City of Novi Non-motorized Master Plan

DRAFT

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City of Novi

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Contents

1. Introduction

Encouraging healthy, active lifestyles through pathway and sidewalk connectivity has been a focus for the City of Novi. The City is a four-time Promoting Active Communities Gold Award winner from the Governor's Council on Physical Fitness, largely due to the over 225 miles of exiting and 90 miles of planned public pedestrian and bicycle facilities.

The City of Novi is now poised to take its bicycle and pedestrian facilities, policies and programs to the next level. This document, funded by the Federal Energy Efficiency Block Conservation Grant program, lays out a systematic way to support non-motorized transportation.

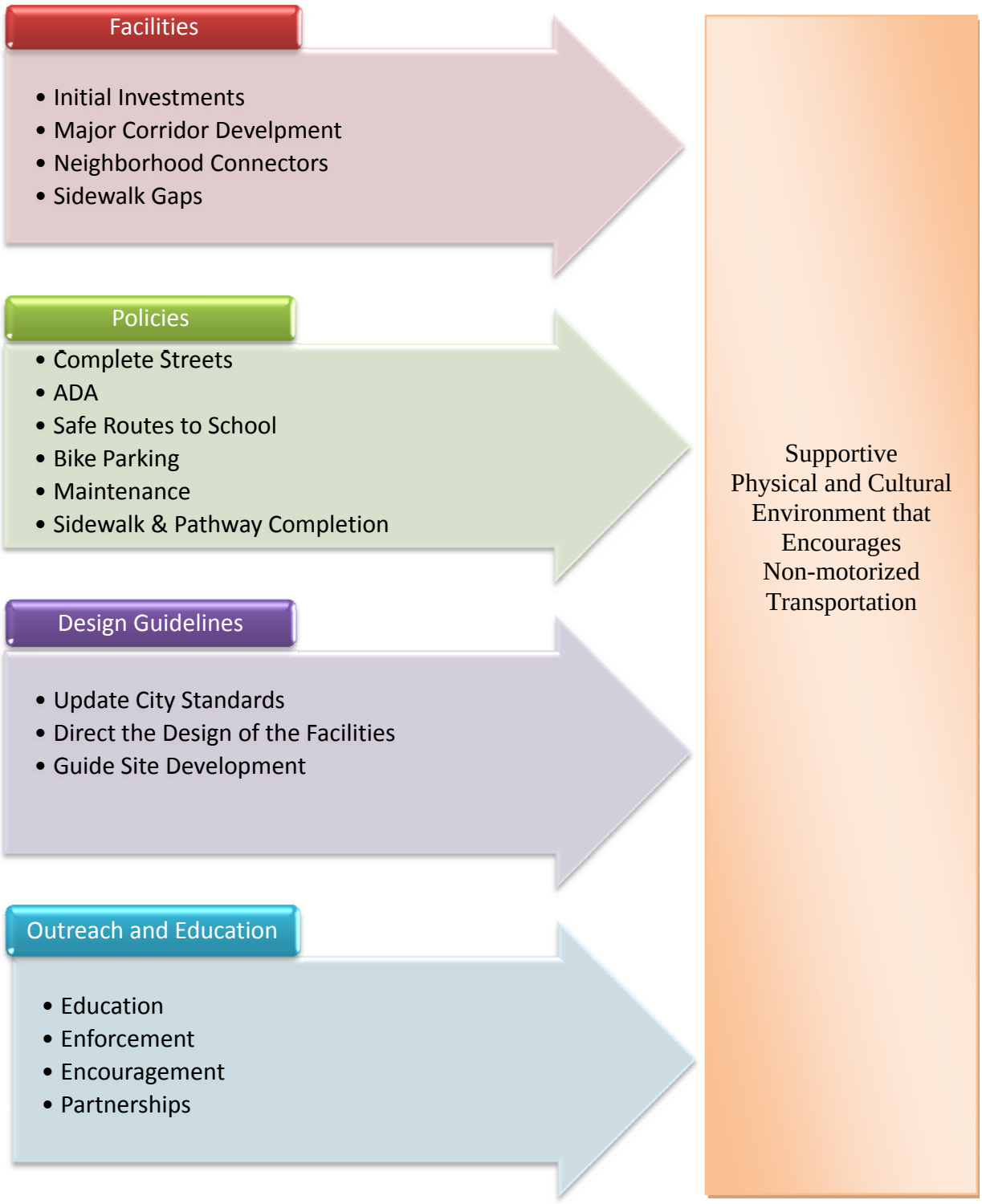
Helping to shape this plan, has been a dedicated group of elected officials, appointed officials, public employees and the general public. The results of an on-line survey and the input gathered at two public workshops guided the proposed non-motorized network as well as setting implementation priorities.

The Non-Motorized Master Plan is comprised of four concurrent implementation tracts that when employed in concert will establish a physical and cultural environment that supports and encourages safe, comfortable and convenient ways for pedestrians and bicyclists to travel throughout the city and into the surrounding communities.

It is anticipated that the cultural changes will result in a greater number of individuals choosing walking and bicycling as their preferred mode of transportation for many local trips. These choices will lead to healthier lifestyles, improved air and water quality, and a more energy efficient and sustainable transportation system.

The following chart outlines the four implementation tracts in the plan. Each sub-element may move forward independently as resources allow. As the Non-Motorized Master Plan is in many ways a continuation and expansion of the City's sidewalk and pathway program, a natural first step for implementation is to address the top priorities from that effort. These top priorities are included in the Initial Investments category.

Fig 1a Four Concurrent Implementation Tracts of the Non-Motorized Plan



1.1 Why Walking and Bicycling Are Important

A comprehensive non-motorized transportation system based on best practices is of paramount importance to the health, safety and general welfare of the citizens of Novi. The benefits of a comprehensive non-motorized transportation system extend beyond the direct benefits to the users of the system to the public as a whole. A well-implemented non-motorized transportation system will reap rewards by:

- Providing viable transportation alternatives for individuals who are capable of independent travel yet do not hold a driver's license or have access to a motor vehicle at all times.
- Improving safety, especially for the young and old who are at most risk due to their dependence on non-motorized facilities and their physical abilities.
- Improving access for the 20% of all Americans who have some type of disability and the 10% of all Americans who have a serious disability.[1]
- Improving the economic viability of a community by making it an attractive place to locate a business while simultaneously reducing public and private health care costs associated with inactivity.
- Encouraging healthy lifestyles by promoting active living.
- Reducing the water, air, and noise pollution associated with automobile use by shifting local trips from automobiles to walking or bicycling.
- Improving the aesthetics of the roadway and community by adding landscaping and medians that improve the pedestrian environment and safety.
- Providing more transportation choices that respect an individual's religious beliefs, environmental ethic, and/or uneasiness in operating a vehicle.
- Reducing the need for parking spaces.
- Creating a stronger social fabric by fostering the personal interaction that takes place while on foot or on bicycle.
- Reducing dependence on and use of fossil fuel with the resulting positive impact on climate change.

Improvements to non-motorized facilities touch all individuals directly, as almost all trips begin and end as a pedestrian.

Where We Are Now

There is little question that the most significant influence on the design of American communities is the automobile. About eighty percent of America has been built in the last fifty years.[2] During those years, the design of everything from homes, neighborhoods, shopping center, schools, workplaces and churches have been profoundly shaped around the car. This is true not only for the site-specific placement of driveways and parking lots, but also the distribution and mixing of land uses.

Accommodations to the automobile came not simply as the logical outgrowth of an additional mode of travel, but often at the expense of bicycling, walking and transit. Increases in automobile volumes and

[1] Disability Status: 2000 - Census 2000 Brief.
[2] Jim Kunstler, *Geography of Nowhere.*

speeds have made sharing a roadway uncomfortable and often unsafe. Also, the need for additional rights-of-way to accommodate added vehicle lanes has regularly come at the expense of space typically set aside for sidewalks.

The pattern of public investment in motor vehicle transportation above all other modes has resulted in an overall reduction in transportation options for the average citizen. Communities are now weighing the convenience of the automobile against the consequences of its use at current levels and trying to strike a balance. The direct and indirect consequences include:

- Current guidelines for exercise call for one hour of activity daily. Physical inactivity is a primary factor in at least 200,000 deaths annually and 25% of all chronic disease-related deaths.[3] Forty percent of adults do not participate in any leisure time physical activity;[4] of those who do participate in exercise, 66.1% use their local streets.[5]
- About 40% of all trips are estimated to be less than two miles which is an easy distance for walking or bicycling, provided appropriate facilities are available. In practice, automobiles are used for 76% of all trips under one mile and 91% of all trips between one and two miles.[6]
- While money for bicycle and pedestrian projects has increased dramatically since 1989 with the passage of federal transportation programs known as ISTEA and TEA-21, in Michigan, only $0.16 per person is spent on pedestrian facilities vs. $58.49 per person on highway projects annually.[7]
- The nation is experiencing an obesity epidemic; 61% of Michigan's adults are considered overweight, which is the second highest rate in the country.[8] While there may be other significant factors, the increase in obesity nationally over the past fifteen years corresponds with an increase in the number of miles driven and a decrease in the number of trips made by walking and bicycling. This epidemic is estimated to result in $22 billion a year in health care and personal expenses.[9]
- In southeast Michigan, people spend on average 18.8% of their income on transportation, second only to shelter at 19.1%.[10]
- The number of children that walk or bike to school has dropped 37% over the last twenty years.[11] The increase in traffic caused by parents taking their children to and from school and other activities has been estimated to be 20 to 25% of morning traffic. Half of the children hit by cars while walking or bicycling to school were hit by parents of other children.[12] Today only about 8% of children walk to school.

[3] Ibid.
[4] W.C. Wilkinson, et. al. Increasing Physical Activity through Community Design: A Guide for Public Health Practitioners. Washington: National Center for Bicycling and Walking. May 2002.
[5] Brownson, Dr. Ross, et.al. "Environmental and policy determinants of physical activity in the United States", American Journal of Public Health, Dec 2001.
[6] Chicago Department of Transportation
[7] Surface transportation Policy Project, "Mean Streets 2000", 2000.
[8] Michigan Governor's Council on Physical Fitness, Health, and Sports.
[9] Ed Pavelka, "Can Commuting Help You Lose Weight?", League of American Bicyclists, Summer 2002.
[10] Surface Transportation Policy Project, "Driven to Spend", 2000.
[11] W.C. Wilkinson, et. al. Increasing Physical Activity through Community Design: A Guide for Public Health Practitioners. Washington: National Center for Bicycling and Walking. May 2002.
[12] Michigan Governor's Council on Physical Fitness, Health, and Sports.

- The result of automobile emissions on public health is just beginning to be understood. In Atlanta during the 1996 Olympics, there was a 22.5% reduction in automobile use; during the same period of time admissions to hospitals due to asthma decreased by 41.6%.[13]In Michigan, non-motorized trips account for about 7% of all trips, but make up about 12% of all traffic fatalities and severe injuries. Non-motorized modes are not inherently dangerous; communities have been able to significantly increase the non-motorized mode-share while simultaneously decreasing the number of non-motorized crashes. Emerging research is showing the single most important factor for improving bicycle and pedestrian safety is increasing the number of bicyclists and pedestrians.

Despite these circumstances, local public demand for improved facilities is significant as made evident by the Community Attitude and Interest Survey conducted in the winter of 200802009. 65% of the households indicated that they have a need for walking and bicycling trails. This was nearly double the need stated for the next highest category.

The Intention of This Plan

The purpose of this plan is to provide a general background on the issues of non-motorized transportation as well as to present a proposal on how to address the issues through policies, programs, and design guidelines for facility improvements. This is not intended to be a replacement for the *AASHTO Guide for the Development of Bicycle Facilities*, *AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities*, *AASHTO Guide for Achieving Flexibility in Highway Design*, USDOT's *Designing Sidewalks and Trails for Access – Part II, Best Practices Design Guide*, the pending *Guidelines for Accessible Public Rights-of-Way*, MUTCD, MMUTCD or any other applicable federal, state, or local guidelines. Rather, it is intended as a synthesis of key aspects of those documents to provide an interpretation on how they may be applied in typical situations in the City of Novi. Given the evolving nature of non-motorized transportation planning, these guidelines should be periodically reevaluated to determine their appropriateness.

The specific facility recommendations within this plan represent a Master Plan level evaluation of the suitability of the proposed facilities for the existing conditions. Prior to proceeding with any of the recommendations in this report though, a more detailed corridor level assessment or traffic study should be done in order to fully investigate the appropriateness of the proposed roadway modifications and/or proposed bicycle or pedestrian facilities.

[13] Friedman, Michael S., et. al. Impact of Changes in Transportation and Commuting Behaviors During the 1996 Summer Olympic Games in Atlanta on Air Quality and Childhood Asthma, Journal of the American Medical ssociation, Febuary 21, 2001.

1.2 Glossary of Terms

Within this document there are a number of terms that may be unfamiliar to many people. The following is a brief glossary of some of the transportation terms that are found in this document:

AASHTO – American Association of State Highway & Transportation Officials.

Bicycle Quality/Level of Service (Bike Q/LOS) – a model for evaluating the perceived safety and comfort of bicycling in a roadway based on conditions within the road (not surrounding land uses) expressed as a letter grade with "A" being best and "F" being worst.

Bicycle Boulevard - a low-volume and low-speed street that has been optimized for bicycle travel through treatments such as traffic calming and traffic reduction; signage and pavement markings; and intersection crossing treatments.

Bike Lane – a portion of the roadway designated for bicycle use. Pavement striping and markings sometimes accompanied with signage are used to delineate the lane. Examples can be found on portions of South Lake Drive, East Lake Drive and Taft Road.

Bike Route –a designation that can be applied to any type of bicycle facility. It is intended as an aid to help bicyclists find their way to a destination where the route is not obvious.

Bulb-outs – see Curb Extensions.

Clear Zones – area free of obstructions around roads, Shared-use Paths, and Walkways.

Clearance Interval – the flashing "Don't Walk" or flashing "Red Hand" phase of pedestrian signals. It indicates to pedestrians that they should not begin to cross the street. A correctly timed clearance interval allows a pedestrian who entered the crosswalk during the "Walk" phase to finish crossing the street at an unhurried pace.

Complete Street- streets that are planned, designed, operated and maintained such that all users may safely, comfortably and conveniently move along and across streets throughout a community.

Crossing Islands – a raised median within a roadway typically set between opposing directions of traffic that permits pedestrians to cross the roadway in two stages. A crossing island may be located at signalized intersections and at unsignalized crosswalks. These are also known as **Refuge Islands.**

Crosswalk – the area of a roadway that connects sidewalks on either side at an intersection of roads (whether marked or not marked) and other locations distinctly indicated for pedestrian crossings by pavement markings.

Curb Extensions – extending the curb further into the intersections in order to minimize pedestrian crossing distance, also known as **Bulb-outs**.

Dispersed Crossing – where pedestrians typically cross the road at numerous points along the roadway, rather than at an officially marked crosswalk.

E-Bike – a bicycle that is propelled by an electric motor and/or peddling.

Fines – finely crushed gravel 3/8" or smaller. The fines may be loosely applied or bound together with a stabilizing agent.

Inside Lane – the travel lane adjacent to the center of the road or the Center Turn Lane.

Ladder Style Crosswalk – a special emphasis crosswalk marking where 1' to 2' wide white pavement markings are placed perpendicular to the direction of a crosswalk to clearly identify the crosswalk.

Lateral Separation – horizontal distance separating one use from another (pedestrians from cars, for example) or motor vehicles from a fixed obstruction such as a tree.

Leading Pedestrian Interval –a traffic signal phasing approach where the pedestrian "Walk" phase precedes the green light going in the same direction by generally 4 to 5 seconds.

Level of Service (LOS) – a measurement of the motor vehicle flow of a roadway expressed by a letter grade with "A" being best or free flowing and "F" being worst or forced flow/heavily congested. Also see Bicycle Level of Service and Pedestrian Level of Service.

Long-term Plan – reflects the vision of the completed non-motorized system. Some improvements may require the reconstruction of existing roadways, the acquisition of new right-of-way, or significant capital investments.

Mid-block Crossings – locations that have been identified based on land uses, bus stop locations and the difficulty of crossing the street as probable candidates for Mid-block Crosswalks. Additional studies will need to be completed for each location to determine the ultimate suitability as a crosswalk location and appropriate solution to address the demand to cross the road.

Mid-block Crosswalk – a crosswalk where motorized vehicles are not controlled by a traffic signal or stop sign. At these locations, pedestrians wait for a gap in traffic to cross the street, motorists are required to yield to a pedestrian who is in the crosswalk (but not if the pedestrian is on the side of the road waiting to cross).

MMUTCD – Michigan Manual of Uniform Traffic Control Devices. This document is based on the National Manual of Uniform Traffic Control Devices (MUTCD). It specifics how signs, pavement markings and traffic signals are to be used. The current version is the 2005 MMUTCD. It was adopted on August 15, 2005 and is based on the 2003 National MUTCD. In 2009 a new National MUTCD was adopted, the state has two years to adopt the national manual. Typically, there are only minor divergences between the two manuals due to specifics in Michigan traffic laws.

Mode-share / Mode split – the percent of trips for a particular mode of transportation relative to all trips. A mode-share / mode split may be for a particular type of trip such as home-to-work.

Mode – distinct types of transportation (cars, bicycles and pedestrians are all different modes of travel).

MVC – Michigan Vehicle Code, a state law addressing the operation of motor vehicles and other modes of transportation.

Near-term Opportunities –improvements that may generally be done with minimal changes to existing roadway infrastructure. They include road re-striping projects, paved shoulders, new sidewalks and crossing islands. In general, existing curbs and drainage structures are not changed.

Neighborhood Greenway – a route that utilizes residential streets and short connecting pathways that link destinations such as parks, schools and **Shared Use Paths**. Neighborhood Greenways may contain the characteristics of a **Bicycle Boulevard** but, in addition, provide accommodations for pedestrians and sustainable design elements such as rain gardens.

Out-of-Direction Travel – travel in an out-of-the-way, undesirable direction.

Outside Lane – the travel lane closest to the side of the road.

Off-road Trail – see Shared Use Path

Pedestrian Desire Lines – preferred pedestrian direction of travel.

Pedestrian Quality/Level of Service (Ped. Q/LOS) – a model for evaluating the perceived safety and comfort of the pedestrian experience based on conditions within the road ROW (not surrounding land uses) expressed as a letter grade with "A" being best and "F" being worst.

Refuge Islands – see Crossing Islands.

Roundabouts – yield-based circular intersections that permit continuous vehicle travel movement.

Shared Roadway –bicycles and vehicles share the roadway without any portion of the road specifically designated for the bicycle use. Shared Roadways may have certain undesignated accommodations for bicyclists such as wide lanes, paved shoulders, and/or low speeds. These routes may also be signed and include pavement markings such as shared-use arrows.

Shared Use Arrow – a pavement marking consisting of a bike symbol with a double chevron above, also known as "sharrows". These pavement markings are used for on-road bicycle facilities where the right-of-way is too narrow for designated bike lanes. The shared use arrow alerts cars to take caution and allow cyclist to safely travel in these lanes when striping is not possible. They are often used in conjunction with signage.

Shared Use Path – a wide pathway that is separate from a roadway by an open unpaved space or barrier or located completely away from a roadway. A Shared Use Path is shared by bicyclists and pedestrians. There are numerous sub-types of Shared Use Paths including Sidewalk Bikeways that have unique characteristics and issues. An example of a Shared Use Path would be the I-275 Metro Trail.

Shy Distance – the distance that pedestrians, bicyclists and motorists naturally keep between themselves and a vertical obstruction such as a wall or curb.

Sidepath – see **Roadside Pathway**

Roadside Pathway – a specific type of Shared Use Path that parallels a roadway generally within the road right-of-way. This is also known as a **Sidepath**.

Signalized Crosswalk – a crosswalk where motor vehicle and pedestrian movements are controlled by traffic signals. These are most frequently a part of a signalized roadway intersection but a signal may be installed solely to facilitate pedestrians crossings.

Speed Table – raised area across the road with a flat top to slow traffic.

Splitter Islands – crossing islands leading up to roundabouts that offer a haven for pedestrians and that guide and slow the flow of traffic. They may also be used at intersections in place of a turning lane.

UTC – Uniform Traffic Code, is a set of laws that can be adopted by municipalities to become local law that address the operation of motor vehicles and other modes of transportation. The UTC is a complementary set of laws to the MVC.

Yield Lines – a row of triangle shaped pavement markings placed on a roadway to signal to vehicles the appropriate place to yield right-of-way. This is a new pavement marking that is used in conjunction with the new "Yield to Pedestrians Here" sign in advance of marked crosswalks.

2. Inventory and Analysis

The major influences on non-motorized travel may be distilled down to two factors: the physical environment and the social environment. The influence of the physical environment is not limited to the existence of specific facilities such as bike lanes and sidewalks. Just as important as facilities is the underlying urban form. The majority of bicycle and pedestrian trips are for short distances. Even with first-rate facilities, large blocks of homogeneous land uses and spread-out development will inhibit many non-motorized trips.

The City of Novi and Oakland County as a whole are at a key juncture. Mainstream media has begun to cover the health and economic implications of our land use and transportation infrastructure decisions. Community leaders and citizen activists are calling for a greater emphasis on non-motorized travel. Yet, there is a tremendous physical and institutional legacy to overcome.

Topics:

2.1 General Conditions

The City of Novi generally consists of dispersed land uses that for the most part, are scaled towards automobile use. Typical of the region, Novi has a primary road system based on a one mile grid with commercial centers located along the busy roadways frequently crusted at the intersections as well as near freeway interchanges.

Bicycle and pedestrian travel outside of neighborhood streets generally follows the primary road system on sidewalks and roadside pathways, although there are some bike lanes in the north and south of town. Opportunities to cross the primary road system are limited with poor bicycle and pedestrian connectivity between neighborhoods that are located on opposite sides of the roadway.

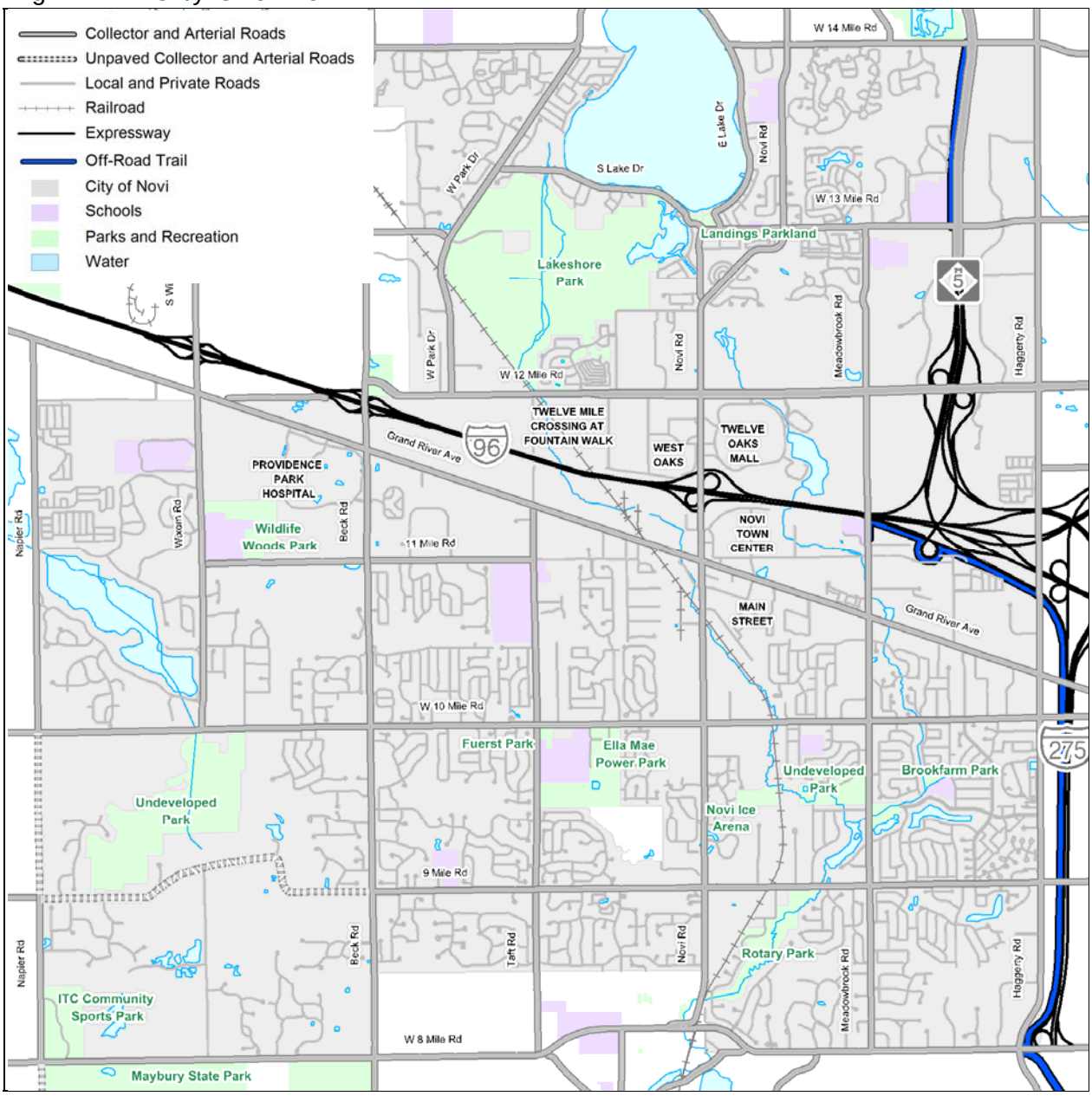
Over the past number of years, the City of Novi has systematically been adding sidewalks and pathways along the primary road system. However, there are still numerous gaps remaining in the system which makes many trips challenging. Trips on unfamiliar routes may often result in a dead end without an obvious alternative. The artificial barriers of the railroad, expressways and the four and five-lane arterials also tend to fragment the City from a non-motorized standpoint. The result is a non-motorized environment that is generally not favorable to walking and bicycling for everyday transportation but is capable of providing for more recreational based trips.

Many of the city's primary roads though are only two to three lanes wide. These roads may be more easily converted to a more bicycle and pedestrian corridors.

The following maps provide a general summary of the existing conditions in the City of Novi:

- Fig. 2.1A. City Overview
- Fig. 2.1B. Existing Land Use
- Fig. 2.1C. Future Lane Use
- Fig. 2.1D. Population Density
- Fig. 2.1E. Existing Trails Inventory
- Fig. 2.1F. Regional Trails Inventory
- Fig. 2.1G. Existing Sidewalks and Roadside Pathways
- Fig. 2.1H. Road Jurisdiction
- Fig. 2.1I. Transportation Improvement Projects
- Fig. 2.1J. Average Daily Traffic Volumes
- Fig. 2.2 K. Posted Speed Limit
- Fig. 2.2 L. Existing Road Cross-Sections
- Fig. 2.1M. Block Size

Fig. 2.1A. City Overview



Population: currently estimated to be 52,231 (city special census, 2007)

Size: Over 30 Square Miles

Fig. 2.1B. Existing Land Use (2008)

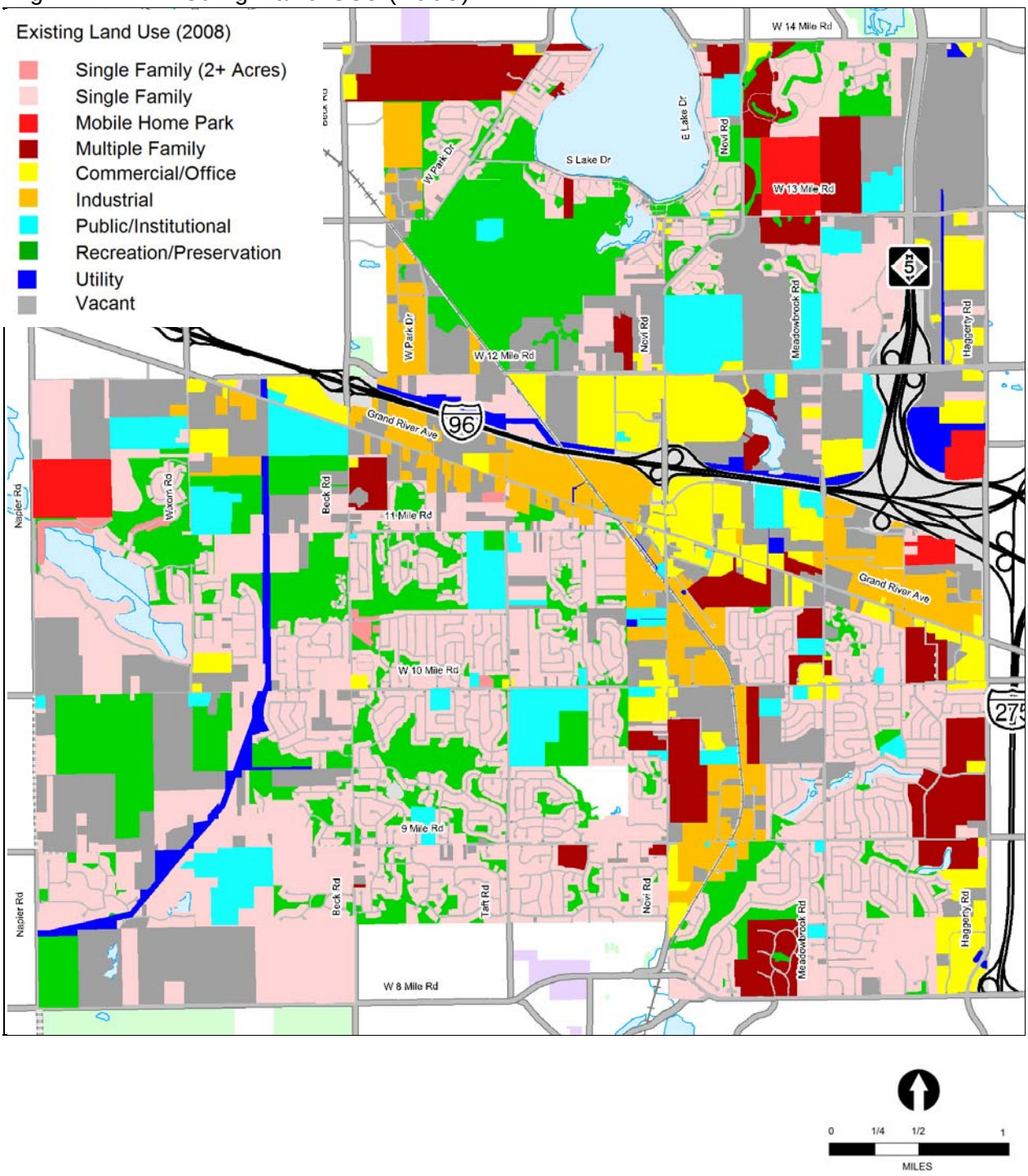
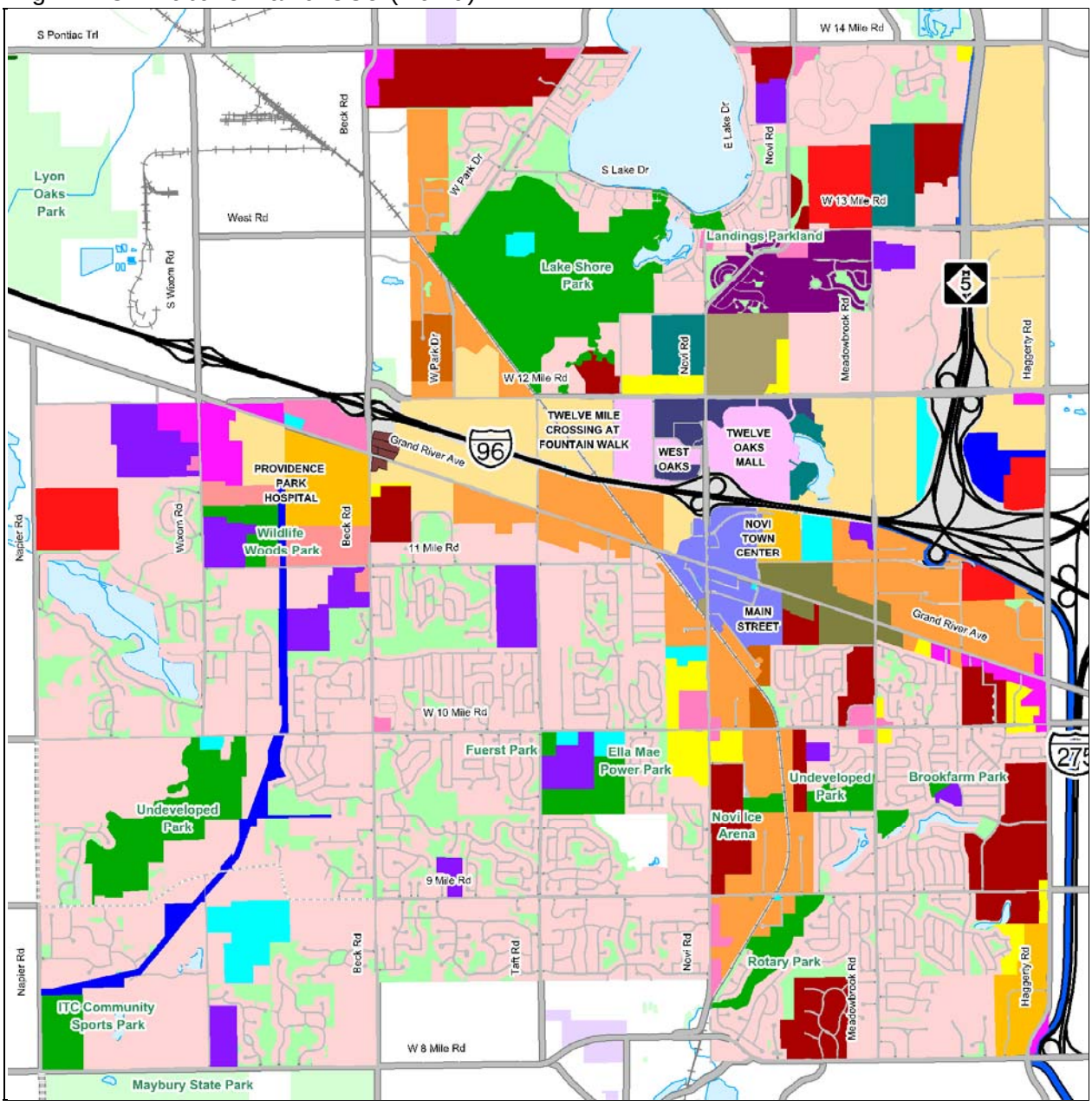


Fig. 2.1C. Future Land Use (2010)

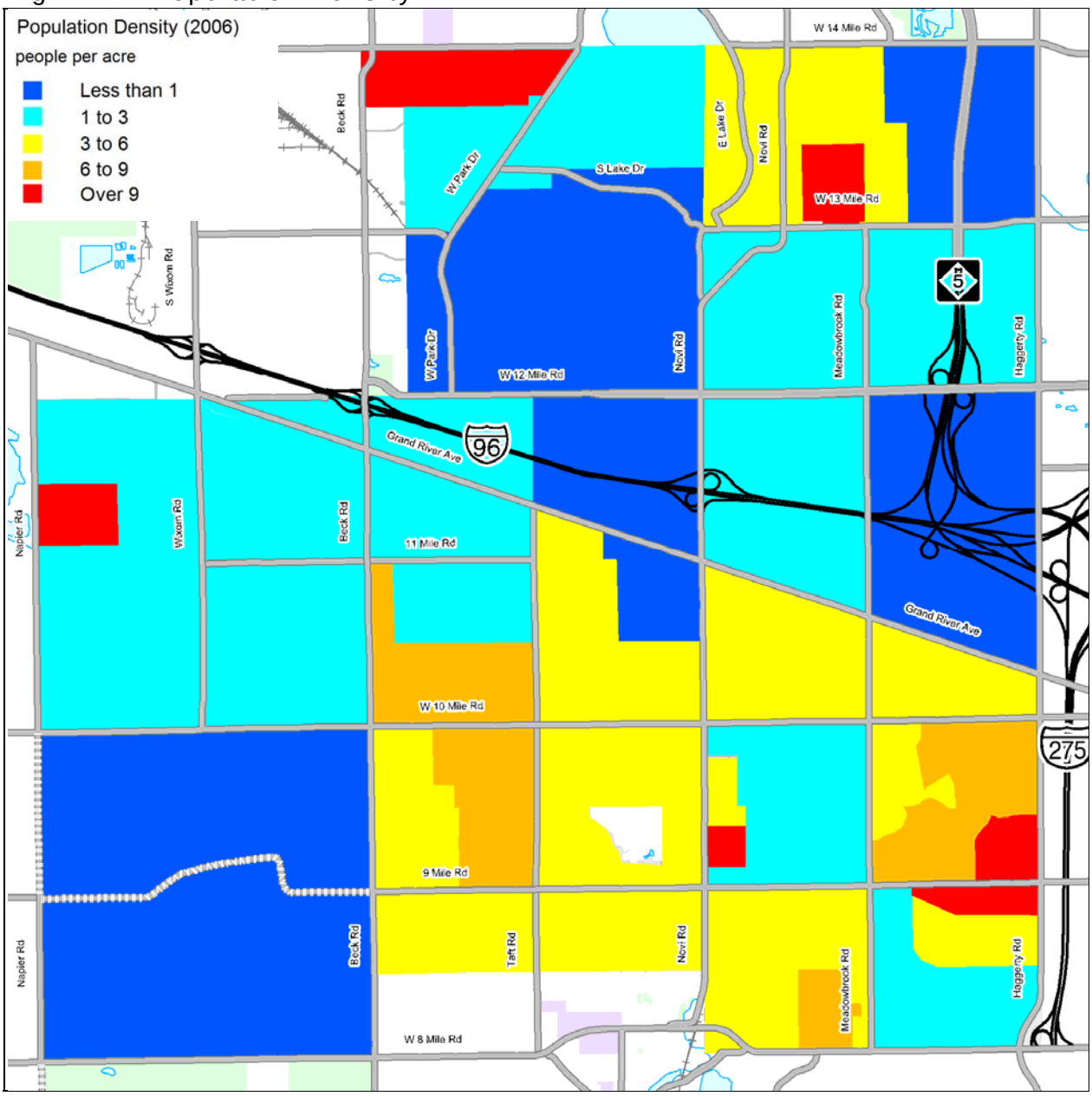


Future Land Use (2010)

- Suburban (Low Rise)
- Single Family
- Mobile Home Park
- Multiple Family
- Local Commercial
- Community Commercial
- Regional Commercial
- Office Commercial
- Community Office
- Office Rd Tech
- Industrial Rd Tech
- Heavy Industrial
- TC Commercial
- TC Gateway
- PD1
- PD2
- PUD
- Educational Facility
- Public
- Private Park
- Public Park
- Cemetery
- Utility

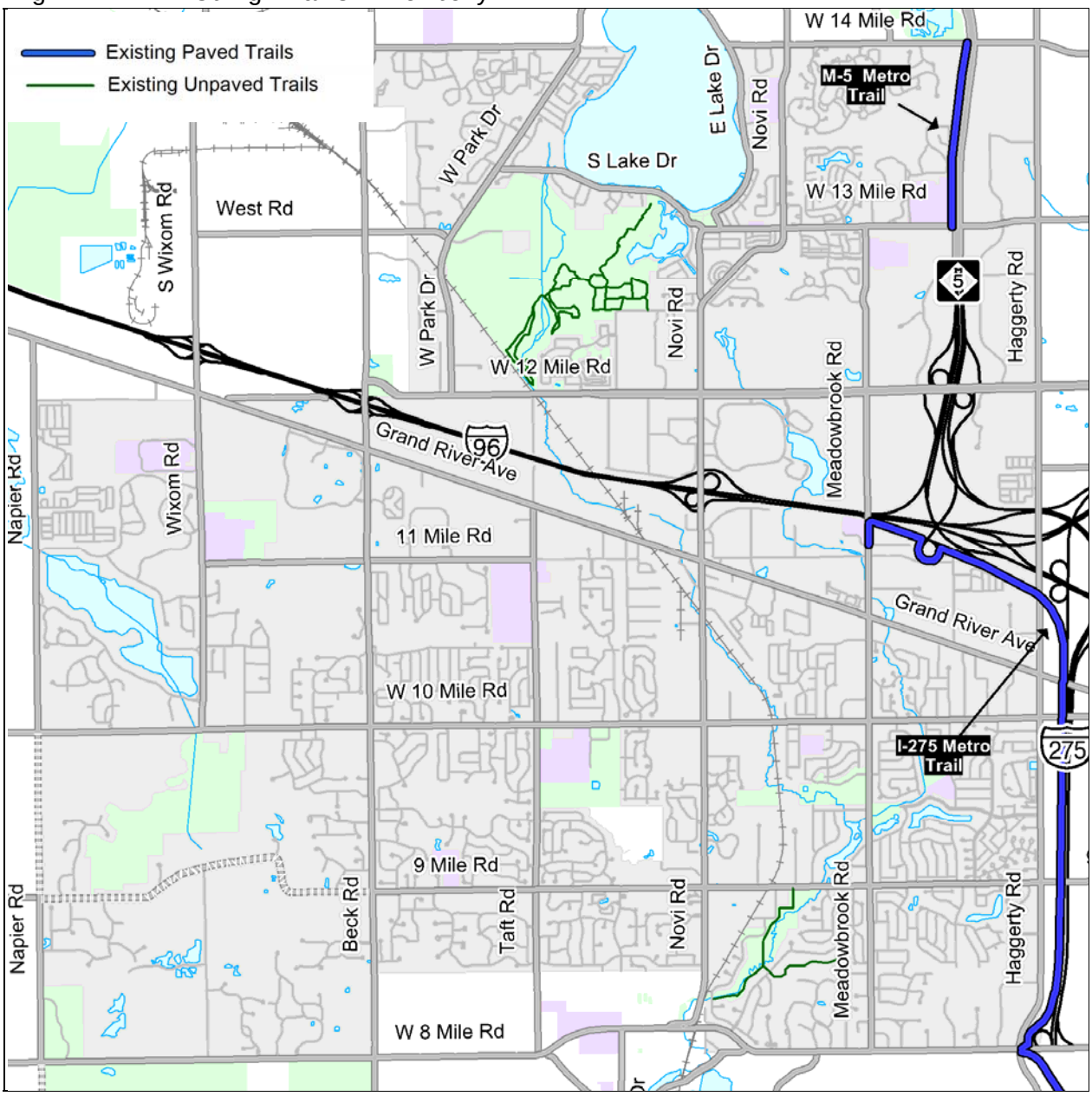
0 1/4 1/2 1 MILES

Fig. 2.1D. Population Density



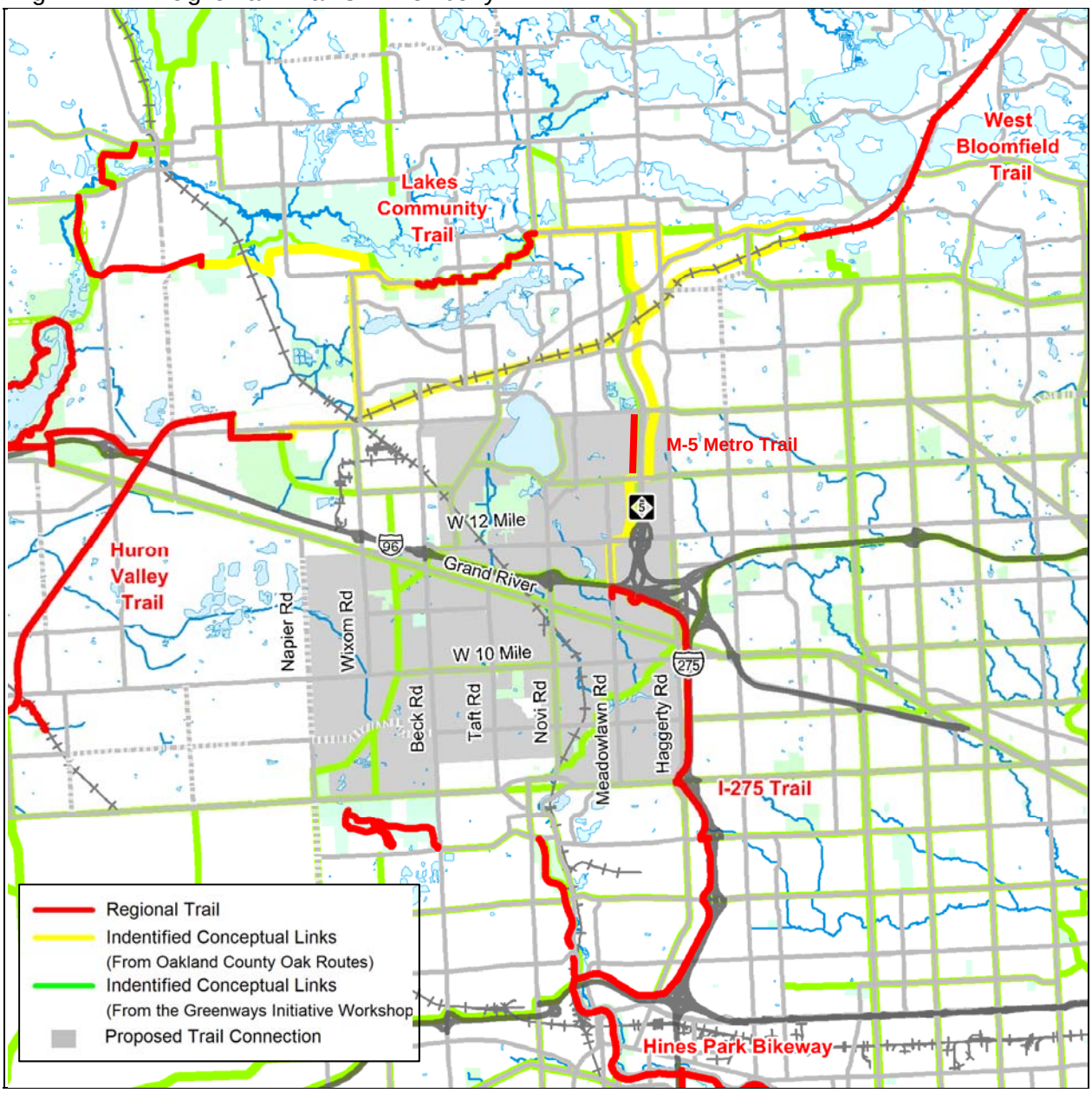
Based on the 2007 special census.

Fig. 2.1E. Existing Trails Inventory



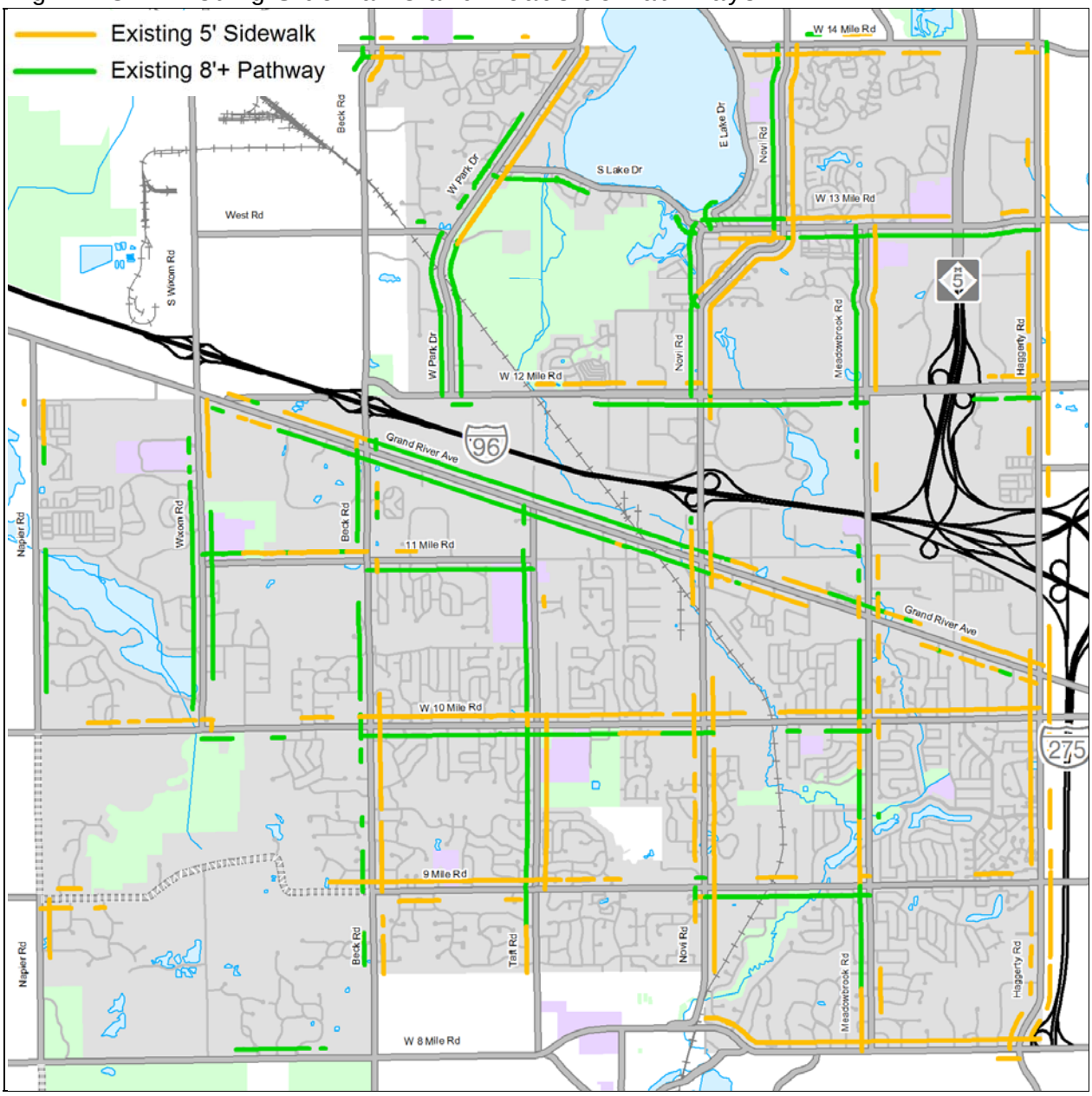
The I-275 Metro Trail is a 40 mile bikeway that links communities in Wayne, Oakland and Monroe counties. The trail terminates at Meadowbrook Road just south of the I-96 expressway. The M-5 Metro Trail was recently built in 2010 with plans to extend north along M-5.

Fig. 2.1F. Regional Trails Inventory



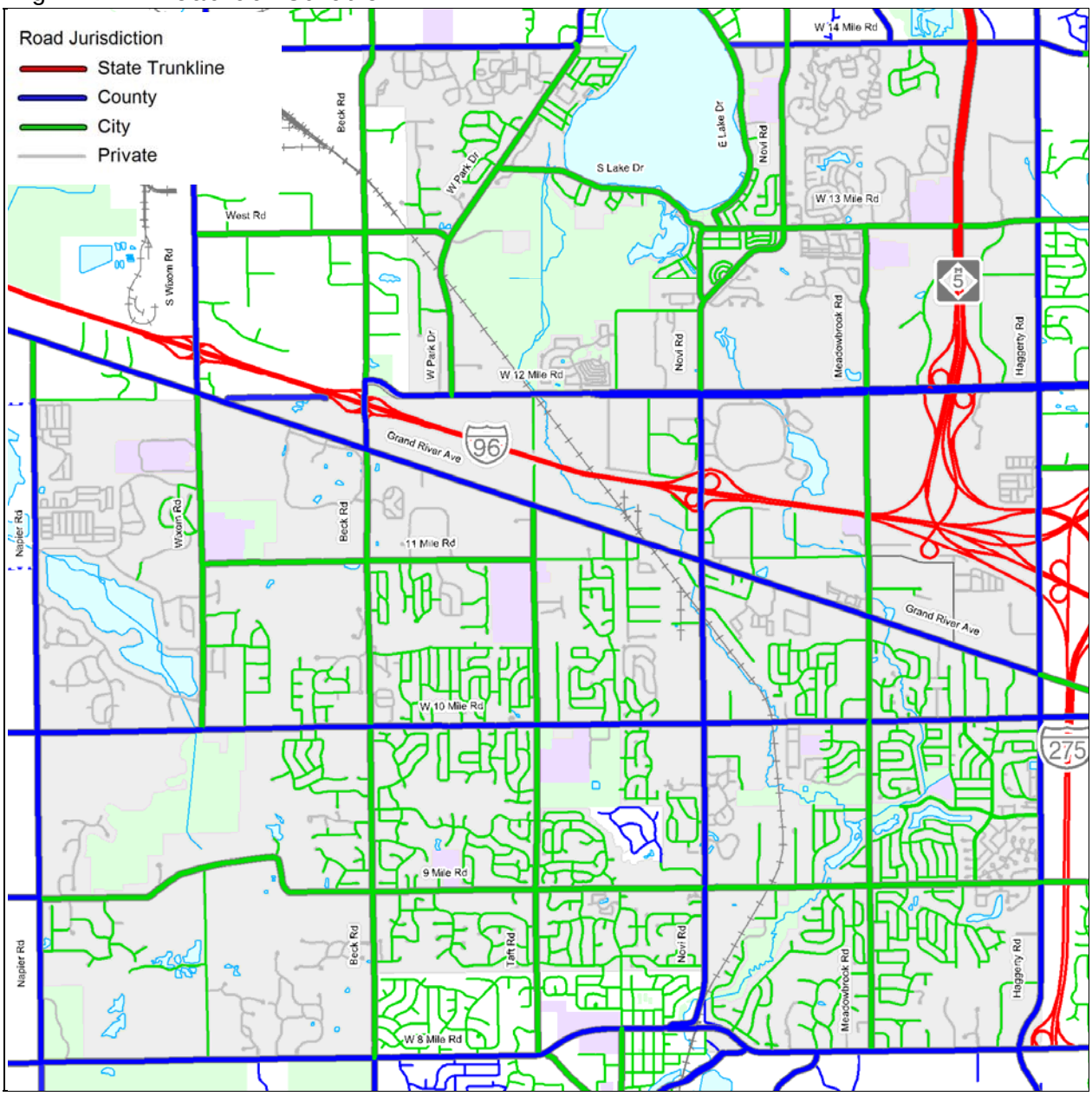
The existing I-275 Metro Trail and under development M-5 Metro Trail runs up the eastern border of the city. When completed it will provide a key link between the extensive regional trail system to the south and the proposed cross state trail to the north. The ITC corridor that generally runs north-south between Wixom Road and Beck Road between Maybury State Park and just east of Lyon Oaks County Park has the potential to link key regional parks to the residents.

Fig. 2.1G. Existing Sidewalks and Roadside Pathways



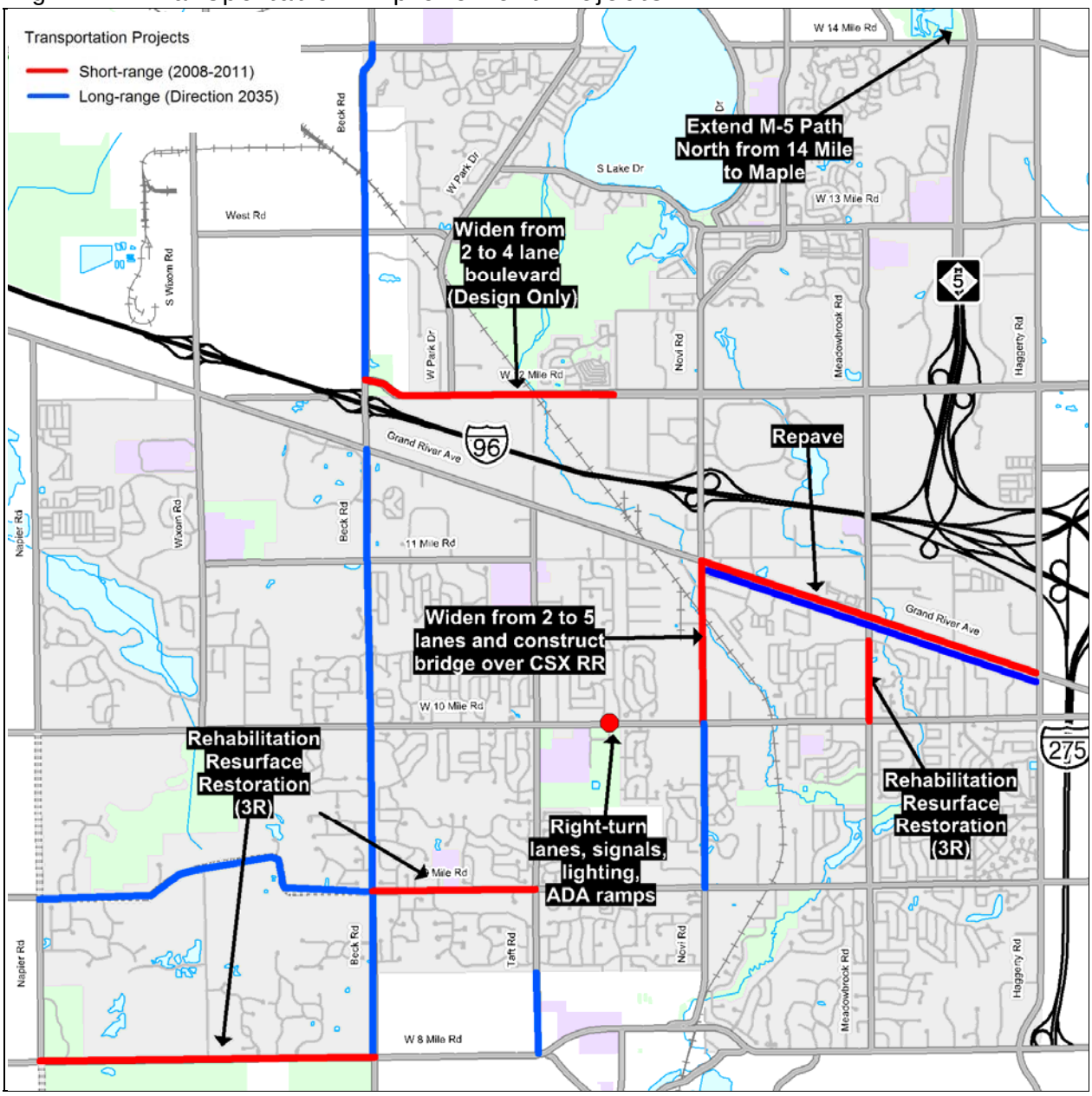
Along major roadways, the city generally has 5’ concrete sidewalks on one side of the road and 8’ asphalt pathways on the other side of the road. In 2006 the City of Novi Pathway and Sidewalk Prioritization Analysis and Process was approved by the City Council. Since that time the City of Novi has completed around 20,000 feet of pathways and sidewalks and developers completed over 10,000 feet of pathways and sidewalks in the City of Novi.

Fig. 2.1H. Road Jurisdiction



Roads owned by the state and managed by the Michigan Department of Transportation (MDOT) are shown in red. Any modifications to these "trunkline" roads must be coordinated with and approved by MDOT. Likewise any roads shown in blue are under the jurisdiction of the county road commission and any modifications to these roads must be coordinated with and approved by the county road commission.

Fig. 2.1I. Transportation Improvement Projects

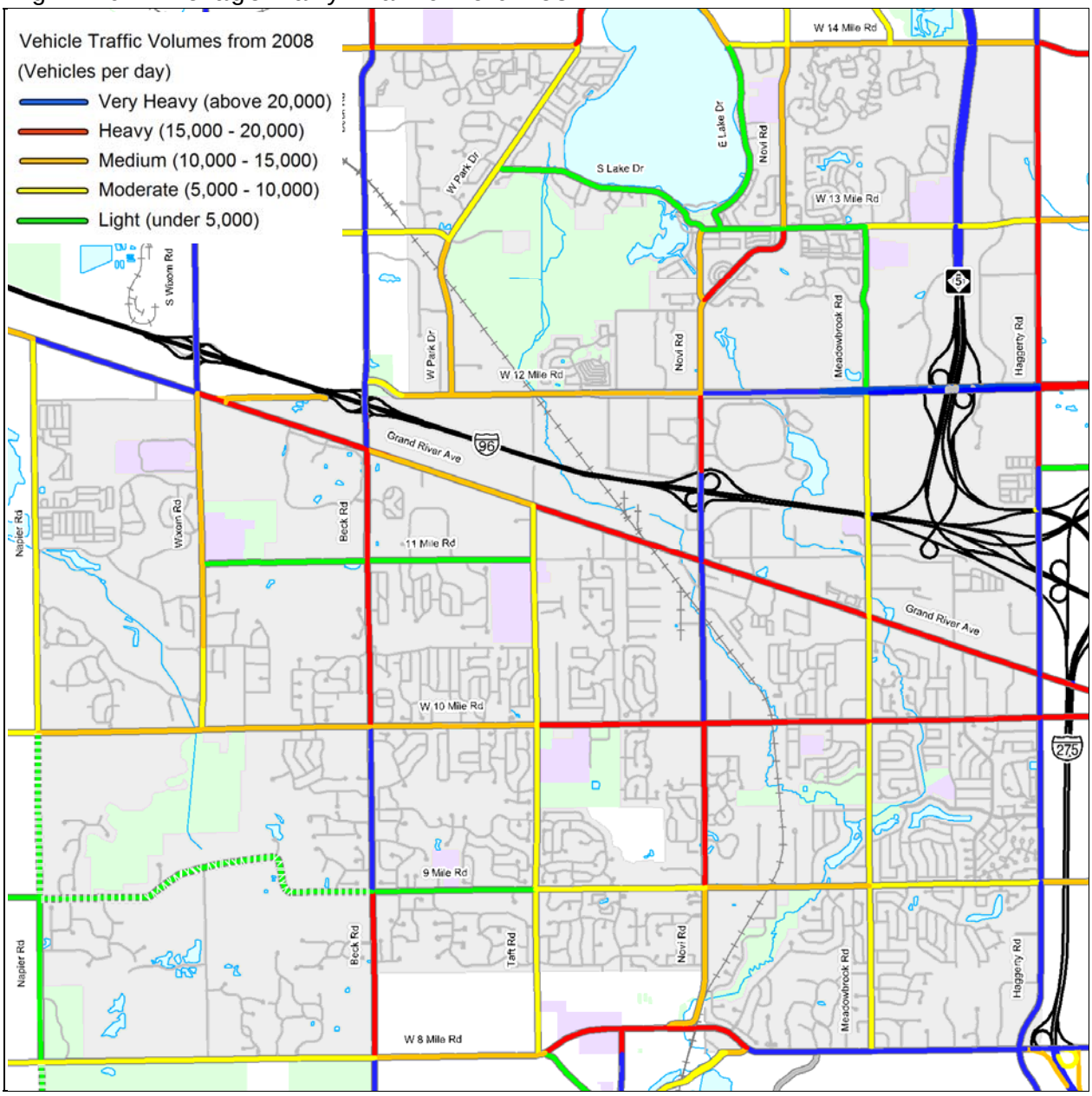


Short –Range – FY 2008-2011 Transportation Improvements (TIP) is a list of all transportation projects receiving federal funding in Southeast Michigan through 2011. The TIP represents the priorities of the cities and transportation agencies for implementing Direction 2035, the region's long range transportation plan.

Long – Range – Direction 2035 is the long-range vision for the proper maintenance and expansion of the transportation infrastructure to meet basic transportation and regional sustainability goals. It serves as a guide for developing a transportation system that is accessible, safe and reliable and contributes to a higher quality of life for the region's citizens. The long-range vision guides implementation of the short-range project in the TIP.

Only Projects on federal-aid eligible roads are mapped.

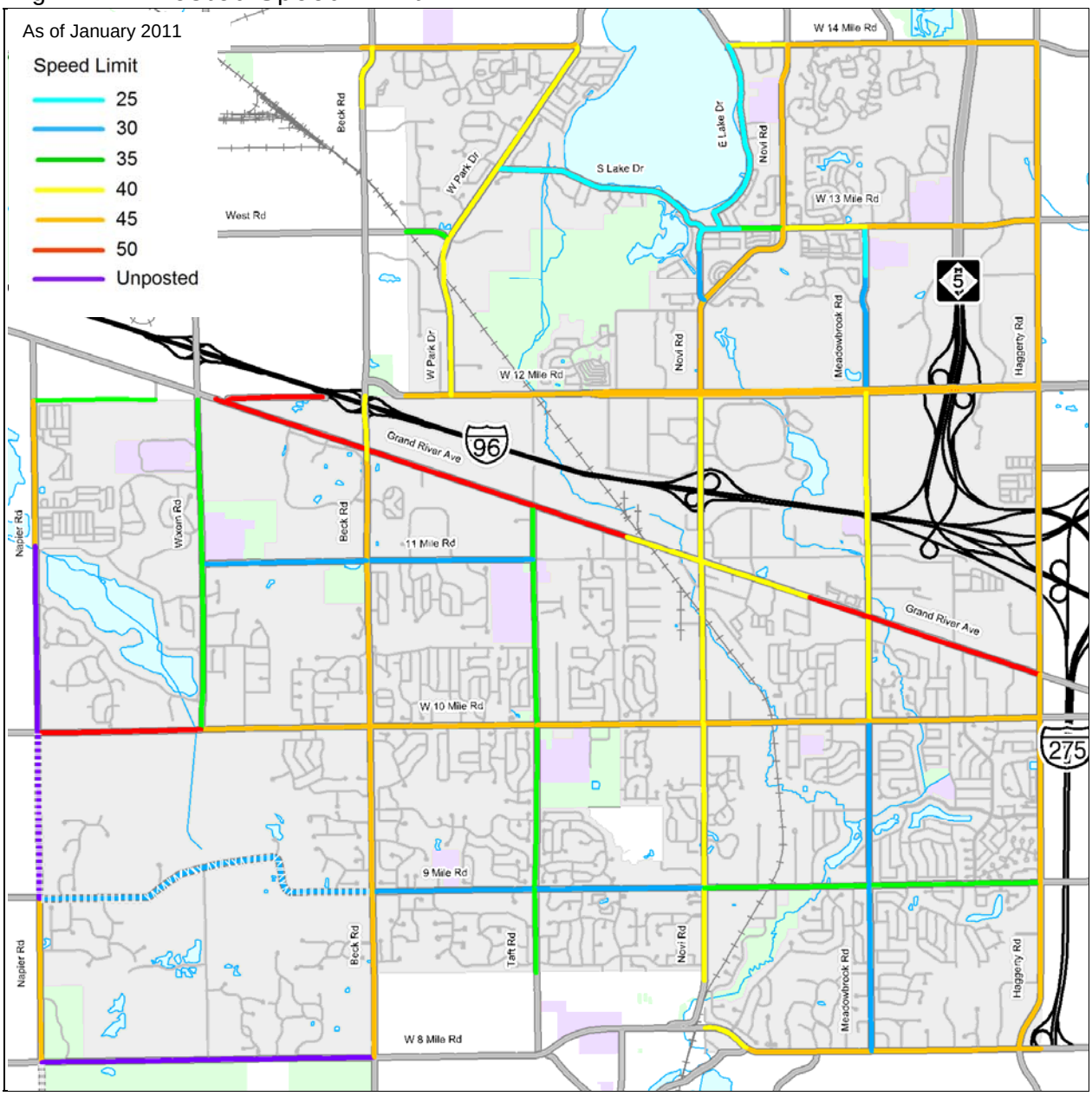
Fig. 2.1J. Average Daily Traffic Volumes



Annual Average Daily Traffic (AADT) is an estimate of traffic volumes. The volumes are based on total two-way traffic over a 24-hour period and may vary by season or day of the week. The volumes are determined from a combination of actual traffic counts and modeling. The map shows 2008 data provided by SEMCOG.

The gradations used generally reflect noticeable changes in the comfort level of bicyclists sharing a roadway with motorists, all other factors being equal.

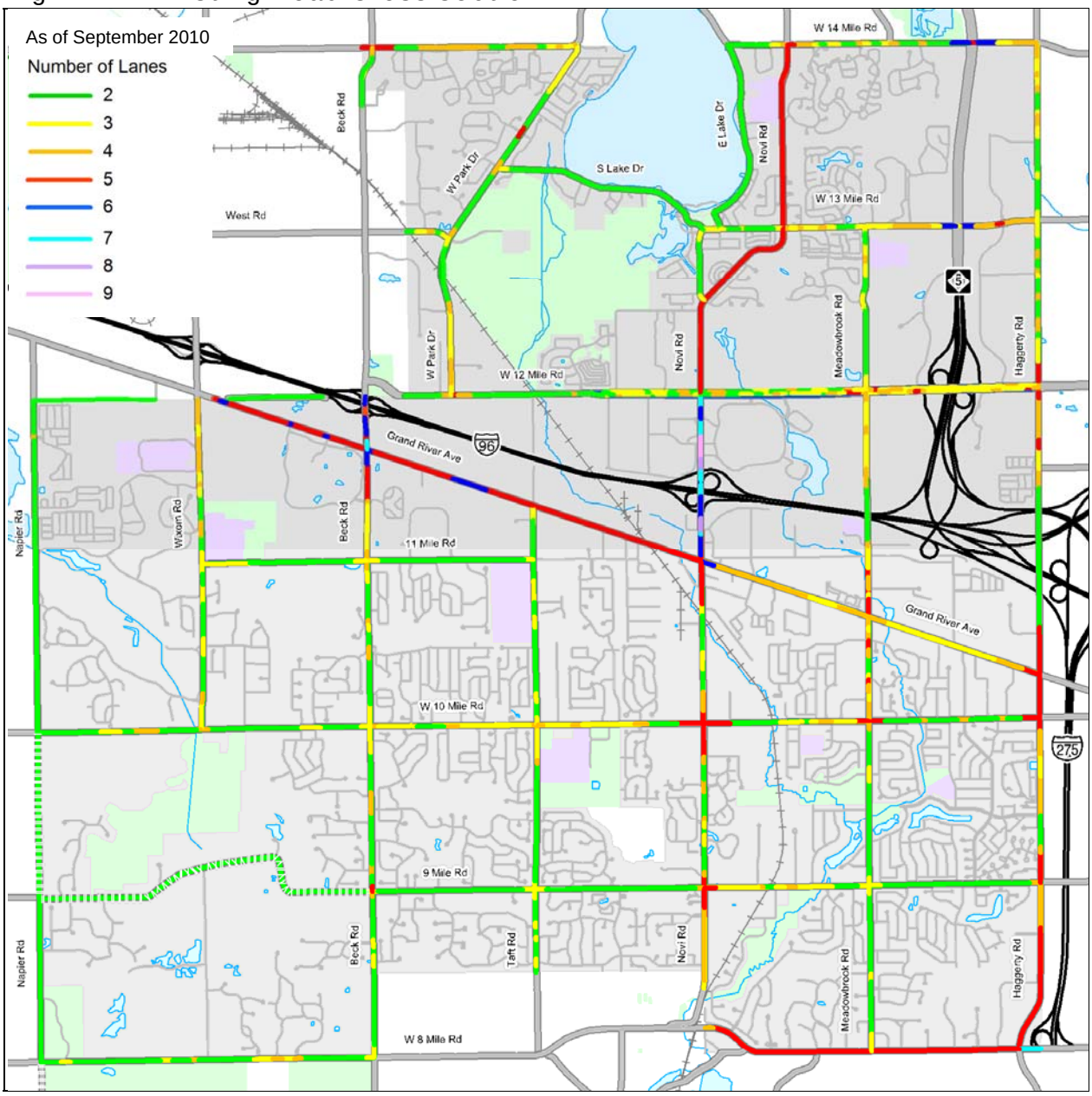
Fig. 2.1K. Posted Speed Limit



Roadways with high speeds can reduce the comfort level for bicycles and pedestrians traveling along a road corridor, and my even discourage bicycle and pedestrian use all together. Actual running speeds are likely higher than posted speeds.

Please note that speed limits along some roads are in the process of changing so some of the speeds listed above may be outdated.

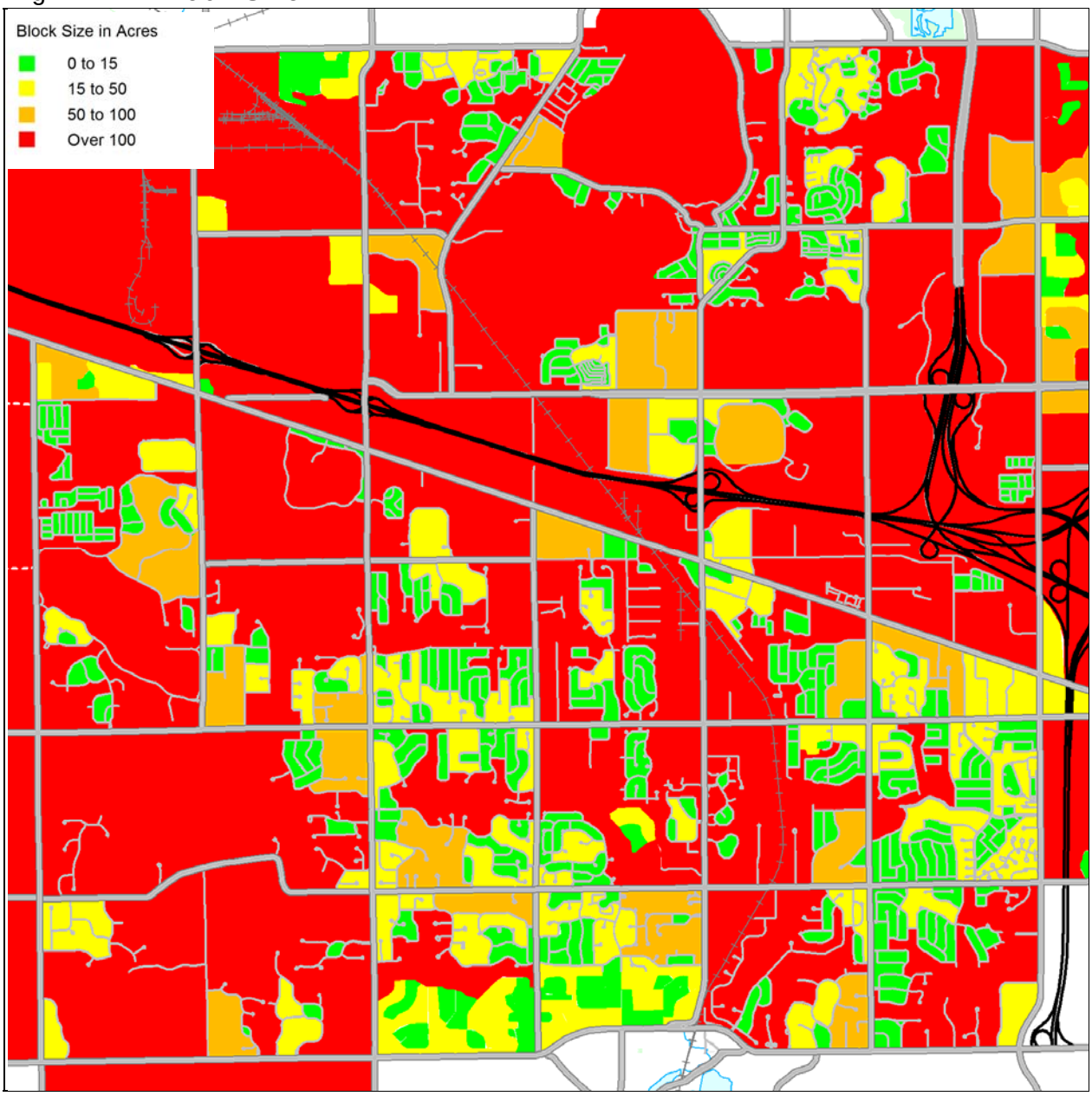
Fig. 2.1L. Existing Road Cross-section



The majority of the roads in the city are two lane roads, although many of these roads have designated turn lanes and by-pass lanes in places. The widest roads for the most part border the freeway corridors.

Generally, roadways with numerous designated turn lanes and by-pass lanes present challenges when trying to incorporate bicycle facilities into the existing road cross-section.

Fig. 2.1M. Block Size



Block size is an excellent measurement of directness of travel and a key indicator in the level of pedestrian activity. A block is defined as an area that a person cannot pass through. These areas usually do not have any sidewalks, roadways or bike paths allowing access between two points. One example is an expressway where you may have to go a mile or more out of your way just to get to the other side.

The majority of the city's landmass is in blocks over 100 acres in size. There are no large contiguous areas where the block size is 15 acres or less in size. Finding ways to create more direct pedestrian travel ways will be key to making Novi a more walkable community.

2.2 The Pedestrian Environment

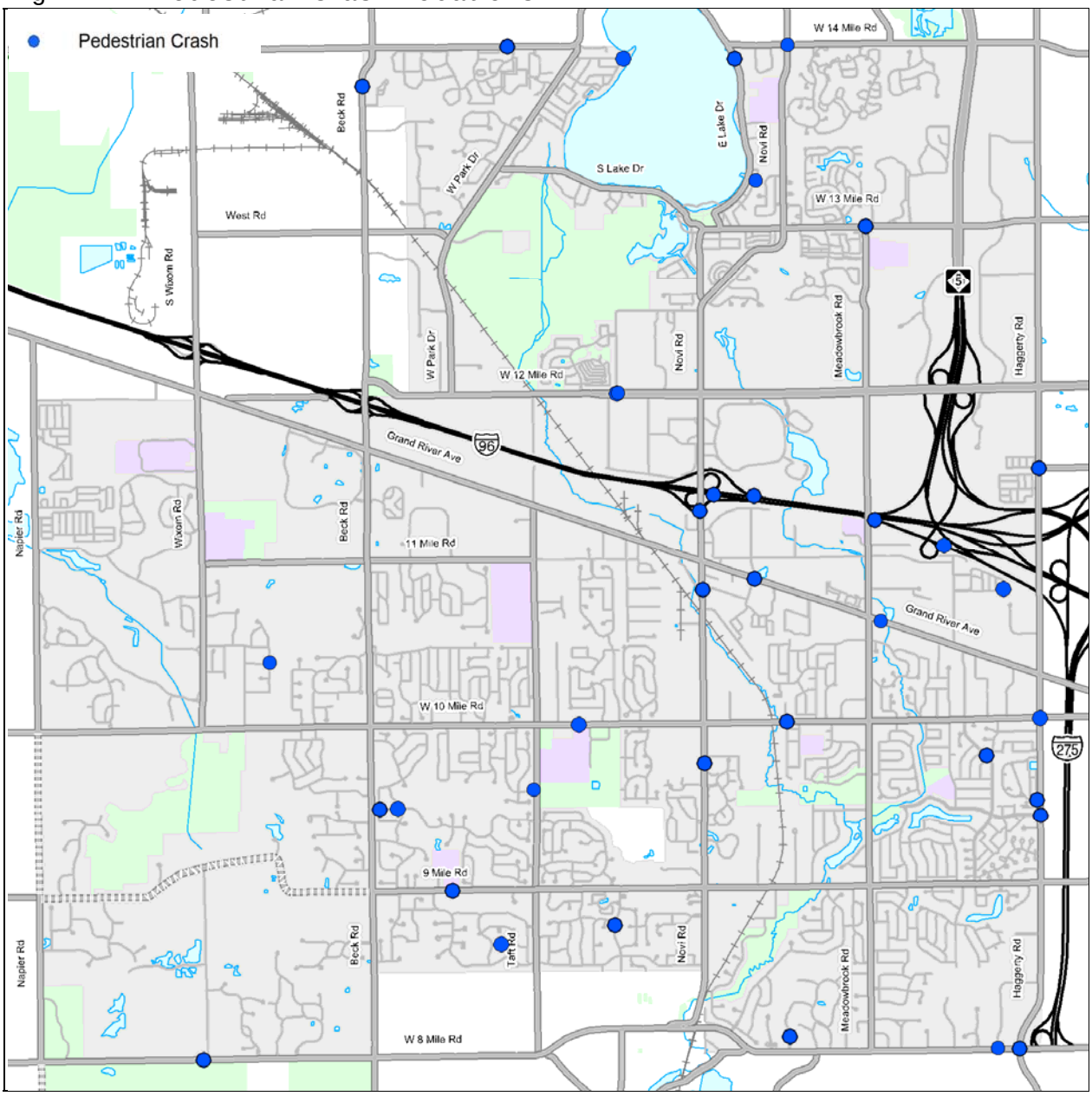
The City of Novi has a partially complete sidewalk system along the major roadways, however there are still significant gaps along major roadways in both the built up and more suburban parts of town. The quality of the pedestrian experience on these sidewalks varies greatly throughout the City. Some sidewalks have little if any buffer such as a row of trees or parked cars, between the sidewalk and the roadway. This lack of a barrier has been shown to have a significant adverse impact on the quality of the walking experience. Other sidewalks and roadside pathways are set well back from the road and have substantial vegetated buffer.

Another major issue lies with cross-roadway accommodations. There are significant stretches of the major thoroughfares that provide no means to cross the roadway safely. There are also places where logical crossings are not accommodated. Even where there are marked crosswalks, they are often inadequate. Many times the existing crossings are missing key safety features, making them difficult to cross, especially on high speed multi-lane roadways.

The following maps provide a general summary of the existing conditions of pedestrian facilities in the City of Novi:

- Fig. 2.2 A. Pedestrian Crash Locations
- Fig. 2.2 B. Pedestrian Crash Data
- Fig. 2.2 C. Existing Sidewalk Quality
- Fig. 2.2 D. Existing Crosswalk Spacing Analysis
- Fig. 2.2 E. Existing Road Crossing Difficulty Assessment

Fig. 2.2A. Pedestrian Crash Locations



The crashes shown are from a five year period, 2004 – 2009.

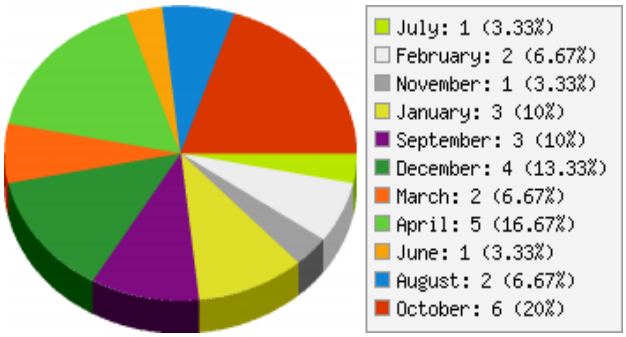
There were 30 pedestrian involved crashes, none were fatal and ten resulted in serious injuries. Drinking or drug use was involved in 3 of the crashes. There was no traffic control at 70% of the crash locations.

The Michigan Traffic Crash Fact website was the source of the data and charts.

Fig. 2.2B. Pedestrian Crash Data

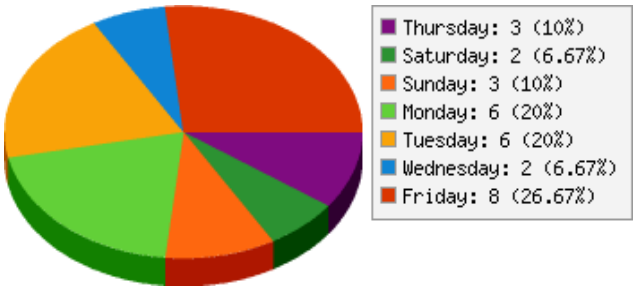
Month of Crash

Pedestrian crashes occurred in every month except February.



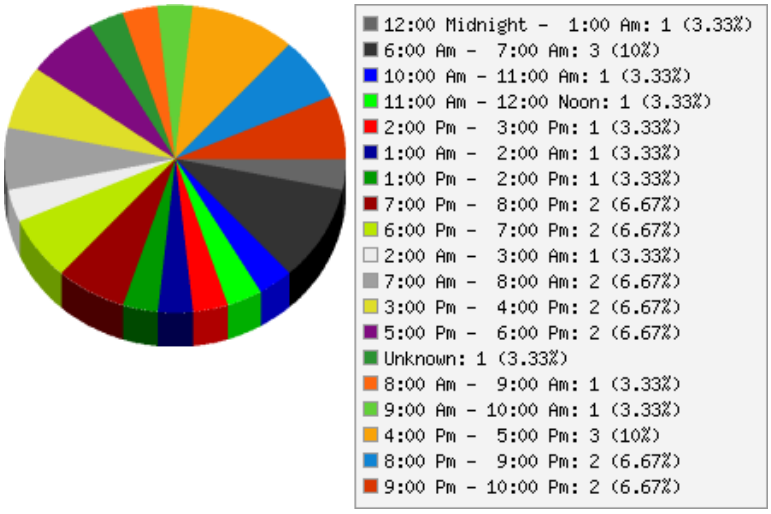
Day of Week

Crashes took place on every day of the week with the most occurring on a Friday.



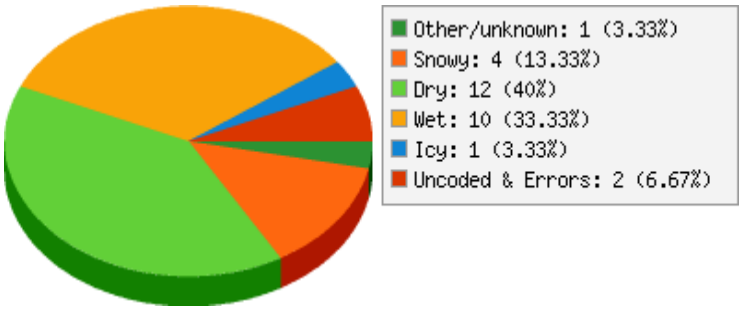
Time of Day

All but one crash took place between 6:00 AM and 10 PM. Half the crashes took place during daylight, 7% took place during dawn and 40% took place in the dark (3% were not coded).



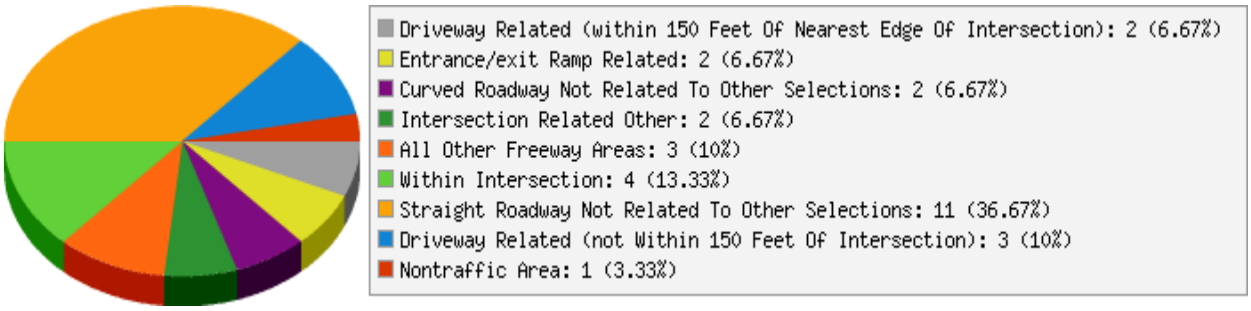
Road Conditions

Wet, Snowy or Icy roads were a factor in about half the crashes.



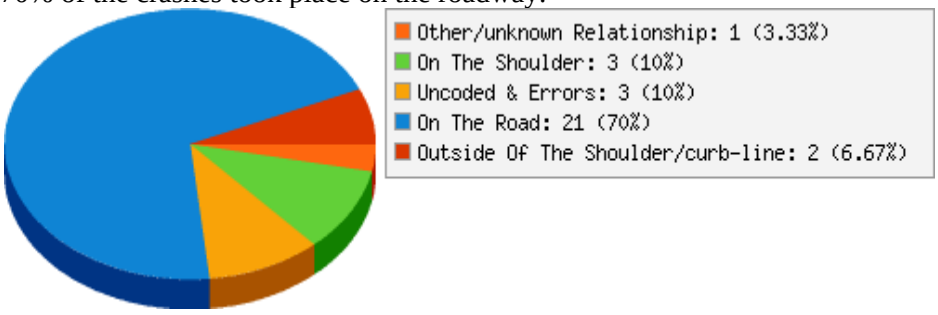
Area of Road at Crash

43% of the crashes are related to an intersection or driveway.



Relation to Roadway

70% of the crashes took place on the roadway.



Sidewalk Quality

A key factor to a pedestrians comfort level on a sidewalk is the degree of separation from the roadway. Elements such as lawn buffers and vertical elements tend to make a pedestrian feel more separated from the roadway, increasing the pedestrian's level of comfort when on a sidewalk.

The sidewalk quality rating system is designed to help identify a pedestrian's level of comfort when on a sidewalk based on the amount of separation from the roadway. The rating system is broken up into five categories A, B, C, D and E. A sidewalk with a rating of "A" has the best pedestrian comfort level and a sidewalk with a rating of "E" has the worst pedestrian comfort level.

A - Rating
Sidewalk is setback from roadway and contains vertical elements such as closely spaced trees and/or light poles.

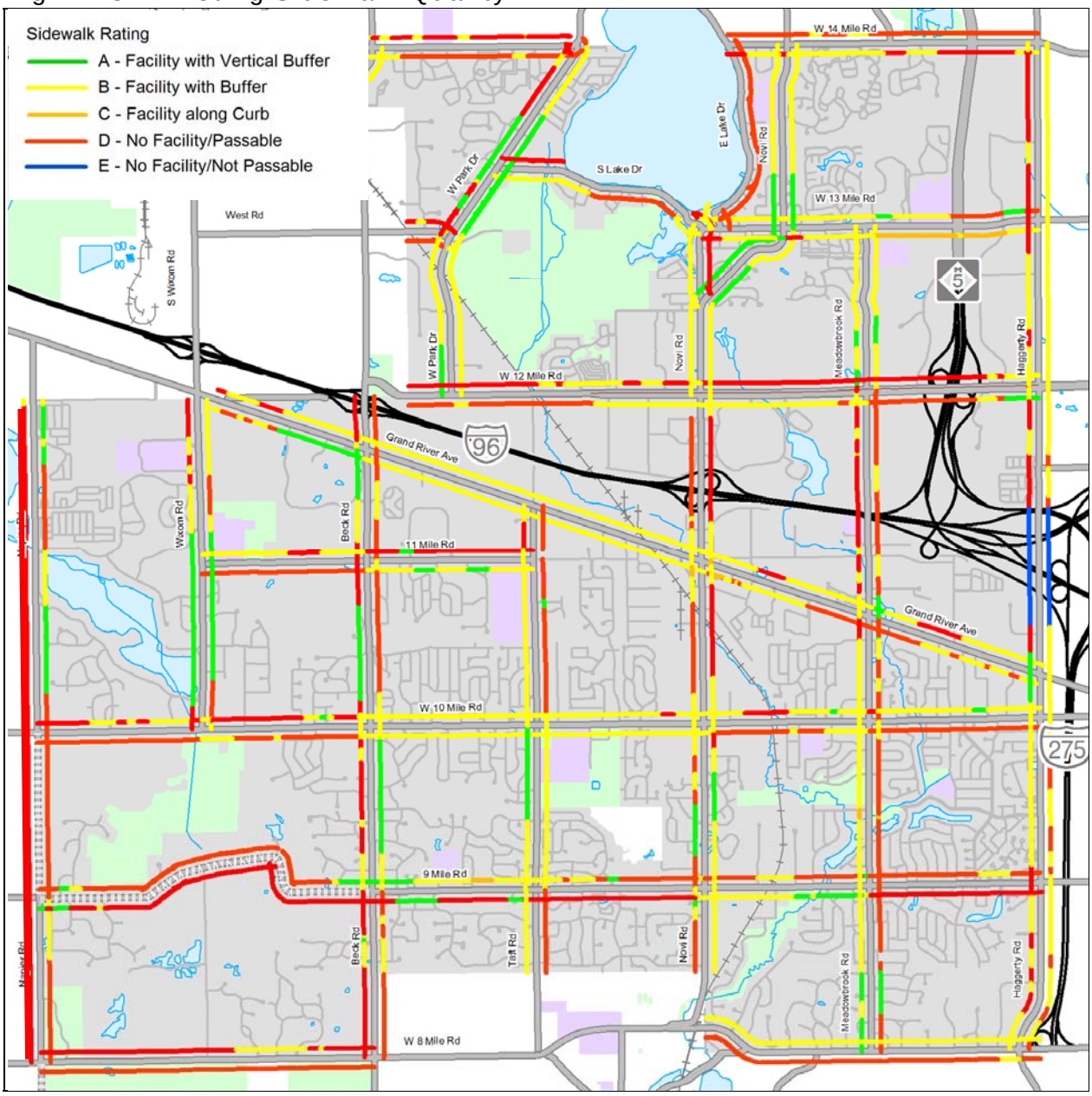
B - Rating
Sidewalk is setback from roadway but contains no vertical elements.

C - Rating
Sidewalk is directly adjacent to the roadway along the curb and has no buffer space or vertical elements.

D - Rating
No sidewalk facility is built, but the area is physically passable by foot.

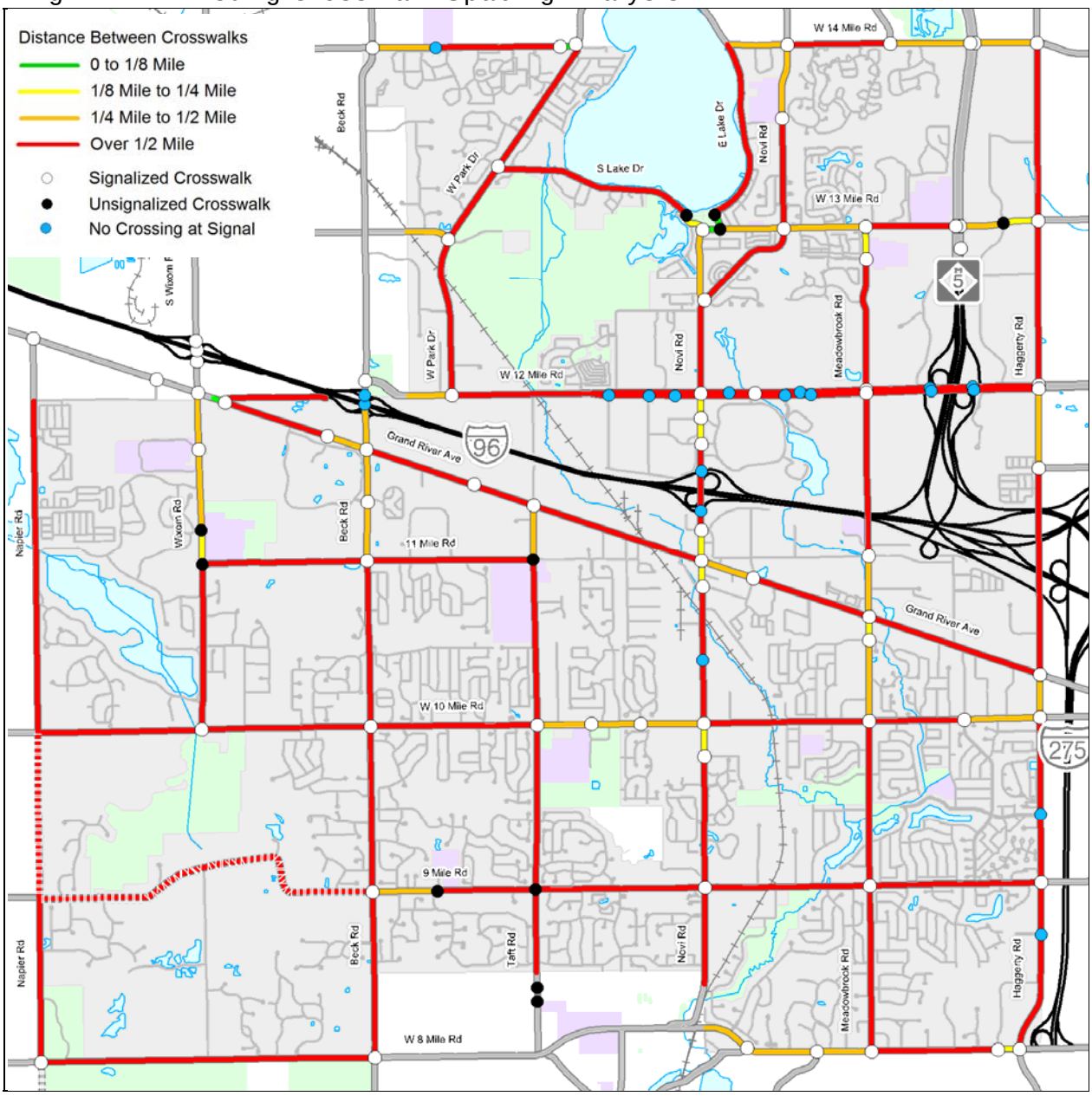
E - Rating
No sidewalk facility is built and the area is not physically passable by foot. Physical barriers such as streams or expressway overpasses usually contribute to this type of situation.

Fig. 2.2C. Existing Sidewalk Quality



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

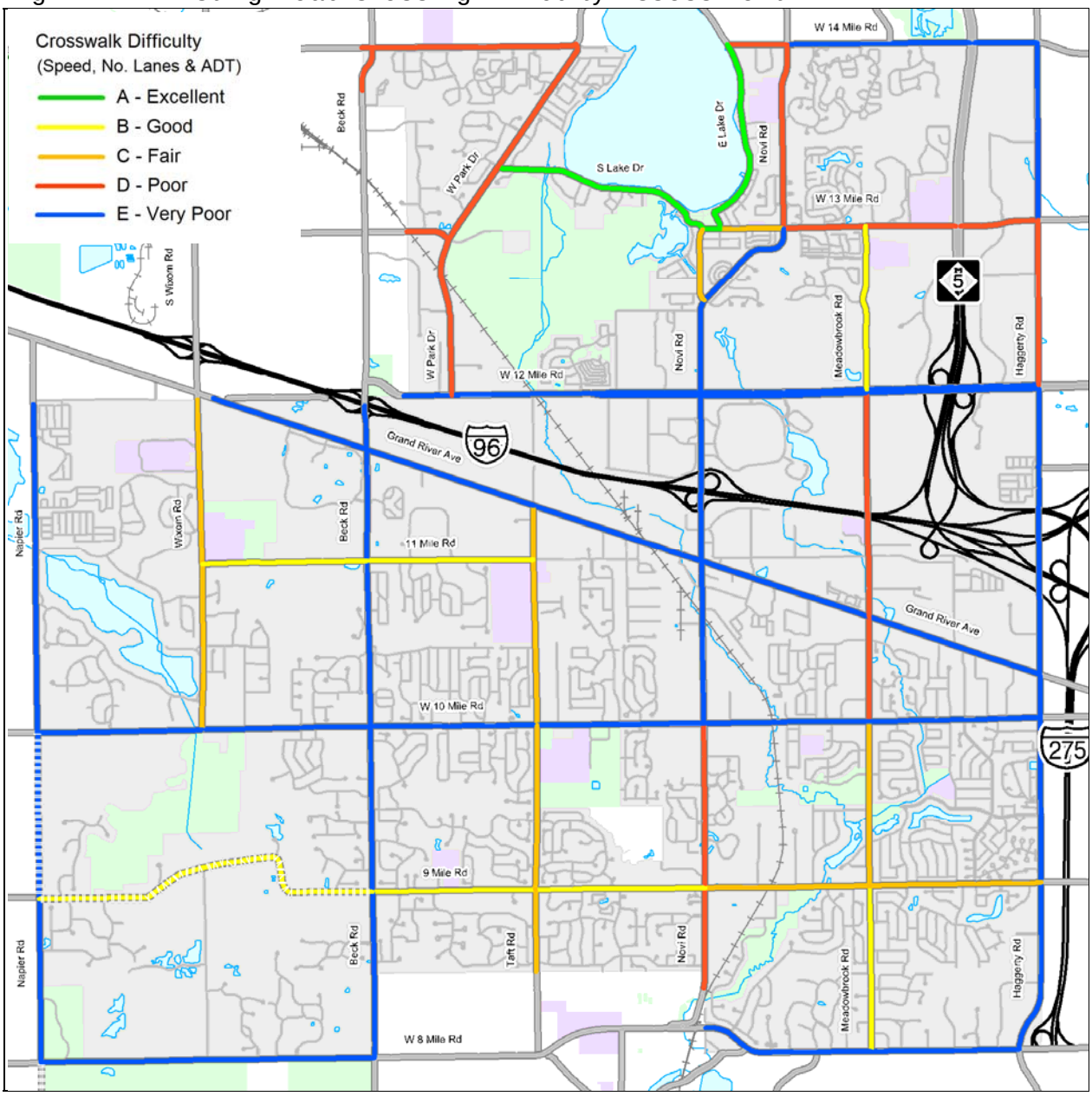
Fig. 2.2D. Existing Crosswalk Spacing Analysis



Crosswalk spacing is a key factor in directness of travel. Most pedestrian trips for personal business (like walking to the store) are about ½ mile long. Where there is demand to cross the road and crosswalk spacing is over 1/8 of a mile apart, midblock crossings are likely to occur. There are numerous stretches or roadway on primary streets within the city with over ½ mile between crosswalks. This analysis measures the distance that a pedestrian would have to travel in order to cross the road at a designated crossing.

This analysis was based on existing conditions. Signalized intersections without pedestrian crossings were not used in this calculation because they do not provide a safe crossing. However, please note that existing signalized crossings that were used in this analysis may not be up to ADA standards, so even if they have a crossing, they may not be accessible to everyone.

Fig. 2.2E. Existing Road Crossing Difficulty Assessment



Road crossing difficulty is a measurement of how difficult a person would typically find it to cross a road at an unmarked mid-block crosswalk. It is based on the number of lanes, speed and average daily traffic. Overall, it is generally difficult to cross with ADT being the most restrictive factor on primary roads in the city.

Grade	Lanes	Speed	ADT
A	2	<30	<5,000
B	3	30	5,000-10,000
C	4	35	10,000-15,000
D	5	40	15,000-20,000
E	6	45+	20,000+

Road crossing difficulty is based on the number of lanes, speed limit and daily traffic volumes. For example a road that has 25,000ADT, 4 lanes and a posted speed limit of 40mph with no existing bike lane would get a E rating. A 5 lane with a speed limit of 40mph receives a D rating, however the 25,000ADT makes it a E rating because the most restrictive rating is applied (please refer to the chart above).

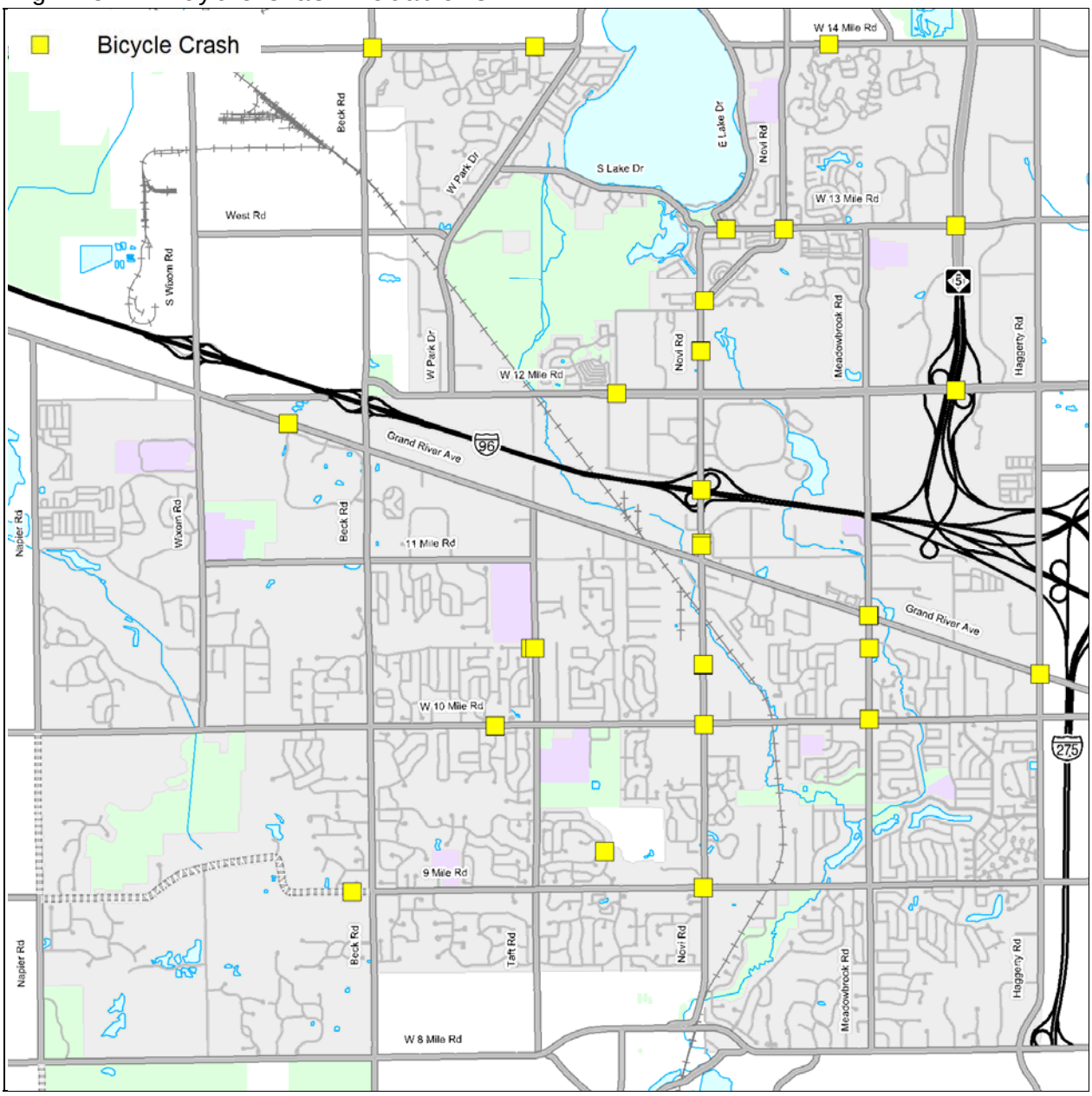
2.3 The Bicycling Environment

The approach to handling bicycles in the City is inconsistent and incomplete. Most of the efforts have been put toward the roadside pathways. There are a few short segments of existing bike lanes in the city. There is a one-way bike lane on South Lake Drive and a two-way bike lane on East Lake Drive with a short pathway connecting the two. There is also a bike lane on Taft Road south of 9 Mile Road. Currently the Pathways along the side of the arterial and collector roads function as the main bicycle facilities. However, this system is incomplete and many bicyclists may prefer to ride in the roadway when commuting across town. Even together, the on-road and off-road facilities do not make for a complete system and transfers between on-road and off-road facilities are not logical or convenient.

The following maps provide a general summary of the existing conditions in the City of Novi:

- Fig. 2.3A. Bicycle Crash Locations
- Fig. 2.3B. Bicycle Crash Data
- Fig. 2.3C. Roadside Pathway Conflicts
- Fig. 2.3D. In-Road Bicycling Quality Assessment

Fig. 2.3A. Bicycle Crash Locations



The crashes shown are from a five year period, 2004 – 2009.

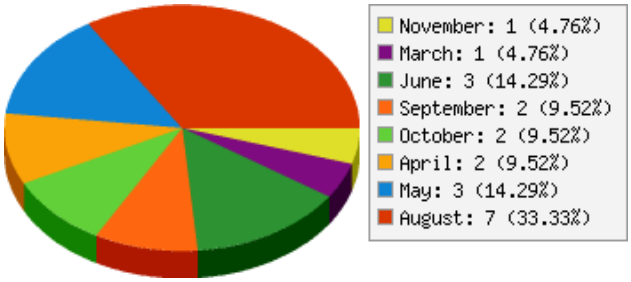
There were 31 bicycle involved crashes, none were fatal and six resulted in serious injury. Drinking or drug use was involved in 1 of the crashes. There was no traffic control at 38% of the crashes; a signal was present at 43% and a stop sign at 19% of the locations.

The Michigan Traffic Crash Fact website was the source of the data and charts.

Fig. 2.3B. Bicycle Crash Data

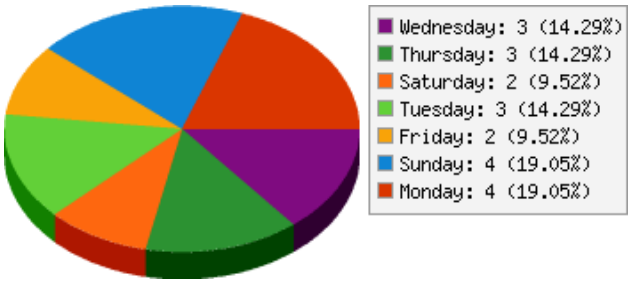
Month of Crash

There were no crashes during the months of December, January, February and March. This is likely due to fewer bicyclists during the winter months and that winter bicyclists are more experienced bicyclists.



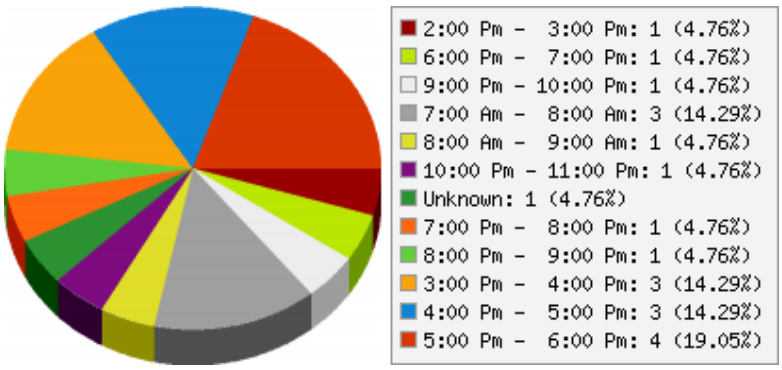
Day of Week

Crashes were evenly distributed throughout the week.



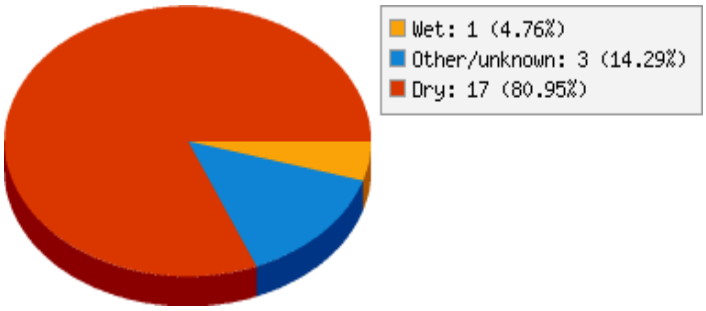
Time of Day

The crashes took place between 7:00 AM and 10 PM. 81% of the crashes took place in daylight, 5% at dusk and 10% took place when it was dark (9% were not coded).



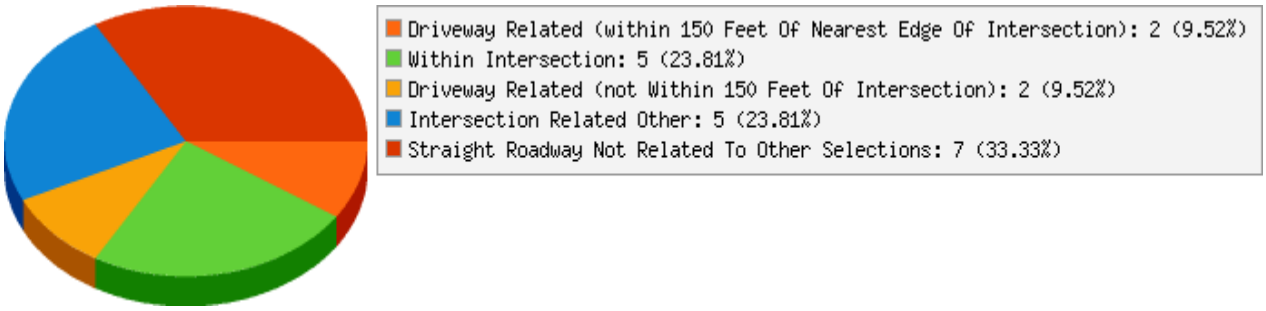
Road Conditions

The road was dry for 80% of the crashes.



Area of Road at Crash

67% of the crashes were related to a driveway or intersection.



Relation to Roadway

86% of the crashes took place in the roadway.

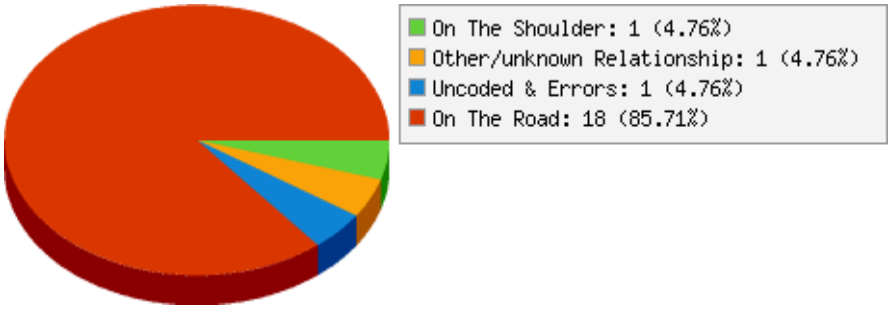
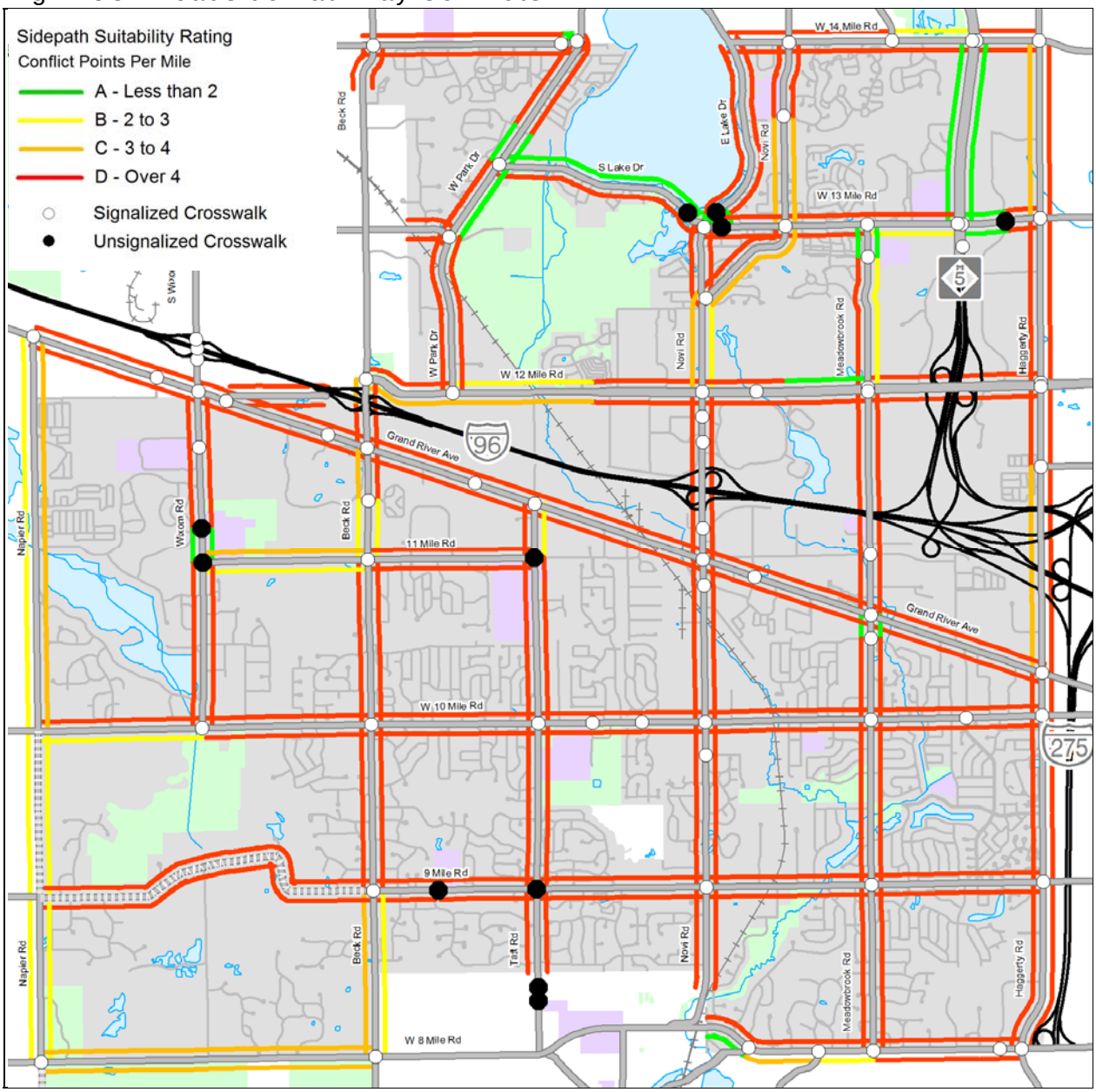


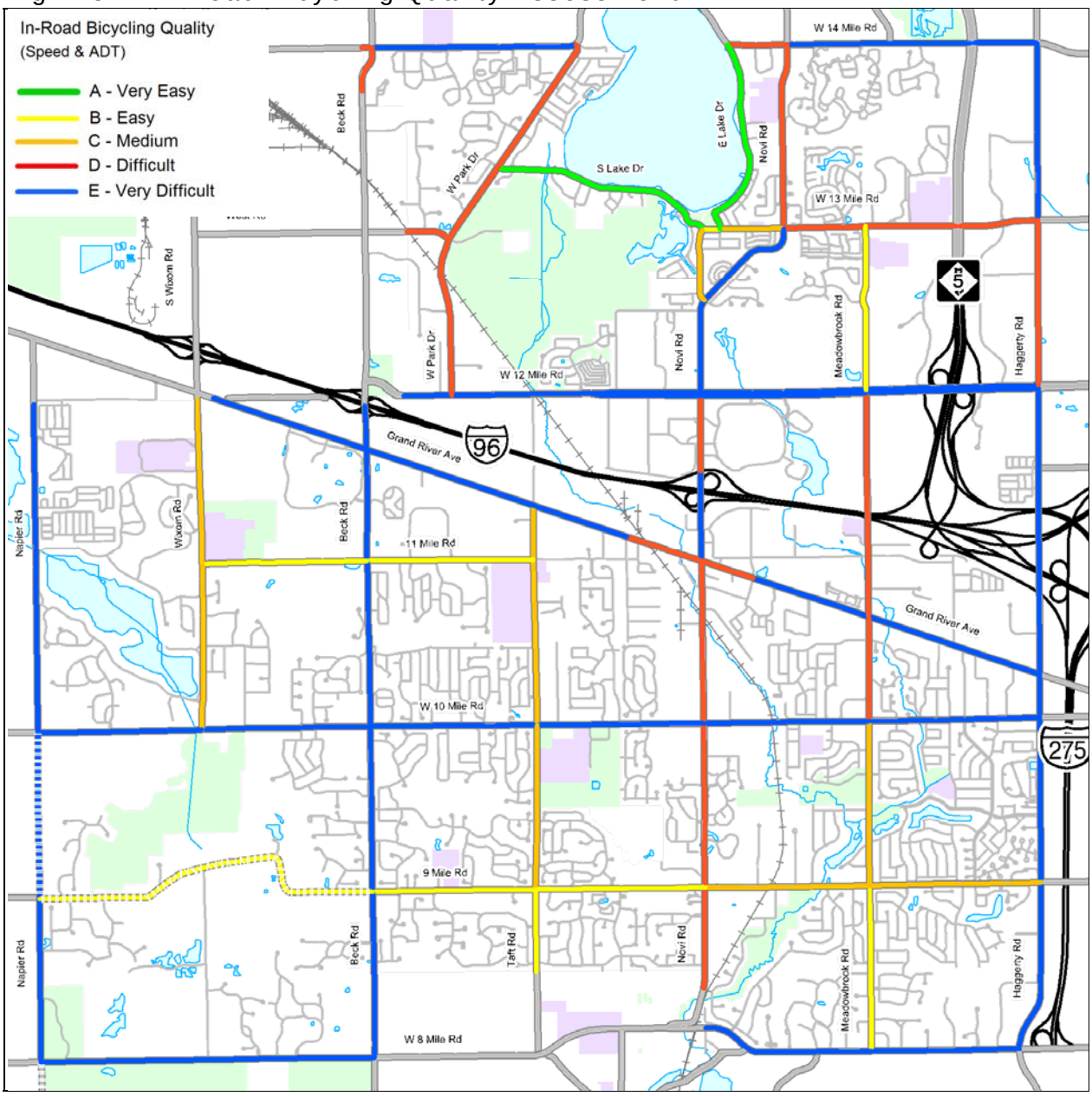
Fig. 2.3C. Roadside Pathway Conflicts



A conflict point is a local road or high traffic volume commercial driveway. For this analysis, each segment of sidewalk between two major roadways was given a rating from A to E based on the number of conflict points (see legend). Ten minor/residential driveways or one local road or high volume driveway was considered equal to one conflict point.

The AASHTO Guide for the Development of Bicycle Facilities generally considers sidewalks undesirable as shared-use paths. This is due to the inherent conflicts between bicycles and motorists where a pathway intersects with driveways and roads. Suitable sidepath locations are uninterrupted by driveways and roadways for long distances and provide safe and convenient road crossing opportunities to destinations on the other side of the road.

Fig. 2.3D. In-Road Bicycling Quality Assessment



In-road bicycling facilities improve the quality of the bicycling experience on busy roads. Quality of the in-road bike facilities is based on speed limit and daily traffic volumes. A road with an existing bike lane has a higher quality; however, there are few existing bike lanes in the city.

Without Bike Lane	With Bike Lane	ADT	Speed Limit
A	A	0-5,000	25
B	A	5,000 – 10,000	30
C	B	10,000 – 15,000	35
D	C	15,000 – 20,000	40
E	C	20,000 – 25,000	45
E	D	Over 25,000	50

Quality of the in-road bike facilities is based on speed limit and daily traffic volumes. For example a road that has 12,000ADT and a posted speed limit of 40mph with no existing bike lane would get a D rating. An ADT of 12,000 puts the road in the C range, however the 40mph speed limit makes it a D rating because the most restrictive rating is applied (please refer to the chart above).

2.4 Projected Energy Savings

The desire to expand non-motorized transportation choices is generally driven by two factors. First is the goal to accommodate non-motorized transportation given the numerous economic, social and public health benefits. The second goal is to reduce the number of Vehicle Miles Traveled (VMT) and the corresponding reduction in Green House Gas (GHG) emissions. This could include shifting trips from single occupancy motor vehicles to bicycling, walking or transit. Regardless of the goal, the question is what change in transportation choices will occur if the environment for walking or bicycling is improved?

Answering this question precisely is hampered by limited data, sparse research on the subject, and the nuances that go into any transportation choice. What is likely, though, is that the number of people who walk and bicycle will increase when the environment for bicycling and walking is improved. It should be noted though that these increases in walking and bicycling do not necessarily have a reciprocal increase in bicycle and pedestrian crashes. Rather, with improved facilities and increases in the number of bicyclists and pedestrians, the crash rates typically decrease as motorists become accustomed to the presence of non-motorized traffic.

One of the least understood aspects of transportation planning is the notion of self-selection. It has been demonstrated that individuals who move to an area with a better non-motorized environment will indeed walk and bicycle more[1]. What is unknown is how much of that increase is the result of the environment alone vs. how much is the result of an individual's choice to live in a place because its environment supports bicycling and walking.

Existing Commuter Mode-split

To understand Novi's potential to increase the number of people walking and bicycling, it is helpful to look at how Novi's current bicycling and walking trends compare to other communities. Then we may be able to gauge approximately how many more people may be enticed to walk and bicycle.

The mode-split is the overall proportion of trips made by a particular mode of travel. This information is generally determined by surveys or census data. When looking at how Novi compares to other cities between 40,000 and 60,000 in population, its pedestrian and bicycle commute numbers are the second lowest. The percent who commute by bike (0.4%) is the third highest of its peers. The percent who walk (0.5%) is the second lowest of its peers. These numbers can likely be attributed to the dispersed land uses in the city which make biking to work a more realistic option than walking to work.

It is likely as Novi continues to develop its commercial core into a more pedestrian friendly environment surrounded by higher density residential development, its percentage of non-motorized trips will rise if appropriate non-motorized linkages are established. As noted earlier, the greatest increase in non-motorized trips will likely come from bicyclists given the land use patterns in the City of Novi.

[1] Krizek, Kevin J., Residential Relocation and Changes in Urban Travel: Does Neighborhood-Scale Urban Form Matter? *Journal of the American Planning Association*. Spring, Vol. 69, No. 3, p.265-281.

Table 2.4A Commute to Work Comparison

Peer Michigan Communities 40,000 to 60,000

			% of Commuters Who:				Percent
Rank	Place	Pop.	Bike	Walk	Use Transit	Don't Drive	Households W/O Car
1	East Lansing	46,704	3.1	22.0	4.4	29.4	10.0
2	Muskegon	40,136	0.5	2.9	1.3	4.7	14.0
3	Battle Creek	53,251	0.2	2.1	1.7	4.1	11.9
4	Midland	41,663	0.4	1.9	0.6	2.8	5.9
5	Lincoln Park	40,008	0.2	1.6	0.8	2.6	8.5
6	Roseville	48,129	0.2	1.1	1.0	2.3	7.1
7	Redford	51,622	0.1	1.1	0.6	1.8	5.8
8	Dearborn Heights	58,264	0.1	1.1	0.4	1.6	6.8
9	Kentwood	45,239	0.1	0.7	0.6	1.4	5.0
10	Portage	44,926	0.1	0.8	0.3	1.3	4.3
11	Novi	47,459	0.2	0.5	0.3	1.0	2.8
12	Bloomfield Township	43,027	0.0	0.29	0.2	0.5	2.2
	Averages	**46,702**	**0.4**	**3.0**	**1.0**	**4.5**	**7.0**

From the US 2000 Census commute to work data as compiled in the online Carfree Census Database found at Bikesatwork.com, compiled by Bikes At Work, Inc., Ames, IA.

It should be noted that the inclusion of East Lansing in the table as a peer city is may not be a fair comparison. University towns such as East Lansing have significantly higher rates of non-motorized trips than non-university town. But in 2000, East Lansing had very few bicycle and pedestrian facilities. In fact none of the peer communities had a significant number of bicycle facilities. Thus, the 3.1% of commuters who bike in East Lansing may not be an unrealistic target when Novi's physical, social and economic environments for walking and bicycling have improved substantially.

Probable Mode Shift Due to Environmental Change

California Department of Transportation (Caltrans) Air Resources Board has developed guidelines to determine the emission reduction benefits associated with auto trips replaced by bicycle trips. One key aspect in determining the percent of trips that may done by bicycle is the ratio of bicycle lane miles to arterial/freeway miles are used. If the ratio is less than 0.35% then a 0.65% bicycle mode share should be used. If greater than 0.35% a 2% mode share should be used (or 6.8% for university towns).

While it may seem easy to dismiss these numbers because they are from California, a state with a much milder climate that Michigan, climate is not the factor most people think it is. In fact, many of the cities with the highest percentage of bicycle commuters are from northern climates: Boulder, Colorado - 7.4%,; Aspen, Colorado - 6.6%; Missoula, Montana -5.9% and Madison, Wisconsin, 3.29%. These percentages are also ten years old and those communities have reported growth in the number of people who bicycle since 2000.

Table 2.4B Existing to Proposed Condition Comparison

Existing Conditions			
	Primary Motorized Routes		
	Freeways	6	
	Principal Arterials	18	
	Minor Arterial	39	
	Collectors	11	
	Total	**74**	
	Primary Pedestrian Routes		
	Sidewalk / Roadside Path*	31	Total /2 (equivelent of sidewalk both sides)
	Off-Road Trails	2	
	Total	**33**	
	Primary Bicycle Routes		
	Bike Lanes	2	
	Bike Routes	0	
	Off-Road Trails	4	
	Total	**6**	
Proposed Conditions			
	Primary Pedestrian Routes		
	Sidewalk / Roadside Path*	21	Total /2 (equivelent of sidewalk both sides)
	Off-Road Trails	20	
		41	
	Primary Bicycle Routes		
	Bike Lanes	68	
	On-Road Bike Routes	36	
	Off-Road Trails	20	
		124	
Comparisons			
	Pedestrian		
	Existing Miles of Pedestrian Routes	45%	of Existing Miles of Motorized Routes
	Exist. + Prop. Miles of Ped. Routes	100%	of Existing Miles of Motorized Routes
	Exist. + Prop. Miles of Ped. Routes	224%	of Existing Miles of Pedestrian Routes
	Bicycle		
	Existing Miles of Bicycle Routes	8%	of Existing Miles of Motorized Routes
	Exist. + Prop. Miles of Bike Routes	176%	of Existing Miles of Motorized Routes
	Proposed Miles of Bicycle Routes	2167%	of Existing Miles of Bicycle Routes

To determine the probable mode shift, a variation of the Caltrans approach has been used. Table 2.4B, Existing to Proposed Condition Comparison, shows the comparison between existing primary bicycle and pedestrian routes and primary motorized routes for both existing and proposed conditions. The primary routes do not take into account the local residential roadways unless they are part of a designated bicycle route.

The data shows that currently, primary pedestrian routes are about 45% of the total of primary motorized routes. When the system is completed, there will be a 1:1 ratio. When looking at peer cities, Midland, which has a more complete sidewalk system, has a walking mode share of 1.9% for commuters. Thus, a 2% walking mode share seems like a reasonable number.

Existing primary bicycle routes are 8% of the existing primary motorized routes. When completed the system 175% of the primary motorized routes. Even when the system is only partially completed, the change will be significant. Looking at the peer cities, Midland has a 0.4% and Muskegon has a 0.5% bicycle mode share for commuting. East Lansing, while a university town, at that time the data was collected it had few bicycle facilities, reports a 3.1% mode share. Thus the Caltrans approach of a 2% mode share once a bicycle system becomes substantially complete seems like a reasonable number.

Thus a 2% pedestrian and 2% bicycle mode share will be used for the targets. Typically, the pedestrian mode share would be greater than the bicycle mode share, but given the current facility build out ratios and Novi's land use patterns it make sense that they would be equal.

Reduction Vehicle Miles Traveled

Not all trip types are the same. People tend to devote more time to a trip to work than a trip to a grocery store. A 30 minute commute may be typical, but people generally would not spend more than 10 minutes traveling to a grocery store. And the average trip distance varies dramatically based on the mode. For example, a 30 minute commute to work may be 20 miles by car, 4 miles by bike or little less than 2 miles by foot.

Some trips are more likely to be undertaken via walking and bicycling than others. Many work commute trips do not require carrying substantial amounts of materials or supplies. But a trip to the grocery store to acquire a week or two worth of groceries is unlikely to be done by bike or foot. But if a grocery store is located between home and work, a person's shopping patterns may change. They may find they make more frequent trips to the grocery store carrying only a few days worth of food home each time which is easily accomplished via foot or bike. This is very common travel and shopping pattern in some communities.

To estimate the trip and related greenhouse gas reduction. An estimate of the % of trip type that may be done by walking or bicycling has been made with a rough average of 2% overall. Also, for each trip type reduced, an estimate of the miles for that trip type has been made.

The end result is that with a substantially complete system, Novi could expect to replace over 18,000 miles of automobile trips with bicycle or pedestrian trips. This would require on average for each person in the city to replace about a1/3 of a mile trip that currently done by automobile with a trip by bicycle or walking. The trip could be of any sort – a trip to work, the store, to visit with friends, for recreation or to school.

This would result in 9 tons less of Co2 being released into the environment each day – over 3,300 tons per year. The active transportation choices will also improve the resident's health in many other ways.

Table 2.4C Estimated Trip and Greenhouse Gas Reduction

Vehicle Miles Traveled							
	City of Novi Population	52,231	City Estimate				
	Daily Trips per Person	4.03	2010 National Household Travel Survey				
	Daily Total Number of Trips	210,491					
	Average Vehicle Trip Length	10.10	2010 National Household Travel Survey				
	Daily Total Vehicle Miles Traveled	527,533					
Reduction in Vehicle Miles Traveled By Walking Trips:							
		Daily Total	**Percent**	**Reduction**	**Trip**	**Trip**	**VMT**
	Trip by Type	**of Trips**	**of Total**	**Goal**	**Reduction**	**Length**	**Reduction**
	To or From Work	33,047	16%	2%	661	1	661
	Work Related Business	6,315	3%	0%	-	0.25	-
	Shopping	41,467	20%	1%	415	0.25	104
	All Other Family & Personal Business	50,728	24%	2%	1,015	0.5	507
	School/Church	20,628	10%	2%	413	0.5	206
	Social and Recreational	55,991	27%	3%	1,680	2	3,359
	Other	1,684	1%	0%	-	1	-
		209,859	100%		4,182		**4,838**
Reduction in Vehicle Miles Traveled By Bicycle Trips:							
		Daily Total	**Percent**	**Reduction**	**Trip**	**Trip**	**VMT**
	Trip by Type	**of Trips**	**of Total**	**Goal**	**Reduction**	**Length**	**Reduction**
	To or From Work	33,047	16%	2%	661	2	1,322
	Work Related Business	6,315	3%	0%	-	0.5	-
	Shopping	41,467	20%	1%	415	1	415
	All Other Family & Personal Business	50,728	24%	2%	1,015	1	1,015
	School/Church	20,628	10%	2%	413	1	413
	Social and Recreational	55,991	27%	3%	1,680	6	10,078
	Other	1,684	1%	0%	-	2	-
		209,859	100%		4,182		**13,242**
	Reduction in Vehicle Miles Traveled	18,080	Miles Per Day				
		3.4%	Total Reduction in VMT				
		0.35	Miles Per Person/Per Day				
		6,599,051	Total Reduction in VMT Per Year				
Projected CO2 Reductions							
	CO2 Emission Factor	454	Grams Per Mile				
	Daily CO2 Reduction	8,208,135	Grams				
	Daily CO2 Reduction	9.05	Tons				
	Yearly CO2 Reduction	3,302	Tons				

3. Proposed Facilities

Master Plan vs. Corridor Planning

The recommendations in this Section represent a Master Plan level evaluation of the suitability of the proposed facilities for the existing conditions. Prior to proceeding with any of the recommendations, a corridor level assessment should be done in order to fully evaluate the feasibility and appropriateness of any roadway modification and/or proposed bicycle or pedestrian facility.

Proposed Improvements Outside the City of Novi

On some of the illustrations, improvements are proposed for areas outside of the limits of the City of Novi. These should not be construed as detailed recommendations as they have not received the same level of evaluation as those facilities within the City. Rather, they show diagrammatically how non-motorized facilities within the City may interact with non-motorized facilities in the surrounding communities.

Some illustrations also show recommendations for improvements on roadways that are not under the jurisdiction of the City of Novi. Any modifications to roads owned by the state and managed by the Michigan Department of Transportation (MDOT), roads owned by the county road commissions, or privately-owned roads, must be coordinated with and approved by the appropriate agency. See Fig 2.1H Road Jurisdiction Map for road ownership.

Topics:

3.1 Non-Motorized Transportation Network

There is no such thing as a typical pedestrian or bicyclist. A single person's preferences for a walking or bicycle route may vary based on the type of trip. A person's daily commute route will likely favor directness of travel over a scenic route (but not always). An evening or weekend ride, walk or run for recreation and exercise will be based on an entirely different set of criteria. It will likely favor local roads and trails through parks and schools.

Individuals also vary greatly in their tolerance of traffic, hills, weather and numerous other factors. A child will likely choose to keep to local roadways on their way to school provided they have safe ways to cross busy streets. An adult who is just starting to bicycle again will likewise shy away from busy roadways, sticking to residential roads wherever possible. But an experienced bicyclist may choose the busy road for its directness of travel. The solution then is not one dimensional, but rather responds to the needs of the various users and trip types. By doing so the plan addresses the needs of the majority of the community's population, not simply a small interest group.

Bicycle and walking are not exclusive modes of travel either. Most bicycle trips will also include some time as pedestrian. Also, some bicycling and walking trips may be a part of a longer multi-modal journey. For example, someone may ride their bike to a bus and then walk from the bus to their final destination.

For all the reasons listed above, there needs to be a spectrum of non-motorized facilities available that gives the user the choice to choose the route that they feel most comfortable with. Off-road trails, neighborhood connector routes, sidewalks, roadside pathways and bike lanes are some of the most common facilities that make up the network.

The following illustrations demonstrate the different elements that go into creating a non-motorized network along with the proposed non-motorized transportation improvements:

- Overview Map (this is a large fold out map that may be found in the back cover of the report)
- Fig. 3.1A. Spectrum of Non-motorized Routes
- Fig. 3.1B. Proposed Bicycle/Pedestrian Focused Corridors
- Fig. 3.1C. Introduction to Auto Focused Corridors
- Fig. 3.1D. Introduction to Road Corridor Types Overview
- Fig. 3.1E. Introduction to Neighborhood Connectors
- Fig. 3.1F. Introduction to Off-Road Trails
- Fig. 3.1G. Proposed Neighborhood Connectors and Trails
- Fig. 3.1H. Proposed Road Crossing Improvements
- Fig. 3.1I. Proposed Regional Trail Connections
- Fig. 3.1J. Proposed Regional Trail Connections (City of Novi)
- Fig. 3.1K. Proposed Sidewalk/Roadside Pathway Improvements

Fig. 3.1A. Spectrum of Non-motorized Routes

A non-motorized system is made up of a variety of routes that provide options for the user to choose their most comfortable route.

PRIMARY LINKS	NEIGHBORHOOD CONNECTORS	OFF-ROAD TRAILS
		
TYPICAL FACILITY TYPES:		
Complete Streets that may include the following: • Bike Lanes & Sidewalks • Sidepaths • Paved Shoulders • Shared-use Arrows • Road Crossing Improvements	Complete Streets that may include the following: • Guided Routes • Named Routes • Bike and Pedestrian Boulevards • Neighborhood Greenways • Crossing Improvements Where Neighborhood Connectors Intersect Primary Roadways	• Foot Trails • Soft-surfaced Trails • Hard-surfaced Trails • Road Crossing Improvements Where Trails Intersect Primary Roadways
CONTEXT AREAS:		
• Urban Suburban and Rural Primary Roads (Arterials and Collectors) • Urban and Suburban roads typically have bike lanes or shared use arrows paired with sidewalks or sidepaths • Rural typically has paved shoulders	• Urban and Suburban Local and Residential Roads • Connecting Pathways Through Neighborhood Parks and Schools • Provide alternative routes to busy Primary Links	• Major Parks • Waterfronts • Abandoned Rail Corridors • Active Rail Corridors • Transmission Corridors
PRIMARY TRIP TYPES:		
• Daily Transportation to Work and Personal Business	• Mix of Daily Transportation, Safe Routes to School and Close to Home Recreation	• Use Depends on Location • Recreation Destination
TRIP CHARACTERISTCS:		
• Users Typically Segregated Into Mode Specific Facilities Such as Sidewalks and Bike Lanes • Exposure to High Speed and High Volumes of Motorized Vehicle Traffic • Just as Direct a Path of Travel as Using a Motor Vehicle	• More of a Shared Space, Sidewalks May or May Not Be Present • Moderate Exposure to Low Speed and Low Volumes of Motorized Vehicle Traffic • In Some Cases Trips Via Neighborhood Connectors May Be Longer Than the Same Trip Via Complete Streets	• Non-motorized Users Separated from Motorized Vehicle Traffic • Minimal Exposure to Motorized Traffic at Roadway Crossings • Directness of Travel Depends on the Route and What Resources It Connects

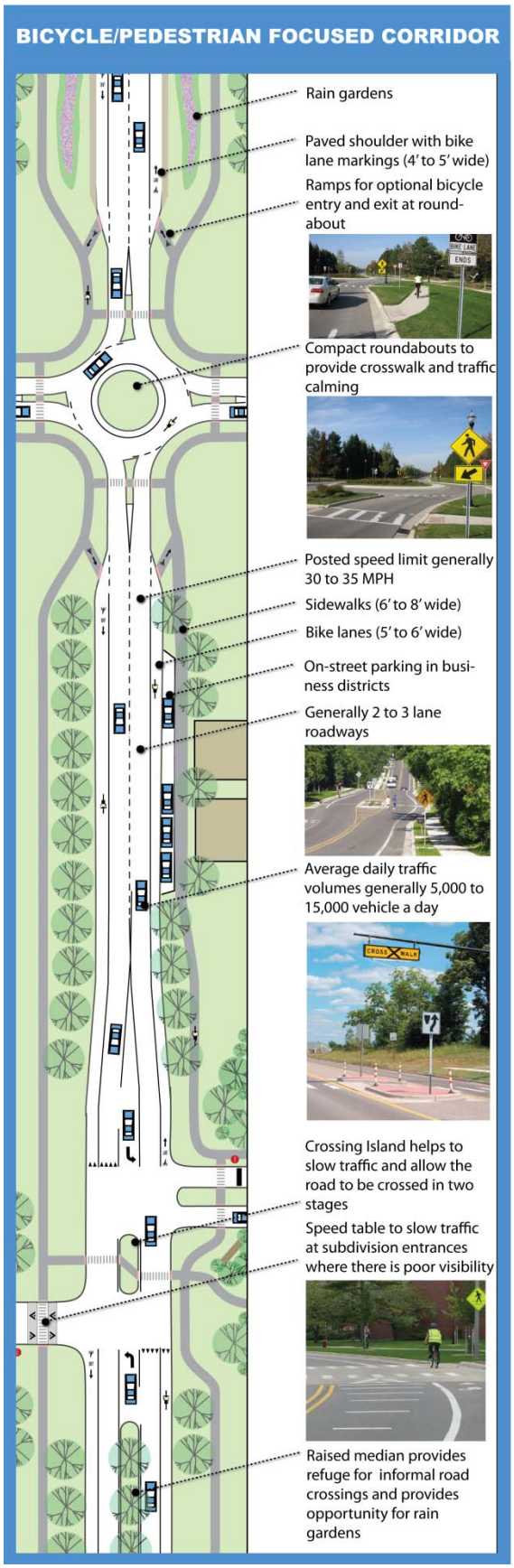
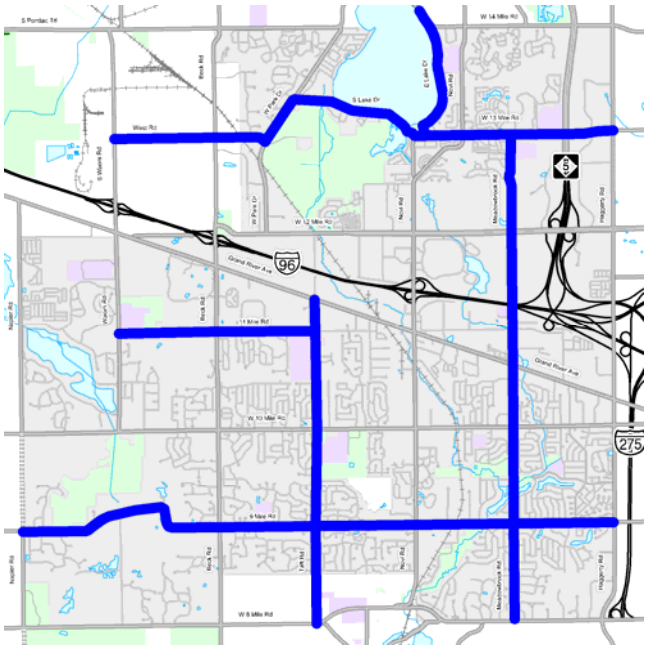


Fig. 3.1B. Primary Links, Bicycle/Pedestrian Focused Corridors

Bicycle/Pedestrian Corridors include:

- East Lake Drive
- South Lake Drive
- West 13 Mile Road
- West Park Drive (Segment)
- West Road
- Meadowbrook Road
- Taft Road
- 11 Mile Road
- W 9 Mile Road



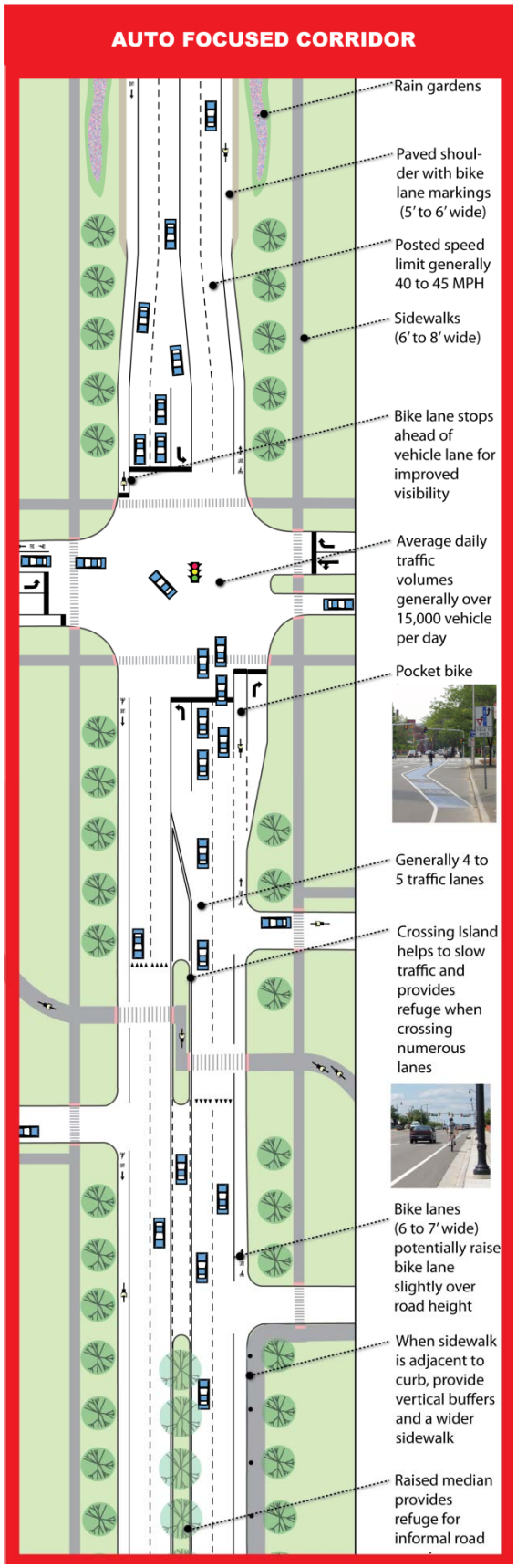


Fig. 3.1C. Primary Links, Auto Focused Corridors

Auto Focused Corridors include:

- Beck Road
- Novi Road
- Haggerty Road
- W 12 Mile Road
- Grand River Avenue
- W 8 Mile Road

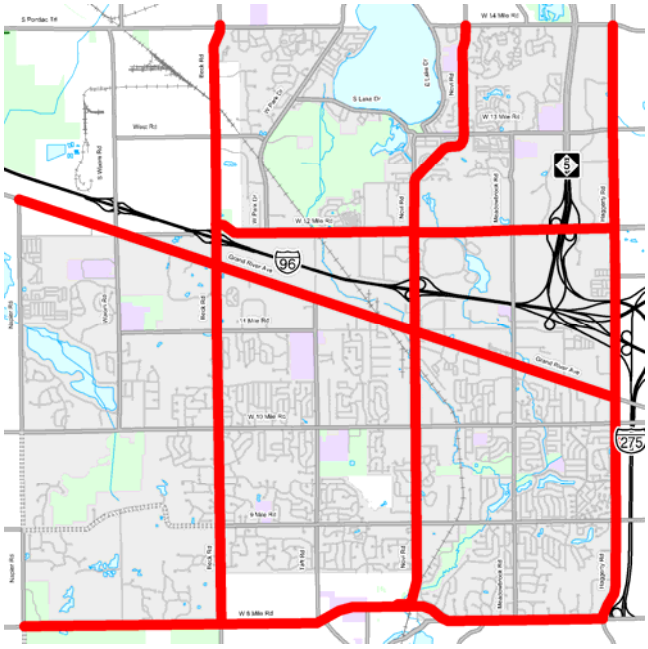
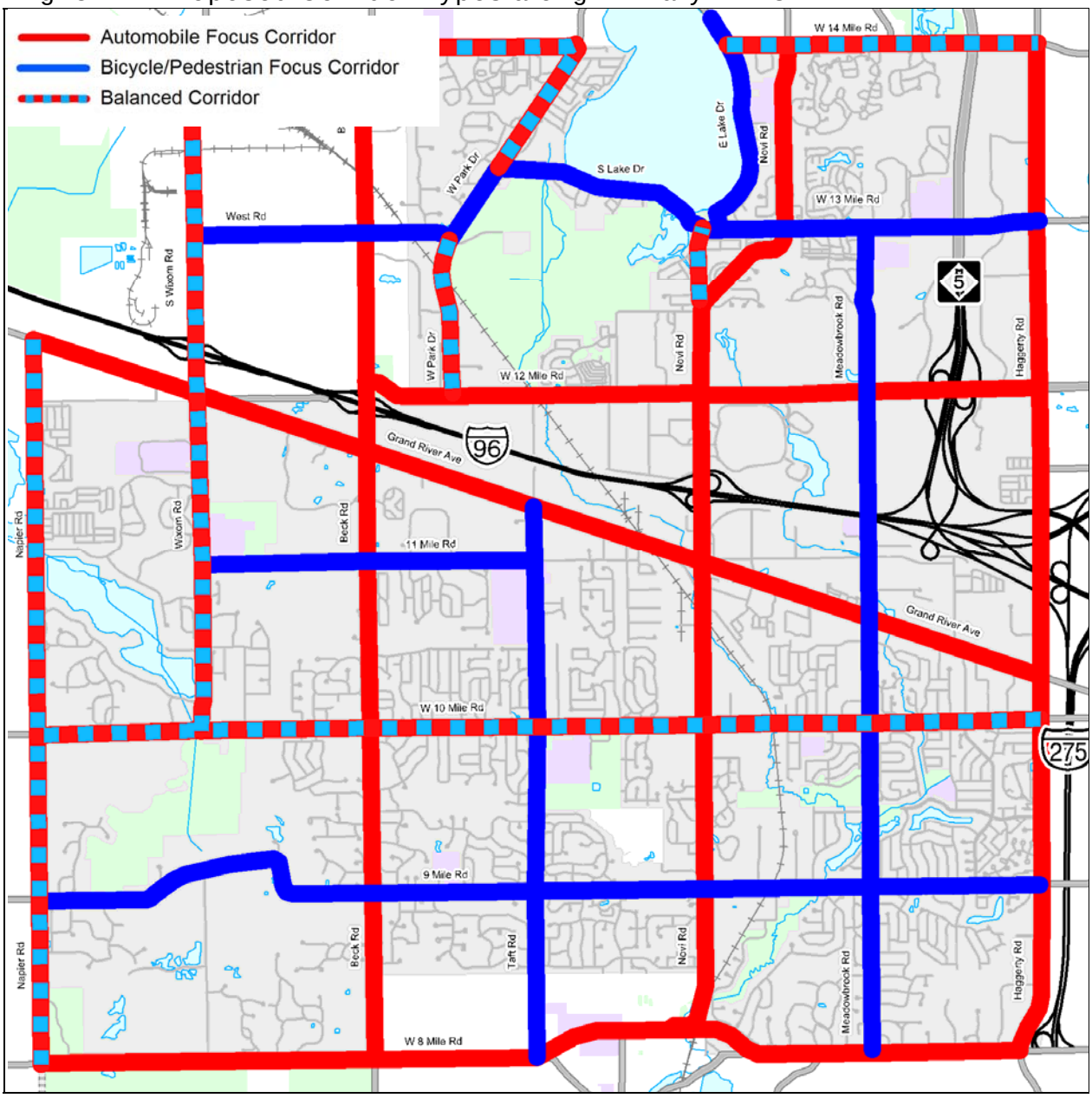


Fig. 3.1D. Proposed Corridor Types along Primary Links



Due to the existing road cross section it is going to be difficult to implement bike lanes in the near term, without paving a shoulder or moving a curb. However, when a road is reconstructed or other opportunities arise, bike lanes and sidewalks should be added to the roadway. Based on public input and existing conditions, this map illustrates the proposed corridor type for each major roadway.

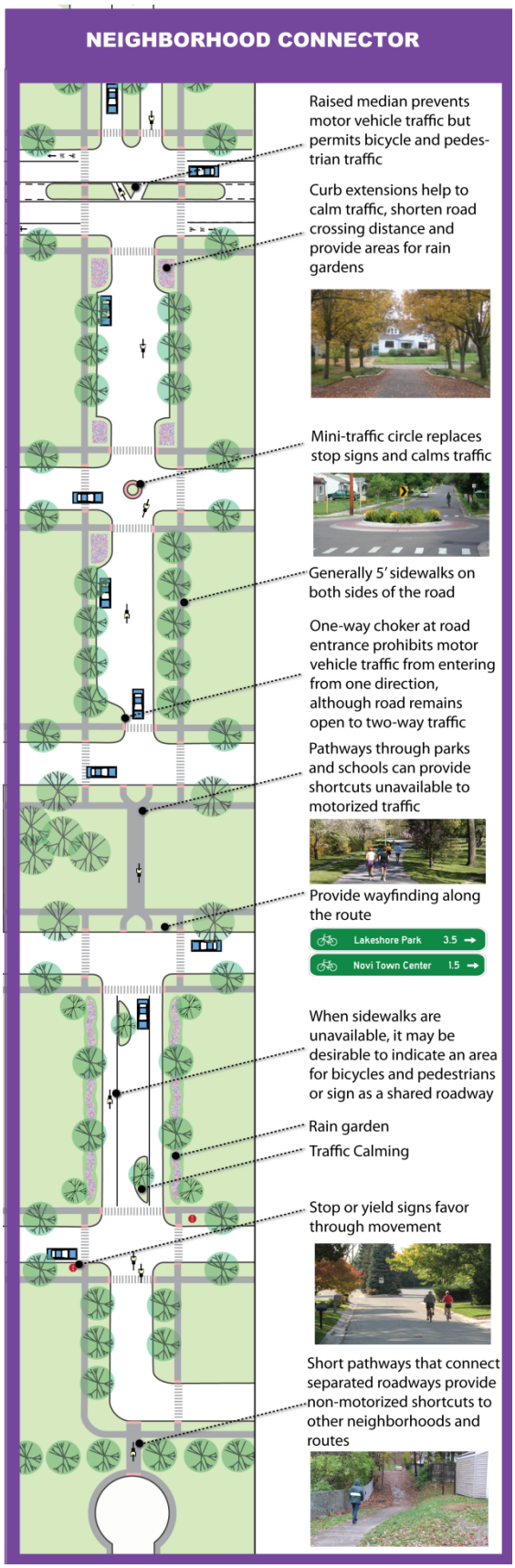


Fig. 3.1E. Neighborhood Connector

Neighborhood connector routes are primarily located on low speed, low traffic volume local roads and connecting pathways. They link neighborhoods to parks, schools and downtowns. Signs provide wayfinding by noting direction and distance to key destinations. Elements such as traffic calming, public art, rain gardens and historic features can be added to enhance the routes.

The local roads in the City of Novi provide great opportunities for neighborhood connector routes, especially for people who prefer to not be along a major arterial or collector road. By incorporating short connecting pathways through schools, parks, and between neighborhoods a tighter network is produced, making it easier for bicyclists and pedestrians to travel through the city.

The connecting pathways are the most critical links in the system, but can also be the hardest to obtain, especially if they pass through private property. It is important to work with the private land owners to obtain easements through these areas.

This plan seeks to provide alternatives and options if it is determined to be impractical to provide the precise route shown.

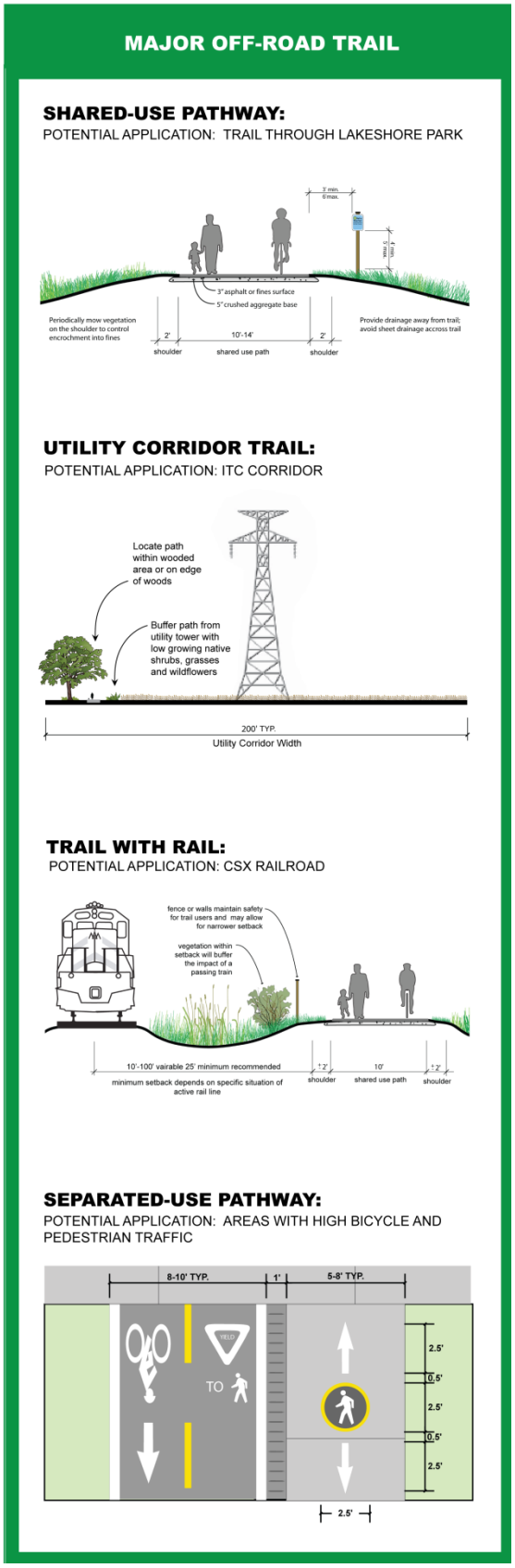


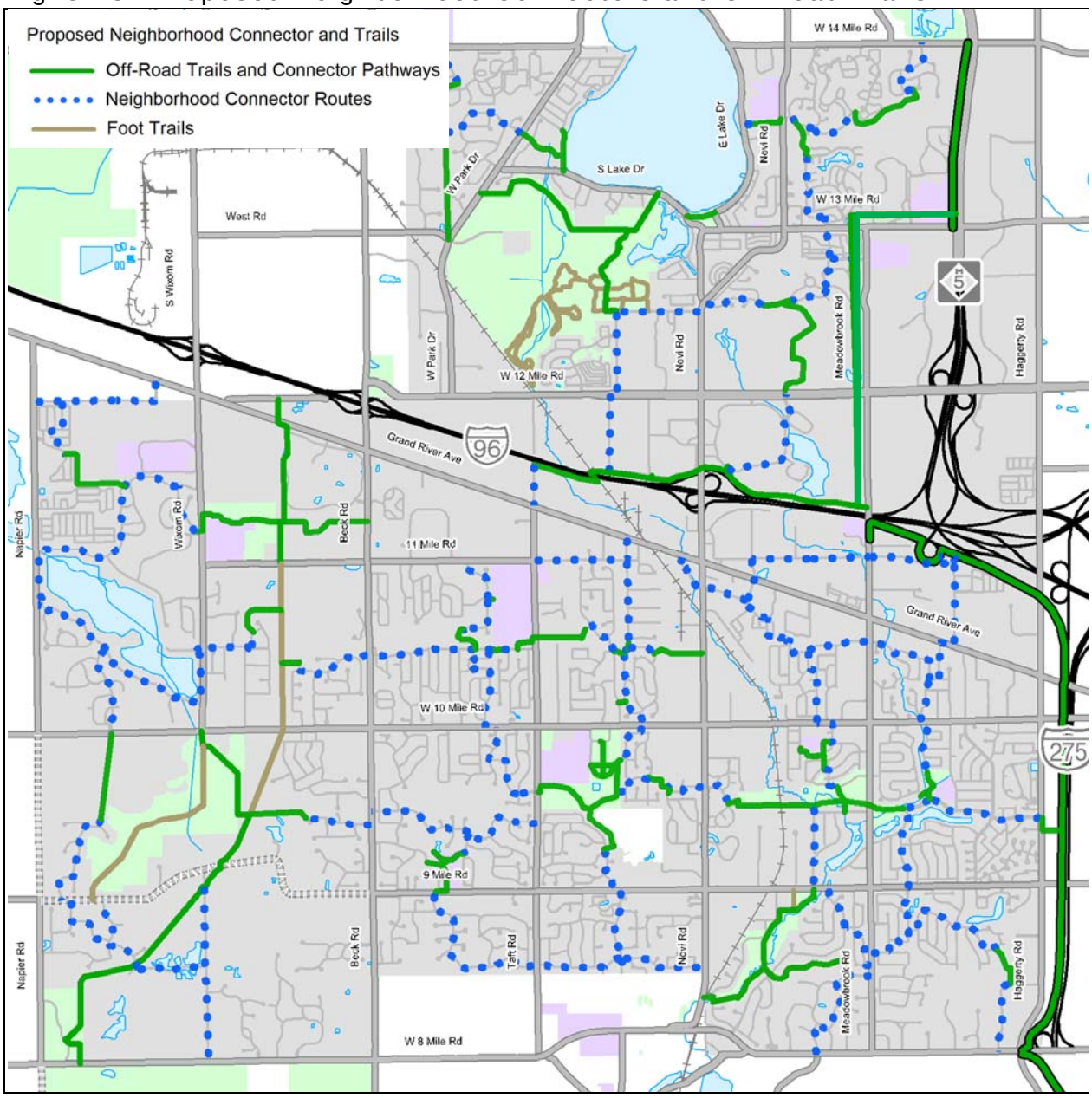
Fig. 3.1F. Major Off-Road Trail

Off-road trails are generally very desirable because they are separated from motorized vehicle traffic. However, they are opportunity-based and unless there is an abandoned rail corridor, existing right-of-way or utility corridor they can be difficult to incorporate into a community.

The City currently has two existing off-road trails, the M-5 Metro Trail and the I-275 Metro Trail. The City also may have a few opportunities to develop off-road trails within the city. They include the following:

- ITC Corridor
- CSX Railroad Corridor
- I-96 Expressway Right-of-way
- City Owned Parks (e.g. Lakeshore Park, ITC Sports Center & Core Habitat Area)

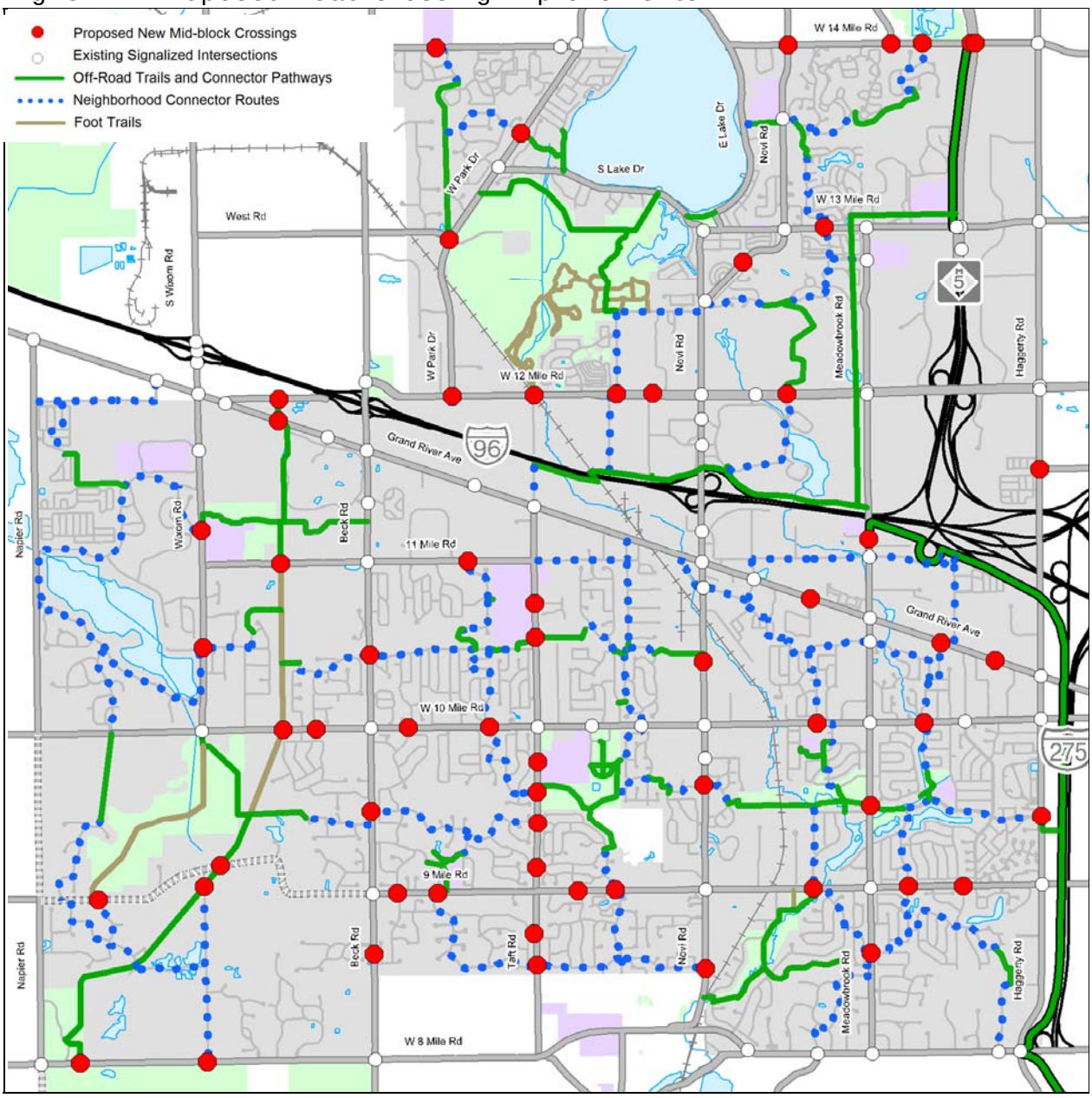
Fig. 3.1G. Proposed Neighborhood Connectors and Off-Road Trails



The neighborhood connector routes and trails provide connectivity between destinations around the city for bicyclists who would not be comfortable bicycling on the primary road system, even if bicycle lanes were present.

Please note that neighborhood connectors are not just restricted to the routes highlighted above. If desired elements of neighborhood connectors are desired, they could be used elswhere in the city as a means to calm traffic, provide non-motorized links and enhance a streetscape.

Fig. 3.1H. Proposed Road Crossing Improvements



Road Crossing Improvements are needed in areas where there is a high demand to cross. These areas occur where a bike route crosses a collector or arterial road, a major bus stop or bus shelter is present, there is a long distance between crosswalks, or there is a high demand based on land use and population density.

This map illustrates where mid-block crossing improvements are needed. Many of these crossings are addressed in the implementation plan with the neighborhood connector routes and major corriodor developments. However, if demand is present they can be implemented sooner. Please note that these are initial recommendations and they need to be studied further prior to implementation.

Fig. 3.1l. Proposed Regional Trail Connections

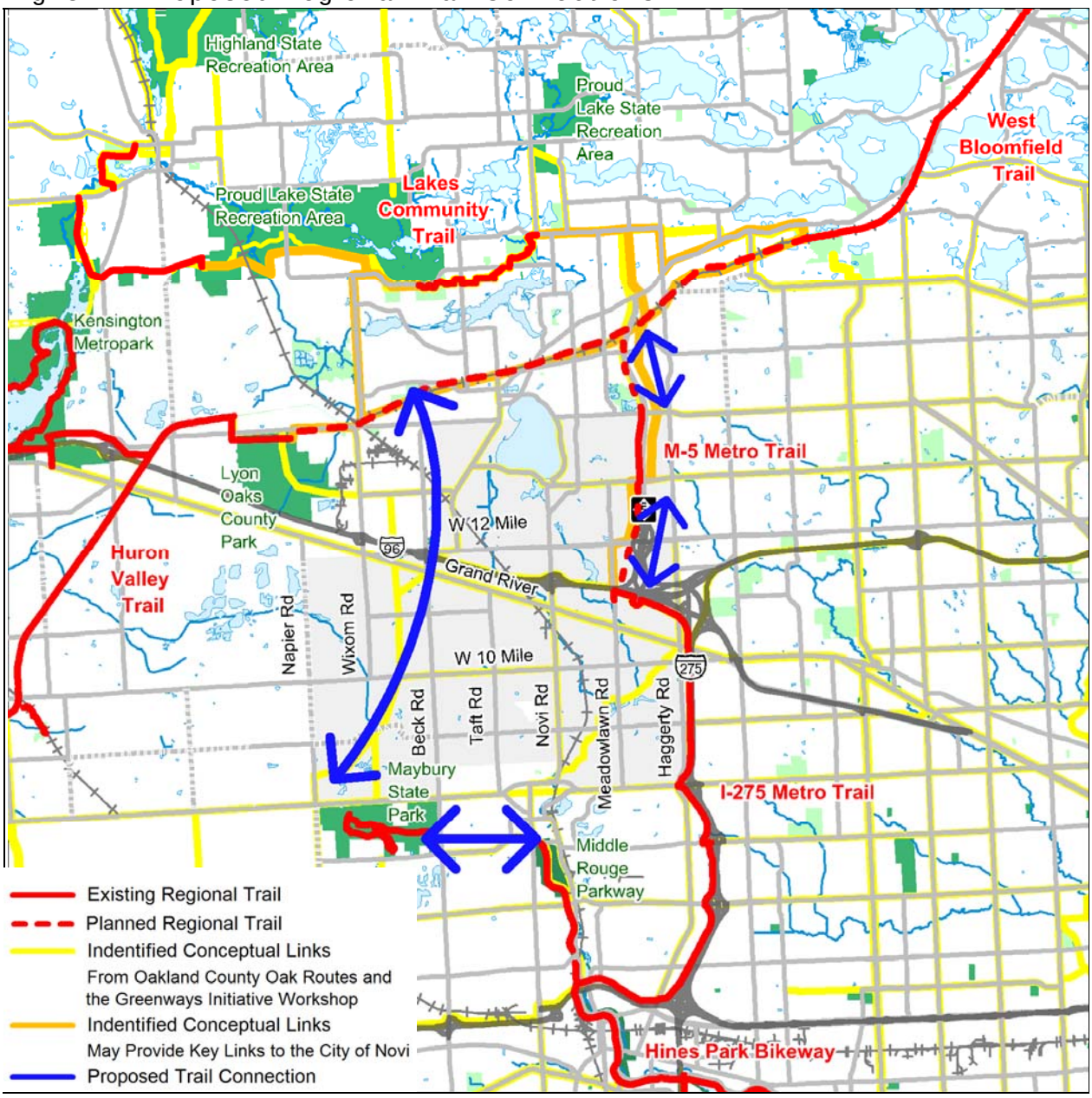
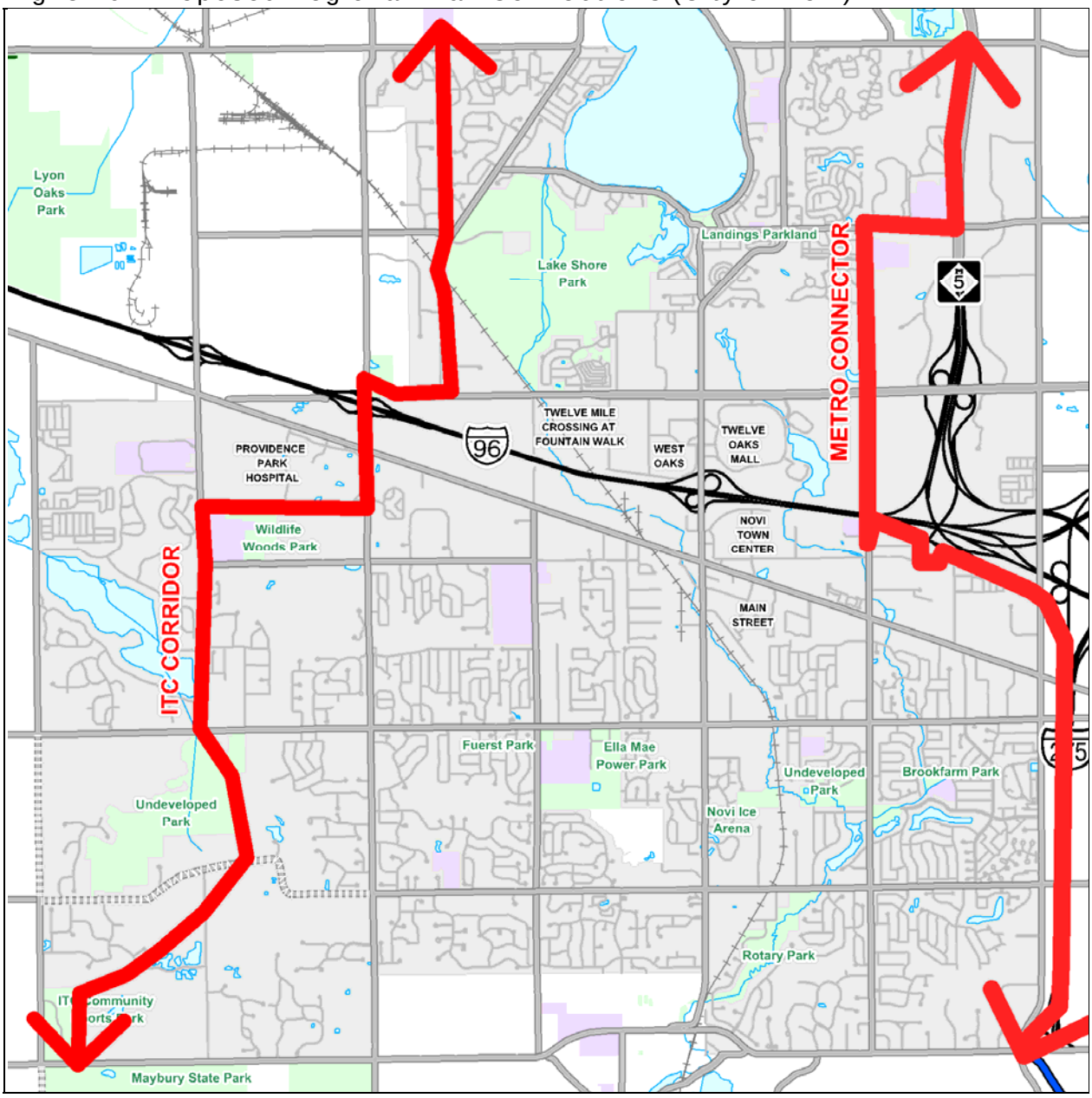
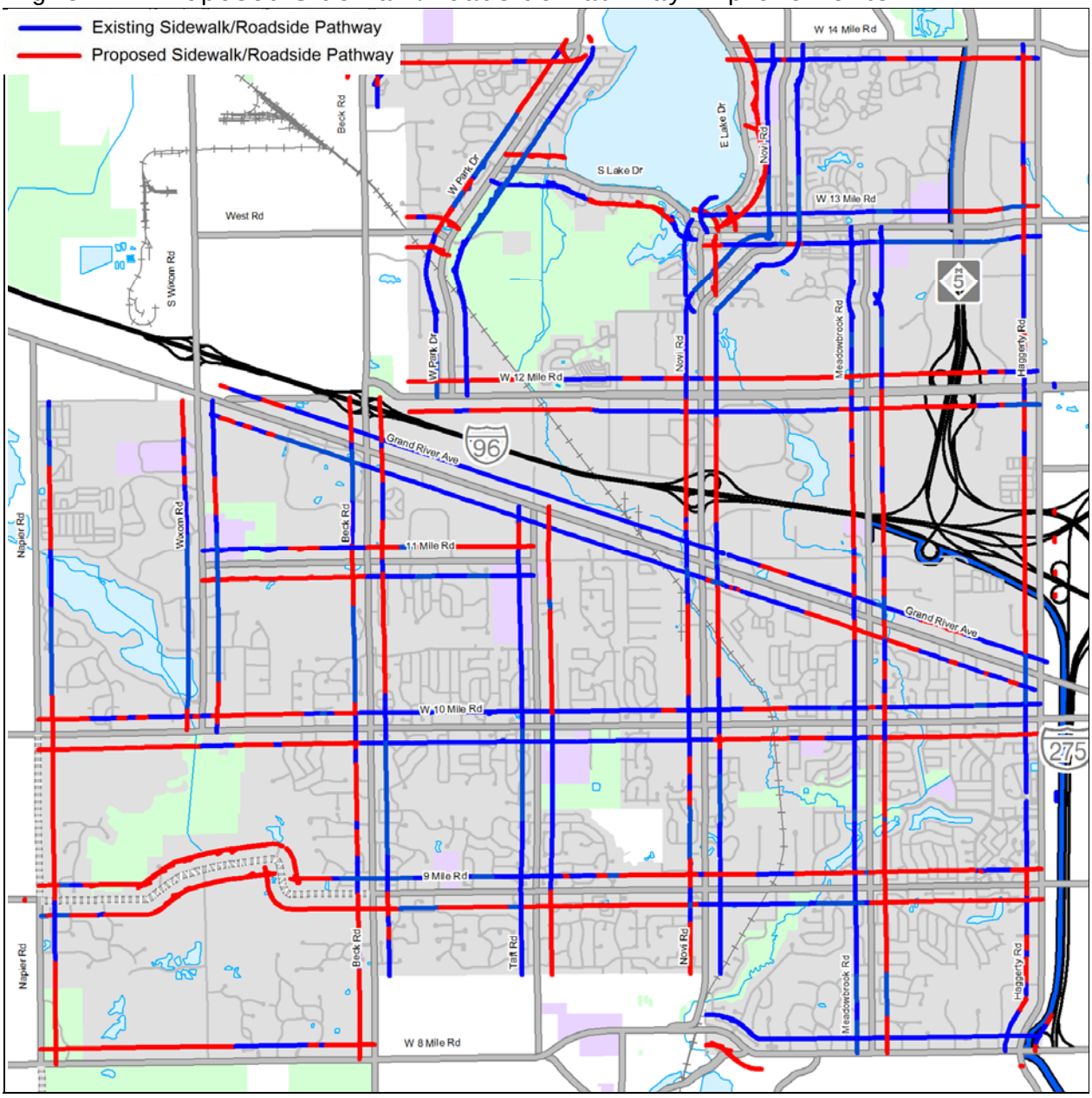


Fig. 3.1J. Proposed Regional Trail Connections (City of Novi)



The proposed ITC Corridor and Metro Connector provide two major regional connections across the City of Novi. The Metro Connector route would consist of a roadside pathway along Meadowbrook Road and 13 Mile. The ITC Corridor is a combination of off-road trails and roadside pathways.

Fig. 3.1K. Proposed Sidewalk/Roadside Pathway Improvements



Ideally, all roads should have sidewalks on both sides of the street. The city currently has 5' sidewalks and 8' roadside pathways. In the future, it would be ideal for sidewalks along major collector and arterial roads to have a minimum width of 6' with a buffer zone and vertical elements such as trees between the sidewalk and road. Please refer to Section 5.1 and 5.4 for more details.

3.2 Implementation Plan

The proposed improvements fall into five tasks. The first task is Initial Investments. This task includes projects that should be done immediately because they complete critical gaps and address safety concerns.

Initial Investments

- Mostly locally funded projects
- Addresses critical gaps in the system
- Addresses safety concerns

After the Initial Investments are completed, the following four tasks should be implemented concurrently as opportunities and funding become available. The four parallel tasks include, Major Corridor Development, Neighborhood Connectors, Sidewalk Gaps, and Construction Integration. Major Corridor Development includes systematic projects that are capital intensive and are of a regional and/or cross community/county significance. Neighborhood Connectors, and Sidewalk Gaps are projects of a local significance that may or may not be as capital intensive and may have some near-term and mid-term solutions. Construction Integration projects include projects that will probably not be done on their own, but will be integrated as part of a larger construction project.

Major Corridor Development

- Cross city bike/pedestrian focused corridors most of which have either regional significance or are important to neighboring communities as well
- High capital investment projects likely supported by federal and state grants
- Generally involve multiple agencies

Neighborhood Connectors

- Locally funded projects
- Low capital investment projects
- Intra-city network oriented

Sidewalk Gaps

- Locally funded projects
- Prioritized to have the most impact for the investment and to respond to public demand
- Extension of the city's current sidewalk prioritization process

Construction Integration

- Projects that can be integrated as part of a larger construction project, such as bike lanes when a road is resurfaced

Some of the improvements include relatively modest changes such as road conversions and signage and others may take longer based on opportunities and available funding. Each task may take multiple years to implement. The speed of the implementation depends on the amount of money the city dedicates to the implementation along with the success of obtaining outside funding.

These tasks were determined based on public input, existing conditions, existing sidewalk and pathway prioritization plan, regional trail plans, geographic distribution and desire to create key cross-community connections. A relative demand analysis was also done to help identify areas where there is the most potential for non-motorized activity.

Cost Estimate Introduction

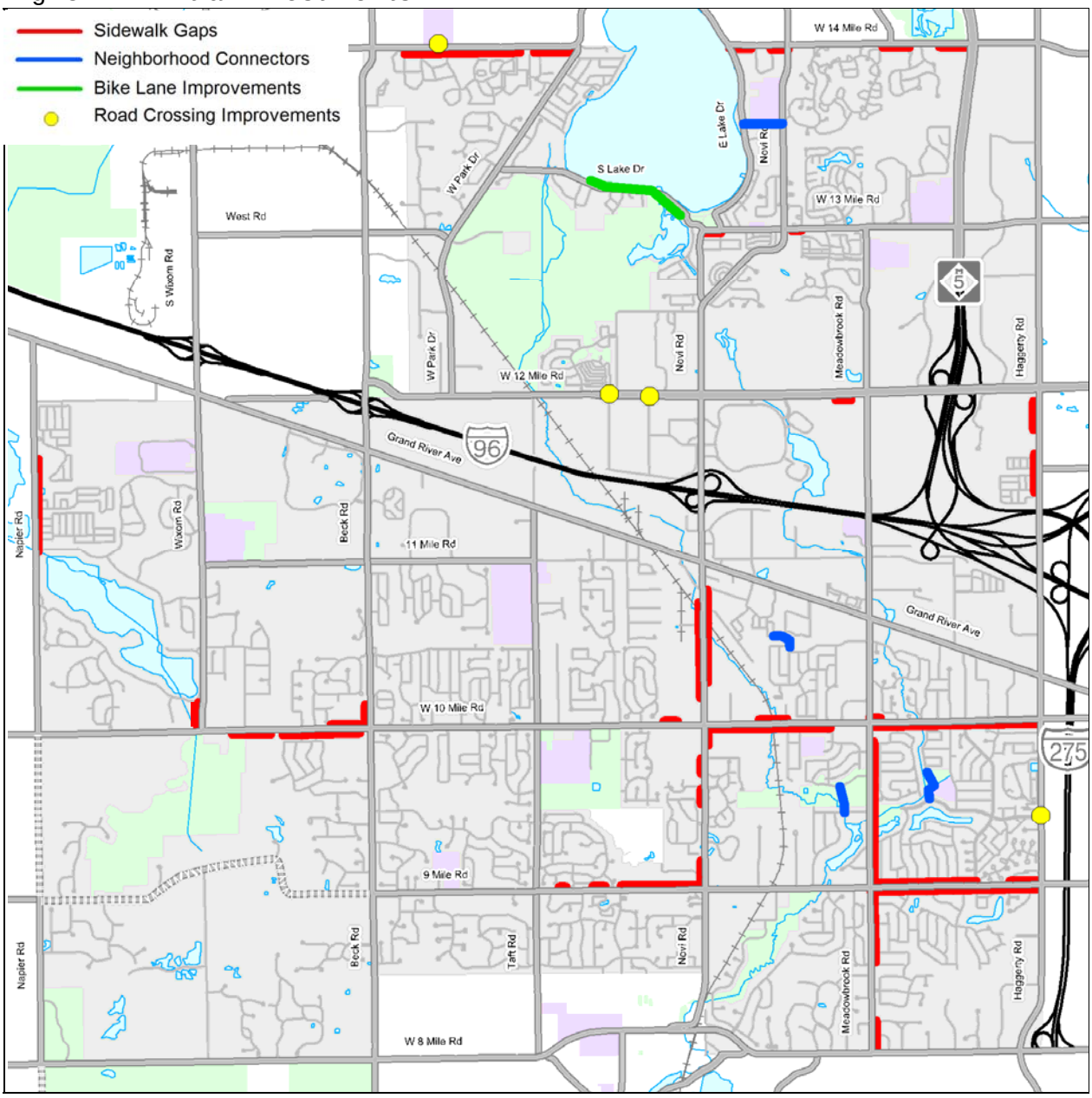
In order to illustrate magnitude of costs and begin planning and budgeting for implementation, planning level cost estimates have been completed for the improvements proposed in the Initial Improvements category as well as the top 3 Major Corridor Development projects. In addition, cost estimates for a handful of "typical" treatments have been developed so that staff can consider these treatments in other areas of the City if so desired.

It should be noted that these estimates are based on concepts only, and while they include healthy (20%) contingencies, they are not based on detailed designs. Quantities were derived from GIS data and aerial imagery. If the City moves forward with implementation, detailed design will be completed and construction cost estimates recalculated at that time.

Acquiring Right –of-Way

Please note that acquiring easements and right-of-way will add to the financial burden of implementation, and can sometimes be as much as the project cost itself. Please refer to the appendix for a detailed breakdown of the cost estimate for the initial investments and top three major corridors where easement issues are reflected.

Fig. 3.2A. Initial Investments



This task focuses on the top sidewalk and pathway gaps and other critical links and safety concerns.

Initial Investments

Complete Sidewalk Gaps
The City of Novi has an existing sidewalk and pathway prioritization process that prioritizes all of the sidewalk gaps in the city. The initial investments include the top 20 sidewalk gaps that are listed in this report.

In addition to the City's top 20 gap improvements, the following additional sidewalk gap improvements should be made to help establish long segments of sidewalk and to connect isolated neighborhoods to the system:

- 14 Mile between Novi Road and M-5 Trail
- Napier Road, build sidewalk on the east side of street between Old Dutch Farms Mobile Home Park and Island Lake
- 12 Mile on the south side of the street build missing sidewalk gap just to the west of Meadowbrook
- Wixom Road on the west side between 10 Mile Road and Island Lake
- 13 Mile on the south side of road build missing sidewalk gaps between Old Novi Road and Meadowbrook Road

Safety Concerns
Road Crossing improvements are needed where there are existing signals with no pedestrian crossing.

- The half-signals along the boulevard portion of 12 Mile Road west of Novi Road
- The intersection of Haggerty and Village Wood Drive
- South Side of Pontiac Trail at Geisler Middle School

The other safety concern that will be addressed is modifying the bicycle and pedestrian pavement markings on South Lake Drive. The existing one-way bike lane on a two-way road presents safety concerns because bicyclists tend to travel the wrong direction in the bike lane, riding against the flow of traffic. There is also a significant amount of pedestrian traffic that uses the shoulder. To address this situation, the paved shoulder will be designated for pedestrian use. Bicyclists will be encouraged to ride in the road with the flow of traffic through the use of Shared-Use Arrows and Share the Road Signage.

Critical Links
Short connecting pathways are important to help link people to nearby neighborhoods, parks and schools. The following short connector pathways should be constructed. Please note that easements may need to be obtained across school property and where conservation easements are located. Each has been labeled as Neighborhood Connector (NC) 1 through 4 to correspond with the cost estimates.

- Link through Hickory Woods Elementary between Novi Road and East Lake Drive (NC-1). Please note that this segment follows the existing right-of-way and would require access across the school property.
- Link connecting the neighborhood to the north through Brookfarm Park to Village Oaks Elementary (NC-2). Please note that this route would utilize the existing bridge over the creek between Brookfarm Park and Village Oaks Elementary and would connect to the existing walkway at Brookfarm Elementary School.
- Link through Undeveloped Park near Meadowbrook Road and Malott Drive connecting the neighborhood to the north to the neighborhood to the south (NC-3). Please note that there is a

conservation easement in this park that prohibits trail and pathway development in this park, and will require additional review to determine feasibility for a future link location.

- Link connecting subdivision to residential development west of Meadowbrook between 10 Mile Road and Grand River Avenue (NC-4). Please note that there is an existing connection between these neighborhoods, however the city would need to obtain access through the private development.

Initial Investments Costs Estimates

Planning level cost estimates for the "Initial Investments" category are summarized in the following table. Details of each estimate can be found in the appendices. Costs are associated with each Segment ID (previously assigned by the City). These are estimates that primarily focus on sidewalk gaps as well as 4 neighborhood connectors identified as priorities during the planning process. Each estimate includes:

- 5% for mobilization
- 20% contingency
- 25% professional fees (design, legal, construction administration)
- For those segments where easements are anticipated in order to construct, an approximate easement size, in square feet, is estimated (included in the appendices). The cost associated with easements will likely differ in each case but must be considered as it will impact the final cost.

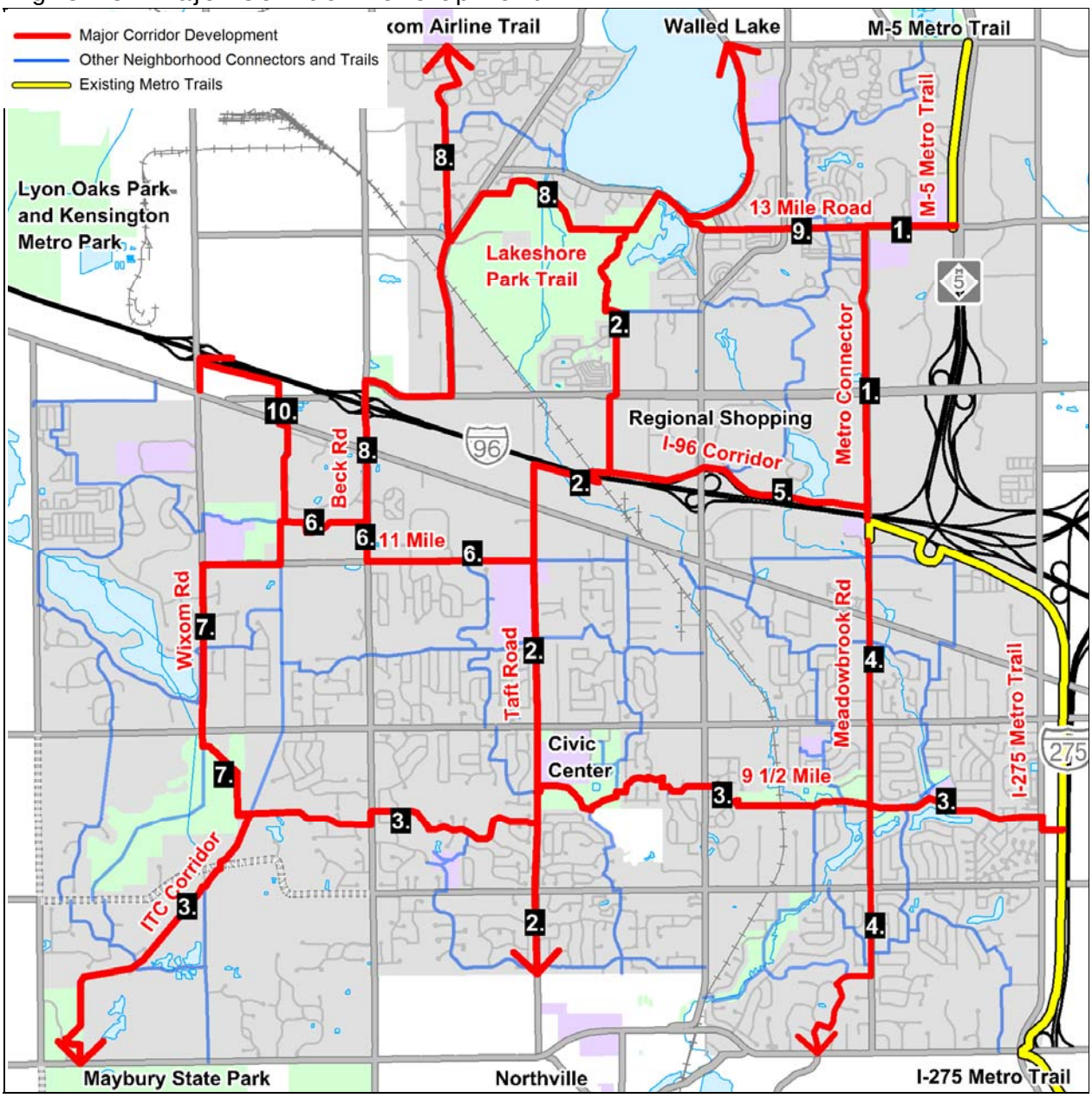
As is depicted in Figure 3.2B., there are 25 sidewalk/path segments included in the Initial Investment Phase with an estimated design and construction cost of $4.88 million. In addition, there are 4 Neighborhood Connector segments proposed in the Initial Investment phase with an estimated design and construction cost of $260,000.

TOTAL INITIAL INVESTMENTS COST ESTIMATE = $5.14 million in addition to the cost of easements

Fig. 3.2B. Initial Investments Cost Estimate Summary

Segment	Priority	Location Description			Unit Price	Cost Estimate
121	19	Nine Mile	South	Between Haggerty and Meadowbrook		$340,755.86
119	13	Meadowbrook	East	Between Eight Mile and Nine Mile		$274,638.28
83	1	Nine Mile	North	Between Haggerty and Meadowbrook		$301,787.50
84	20	Meadowbrook	East	Between Nine and Ten Mile		$604,261.72
81	6	Ten Mile	South	Between Haggerty and Meadowbrook		$625,854.30
80B	10	Ten Mile	North	East of Meadowbrook		$13,681.64
90	8	Ten Mile	South	Between Meadowbrook and Novi Rd		$450,487.11
89	11	Novi Rd	East	Between Ten Mile and Ice Arena		$139,187.50
92	5	Novi Rd	West	Between Nine and Ten Mile		$238,716.80
93	12	Nine Mile	North	Between Novi and Taft		$173,249.22
62	14	Ten Mile	North	Between Novi and Taft		$83,462.89
25	90	Haggerty Rd	West	Between Twelve Mile and I-696		$149,022.66
129	50	Fourteen Mile	South	Between two subdivisions		$101,885.94
1b	71	Fourteen Mile	South	Just west of M-5		$73,396.88
4	39	Fourteen Mile	South	Just west of Novi Rd		$15,052.73
5	54	Fourteen Mile	South	Just east of East Lake Dr		$37,841.80
9	9	Pontiac Trail	South	West of West Park Dr		$302,424.61
55	15	Beck Rd	West	Just north of Ten Mile		$66,323.83
54	15	Ten Mile	North	Just west of Beck		$92,660.16
99	17	Ten Mile	South	Between Beck and Wixom Rd		$304,843.36
44	78	Napier Rd	East	Between Twelve Mile and Island Lake Dr		$379,062.11
29		Twelve Mile Rd	South	Between Meadowbrook and Twelve Oaks Mall		$29,084.38
15		13 Mile Rd	South	Between Old Novi Rd and Martin Avenue		$20,009.77
16b		13 Mile Rd	South	Between Novi Rd and Holmes Rd		$22,010.55
48		Wixom Rd	West	Between Ten Mile and Island Lake		$37,585.55
				TOTAL SIDEWALK/PATH GAPS		**$4,877,287.14**
Neighborhood Connectors						
		NC 1		**East Lake Dr to Novi Rd**		$68,667.97
		NC 2		**Brookfarm Park**		$30,214.84
		NC 3		**West of Meadowbrook between Nine Mile and Ten Mile**		$111,816.02
		NC 4		**West of Meadowbrook between 10 Mile and Grand River**		$49,321.88
				TOTAL NEIGHBORHOOD CONNECTORS		**$260,020.70**
				TOTAL INITIAL INVESTMENTS		**$5,137,307.84**

Fig. 3.2C. Major Corridor Development



Major regional, city and countywide connections across the city that provide a backbone to the non-mototrized system.

Major Corridor Development

The following improvements are listed in order of implementation. The order of implementation was developed based on public input, near-term opportunities, demand and where the majority of the population would be served. These are large multi-year projects that may be implemented in pieces based on opportunities and funding. Overall, they will provide the framework for the non-motorized system. If opportunities arise for projects lower on the list those projects should be completed first.

1) Metro Connector (See Figure 3.2C.)

Provide connection between the existing I-275 Metro Trail and existing M-5 Trail.

- Extend I-275 Metro Trail south (using 10' wide asphalt) to Bridge Street and provide crossing island on Meadowbrook Road
- Construct 10' wide asphalt path along the west side of Meadowbrook Road between 11 Mile Road and 13 Mile Road.
- Construct 10' wide asphalt path along the north side of 13 Mile Road between Meadowbrook and the M-5 Metro Trail
- Narrow the travel lanes to 11', pave 5-6' shoulder, and strip for bike lanes on Meadowbrook Road between 11 and 12 Mile Roads
- Improve pedestrian crossing at 12 Mile and Meadowbrook Road intersection
- Provide wayfinding signage to direct users from the M-5 Metro Trail to the I-275 Trail

2) Taft Road Corridor (See Figure 3.2C.)

Provide connection along Taft Road Corridor connecting to Northville to the south and Walled Lake to the north.

- Completion of the sidewalk/path system
- Addition of bike lanes along Taft Road by paving 5-6' wide shoulders and striping/signing
- Improve the following intersections to provide for safe crossings and room for bike lanes. Refer to section 5.4 Subdivision Entrances for more details.
    - Galaway Drive – Subdivision Intersection Design (Figure 5.4AB)
    - Princeton/Byrne – Mid-Block Crossing and Rectangular Rapid Flash Beacon
    - Dunbarton Dr – Subdivision Intersection Design (Figure 5.4AB)
    - White Pine Dr –Subdivision Compact Roundabout (Figure 5.4AD)
    - Addington Lane – Subdivision T-Intersection Design (Figure 5.4AC)
    - Novi High School Entrances – Subdivision T-Intersection Design (Figure 5.4AC)
    - Emerald Forest Blvd – Subdivision T-Intersection Design (Figure 5.4AC)
    - Between Jacob Drive and the entrances to Novi Woods Elementary, Meadows School, and Parkview Elementary – Subdivision T-Intersection Design (Figure 5.4AC)
- Construct 10' wide asphalt trail along Taft Road north of Grand River Avenue
- Construct 10' wide asphalt trail along south side of I-96 corridor, utilize the existing CSX underpass to get under I-96, cross over the CSX railroad, and continue the trail along the north side of I-96 along the ITC property connecting to Fountain Walk Drive

- Extend sidewalk south along Cabaret Drive to connect into proposed trail
- Provide on-street bike route on Cabaret Drive and Dixon Road
- Include a Pedestrian Hybrid Beacon (HAWK) at 12 Mile Road/Cabaret Drive Intersection
- Construct 10' wide asphalt trail through Lakeshore Park to connect to Lakeshore Drive (remain on high ground and avoid existing mountain bike trails as much as possible)
- Include wayfinding signage along route to direct users

Crossing I-96 at the Railroad tunnel may present some challenges. If that is the case evaluate providing a separate non-motorized crossing at Taft Road and the I-96 expressway.

3) 9 ½ Mile Neighborhood Greenway (See Figure 3.2C.)

Provide a connection that parallels 9 and 10 Mile Road along the local roadways using short connecting pathways through schools, parks and undeveloped open space.

- Include road crossing improvements where the proposed route crosses a collector or arterial street including:
    - Novi Road –Compact Roundabout (Figure 5.4AD)
    - Meadowbrook Road – Crossing Island
    - Taft Road - Compact Roundabout (Figure 5.4AD) (also included in Taft Road Corridor Project)
    - Beck Road - Subdivision T-Intersection Design (Figure 5.4AC)
- Provide crossing of railroad near Novi Ice Arena. If crossing is unattainable, provide alternate route on 10 Mile Road by completing sidewalk gaps and providing at-grade railroad crossing..
- Obtain easements and build short connector pathways (10' wide asphalt)
- Provide traffic calming techniques on local neighborhood streets
- Construct the south extension ITC Corridor Trail connecting 9 ½ Mile Neighborhood Greenway South to ITC Park and Maybury State Park
- Include wayfinding signage along route to direct users

4) Meadowbrook Road South of I-96

Provide connection along Meadowbrook Road Corridor.

- Completion of the sidewalk/path system
- Addition of bike lanes along Taft Road by paving 5-6' wide shoulders and striping/signing
- Improve the following intersections to provide for safe crossings and room for bike lanes. Refer to section 5.4 Subdivision Entrances for more details.
    - Chattman Drive - Subdivision T-Intersection Design (Figure 5.4AC)
    - Marks Drive/Fawn Trail – Midblock Crossing Island between both streets
- Implement neighborhood connector route and include wayfinding signage along route to direct users

5) I-96 Corridor (See Figure 3.2C.)

Provide a connection that parallels the north side of the I-96 expressway and connectos Taft Road and Meadowbrook Road to the Regional Shopping Centers.

- Build trail along north side of I-96 Expressway utilizing MDOT and ITC property
- Provide trail crossing at Novi Road by improving existing intersection
- Work with the adjacent landowners to provide access from the trail to the shopping centers

Long-term:

- Provide trail crossing on Meadowbrook Road when sidewalk gaps along the west side of the road are complete

6) 11 Mile/Beck Road/Providence Park Hospital/ Wild Woods Park (See Figure 3.2C.)

11 Mile Road:

- Complete Sidewalk and Pathway Gaps along 11 Mile Road
- Provide Mid-block Crossings on 11 Mile Road where proposed neighborhood connector route intersection with 11 Mile Road
- Add Shared-use arrows on 11 Mile Road in the near-term until the shoulders are paved and bike lanes can be included

Beck Road:

- Complete Sidewalk and Pathway Gaps along roadway
- Provide Mid-block Crossings

Providence Park Hospital

- Obtain easements to construct pathway between Wixom Road and Beck Road

7) Wixom Road/Undeveloped Park (See Figure 3.2C.)

Wixom Road:

- Complete Sidewalk and Pathway Gaps along roadway
- Provide Mid-block Crossings

8) Beck Road/West 12 Mile Road/West Park Dr/Off-road Trail (See Figure 3.2C.)

Beck Road

- Complete Sidewalk and Pathway Gaps on west side of road
- Add sidewalks to both sides of I-96 overpass (see Figure 3.3C.)
- Improve road crossing at Beck Road and W 12 Mile

12 Mile Road

- Complete Sidewalk and Pathway Gaps along north side of W 12 Mile Road

W Park Dr Off-road Trail Extension

- Improve road crossing at West Park Drive and West Road

- Building 10’ shared use path along city owned property north of West Road
- Provide bike route along Portside Drive to connect trail to South Pontiac Trail

9) Lakeshore Park/13 Mile Road (See Figure 3.2C.)

Lakeshore Park

- Add 10’ shared use path through north side of Lakeshore Park paralleling South Lake Road

W 13 Mile Road Corridor

- Complete Sidewalk and Pathway Gaps
- Add Bike Lanes to West 13 Mile Road through road conversions and paving the shoulders

10) ITC Corridor– North Extension (See Figure 3.2C.)

- Obtain easement and construct off-road trail along ITC corridor
- Obtain easement to construct off-road trail along the west edge of Providence Park Hospital where ITC property stops
- Improve road crossing on Grand River Avenue
- Work with Wixom to continue trail extension northwest through the Beck Road/I-96 Interchange and over to Lyon Oaks Park (See Figure 3.3D.)

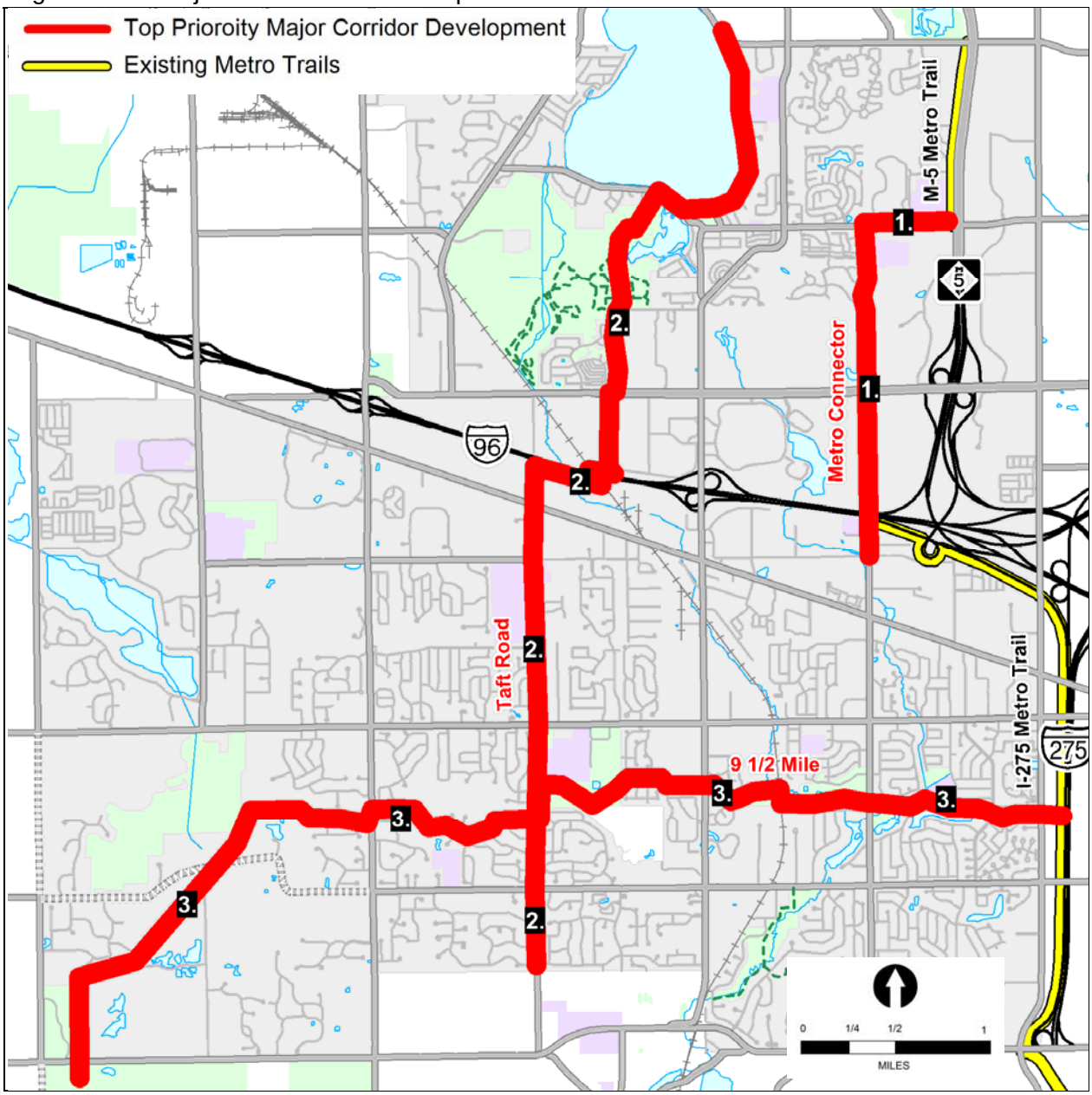
Major Corridor Development Cost Estimates

A number of projects were identified and categorized as a "Major Corridor Development". However, 3 are considered top priority projects (Figure 3.2D.) based on input during the planning process, connecting regional systems, and potential for outside funding assistance.

1. Metro Connector
2. Taft Road Corridor
3. 9 1/2 Mile Neighborhood Connector

The following describes the routes and proposed improvements in more detail and provides a planning level cost estimate. More detail of the planning level cost estimate can be found in the Appendix.

Fig. 3.2D. Major Corridor Development



Metro Connector

The Metro Connector is a high priority project to connect the existing 40+ mile I-275 Metro Trail and the existing M-5 Metro Trail. The proposed connector route is along Meadowbrook Road and 13 Mile Road.

TOTAL METRO CONNECTOR COST ESTIMATE = $886,000 in addition to the cost of easements

This is a good candidate project (or at least parts of it) for outside funding assistance. If a Transportation Enhancement grand application is submitted, a discussion should take place with MDOT regarding the options of concrete removal and replacement with new 10' wide asphalt (as estimated) versus adding additional concrete width to existing paths to meet AASHTO standard of 10' wide. Potential funding sources include the MDOT Enhancement Program, the MDNRE Trust Fund, and CMAQ.

Taft Road Corridor

The Taft Road Corridor project is intended to showcase a truly "complete street" within the City of Novi with considerable improvements made to more safely accommodate pedestrians and bicyclists as well as reduce vehicular travel speeds. The Taft Road Corridor has been identified as a "Bicycle/Pedestrian Focused Corridor" and has the potential to serve as a major north-south non-motorized route within the City as well as to Northville and Walled Lake.

TOTAL TAFT ROAD CORRIDOR COST ESTIMATE = $5.05 million in addition to the cost of easements

Due to size and cost, this project would most likely be implemented in phases. This is a good candidate project (or at least parts of it) for outside funding assistance. If grant funds are used, it's anticipated they would be used to construct particular segments of the proposed improvement such as the intersection improvements, the I-96/RR crossing, and/or the addition of bike lanes along Taft Road. The planning level cost estimate includes a $1 million allowance for the I-96/RR crossing. This area will require more detailed analysis and coordination with MDOT, ITC, and CSX before being able to develop a more accurate cost estimate. Potential funding sources for portions of the Taft Road Corridor improvements include MDOT Enhancement, Safe Routes to School, MDNRE Trust Fund, and CMAQ.

9 ½ Mile Neighborhood Connector

Providing a significant east-west non-motorized route between 9 Mile and 10 Mile Roads was discussed, refined, and moved up as a priority during the planning process. The route is desirable as it includes the potential to connect a number of parks, schools, neighborhoods, and undeveloped open space. Portions of the 9 ½ Mile Neighborhood Connector are proposed to follow existing residential streets, with traffic calming measures proposed. The route is also intriguing for its potential to serve as a demonstration of an urban greenway.

TOTAL 9 ½ MILE NEIGHBORHOOD CONNECTOR COST ESTIMATE = $4.97 million in addition to the cost of easements

Due to size and cost, this project would most likely be implemented in phases. This is a good candidate project (or at least parts of it) for outside funding assistance. If grant funds are used, it's anticipated they would be used to construct particular segments of the proposed improvement such as the ITC/Maybury connector or the traffic calming improvements. The planning level cost estimate includes a $500,000 allowance to cross the railroad including approach ramps to meet ADA requirements. The estimate also includes a $400,000 allowance to implement a variety of traffic calming techniques along the local residential streets and $150,000 allowance to develop a coordinated wayfinding system along the entire route. There is a considerable amount of boardwalk anticipated (over 4150 feet). This is a high cost item

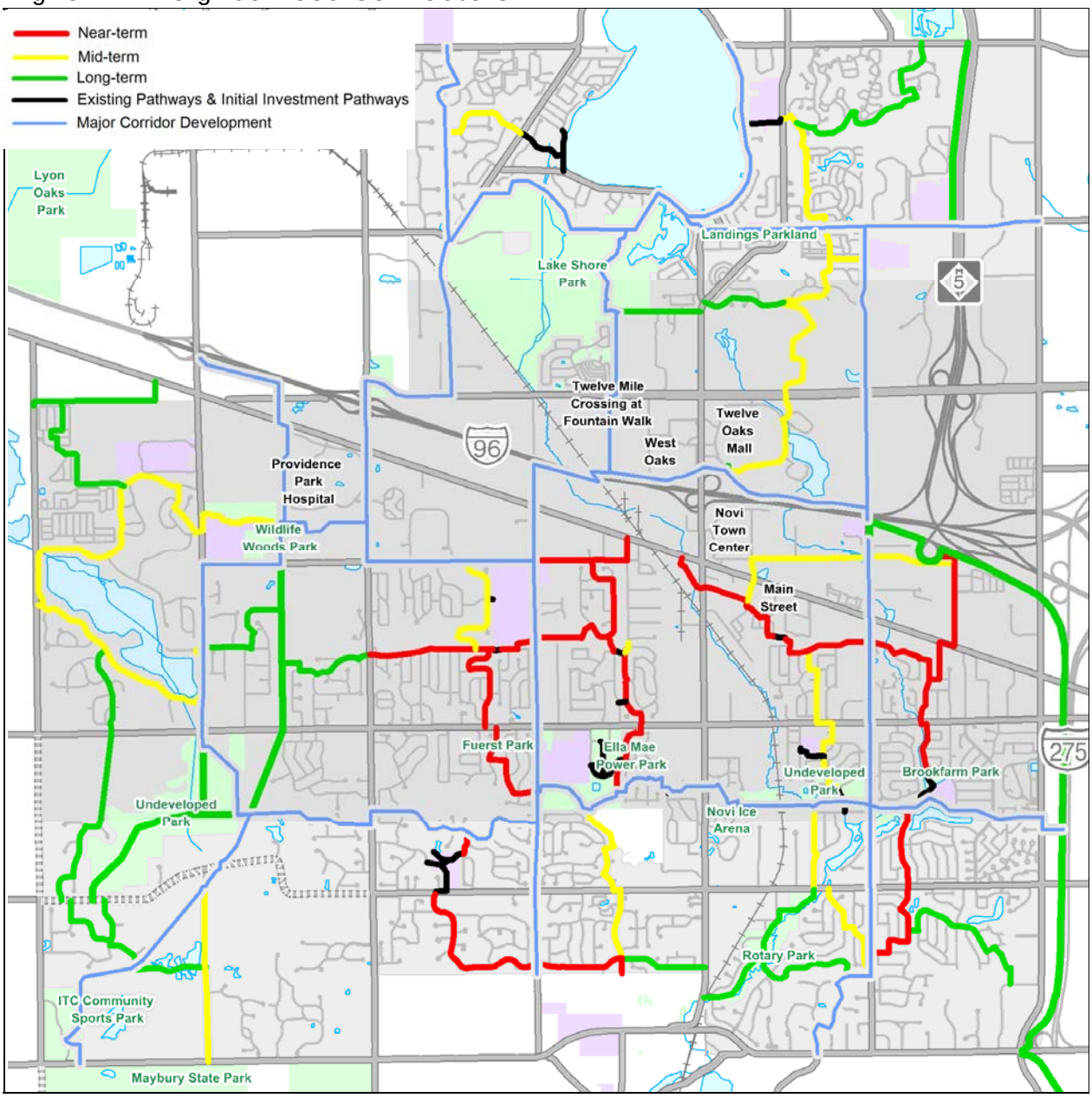
and has been estimated utilizing the City's standard 8' wide section. If grant funding is sought for this improvement, a 14' wide boardwalk will likely be required, increasing the overall cost. Potential funding sources for portions of the 9 ½ Mile Neighborhood Connector improvements include MDOT Enhancement, Safe Routes to School, MDNRE Trust Fund, and CMAQ.

The following table summarizes the top 3 priority Major Corridor Development projects. The table includes the approximate length of the entire project, a planning level cost estimate, as well as potential funding sources. It should be noted that if the City seeks, for example, MDOT Enhancement funds to complete the Metro Connector project, it may not be as likely that the City would receive additional dollars for the other two projects. Estimates of the possible percentage of funds that the City may be able to seek and obtain for implementation has also been identified based on typical award amounts. In addition, with the City's recent award of MDNRE Trust Fund dollars for the Landings Park project, it may be a few years (2 or 3) before the City can be successful in approaching the Trust Fund again for additional projects. Like most funding sources, the Trust Fund like to geographically disperse their dollars. Typically, the Trust Fund looks for a community to finish and close out one Trust Fund project before applying for another. This is not a hard fast policy, but has been a historical pattern.

Fig 3.2E. Major Corridor Development Projects (Top 3) Summary

	Length	Planning Level Cost Estimate	Potential Funding Source(s)
Metro Connector	2.5 miles	$886,000	MDOT Enhancement (65%) City of Novi (35%)
Taft Road Corridor	8 miles	$5.03 M	MDOT Enhancement (8%) MDNRE Trust Fund (5%) CMAQ (5%) Safe Routes to School (1%) City of Novi (81%)
9 ½ Mile Neighborhood Connector	7 miles	$4.87 M	MDOT Enhancement (10%) MDNRE Trust Fund (6%) Safe Routes to School (1%) CMAQ (5%) City of Novi (78%)

Fig. 3.2F. Neighborhood Connectors



Neighborhood Connectors

Please note that neighborhood connectors are not just restricted to the routes highlighted above. If desired elements of neighborhood connectors are desired, they could be used elswhere in the city as a means to calm traffic, provide non-motorized links and enhance a streetscape.

Near-term Neighborhood Connectors

- Build short connector pathways through existing right-of-way and city owned property
- Provide wayfinding and signage along near-term routes
- Implement traffic calming elements along near-term routes
- Implement road crossing improvements where near-term neighborhood connector routes cross a major roadway

Mid-term Neighborhood Connectors

- Build short connector pathways through existing right-of-way city owned property
- Obtain easements to build short connector pathways through private owned property
- Provide wayfinding and signage along mid-term routes
- Implement traffic calming elements along mid-term routes
- Implement road crossing improvements where mid-term neighborhood connector routes cross a major roadway

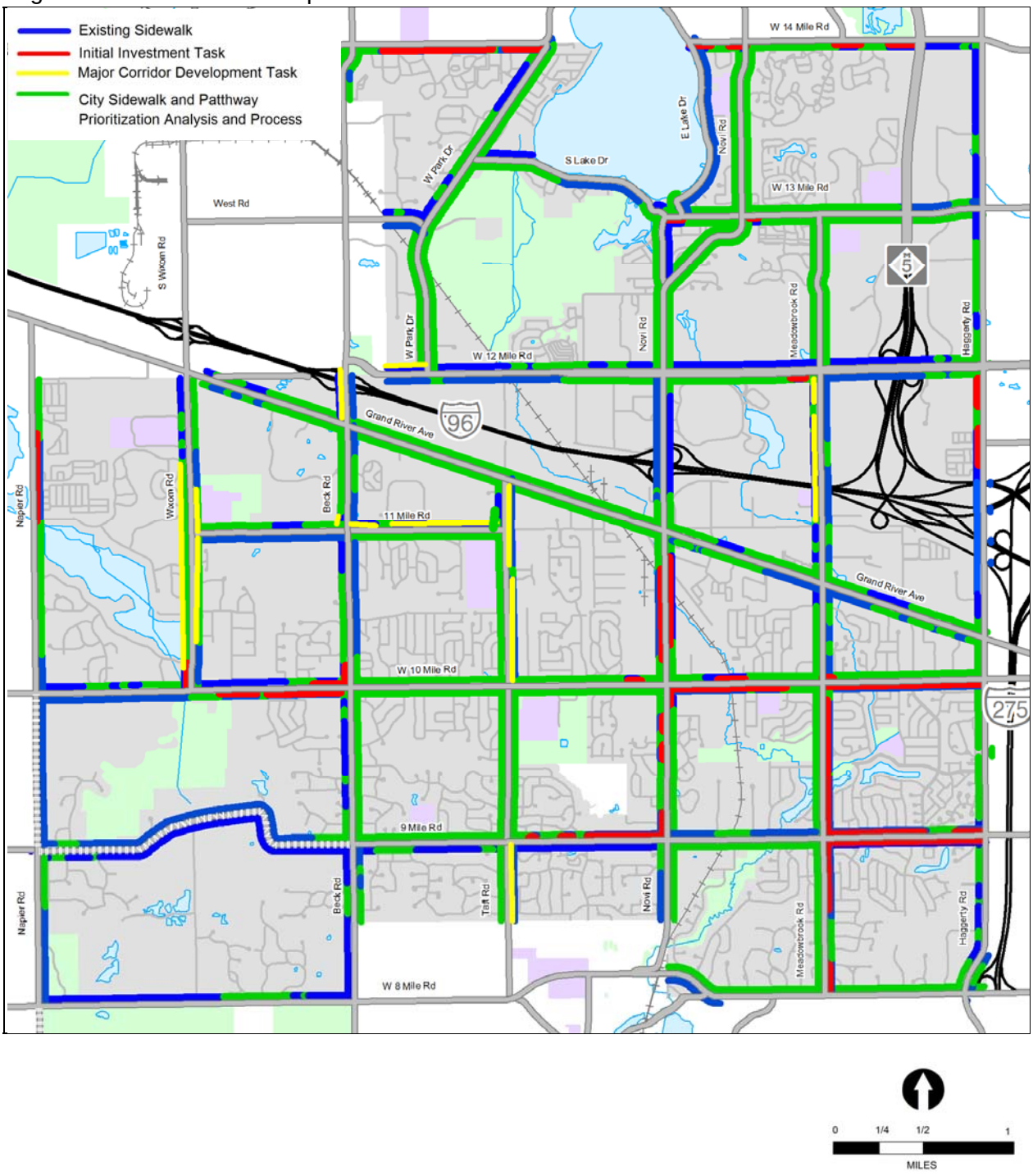
Long-term Neighborhood Connectors

- Obtain easements to build short connector pathways through private owned property
- Provide wayfinding and signage along long-term routes
- Implement traffic calming elements along long-term routes
- Implement road crossing improvements where long-term neighborhood connector routes cross a major roadway
- If there is enough demand consider paving the pathways through Rotary Park
- Build unpaved pathway along ITC corridor if allowable and eventually if there is demand consider paving the trail

Sidewalk/Roadside Pathway Gaps

Many of the sidewalk gaps are addressed through the Major Corridors task and the Initial Investments task. The remaining sidewalk gaps that are not addressed by other tasks should be put into the City of Novi's Sidewalk and Pathway Prioritization Analysis and Process to determine when they should be implemented.

Fig. 3.2F. Sidewalk Gaps



Construction Integration

The costs to undertake some non-motorized projects independently of a road reconstruction project would be significant. Thus, in order to maximize the impact of finite resources, the long-term improvements are expected to be implemented as a road is completely reconstructed (not just resurfaced). In general, construction integration improvements:

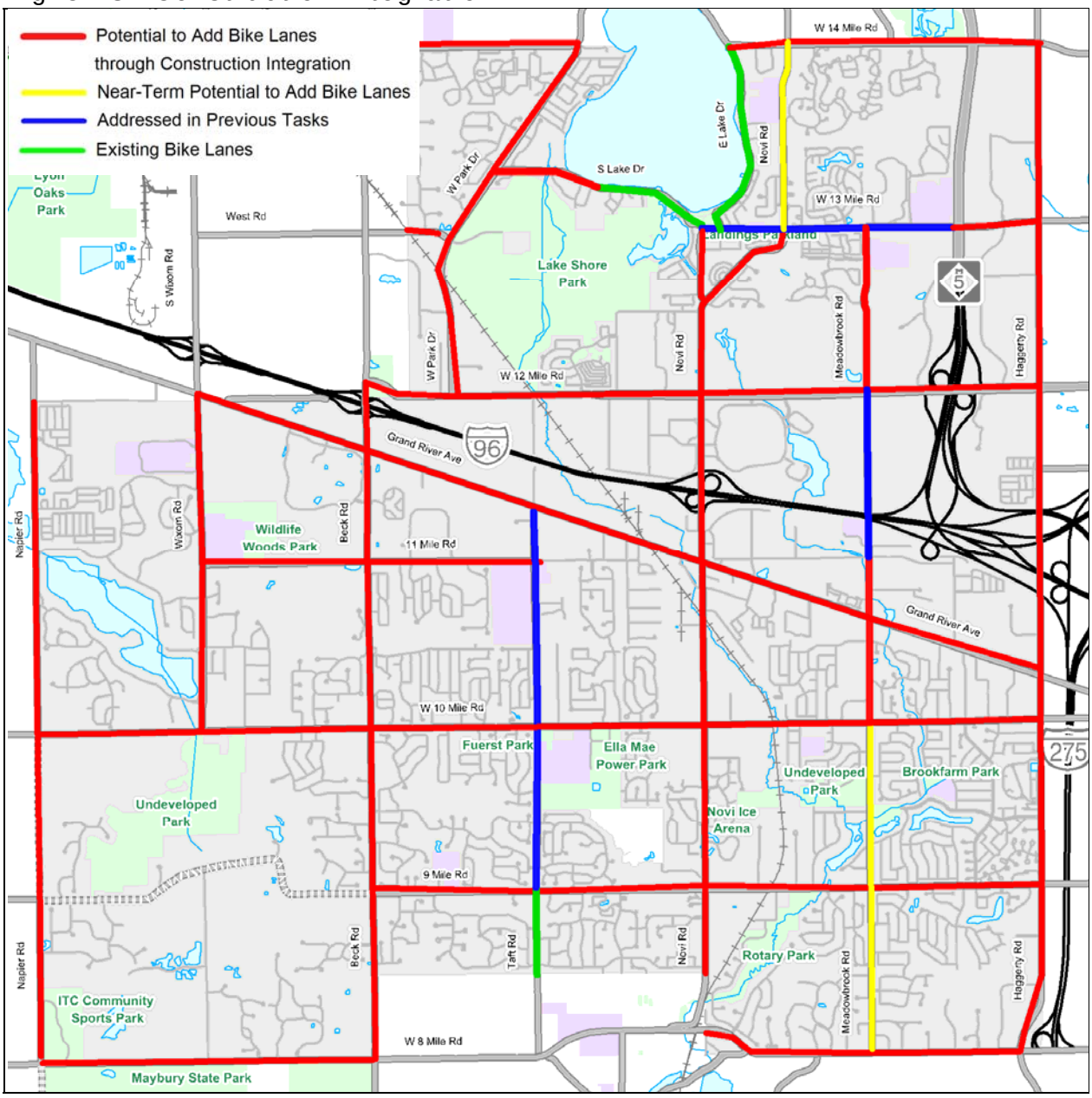
- Are generally implemented when a new road is built or an existing road is completely reconstructed. Reconstruction projects typically include new curb and gutter as well as storm water systems.
- Generally require that a road be widened to accommodate the minimal lane width requirements for all users and may require additional rights-of-way.
- Strive to meet the minimum desired widths for bike lanes, motor vehicle lanes, buffers, and sidewalks to the extent that it is practical given the project's context.

This report does not define the ideal long-term cross section for every primary road in the City. Rather it defines what improvements should be included and provides guidelines for a wide variety of road and right-of-way scenarios. Construction integration projects are very important; however they can be very capital intensive and should be prioritized after the initial investments are made. With the City's adoption of complete streets guidelines, is it assumed that bicycle and pedestrians improvements will be incorporated into all projects as a matter of course.

Construction integration tasks include:

- Add bike lanes along arterial and collector roads that were not addressed in the previous tasks. Many of the roads have potential to add a paved shoulder to obtain bike lanes, however, due to the fluctuation in the number of lanes at intersections and curbs that occur in numerous places along the roadway a simple paving of the shoulder may not be as simple as it seems and it may be more feasible to wait until the road is reconstructed to pave the shoulders and add bike lanes.
- Meadowbrook Road between W 10 Mile Road and W 8 Mile Road may be the best candidate to attempt a near-term bike lane conversion by paving the shoulder and narrowing the traffic lanes and improving the subdivision entrances similar to Taft Road.
- Novi Road between W 13 Mile Road and W 14 Mile may be a candidate for a near-term bike lane by converting it to a three lane road with a median where there are no turning movements.
- Add sidewalks and bike lanes to Novi Road/I-96 interchange(refer to Figure 3.3A for proposed improvements)
- Add bike lanes to Beck Road/I-96 interchange
- If CSX railroad becomes abandoned there may be potential to build a rail-trail along corridor.

Fig. 3.2G. Construction Integration



Potential Funding Sources

There are several potential funding sources to investigate as projects move toward implementation. Some projects have a higher likelihood of receiving outside funding assistance than others. Potential funding sources from outside entities change and evolve on a regular basis. Understanding available funding programs, their requirements and deadlines requires continuous monitoring. A few of the more common funding sources have been detailed here as a reference and resource. These are in addition to traditional funding methods such as the general fund, millages, bonds, Community Development Block Grants, etc.

MDOT Transportation Enhancement Program

Transportation Enhancement (TE) activities are federally funded, community-based projects that expand travel choices and enhance the transportation experience by improving the cultural, historic, aesthetic and environmental aspects of the transportation infrastructure. To be eligible, a project must fall into one of the 12 TE activities and relate to surface transportation. Activities that relate to the implementation of this Master Plan include:

- Provision of facilities for pedestrians and bicycles.
  Includes bike lane striping, wide paved shoulders, bike parking, bus racks, off-road trails, bike and pedestrian bridges and underpasses.
- Paved shoulders four or more feet wide
- Bike lanes
- Pedestrian crosswalks
- Shared use paths 10 feet wide or greater
- Path/trail user amenities
- Grade separations
- Bicycle parking facilities
- Bicycle accommodations on public transportation
- Provision of safety and educational activities for pedestrians and bicyclists
- Programs designed to encourage walking and bicycling by providing potential users with education and safety instruction through classes, pamphlets and signage
- Preservation of abandoned railway corridors (including the conversion and use thereof for pedestrian and bicycle trails).
- Acquiring railroad rights-of-way; planning, designing and constructing multi-use trails; developing rail-with-trail projects; purchasing unused railroad property for reuse.

A minimum 20% local match is required (although more match is preferred) for proposed projects and applications are accepted on an on-going basis.

Michigan Natural Resources Trust Fund

The MNRTF provides funding for both the purchase of land (or interests in land) for recreation or protection of land because of its environmental importance or scenic beauty and the appropriate development of land for public outdoor recreation use. Goals of the program are to: 1) protect Michigan's natural resources and provide for their access, public use and enjoyment; 2) provide public access to Michigan's water bodies, particularly the Great Lakes, and facilitate their recreation use; 3) meet regional, county and community needs for outdoor recreation opportunities; 4) improve the opportunities for outdoor recreation in Michigan's urban areas; and, 5) stimulate Michigan's economy through recreation-related tourism and community revitalization.

All proposals for grants must include a local match of at least 25% of the total project cost. There is no minimum or maximum for acquisition projects. For development projects, the minimum funding request is $15,000 and the maximum is $300,000. Applications are due in April and projects must meet the goals of the Novi Parks and Recreation Master Plan. In addition, with the City's recent award of MDNRE Trust

Fund dollars for the Landings Park project, it may be a few years (2 to 3) before the City can be successful in approaching the Trust Fund again for additional projects. This is due to the Trust Funds historical pattern of dispersing their dollars geographically.

Congestion Mitigation and Air Quality Improvement Program (CMAQ)
The CMAQ program was created to reduce congestion on local streets and improve air quality. Funds are available to urban communities designated as "non-attainment" areas for air quality. Pedestrian and bicycle projects are eligible for CMAQ funding where they can be shown to divert motor vehicle commuting traffic that would otherwise take place. CMAQ projects on roads must be on federal-aid eligible roads. There is typically a 20% local match requirement. SEMCOG issues a call for applications each year (typically spring) and distributes the funds after review. In 2011, there was approximately $17.4 million available in the SEMCOG region.

DALMAC Fund
Established in 1975 to promote bicycling in Michigan, the DALMAC Fund is administered by the Tri-County Bicycle Association and supported by proceeds from DALMAC. The DALMAC Fund supports safety and education programs, bicycle trail development, state-wide bicycle organizations, and route mapping projects. Applications must be submitted by March 1. They are reviewed by the DALMAC Fund Committee and approved by the Board. Grants are made by May of the year they were submitted. Applications can be found at www.biketcba.org. This is a relatively small grant program with a total of $70,000 in 2010.

KODAK American Greenways Awards
Kodak, The Conservation Fund, and the National Geographic Society, provide small grants to stimulate the planning and design of greenways in communities throughout America. Made possible by a grant from Eastman Kodak, the program also honors groups and individuals whose ingenuity and creativity foster the creation of greenways. The application period typically runs from March 1st through June 1st. Program goals are to: develop new, action-oriented greenways projects; assist grassroots greenway organizations; leverage additional money for conservation and greenway development; and, recognize and encourage greenway proponents and organizations. Maximum grant is $2,500. For more information go to www.conservationfund.org.

Safe Routes to School
The Safe Routes To School Program is a national movement to make it safe, convenient and fun for children to bicycle and walk to school. In Michigan, the program is sponsored by the Michigan Fitness Foundation and has gained momentum over the past few years. Examples of projects and programs eligible for funding include sidewalks, traffic calming, crossing improvements, bicycle and pedestrian facilities, public awareness campaigns, traffic education and enforcement, etc. Schools must be registered and develop a Walking Audit in order to be eligible to apply. SR2S funding is 100 percent federal; no match is required. Projects must be constructed within 2 miles of the school. Applications are received and reviewed quarterly. Typical funding is approximately $200,000 per school and does not cover engineering, administration or permits.
www.saferoutesmichigan.org

Bikes Belong
The Bikes Belong Coalition is sponsored by members of the American Bicycle Industry. Their mission is to put more people on bikes more often. The program funds projects in three categories: Facility, Education, and Capacity Building. Requests for funding can be up to $10,000 for projects such as bike paths, trails, lanes, parking, and transit, and safe routes to school. Applications are accepted via email three times per year (April, August and November). More information can be found at www.bikesbelong.org.

3.3 Specific Area Concept Plans

The following concept plans were prepared to show how some of the ideas of the Non-motorized Plan may be applied to specific areas. These concept plans should not be taken as completely developed designs. Rather, they are to illustrate a design idea. The areas shown will require separate design studies that may involve a more detailed investigation of the site conditions including public input and the development of alternatives and draft preliminary plans.

Crossing I-96

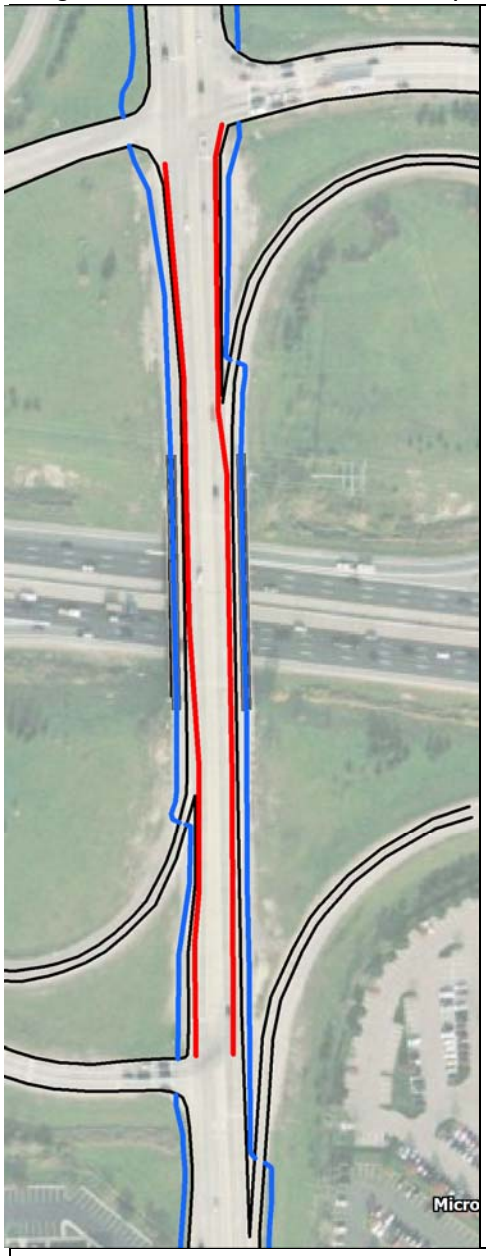
The I-96 expressway creates a significant barrier across the City with only one pedestrian crossing along Wixom Road which is outside of the City limits. Novi Road, Taft Road and Meadowbrook Road were identified as major areas of concern for pedestrians and bicyclist who want to cross the expressway and access commercial and recreational destinations on both sides of the expressway. Currently, Novi Road, Beck Road and Meadowbrook Road overpasses do not have any non-motorized facilities and Novi Road and Beck Road are difficult to cross as a pedestrian or bicyclist due to the heavy traffic and free-flowing ramps.

Free-flow ramps pose many dangers to bicyclists and pedestrians. Motor vehicle speeds are high and there are many merging operations taking place commanding the attention of motorists. The I-96 freeway interchanges were all recently rebuilt, so it may be a while until improvements are made at these crossings. When the interchanges are reconstructed, a general design principal, consistent with non-motorized travel, would be to bring all ramps perpendicular to the roadway to reduce speeds at crosswalk locations and establish more appropriate intersections for urban and suburban crossings.

The following illustrations demonstrate potential ways to retro-fit the existing expressway crossings to include non-motorized facilities. Please note that these illustrations were developed in coordination with the MDOT Novi Transportation Improvement Study:

- Fig. 3.3A. Novi Road Overpass
- Fig. 3.3B. Meadowbrook Road Overpass
- Fig. 3.3C. Beck Road Overpass
- Fig. 3.3D. Wixom Road Overpass
- Fig. 3.3E. CSX Underpass

Fig. 3.3A. Novi Road Overpass Retro-fit Cross Section



The Novi Road interchange is a daunting environment for bicyclists and pedestrians. But it is a key link between the City's major commercial centers and despite its lack of facilities, pedestrians and bicyclists still use the overpass.

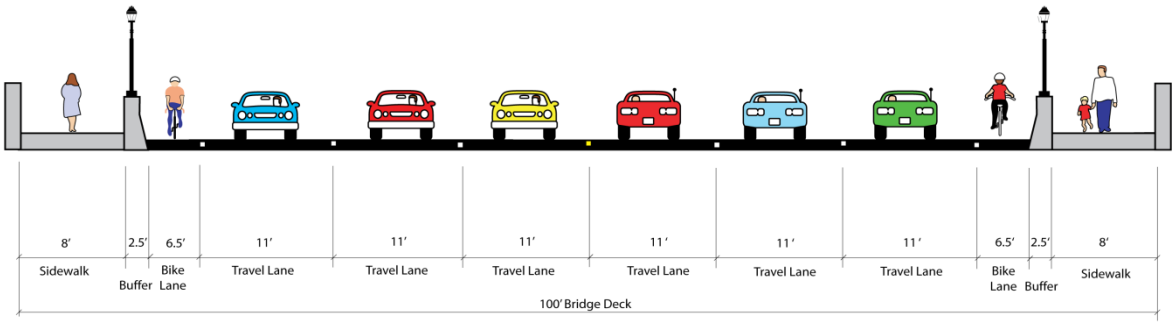
The bridge deck is 100' wide with a large recovery area on the outside and an unused center lane. This provided an opportunity to reallocate space on the bridge deck to accommodate bicycle and pedestrian facilities.

The following list describes basic improvements that could be made to improve bicycle and pedestrians facilities on the bridge:

- Add sidewalk to bridge deck by removing center median and reducing the travel lanes to 11' wide. Please note that due to the existing grade some earthwork would be required to build the sidewalks approaching the bridge deck.
- Until bike lanes can be implemented north and south of the bridge deck on Novi Road provide a 6.5' paved shoulder and allow bicycles to cross the bridge as a pedestrian using the sidewalk.
- Provide high visibility crosswalks at all free-flowing ramps by using the rectangular rapid flash beacon with an advanced warning flash beacon.
- In the future, when the interchange is reconstructed, bring all ramps perpendicular to the roadway to provide a safer crossing environment for pedestrians and bicyclists.

Sidewalk
Paved Shoulders

Potential Cross Section:



The City should consider going beyond providing just basic accommodations for bicyclists and pedestrians. The Novi Road interchange is a gateway to the city. It is a major connection between two regional shopping centers and one of the first things (and sometimes the only thing) many people experience when visiting the City of Novi.

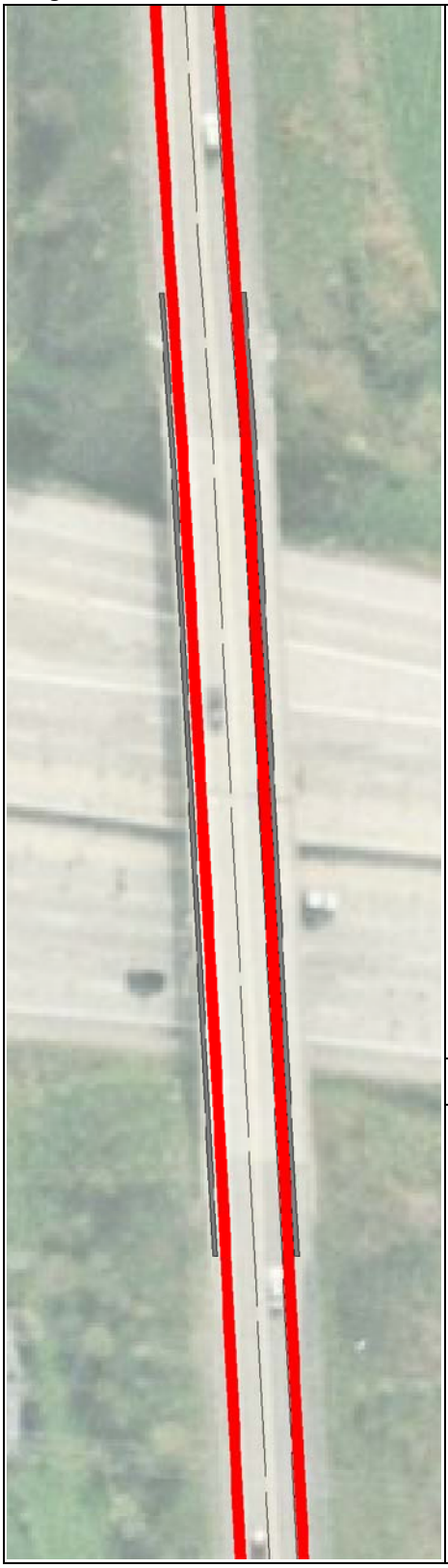
Currently the interchange is utilitarian in nature. However, there is potential to enhance the interchange to create a signature corridor that reflects the character of the city and provides a memorable first impression of the community while simultaneously addressing important bicycle and pedestrian safety concerns.

Many communities have created landmark bridges that are an important part of their identity. Numerous improvements have been completed or are underway on Novi Road north and south of the interchange. Upgrading the bridge would establish a hallmark corridor through the heart of the city that also bears the city's name.

Wabasha Street Bridge in St. Paul Minneapolis

Existing conditions for the Novi Street overpass

Fig. 3.3B. Meadowbrook Road Overpass Retro-fit Cross Section



Meadowbrook Road provides the best opportunity to add bicycle facilities to an existing crossing of I-96. Beck Road and Novi road are interchanges and Haggerty Road is comprised of multiple bridges. It also provides a connection between the I-275 Metro Trail and the M-5 Metro Trail.

The following list describes basic improvements that could be made to improve bicycle and pedestrian facilities on the bridge:

- Add 9' bike lanes to both side of the road by paving the shoulder and reducing the travel lanes to 11' wide. The wide paved shoulder will also allow room for pedestrians walking against the flow of traffic over the bridge.
- Provide a crossing island on Meadowbrook just north of Bridge Street by utilizing the existing center turn lane.
- Since Meadowbrook Road provides both a regional trail connection and an everyday commuter connection, when the overpass is reconstructed, there should be a 6' bike lane on both sides of the road and a 10' shared use path should be constructed on the west side of the road..

Bike Lanes

Potential Cross Section:

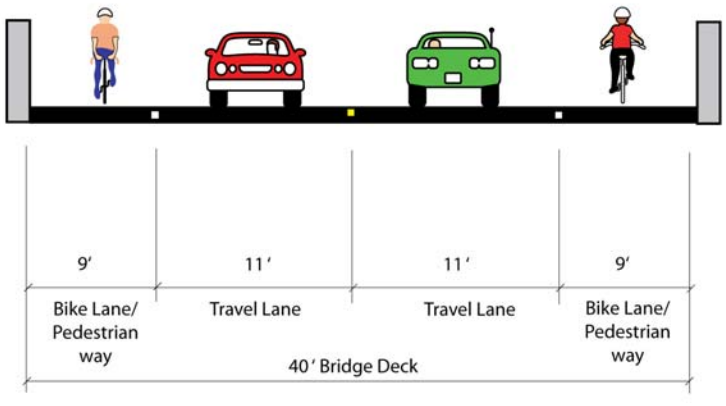
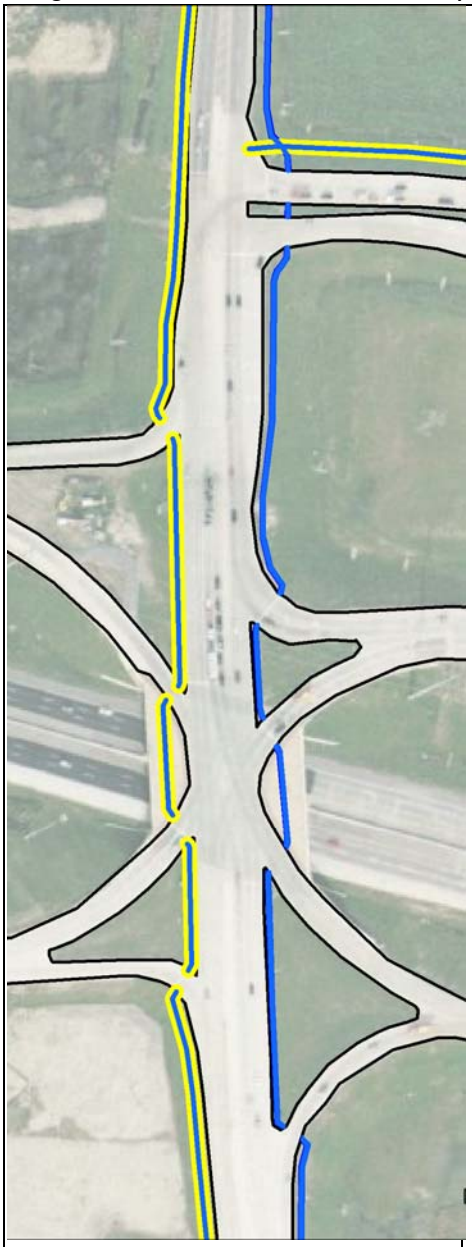


Fig. 3.3C. Beck Road Overpass Retro-fit Cross Section



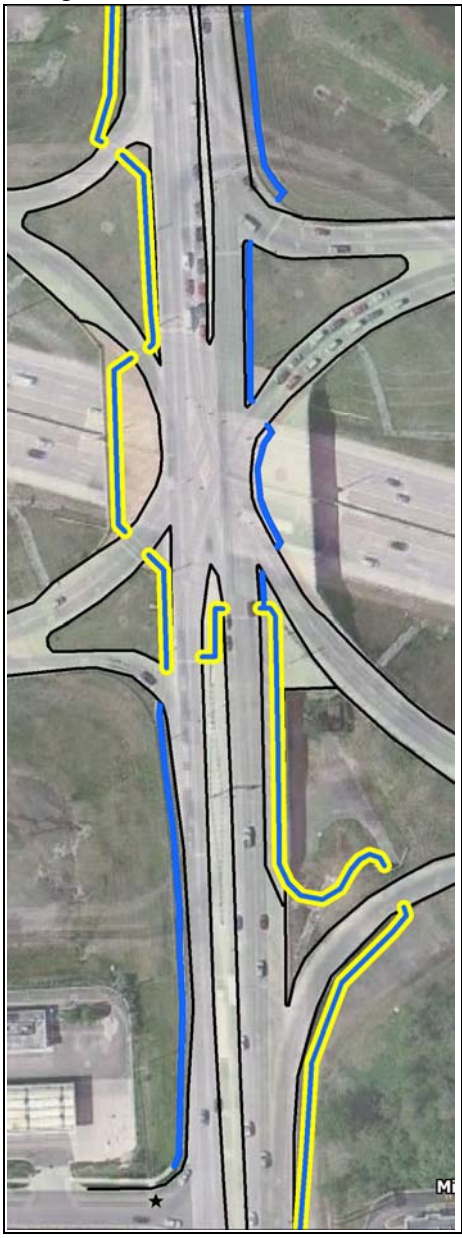
Beck Road was reconstructed in 2005 into a Single Point Urban Interchange and has no bicycle or pedestrian facilities.

The following list describes basic improvements that could be made to improve bicycle and pedestrians facilities on the bridge:

- Add 10’ Shared use path to provide a regional trail connection on the west side of Beck Road. Please note that due to the existing grade some earthwork would be required to build the sidewalks approaching the bridge deck.
- Provide high visibility crosswalks at all free-flowing ramps by using the rectangular rapid flash beacon with an advanced warning flash beacon.
- The 10’ Shared use path will probably be the only non-motorized connection on this bridge for quite some time, as bike lanes are difficult to add to the existing geometry and it may be a while until there is sufficient demand for a sidewalk on the east side of the road.

Sidewalk
Regional Trail Connections

Fig. 3.3D. Wixom Road Overpass Retro-fit Cross Section



Wixom Road was reconstructed in 2007 into a Single Point Urban Interchange and has a 6' sidewalk on the west side. This is the only interchange that provides a pedestrian crossing over the freeway, however it is not in the City of Novi's jurisdiction.

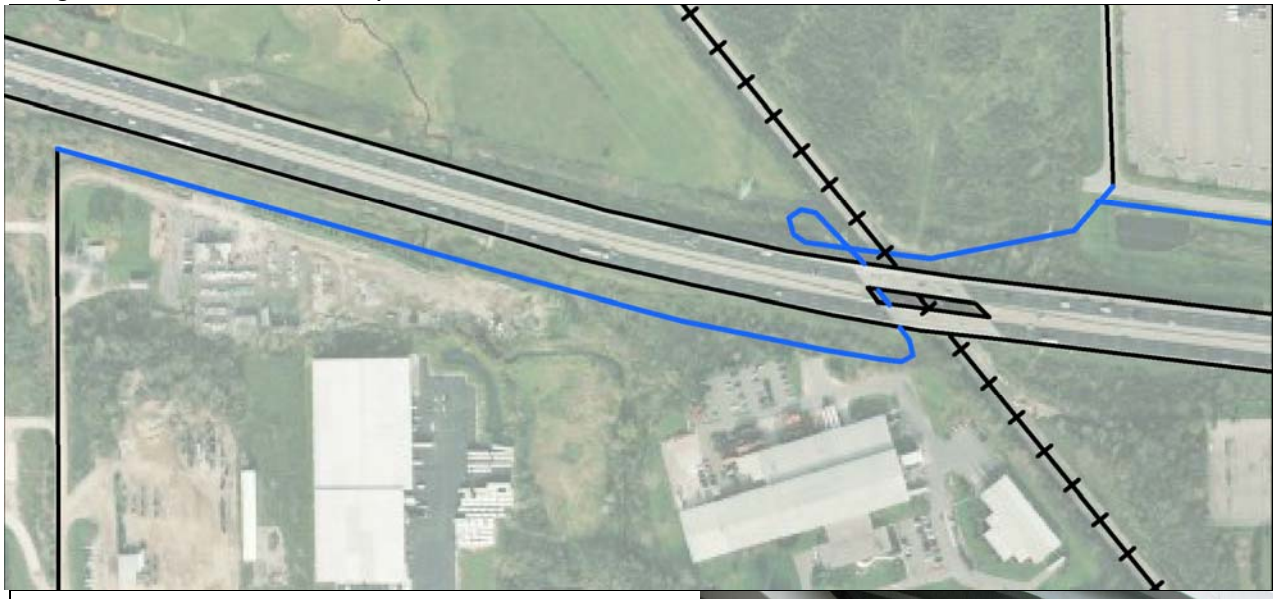
The following list describes basic improvements that could be made to improve bicycle and pedestrians facilities on the bridge:

- Provide high visibility crosswalks on existing sidewalk at all free-flowing ramps by using the rectangular rapid flash beacon with an advanced warning flash beacon.
- When the regional trail connection is implemented utilize the existing tunnel under the I-96 east-bound on-ramp and ramp the pathway up to the bridge deck. Provide a road crossing across Wixom Road using the existing signals and median to link to the existing sidewalk. Then widen the existing sidewalk on the west side of the road to a 10' Shared use path where it provides a regional trail connection.

The recommendations for this overpass were developed from the I-96 Corridor Study.

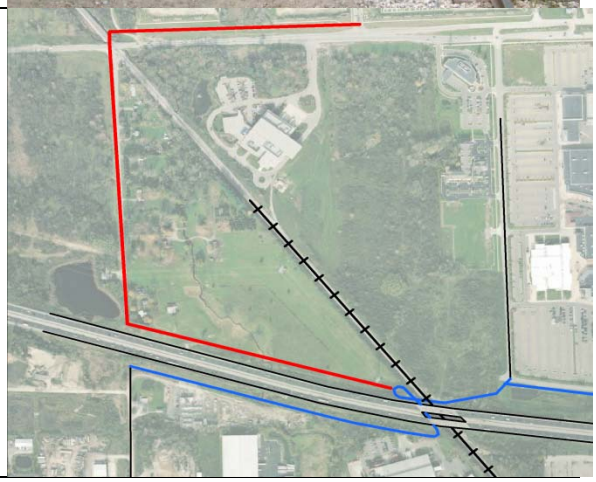
Sidewalk
Regional Trail Connections

Fig. 3.3E. CSX Underpass Retro-fit



Utilize the existing CSX railroad underpass to build a trail along the west side of the railroad. By working with the existing bridge deck or building a separate facility, build a bridge over the railroad to provide a trail crossing to the east to connect to the regional shopping centers.

The alternative route to building a bridge over the railroad would be to take the trail to the west and connect to Taft Road, go north along Taft Road to 12 Mile Road and provide an at-grade railroad crossing along 12 Mile Road. At this point it may be worth exploring the option of building a separate non-motorized bridge over I-96 connecting Taft Road to avoid the CSX railroad altogether.



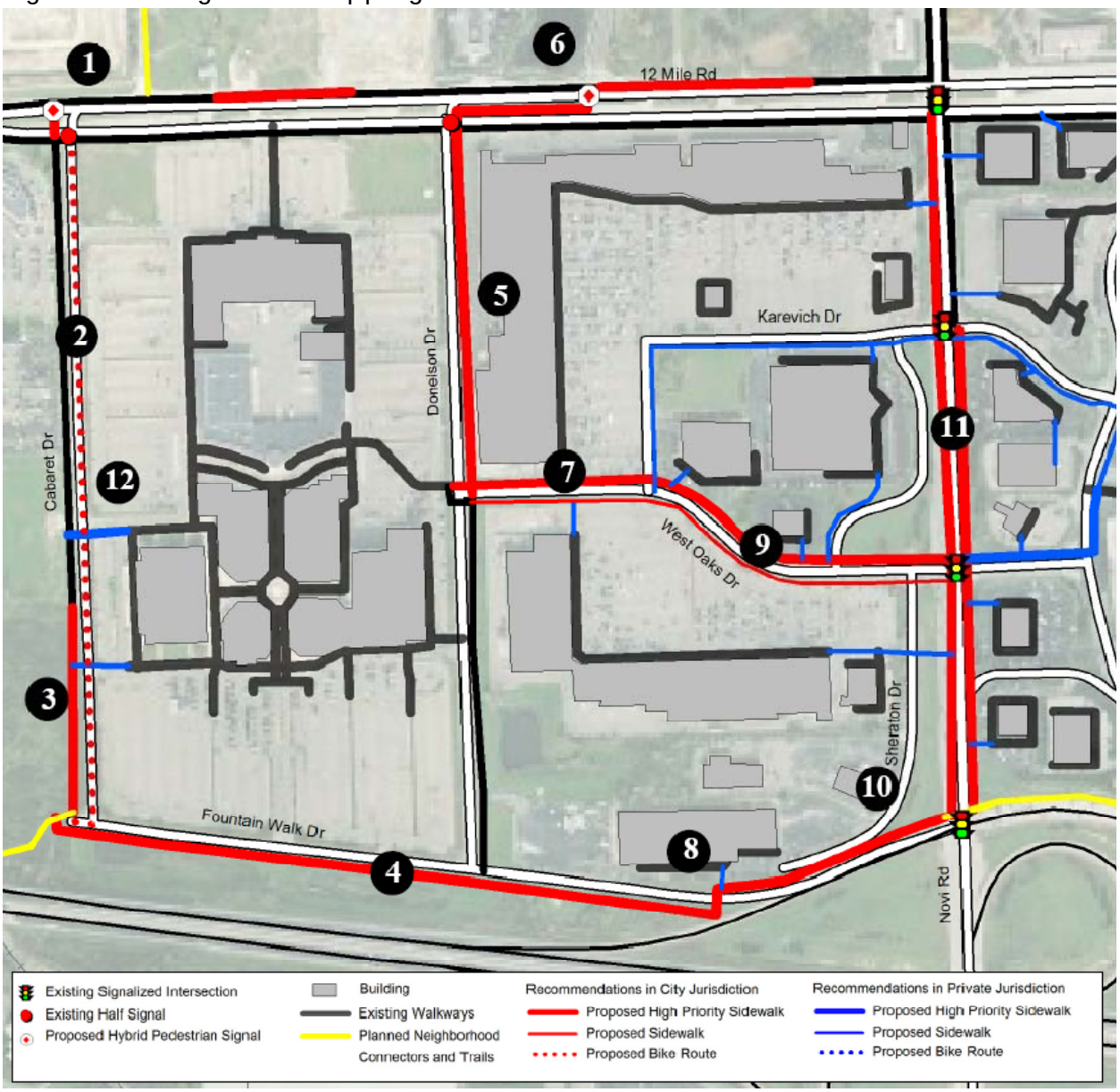
Regional Shopping Center

The regional shopping center is a major destination in the City of Novi and an area that many people refer to as "Downtown Novi". From a non-motorized standpoint it is important to make connections to this destination and to make connections within the shopping center. It is recommended that the private and public entities work together to try and make this area more bicycle and pedestrian friendly.

The following illustrations demonstrate potential ways to incorporate non-motorized facilities within the regional shopping center:

- Fig. 3.3D. Regional Shopping Center West of Novi Road
- Fig. 3.3E. Regional Shopping Center East of Novi Road

Fig. 3.3D. Regional Shopping Center West of Novi Road



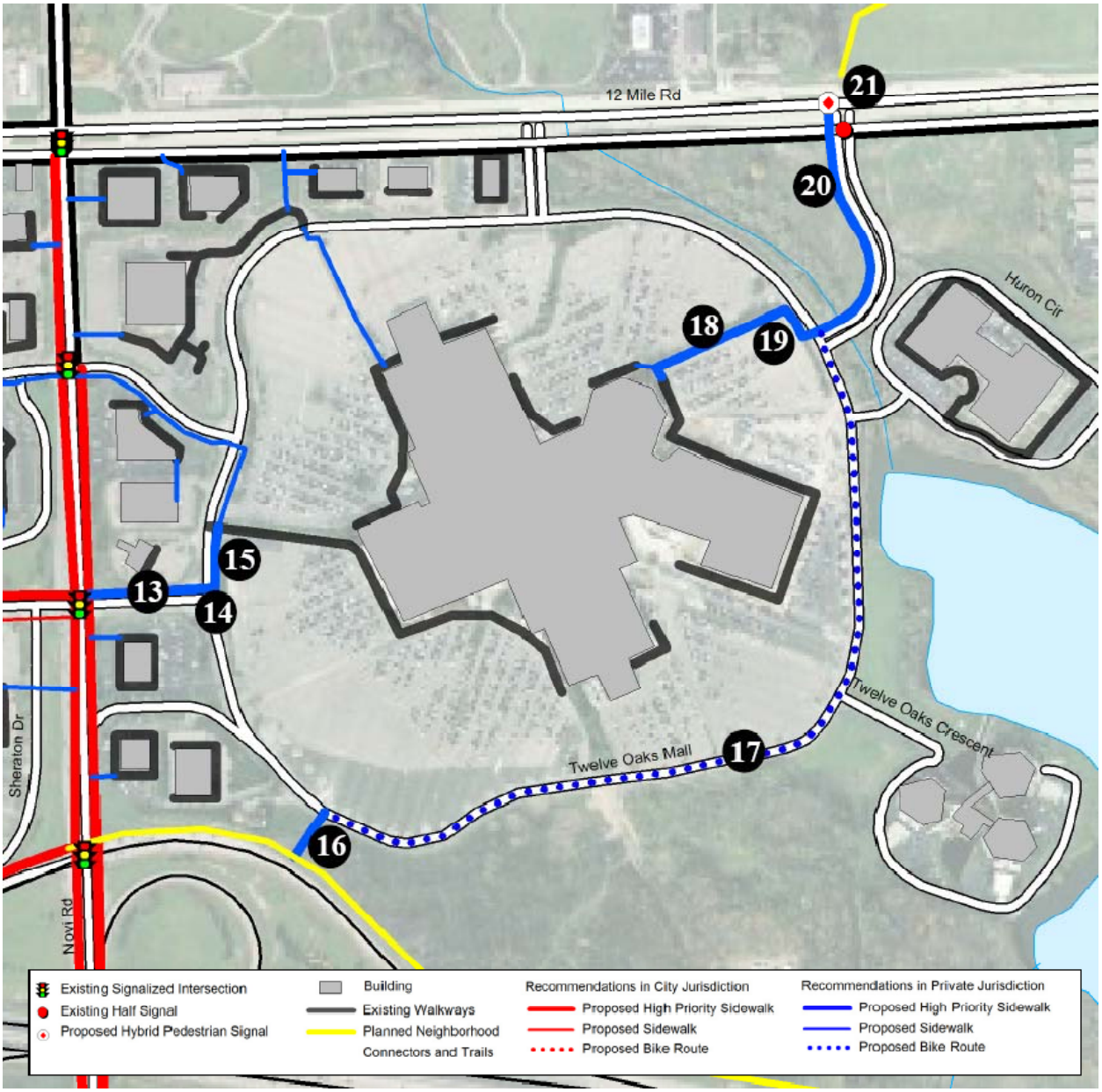
Recommendations for items in Public Jurisdiction:

1. Provide Pedestrian Crossing on 12 Mile by adding a Pedestrian Hybrid Beacon at Cabaret Dr
2. Implement on road bike route on Cabaret Dr
3. Extend 6’ pathway along the west side of Cabaret Dr down to Fountain Walk Dr
4. Build 10’ Shared Use Path along the south side of Fountain Walk Dr
5. Extend 6’ pathway along the east side of Donelson Dr between West Oaks Dr and 12 Mile Road
6. Provide Pedestrian Crossing on 12 Mile by adding a Pedestrian Hybrid Beacon at Carlton Way
7. Provide road crossing on West Oaks Dr
8. Provide road crossing on Fountain Walk Dr between Donelson Dr and Novi Road
9. Build 6’ sidewalk along north side of West Oaks Dr between Donelson Dr and Novi Road
10. Build 10’ Shared Use Path to north side of Fountain Walk over to Novi Road
11. Build Sidewalk along both sides of Novi Road

Recommendations for items in Private Jurisdiction:

12. Build 6’ sidewalk connecting Cabaret Dr to the Existing sidewalks

Fig. 3.3E. Regional Shopping Center East of Novi Road



Recommendations for items in Private Jurisdiction:

13. Build 6’ sidewalk along north side of road
14. Provide Pedestrian crossing at intersection
15. Build 6’ sidewalk along east side of road to connect to existing sidewalk
16. Build 10’ shared use path when trail along I-96 is built
17. Implement on road bike route along drive when I-96 trail connection is made
18. Build 6’ sidewalk
19. Provide pedestrian crossing at intersection
20. Build 6’ sidewalk along west side of road

Recommendations for items in Public Jurisdiction:

21. Provide Pedestrian Crossing on 12 Mile by adding a Pedestrian Hybrid Beacon when neighborhood connector pathway is implemented