY Buffalo State/ Delaware Park and points south
- Connection will not only improve biking experience, but can also serve to remake Elmwood Ave into a complete street, which could spur economic development along the corridor

### PROPOSED CROSS SECTION - AT MIDBLOCK



Existing ROW Width: 88 feet | Existing Curb-to-Curb Width: 56 feet

## CONSTRAINED RIGHT-OF-WAY

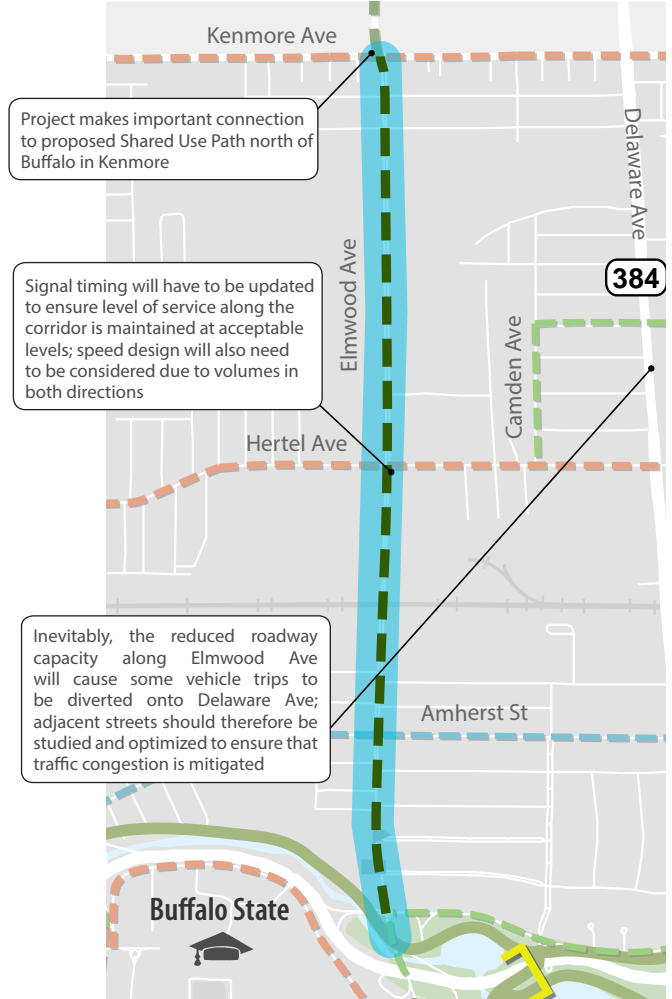


There is a constrained right of way where Elmwood Ave crosses under the rail bridge. This section will need to be carefully redesigned to successfully accommodate bike, pedestrian and vehicular traffic.

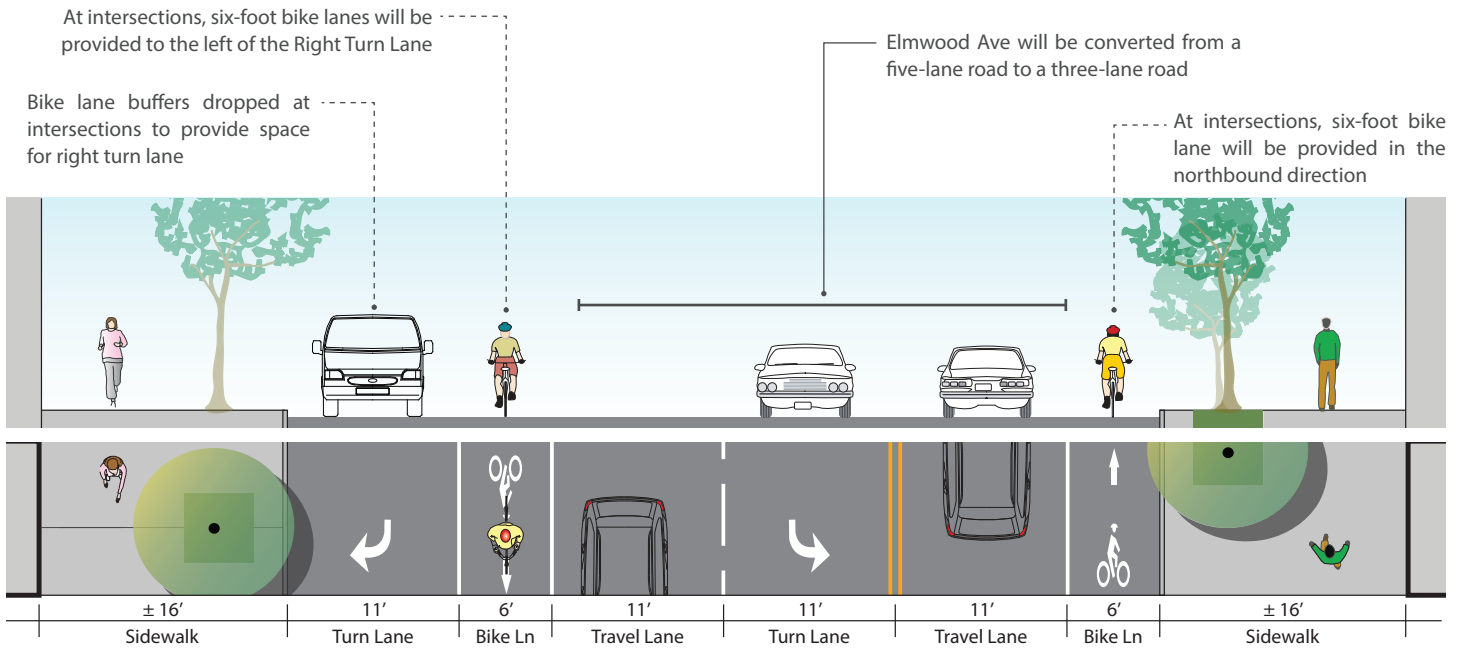
## COST ESTIMATE

1. Roadway Striping, Markings and Signage	\$122,000
2. Delineator Posts/Bollards	\$62,250
<b>Sub Total</b>	<b>\$184,200</b>
3. Additional Costs	+33%
<b>Total</b>	<b>\$245,018</b>

## PROJECT AREA



## PROPOSED CROSS SECTION - AT SIGNALIZED INTERSECTION



Existing ROW Width: 88 feet | Existing Curb-to-Curb Width: 56 feet

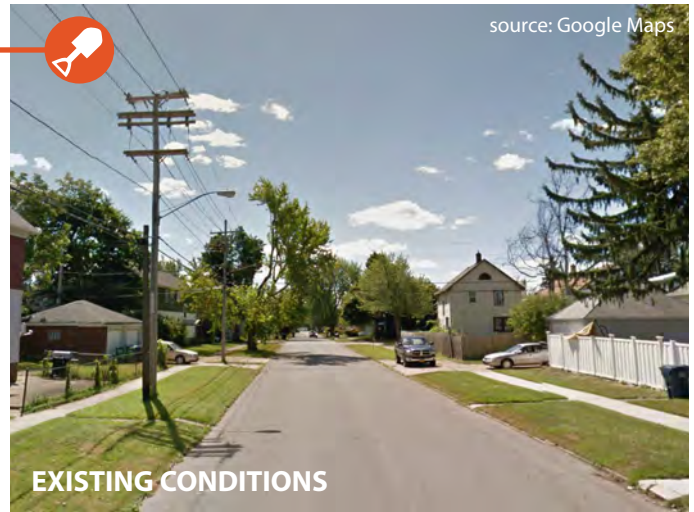


## B: PARKRIDGE AVE

This project would provide a key connection from the UB South Campus to the proposed bicycle facilities along Kensington Ave. The low vehicle volumes (<3000-5000 ADT) and restricted parking along on the west side of Parkridge present an opportunity to create a safe and comfortable bicycle facility. The proposed design includes a contra-flow bike lane in the south bound direction, and shared lane markings (or “sharrows”) north bound. “Bike may use full lane” and other wayfinding signs would be installed to help guide users along the corridor towards the proposed facility on Kensington. The installation of traffic calming treatments would further improve the bicycling experience along Parkridge.

### EXISTING ISSUES

- There is no existing bikeway connection from the UB South Campus to downtown
- Lack of parking on the west side of the street creates effectively wide travel lanes. Wide travel lanes have been cited as contributing to higher overall speeds when compared to narrow travel lanes



### WHY IT'S IMPORTANT

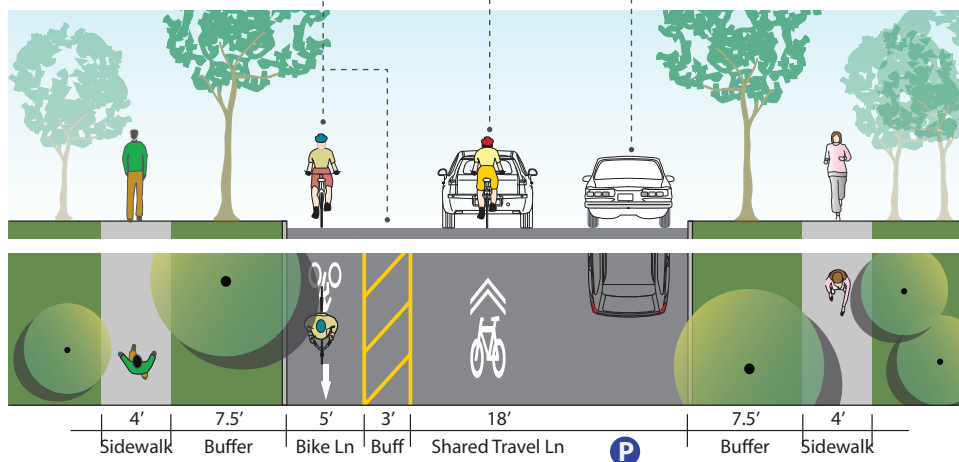
- Would create a strong connection between UB South Campus and the proposed facility on Kensington Ave
- Would delineate travel lanes along the street, reducing the width of the vehicular lanes. This would likely have the effect of moderating overall travel speeds along the street, creating a more comfortable environment for bicyclists, pedestrians and neighborhood residents

### TYPICAL PROPOSED CROSS SECTION

Since parking is restricted on the west side of the street, the excess pavement width can be converted into a contra-flow bike lane and three foot buffer

The north bound lane will be marked with shared lane markings to reinforce that motorists need to share the road with bicyclists

Parking will be retained on the east side of the road



Existing ROW Width: 49 feet | Existing Curb-to-Curb Width: 26 feet

## NEIGHBORHOOD BIKEWAY DESIGN STRATEGY

While no federal guidelines exist, several best practices have emerged for the development of neighborhood bikeways. At a minimum, neighborhood bikeways should include distinctive pavement markings and wayfinding signs. They can also use combinations of traffic calming, traffic diversion, and intersection treatments to improve the bicycling environment. The appropriate level of treatment to apply is dependent on roadway conditions, particularly motor vehicle speeds and volumes. Traffic conditions on neighborhood bikeways should be monitored to provide guidance on when and where treatments should be implemented. When motor vehicle speeds and volumes or bicyclist delay exceed the preferred limits, additional treatments should be considered for the neighborhood bikeway.

The neighborhood bikeway 'toolbox' includes:

1. Effective Wayfinding through Signs + Pavement Markings
2. Speed and Volume Management
3. Intersection Design + Management

### Signage



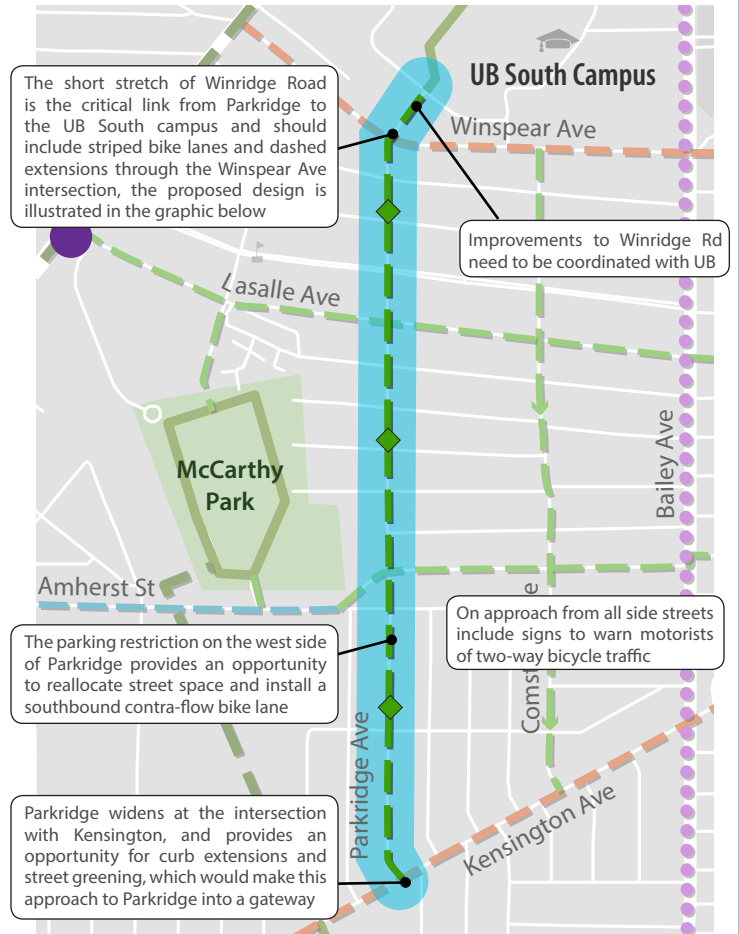
### Pavement Markings



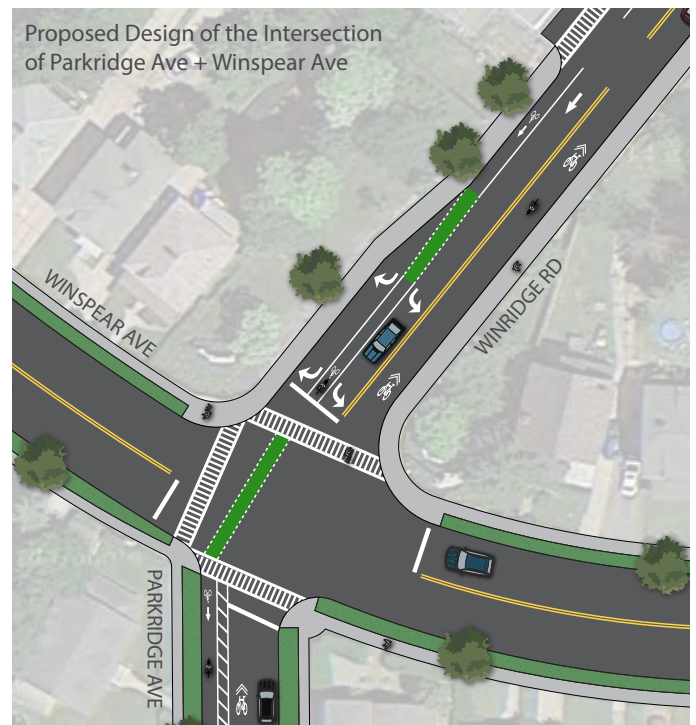
### Traffic Diversion



## PROJECT AREA



## KEY INTERSECTION



## COST ESTIMATE

1. Roadway Grinding, Restriping & Signage	\$39,500
2. Bicycle Signalization	\$14,000
<b>Sub Total</b>	<b>\$53,500</b>
3. Additional Costs	+33%
<b>Total</b>	<b>\$72,500</b>



## C: KENSINGTON/FILLMORE INTERSECTION

The intersection of Kensington Ave and Fillmore Ave is a critical link along the future bikeway corridor, but is difficult to navigate for all travel modes. In the west bound direction, there are six travel lanes on the approach to Fillmore, plus an additional four in the east bound direction. This creates a large expanse of pavement and a long exposure time for bikes and pedestrians crossing Kensington. Longer crossing exposure times increase bike/pedestrian/motor vehicle conflicts, and can increase the probability of crashes. With approximate AADT between 5,000 - 10,000 vpd, Kensington has excess capacity, and a road diet is recommended for the corridor. This will provide additional street space that can be converted into bicycle facilities.



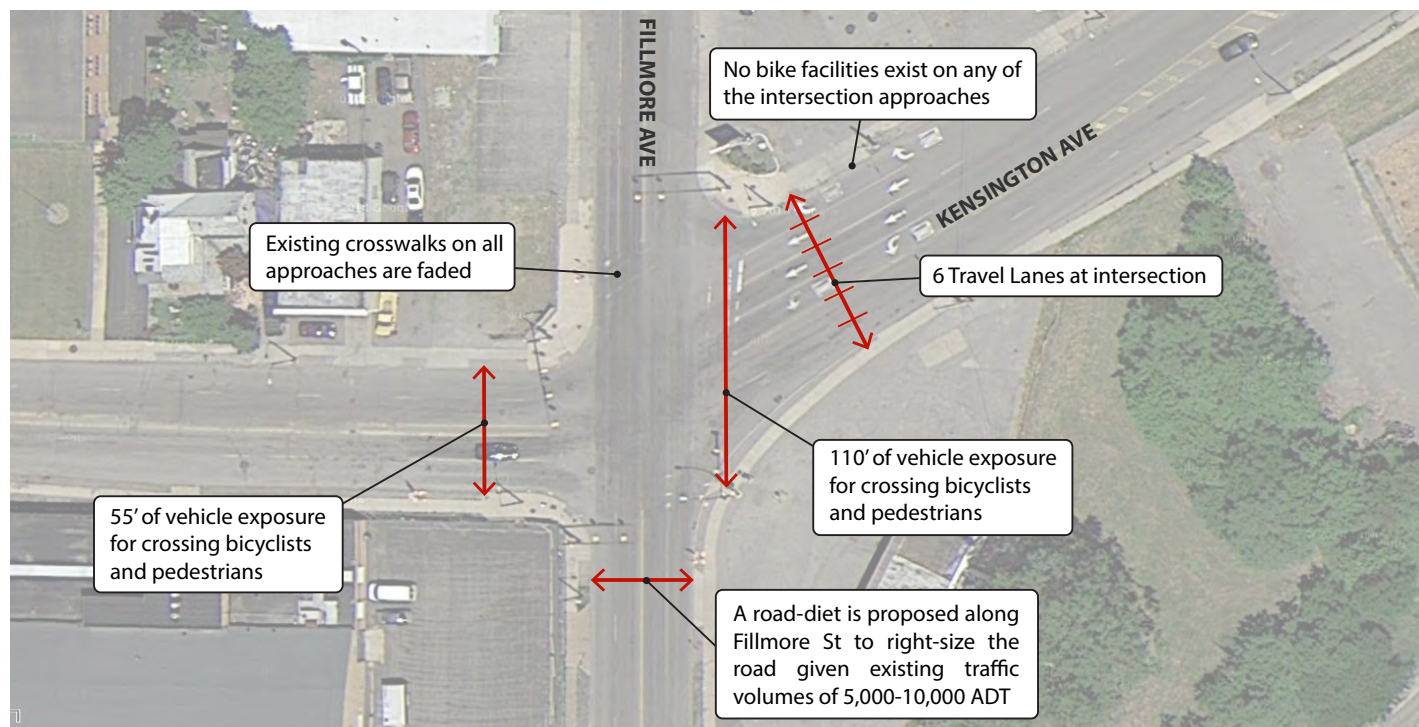
### EXISTING PROJECT ISSUES

- Long crossing distances are correlated with higher likelihood of bike and pedestrian injuries
- Roads that are constructed to carry more vehicles than travel upon them (i.e. roads that are over-built or have excess capacity) are correlated with elevated overall travel speeds
- The intersection is confusing and difficult to navigate for all modes of travel

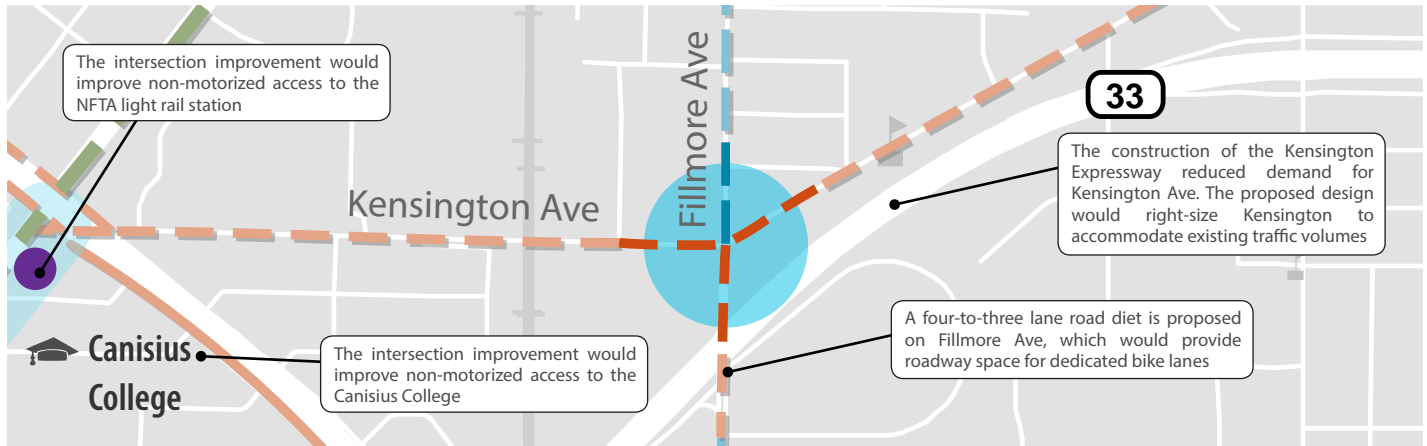
### WHY IT'S IMPORTANT

- Intersection improvements will reduce bicycle and pedestrian exposure times, improving safety
- Intersection improvements will make the crossing more logical
- The road will be 'right-sized' for existing traffic volumes, improving the flow of traffic along Kensington Ave
- Future bike lane along Kensington Ave will be provided, improving safety and comfort

### EXISTING INTERSECTION CHALLENGES



## PROJECT AREA

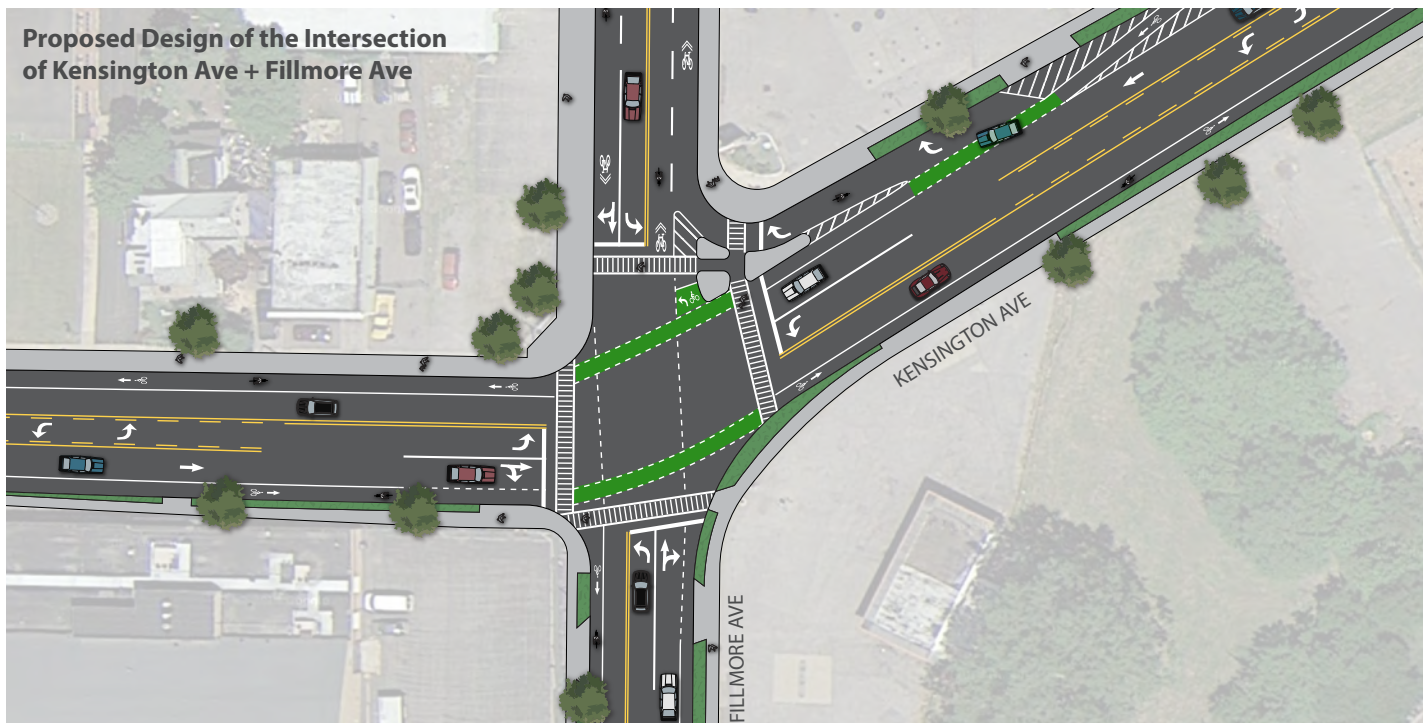


Green pavement markings help to identify conflict areas between bicyclists and motor vehicles. This treatment is especially effective where vehicles cross a bike lane to make right-hand turns, as shown in the image above.

## COST ESTIMATE

1. Roadway Grinding, Restriping & Signage	\$20,500
2. Intersection Refuge Islands	\$26,000
<b>Sub Total</b>	<b>\$46,500</b>
3. Additional Costs	+33%
<b>Total</b>	<b>\$63,000</b>

## PROPOSED INTERSECTION DESIGN





## D: DELAVAN AVE CYCLE TRACK

Delavan Ave presents a key east-west bikeway connection south of Forest Lawn Cemetery. Currently, this section of the street consists of a wide (50') two-lane road, with an unmarked parking lane on the south side. The proposed design includes a two-way cycle track on the north side of the road, which would effectively narrow the vehicle travel lanes. This would help to calm traffic along the corridor and improve traffic flow along this section of Delavan Ave.

On the west edge of the project area, non-motorized access to the cemetery is complicated by the long north-south crossing of Delavan at Delaware Ave. The proposed design would improve this crossing.



### EXISTING ISSUES

- This section of Delavan Ave consists of a wide street, with wide travel lanes that contribute to higher overall travel speeds
- Crossing Delavan to Forest Lawn Cemetery is challenging for bicyclists and pedestrians

### WHY IT'S IMPORTANT

- Narrower travel lanes will help to traffic calm on the street and improve traffic flow
- The project will include improvements to the intersection of Delavan and Delaware Ave, which will improve non-motorized crossings in all directions
- The proposed cycle track will provide a key east/west bikeway connection between Main Street and Elmwood Village

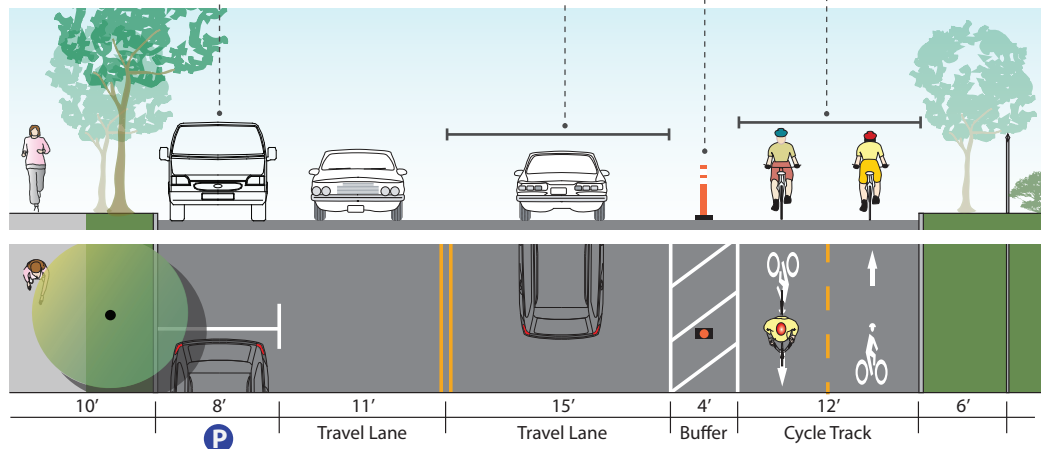
### TYPICAL PROPOSED CROSS SECTION

Parking will be retained on the south side of the street

15' west bound travel lane provides extra space for left-turning vehicles to allow thru vehicles to pass

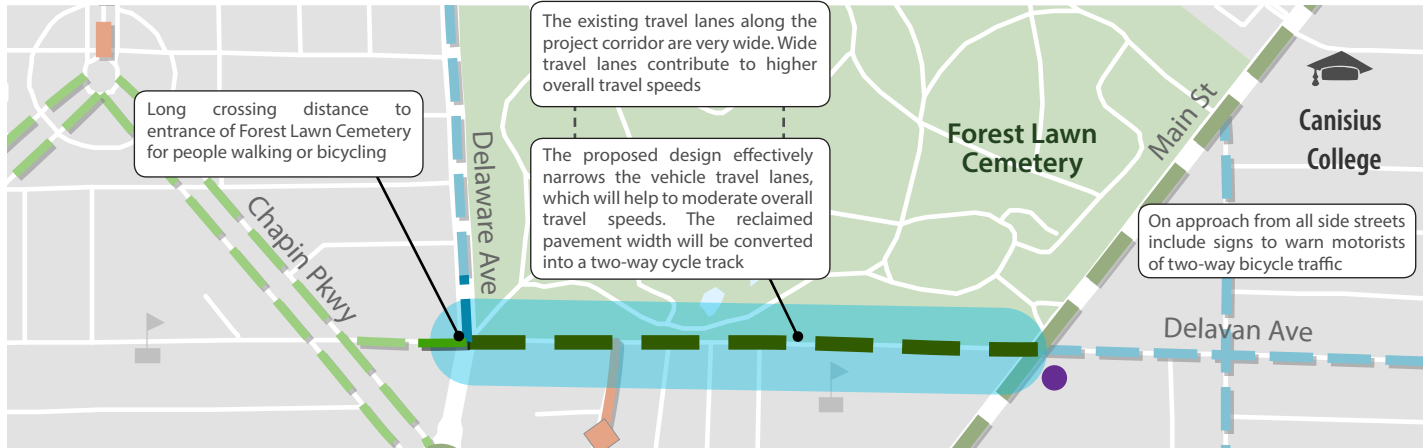
Flexible bollards and a striped buffer will provide strong visual separation from motor vehicles

Two-way cycle track will be installed on the north side of the road



Existing ROW Width: 66 feet | Existing Curb-to-Curb Width: 50 feet

## PROJECT AREA

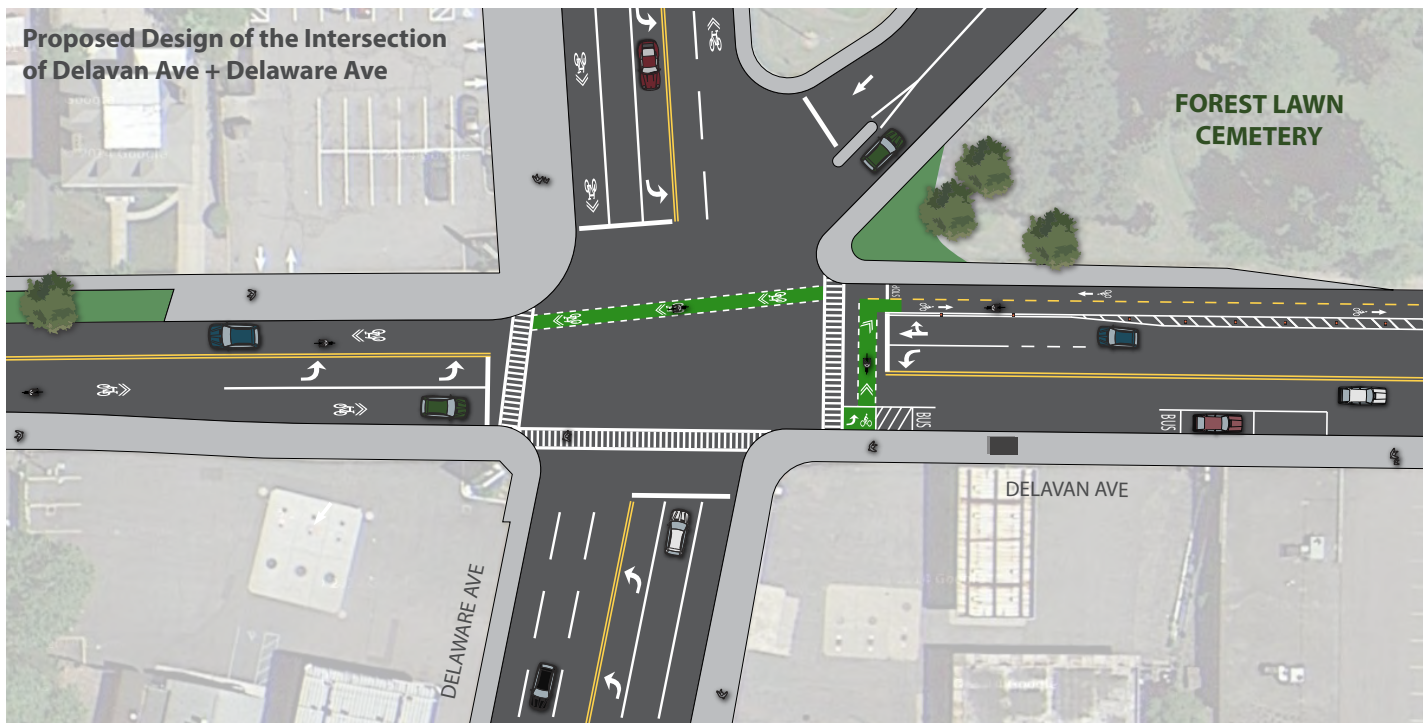


Two-stage turn queue boxes provide a holding area for bicyclists to queue, allowing them to cross an intersection in two stages. This crossing pattern is more comfortable, especially for less experienced bicyclists

## COST ESTIMATE

1. Roadway Grinding, Restriping, Signage & Bollards	\$46,800
2. Bicycle Signalization	\$14,000
3. Delavan/Delaware Bike and Ped Intersection Improvements	\$43,600
<b>Sub Total</b>	<b>\$104,300</b>
4. Additional Costs	+33%
<b>Total</b>	<b>\$141,600</b>

## PROPOSED INTERSECTION DESIGN







## E: MAIN ST CYCLE TRACK

Main Street is the most direct at-grade route for people travelling from many areas of Buffalo to Downtown. It also serves as the cross-road between East and West Buffalo. The significance of this road and the role that it plays in Buffalo's transportation network makes it a critical bikeway link. The current design of the corridor makes it an auto-dominated thoroughfare, and the proposed design would reshape the character of the road, making it a Complete Street that better serves all modes of travel. The road would be converted from a five/six lane road to a three/ four lane road. A two-way cycle track is proposed for the west side of the road, which would serve as the primary north/south protected facility for Buffalo. Intersection improvements along the corridor are proposed as well.

### EXISTING ISSUES

- Main St is an auto-dominated thoroughfare but the most direct route to downtown
- The five/six lane roadway is far below capacity for the current traffic volumes that range from 15,000 to more than 18,000 AADT
- The high traffic volumes and absence of dedicated bicycle facilities makes biking along Main St uncomfortable, even for experienced bicyclists
- Mill-and-overlay is highly desirable within the cycle-track zone and buffer

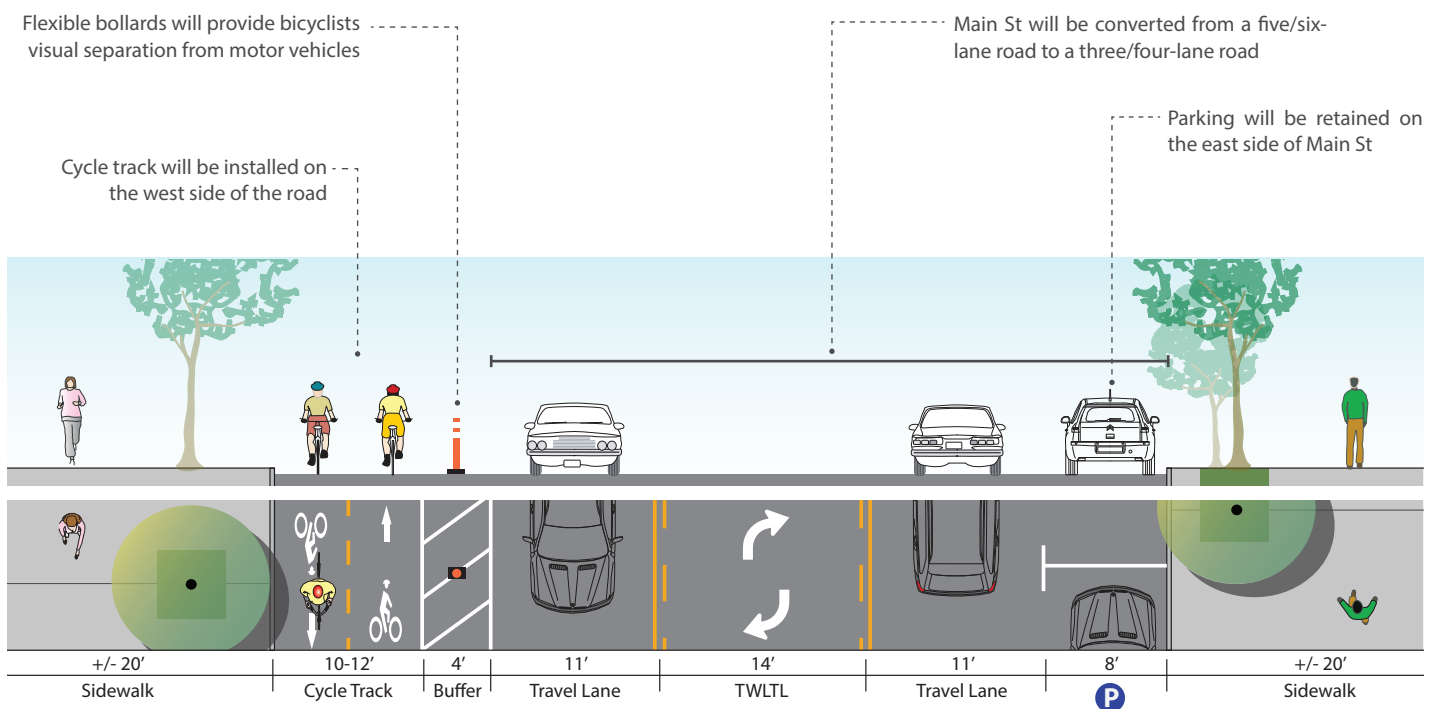


EXISTING CONDITIONS

### WHY IT'S IMPORTANT

- Would provide critical north/south bikeway connection for the City and connect to Metro stations
- Repeatedly cited as the most important project by the public
- Would provide North/South access for neighborhoods in East and West Buffalo
- Would change the character of Main St, converting it into a complete street that encouraged walking and biking

### TYPICAL PROPOSED CROSS SECTION

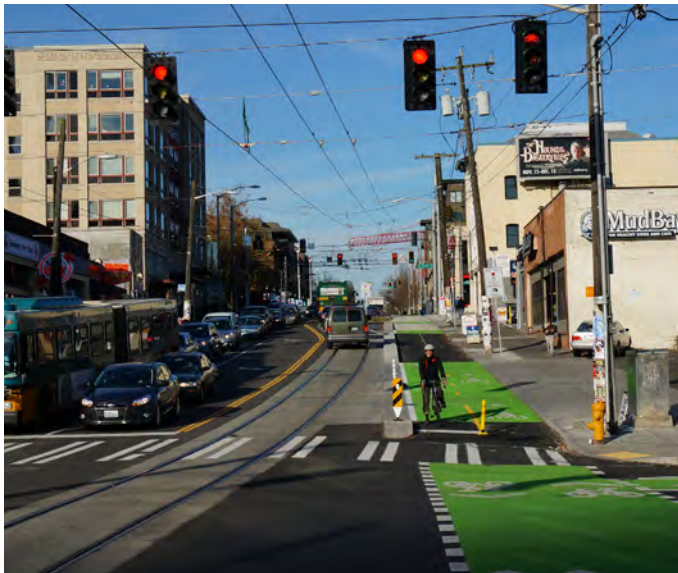


## REPRESENTATIVE PROJECTS



Source: Midtown Alliance

Two-way cycle tracks have been successfully implemented across the United States; this image shows the 10th St cycle track in Atlanta, GA, which is similar in dimension to the proposed cycle track on Main St

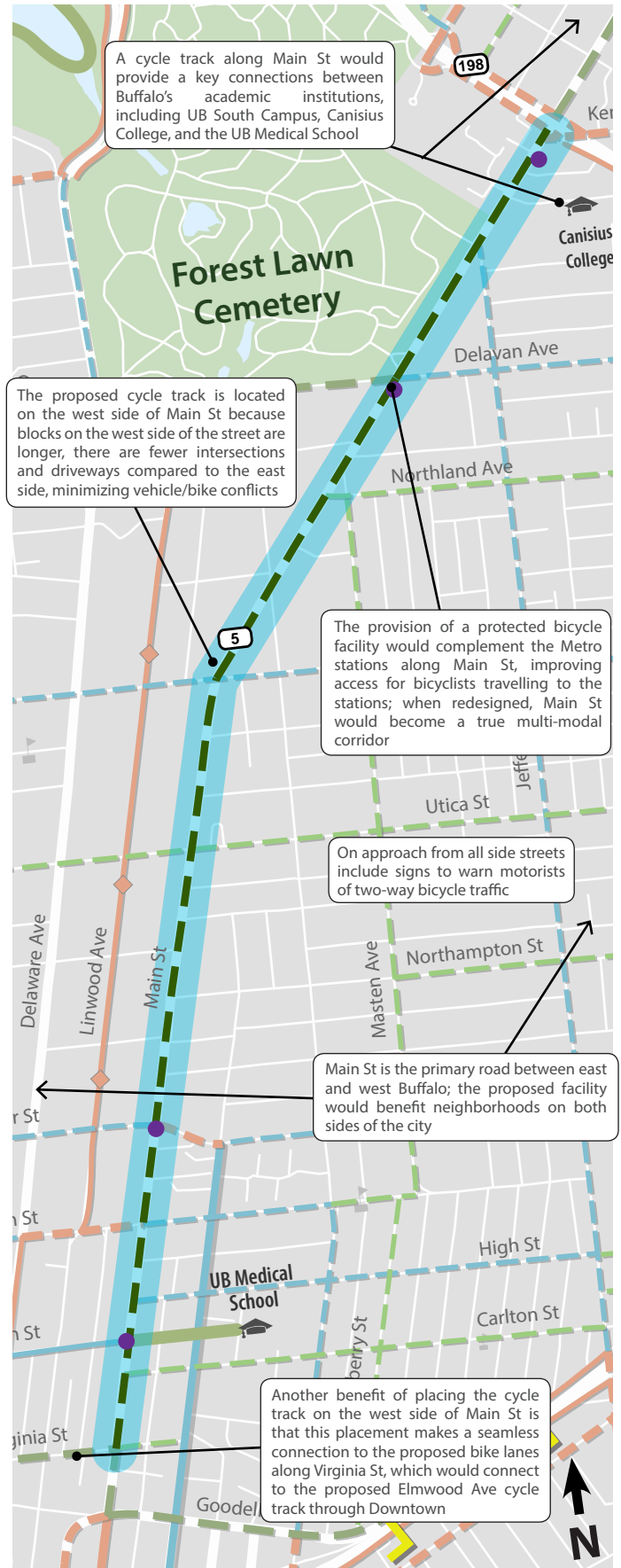


Green pavement markings help to identify conflict areas between bicyclists and motorists; this type of treatment has been widely adopted, as shown above in Broadway cycle track in Seattle, WA

## COST ESTIMATE

1. Roadway Grinding, Restriping, Signage & Bollards	\$280,000
2. Bicycle Signalization	\$112,000
3. Mill and Overlay Cycle Track	\$336,700
<b>Sub Total</b>	<b>\$728,800</b>
4. Additional Costs	+33%
<b>Total</b>	<b>\$989,000</b>

## PROJECT AREA



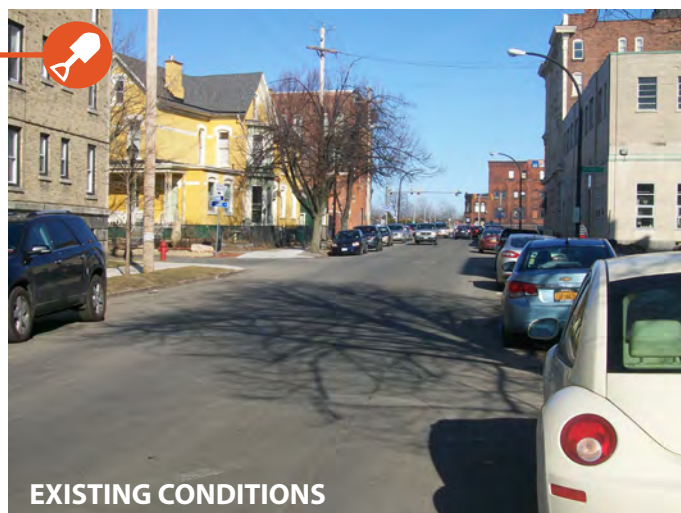


## F: VIRGINIA ST BIKE LANES

Virginia St provides connectivity between two interested but concerned corridors in the city, Main St and Elmwood Ave. The important link that Virginia serves entails that the proposed bicycle facility along it be designed to accommodate a wide range of bicyclists. If the street cross-section was to remain as is, with on-street parking and two travel lanes in both directions, there would not be enough roadway space for the installation of bike lanes. The proposed design converts Virginia St into a one-way street eastbound. This configuration provides additional street space that can fit a conventional bike lane east bound, and a contra-flow bike lane west-bound, permitting two-way bicycle travel. When Virginia St is converted into a one-way, east bound street, it will form a couplet with west-bound Edward Street, a block to the south. Before this change is made, however, additional community outreach will be required to ensure the new traffic flow functions well for the neighbors and businesses in the immediate area.

### EXISTING PROJECT ISSUES

- No bikeway connection exists
- Posses a barrier to bicycling



EXISTING CONDITIONS

### WHY IT'S IMPORTANT

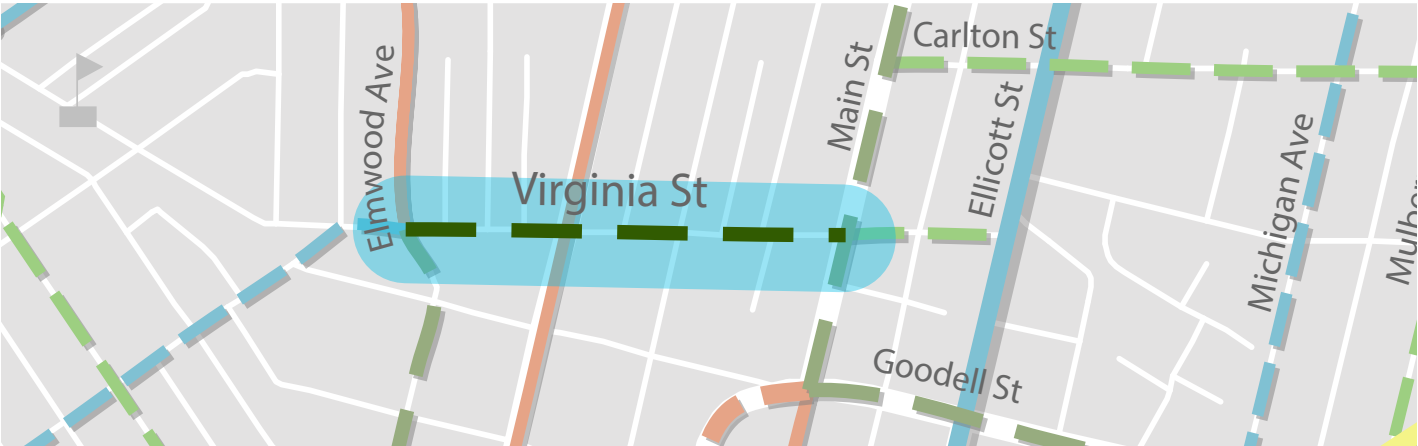
- Represents an important bikeway connection
- Would provide comfortable, two-way bicycle travel
- Would provide critical link between two interested but concerned facilities along Main St and Elmwood Ave

### PHOTO SIMULATION

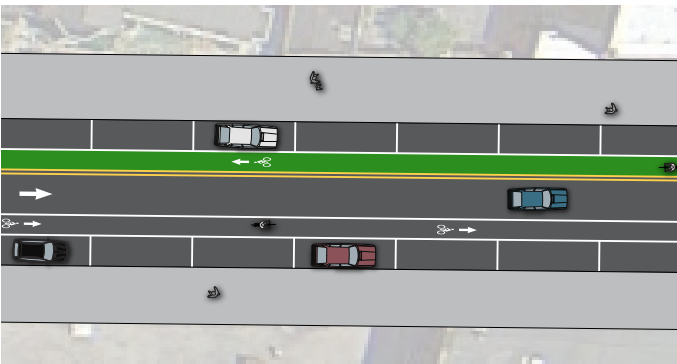


Virginia Street looking east to the Main Street intersection

# PROJECT AREA



# MIDBLOCK DESIGN

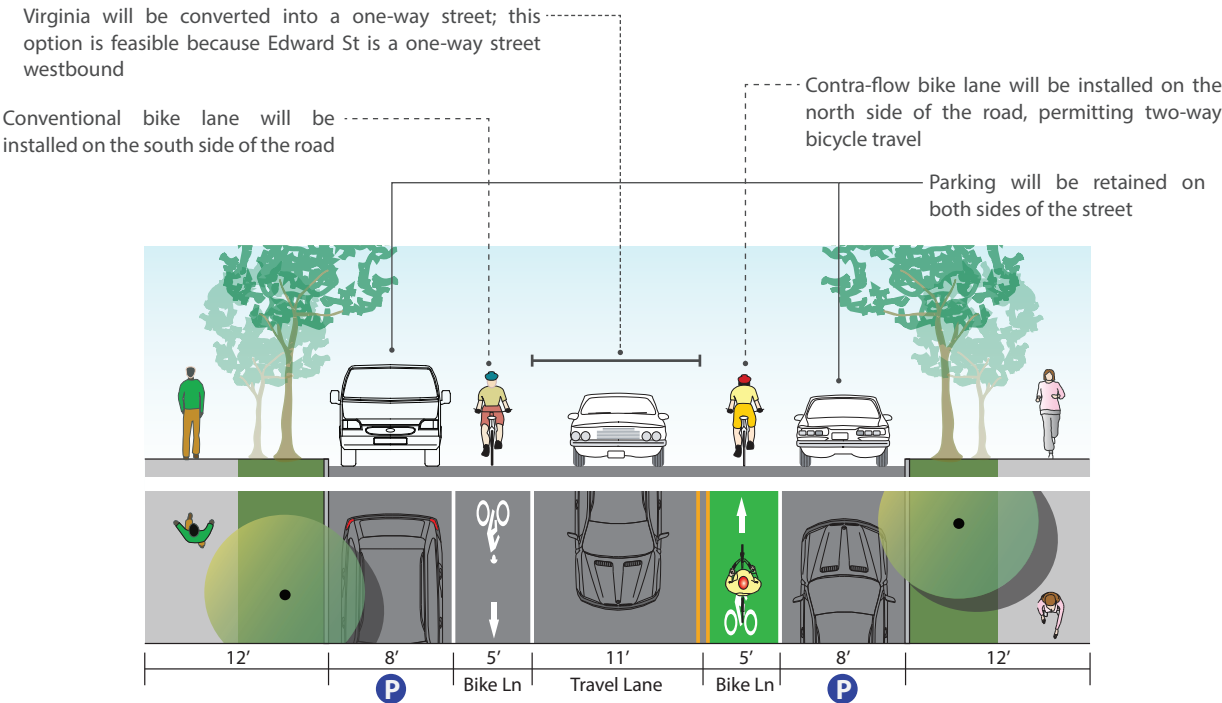


The proposed design converts Virginia into a one-way street eastbound; the reclaimed pavement width will be converted into a bike lane eastbound and a contra-flow bike lane west bound, while retaining parking

# COST ESTIMATE

1. Roadway Striping & Signage	\$62,100
2. Bicycle Signalization	\$21,000
<b>Sub Total</b>	<b>\$83,100</b>
3. Additional Costs	+33%
<b>Total</b>	<b>\$112,800</b>

# TYPICAL PROPOSED CROSS SECTION



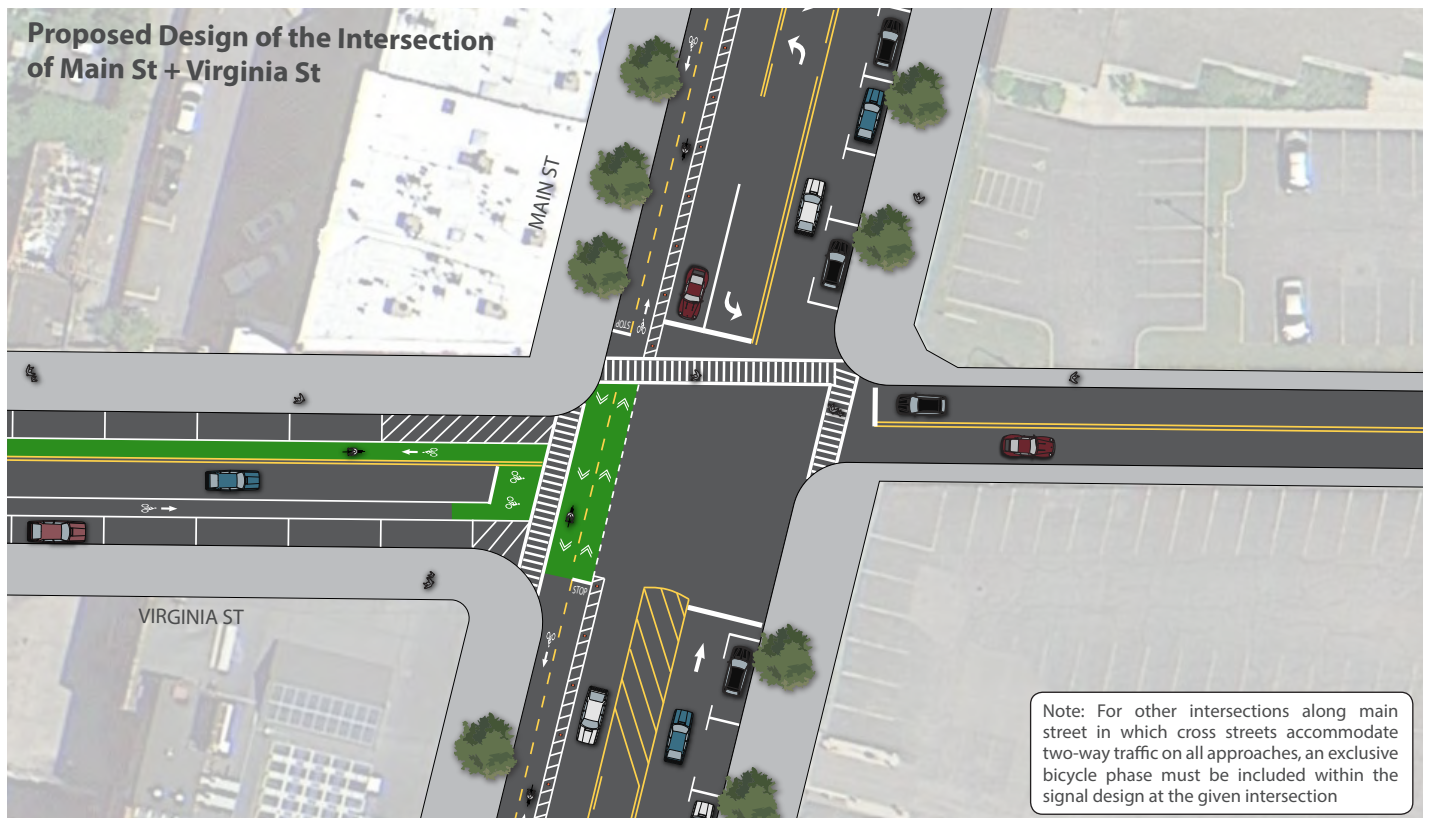
Existing ROW Width: 61 feet | Existing Curb-to-Curb Width: 37 feet



## E/F: MAIN ST + VIRGINIA ST INTERSECTION



### INTERSECTION DESIGN - MAIN ST SOUTH



## G: UTICA ST

Utica St represents a key east/west bikeway corridor. The directness of Utica St, combined with low traffic volumes ranging from <3,000-5,000 ADT, makes it an appealing candidate for conversion into a neighborhood bikeway.

Ideally, neighborhood bikeways should carry less than 3,000 vpd. Given that Utica St currently carries up to 5,000 vpd, it is proposed that traffic calming and potential traffic diversion treatments be implemented along the corridor to slow traffic down and potentially to divert traffic to parallel routes, such as Ferry St, decreasing traffic volumes. Options for converting Utica St into a neighborhood bikeway are presented on the following pages.



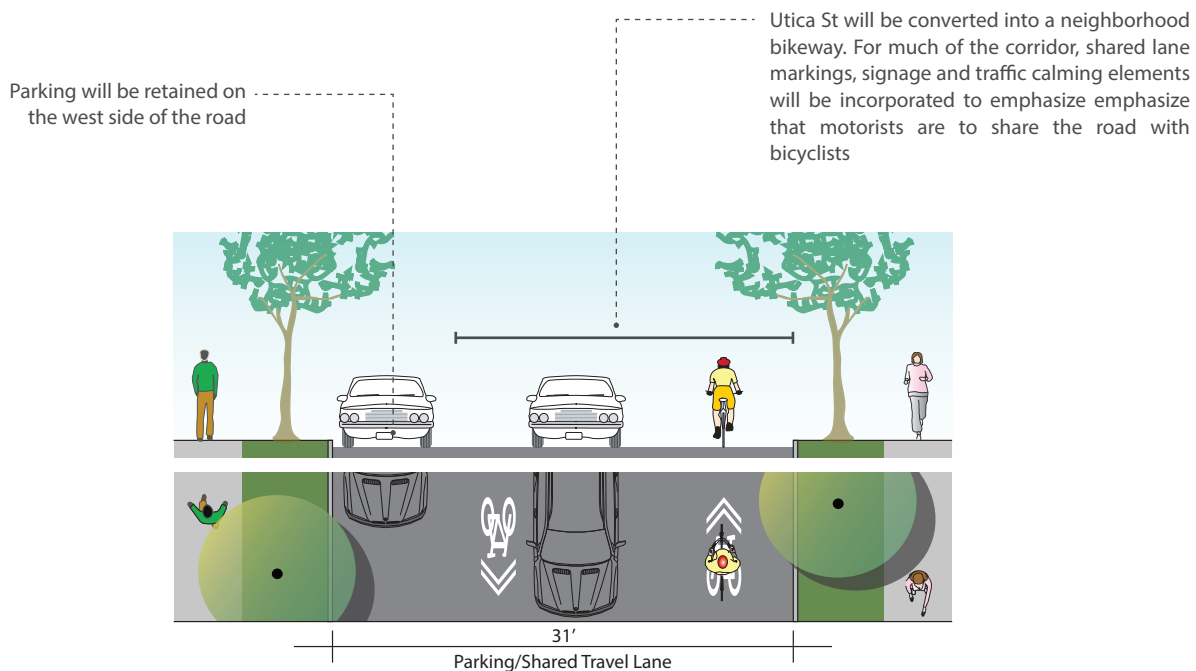
### EXISTING ISSUES

- There is no convenient and direct east/west bikeway
- Traffic volumes along Utica St are higher than the 3000 vpd threshold that is ideal for shared-street bicycling environments
- The higher than ideal traffic volumes can be mitigated by reducing the posted speed limit, ideally to 20 mph

### WHY IT'S IMPORTANT

- Will provide a key all ages and abilities east/west bikeway connection
- Will traffic calm the corridor, moderate vehicle speeds and improve the bicycling experience along Utica St
- The effects of traffic calming will benefit neighborhood residents, making the street safer for all modes

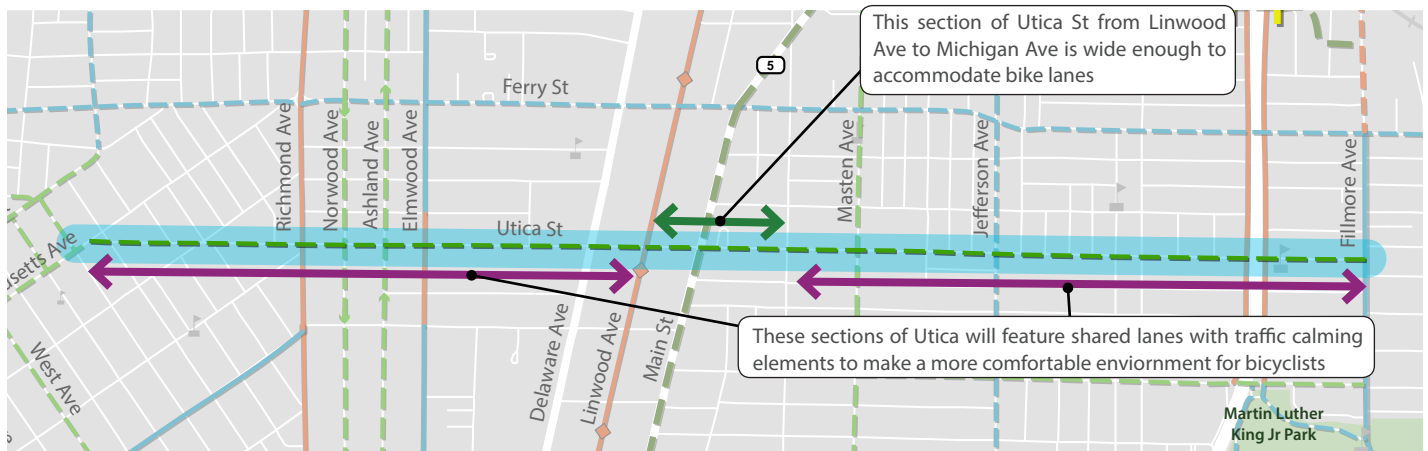
### TYPICAL PROPOSED CROSS SECTION



Existing ROW Width: 66 feet | Existing Curb-to-Curb Width: 31 feet

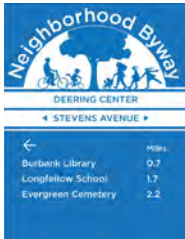


## PROJECT AREA



## OTHER COMPONENTS OF NEIGHBORHOOD BIKEWAYS

### Signage



Source: Portland, ME

Neighborhood Bikeways should be branded with unique stencils, "Neighborhood Bikeway" signs or custom street-sign toppers

### Pavement Markings



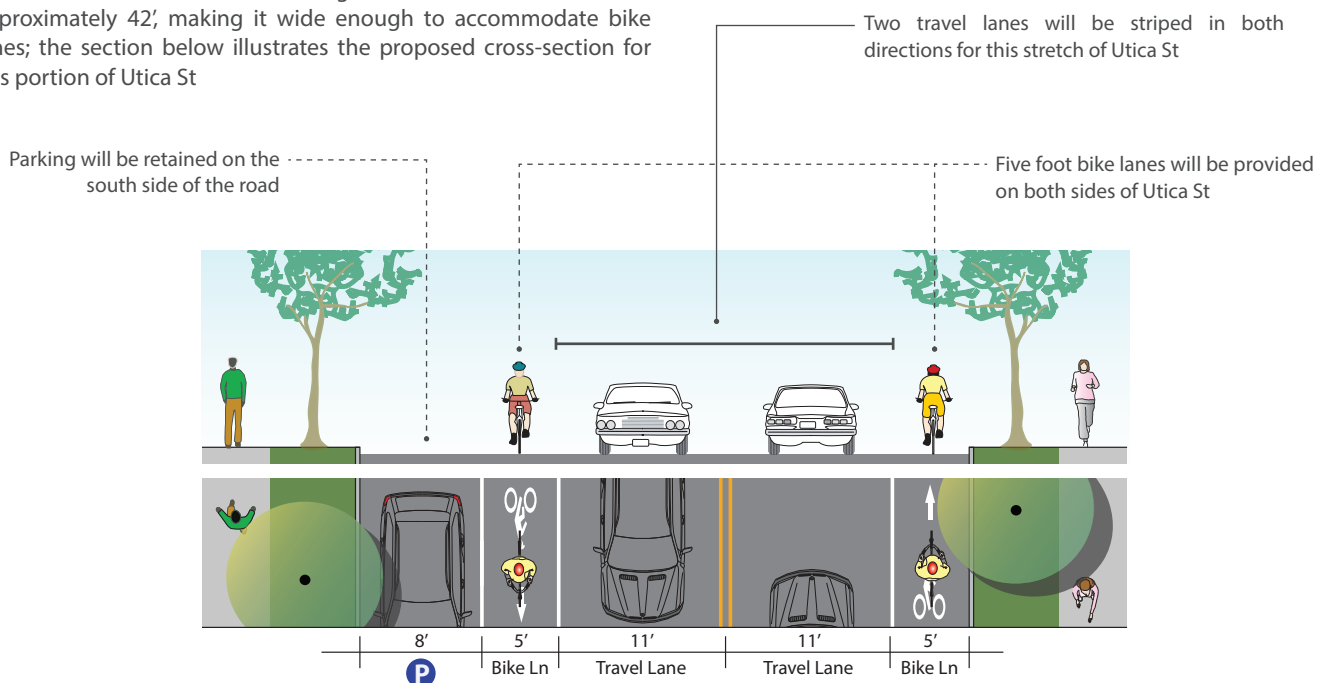
Shared Lane Markings encourage motorists to share the road

## COST ESTIMATE

1. Pavement Markings, Signage & Traffic Calming Elements	\$131,900
2. Section of Bike Lane	\$9,300
<b>Sub Total</b>	<b>\$141,200</b>
3. Additional Costs	+33%
<b>Total</b>	<b>\$191,700</b>

## PROPOSED CROSS SECTION - LINWOOD TO MICHIGAN

Between Linwood Ave and Michigan Ave, Utica St widens to approximately 42'; making it wide enough to accommodate bike lanes; the section below illustrates the proposed cross-section for this portion of Utica St



Existing ROW Width: 49 feet | Existing Curb-to-Curb Width: 42 feet

## TRAFFIC CALMING FOR NEIGHBORHOOD BIKEWAYS

### HORIZONTAL DEFLECTION

Horizontal traffic calming devices cause drivers to slow down by constricting the roadway space or by requiring careful maneuvering.

*Traffic Circles reduce speeds through intersections*



*Curb extensions increase turn radii and reduce turning speed*



*Chicanes deflect vehicles and reduce mid-block speeds*



*Chokers create pinch-points that reduce speeds mid-block*



**Traffic Circle**



**Curb Extension**



**Chicane**

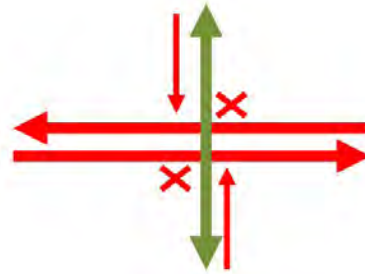


**Choker**



### STRATEGIES FOR REDUCING VOLUME

Maintaining motor vehicle volumes below 3,000 AADT (annual average daily traffic), where 1,000 - 1,500 AADT is preferred, significantly improves bicyclists' comfort. To manage volume, physical or operational measures can be taken on routes that have been identified as a bicycle boulevard. These volume management elements also provide an opportunity for landscaping, stormwater management, and other pedestrian and bicycle supportive amenities.



*Volume management tactics help to divert traffic away from neighborhood bikeways, reducing volumes along the bikeway*



#### Traffic Restriction Signage:

The most straightforward traffic volume reduction strategy is signage restricting motor vehicle through movement



#### Choker Entrances:

Choker entrances are used to reduce motor vehicle volumes by restricting/constraining vehicle passage while allowing full bicycle passage to a boulevard



#### Stop Sign Placement:

At minor intersections, stop signs on bicycle boulevards should be placed on side street approaches in a way that favors through traffic on the bicycle boulevard



#### Median Traffic Diverters:

Median diverters restrict through motor vehicle movements while providing a refuge for bicyclists to cross in two stages



## H: NIAGARA ST

Niagara St is slated for reconstruction in the near future, and the bikeway improvements proposed in this plan will help to convert the street into a multi-modal corridor. The Niagara River Greenway runs north/south on the banks of the Niagara River, but due to right-of-way constraints, it is routed along Niagara St from Broderick Park for several blocks before returning to the river's bank south of the Peace Bridge. This segment of the greenway is the weak link in an otherwise uninterrupted trail. The proposed bikeway improvements along Niagara St will improve the on-street experience for greenway users, as well as provide a critical bikeway connection. Niagara St will be enhanced with street trees, creating a green visual corridor that will serve to emphasize that the street is a key segment in the Niagara River Greenway.



### EXISTING PROJECT ISSUES

- Lack of adequate space to accommodate greenway users
- Weak link in the Niagara River Greenway
- No bicycle accommodation exists
- Does not provide a welcoming/memorable user experience; rather the street is an auto-dominated thoroughfare

### WHY IT'S IMPORTANT

- Would create a seamless connection to the off-street portions of the Niagara River Greenway
- Provides critical bikeway connection
- Ensures the reconstructed street accommodates all modes of travel
- Streetscape improvements would enhance the aesthetics and marketability of the corridor

### PHOTO SIMULATION



## GREENWAY CONNECTION

An exclusive bicycle phase must be included within the signal design at this and other intersections where Niagara St intersects with another two-way street

On approach from all side streets include signs to warn motorists of two-way bicycle traffic

Street trees will create a green visual corridor - making Niagara St into a on-street greenway and enhancing the aesthetics and marketability of the corridor

The proposed cycle track along Niagara St will make a seamless connection to the Niagara River Greenway, greatly enhancing the appeal of the Greenway



## COST ESTIMATE

1. Roadway Destriping, Striping & Signage	\$34,200
2. Bicycle Signalization	\$21,000
3. Raised Median Buffer	\$385,800
<b>Sub Total</b>	<b>\$441,000</b>
4. Additional Costs	+33%
<b>Total</b>	<b>\$598,400</b>

## TYPICAL PROPOSED CROSS SECTION

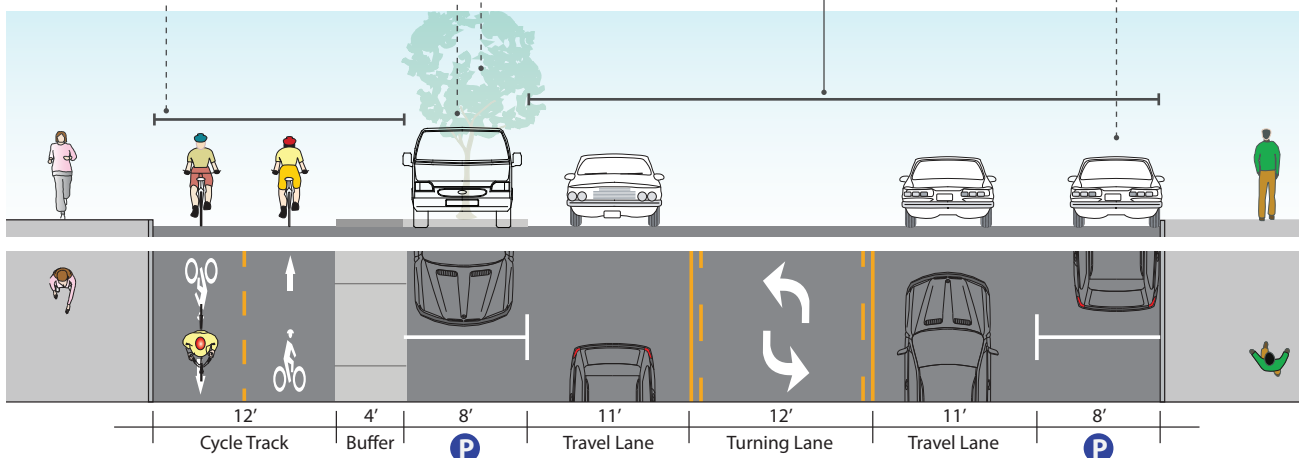
South of Ferry St, parking pockets and bump-outs at intersections will create a linear corridor, integrating this section of Niagara St seamlessly into the Niagara River Greenway

A raised median will provide a physical barrier between motor vehicles and bicyclists, improving the safety and comfort of the cycle track

North of Ferry Street, flush surface with delineator posts replaces the raised island and landscaped zones.

Niagara St will be right-sized to accommodate existing traffic volumes, converted from a four-lane road to a three-lane road (with center TWLTL)

Parking will be retained on both sides of the street



Existing ROW Width: 99 feet | Existing Curb-to-Curb Width: 66 feet



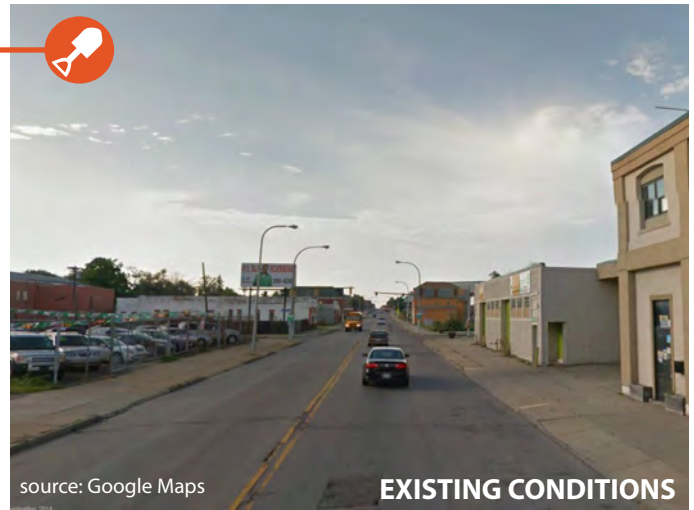
## I: JEFFERSON AVE

Jefferson Ave was identified several times in the various rounds of public input and stakeholder engagement as a very desirable north/south bikeway connection. Currently, the curb-to-curb width precludes the installation of bike lanes if parking is retained on both sides of the street. In the near-term, this existing street cross section will be maintained, and shared lane markings are proposed. Since traffic volumes are higher than ideal (5,000-8,000 vpd) for the application of SLMs, it is recommended that enhanced SLMs be used.

It was identified that in some areas, demand for on street parking is low. In the long-term, parking on one side of the street could be removed to provide street space for the installation of bike lanes. This option will provide a higher level of comfort for a greater range of bicyclists.

### EXISTING PROJECT ISSUES

- Desirable north/south route for bicyclists, but there is no indication to motorists that they should expect bicyclists along the street
- No existing accommodation for bicyclists

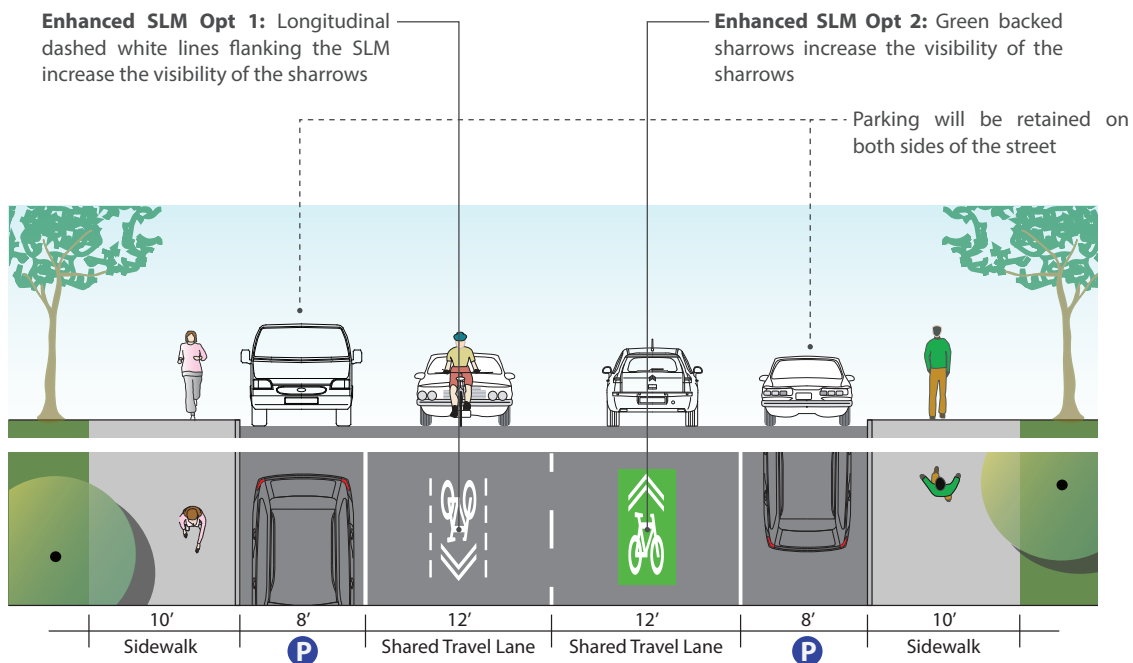


### WHY IT'S IMPORTANT

- In the short term, will designate the street as a bikeway through the application of SLMs
- In the long term, parking on one side of the street could be removed to provide adequate street space for the installation of bike lanes
- If bike lanes were installed, Jefferson would become a desirable bikeway route for a wide range of bicyclists

### TYPICAL PROPOSED CROSS SECTION - NEAR TERM

Given existing traffic volumes along Jefferson (5,000- 8,000 vpd) the near term option would provide a facility primarily for strong and fearless riders. To increase motorists' awareness of bicyclists along the corridor, enhanced shared lane markings are recommended. Two types of enhanced SLMs are illustrated below.



## ENHANCED SHARED LANE MARKINGS



**OPT 1:** Longitudinal white lines flanking a standard SLM helps to emphasize to motorists the presence of bicyclists, and for bicyclists, communicates proper lane positioning

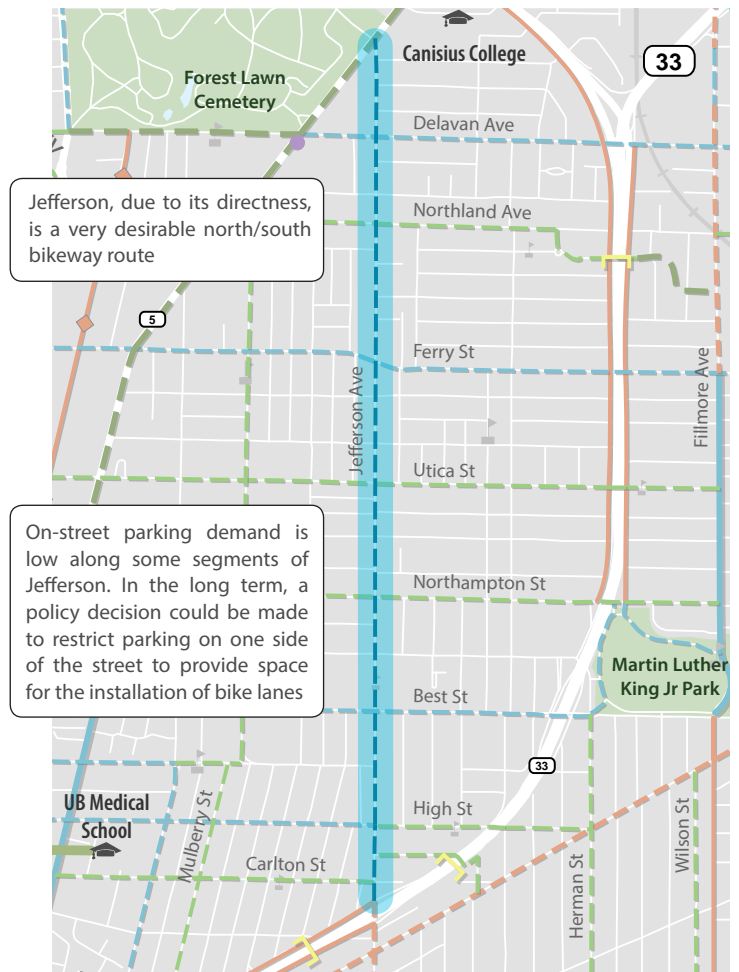


**OPT 2:** Green back sharrows are another option for an enhanced shared lane marking; the green treatment (typically thermoplastic) makes the SLM much more visible, and accentuates the presence of bicyclists along the corridor

### COST ESTIMATE

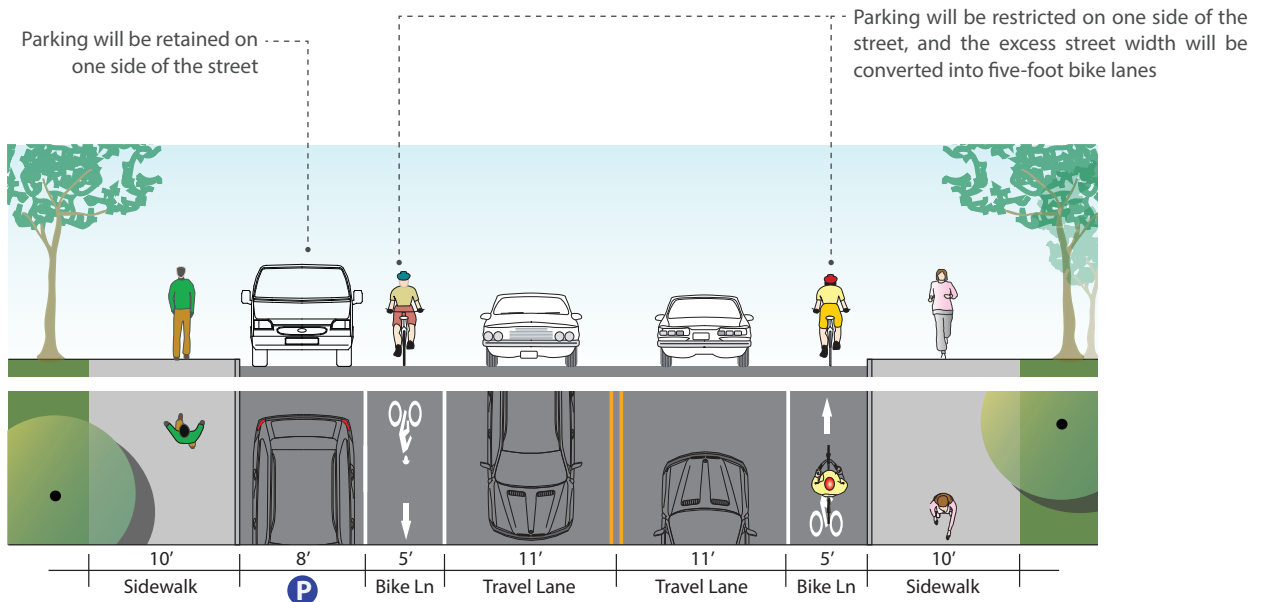
Short Term Option #1 Enhanced SLM:	\$30,000
• dashed longitudinal line flanking sharrow	
Option #2 Enhanced SLM	\$50,000
• Green Back Sharrow	
Short Term Long Term Option #3	\$92,000
• Destriping, Striping & Signage	
<b>Sub Total of Options</b>	<b>\$172,000</b>
4. Additional Costs	+33%
<b>Total Of Options</b>	<b>\$228,760</b>

## PROJECT AREA



## PROPOSED CROSS SECTION - LONG TERM OPTION

Jefferson Ave represents a desirable north/south bikeway corridor, but given the existing right-of-way and parking on both sides of the street, only shared lane markings are a feasible treatment in the near term. This treatment is not ideal given the traffic volumes along the corridor (5,000-8,000 vpd), and the proposed long-term option would remove parking from one side of the street, converting the excess street space into bike lanes. This facility is more appropriate given the volumes along Jefferson, and would provide a much more comfortable bikeway connection for a larger range of bicyclists.



Existing ROW Width: 60 feet | Existing Curb-to-Curb Width: 40 feet



## J: BROADWAY INTERSECTION

This portion of Broadway was selected as a catalyst project because it presents a design challenge to successfully move bicyclists through the intersection. With five major streets converging at a single point, bicycling through the intersection is very difficult, and likely only the most brazen bicyclists are currently choosing this route to access downtown. The proposed improvement to Broadway and the surrounding streets would delineate bicyclist lane positioning through the intersection, and make traffic circulation more logical. To decrease crossing distances and exposure time for bicyclists and pedestrians, a pork chop island is proposed at the intersection between Broadway and William St. The enhancements will improve crossing conditions for all modes of travel.



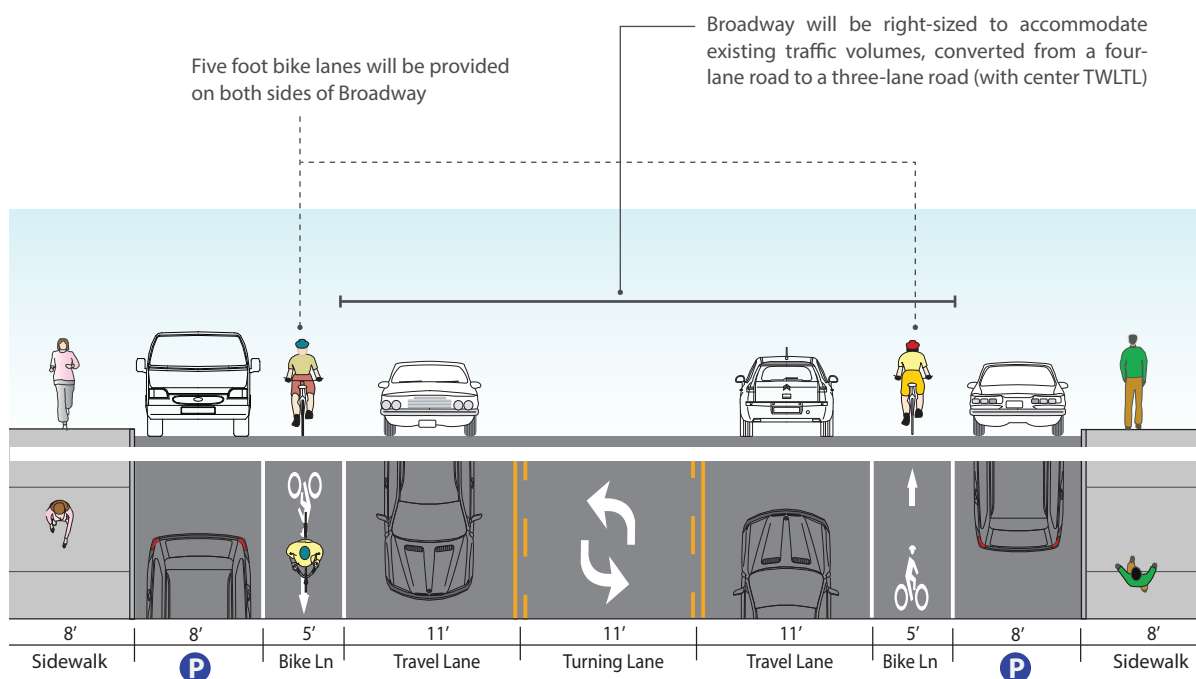
### EXISTING PROJECT ISSUES

- Crossing the intersection for all modes of travel is difficult
- Likely only the most brazen bicyclists are choosing to use this intersection to access downtown
- Pedestrian crossing distances are long

### WHY IT'S IMPORTANT

- Broadway represents an important east/west bikeway connection
- The intersection of Broadway/William/Ellicott would be made more logical
- Lane position on the approaches and through the intersection would be delineated for bicyclists, improving the crossing experience

### TYPICAL PROPOSED CROSS SECTION



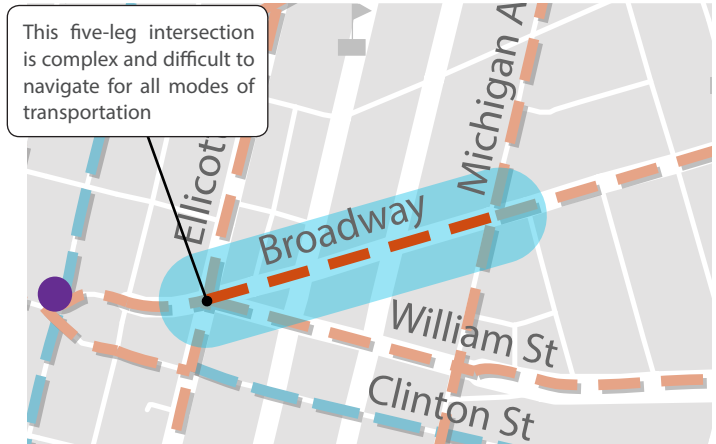
Existing ROW Width: 75 feet | Existing Curb-to-Curb Width: 59 feet

## THROUGH TRAVEL LANE TRANSITIONS



When bicyclists need to cross a turn lane to make a through movement, a conflict is created. Through travel lane transition zones can be enhanced by dropping the bike lane in advance of the intersection so that bicyclists can merge across the turn lane as gaps in traffic permit. Shared lane markings can also be applied to provide additional guidance.

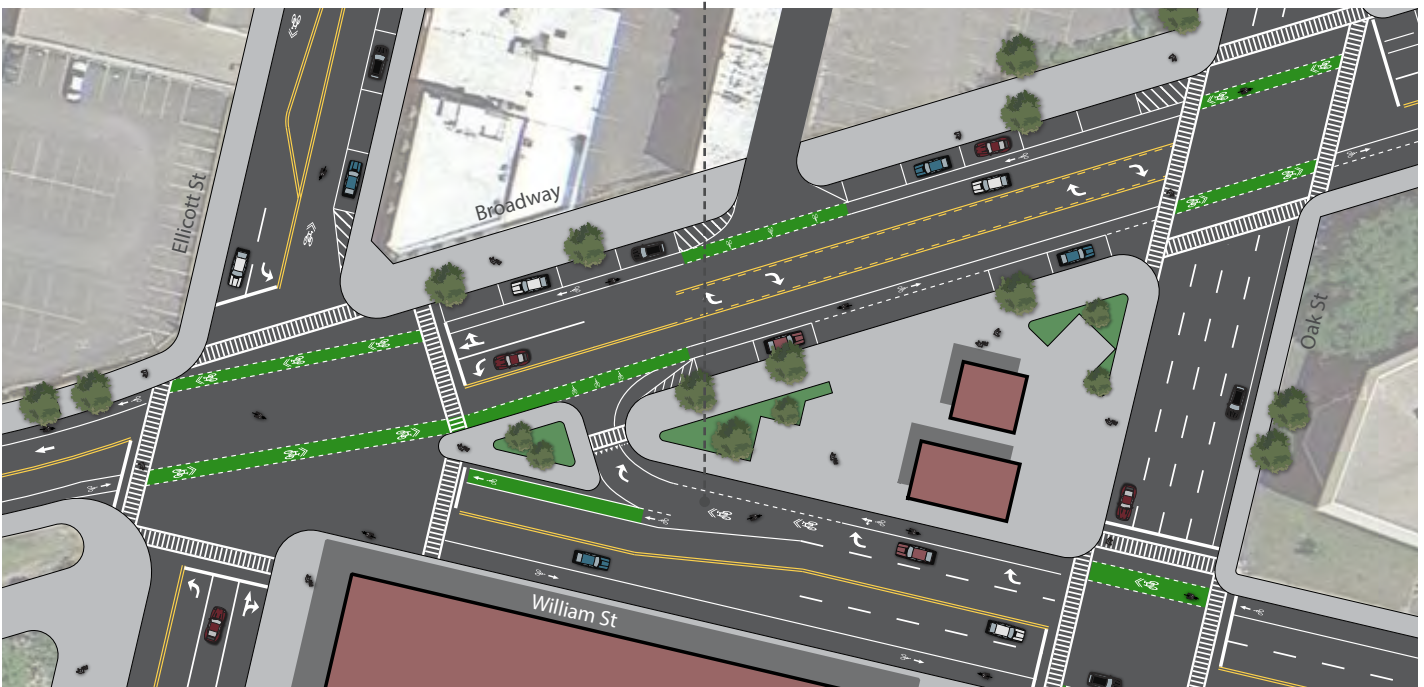
## PROJECT AREA



## COST ESTIMATE

1. Roadway Destriping, Striping & Signage	\$38,300
2. Bicycle Signalization	\$103,400
<b>Sub Total</b>	<b>\$141,700</b>
3. Additional Costs	+33%
<b>Total</b>	<b>\$192,300</b>

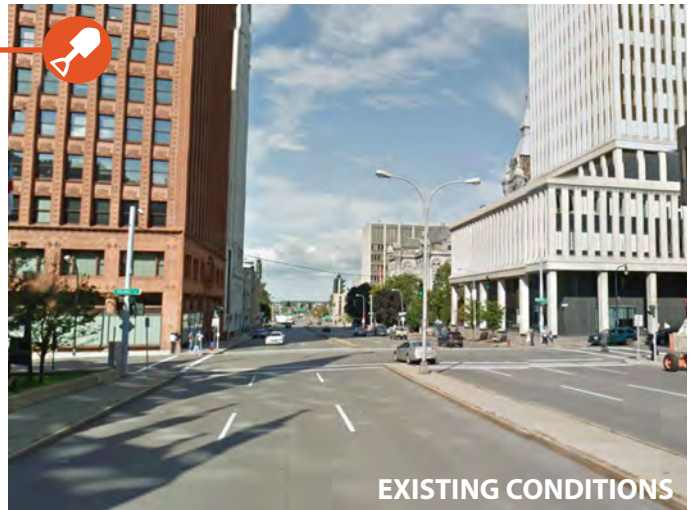
## PROPOSED INTERSECTION DESIGN





## K: CHURCH ST CYCLE TRACK

Currently, Church St is not an inviting street for bicyclists, but could provide a critical east-west connection through the heart of downtown. Due to the design of the street, very few bicyclists likely choose to ride on-street along Church coming to and from downtown. Church St serves as an example of a street, that when improved, would become a desirable bikeway connection due to its proximity to Downtown. One-way cycle tracks are proposed on both sides of Church St and Division St, which will provide an all-ages-and-abilities separated facility for bicyclists.



EXISTING CONDITIONS

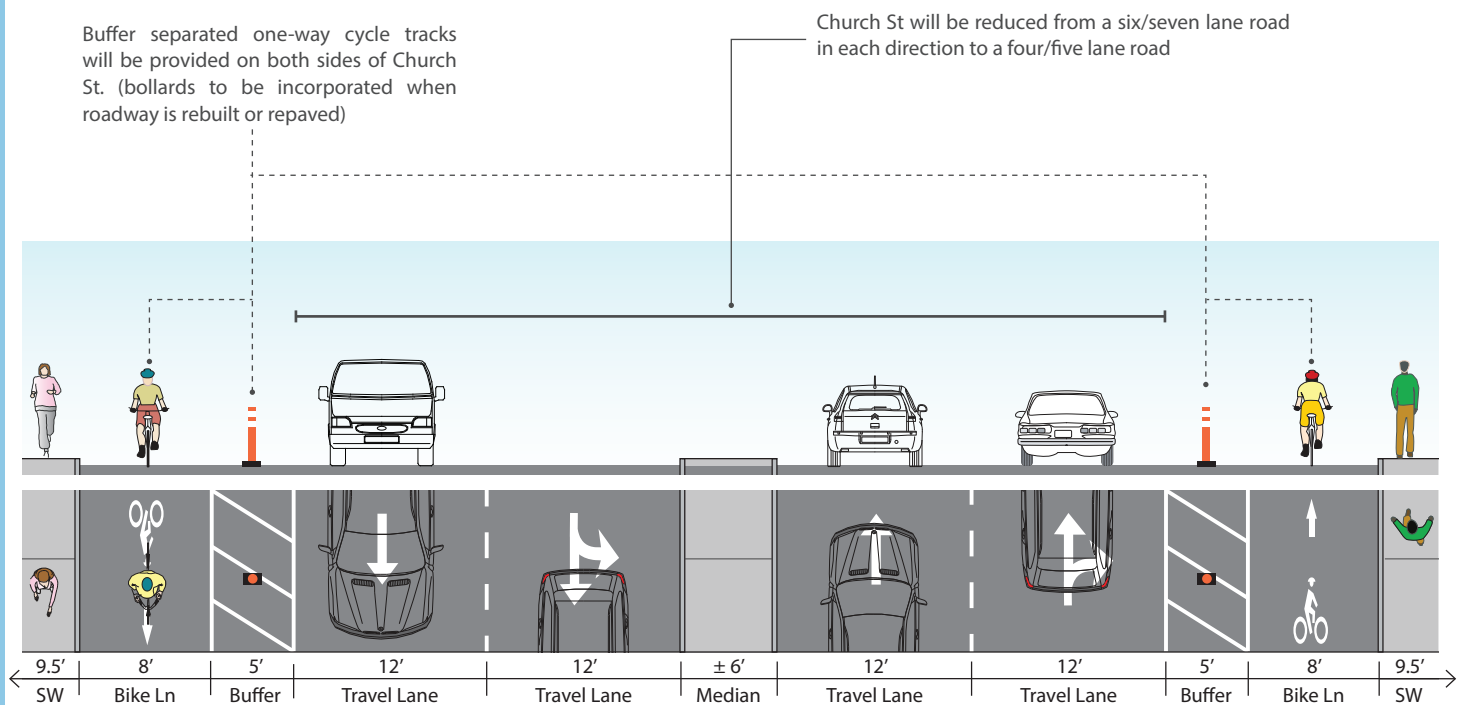
### EXISTING PROJECT ISSUES

- Church St is an intimidating street to bicycle upon
- No convenient east/west connection into Downtown Buffalo exists
- The street is an auto-dominated thoroughfare

### WHY IT'S IMPORTANT

- Would provide an all-ages-and-abilities facility
- Would provide convenient and direct access to downtown

### CHURCH ST PROPOSED CROSS SECTIONS



Existing ROW Width: 99 feet | Existing Curb-to-Curb Width: 80 feet

PROJECT AREA

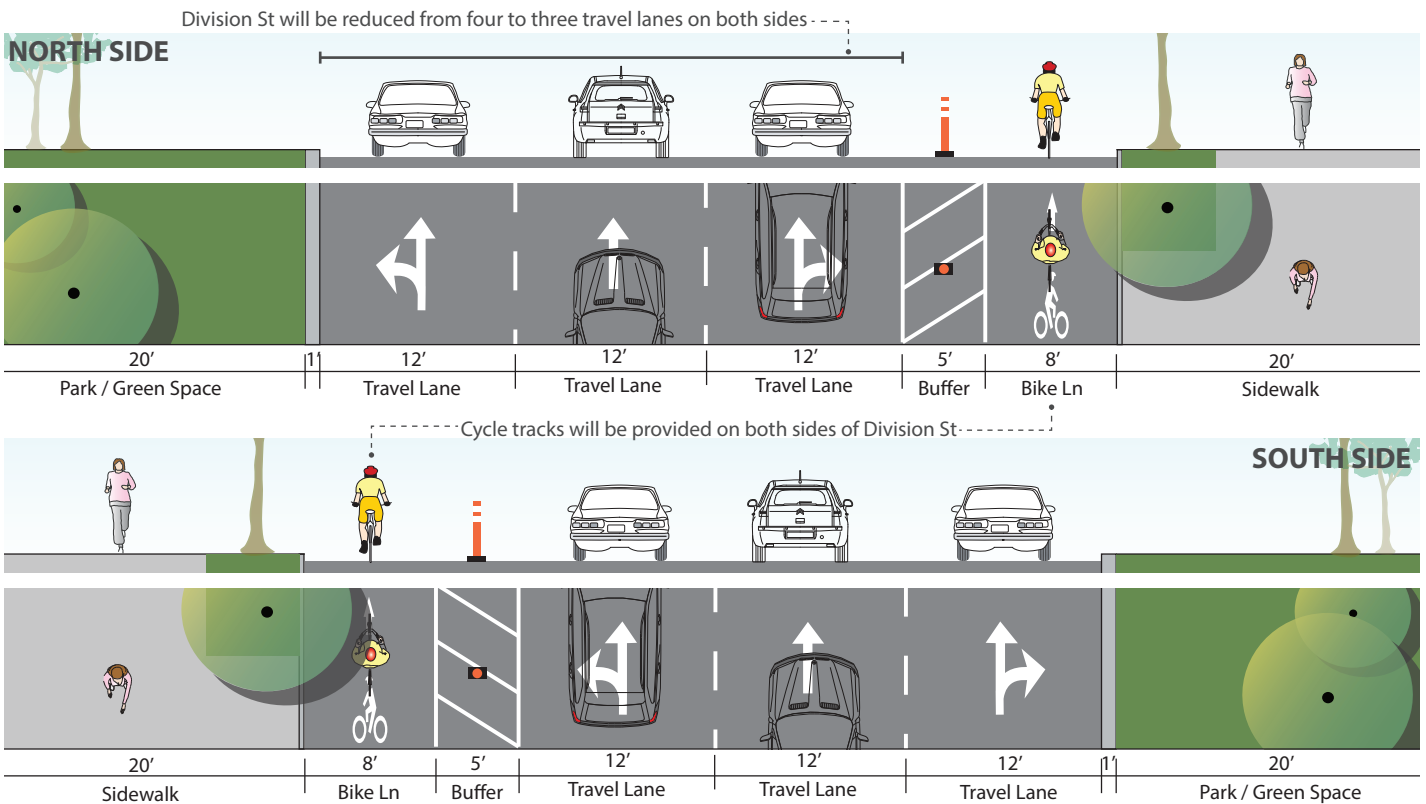


COST ESTIMATE

Church St Four-Lane w/ One-Way Cycle Track	\$37,800
• destriping, striping, signage & bollards	
Division St Four-Lane w/ One-Way Cycle Track	\$40,900
• destriping, striping, signage & bollards	
<b>Sub Total</b>	<b>\$72,700</b>
<b>Additional Costs</b>	<b>+33%</b>
<b>Total</b>	<b>\$98,700</b>



DIVISION ST PROPOSED CROSS SECTIONS



Existing ROW Width: 90 feet | Existing Curb-to-Curb Width: 50 feet





Introduction

Performance  
Measures

# CHAPTER FIVE

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## IMPLEMENTATION

BUFFALO BICYCLE MASTER PLAN

Rendering of Proposed Main St Cycle Track



## INTRODUCTION

The Implementation Recommendation section outlines a strategy for the development of the city-wide bicycle network. Comprised of facilities for those considered “interested, but concerned”, “enthused and confident” and “strong and fearless” bicyclists, the implementation of the network is intended to elevate Buffalo’s League of American Bicyclists (L.A.B.) Bike Friendly Community status from its current bronze level to silver, gold and, ultimately, platinum level. The long-term implementation of the network will feature a three-step process that includes:

1. Maintaining Mayor Brown’s commitment to create 10 lane miles of new bike facilities per year, which includes new bike lanes and ‘sharrows’ within currently-funded mill-and-overlay and Federal Aid projects.
2. Securing funding and staff resources to develop the Master Plan’s eleven catalyst projects, with high-level emphasis on the Main Street Cycle Track<sup>1</sup> (shown left) and other projects needed to facilitate Main Street’s connection to nearby bike facilities on Linwood or Delaware.
3. Developing a long-term strategy for funding and maintaining the recommended ~300 lane mile, city-wide network, utilizing state CHIPS, CFA or other key funding sources.

Concurrent with the three primary actions above, other key city-wide implementation actions include:

- Buffalo Common Council’s adoption of the City of Buffalo Bicycle Master Plan Update’s recommendations
- Buffalo Common Council and the City Department of Public Works adoption of the NACTO Urban Bikeway Design Guide, and incorporation of recommendations from FHWA’s recent Separated Bike Lane Planning and Design Guide
- Ensure that the City DPW’s repaving list is coordinated with recommended bikeways in the Master Plan
- Pursue area-wide recommendations for traffic-calming (especially around schools) in a long-term pursuit to slow traffic and create a more amenable environment for bicycling
- Develop a public outreach strategy for the eleven catalyst projects illustrated in this report
- Work with non-profits such as GObike Buffalo and the Buffalo Niagara Partnership to develop public-private partnerships to fund catalyst projects in the short term and all city-wide bicycle projects in the long term



The Elmwood Ave Cycle Track is the product of Mayor Brown’s commitment to implement more bicycle facilities in Buffalo

<sup>1</sup> The Main Street Cycle Track, in particular, is intended to be a “game changer” for the city. It contains many of the ingredients for a successful project that changes how people think of bicycling in Buffalo and induces new riders: it’s a “protected” facility, it links major destinations—the north end of downtown, the Medical Campus, Canisius College and ultimately, the UB South campus—it provides connections to many Metro stations, its flat and is relatively-easily accessible from both the East-side and West-side neighborhoods.



## PERFORMANCE MEASURES

Critical to the success of the master plan is to gauge its progress using a series of Performance Measures. Performance Measures (PMs) are tools to monitor progress related to building new facilities, expanding ridership, improving safety, and ensuring a diverse bicycling population over time. Because PMs are typically quantitative in nature, they must also be trackable through data collection such as bicycle counts, surveys, and crash statistics over specific time intervals.

It should be recognized that no one performance measure by itself will determine the success of the Master Plan. The PMs must be examined together to fully assess progress. For instance, if the total mileage of bicycle facilities were to increase significantly, but the number of people bicycling remained static, that would signify that there is an issue somewhere in the system that needs to be addressed.

The table below provides a list of the performance measures set against an approximately ten-year time frame that is intended to move Buffalo into the upper echelon of mid-size bicycle-friendly cities, such as Madison, Wisconsin, and Salt Lake City, Utah.

Table 5.1

#	Performance Measure	Current Status	Annual Goal for Year		
			2018	2021	2025
1	L.A.B. Bike Friendly Community Status	Bronze	Silver	Gold	Platinum
2	Lane miles of bike facilities	72 miles	150*	200*	300*
3	Bicycle Commuter Mode Share (city-wide, during warm-weather months)	1.6%	3.2%	6%	10%
4	Bicycle racks	~400	600	800	1,000
5	On-street bike parking corrals (seasonal)	0	3	15	30
6	Reported motor vehicle-bicycle crashes w/ injuries	1.0X	0.9X	0.75X	0.5X
7	Percentage of schools connected by bicycle facilities and/or traffic-calmed roadways	unknown	25%	50%	90%

\* Mileage numbers include Mayor Brown's commitment to stripe ten lane miles of bike facilities per year

Properly tracked with regular counts and data-gathering efforts, the Performance Measures will complement the Goals established for this master planning effort, and leverage bicycle-infrastructure improvements to enhance the City's livability and economic vitality. Combined with on-going downtown/BNMC redevelopment efforts, revitalization of economically-distressed neighborhoods, and an expanding arts and culture scene, bicycle improvements will place Buffalo on a trajectory to gain jobs and population in the future and become a more green and sustainable community.



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