WestPlan 2045 Long Range Transportation Plan

WEST MICHIGAN SHORELINE
REGIONAL DEVELOPMENT COMMISSION

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REGIONAL DEVELOPMENT COMMISSION
(WMSRDC)

The WMSRDC is a regional council of governments representing 127 local governments in the West Michigan counties of Lake, Mason, Muskegon, Newaygo, Oceana, and northern Ottawa.

The mission of WMSRDC is to promote and foster regional development in West Michigan… through cooperation amongst local governments.

WMSRDC
WEST MICHIGAN SHORELINE
REGIONAL DEVELOPMENT COMMISSION

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CHAPTER 1: INTRODUCTION

Overview of Plan

On December 4, 2015, President Obama signed into law Public Law 114-94, the Fixing America's Surface Transportation Act (FAST Act). The FAST Act funds surface transportation programs - including, but not limited to, Federal-aid highways - at over $305 billion for fiscal years (FY) 2016 through 2020. It is the first long-term surface transportation authorization enacted in a decade that provides long-term funding certainty for surface transportation. This summary reviews the policies and programs of the FAST Act administered by the FHWA.

The Moving Ahead for Progress in the 21st Century Act (MAP-21), enacted in 2012, included provisions to make the Federal surface transportation more streamlined, performance-based, and multimodal, and to address challenges facing the U.S. transportation system, including improving safety, maintaining infrastructure condition, reducing traffic congestion, improving efficiency of the system and freight movement, protecting the environment, and reducing delays in project delivery. The FAST Act builds on the changes made by MAP-21.

MAP-21funded surface transportation programs at over $105 billion for fiscal years (FY) 2013 and 2014 and was the first long-term highway authorization enacted since 2005. By transforming the policy and programmatic framework for investments to guide the system's growth and development, MAP-21 created a streamlined and performance-based surface transportation program and builds on many of the highway, transit, bike, and pedestrian programs and policies established in 1991.

The Clean Air Act of 1970 (CAA) and its amendments require that the federal government review all transportation plans to assure improved air quality. These conformity requirements, first introduced in the 1977 CAA Amendments, prohibited federal approvals of actions that did not concur with state government's State Implementation Plan (SIP) for air quality improvements. These requirements were further expanded in the 1990 Amendments to require that transportation plans conform to the SIP's expressed purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards, and achieving expeditious attainment of such standards.

A portion of Muskegon County and the State of Michigan are operating under the State Implementation Plan (SIP). This plan identifies how air quality will be protected and improved in the state. The processes for reviewing and approving long range transportation plans and projects are outlined in the SIP and are being followed in the development of transportation plans statewide.

Under the CAA, the U.S. Environmental Protection Agency has classified a portion of Muskegon County as nonattainment and Ottawa County as an attainment area for the ground-level ozone pollutant. Muskegon is classified as its own area while Ottawa and Kent counties are classified as a two-county combined area.

The WestPlan 2045 Long-Range Transportation Plan provides for a multi-jurisdictional, multi-year look at the Muskegon/northern Ottawa area's future transportation system. Transportation needs and resources

were evaluated for the period 2020 to 2045, and appropriate plans were made for meeting long-term needs, in the best manner possible with constrained finances. The plan also includes the use of local, state, and federal transportation goals and objectives to guide transportation plans and projects. This plan covers transportation for all of the WestPlan area and, as such, features input from local elected officials, municipal and road agency staff, and the citizens of the Muskegon/northern Ottawa area.

WestPlan Member Agencies

Federal Highway Administration
City of Ferrysburg
City of Grand Haven
Harbor Transit
Michigan Department of Transportation
City of Muskegon
Muskegon Area Transit System
Muskegon County Road Commission
City of Muskegon Heights
City of North Muskegon
City of Norton Shores
Ottawa County Road Commission
City of Roosevelt Park
City of Whitehall
Village of Spring Lake
City of Montague
Village of Fruitport
Muskegon County urban twp. rep.
Ottawa County urban twp. Rep
Muskegon County rural twp. rep.
Ottawa County rural twp. rep.
Muskegon County
Ottawa County

Description of the MPO

WestPlan consists of a Policy Committee and a Technical Committee. The Technical Committee reports directly to the Policy Committee. The Policy Committee is responsible for all final decisions regarding transportation. All meetings, with the exception of special meetings, are held during normal business hours.

The Technical Committee usually meets every month, and is made up mostly of staff members of various member agencies. Members are typically engineers, city managers, or DPW staff. The Technical Committee acts as an advisory committee to work on issues which are primarily technical. The Technical Committee then makes recommendations to the Policy Committee.

The Policy Committee also usually meets every month. It is comprised almost entirely of local elected officials who have been appointed to the committee by their jurisdictions. The Policy Committee is responsible for all final decisions regarding transportation within the MPO.

Summary of the Planning Process

The development and management of a community's transportation system requires various levels and degrees of planning. At one level, individual communities may develop implementation plans for a single construction season or capital improvement plans to meet needs for the next five to six years. At another level, metropolitan planning organizations (MPO's) develop both short and long-range transportation plans that cross municipal boundaries and provide a transportation vision for an entire metropolitan area.

Ten Federal Planning Factors

1. Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity and efficiency.

2. Increase the safety of the transportation system for motorized and non-motorized users.

3. Increase the security of the transportation system for motorized and non-motorized users.

4. Increase the accessibility and mobility of people and for freight.

5. Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and state and local planned growth and economic development patterns.

6. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.

7. Promote efficient system management and operation.

8. Emphasize the preservation of the existing transportation system.

9. Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation.

10. Enhance travel and tourism.

Ten Federal Planning Factors

The continual development of this document is a cooperative effort of the local communities, transportation stakeholders, the public, and MPOs. The process, explained below, includes the development of numerous elements. The development of the Long Range Transportation Plan (LRTP) is driven, in part, by ten federal planning factors which have been identified by the FHWA.

All of the proposed expansion projects in both the LRTP and the FY2020-2023 Transportation Improvement Program (TIP) further at least one of these goals and in fact usually touch on multiple goals.

One of the first steps in the process involves scoping. During this scoping process, MPO committees reviewed the existing vision, goals, and objectives. A number of changes were made in anticipation of performance based planning measures. These decisions were informed by the ten federal planning factors as well as other considerations.

The collection and analysis of data is one of the first steps of the planning process. For this effort, demographic information on the Muskegon and northern Ottawa County area was collected at a detailed "traffic analysis zone" ("TAZ") level. This included socio-economic data items such as population, housing units, vehicles available, retail and non-retail employment, and other data. Information that was also gathered includes traffic count levels, land use patterns, zoning ordinances, comprehensive development plans, environmental factors, and recent local developments.

In addition to the collection of current data, projections must be made for future years of the plan. Using

population and employment projections, environmental and other development constraints, land-use patterns, local knowledge, and many other factors, socio-economic estimates were made for the year 2045. These projections provide an estimate of how the Muskegon/northern Ottawa MPO area may develop in the coming years.

As the socio-economic data was being compiled and projections were being made, a computer model of the WestPlan transportation network was also being further refined. The computer model, used for long-range planning and for air quality modeling, includes a complex network of simulated roadways in the WestPlan area. Each roadway in the model carries a simulated level of traffic based on the surrounding land uses, population, traffic counts, roadway types, and other socio-economic factors.

The current socio-economic data and traffic information was used as input to the model, and the model was calibrated so that the simulated traffic closely matched actual traffic patterns and data. Once the calibration process was complete, the socio-economic data estimates for the year 2045 were included in the model in order to determine if the current transportation system would be able to accommodate the growing or shifting demographics of the area. The purpose of the model is to identify roadways that are currently deficient or will be in the future.

In addition to modeled capacity deficiencies, other transportation concerns are addressed in the plan. This is accomplished through the identification of a "local concerns" list and through the development of goals and objectives. The local communities compiled the local concerns in order to address transportation needs such as safety, operational, or economic concerns that may not be shown by the capacity deficiency model. The concerns and desires of the WestPlan area are also included in the goals and objectives for this plan. These goals and objectives will guide transportation efforts into the future.

As the goals and objectives were being developed, financial resources were also being analyzed. As the plan must be financially constrained, an estimate of transportation revenues to the area must be calculated before plans for the transportation system and implementing projects can be selected. Recent funding sources and levels were used by MDOT to project future revenues, and the total amount of transportation funds that could be expected through the year 2045. This list of projects includes only those projects that significantly change the transportation network, and does not need to include resurfacing projects and other routine preservation projects.

Brief Description of Public and Stakeholder Involvement

Public and stakeholder involvement throughout the LRTP planning process was ensured through a number of mechanisms:

- Press and information releases
- Facebook notifications
- Internet web page
- Annual report
- Special meetings
- Workshops
- Public meetings
- Meetings of the WestPlan Technical and Policy Committees
- Direct mailings of the WMSRDC newsletter

Federal legislation also requires that WestPlan consult with federal, state and local entities that are responsible for:

- Economic growth and development
- Environmental protection
- Airport operations
- Freight movement
- Land use management
- Natural resources
- Conservation
- Historic preservation

A list of these transportation stakeholder agencies is located in the appendices. The goal of this process is to eliminate or minimize conflicts with other agencies' plans that impact transportation. WestPlan staff began the consultation process by reviewing its current stakeholder list to expand and ensure that the correct types of organizations noted above were receiving information regarding the LRTP. With the assistance of FHWA, Michigan Department of Transportation (MDOT), and other MPOs, additional entities are constantly being identified therefore expanding the transportation stakeholder list.

Agencies on the consultation list were contacted when a draft list of projects was adopted by the Technical and Policy committees.

Progress Since Last Plan

WestPlan is committed to the region-wide promotion and implementation of a safe, convenient, and seamless passenger and freight multimodal transportation system that includes highway, rail, bus, bicycle, and pedestrian mobility networks. Attaining this vision will require modernizing the region's existing transportation infrastructure and identifying additional funding sources to help pay for it.

Preservation of existing roadways and facilities has been the emphasis of the MPO, with significant commitments from federal, state, and local sources to fund transit, highway, and non-motorized projects in the MPO area. The largest project to be completed is M-231, which opened in 2015. This important project provides a much needed crossing over the Grand River in Ottawa County, and provides an alternate route for travelers around the City of Grand Haven and the US-31 drawbridge, which is a common area for congestion during peak traffic.

On the transit side, there have been large scale investments within the MPO area. In 2015, the Muskegon Area Transit System (MATS) completed work on a multi-million dollar investment to rebuild the downtown Herman Ivory Terminal. The new terminal includes expanded restroom facilities, room for more customer service staff, an indoor waiting area and a plaza next to the building on Second Street.

The WestPlan MPO also planned and implemented the expansion of several non-motorized trail facilities in the area. Both Ottawa and Muskegon counties have shown a commitment to fund these types of projects. In Ottawa County, the first 1.8 miles of the Spoonville Trail were opened in 2016. This first phase goes from North Cedar Drive to Leonard Road, crossing the Sgt. Henry E. Plant Memorial Bridge.

In Muskegon County, the Fred Meijer Berry Junction trail was completed in 2018. This entire trail is now complete and connects the southern end of the Hart-Montague Trail to the Lakeshore Trail in the City of North Muskegon. The trail is approximately 12 miles from Whitehall to North Muskegon.

In 2017, WestPlan MPO assisted MDOT, in consultation with local municipalities, governments, and regional planning agencies, on updating the non-motorized plan for the Grand Region. The MDOT-Grand Region encompasses the western central portion of Lower Michigan and includes 13 counties: Allegan, Barry, Ionia, Kent, Lake, Mason, Mecosta, Montcalm, Muskegon, Newaygo, Oceana, Osceola, and Ottawa. The plan serves as a tool to help identify gaps in the non-motorized network, prioritize non-motorized investment, coordinate with other agencies, and foster cooperative planning across municipal/county boundaries. More information on these projects, as well as many others, can be found throughout this LRTP.

CHAPTER 2: REGIONAL OVERVIEW

Brief History of the Region

Muskegon County

The earliest recorded history of the Muskegon area reflects that it was inhabited by the Ottawa and Pottawatomie tribes. The name "Muskegon" is derived from the Ottawa Indian term "Masquigon" meaning "marshy river" or "swamp." The "Masquigon" river is identified on French maps as early as the 17th century, suggesting that French explorers had reached Western Michigan by that time.

The first known Frenchmen in the area were Father Jacques Marquette, who traveled through the area in 1675 on his way to St. Ignace and a party of French soldiers under LaSalle's lieutenant, Henry de Tonty, who passed through in 1679.

The earliest known resident of the county was a fur trader and trapper named Edward Fitzgerald, who settled in the area in 1748. Settlement of the area began in 1837 with the organization of Muskegon County from portions of Ottawa and Oceana counties. At the time of its incorporation in 1859, Muskegon County had six townships (Muskegon, Norton, Ravenna, White River, Dalton, and Oceana).

The lumbering era put Muskegon County on the map, in economic terms. Ravenna was settled in 1844 when E. B. Bostwick built a sawmill. The city and township were named after Ravenna, Ohio, the hometown of the surveyor who platted the land. Norton Shores was settled by Colonel S. Norton in 1846. Casnovia was founded in 1850 by a tavern keeper named Lot Fulkerson. Montague was first settled in 1855 by Nat Sargent. Whitehall was platted in 1859 by Charles Mears and Giles B. Slocum. The town was originally named after Mears. In 1864, the Muskegon Log Booming Company was formed to sort logs and raft them to the mills. In 1868, Crawville, was founded by Edward Craw. It was renamed "Fruitport" a year later when the Pere Marquette Railroad built a station in the town that was a fertile fruit growing area and a port. The City of Muskegon was incorporated in 1869. In 1872, North Muskegon was recorded as Reedsville, named for the first settler, Archibald Reed. It was renamed in 1881 when it was incorporated as a village. North Muskegon was later incorporated as a city in 1891.

1890 marked the end of the lumber boom in Muskegon County. Successful area industrialists formed the Muskegon Improvement Company to stimulate the economy as it lagged at the end of the lumber boom. The Muskegon Improvement Company purchased 1,000 acres and sold the lots in a lottery, using the proceeds to underwrite new businesses. The project was successful enough that a train station was located in the area (Muskegon Heights) in 1902 to serve the Chicago & West Michigan Railroad.

Union Depot was opened in 1885 to serve the Chicago & West Michigan; Muskegon, Grand Rapids, & Indiana; and the Toledo, Saginaw & Muskegon railroads. It was designed by A.W. Rush & Son of Grand Rapids in the Richardsonian Romanesque style. The station was closed in 1971 until it was donated to the county in 1992, restored, and reopened as the visitor's center and museum. Lakewood Club was formed as a resort association in 1912 by the Mayo brothers. It was popular enough by 1914 that a seasonal post office was set up, which became permanent in the 1940s.

The oil boom in Muskegon County was a distinct period during the city's industrial era. The oil was found by accident in 1869 when Gideon Truesdell was looking for salt. They had been drilling in various Muskegon County locations for salt between 1869 and 1886 but the salt they found was contaminated with petroleum. In 1922, Stanley Daniloff found oil seepage in the swampland near his home, within five years he had amassed enough funds to have the site drilled and a "gusher" was located in Muskegon Township in 1927. The price of crude oil fell with the depression in 1929 and the oil boom ended.

During the world war period, Muskegon became an "Arsenal of Democracy." In the post war housing boom, Roosevelt Park was formed as a residential suburb in 1949 and named after Franklin Delano Roosevelt. The 1950s and 60s brought rough economic times to Muskegon County. Many workers were laid off and several local companies closed. In the 1960s and 70s, consolidation and mergers with national corporations left few locally-owned businesses in the county. The local economy has been struggling to diversify since that time.

Northern Ottawa County

As in Muskegon County, the Pottawatomie and Ottawa Indians lived in the Grand Haven area prior to the first white settlers. The Grand River served as a trade route for the Native American tribes. The first permanent white settler to the area was Rev. William Montague Ferry, a Presbyterian minister who moved to the area in 1834. Ferry founded the first area church as well as the town of Ferrysburg.

A plat for the City of Grand Haven was recorded in 1835. The settlement of the surrounding areas of Spring Lake and Ferrysburg followed soon after. Over the following six decades Grand Haven saw success as part of the lumbering industry due to its location as a port.

The railroad arrived in 1858 which assisted in the development of the area's manufacturing and resort industries which took advantage of the port. In the past few decades northern Ottawa County has become a vibrant port, boating, fishing, and resort community.

History of Metropolitan Transportation Planning in the Region

The WestPlan MPO is located along the routes of U.S. 31 and Interstate 96, which are two major state transportation arteries linking the area to all major regional population and economic centers such as Chicago, Detroit, Grand Rapids, Lansing, Indianapolis, and Milwaukee. U.S. 31 runs north and south along the Lake Michigan shoreline from South Bend, Indiana to Mackinaw City, Michigan. However, the classification of U.S. 31 as an expressway terminates at Ludington, Michigan, where it becomes a state highway generally served by only two lanes. The course of Interstate 96 is an east-west direction from Muskegon to Detroit by way of Grand Rapids and Lansing. The Muskegon metropolitan area is provided with public transit opportunities through the Muskegon Area Transit System (MATS).

Northern Ottawa County's public transit needs are covered by Harbor Transit Multimodal Transportation System (Harbor Transit), which provides public transportation to the area through a demand-response system, as well as limited fixed routes which operate during the summer months.

Commercial air service is available at the Muskegon County Airport with daily service to Chicago's O'Hare Airport. The major airline that operates out of Muskegon is United Airlines. Muskegon and

Grand Haven presently serve as the major deep water ports in the area. In June 2004, Muskegon began receiving car ferry service to Milwaukee, Wisconsin by way of the Lake Express. This diesel-powered catamaran-style ferry travels at speeds of up to 40 miles per hour. Service is provided numerous times a day from late April through October.

One of the primary inter-city non-motorized routes in the region is the Hart-Montague Trail State Park. The trail spans 22.5 miles from Hart in Oceana County to Whitehall in Muskegon County. Recent efforts resulted in the construction of the Fred Meijer Berry Junction Trail, which is a 10-mile stretch of trail between Whitehall and North Muskegon. This connects the Hart-Montague Trail to the City of Muskegon's Lakeshore Trail. This trail covers about 12 miles throughout Muskegon. Another path, the Musketawa Trail, extends 26 miles eastward from Muskegon to Marne in Ottawa County. From Marne, the trail becomes the Fred Meijer Pioneer Trail which extends into Kent County. Additionally, efforts are underway in northern Ottawa County to complete a trail system which would connect local trails with regional trails. U.S. Bicycle Route 35 also runs through both Ottawa and Muskegon counties, partially on the aforementioned trails and partially on local roads.

Metropolitan transportation planning in the Muskegon area is a long-standing process dating back to 1973, when the West Michigan Shoreline Regional Development Commission organized the Muskegon Area Transportation Planning Program (MATPP) as the MPO Policy Committee. WMSRDC has administered and staffed the MPO since 1973. WestPlan undertakes a comprehensive transportation planning program to maintain the eligibility of local governments in the area to receive federal and state transportation funds for street and road improvements, as well as subsidies for mass transit. In 2003, when the U.S. Census Bureau expanded the Muskegon Urbanized Area to include northern Ottawa County, the WMSRDC realigned the Metropolitan Planning Area (MPA) of the MPO and organized the West Michigan Metropolitan Transportation Planning Program (WestPlan). In 2002, the U. S. Census Bureau expanded the urbanized boundary for the Muskegon MPO. This action expanded the urbanized area to include northern Ottawa County. Four townships, two cities, and one village were added to the MPO. The change was based on population density, and it was determined that the area between the Muskegon urbanized area and the Grand Haven urbanized area, also known as the "tri-cities area", was now one contiguous urban area. This expanded MPO is now known as the West Michigan Metropolitan Transportation Planning program or WestPlan.

In 1974, a Long-Range Transportation Plan was developed for the Muskegon Urban area. This plan was updated in 1986 and then re-certified as a Policy Document by the MATPP in 1990. In 1991, the plan was reviewed in light of the Clean Air Act Amendments (CAAA) of 1990 and was approved by the Environmental Protection Agency (EPA) as a conforming plan for air quality. In recent years, the effects of the Clean Air Act Amendments (CAAA) of 1990 and the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 have caused changes in the scope and scale of transportation plans. After the 2010 Census the boundaries of the ACUB were changed yet again. With this expansion the urbanized boundary was extended south into Port Sheldon Township in Ottawa County.

CHAPTER 3: REGIONAL GOALS AND OBJECTIVES

This update to the LRTP for 2045 will serve as a policy statement and a guide for decision-making for the WestPlan MPO, funding agencies, stakeholders, and transportation partners. The plan includes an inventory of needs and deficiencies of the MPO's transportation network. Additionally, it establishes priorities for allocation of federal funds and directs transportation improvement programming. The 2045 LRTP continues to focus on state and federal initiatives and guidance, and to position the MPO to respond to anticipated trends of federal legislation governing transportation funding and investments. These include asset management and performance measures as two examples. A number of the goals identified in this chapter are consistent with performance measures identified in **Chapter 4: Performance Based Planning**. As examples, *Goal 4: Multi-modal Choices and Connections* is reflected in the Public Transportation Performance Measures and *Goal 6: System Efficiency and Preservation* is consistent with Pavement and Bridge Performance Measures. It is anticipated that the goals and objectives will be further integrated with performance measures as time goes on.

Themes, Goals, and Objectives

The 2045 LRTP will serve many purposes including setting the stage for the MPO's Transportation Improvement Program. Additionally, it will be used to evaluate infrastructure investments and consistency with local, county, and regional land use and development goals. These goals were developed to encompass the array of users, conditions, needs, and potential solutions exclusive to the overall transportation system within the MPO. Objectives were then developed for each goal that could be used to evaluate the value of individual projects and also measure the success of the plan as a whole. In this manner, the 2045 LRTP goals and objectives are organized into six primary themes that are consistent with the required federal planning factors and statewide guidance:

1. Economic Vitality

Goal: Ensure that transportation investments support the economic vitality of Muskegon and northern Ottawa County, and enable local, regional, statewide, and global competitiveness, productivity, and efficiency.

Objectives:

- Improve access to targeted investment areas and planned development
- Improve access to the interstate
- Improve access to major attractions
- Improve intermodal goods movement

2. Multimodal Transportation Safety

Goal: Increase the safety of the transportation system for all users.

Objectives:

• Reduce the number of motorized and non-motorized crashes

• Reduce the hazard potential for roadway-rail crossings

• Improve the safety of school zones and enhance connectivity to surrounding neighborhoods

3. Multimodal Transportation Security

Goal: Increase the security of the transportation system for all users.

Objectives:

• Improve traffic control devices, signage, and access management

• Improve emergency response time and access

• Address transportation concerns associated with critical facilities

4. Multimodal Choices and Connections

Goal: Increase the integration and connectivity of the transportation system across modes to increase accessibility and mobility options for people and freight.

Objectives:

• Improve access and facilities for cyclists and pedestrians

• Improve access to public transportation and carpool opportunities

• Improve passenger and freight services for air, rail, and waterborne transportation

5. System Sustainability and Livability

Goal: Ensure that transportation investments protect and enhance the environment, promote energy conservation, improve quality of life, and promote consistency with state and local planned growth and economic development.

Objectives:

• Improve access to employment and recreational opportunities

• Reduce impacts to environmental, natural, and cultural resources

• Support locally derived land use planning initiatives

• Incorporate Smart Transportation principles into project designs

6. System Efficiency and Preservation

Goal: Ensure efficient system management and operations that emphasize preservation of the existing transportation system.

Objectives:

- Improve and maintain pavement quality
- Reduce the number of structurally deficient bridges
- Improve traffic signal system operations
- Improve Level of Service (LOS) on congested corridors and intersections

Background Preparation

To achieve these goals and objectives the development of the 2045 LRTP included a comprehensive evaluation of local transportation & land use studies, municipal comprehensive plans, and county comprehensive plans, as well as coordination with key municipal, economic development officials, and other key stakeholders. This information provided a context for the development of the plan and provided participants with a better understanding of relevant statistics, issues, and trends. Results of this activity include:

Review of Previous LRTP and Discussion with Partners: A review of the previous long-range plan at the start of the update process allowed staff and key stakeholders the opportunity to identify strengths and shortcomings—in process, content, or implementation—of the previous plan and adjust accordingly. While planning partners will likely have identified their own issues, there should also be the opportunity for additional stakeholders, such as MDOT, advocacy organizations, and the public, to provide additional input on how the plan and process might be improved. In addition to a critique, this discussion provided an opportunity to share lessons learned from others as well as new and evolving approaches to long-range planning.

Review of other related plans: In developing the next plan, it is important to look at the direction of other plans—both short- and long-term—that could directly or indirectly impact a region's transportation system. This is an opportunity to factor in the results of corridor studies as well as other transportation plans and studies at the local, state, and even national levels. With a recent emphasis on ensuring consistency and linkages with other ongoing planning activities, it is also important to consider county land use plans, long-range plans of transit properties, economic development plans, utility expansion plans, etc. Each of these external resources can provide valuable input into development of the next long-range transportation plan, thereby increasing the value and relevance of the document.

Stakeholder Survey: A transportation priorities survey was emailed to individuals and agencies currently on the transportation stakeholder list and policy and technical committee members. The transportation

stakeholder list is continuously updated and expanded. A link to the survey was also posted on the WMSRDC website and the WMSRDC Facebook page. A copy of the survey is included as an appendix in this document.

CHAPTER 4: PERFORMANCE BASED PLANNING

A key feature of the FAST-Act of December 2015 is the establishment of a performance and outcome based planning program for state DOTs and MPOs, originally introduced through the Moving Ahead for Progress in the 21st Century (MAP-21) Act. The objective of a performance based program is for states and MPOs to invest resources in projects that collectively will make progress toward the achievement of nationally set goals. 23 CFR 490 outlines the national performance goals for the federal-aid highway program required to be established in six areas: safety, infrastructure condition, congestion reduction, system reliability, freight movement, and environmental sustainability.

Within one year of the U.S. Department of Transportation final rules on performance measures, states are required to set performance targets in support of these measures. Within 180 days of the state setting targets, MPOs are then required to choose to support the statewide targets, or optionally set their own targets. To ensure consistency, each MPO must, to the maximum extent practicable, coordinate with the relevant state and public transportation providers when setting performance targets. Any new TIP document or amendment must comply with performance reporting requirements beginning on May 27, 2018.

Performance Measures

The regulations required the U.S. Department of Transportation, FHWA to establish final rules on performance measures to address the seven areas in the legislation, resulting in the following areas being identified as measures for the system:

- Pavement condition on the Interstate system and on the remainder of the National Highway System (NHS)
- Performance (system reliability) of the Interstate system and the remainder of the NHS
- Bridge condition on the NHS
- Fatalities and serious injuries, both number and rate per vehicle mile traveled, on all public roads, as well as bicycle and pedestrian fatalities and serious injuries
- Traffic congestion
- On-road mobile source emissions
- Freight movement on the Interstate system

In addition, the FTA was charged with developing a rule establishing a strategic and systematic process of operating, maintaining, and improving public capital assets effectively through their life cycle. The Transit Asset Management Final Rule 49 CFR part 625 became effective October 1, 2016 and established four performance measures. The performance management requirements outlined in 49 CFR 625 Part D are a minimum standard for transit operators and involve measuring and monitoring the following:

- Rolling stock - vehicles used for providing public transportation, revenue and non-revenue
- Equipment - articles on non-expendable, tangible property with a useful life of at least one year
- Facilities - building or structure used in providing public transportation
- Infrastructure - means the underlying framework or structures that support a public transportation system

A Transit Asset Management (TAM) Plan was required to be in place for transit operators by October 1, 2018, two years after the effective date of the regulations.

The timeline for implementation of the national performance measures is determined upon when the final rule was published for each measure, which then established an effective date for that measure. ***Table 1***, on the following page, is a summary of the performance measure areas and the current or anticipated implementation status.

Table 1: Performance Measures and Targets

Performance Measure	Performance Targets
Safety Performance	• Number of fatalities • Rate of fatalities • Number of serious injuries • Rate of serious injuries • Number of non-motorized fatalities and non-motorized serious injuries
Pavement and Bridge Condition	• Percent NHS bridge deck area in good condition • Percent NHS bridge deck area in poor condition • Percent interstate pavement in good condition • Percent interstate pavement in poor condition • Percent non-interstate NHS pavement in good condition • Percent non-interstate NHS pavement in poor condition
System Performance and Freight Reliability	• Percent of person-miles traveled on the interstate that are reliable • Percent of person-miles traveled on the non-interstate NHS that are reliable • Truck travel-time reliability index
Congestion Mitigation and Air Quality	• Peak hour excessive delay per capita • Percent of non-single occupancy vehicle travel • Total emissions reduction
Public Transportation	• Transit Asset Management (TAM) Plans (rolling stock, equipment, facilities, infrastructure) • State of Good Repair measures are identified by individual transit providers as part of TAM Plan • Public Transportation Agency Safety Plan (Fatalities, Injuries, Safety events, System reliability)

Performance Targets

State Targets

Within one year of the U.S. DOT final rule on performance measures, states are required to set performance targets in support of those measures. States may set different performance targets for urbanized and rural areas. To ensure consistency, each state must, to the maximum extent practicable:

- Coordinate with an MPO when setting performance targets for the area represented by that MPO; and

- Coordinate with public transportation providers when setting performance targets in an urbanized area not represented by an MPO [§1202; 23 USC 135(d)(2)(B)]

The Statewide Transportation Improvement Program (STIP), state asset management plans under the National Highway Performance Program (NHPP), and state performance plans under the Congestion Mitigation and Air Quality Improvement Program are required to include performance targets. Additionally, state and MPO targets should be included in statewide transportation plans.

MPO Targets

Within 180 days of the state and/or providers of public transportation setting performance targets, it is required that MPOs set performance targets in relation to the performance measures (where applicable). To ensure consistency, each MPO must, to the maximum extent practicable, coordinate with the relevant state and public transportation providers when setting performance targets. MPO Metropolitan Transportation Plans (MTPs) and TIPs are required to include state and MPO targets.

Performance Based Planning in the Muskegon/Northern Ottawa, Michigan Urbanized Area

The Muskegon/northern Ottawa MPO (WestPlan) has a number of systems in place to address the performance measures and targets. WestPlan maintains a traffic count program which has been integrated into a traffic count database system. Currently, WestPlan collects traffic counts for approximately 400 count locations within the MPO planning area. In addition, the MPO utilizes bike/pedestrian counters to collect non-motorized traffic data. This system is projected to facilitate improved data for the travel demand model which forecasts future traffic congestion.

The MDOT sponsored collection of pavement condition data on federal-aid eligible roadways, through the statewide Asset Management program, provides WestPlan with data (both current and historic) to address the status of pavement conditions in the WestPlan area. MDOT also collects and updates data through the Highway Performance Monitoring System (HPMS). WestPlan has access to detailed traffic crash data for its area through its subscription to the Traffic Crash Analysis Tool (TCAT) program of the Transportation Improvement Association (TIA) of Michigan and through the Crash Facts program of the Michigan State Police/Office of Highway Traffic Safety. WestPlan also conducts local road ratings for cities and villages in the MPO and in the region as well. The same PASER rating standards are used and reports are generated for the agencies to use in their Asset Management Plans.

Most of the performance targets are directed at the National Highway System, which is primarily under the jurisdiction of MDOT in the WestPlan area. Therefore, WestPlan will coordinate with MDOT (as set forth in the federal regulations) in the development of targets for roadways in the WestPlan area subject to the NHS-based performance targets and will choose to "support the state targets" as its official response for these categories. Any roadways designated as NHS which are under local jurisdiction are to be assessed in conjunction with the responsible local road agency, but separate targets are not expected to be established.

As targets are established in the process of developing future Metropolitan Transportation Plans and Transportation Improvement Programs, WestPlan will assess the impact of any proposed projects on the performance measure areas (and targets), as noted at the beginning of this chapter. This will be done using the best available data at the time of assessment. Projects providing a high level of benefit in meeting identified performance targets will be considered for priority in programming.

MPO TARGET SETTING

Safety

On September 6, 2019, the MDOT reported to Michigan's metropolitan planning organizations (MPOs) that it had set safety targets for calendar year 2020. On December 18, 2019, the WestPlan Policy Committee voted to exercise its option to "support the state targets" for the five categories of safety information. Safety targets are required to be developed by the state and responded to by the MPOs each year. **Table 2** provides the Michigan State Safety Targets for Calendar Year 2020.

Table 2: Michigan State Safety Targets for Calendar Year 2020

Safety Performance Measure	Baseline Condition (2018)	Calendar Year 2020 State Safety Target
Fatalities	987.4	999.4
Fatality Rate	.99	.97
Serious Injuries	5,415.6	5,520.4
Serious Injury Rate	5.41	5.34
Non-motorized Fatalities & Serious Injuries	742.4	735.8

WestPlan has limited access to federal safety funds provided to the state. As a small MPO, WestPlan local agencies apply annually for consideration of funding for safety projects from statewide pool of safety funds. Project selection at the state level is heavily weighted toward projects impacting fatality and serious injury crash locations. WestPlan supports the local agencies when they decide to apply for safety funding and will add any selected projects to the current TIP as soon as a positive funding determination has been made by MDOT.

Pavement, Bridge, and Reliability Performance

On May 21, 2018, the MDOT reported to Michigan's MPOs that it had set Bridge, Pavement, and Reliability targets for calendar years 2019 through 2022. On September 19, 2018, the WestPlan Policy Committee voted to exercise its option to "support the state targets" for the Bridge, Pavement and Reliability Performance Measures. ***Table 3*** shows the supported targets for FY2019-2022:

Table 3: State Targets for Bridge, Pavement, and Reliability

State Targets for First Performance Period

Performance Area	Measure	Baseline Condition (Calendar Year 2017)	2-Year Targets	4-Year Targets
Bridge	Percent National Highway System (NHS) Deck Area in Good Condition	32.7%	27.2%	26.2%
	Percent NHS Deck Area in Poor Condition	9.8%	7.2%	7.0%
Pavement	Percent of Interstate Pavement in Good Condition	56.8%	N/A	47.8%
	Percent of Interstate Pavement in Poor Condition	5.2%	N/A	10.0%
	Percent of Non-Interstate NHS Percent in Good Condition	49.7%	46.7%	43.7%
	Percent of Non-Interstate NHS Percent in Poor Condition	18.6%	21.6%	24.6%
Reliability	Level of Travel Time Reliability of the Interstate	85.1%	75.0%	75.0%
	Level of Travel Time Reliability of the Non-Interstate NHS	85.8%	N/A	70.0%
	Freight Reliability Measure on the Interstate	1.38	1.75	1.75
Congestion Mitigation/ Air Quality (CMAQ)*	Annual Hours of Peak Hours Excessive Delay per Capita	18 hours, 30 minutes	N/A	22 hours
	Percent of Non-Single Occupancy Vehicle Travel	16.0%	14.4%	14.4%
	Mobile Source Emission Reduction for Carbon Monoxide	87,665.109	32,968.780	65,937.560
	Mobile Source Emission Reduction for Particulate Matter	653.357	417.410	834.820

**Performance measures apply only to portions of the Southeast Michigan Council of Governments planning area. Also, baseline data for emission reductions shows the total reduction from CMAQ funded projects over the 2014-2017 time period.*

Pavement

Federal regulations require that states measure, monitor, and set goals for pavement performance based upon a composite index of metrics. The four pavement condition metrics are: International Roughness Index (IRI), Cracking Percent, and Rutting or Faulting as reported by each state to the Highway Performance Monitoring System (HPMS) database. IRI and Cracking Percent are metrics for all road types. Rutting is only applicable to asphalt pavements and faulting is only measured for jointed concrete pavements. The rule applies to the entire National Highway System (NHS), which includes Interstate and Non-interstate NHS. MDOT is responsible for approximately 5,931 through-lane miles of interstate in Michigan, as of 2016.

The Non-Interstate portion of the system includes MDOT trunkline routes (M-routes) (about 11,959 miles in 2016) and local government owned non-trunkline roads (about 4,239 miles in 2016). Local agencies are responsible for 19% of the NHS route mileage in Michigan.

MDOT has established 2-year and 4-year targets for a 4-year performance period for pavement condition on the National Highway System (NHS) in response to the federal regulations. The 4-year performance period includes January 1, 2018 to December 31, 2022. There are a total of three progress reports due within the 4-year performance period: a Baseline Performance Report was published on October 1, 2018; a Mid-Performance Period Progress Report due October 1, 2020; and a Full Performance Period Progress Report due October 1, 2022. FHWA will determine if significant progress has been made from report to report. Based on the metrics described above and the rating of roads along a metric value range, there are four measures that will be used to assess pavement condition: percentage of Interstate road pavement in "Good" condition; percentage of Interstate road pavement in "Poor" condition; percentage of Non-interstate NHS pavement in "Good" condition; and percentage of Non-interstate NHS pavement in "Poor" condition.

Bridge

The federal performance measures require that state DOT's establish 2-year and 4-year targets for a 4-year performance period for the condition of infrastructure assets. State DOT's established their first statewide targets on May 20th, 2018. As with the pavement condition reporting, state DOTs are required to submit three performance reports to FHWA within the 4-year performance period: a Baseline Performance Report published on October 1, 2018; a Mid-Performance Period Progress Report by October 1, 2020; and a Full Performance Period Progress Report by October 1, 2022. The two performance measures for assessing bridge condition are: percentage of National Highway System (NHS) bridges in "Good Condition"; and percentage of NHS bridges in "Poor Condition".

The MPOs will establish targets by either supporting MDOT's statewide target(s), or defining a target unique to the metropolitan area each time MDOT sets a target. As part of the Full Performance Period Progress Report, the MPOs will report their established targets, performance, progress, and achievement of the targets to MDOT in a manner that is agreed upon by both parties and documented in the Metropolitan Planning Agreement. MPOs are not required to report separately to FHWA.

WestPlan supports the maintaining of NHS and local bridges within its area. However, bridge funding is administered at the state level by MDOT. MDOT evaluates bridges on interstate and state trunkline routes for necessary projects and funding. A statewide Local Bridge Advisory Board allocates funds for the Michigan Local Bridge Program based on available funds and weighted ratios. In 2016, only 89 of 363 submitted local bridge projects could be funded due to budget constraints. As of June 2017, approximately 2 million square feet of locally owned bridges in Michigan have deck area in poor, serious, or critical condition. This translates to the local agencies in Michigan having 17% of NHS bridge deck area under their jurisdictions in poor condition. This exceeds the penalty threshold of no more than 10% of NHS bridges, measured by deck area, being classified as structurally deficient. MDOT's NHS bridge condition by deck area is only slightly under the 10% threshold, at 9% poor condition.

MDOT is projecting "condition improvement" for the NHS bridges in the state based on projects programmed through the MDOT and local bridge programs described above. Deterioration is estimated based on comparing network wide deterioration rates to the age and condition of each major component of each structure.

The targets are highly dependent on the deck area of bridges that fall to poor, and so the smaller the inventory considered the higher potential for a single bridge to skew results. The statewide targets are assumed to be less variable than for an individual MPO.

Congestion Mitigation and Air Quality

This measure applies to urbanized areas containing NHS mileage and having a population over 200,000 (Phase 1 population over 1 million). The WestPlan area does not qualify for inclusion in this measure.

National Highway System (NHS) Asset Management Plan

MDOT is required to develop an Asset Management Plan for the NHS that includes:

- Pavement and bridge inventory and conditions on the NHS
- Objectives and measures
- Performance gap identification
- Life-cycle cost and risk management analysis
- A financial plan
- Investment strategies

The USDOT has set minimum standards for states to use in developing and operating bridge management systems and pavement management systems.

A System Performance Report (SPR) is required in the long range Metropolitan Transportation Plan (MTP). The System Performance Report is an appendix to this MTP, and will periodically be updated to reflect the monitoring and update of the actual performance target metrics over time. This will document the progress and achievement of accomplishing the performance measures. A detailed list of projects that are anticipated to help meet the proposed targets for Bridge, Pavement, and Reliability performance measures can also be found in the appendix of this document.

Public Transportation

There are two transit providers in the WestPlan area; Muskegon Area Transportation System (MATS) and Harbor Transit Multi-Modal Transit System (HT). Both are direct recipients of funds from the FTA. As such, MATS and HT are identified as Tier II recipients under the current federal legislation and have

developed state of good repair targets. The MATS and HT FY2019 state of good repair targets are shown in ***Table 4*** below:

Table 4: Transit State of Good Repair

Asset Class	**Current Condition MATS**	**Current Condition Harbor**	**2019 Target MATS**	**2019 Target Harbor Transit**
Revenue Vehicles: small bus and van	1%	5%	1%	5%
Revenue Vehicles: large bus	20%	21%	20%	21%
Service Vehicles	1%	5%	1%	5%
Facilities	1%	5%	1%	5%

Transit Asset Management Plans (TAM)

MATS and HT have both submitted TAM plans and can be viewed in the Appendix section of this document. In addition, the entire transit project list for FY2020-2023 can also be viewed in the Appendix section of this document.

CHAPTER 5: CONSULTATION

The Consultation process is considered to be a separate process from the general public participation process and is meant as a way to better consider the needs of "consulted" agencies. There are specific requirements that outline what types of agencies or stakeholders need to be consulted during the transportation planning process and the type of information that needs to be shared with these interested parties. It is suggested that contacts with state, local, Indian Tribes, and private agencies responsible for the following areas be contacted:

- Economic growth and development
- Environmental protection
- Airport operators
- Freight movement
- Land use management
- Natural resources
- Conservation
- Historical preservation
- Human service transportation providers

The overarching goal of this process is to eliminate or minimize conflicts with other agencies' plans, programs, or policies as they relate to the LRTP. By consulting with agencies such as Tribal organizations or land use management agencies during the development of the LRTP, these groups can compare the LRTP project list and map with other natural or historic resource inventories. WestPlan will also be able to compare the draft LRTP to any documents received and make adjustments as necessary to achieve greater compatibility.

The consultation process that WestPlan undertook is based on recommendations from the FHWA and the MDOT.

Consultation Agency List

The organizations from the Interested Citizens/Agencies list that WestPlan maintains for transportation public participation was used as a the consultation list, as this list encompasses many of the types of agencies and contacts targeted for this process. The Consultation list and Interested Citizens/Agencies list can be found in the appendices.

For those agencies targeted for consultation, a process of notification and information was undertaken. The following materials were sent to the consulted agencies on December 16, 2019: 1) an email explaining the consultation process, the Long Range Transportation Planning process, and the role of the WestPlan; 2) an invitation to a meeting on January 22, 2020 at the WestPlan office; 3) directions on how to provide input on the planning process and the project list, as well as how to contact WestPlan staff; 4) a link to the 2045 LRTP Project List; and 5) a link to maps of the LRTP projects.

The Consulted Agencies were contacted prior to the general public participation comment period in order to provide additional time for their review and to give WestPlan the opportunity to make changes to the LRTP before the official public comment period begins. The Consulted Agencies were asked to have all comments to WestPlan by January 22, 2020.

Consultation Meeting

WestPlan hosted a Consultation open house style meeting on January 22, 2020 at the WestPlan office to provide a formal opportunity for WestPlan to directly speak with consulted agencies and to gain their input on the proposed LRTP prior to its public release. At the open house, the LRTP project list and project map and Environmental Justice maps with projects overlay were presented, reviewed, and discussed with regard to other ongoing land use, environmental, or community plans to explore how the transportation projects or programs might interact. Consulted agencies were encouraged to submit any further comments to WestPlan for consideration during the remaining LRTP planning process.

Notes were taken of comments made during the meeting and were submitted to the Technical and Policy committees for their review. These notes appear at the end of this chapter.

Documentation of Consultation

The intent of the consultation requirement is to exchange information with the consulted agencies and compare knowledge, plans, maps, and inventories developed with the LRTP to ensure compatibility. To document this exchange, comments from consulted agencies, notes from the consultation meeting, and information distributed as part of the consultation process may be found at the end of this chapter. As a result of the consultation outreach, eight individuals attended the Consultation open house and WestPlan received two emails from interested citizens and/or agencies.

Email Comments Received During Consultation and WestPlan Response

Heidi Tice, Fruitport Township Supervisor - Thank you. I will make sure to. WestPlan response: Thank you for your interest.

Kathy Evans, WMSRDC Environmental Program Manager - My comment on the environmental part of the long range plan is about Witham Road. There is a need for improved Bear Creek and Bear Lake water quality. The Bear Creek watershed is on the State of Michigan's 303D list of water bodies that do not meet state standards for nutrients (phosphorous). There is a need for better stormwater runoff management in the City of North Muskegon to prevent the ongoing direct discharge of urban, non-point source pollutants from reaching Bear Creek through the storm drain system that leads to Witham Road and Bear Creek. In 2018, Witham Road was re-surfaced and the east and west embankments were

strengthened with clean fill, filter cloth and rock rip rap as part of a fish and wildlife restoration project. This was done to ensure that the restoration project would not worsen existing road conditions. A future, long range improvement would make more permanent improvements to stabilize the road and could include a bike path along the east side, connecting Laketon Township to the City of North. WestPlan response: Thank you for your comment.

Comments Received During Consultation Meeting on January 22, 2020 and WestPlan Response

1. Laird Schaefer, an interested citizen asked questions about MDOT planning process and how it works with MPO planning process and requested an update on transit connection between MATS and Harbor Transit. WestPlan response: MPO staff explained the MDOT and MPO transportation planning process and how they coincide and provide an update on the transit connection.

2. Jamie Way, an interested citizen, stated that the MPO should focus road efforts on Muskegon Heights. WestPlan response: MPO staff thanked citizen for comment and will share comment with MPO committees.

3. Syndi Copeland, an interested citizen, stated she thought the Environmental Justice maps with project overlay were very helpful. WestPlan response: MPO staff thanked citizen for comment and will share comment with MPO committees.

4. Stephen Carlson, an interested citizen and economic development planner, asked about Lakes Mall route and stated the transportation infrastructure near the critical dune lands needs to be updated. He also emphasized the important of walkability. WestPlan response: MPO staff thanked citizen for comment, discussed his comments, and will share comments with MPO committees.

5. Gale Nobes, an interested citizen and environmental planner, stated that Lakeshore Drive may have capacity issues in the future. WestPlan response: MPO staff thanked citizen for comment, discussed additional road capacity issues, and will share comment with MPO committees.

6. Ryan Coffey, MSU Extension representative, shared information on the Dragon Trail in Newaygo County and asked questions about stormwater parking lot run-off. MPO staff thanked him for his comments and discussed the Dragon Trail and stormwater run-off issues and possible solutions for parking lots.

Consultation Email Distributed to Consulted Agencies on December 16, 2019

December 16, 2019

Dear Consultation Agency:

As the Metropolitan Planning Organization (MPO) for the Muskegon/Northern Ottawa County Area, the West Michigan Metropolitan Planning Organization (WestPlan) is required to produce a Long Range Transportation Plan (LRTP) with, at a minimum, a twenty-year planning horizon. The LRTP must include both long and short-range strategies/actions that lead to the development of an integrated, intermodal transportation system that facilitates safe and efficient movement of people and goods, while addressing current and future transportation demands.

Throughout the plan development, deficiencies are identified on the county transportation system and improvements are planned to mitigate those problem areas. This list of projects is included in the plan. In accordance with federal regulations set out by the Fixing America's Surface Transportation (FAST Act), WestPlan, as a part of the LRTP development process, is required to consult with agencies that are responsible for environmental protection, historical preservation, natural resource management, transportation services, economic development, human services, and land use planning. You have been identified as an agency of this type or an interested partner.

WestPlan is seeking input on its 2045 Long Range Transportation Plan list and map of proposed projects. The list and map are available at the West Michigan Shoreline Regional Development Commission (WMSRDC) website at www.wmsrdc.org. Please review the map and list of proposed projects.

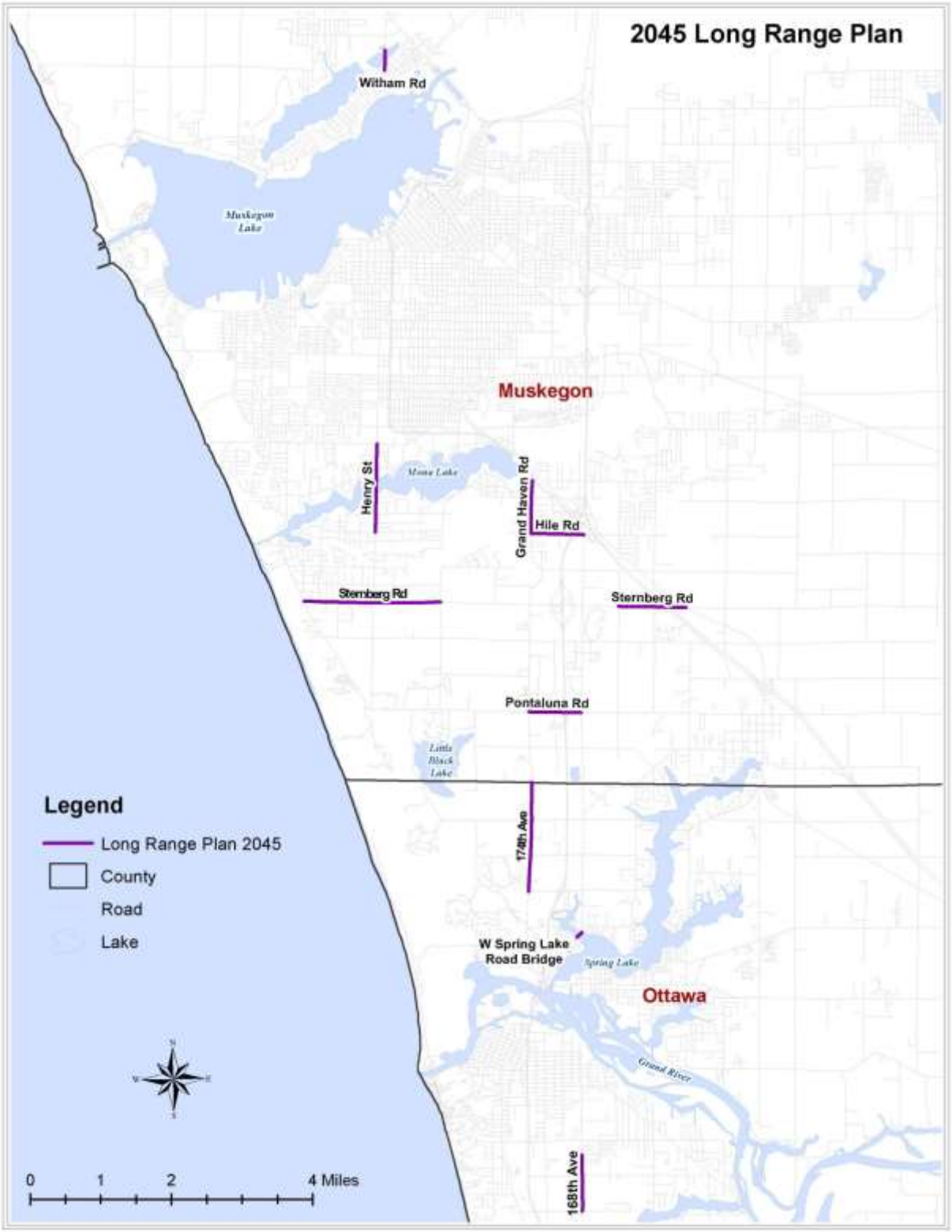
An open house style meeting to allow dialogue on any comments will be held on:

Wednesday, January 22, 2020
9:00 a.m. – 11:00 a.m.
(this is an open house meeting with no formal presentation so please stop in anytime between 9 a.m. and 11 a.m.)
WMSRDC office in the Terrace Plaza Building in downtown Muskegon
316 Morris Avenue, Suite 340,
Muskegon, MI 49440-1140

Please provide any written comments by Wednesday, January 22, 2020 to the address above or by email to Joel Fitzpatrick, Transportation Director at jfitzpatrick@wmsrdc.org. For questions or verbal comments, please call (231) 722-7878 ext. 16. Your comments are an integral part of the transportation planning process.

Draft 2045 WestPlan Long Range Plan Project List

Project Name	To/From	Description	Jurisdiction	Cost	Est. Year of Const.	Project Length
168th Avenue	Hayes Street to North of Comstock	Reconstruct- Expand from 2 to 3 lanes	Ottawa County Road Commission	$1,400,000	2040	.8 Miles
Henry Street	Seminole to Hile	Reconstruct from 2 to 3 lanes	Norton Shores	$1,600,000	2045	1.25 miles
Sternberg Road	Quarterline Road to Airline Road	Add center left turn lane – 1 mile	MCRC	$800,000	2030	1 mile
Witham Road	Bear Creek Bridge to Moulton Road	Reconstruct and add left turn lane and storm sewer – 2000 feet	North Muskegon	$670,000	2040	2,000 feet
Sternberg Road	Martin Road to Lake Harbor Road	New two lane road – 2 miles	Norton Shores	$2,200,000	2045	2 miles
Pontaluna Road	Grand Haven Road to Harvey	Reconstruct from 2 to 3 lanes - .75 miles, with bike lanes	Norton Shores	$1,600,000	2045	.75 miles
Grand Haven Road	Hile to 100 ft south of Seaway	Reconstruct from 2 to 3 Lanes.	Norton Shores	$1,100,000	2045	.75 miles
Hile Road	Harvey Street to Grand Haven Road (excludes US-31 bridge)	Reconstruct from 2 to 3 lanes with bike lanes	Norton Shores	$1,600,000	2045	.75 miles
174th Avenue	Van Wagoner Road to Wilson Street	Reconstruct from 2 to 3 lanes	Ottawa County Road Commission	$1,800,000	2040	1.5 miles
West Spring Lake Road Bridge	Lake Road to 168th Avenue	Reconstruct bridge structure	City of Ferrysburg	$13,000,000	2025	447 ft.
Public transit is an important transportation mode in our community. The public transit agencies in the MPO operate services within the financial constraints presented and, like the road agencies are continually seeking opportunities to improve and to secure additional resources where available. Current and future transit studies will help to identify specific projects.						


2045 Long Range Plan
Witham Rd
Muskegon Lake
Muskegon
Henry St
Mona Lake
Grand Haven Rd
Hile Rd
Sternberg Rd
Sternberg Rd
Pontaluna Rd
Little Black Lake
174th Ave
W Spring Lake Road Bridge
Spring Lake
Ottawa
Grand River
168th Ave
Legend
Long Range Plan 2045
County
Road
Lake
0
1
2
4 Miles

CHAPTER 6: PUBLIC INVOLVEMENT

WestPlan is committed to ensuring that citizen input will figure prominently throughout the planning processes and contribute to transportation problem identification through public comment periods, public meetings, open houses, and review of the draft document.

WestPlan, as the Metropolitan Planning Organization (MPO), is also federally required to explicitly set forth public participation policies. The standards for this process are found in Title 23 CFR 450.316 which requires that the public have reasonable opportunity to comment on transportation plans and programs. These policies are laid out in the Public Participation Plan in Transportation Decision Making, which can be found on the WMSRDC website at www.wmsrdc.org and as an appendix to this document.

The Public Participation Plan document describes all of the public participation goals and requirements for WestPlan, including specific details regarding the development of the LRTP. These guidelines were followed by WestPlan throughout the development of the 2045 LRTP. The update of the 2045 LRTP was a lengthy process—nearly two years in the making—that involved a variety of public outreach tools, including announcements on social media, direct e-mailings, public meetings, and an open house.

Public Participation Mailing List

WestPlan maintains an extensive public participation emailing list that is used to provide information and notice to the public regarding transportation planning activities. The Interested Citizen/Agency list includes many representatives. The list of interested cities and agencies includes non-profits, faith-based organizations, concerned citizens, educational organizations, elected officials, environmental organizations, government entities and organizations, media, organizations serving the disabled, organizations serving senior citizens, transportation related organizations, and tribal organizations. This list is continually maintained and can be found in full in the appendix of this document.

Public Participation Outreach

The LRTP process included a re-evaluation and updated version of the Public Participation Plan with input sought from the Technical and Policy Committees. Staff worked closely with the MPO representative from FHWA to incorporate suggested updates to the plan, reviewed past public participation practices used by WestPlan, and reviewed plans written and followed by other Michigan MPOs to understand which worked well and discover new practices which could improve WestPlan's efforts. The updated Public Participation Plan in Transportation Decision Making was approved by the WestPlan Policy Committee in August 2018 after a 45-day public comment period was conducted. All comments made during the public review period were incorporated into the plan prior to WestPlan Policy Committee approval.

To provide the public with fast, easy access to all things related to the LRTP update, staff continued to maintain the wmsrdc.org website throughout the planning process. This included posting announcements for all public participation opportunities, the Public Participation Plan, air quality conformity analysis documents, other relevant background information, past planning documents, and MPO Technical and Policy Committee meeting materials. The WMSRDC website, which was totally updated in 2015, also

hosts streamlined menus, simple navigation, interactive project related mapping, and other information 24 hours a day. The WMSRDC website can be found at www.wmsrdc.org. More specifically it includes a list of all LRTP projects, LRTP projects, links to transportation related documents, contact information, etc.

The update of the 2045 LRTP included a notice and LRTP information announced via the WMSRDC website, emails to interested citizen/agency list, press release to local media, and notice on social media on September 4, 2019. This announcement included an online survey via Survey Monkey developed by MPO staff to engage interested others in a discussion about transportation-related improvements for Muskegon and northern Ottawa counties. The survey was developed to take less than ten minutes to complete and assistance in completing the survey was offered by directing potential respondents to MPO staff through telephone or email. As an incentive to complete the survey, a $25 Meijer gift card was offered and given away to a randomly drawn respondent. In addition to multiple choice transportation related questions, the survey allowed respondents to share their contact information for the purpose of being added to the interested citizen/agency list. The survey also included an option to state other comments or concerns respondents thought might help efforts to develop a responsible LRTP. There were a total of 73 respondents to the survey. The survey results can be found in the Appendix.

Once the draft LRTP document, environmental justice, air quality conformity, and identification of deficiencies were complete, a 14-day public comment period was held from **March 19 to April 1, 2020.** Notices of the public comment period were posted on the WMSRDC website on March 18, 2020 and sent to all on the interested citizen/agency list. An announcement regarding the public comment period with a link to the draft plan was also made on social media. Throughout the 14-day public comment period, the draft document was available to view on the WMSRDC website. Because of issues related to the COVID-19 virus, the draft plan was not available to review in hard copy format during the official public involvement period. A hard copy was available for public review during previous MPO meetings and at the WMSRDC office before the COVID-19 social distancing issues were established.

All public comments received through the online survey, throughout the course of document development, as well as during the official public comment period, including comments received at the public meetings, can be found in the appendix of this document. All public comments received were provided to the WestPlan Technical and Policy Committees for consideration, and in some instances the inquirer was directed to the respective road or transit agency for more project-specific details.

Typically an open house regarding the draft 2045 LRTP would be held. However, because of issues related to the COVID-19 virus, an open house was not scheduled.

In addition to the official public involvement period and the survey, opportunities for public comment were available at monthly Technical Committee, Policy Committee, and WMSRDC Board meetings. Agendas and minutes for these meetings are regularly posted on the wmsrdc.org website.

All documents, events, and public comment opportunities were published on the WMSRDC website throughout the LRTP development process and were also made public through press releases to local media. Additionally, to provide ample time for staff to incorporate comments received, WestPlan Policy

Committee approval was not scheduled to take place until April 15, 2020 which is 14 days after the close of the public comment period.

Conclusion

Throughout the 2045 LRTP development, all pertinent public participation information was taken to the WestPlan Technical and Policy Committees for their review and consideration. This committee review aided staff during the process, helping to make decisions regarding the plan along the way.

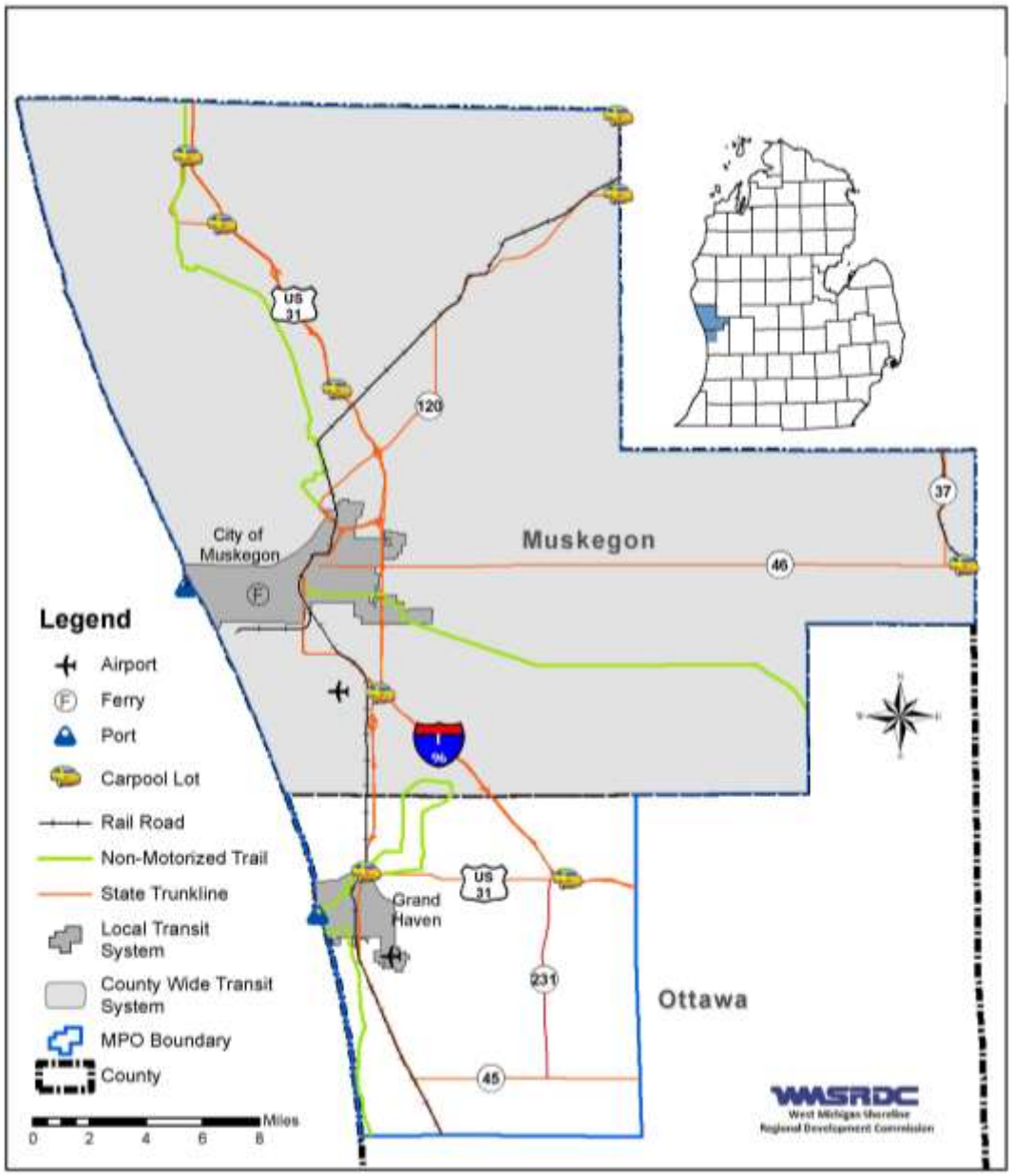
All comments received were reviewed and incorporated into the LRTP when and where appropriate. Specifically, all written public comments during the public involvement period were recorded in the appendix of this document along with staff or MPO Policy Committee responses. An evaluation of the 2045 LRTP public participation efforts will be made through our Public Participation Plan process to identify areas of success and areas that can be improved upon for future plan development.

CHAPTER 7: INVENTORY

Existing Transportation System Facilities

The Muskegon/northern Ottawa MPO area has a very diverse multi-modal transportation system. The network includes a mix of highway, public transportation, non-motorized, as well as freight, rail, port and air transportation. With such a complex system, there is a continuing need to identify and plan for this regional and global asset. ***Figure 2*** below gives an overview of the existing system.

Figure 2: Existing Transportation System



Highways and Bridges

There are approximately 2,257 miles of public roads in the WestPlan MPO area, of which, 860 are maintained through federal transportation money, as designated through the National Functional Classification System (NFC) and the National Highway System (NHS). Approximately 425 miles are NFC classified as arterial, interstate, or other freeway. These routes include US-31, I-96, M-120, M-37, M-46, M-231, and M-104. Also included with these routes are all "Business Routes" (BR). These routes are generally considered "Trunkline" routes and are under the jurisdiction of the MDOT. There are approximately 435 miles of NFC classified major and minor collectors in the MPO area. Collectors are generally under the ownership of the local road agencies; road commissions, cities, or villages. The remaining 1,398 miles are considered "Local" and are not funded with federal transportation money, but are eligible for PA51 funding and are also under the supervision of local road agencies.

National Functional Classifications of roadways reflect a roadway's balance between providing land access versus mobility. Functional classification is the process by which public streets and highways are grouped into classes according to the character of service they are intended to provide. Classifications of roadways play an important role in the planning, funding, and management of the transportation network. The FHWA provides specific guidelines when assigning roadway classifications. If a road is not federally classified, the road may not be eligible for federal funding. In that case, local money may be used for maintenance or improvements.

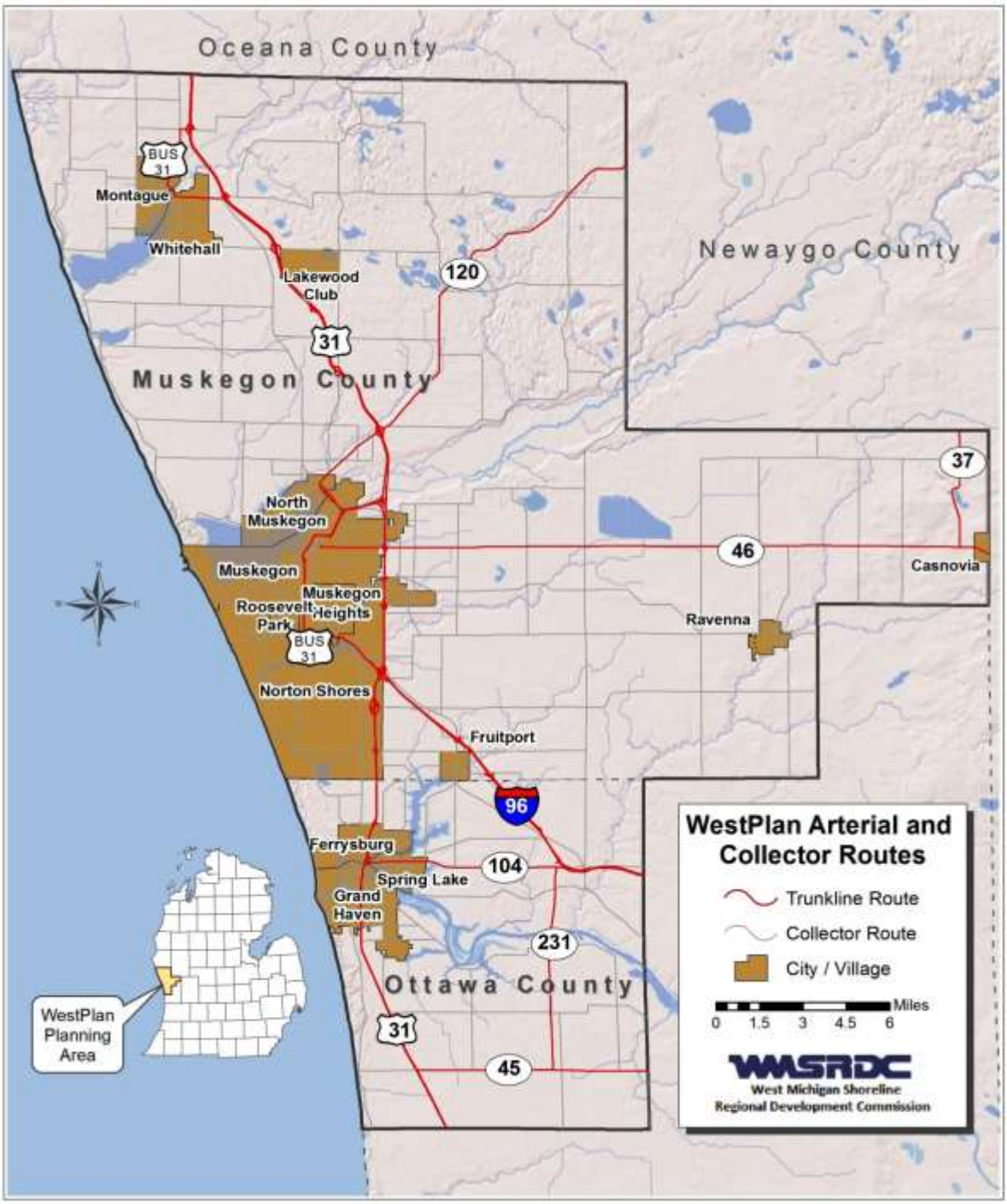
Arterials are the highest classified roads, and are regulated by state and federal agencies. Cities, villages and road commissions maintain all other roads down to the local level. Other local governments that are not road agencies, such as townships, do not receive federal funding for road projects. In these cases the county road commission would have jurisdiction over the road and would work with the local government on projects. The classification system includes interstates, other freeways, arterials, collectors, and locals. In order to receive federal funding, a road must be classified higher than a "local" road. A general summary of the selected classifications are as follows:

FHWA Hierarchy of National Functional Classification Roadways

Arterials (Principle and Minor): These roads serve major centers of activity within the metropolitan area. Principle and minor arterials should carry the majority of non-freeway traffic within the network. Minor arterials provide service for trips of moderate length, serve geographic areas that are smaller than their higher arterial counterparts and offer connectivity to the higher arterial system. In an urban context, they interconnect and augment the higher arterial system, provide intra-community continuity and may carry local bus routes. In rural settings, they are identified and spaced at intervals consistent with population density, so that all developed areas are within a reasonable distance of a higher level arterial. ***Figure 3*** is a map of the Arterial and Collector routes within the MPO.

Interstate Highways: Interstates are the highest classification of arterials and were designed and constructed with mobility and long distance travel in mind. Interstate roads are generally limited access, divided highways offering high levels of mobility while linking major urban areas of the United States. I-96 is the only corridor in this region that is on the Interstate Highway Network.

Figure 3: Arterial and Collector Routes



Other Freeway- These roads may look and function similar to interstate roads. These roads will also have directional travel lanes separated by some type of physical barrier, and their access and egress points are limited to on- and off-ramp locations or a very limited number of at grade intersections. US-31 north of Grand Haven is an example of such a road.

Other Principal Arterial (Urban and Rural) - These roadways serve major centers of metropolitan areas, provide a high degree of mobility and can also provide mobility through rural areas. These roadways are designed to serve abutting land uses directly with driveways and at grade intersections.

Collectors (Major and minor): Collectors distribute trips from the arterial system to ultimate destinations. These roads usually provide traffic access and circulation to residential, commercial and industrial areas.

Local Roads: These roads offer the lowest level of mobility and provide access to both land and higher roadway systems within the network.

WestPlan MPO Roads Classified as Arterials

I-96

Interstate 96 (I-96) connects Muskegon County with Detroit, and several cities along the way. I-96 merges into US 31-BR near the US-31 interchange in the City of Norton Shores. The original connection between the existing I-96 near Coopersville and US-31 in Muskegon County was established in the early 1960's. This route replaced the previous route known as US-16 through Muskegon County. There are several access points along this five mile stretch. Exits 4 and 5 provide access on and off from I-96 to the Fruitport area, and there is an exit farther west at the Hile Road area. There is a connection to US-31 that allows travelers to go north or south on US-31. This is a most important junction because of the Lakes Mall and all of the adjacent development around the mall, as well as the Muskegon County Airport that is in the vicinity. There is an ongoing effort to provide a more efficient transition from the I-96 corridor to the US-31 corridor by means of an additional access point along I-96. Several studies have looked at the possibility of adding an interchange at the intersection of I-96 and Sternberg Road in Fruitport Township. MDOT has indicated that funding and federal requirements have delayed any potential projects from moving forward at that location.

US-31

US-31, in its entirety, traverses from southern Alabama to Michigan. In the MPO area, US-31 is a north/south limited access route that runs from the southern border of Grand Haven Township in Ottawa County, to the northern border of Muskegon County near Montague. The route changes characteristics in Ottawa County, where at grade crossings are common at most major intersections. In Muskegon County, the route has limited access, and there are eleven access points along the roughly 28 mile stretch inside Muskegon County. However these serve as access points to communities and other development within the region. Most of the interchanges have development around them, but there are a few in the northern county that remain undeveloped. The most heavily developed areas are around Sternberg Road, the Laketon Avenue, Sherman Boulevard, Colby Road, M-46, M-104, and M-120. There are two business route portions of US-31 in Muskegon County. Starting in the south, there is US-31 BR that extends from the western termination of I-96 near the US-31/I-96 interchange, north to M-120 near the former B.C. Cobb power plant in the City of Muskegon. The second US-31 BR is in the White Lake area, near the cities of Whitehall and Montague. This route begins at the Colby Road/US-31 interchange and travels through the City of Whitehall and into the City of Montague, terminating at the Fruitvale Road/US-31

interchange, north of Montague. The Business Routes serve as important connections to the communities and provides mobility to interregional corridors. MDOT is working with the City of Grand Haven to assess improvement needs and options on existing US-31, including the Jackson Street intersection.

M-37

M-37 is another north/south route that traverses a large area in the state, but only about five miles in Muskegon County. The Muskegon portion begins near the Village of Casnovia and heads north through Bailey before entering Newaygo County. Most of the road in that area is two lanes, with a few added turn lanes or flares for accommodating turn movements. There are a few pockets of commercial activity along the route, but most of the land use is agriculture based.

M-45

M-45 (Lake Michigan Drive) starts near Lake Michigan at an intersection with Lakeshore Drive near the Grand Rapids water filtration plant. The road runs east to an intersection with US-31 in Agnew, where the M-45 designation begins. The road runs through rural Ottawa County to Allendale, where it passes through the main campus of Grand Valley State University. M-45 ends at the interchange with I-196. Lake Michigan Drive continues east to its end where it becomes Pearl Street near the Grand River in downtown Grand Rapids.

M-46

M-46 (Apple Avenue) is a major trunk line route in Muskegon County, and provides east-west travel through the entire county. From the east, at the intersection of M-37, the road runs west to the City of Muskegon and terminates just east of US-31 BR. M-46 has experienced considerable growth with Muskegon Community College and Baker College now located in the same vicinity, along with the Orchard View School District and the campus of Mercy Hospital.

M-104

The western terminus of M-104 is at US-31 in Ferrysburg at the north end of the drawbridge spanning the Grand River north of Grand Haven. The highway runs along Savidge Street and crosses a bridge over the channel that connects the river with Spring Lake. On the opposite shore, the trunkline continues along Savidge Street, running between the river to its south and Spring Lake to its north. M-104 crosses the central business area of the Village of Spring Lake. East of downtown, the highway transitions to follow Cleveland Street, and continues due east to Nunica. The eastern terminus of M-104 is located at the exit 9 interchange along I-96 just west of Nunica.

M-120

M-120 (Holton Road) begins in the City of Muskegon, near the border with the City of North Muskegon, and heads in a north-easterly direction into Oceana and Newaygo counties near the Holton area. Most of this roadway is two lanes, other than a few areas where turn lanes have been added to accommodate turn movements. There are approximately 20 miles of road that are designated as M-120 in Muskegon

County. The most heavily developed areas are in the southern portion of the road in the Charter Township of Muskegon and in Dalton Township.

M-231

M-231 between M-45 and I-96/M-104 was completed in the fall of 2015 and has full traffic flow to date. The route begins along M-45 (Lake Michigan Drive) in Robinson Township near the intersection with 120th Avenue, and runs due north and across the Grand River into Crockery Township. The route has an at-grade intersection with Lincoln Street, which is the only other intersection along the corridor, except for the termini. M-231 continues northward, crosses over Leonard Street, and then ends at M-104 (Cleveland Street). I-96 is located near this intersection, which allows access to Muskegon (northwestward) or Grand Rapids (eastward); ramps were also added at the 112th Avenue interchange for additional access to the Nunica area.

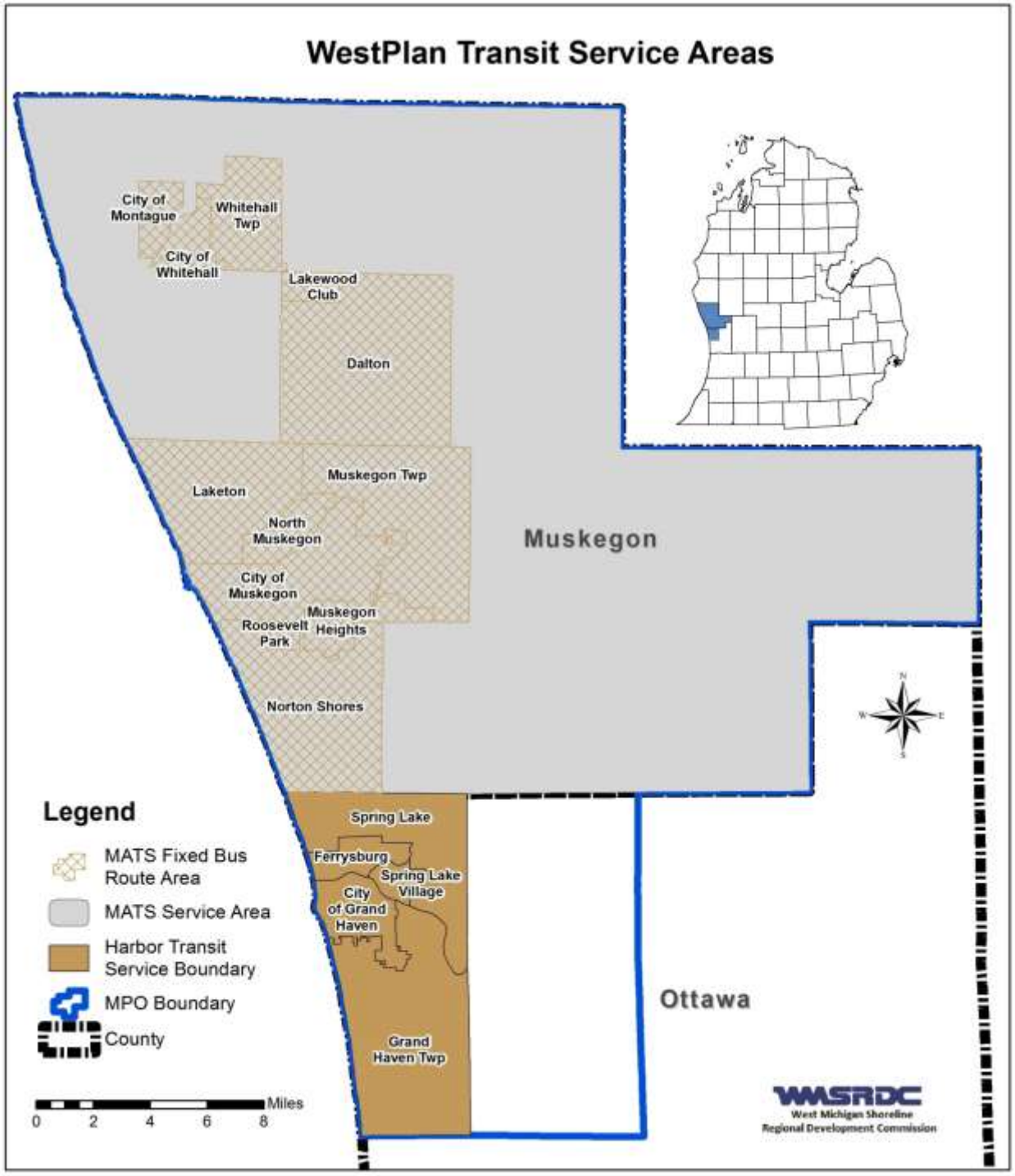
Previously, in order to cross the Grand River, travelers either used US-31 through Grand Haven or 68th Avenue through Eastmanville. This new road provides a river crossing almost equidistant between the two, greatly reducing drive times between areas north and south of the river and improving mobility in Ottawa County. Previously, a drive from Nunica to Robinson was a 20-mile trip; the new highway now provides a route closer to 7 miles in length. In addition, this crossing over the Grand River serves as an important connection for emergency responders and serves as an emergency route for motorists in the event that the US-31 bascule bridge in Grand Haven or the 68th Avenue bridge in Eastmanville is inaccessible. M-231 provides a third crossing over the Grand River within the MPO region; four bridges cross the Grand River in all of Ottawa County, including M-231. The M-231 bridge over the Grand River also includes a separated, non-motorized bridge.

There has been interest expressed by communities and other agencies in the area to study this corridor further. One of the options initially studied included extending M-231 further south towards US-31 north of Holland and to I-196 east of Zeeland. The current configuration of M-231 today was the Preferred Alternative in the approved Environmental Impact Statement, based on the funding available at that time. A formal environmental review has not been initiated for further study of this corridor. MDOT will participate with the MPO and others interested in studying this corridor further and evaluating local and MDOT system needs. Additional state highway improvements will depend on statewide priorities and funding levels.

Public Transit

Within the WestPlan area there are two major transit providers, as well as a number of smaller transit providers. In Muskegon County, the Muskegon Area Transit System is the major provider and the Harbor Transit Multi Modal Transportation System is the primary transit agency in northern Ottawa County. ***Figure 4*** shows a map of current transit service areas.

Figure 4: Transit Service Areas



Muskegon Area Transit System (MATS)

The Muskegon Area Transit System (MATS) is a department of the County of Muskegon. Since 1974, MATS has provided public transportation in the Muskegon community on behalf of the local

communities. MATS operates a network of fixed route bus services in the Muskegon area and demand-response services throughout the county. As the public transportation provider in the community, MATS also participates in transportation planning to improve the community and coordinates various transportation efforts. MATS partners with the FTA for federal operating and capital funds, and the MDOT for state operating and capital funds. MATS also receives local funding from municipalities in the service area and from fare revenues.

MATS has a total of 34 vehicles and employs up to 70 people. In fiscal year 2019, MATS traveled 732,610 miles, served 480,253 passengers and operated 52,150 vehicle hours.

MATS currently operates service on 11 fixed-routes serving urbanized and regional areas consisting of the cities of Muskegon, Muskegon Heights, Roosevelt Park, Norton Shores, Whitehall, Montague and Muskegon Township. MATS also provides paratransit services throughout Muskegon County to meet public demand. The hours of operation are Monday through Friday, 6:30 am to 10:40 pm and Saturdays 9:30 am to 6:00 pm.

Harbor Transit Multi Modal Transportation System

Harbor Transit has been serving the public transportation needs of the Tri-Cities area since 1975. It was reorganized into the Harbor Transit Multi-Modal Transportation System in January of 2012 which coincided with the expansion of the service area to include all of Grand Haven Charter Township. In 2014, the residents of Spring Lake Township approved a ballot proposal to add Spring Lake Township to the service area. The total service area now covers 55.5 square miles and includes the cities of Grand Haven and Ferrysburg, the Village of Spring Lake, Spring Lake Township, and Grand Haven Township. Harbor Transit operates as a call/on-demand service. In 2013, a $700,000 building rehab and renovation project was completed that will allow for better customer service and operation areas.

The system employs 65 full and part-time employees and operates a fleet of 25 buses along with two seasonal trolleys. The fleet is powered by fifteen gasoline motor vehicles along with ten L. P. powered buses. In a normal month, buses will travel 40,000 miles.

The Harbor Transit Multi-Modal Transportation System partners with the FTA for federal operating and capital funds, and the MDOT for state operating and capital funds. Locally, Harbor Transit operates as an authority and receives local mileage funding from the City of Grand Haven, City of Ferrysburg, the Village of Spring Lake, Spring Lake Township and the Township of Grand Haven for operating funds and small capital projects.

Other Transit Providers

In addition to MATS and Harbor Transit, there are a number of other non-profits within the MPO which provide specialized transit services. Many of these non-profits access funding through the 5310 program. Examples of these providers are the Age Well Services, Pioneer Resources, and Goodwill Industries.

Pioneer Resources

Pioneer Resources offers services for people with mobility impairments, developmental disabilities, senior citizens and others facing transportation barriers. Services are provided along the lakeshore in western Michigan (Ottawa and Muskegon counties). Pioneer Resources can also assist eligible passengers or organizations with field trips and special events.

Age Well Services

The Age Well Services Senior Transportation Program is a service for Muskegon County seniors who are living on limited incomes and need transportation to get to their medical appointments. The service provides door-to-door, non-emergency medical transportation and operates Monday-Friday from 8:30am – 5:00pm.

Intercity Bus Service

Greyhound operates two daily arrivals and departures out of the MATS terminal on Morris Avenue in Muskegon. The terminal is open Monday through Saturday. Service is available to a variety of cities. Muskegon is part of the Greyhound Great Lakes region. In addition to providing an important linkage between Muskegon/northern Ottawa County and other areas, intercity bus service contributes to reducing congestion, pollution, and energy consumption.

Air Transportation

Muskegon and Ottawa County (City of Grand Haven) both provide different levels of air service to the MPO area and surrounding region.

Muskegon County Airport

The Muskegon County Airport is a safe, clean and modern commercial air facility serving West Michigan. The Muskegon County Airport was established at its current site in 1929 when the Muskegon County Board of Supervisors voted to purchase 242 acres of land in Norton Township as a site for the new County Airport. Since that time, the Airport has been developed into a major regional air transportation facility, providing direct access to the air transportation system to a Metropolitan Statistical Area (MSA) of nearly 500,000 residents.

The airport is included in the Federal Aviation Administration's (FAA) National Plan of Integrated Airport System (NPIAS), making it eligible for both entitlement and discretionary funding as a primary commercial service airport. Approximately 95% of the aircraft operations are general aviation/corporate in nature, and the remaining 5% is commercial airline service.

The Airport is open 24 hours per day, 7 days per week, providing a base for varied services, including, but not limited to, daily United Airlines jet service to Chicago O'Hare, U.S. Coast Guard Search and Rescue, medical life flights, flight training, casino charter flights, airframe/power plant/avionics repair, and private/corporate aircraft

storage. On site firefighting, per Federal Aviation Regulation Part 139, is available, as is law enforcement support through an agreement with the Muskegon County Sheriff Department.

Grand Haven Memorial Airport

The Grand Haven Memorial Airport provides the Grand Haven area with a convenient, accessible and safe Airport for business and recreational small aircraft users. Grand Haven Memorial Airport is a U-5 General Aviation all-weather facility, licensed by the MDOT Aeronautics office. The Airport is served with a paved primary runway 3,750 feet long and a paved cross-wind runway 2,100 feet long. The Airport is operated through a management agreement with Benz Aviation of Grand Haven that provides a Fixed Base Operator (FBO) for service, maintenance and general day-to-day airport management.

The Airport has a 1,360 square foot administration building, a maintenance and community hangars. The Airport has 68 rental hangars. Hangars are available for lease.

Port and Maritime Transportation

Port of Muskegon

Muskegon County offers five commercial docking facilities providing a variety of shipping, logistics support, storage, towing, and ship repair services for corporations. Convenient options are available to deliver and receive goods from the Port of Muskegon, and move those goods to market, nationally and internationally.

Muskegon Lake is the largest natural deep-water port in West Michigan. The Port of Muskegon handles shipments of freight, aggregate, and salt throughout the year.

The United States Army Corps of Engineers provides funding for dredging of the Muskegon Lake Channel to provide year-round access to port facilities.

In addition to the commercial port facilities, 12 recreational marinas operate on Muskegon Lake and over 20 charter fishing operations call Muskegon Lake home. White Lake, about 7.5 nm north of the Muskegon Lake Channel, has 8 recreational marinas and 12 charter fishing operators. A scenic cruise ship, the Aquastar, offers leisure and dinner cruises on Muskegon Lake and Lake Michigan from its berth on Muskegon Lake.

Building on its tradition as a Port City, Muskegon County is also served by the Lake Express Ferry, a high-speed ship carrying passengers and vehicles across Lake Michigan from Milwaukee to Muskegon in just 2.5 hours, offering two runs every day during its May-October season.

Port of Grand Haven/Ferrysburg/Village of Spring Lake

At the mouth of the Grand River, lie the cities of Grand Haven and Ferrysburg, as well as the Village of Spring Lake. There is limited shipping activity in this area, primarily of aggregates, but a majority of the activity is recreation-based. There are adequate modes of transportation to accommodate shipping activities, but water depth fluctuation plays an important role, and being the mouth of Michigan's longest river, there are a lot of deposits occurring in that area. The average depth of the harbor is around 16-20 feet, which make it difficult for deeper draft vessels to use the port. The US Army Corps of Engineers provides annual funding for dredging of the channel to allow for deeper draft vessels that deliver to the docks in Grand Haven and Ferrysburg. Fishing and boating are the primary uses of this waterway, but Grand Haven is also the home to the United States Coast Guard's "Group Grand Haven," which coordinates all Lake Michigan Coast Guard activities.

Rail and Freight Transportation

Genesee-Wyoming Inc. operates a short rail line in the Muskegon-northern Ottawa area, which connects to several other regional lines throughout the state. The Michigan Shore Railroad (MS) is located along the shore of Lake Michigan and interchanges with the CSXT. The MS operates a line with more than 7,000 cars per year, primarily consisting of sand and chemicals. These routes are illustrated in ***Figure 5***

At this time there is no rail passenger service in the MPO Area, but the region is served by Amtrak and there are ongoing discussions with local and state leaders about expanding Amtrak services that exist in Holland and Grand Rapids, into the MPO area. Amtrak's Pere Marquette route connects these two cities with Chicago.

Figure 5: Michigan's Rail System

Michigan Shore Railroad, Inc.
101 Enterprise Drive
Vassar, Michigan 48768
989-797-5100

Genesee & Wyoming Railroads - Midwest Region

GR	Grand Rapids Eastern Railroad Inc.
HESR	Huron and Eastern Railway Company, Inc.
MMRR	Mid-Michigan Railroad, Inc.
MS	Michigan Shore Railroad, Inc.
MQT	Marquette Rail, LLC

G&W Nearby Railroads

CFE	Chicago, Fort Wayne & Eastern Railroad
IORY	Indiana & Ohio Railway Company

Dashed line indicates Trackage Rights

Non-Motorized Transportation

Regional efforts are focused on a strategic approach to creating safe and easily identified routes throughout the area, as well as connecting to other regional facilities. The region currently has numerous pedestrian and bicycle transportation facilities. Existing and proposed networks should be linked, if possible, to encourage their use by casual travelers, commuters, and for recreational purposes. An extensive bicycle and pedestrian network not only stimulates single-mode trips (walking or biking alone), but also encourages the use of public transit. Transit agencies have provided crucial links to the non-motorized system in the area by adding bicycle racks to the busses that service the Muskegon urbanized area and the Harbor Transit Multi Modal Transportation System service area.

Pedestrian facilities include sidewalks, bike lanes, greenways, and trails. Sidewalks are common in a majority of the cities and villages within the region, but are less common in the rural areas. Many communities also utilize expanded lanes on the roadway for bikers and walkers.

In 2013 the MPO completed a Non-Motorized plan for the MPO area. The plan outlines the trails, bike paths, and paved shoulders, as well as traffic data along roadways with wide shoulders. The plan is available on the WMSRDC website.

In 2017, MDOT, in consultation with local municipalities, governments, and regional planning agencies, updated the Non-Motorized plan for the Grand Region. The MDOT-Grand Region encompasses the western central portion of Lower Michigan and includes 13 counties: Mason, Oceana, Muskegon, Ottawa, Lake, Osceola, Newaygo, Mecosta, Montcalm, Kent, Ionia, Allegan, and Barry. The plan serves as a tool to help identify gaps in the non-motorized network, prioritize non-motorized investment, coordinate with other agencies, and fosters cooperative planning across municipal/county boundaries. The plan is available through the MDOT website.

Lakeshore Trail System (Muskegon County)
This system of trails in the City of Muskegon was started in 1998. The trail system is approximately 13 miles in length, and offers a variety of routes throughout the city. Future plans include linking the Laketon Avenue section with the Musketawa Trail to the east. There are also plans on connecting the Shoreline Route with another connector in North Muskegon, which will link this system up with the Muskegon State Park and the Hart-Montague Trail.

Musketawa Trail (Muskegon County)
This trail system contains approximately 26 miles of paved recreational trail, which extends from the City of Marne in Ottawa County, west to the City of Muskegon, in Muskegon County. This trail is used by bikers, horseback riders, in-line skaters, cross country skiers, wheelchair travelers, and nature lovers. Future plans include linking up with other trail systems in Muskegon County.

Hart-Montague Trail (Muskegon County)
This trail system runs from Hart, south to Whitehall. It is approximately 24 miles in length. The trail ends at the Whitehall southern city limits, where Phase I of the Fred Meijer Berry Junction Trail continues south into Dalton Township.

Fred Meijer Berry Junction Trail (Muskegon County)
This entire trail is now complete and connects the southern end of the Hart-Montague Trail to the Lakeshore Trail in the City of North Muskegon. The trail is approximately 12 miles from Whitehall to North Muskegon. The trail is sponsored and maintained by a very active group called the Friends of the Fred Meijer Berry Junction Trail.

Grand Haven Waterfront Trail (Ottawa County)
The Grand Haven Waterfront Trail offers access to the Grand Haven State Park and public parking areas along the waterfront.

North Bank Trail (Ottawa County)
The North Bank Trail (NBT) currently consists of 3.3 miles of paved trails, with an additional 14.7 miles planned for the future, once funding is secured. The multipurpose pathway is located along the former Grand Trunk Railroad that extends from Spring Lake to Coopersville. The path connects at the east end of the Village of Spring Lake Bike Path to the east end of the Musketawa Trail and serves as a regional link between the beaches of Grand Haven/Spring Lake area and the Grand Rapids metro area. Spring Lake Township is part of the "Friends of the North Bank Trail" committee that has been meeting since August of 2006 to support and strategize future NBT projects. In addition, the Spoonville Trail crosses the new M-231 bridge and will connect the Grand River Greenway Trail (once completed) to the North Bank Trail. The 28-mile Grand River Greenway would run on the south side of the Grand River and eventually connect with Allendale trails, which connect to Grand Rapids.

Lakeside Trail (Ottawa County)
The Lakeside Trail is a 15 mile trail system that encircles Spring Lake through the communities of Ferrysburg, Fruitport, and the Village of Spring Lake. There are connections from this trail to the North Bank Trail and the Grand River Greenway. The Lakeside Trail runs on the north side of Savidge from North Fruitport Road to the east to Old Boy's Brewhouse on the west. A cross country skiing/snowshoeing trail is located in the wooded area north of Lakeside Trail. It begins at North Buchanan, proceeds to Fruitport Road and continues along the North Bank Trail, through by Spring Lake Township, which is a continuation of the Rail-Trail that extends east 3.3 miles into Spring Lake and Crockery Townships.

Spoonville Trail (Ottawa County)
The first 1.8 miles of the Spoonville Trail were opened in 2016. This first phase goes from North Cedar Drive to Leonard Road, crossing the Sgt. Henry E. Plant Memorial Bridge. When completed, the trail will create a link between the North Bank Trail and the Grand River Explorers Trail. As previously stated, the Spoonville Trail crosses the new M-231 bridge and will connect the Grand River Greenway Trail (once completed) to the North Bank Trail.

Lakeshore Trail (Ottawa County)

The Lakeshore Trail in Ottawa County is a 20 mile paved path that connects the communities of Grand Haven and Holland and allows users to travel from the Grand Haven State Park to the Holland State Park on one continuous route.

In addition to these major trails there are a number of other local trails, pathways and other non-motorized facilities within the MPO area that are collaborations between state and local municipalities.

Safety Planning

Safety planning is one of the key criteria examined during the project selection process of TIP and LRTP development. In addition to road and transit projects that have safety components, MPO committees have approved a number of projects which are primarily safety related projects. Most notably these include various Safe Routes to School projects. Also, many of the non-motorized trail and transit projects have key safety components.

The West Michigan Shoreline Regional Development Commission is responsible for Hazard Mitigation Planning for the entire region, which includes Muskegon County. Similar planning is done for Ottawa County by the State of Michigan. Hazard Mitigation Plans are developed to identify, reduce and eliminate long-term risks to people and property from natural or manmade hazards. Planners work directly with the Michigan State Police and the Federal Emergency Management Agency, as well as local emergency managers and stakeholders.

Some of the issues identified through this program include weather related hazards such as fog and winter storms. With the proximity to Lake Michigan, the MPO area is prone to these types of hazardous weather conditions. Also identified in these plans are issues such as hazardous material incidents, which could be uncontrolled releases of hazardous materials along the transportation network. An infrastructure failure is another potential hazard identified in these plans. The failure of critical public or private infrastructure could result in temporary loss of essential functions and/or services. The MDOT has identified and posted emergency routes along the major trunklines in Muskegon and Ottawa Counties, primarily on US-31 and I-96.

CHAPTER 8: TRENDS AND PROJECTIONS

2015 Population/Households/Employment

MDOT and WestPlan staff worked together to update Transportation Analysis Zones (TAZs) boundaries for the MPO area and to produce a list of 2015 population, household, and employment data for each jurisdiction in the WestPlan MPO area. The data was distributed to the WestPlan Technical Committee for their review and updates. The socioeconomic data is a major input into the regional travel demand model, used to calculate trip productions and attractions. The following table represents population, household, and employment estimates for the year 2015. These figures were reviewed at the local level and were approved by the WestPlan Policy and Technical Committees in September of 2018. These figures were then used as base year inputs in the regional travel demand model and assisted the Technical Committee to identify deficiencies in the regional transportation system. Meetings were also held with local units of government in June of 2019 in order to review 2015 base socioeconomic data and get input on future year data.

MDOT purchased geocoded business employment data from multiple private market research firms and merged the files into a single MDOT employment database. This data includes the physical street address, employment level, and NAICS code for each record. MDOT cleaned this merged database by researching and editing records with missing or incorrect addresses, incorrect NAICS codes, duplicate records, and incorrect employment levels. This base year employment data was reviewed by local agencies and MPO staff and approved through the MPO committee process.

2045 Population/Households/Employment

Working from the 2015 population, households, and employment totals that were approved by the WestPlan Technical Committee and Policy Committee, several sources were used to identify growth rates and prepare the future estimates. The WMSRDC developed demographic and economic projections for Lake, Mason, Muskegon, Newaygo, Oceana, and northern Ottawa counties. The population forecasts were developed using variations of the traditional cohort survival technique of population forecasting and historical trends. This method examines trends in population as provided by the U.S. Census Bureau. The employment projections developed by WMSRDC are by place of employment (not residence), and are based on data from the Regional Economic Information System (REIS) published by the U.S. Department of Commerce, Bureau of Economic Analysis and the Michigan Department of Career Development/ Employment Services Agency, Labor Market Analysis Section. The economic projections were also based on data provided by the Institute for Research on Labor, Employment, and the Economy at the University of Michigan through the Regional Economic Models, Inc. (REMI) economic and demographic forecasting and simulation model. The projection methodology utilizes past trends, existing economic activity, and anticipated growth to estimate employment totals for each county.

WestPlan members and local officials reviewed and submitted information on planned future development which was incorporated into the base year and future year data. This allowed known future development to be placed into the correct TAZ. Socio-economic data was projected out to 2045 utilizing the 2015 TAZ data. Future year projections of employment by type used the 2045 REMI forecast, as a

control total by MCD. The additional employment was distributed into each zone using a weighted average by current number of employees plus known development.

Tables 5 through 8 on the following pages, tables represent population, household, and employment estimates for the year 2045. These figures were approved by the WestPlan Policy and Technical Committees in August of 2019.

Table 5: Future Year Demographics - Population

WestPlan Future Year Demographics By Jurisdiction

Jurisdiction	Total 2015 Population	Total 2020 Population	Total 2025 Population	Total 2035 Population	Total 2045 Population
Blue Lake Twp	2,245	2,332	2,422	2,561	2,666
Casnovia	154	157	160	163	164
Casnovia Twp	2,674	2,724	2,774	2,832	2,852
Cedar Creek Twp	3,285	3,333	3,379	3,424	3,419
Crockery Twp	4,168	4,265	4,324	4,304	4,150
Dalton Twp	7,869	8,133	8,394	8,791	9,066
Egelston Twp	9,778	9,952	10,116	10,289	10,328
Ferrysburg	2,990	3,022	3,025	2,981	2,937
Fruitland Twp	5,469	5,572	5,676	5,798	5,844
Fruitport	1,149	1,175	1,201	1,235	1,252
Fruitport Twp	12,415	12,712	12,994	13,376	13,578
Grand Haven	10,665	11,193	11,306	11,185	10,762
Grand Haven Twp	15,763	16,359	16,792	17,131	16,954
Holton Twp	2,475	2,499	2,523	2,533	2,510
Laketon Twp	7,505	7,625	7,737	7,849	7,852
Lakewood Club	1,132	1,171	1,207	1,264	1,304
Montague	2,412	2,456	2,559	2,649	2,695
Montague Twp	1,566	1,573	1,581	1,574	1,547
Moorland Twp	1,450	1,460	1,470	1,465	1,443
Muskegon	37,664	37,970	38,163	37,989	37,310
Muskegon Heights	10,660	10,621	10,580	10,334	9,954
Muskegon Twp	17,404	17,590	17,762	17,845	17,690
North Muskegon	3,746	3,758	3,769	3,732	3,645
Norton Shores	23,776	24,305	24,853	25,857	26,174
Ravenna	1,251	1,268	1,284	1,296	1,292
Ravenna Twp	1,529	1,545	1,565	1,580	1,577
Robinson Twp	6,215	6,401	6,525	6,567	6,417
Roosevelt Park	3,798	3,832	3,866	3,873	3,830
Spring Lake	2,437	2,492	2,528	2,519	2,440
Spring Lake Twp	12,092	12,408	12,598	12,582	12,197
Sullivan Twp	2,379	2,399	2,421	2,424	2,395
White River Twp	1,302	1,314	1,323	1,329	1,314
Whitehall	2,675	2,769	2,819	2,783	2,711
Whitehall Twp	1,847	1,885	1,918	1,963	1,979
WestPlan TOTAL	**223,939**	**228,270**	**231,614**	**234,077**	**232,248**

Note: Some TAZ boundaries overlap multiple jurisdictions; Totals reflect demographic totals of all TAZs assigned to the parent jurisdiction.

2015 Demographic information is derived from the 2010 Decennial Census and was approved in 2018 by the WestPlan Policy committee. The future year estimates were developed using the Regional Economic Models Inc. (REMI) tool and observed population trends.

Table 6: Future Year Demographics - Group Quarter Population

WestPlan Future Year Demographics By Jurisdiction

Jurisdiction	Total 2015 Group Quarters Population	Total 2020 Group Quarters Population	Total 2025 Group Quarters Population	Total 2035 Group Quarters Population	Total 2045 Group Quarters Population
Blue Lake Twp	3	3	3	3	3
Casnovia	0	0	0	0	0
Casnovia Twp	27	27	27	28	28
Cedar Creek Twp	23	23	23	23	23
Crockery Twp	44	44	45	44	41
Dalton Twp	19	19	20	21	21
Egelston Twp	26	26	26	27	27
Ferrysburg	7	7	7	14	17
Fruitland Twp	10	10	10	10	10
Fruitport	0	0	0	0	0
Fruitport Twp	70	70	70	71	73
Grand Haven	172	174	176	175	167
Grand Haven Twp	91	92	93	97	95
Holton Twp	19	19	19	19	19
Laketon Twp	3	3	3	3	3
Lakewood Club	0	0	0	0	0
Montague	0	0	0	0	0
Montague Twp	0	0	0	0	0
Moorland Twp	0	0	0	0	0
Muskegon	5,057	5,085	5,108	5,085	4,984
Muskegon Heights	199	190	190	187	181
Muskegon Twp	230	231	233	233	231
North Muskegon	51	51	51	49	48
Norton Shores	144	146	149	153	156
Ravenna	7	7	7	7	7
Ravenna Twp	7	7	7	7	7
Robinson Twp	44	44	45	45	44
Roosevelt Park	29	29	29	29	29
Spring Lake	8	8	8	8	8
Spring Lake Twp	142	145	147	146	142
Sullivan Twp	0	0	0	0	0
White River Twp	9	9	9	9	9
Whitehall	149	149	149	143	140
Whitehall Twp	40	40	41	42	42
WestPlan TOTAL	**6,630**	**6,658**	**6,695**	**6,678**	**6,555**

Note: Some TAZ boundaries overlap multiple jurisdictions; Totals reflect demographic totals of all TAZs assigned to the parent jurisdiction.

2015 Demographic information is derived from the 2010 Decennial Census and was approved in 2018 by the WestPlan Policy committee. The future year estimates were developed using the Regional Economic Models Inc. (REMI) tool and observed population trends.

Table 7: Future Year Demographics - Housing Units

WestPlan Future Year Demographics By Jurisdiction

Jurisdiction	Total 2015 Occupied Housing Units	Total 2020 Occupied Housing Units	Total 2025 Occupied Housing Units	Total 2035 Occupied Housing Units	Total 2045 Occupied Housing Units
Blue Lake Twp	708	740	772	818	846
Casnovia	52	54	55	57	58
Casnovia Twp	807	834	860	893	902
Cedar Creek Twp	1,268	1,308	1,343	1,381	1,388
Crockery Twp	1,458	1,546	1,622	1,706	1,725
Dalton Twp	2,755	2,897	3,016	3,201	3,309
Egelston Twp	3,280	3,404	3,499	3,624	3,659
Ferrysburg	1,341	1,403	1,449	1,493	1,489
Fruitland Twp	1,987	2,072	2,149	2,256	2,309
Fruitport	455	475	494	520	535
Fruitport Twp	4,511	4,725	4,912	5,190	5,338
Grand Haven	4,826	5,282	5,537	5,825	5,902
Grand Haven Twp	5,644	6,104	6,492	7,003	7,247
Holton Twp	822	846	865	887	889
Laketon Twp	2,900	3,024	3,124	3,265	3,324
Lakewood Club	361	379	395	420	432
Montague	969	1,004	1,053	1,097	1,122
Montague Twp	548	562	574	586	587
Moorland Twp	528	547	562	584	590
Muskegon	13,274	13,625	13,866	14,067	13,948
Muskegon Heights	4,001	4,055	4,083	4,051	3,931
Muskegon Twp	6,314	6,527	6,696	6,903	6,946
North Muskegon	1,633	1,685	1,726	1,774	1,777
Norton Shores	9,778	10,220	10,621	11,383	11,652
Ravenna	407	419	430	443	445
Ravenna Twp	501	514	526	541	545
Robinson Twp	2,041	2,186	2,310	2,456	2,511
Roosevelt Park	1,655	1,700	1,735	1,765	1,753
Spring Lake	1,050	1,112	1,167	1,230	1,248
Spring Lake Twp	4,803	5,125	5,383	5,687	5,779
Sullivan Twp	818	845	870	900	908
White River Twp	487	500	512	524	524
Whitehall	1,072	1,153	1,194	1,217	1,213
Whitehall Twp	660	686	708	740	753
WestPlan TOTAL	**83,714**	**87,558**	**90,600**	**94,487**	**95,584**

Note: Some TAZ boundaries overlap multiple jurisdictions; Totals reflect demographic totals of all TAZs assigned to the parent jurisdiction.

2015 Demographic information is derived from the 2010 Decennial Census and was approved in 2018 by the WestPlan Policy committee. The future year estimates were developed using the Regional Economic Models Inc. (REMI) tool and observed population trends.

Table 8: Demographics - Employment Total

WestPlan Future Year Employment By Jurisdiction

Jurisdiction	2015 Employment Total	2020 Employment Total	2025 Employment Total	2035 Employment Total	2045 Employment Total
Blue Lake Twp	518	508	521	544	580
Casnovia	82	80	77	73	71
Casnovia Twp	603	574	574	570	570
Cedar Creek Twp	396	378	378	370	375
Crockery Twp	1,570	1,565	1,589	1,630	1,701
Dalton Twp	1,658	1,589	1,596	1,607	1,652
Egelston Twp	2,556	2,523	2,491	2,445	2,455
Ferrysburg	1,223	1,156	1,173	1,193	1,230
Fruitland Twp	1,069	1,043	1,061	1,087	1,142
Fruitport	572	561	571	593	619
Fruitport Twp	5,944	5,617	5,635	5,674	5,796
Grand Haven	13,966	13,838	14,272	15,075	16,074
Grand Haven Twp	5,842	5,975	6,048	6,167	6,432
Holton Twp	624	611	621	633	669
Laketon Twp	1,202	1,182	1,203	1,251	1,322
Lakewood Club	93	84	85	85	86
Montague	1,475	1,455	1,477	1,515	1,578
Montague Twp	575	553	545	523	521
Moorland Twp	282	274	274	273	277
Muskegon	24,616	24,463	24,686	25,205	26,115
Muskegon Heights	5,458	5,336	5,262	5,100	5,064
Muskegon Twp	8,033	8,022	8,017	8,048	8,252
North Muskegon	1,783	1,768	1,796	1,857	1,938
Norton Shores	15,424	15,493	15,502	15,294	15,402
Ravenna	530	519	517	513	518
Ravenna Twp	829	795	777	748	737
Robinson Twp	1,409	1,398	1,398	1,439	1,492
Roosevelt Park	3,456	3,339	3,306	3,212	3,206
Spring Lake	1,904	1,902	1,938	1,971	2,054
Spring Lake Twp	5,706	5,688	5,724	5,739	5,889
Sullivan Twp	296	281	278	272	264
White River Twp	280	275	276	272	290
Whitehall	3,012	2,990	2,937	2,803	2,734
Whitehall Twp	1,007	1,006	1,031	1,080	1,143
WestPlan TOTAL	**113,993**	**112,841**	**113,636**	**114,861**	**118,248**

Note: Employment totals do not include businesses listed as a Home-Based Business (HBB).

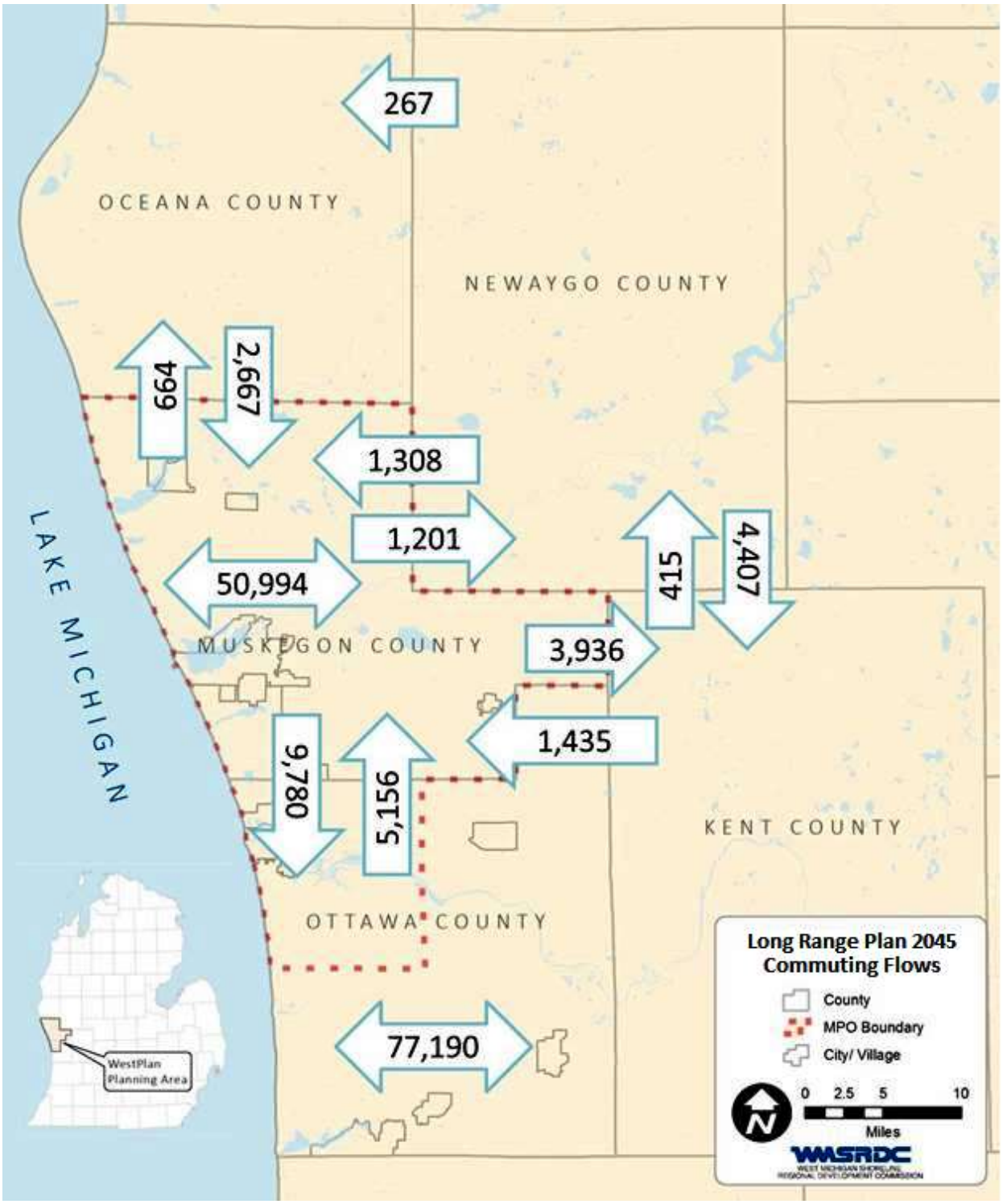
Travel Patterns

There is a significant amount of commuting in the WestPlan area for employment. 2010 County-to-County commute data illustrates significant worker flows into and out of the WestPlan area to neighboring counties. Utilizing the American Community Survey (ACS) data from the U.S. Census Bureau, the extent of commute flows can be seen from one county to another.

Muskegon County draws 5,156 workers from Ottawa County, 1,435 from Kent County, and 1,308 from Newaygo County. Conversely, 9,780 workers travel to Ottawa County, 3,936 workers commute to Kent County, 1,201 workers to Newaygo County, and 664 workers travel to Oceana County. See ***Figure 6*** for a map showing the flows between counties.

The American Community Survey Data (ACS) also provides information about the average commute times to work. The mean travel time for Muskegon County workers is 21.0 minutes while the mean travel time to work for Ottawa County workers is 20.2 minutes. The state of Michigan average is 24.0 which equals 3 or more minutes higher than the WestPlan MPO area.

Figure 6: Commuting Flows from 2000 Census



CHAPTER 9: REGIONAL ISSUES

While the modeled capacity deficiencies of the transportation system are addressed in **Chapter 10: Travel Demand Model**, there are a number of other transportation concerns which have been identified for inclusion in the LRTP. These include system conditions, system operations, and a variety of other trends and issues impacting transportation in the WestPlan MPO.

Through background research and discussion with various local agencies and individuals throughout the planning process, a number of local concerns and issues relating to transportation in the WestPlan area were identified. Trends and issues were researched through the review of various local plans, review of federal websites and publications, and local workshops with the public and local elected and appointed officials. During the LRTP process a number of opportunities were provided for public input on the plan. These are further outlined in greater depth in **Chapter 6: Public Involvement**.

System Condition

Knowledge of the condition of the transportation system is important in making an informed decision on potential alternatives to address the transportation needs of the MPO. In addition to the deficiencies outlined in **Chapter 10: Travel Demand Model**, staff also tracks pavement condition through its Asset Management program as well as having direct involvement in non-motorized planning for the MPO.

Transportation Asset Management

Staff is directly involved in monitoring the road conditions within the MPO through its Asset Management program. Asset Management is a concept in the transportation industry that is emerging as an important planning tool for public officials, planners, engineers, and others. Asset Management is based on an inventory of each local road network within the region. It provides data that allows transportation officials to monitor, plan, and strategically improve the road network. This strategic method of investment marks a break from the traditional "tactical" method of fixing roads that have the most severe problems.

In 2002 the Michigan Transportation Commission formed an Asset Management Council with the objective to implement a state law that enacted the Asset Management Program. The Council is appointed by the Transportation Commission and answers directly to the Commission and legislature. Its five main elements include: policy goals and objectives, data collection, planning and programming, program delivery, and monitoring and reporting. Its goal is to inventory all 39,000 miles of federal aid eligible roads within the State of Michigan, and according to the data collected, determine future distribution of Act 51 transportation funds. Act 51 is a state transportation funding source. In the future, the Asset Management Council may implement a similar initiative to collect similar information on the remaining local road network.

The purpose of this task is to help satisfy the requirements of P.A. 499 of 2002, which establishes an Asset Management Council and charges it to develop an Asset Management Process for the State of Michigan. Regional transportation planning agencies play a significant role in this process as outlined in the task assignments below.

The Asset Management Council has developed a statewide process that will result in approximately 50 percent of federal aid eligible roads in the state to be rated per year using the PASER system. Each year, WMSRDC staff, along with the MDOT and a county road commission employee, collects this data within the MPO as well as the rest of the five-county region. WMSRDC staff also assists local units of government by collecting the same data on their local road systems.

Recent changes to state legislation require that local transportation agencies with at least 100 certified road miles submit bridge asset management plans, road asset management plans, and compliance plans to MDOT. WMSRDC staff has received training in these plans and will be available to assist local road agencies.

Non-Motorized Planning

In addition to monitoring the road conditions within the MPO, WMSRDC staff is also heavily involved in monitoring the non-motorized system. In 2013, the MPO undertook a study to develop a non-motorized plan for the MPO area. The study included an examination of existing non-motorized trails within the MPO boundaries and identified new connections to fill in the gaps between existing and proposed, but not yet constructed, trails. This plan provides a guide for the MPO, Muskegon County, northern Ottawa County, and the various municipalities and townships to develop trail connections that will provide an interconnected system for the entire area. In addition to identifying desirable trail connections, the plan identified potential funding sources and priorities. The consulting firm Progressive AE worked with representatives of the MPO to analyze existing data and develop plans identifying these new connections. Input was sought from various MPO partners in development of the plan. The MPO identified these partners and determined the extent of their involvement.

To commence the project, Progressive AE met with MPO representatives to collect and review the existing base data, review the project schedule, and begin to identify issues and opportunities as they related to the potential trail connections and alignments. It was determined that the study area would include all of the applicable communities within Muskegon County and northern Ottawa County in the MPO. The base data that was collected included:

- GIS mapping
- Township tax parcel mapping
- Michigan Resource Information System (MIRIS) base data
- Applicable city, village, and township recreational/other master plans
- MPO's Transportation Improvement Program
- MPO's Long Range Transportation Plan
- Muskegon and Ottawa County Master Plans and Recreation Plans

The various master plans, transportation plans, and recreation plans were reviewed for any pertinent non-motorized transportation components. These components provided the foundation for future recommendations and were included in the Muskegon/Northern Ottawa Non-motorized Plan. Utilizing the existing base information, Progressive AE completed an all encompassing system reconnaissance within the MPO and performed a review and verification of existing system conditions, as needed. Existing non-motorized transportation facilities and currently planned connections were confirmed for creation of a comprehensive system. Maps illustrating the various existing non-motorized systems were created. In addition, these plans identified potential new non-motorized trail connections. Progressive AE met with MPO representatives to review the preliminary non-motorized trail connections and support plans/documents. Revisions and corrections to the preliminary plans suggested by MPO representatives were noted. Based on input from the previous tasks, the preliminary non-motorized trail connections and support plans/documents were revised and resubmitted.

The MPO then sent the plans to various municipalities within the study area, as well as pertinent advocacy groups to solicit their input and comments regarding the existing, proposed, and suggested non-motorized trail connection design. Comments, suggestions, and concerns received back from these groups were then incorporated into the final plans. In addition, preliminary prioritization of various non-motorized trail connections was developed along with preliminary order of magnitude cost estimates. Potential funding sources were identified, as well as potential partners in the development of trial sections.

Finally, mapping of existing and proposed facilities was divided out by community to make the document more usable for each MPO constituent related to their own particular non-motorized facilities. An overview of the WestPlan non-motorized system can be found in **Chapter 7: Inventory of Existing Transportation System**. The entire Non-Motorized plan is also available from WMSRDC.

In addition to the MPO's plan, MDOT - Grand Region updated their region wide non-motorized plan in 2017. This is a 13-county plan which includes the WestPlan MPO.

System Operations

With so many road agencies and transit agencies responsible for their own portion of the transportation operations, it can be difficult to get a full picture of how the system operates. However, there are a number of examples showing the MPO is coordinating system level programs which enhance operations.

Traffic Count Program

One example of systems operation within the MPO is the coordination of traffic counting services. WMSRDC, operating as the administrative agency for the MPO, has taken the lead on a MPO-wide traffic count system. In addition to the traffic counting itself, the MPO has become the repository and access site for traffic counts within the MPO.

Every year the MPO contracts with a consultant to collect approximately 100 traffic counts. Once completed these counts are uploaded onto a user friendly database site which can be accessed through

WMSRDCs website. A portion of the counts which are collected are classification counts. These counts are used to enhance data and maximize the use of count locations.

In 2020, the MPO began cooperating with MDOT with the goal of integrating WestPlan traffic counts onto the State of Michigan's traffic count database.

Air Quality Program

Another example of systems operations within the MPO is the Air Quality program which is coordinated by WMSRDC. WMSRDC is a member of the West Michigan Clean Air Coalition (WMCAC). Formed in 1995, the WMCAC is a partnership of businesses, academic institutions, government agencies, industries, and non-profit organizations in Kent, Ottawa, Muskegon, and Kalamazoo counties working together to achieve cleaner air in the region through the education and promotion of voluntary emission reduction activities. The WMCAC coordinates with adjacent MPOs, including GVMC and the MACC.

The coalition works to educate the public and to promote voluntary emission reduction activities. Individuals and businesses can help the coalition by making clean air choices on Clean Air Action Days. The coalition attempts to limit the health and environmental damage that excessive ground level ozone can cause by encouraging organizations and the general public to alter their lawn maintenance activities, refueling habits, and travel methods. West Michigan residents can stay informed about air quality year round by visiting the WMCAC's website at www.wmcac.org.

A Clean Air Action Day is called when weather forecasters have predicted that conditions will be conducive to the formation of ozone or fine particulate matter. On a Clean Air Action Day, West Michigan residents are being asked to take certain voluntary actions to protect their health and reduce emissions.

Highways Performance Monitoring System

The Highways Performance Monitoring System (HPMS) program is a national highway information system that monitors data on the extent, condition, performance, use, and operating characteristics of the nation's highways. HPMS data is used extensively at the federal level in the analysis of highway system condition and performance, but more importantly in the appropriation of Federal Highway dollars and in support of federal efforts to secure increased transportation funding.

Trends and Issues Affecting Regional Transportation

As has previously been discussed, there are a number of trends and issues which affect transportation within the WestPlan MPO.

Port Access and Expansion

As identified in **Chapter 7: Inventory of Existing Transportation System**, both the City of Grand Haven and the City of Muskegon have deep-water ports. Due to changes in ownership of waterfront parcels, as well as the closing of the Consumers Energy Cobb plant, there is a great deal of concern within the MPO about the future of port freight movement on Muskegon Lake.

The City of Muskegon will continue to promote their Master Plan goal of shifting industrial uses toward the east end of Muskegon Lake. This effort includes the potential swap of public land at the east end of the lake with privately owned land on the waterfront closer to downtown and known as the Third Street Wharf. The land swap has the potential to impact water and land transportation and will create more direct vehicular and pedestrian access to the waterfront and the downtown core, as well as additional dock space for both commercial and recreational uses. Potential uses at the Third Street Wharf include a cruise ship dock, transient boat slips, a pedestrian walkway to the shore, and other recreational uses. Aggregate shipping and storage would likely be moved to the east end of the lake.

Transit

Another concern which continues to be discussed is the lack of transit connections, not only connecting to areas outside the MPO, but internal connections as well. Currently, the Muskegon Area Transit System operates within Muskegon County and the Harbor Transit Multimodal Transportation System operates in northern Ottawa County. Several years ago, Harbor Transit added Spring Lake Township to their service area so the two service areas are now adjacent. Services remain unconnected however, so at this time there is no connection between the routes of the two systems. It is the position of the Policy Committee that such a connection is important to the communities and citizens of the MPO and request that Harbor Transit and MATS negotiate a connection.

The Muskegon Area Transit System is currently engaged in a Route Study and Comprehensive Operational Analysis that will help establish priorities for transit service in the county. The aim of this study is to help identify the strengths and weaknesses of the existing transit network, and highlight opportunities for service improvement and expansion.

Secondly, there is a lack of connections between transit systems in the MPO and other population/job centers/medical areas. Specifically, area leaders are interested in a connection between the Muskegon and Grand Haven areas. There are currently ongoing discussions regarding the connection between MATS and Harbor Transit. There have also been discussions regarding connections between the Muskegon/Northern Ottawa MPO area with Grand Rapids and Holland. While a study has been completed showing that such routes are not feasible, there continues to be interest in the subject.

The existing transit systems are further detailed in **Chapter 7: Inventory of Existing Transportation System**.

Passenger Rail Issues

WestPlan continues to keep abreast and participate in the Westrain Collaborative. Westrain is a coalition of public and private organizations and interested individuals along the Amtrak Pere Marquette line (Grand Rapids, Holland, Bangor, and St. Joseph/Benton Harbor) in Michigan. The group exists to preserve and promote passenger rail in West Michigan. With funding provided by the State of Michigan and matched by Westrain members, the Collaborative undertakes local marketing activities and initiatives. Promotion of passenger rail (Amtrak) service in the Muskegon/Northern Ottawa area is provided through WestPlan's continued participation in the Westrain Collaborative.

A continued interest remains in some type of connection in the MPO to passenger rail service. Currently, the closest service to passenger rail is Amtrak in Holland and Grand Rapids. Currently existing is a direct Greyhound bus route from Muskegon to Grand Rapids and an indirect route to Holland via a transfer in Grand Rapids.

Environmental/Livability Issues/Climate Change

The impacts of transportation projects on the environment and livability of the WestPlan area were identified as a concern by members of the public.

There are a number of potential impacts of climate change on transportation infrastructure, including: accelerated pavement deterioration, flooded roadways, bridge damage/repairs, shoreline erosion, increased maintenance, and increased storm-water and drainage issues.

Environmental issues including livability and climate change are factors which are evaluated during the project selection process. During the goal setting process, outlined in **Chapter 3**, both the Technical and Policy Committees selected the following goal related to Sustainability and Livability as one of their six goals:

Goal: Ensure that transportation investments protect and enhance the environment, promote energy conservation, improve quality of life, and promote consistency with state and local planned growth and economic development

Air Quality

Air quality continues to be an issue in the MPO and West Michigan due to the area's proximity to Lake Michigan and southwest winds coming across the lake. The air quality monitor in Muskegon County (located in Laketon Township) is violating the 2015 National Ambient Air Quality Standard (NAAQS) for ozone. Due to this, part of Muskegon County is designated a nonattainment area for the 2015 NAAQS and the entire county is a maintenance area for the 1997 ozone NAAQS. Ottawa County meets the 2015 NAAQS, but remains a maintenance area for the 1997 ozone NAAQS. The air quality conformity documents are included in the Appendix to this document.

Funding

The lack of adequate funding levels was another issue which was brought up by members of the public at multiple meetings throughout the process of creating the LRTP. Specifically, a desire to see Act 51 revisited was mentioned often. An in depth look at funding is examined in **Chapter 13: Financial Resource Analysis**. In particular, the lack of funding for local roads was seen as impacting the transportation system as a whole. Although the financial analysis shows that the 2045 LRTP is financially constrained, there is not enough funding available to adequately maintain the transportation system.

CHAPTER 10: TRAVEL DEMAND MODEL

Travel demand forecasting models (TDMs) are a major analysis tool for the development of long-range transportation plans. These mathematical models are designed to calculate the number of trips, connect their origins and destinations, forecast the mode of travel using projected socio-economic data, and identify the roadways or transit routes most likely to be used in completing a trip. Models are used to determine where future transportation problems are likely to occur, as indicated by modeled roadway congestion. Once identified, the model can test the ability of roadway and transit system improvements to address those problems.

The urban area travel demand modeling process for the Muskegon County and Northern Ottawa County area was a cooperative effort between WestPlan, being the MPO, and the MDOT Statewide and Urban Travel Analysis Section. MDOT provided the lead role in the process and assumed responsibility for modeling activities with both entities reaching consensus on selective process decisions. The local transportation planning agency is the MPO, comprised of representatives of local governmental units and is the umbrella organization responsible for carrying out transportation planning in cooperation with MDOT and the FHWA. This is typically accomplished by full coordination of the local agencies with the MPO.

The results of the modeling effort provide an important decision-making tool for the MPO LRTP development as well as any transportation related studies that might follow. The modeling process is a systems-level effort. Although individual links of a highway network can be analyzed, the results are intended for determination of system-wide impacts. At the systems level, impacts are assessed on a broader scale than the project level.

The travel demand modeling for WestPlan has been completed using TransCAD software utilized by MDOT. The model is a computer simulation of current and future traffic conditions and is a system-level transportation planning model.

The current WestPlan model was developed for the 2015-2045 plan. The boundary includes all of Muskegon County and the northwestern portion of Ottawa County that is in the WestPlan Planning Boundary.

Phases of the Model

Data Collection: Socio-economic and facility inventory data are collected.

Trip Generation: The model generates a synthetic population of households based on the aggregate characteristics of the population encoded in the traffic analysis zones (TAZ). The level of vehicle ownership is also applied to the household.

Trip Distribution: The number of trips for various purposes (work, school, other, etc.) predicted for each household. The trips produced in each TAZ are distributed to all other TAZs based on attractiveness of the zone.

Mode Choice: Person trips are assigned to a mode of travel such as drive alone, shared ride 2 persons, shared ride 3+ persons, and transit. The dominant mode of travel (private automobile, bus, walking/biking) is modeled for the household's trip of each purpose.

Traffic Assignment: Trips are assigned to the roadway network and routes are chosen such that travelers minimize their travel time and costs.

Model Calibration/validation: Verifying volumes (trips) simulated in traffic assignment replicate observed traffic counts.

System Analysis: Testing alternatives and analyzing changes in order to improve the transportation system.

Components of the Model

Traffic Analysis Zone (TAZ):

The Traffic Analysis Zone (TAZ) is the primary geographical unit of analysis of the travel demand model and it represents the origins and destinations of the travel activity within the model area. TAZs are determined based upon several criteria including similarity of land use, compatibility with jurisdictional boundaries, presence of physical boundaries, and compatibility with the road system. Streets and natural features such as rivers are generally utilized as zone boundary edges. TAZs vary in size depending on population, employment, and road network density. The WestPlan region is divided into 706 TAZs along with 30 external zones. Each TAZ includes population and employment data (aggregated from census blocks) which is fed into the Travel Demand Model.

Road Network:

Using the TransCAD software, a traffic network is built to represent the existing road system. The WestPlan Model network is based on the Michigan Geographic Framework and includes most roads within the study area classified as a minor collector or higher by the national functional classification system. Other roads are added to provide continuity and/or allow interchange between these facilities.

Transportation system information or network attributes required for each link include facility type, area type, lane width, number of through lanes, parking availability, national functional classification and traffic counts (based on availability). The network attributes were provided by MDOT staff and reviewed by the MPO and Technical Advisory and Policy Committees. Link capacities and free flow speeds are determined based on network attributes such as national functional classification, facility type, and area type. These features of the road network are used in the traffic assignment process and in determining traffic conditions. The link capacity was determined by utilizing a look up table developed as part of the Urban Model Improvement Project undertaken by MDOT Urban Travel Analysis Staff. The table is based on the highway capacity manual taking into account the network attributes and sets a capacity that would approximate a level of service "E". This level of service is characterized by: stop-and–go-travel, reduced flow rates and severe intersection delays. A volume to capacity ratio of one or greater would represent a level of service E or greater which typifies unacceptable or deficient traffic conditions.

The two data systems, the zone system (socio-economic data), and the street system (network) are interrelated through the use of centroids. Each zone is portrayed on the network by a point (centroid) which represents the weighted center of activity for that zone. A centroid is connected by a set of links to the adjacent street system. That is, the network is provided with a special set of links for each zone which connects the zone to the street system. Since every zone is connected to the street system by centroid connectors, it is possible for trips from each zone to reach every other zone by way of a number of paths through the street system.

The WestPlan 2015 calibrated/validated network includes approximately 950 miles of roadway (excluding centroid connectors) with the following classifications:

- 86 miles of Freeways (trunklines)
- 21 miles of Ramps (trunklines)
- 96 miles of Other Principal Arterials
- 229 miles of minor arterials
- 377 miles of major collectors
- 141 miles of minor collectors and local roads

Socio-Economic Data and Population Synthesis

Travel demand models are driven, in part, by the relationship of land use activities and characteristics of the transportation network. Inputs to the modeling process include the number of households, population-in households, vehicles, and employment located in a given TAZ. These characteristics are generally referred to as socio-economic data (SE-Data). The collection and verification of the SE-Data was a collaborative effort between WestPlan, MPO committee members, and MDOT.

For the base year of the model, household, population, and employment data from the 2010 U.S. Census, the 2015 American Community Survey, and the Nielson employment databases were presented to the MPO and Technical Advisory and Policy Committees. Committee members were asked to provide detailed information about new development and where employers or population had been reduced. TAZs were created from the 2010 census blocks and constrained by the network, Minor Civil Division (MCD) boundaries, and physical barriers. Values for population and occupied households were aggregated from the 2010 census blocks. MDOT staff used this and MCD projections, as well as input from MPO staff and local officials, to develop the TAZ values for the forecast years of 2020, 2025, 2035 and 2045. The TAZ values were then reviewed by local agencies and MPO staff and approved through the MPO committee process.

The Nielsen Company and Hoovers, Inc. are both private market research firms providing several consumer and business databases which are continuously updated and regularly verified. MDOT purchased geocoded business employment data from both firms and then merged the files into a single MDOT employment database. This data includes the physical street address, employment level, and NAICS code for each record. MDOT cleaned this merged database by researching and editing records with missing or incorrect addresses, incorrect NAICS codes, duplicate records, and incorrect employment levels. This base year employment data was reviewed by local agencies and MPO staff and approved through the MPO committee process.

WestPlan members and local officials submitted information on planned future development which was incorporated into the base year data. This allowed known future development to be placed into the correct TAZ. Socio-economic data was then projected out to 2045 utilizing the 2015 TAZ data. Future year employment was distributed into each zone using a weighted average by current number of employees plus known development. WestPlan staff and committees reviewed the estimates and projections and made adjustments given their local knowledge and greater understanding of the unique local circumstances in each TAZ.

The WestPlan travel demand model generates a synthetic population of households based on the demographic information associated with the traffic analysis zones. For each zone, individual households are created. Each household has a total number of persons, workers and students. Each household also has an income variable that indicates whether the household belongs to the lower, middle, or upper income category. The number of vehicles available to each household is modeled separately, after the population synthesis, based on these variables and other variables describing the zone in which the household is located.

Trip Generation

The trip generation process calculates the number of person-trips produced from or attracted to a zone, based on the socio-economic characteristics of that zone. The relationship between person-trip making and land activity are expressed in equations for use in the modeling process. The formulas were derived from MI Travel Counts, Michigan travel survey data, and other research throughout the United States. Productions were generated with a cross-classification look-up process based on household demographics. Attractions were generated with a regression approach based on employment and household demographics. In order to develop a trip table, productions and attractions must be balanced. Walk/bike trips are calculated using a factor for each trip purpose derived from the MI Travel Counts travel survey data. The walk/bike trips are removed from the production/attraction table before trip distribution is performed. The WestPlan travel demand model also has a simple truck model that estimates commercial and heavy truck traffic based on production and attraction relationships developed from the Quick Response Freight Manual (QRFM). The QRFM uses the employment data from the TAZ layer in calculating the percentage of trucks.

Trips that begin or end beyond the study area boundary are called external trips. These trips are made up of two components: external to internal (EI) or internal to external (IE) trips and through-trips (EE). EI trips are those trips which start outside the study area and end in the study area. IE trips start inside the study area and end outside the study area. EE trips are those trips that pass through the study area without stopping; this matrix is referred to as the through-trip table.

Shared External Stations

WestPlan is located adjacent to two other MPOs: the Macatawa Area Coordinating Council (MACC), which is the designated MPO for the greater Holland-Zeeland area, and the Grand Valley Metropolitan Council (GVMC), which is the designated MPO for the greater Grand Rapids-Wyoming area. As shown in **Table 9** the southernmost boundary of the WestPlan travel demand model shares four external stations with the MACC model. The most eastern WestPlan model boundary shares 13 external stations with the

GVMC model. **Table 10** below provides all external stations and with what MPO they are shared with, if applicable.

All three model area boundaries meet primarily within Ottawa County. In addition, there are several unique travel characteristics in and around Ottawa County that justifies coordination of external stations between the three MPOs. This includes:

- Limited crossings over the Grand River, which runs east to west in the northern half of the county (A bridge closure or congestion in one area may affect the trip patterns and/or volumes of another bridge or corridor in the adjacent MPO models.)
- Regional trip relationships between the three MPO areas, such as commuters travelling from Holland to Muskegon, or Muskegon to Grand Rapids
- Major corridors, such as M-231, 120th Ave, Fillmore Ave, M-45 (Lake Michigan Dr.), I-96, etc., are near or extend into adjacent MPO models
- Land-use patterns and socio-economic changes that impact or change regional travel

As such, it was determined that using uniform volumes and growth rates at the shared external stations, for all modeled years, should be used. This allows larger regional changes in one model area to affect travel behavior in the adjacent MPO models. The volumes and growth rates were developed and coordinated between the three MPOs, MDOT-Statewide and Urban Travel Analysis (SUTA), and the MDOT-Grand Region.

The external station trip distributions were developed primarily based on subarea analysis from the MDOT Statewide travel demand model. Socio-economic trends, such as employment and housing, and travel pattern analysis guided the development of growth rates for the shared external stations, in addition to analysis from the statewide model. In some instances, the trip pattern distributions between shared external stations were adjusted in the model future years, because of known land-use or roadway changes.

Table 9: WestPlan and MACC Shared External Stations

Road Name	National Functional Class	Location
Lakeshore Dr	Major Collector (NFC #5)	Grand Haven Twp
US-31	Other Principal Arterial (NFC #3)	Grand Haven Twp
120th Ave	Major Collector (NFC #5)	Robinson Twp
96th Ave	Major Collector (NFC #5)	Robinson Twp

Table 10: WestPlan and GVMC Shared External Stations

Road Name	National Functional Class	Location
Fillmore St	Local Road (NFC #7)*	Robinson Twp
M-45 / Lake Michigan Dr	Other Principal Arterial (NFC #3)	Robinson Twp
Bass Dr	Major Collector (NFC #5)	Robinson Twp
Leonard St	Major Collector (NFC #5)	Robinson Twp
I-96	Interstate Freeway (NFC #1)	Robinson Twp
Cleveland St	Major Collector (NFC #5)	Robinson Twp
Moorland Rd / 80th Ave	Minor Collector (NFC #6)	Ravenna Twp
Ravenna Rd / 56th Ave	Major Collector (NFC #5)	Ravenna Twp
Ellis Rd / Gooding St	Major Collector (NFC #5)	Ravenna Twp
Harrisburg Rd / Truman St	Major Collector (NFC #5)	Ravenna Twp
Trent Rd / 36th Ave	Major Collector (NFC #5)	Casnovia Twp
M-37 / M-46 / Apple Ave	Minor Arterial (NFC #4)	Casnovia Twp
Bailey Rd / 21 Mile Rd	Minor Collector (NFC #6)	Casnovia Twp

Trip Distribution

Trip distribution involves the use of mathematical formula which determines how many of the trips produced in a TAZ will be attracted to each of the other TAZs. It is the process which connects productions to attractions, connecting the ends of trips produced in one zone to the ends of trips attracted to other TAZs. The equations are based on travel time between TAZs and the relative level of activity in each zone. Trip purpose is an important factor in development of these relationships. The trip relationship formula developed in this process is based on principals and algorithms commonly referred to as the gravity model.

The gravity model is the most widely used and documented technique originally derived from Newton's Law of Gravity. Newton's Law states that the attractive force between any two bodies is directly related to the masses of the bodies and inversely related to the distance between them. Analogously, in the trip distribution model, the number of trips between two areas is directly related to the level of activity in an area (represented by its trip generation) and inversely related to the distance between the areas (represented as a function of travel time).

Research has determined that the pure gravity model equation does not adequately predict the distribution of trips between zones. The value of time for each purpose is modified by an exponentially determined "travel time factor" or "F factor", also known as a "friction factor." Friction factors represent the average area-wide effect that various levels of travel time have on travel between zones. They were developed using an exponential function described in the Travel Estimation Techniques for Urban Planning, NCHRP 716 and calibrated to observed trip lengths by trip purpose derived from the MI Travel Counts travel survey data. The friction factor matrix is generated in TransCAD during the gravity model process.

The primary inputs to the gravity model are the normalized productions and attractions by trip purpose developed in the trip generation phase. The second data input is a measure of the temporal separation between TAZs. This measure is an estimate of travel time over the transportation network from TAZ to TAZ, referred to as "skims." In order to more closely approximate actual times between TAZs and to account for the travel time for intra-zonal trips, the skims were updated to include terminal and intra-zonal times. Terminal times account for the non-driving portion of each end of the trip and were generated from a look-up table based on area type. They represent that portion of the total travel time used for parking and walking to the actual destination. Intra-zonal travel time is the time of trips that begin and end within the same zone. Intra-zonal travel times were calculated utilizing a nearest neighbor routine.

The gravity model utilizes the by trip purpose Productions and Attractions, the by trip purpose friction factors, and the travel times, including terminal and intra-zonal. The output is a TAZ to TAZ matrix of trips for each trip purpose.

Mode Choice

The number of person trips and their trip starting and ending point have been determined in the trip generation and trip distribution steps. The mode choice step determines how each person trip will travel. The WestPlan travel demand model uses a simplified mode choice to predict mode choice.

The process uses a qualitative measure of transit network service at the zonal level to estimate transit mode shares. Transit shares are a function of trip purpose, production zone average autos per household and attraction zone area type. Transit service is represented with zonal yes/no flags, so transit shares are only estimated where both the production zone and attraction zone have transit service.

Auto mode shares are a function of trip purpose, production zone average autos per household, attraction zone area type, and trip distance. The split between single occupancy vehicles (SOV) and shared ride trips (SR2 & SR3+) is based on the average auto occupancy for the applicable trip purpose. The output to this step is a vehicle trip matrix by trip purpose. The external trips and the truck trips, which are originally developed as vehicle trips eliminating the need of the mode choice step for these trip purposes, are added to the vehicle trip matrix.

Traffic Assignment

Traffic assignment is the final step in the traditional four step TDM process. In this step, trips are assigned to a route, or path, on the roadway network between each trip origin and destination. The basic premise of

trip assignment is that trip makers will choose the best path between each origin and destination. The determination of the best path is based upon selecting the route with the least impedance. Impedance, in this application, is based upon travel time – calculated as a function of link distance and speed (and later as a function of link volume and capacity). Speeds used to calculate minimum travel times are based on each link's area type, facility type, number of travel lanes, lane width, and parking. Speeds represent a relative impedance to travel and not posted speed limits. Essentially, trip makers on the roadway network will choose the route, between each trip origin and destination, which minimizes travel time.

The User Equilibrium algorithm (a commonly used algorithm) was employed in the WestPlan traffic assignment component. User equilibrium is based on the principle that while selecting the best route, trip makers will use all possible paths between an origin and destination that have equal travel time – so that altering paths will not save travel time. This algorithm attempts to optimize the travel time between all possible paths, reflecting the effects of system congestion.

The product of the traffic assignment component is a series of vehicle-trip (volume) tables, by mode, for each link in the model roadway network. These assigned link volumes are then compared to observed traffic data as part of the model calibration, validation and reasonability checking phase of the overall modeling process.

The WestPlan travel demand model has 4 time periods that were developed to match the peak periods observed in traffic counts. The following period were used:

AM Peak (7:00am – 9:00am)
Mid-Day (9:00am – 3:00pm)
PM Peak (3:00pm – 6:00pm)
Off Peak (6:00pm – 7:00am)

A fixed time of day factor method was utilized. The factors were developed from the MI Travel Counts Michigan travel survey data and vary by trip type. Default factors from the Quick Response Freight Manual I (QRFM I) were used for truck trips.

Model Calibration/Validation

The outputs of each of the four main steps, Trip Generation, Trip Distribution, Mode Choice and Assignment, are checked for reasonableness against national standards. Modifications can be made at each step before moving on to the next.

The final model calibration/validation verifies that the assigned volumes simulate actual traffic counts on the street system. When significant differences occur, additional analysis is conducted to determine the reason. At this time, additional modifications may be made to the network speeds and configurations (hence paths), trip generation (special generators), trip distribution (F factors), socio-economic data, or traffic counts.

The purpose of this model calibration phase is to verify that the base year assigned volumes from the traffic assignment model simulate actual base year traffic counts. When this step is completed, the systems model is considered statistically acceptable. This means that future socio-economic data or future

network capacity changes can be substituted for base (existing) data. The trip generation, trip distribution, mode choice and traffic assignment steps can be repeated, and future trips can be estimated for systems analysis. It is assumed that the quantifiable relationships modeled in the base year will remain reasonably stable over time.

Applications of the Calibrated/Validated Model

Generally, three distinct alternative scenarios are developed for a LRTP:

1. Simulated Base Year (2015) volumes assigned to the Base Year (2015) Roadway Network: This scenario includes the assignment of 2015 model volumes, generated using 2015 SE data, onto the roadway network representing 2015 conditions. This is referred to as the validated, existing network scenario, or base-year alternative, and is a prerequisite for the other two scenarios.

2. Simulated Forecast Year volumes assigned to a Modified Base Year Roadway Network: This scenario includes the assignment of 2045 volumes, generated using 2045 SE data, onto an amended roadway network representing 2015 conditions, and including any improvements completed since 2015 and future (near term) improvements for which funds have been committed. This alternative characterizes future capacity and congestion problems if no further improvements to the transportation system are made. This deficiency analysis on the existing plus committed (E+C) network is also called the "do nothing", or "no-build" alternative, and includes only the E+C roadway system.

3. Simulated Forecast Year (e.g. 2045) volumes on a proposed Forecast Year (e.g. 2045) Roadway Network: this scenario includes the assignment of 2045 volumes, generated using 2045 SE data, onto the roadway network as it is proposed to exist in the forecast year of 2045. This scenario is the long range transportation plan "build" alternative. It includes the E+C roadway network, plus proposed capacity improvement and expansion projects.

System Analysis

Once the base and future trips have been estimated, a number of transportation system analyses can be conducted:

- Roadway network alternatives to relieve congestion can be tested as part of the LRTP. Future traffic can be assigned to an amended, existing roadway network (i.e. “No Build” Network) to represent the future impacts to the transportation system if no improvements were made. From this, improvements and/or expansions can be planned that could help alleviate demonstrated capacity issues.
- Traffic impacts of roadway changes, such as adding or reducing capacity, can be assessed. Some roadway operational improvements can also be included in these types of analyses, such as the addition of weave-merge lanes or roundabouts.
- Individual links can be analyzed to determine which TAZs are contributing to the travel on that link (i.e. the link's service area). This can be shown as a percentage breakdown of total link volume.
- The impacts of land use changes on the roadway network can be evaluated (e.g. impact of a new major retail establishment).

- Road closure/detour evaluation studies can be conducted to determine the effects of closing a roadway and detouring traffic during construction activities. This type of study is very useful for construction management.

Congestion Analysis

With the completion of the travel demand model, areas of potential congestion in the roadway network were identified based on the volume to capacity ratios of the links. This means that the higher the V/C ratio, the higher the chances are that the roadway may experience congestion. The regional travel demand model identifies areas where traffic congestion is expected and produces a list of roadway segments that are congested or are close to capacity in the years 2015 and 2045.

The volume to capacity ratio reflects a volume for a specified time period and a capacity for that same period of time. It does not reflect areas that experience brief congestion at certain short time periods or because of roadway geometrics, or roadway condition. Congested areas are identified in the table and attached maps below.

The Travel Demand Model provided by MDOT provides a list of segments where congestion may occur through 2045. Congestion occurs when traffic volumes approach or exceed volumes that the roadway is designed to handle safely. Each link was assigned a volume to capacity ratio for each of the scenarios listed above. The WestPlan Technical and Policy committees reviewed these modeling results and took them into consideration as the LRTP Improve and Expand project list was created.

Congested Segments

The Base Year scenario shows existing conditions of the area-wide transportation system as it was in 2015. There is little traffic congestion in majority of the WestPlan road network from the base year.

According to the model, the following corridors shown in ***Table 11*** are identified as nearing congestion for the base year (2015), with V/C ratio greater than 0.8. Highlighted corridors have a V/C ratio greater than 1.0.

Table 11: Base Year Congested Segments

AM Peak Period (7:00am-9:00am)		
Road Name	**Municipality**	**Extent**
North US 31/Holton Ramp	Dalton Twp	Off Ramp
Holton Rd (Southbound)	Dalton Twp	Bard to River Rd
Holton Rd / S US-31 Ramp	Dalton Twp	Entrance Ramp
South BR US 31/Norton	Norton Shores	South Seaway off ramp to Norton
Pontaluna Rd	Norton Shores	Grand Haven Rd to US-31
M-120 Causeway (Southbound)	Muskegon	Holton to Moses J Jones
Apple Ave	Muskegon Twp	US-31 to Shonat Rd
M-104 / Savidge	Spring Lake	US-31 to Lake Ave
US-31	Muskegon, Norton Shores	Laketon to I-96
M-104 / Savidge (Eastbound)	Spring Lake	West of School St
US-31	Grand Haven	Fulton St to Comstock St

PM Peak Period (3:00pm-6:00pm)		
Road Name	**Municipality**	**Extent**
North US 31/Holton Ramp	Dalton Twp	Off Ramp
South BR US 31/Norton	Norton Shores	South Seaway off ramp to Norton
Pontaluna Rd	Norton Shores	Grand Haven Rd to US-31
M-120 / Causeway (Northbound)	Muskegon	Holton to Moses J Jones
Apple Ave	Muskegon Twp	US-31 to Shonat Rd
US-31	Muskegon, Norton Shores	Laketon to I-96
M-104 / Savidge (Eastbound)	Spring Lake	West of School St
M-104 / Savidge	Spring Lake	US-31 to Lake Ave
US-31	Grand Haven	M-104 to Comstock St

Daily		
Road Name	**Municipality**	**Extent**
Pontaluna Rd	Norton Shores	Grand Haven Rd to US-31
M-104 / Savidge (Eastbound)	Spring Lake	West of School St
US-31	Grand Haven	M-104 to Comstock St

The maps on the following pages, shown in ***Figures 7, 8, and 9*** highlight corridors which are nearing congestion from the base year 2015 as shown by the travel demand model.

Figure 7: 2015 Daily Volume to Capacity

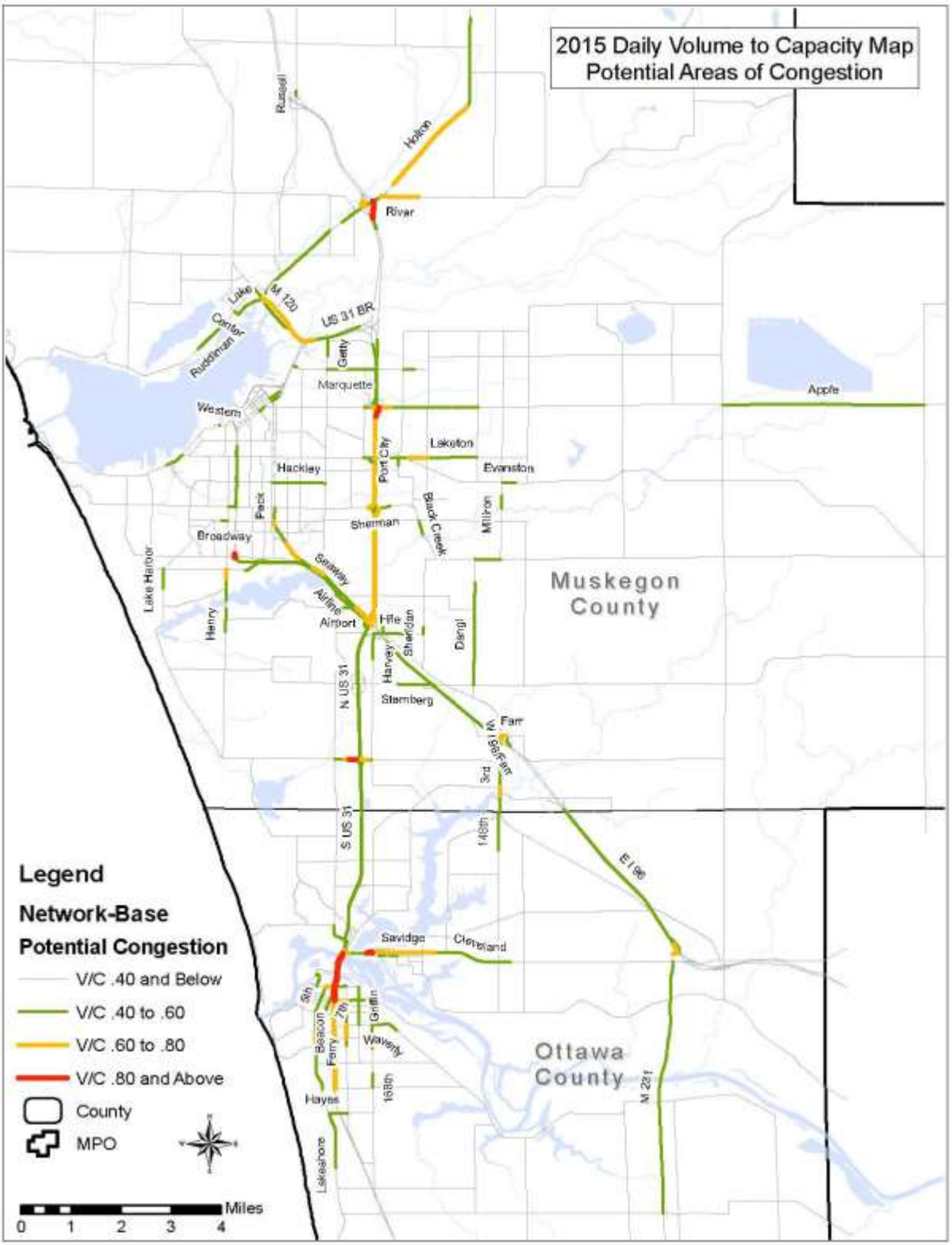


Figure 8: 2015 AM Flow

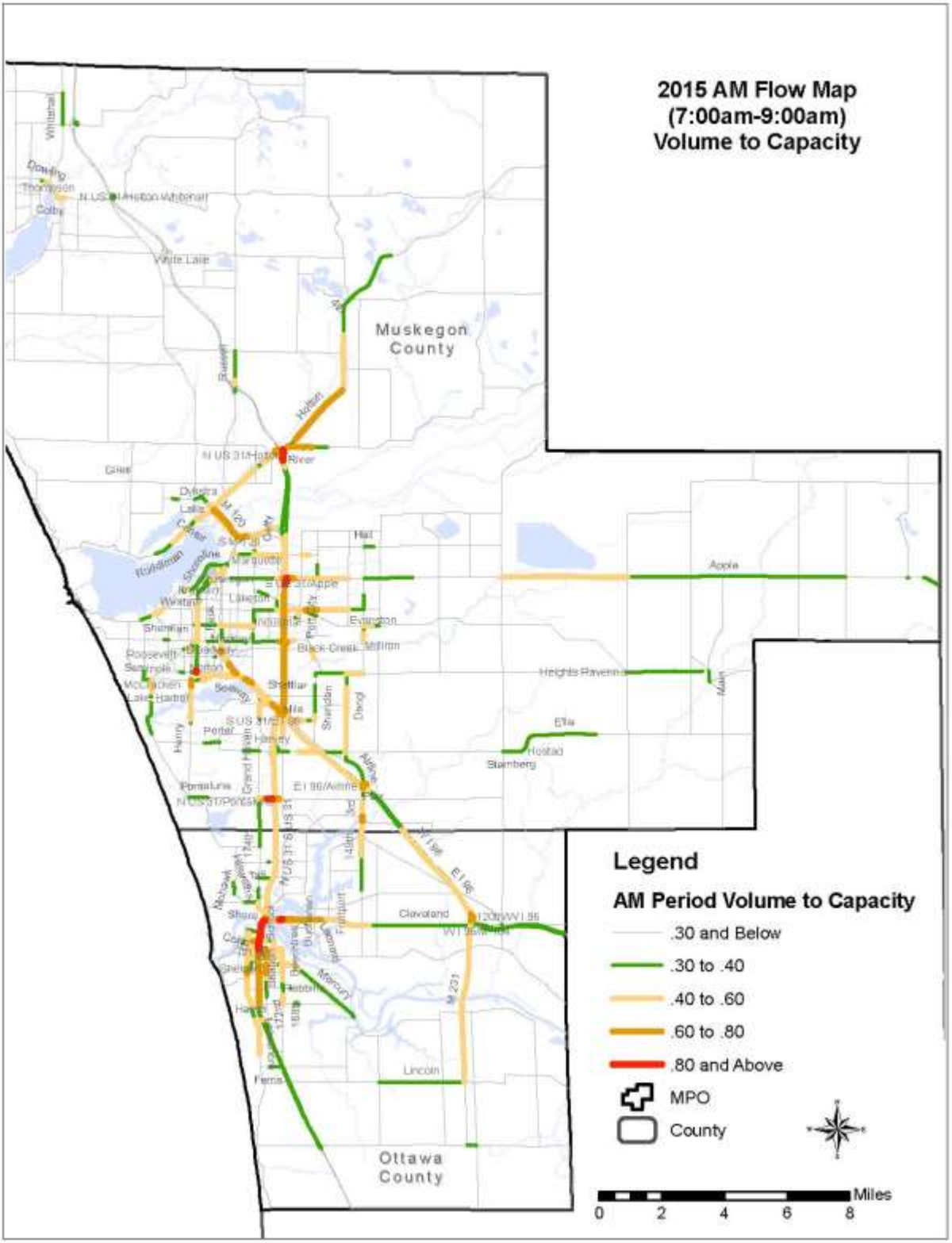
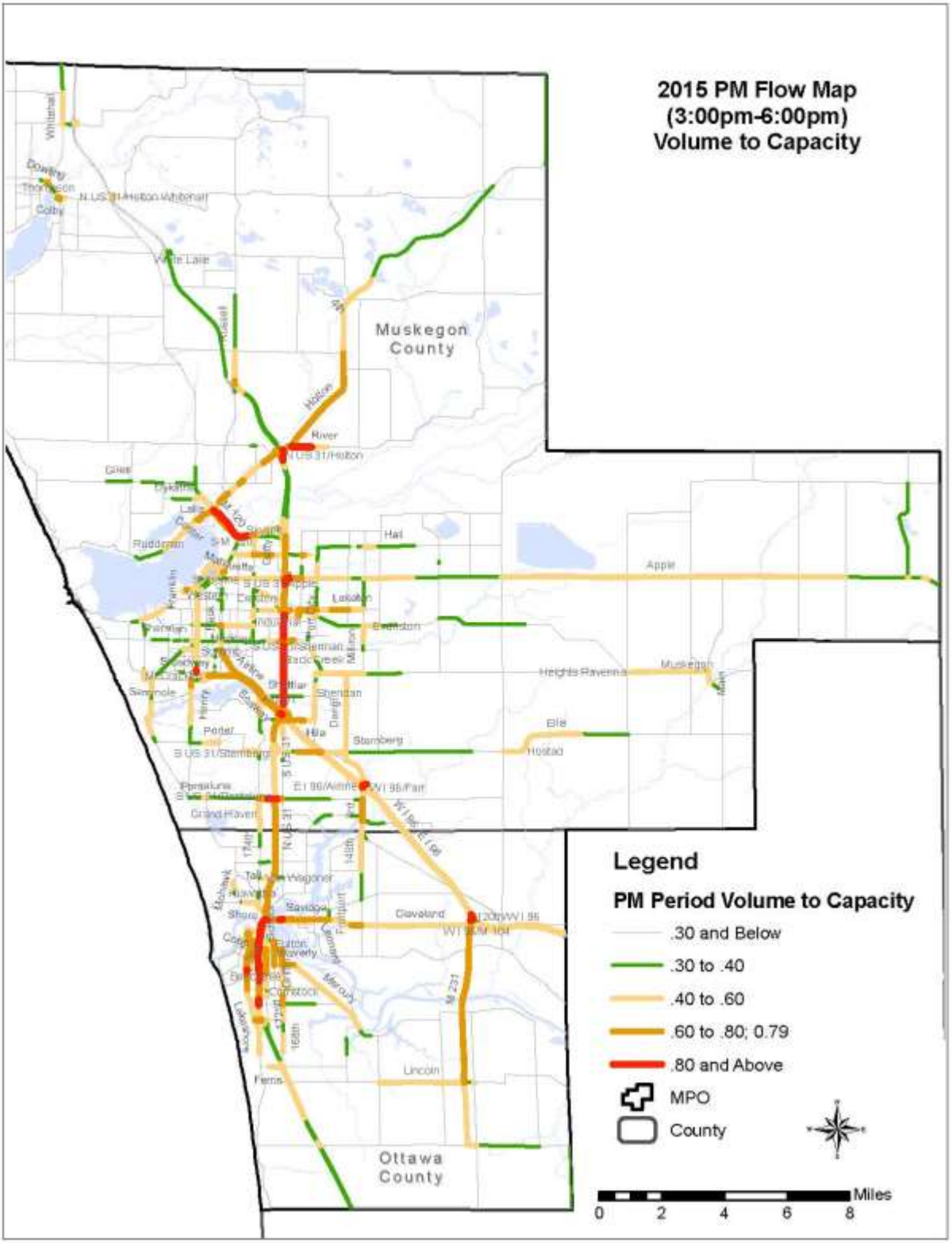


Figure 9: 2015 PM Flow



Future Congested Segments (2045)

The 2045 scenario shows forecasted conditions of the area-wide transportation system including both committed projects and proposed capacity improvements and expansion projects. In general, congestion increased slightly along the same corridors highlighted from the 2015 model results with additional corridors including M-231, M-104 through Spring Lake, roads parallel to US-31 in Grand Haven, I-96 at US-31 interchange, and US-31 from I-96 to Apple Ave including northbound exit ramps.

The corridors listed below in ***Table 12*** are identified as nearing congestion for the future (2045), with V/C ratio greater than 0.8. Highlighted corridors have a V/C ratio greater than 1.0.

Table 12: Future Congested Segments

AM Peak Period (7:00am-9:00am)		
Road Name	**Municipality**	**Extent**
N US-31 / Holton Rd Ramp	Dalton Twp	Exit Ramp
S US-31 / Holton Rd Ramp	Dalton Twp	Entrance Ramp
Holton Rd (Southbound)	Dalton Twp	Bard to River Rd
Russell Rd (Southbound)	Dalton Twp	E Bard to W Bard Rd
River Rd (Westbound)	Dalton Twp	Nielson Rd to Holton Rd
I-96 (East and West)	Norton Shores	At US-31 Interchange
South BR US 31/Norton	Norton Shores	South Seaway off ramp to Norton
US-31 (North and South)	Muskegon, Norton Shores	Apple to I-96
Pontaluna Rd	Norton Shores	Grand Haven Rd to US-31
M-120 / Causeway (Southbound)	Muskegon	Holton to Moses J Jones Pkwy
Apple Ave	Muskegon Twp	US-31 to Shonat Rd
N US 31/Apple Ramp	Muskegon Twp	Exit Ramp
N US 31/Laketon Ramp	Muskegon	Exit Ramp
N US 31/Sherman Ramp	Fruitport Twp	Exit Ramp
Hile Rd (Westbound)	Fruitport Twp	Wilfred to I-96
Farr Rd	Fruitport Twp	East of Airline Hwy
M-104 / Savidge	Spring Lake	US-31 to Lake Ave
Sheldon Rd	Grand Haven	Robbins to Park Ave
Ferry St	Grand Haven	Taylor to Washington Ave
US-31	Grand Haven	M-104 to Comstock St
M-231	Crockery Twp	I-96 to Lincoln St
E I-96 / 120th Ave Ramp	Crockery Twp	Exit Ramp to 120th Ave

PM Peak Period (3:00pm-6:00pm)		
Road Name	**Municipality**	**Extent**
N US-31 / Holton Rd Ramp	Dalton Twp	Exit Ramp
S US-31 / Holton Rd Ramp	Dalton Twp	Entrance Ramp
Russell Rd (Northbound)	Dalton Twp	E Bard to W Bard Rd
River Rd (Eastbound)	Dalton Twp	Nielson Rd to Holton Rd
I-96 (East and West)	Norton Shores	At US-31 Interchange
US-31 (North and South)	Muskegon, Norton Shores	Apple to I-96
South BR US 31/Norton	Norton Shores	South Seaway off ramp to Norton
Pontaluna Rd	Norton Shores	Grand Haven Rd to US-31
M-120 / Causeway (Northbound)	Muskegon	Holton to Moses J Jones Pkwy
Apple Ave	Muskegon Twp	US-31 to Shonat Rd
N US 31/Apple Ramp	Muskegon Twp	Exit Ramp
Hile Rd (Westbound)	Fruitport Twp	Wilfred to I-96
Farr Rd	Fruitport Twp	East of Airline Hwy
M-104 / Savidge	Spring Lake	US-31 to Lake Ave
Sheldon Rd	Grand Haven	Robbins to Park Ave
Ferry St	Grand Haven	Taylor to Washington Ave
US-31	Grand Haven	M-104 to Comstock St
M-231	Crockery Twp	I-96 to Lincoln St
E I-96 / 120th Ave Ramp	Crockery Twp	Exit Ramp to 120th Ave

Daily		
Road Name	**Municipality**	**Extent**
S US-31 / Holton Rd Ramp	Dalton Twp	Exit Ramp
E I-96 / 120th Ave Ramp	Crockery Twp	Exit Ramp to 120th Ave
I-96 (Eastbound)	Norton Shores	At US-31 Interchange
M-104 / Savidge	Spring Lake	US-31 to Lake Ave
US-31	Grand Haven	M-104 to Comstock St

The maps on the following pages in ***Figures 10, 11, 12, and 13*** highlight corridors which are nearing capacity and likely to become congested by the year 2045, as forecasted by the travel demand model.

Figure 10: 2045 PM No Build Model

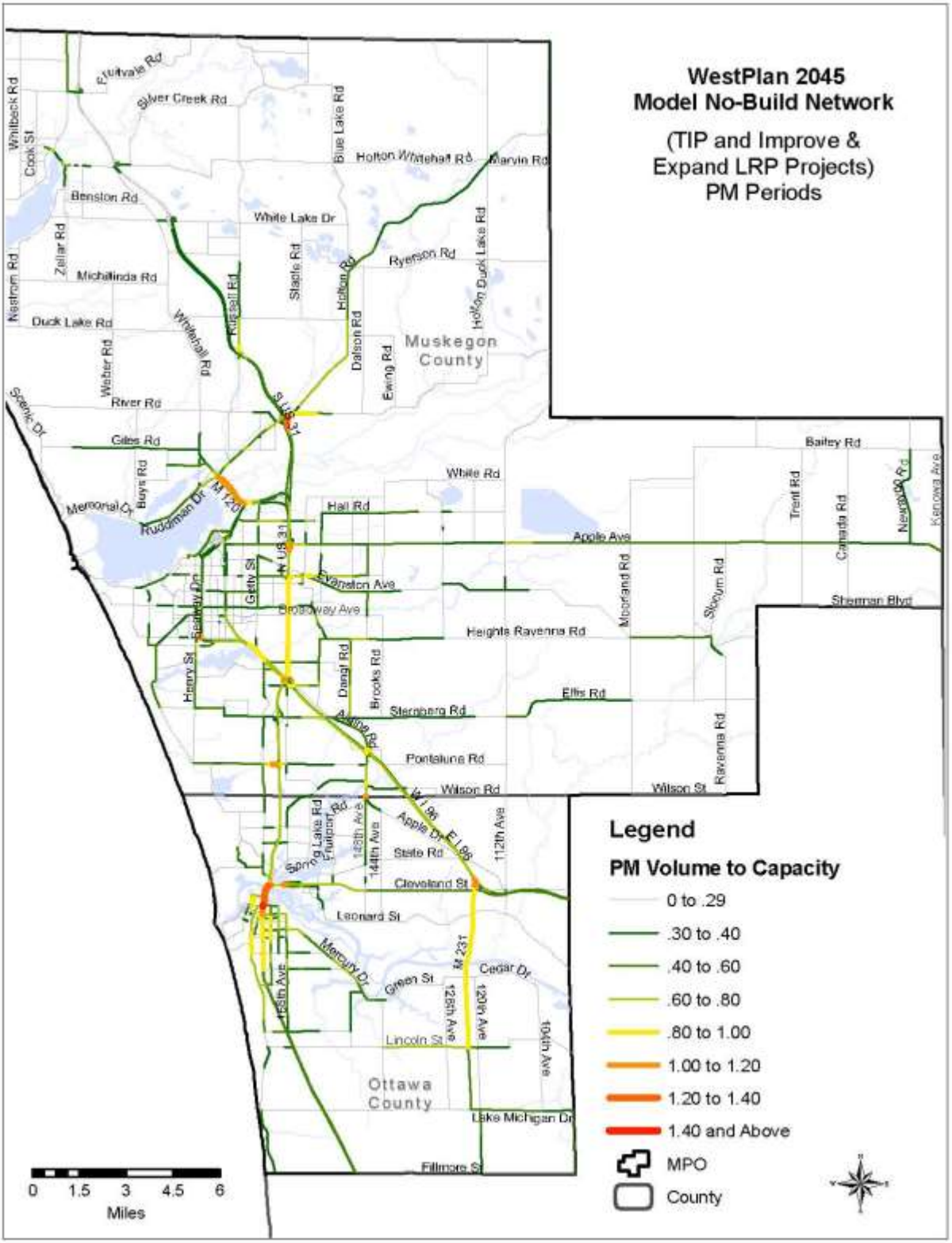


Figure 11: 2045 AM Build Model

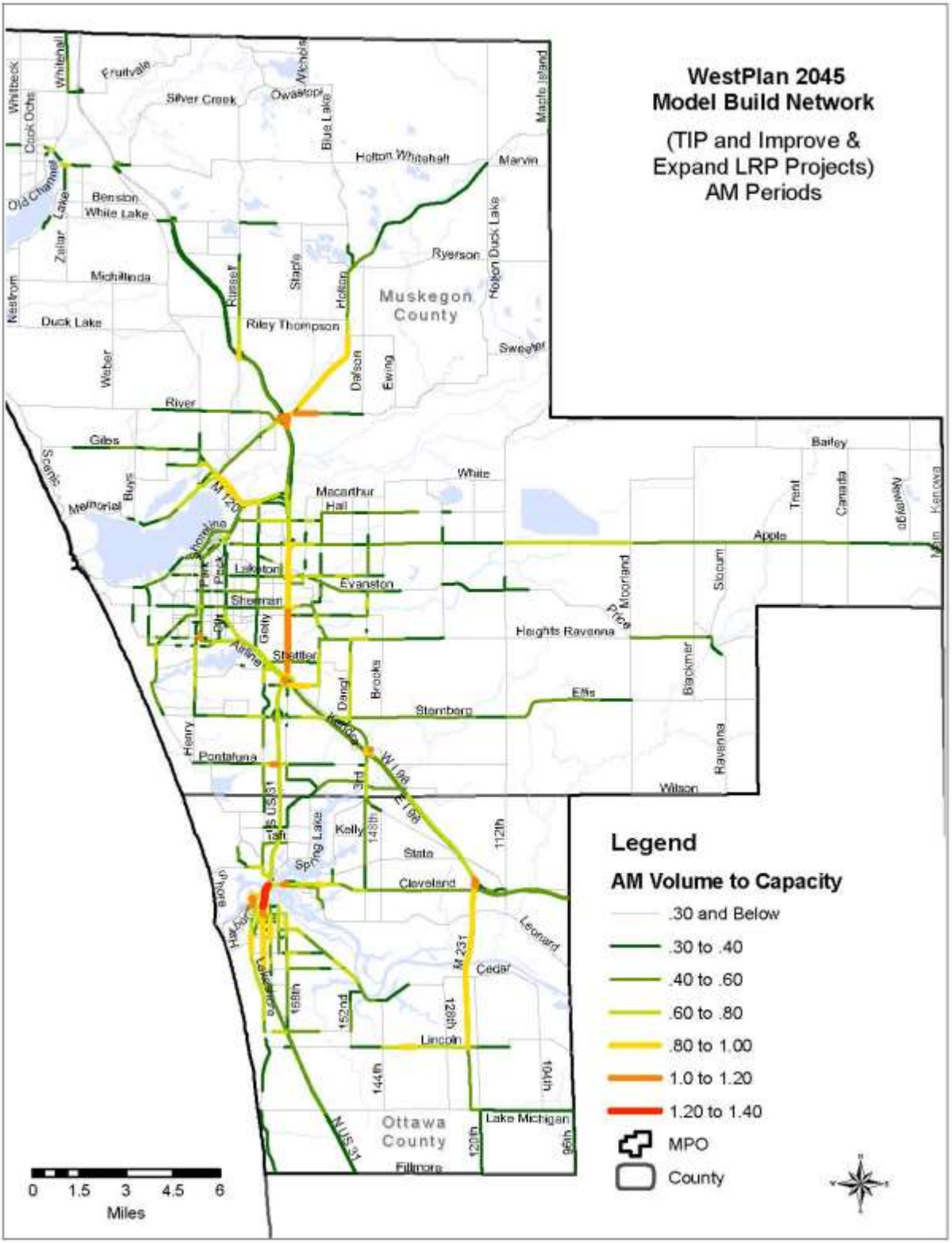


Figure 12: 2045 PM No Build Plus Committed Projects

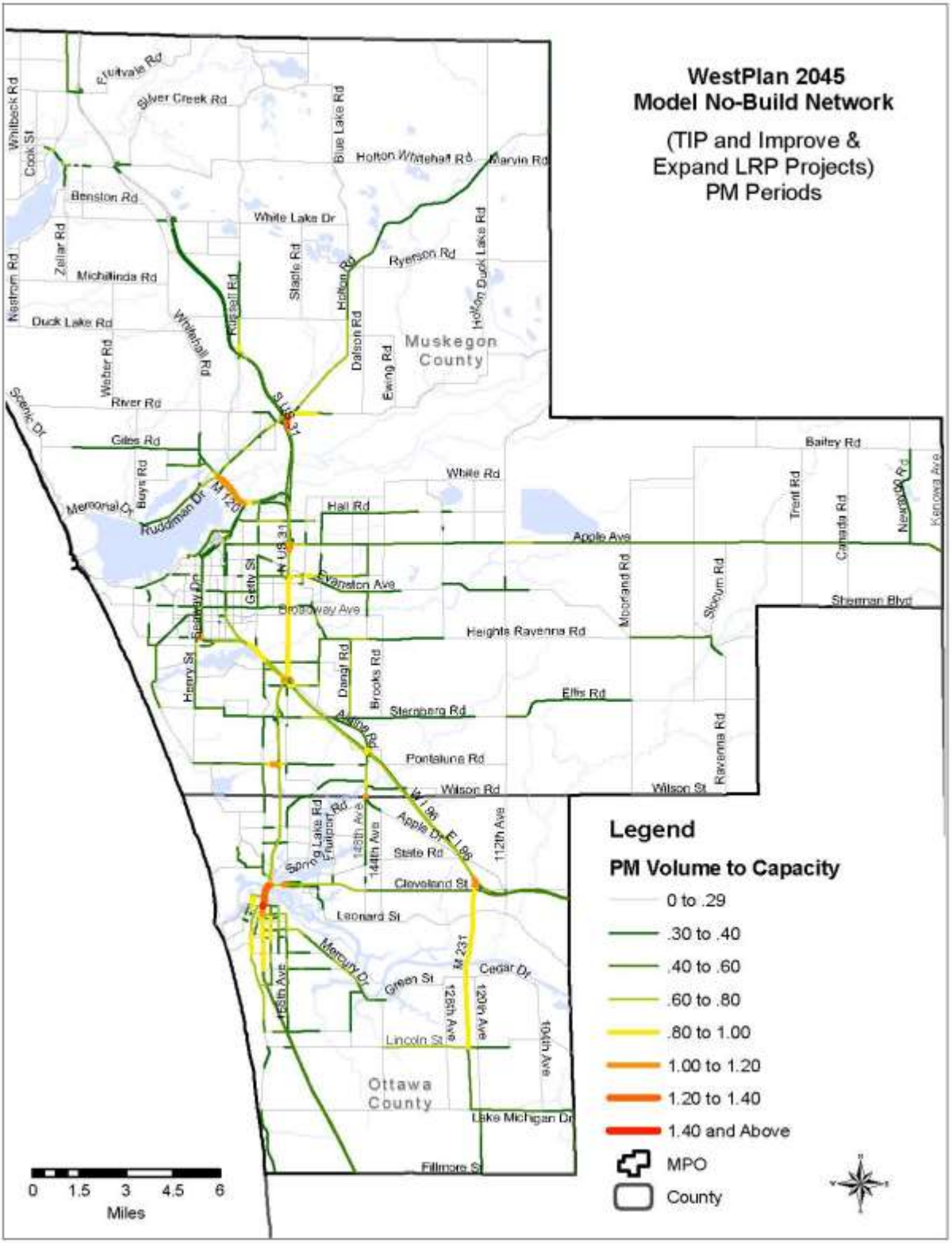
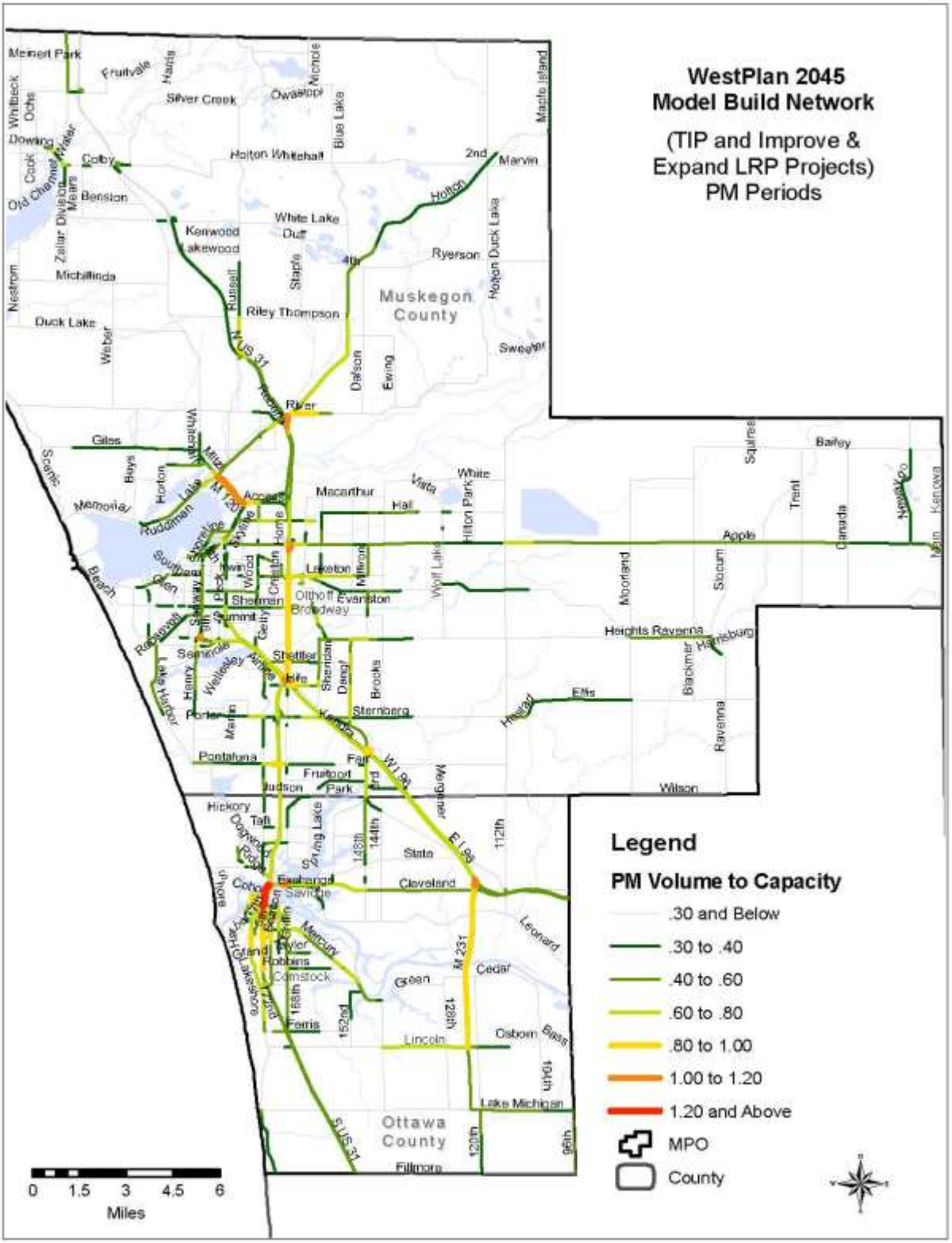


Figure 13: 2045 PM Build Model TIP and Expand



2045 Long Range Plan Improve and Expand Projects

With knowledge in hand of available funding and the transportation system needs and deficiencies, the WestPlan Technical and Policy Committees have selected improve and expand projects for the life of the plan. The capacity deficiencies and local concerns, as determined by the computer model and the local communities, lay the groundwork determining where improvements should occur in the coming years. Some of the deficiencies and concerns require further study before the right solution is identified. Others may have work already planned from previous plans, or may have a relatively simple solution. Those projects that have been identified as possible solutions are identified here.

The following list indicates specifically listed improve and expand projects. These are generally projects that increase capacity on a roadway. Examples of improve and expand projects may be the addition of traffic lanes, turn lanes, or the construction of a new roadway. These projects are funded with federal, state, local funds or any combination of the three, depending on the needs of the organization that is involved in the project. During the process of determining projects, both Harbor Transit and the Muskegon Area Transit System were involved and asked to submit long term improve and expand type projects, or projects that could benefit identified deficiencies in the system. There were no projects submitted by either of the MPO transit agencies.

- Sternberg Road, from Quarterline Road to Airline Road
- Henry Street, from Seminole to Hile, Reconstruct from 2 to 3 lanes
- Witham Road, from Bear Creek Bridge to Moulton Road
- Sternberg Road, from Martin Road to Lake Harbor Road, new two lane road
- Pontaluna Road, Harvey Street to Grand Haven Road, from two to three lanes, .75 miles
- Hile Road, Harvey Street to Grand Haven Road, Reconstruct from 2 to 3 lanes with bike lanes
- Grand Haven Road, from Hile Road to 100 ft. south of Seaway Drive, Reconstruct from 2 to 3 Lanes
- 168th Avenue, from Hayes Street north to Comstock, expand from 2 to 3 lanes
- 174th Avenue, from Van Wagoner Rd to Wilson Street, expand from 2 to 3 lanes
- West Spring Lake Road Bridge, from Lake Road to 168th Avenue, reconstruct bridge

As stated previously, a number of potential deficiencies were identified. A number of these deficiencies occur on state trunkline roads. After reviewing the list with MDOT and the other members of the technical committee, it was determined that deficiencies on these roadways did not merit inclusion as projects at this time.

General maintenance projects and projects that do not add capacity to the transportation system are not specifically listed in this plan, but are of primary importance to maintaining the system and receive support under the goals and objectives of the plan.

Identification of Local Concerns

The computer travel demand model is designed to predict capacity deficiencies such as those listed previously in this chapter. This is a beginning step for the analysis of the area's future transportation needs. However, many of the other potential transportation needs in the community are unrelated to capacity issues. Based on the other types of transportation system needs, the local communities have identified the following corridors and transportation projects as issues of concern. Although there may be no specific projects identified, these areas should be closely monitored, as should the capacity deficiencies. It is presumed that many of these corridors will be studied further in the twenty-six year period, and that solutions will be proposed, as they become evident. The list of these corridors is in no specific order, and no ranking system is assumed or implied.

1. Hackley Corridor - The Hackley Corridor is a significant urban route that serves vital portions of the urban area.

2. Peck Corridor - The Peck Corridor is an urban road that carries a substantial volume of daily traffic. Routine maintenance is necessary to keep this corridor functioning at peak efficiency.

3. Broadway and Summit Corridors - The Broadway and Summit corridors carry significant volumes of daily traffic, especially in the urban areas. These corridors require attention to keep them operating at peak efficiency.

4. Getty and Quarterline Corridors - These north/south corridors are important routes that serve both through-traffic and local traffic. Getty is especially important in its service as a continuous through route, while Quarterline serves important educational facilities and higher-density housing areas.

5. Marquette and Apple Corridors - These east/west corridors serve as vital throughways to get people to and from important educational, recreational, governmental, and medical facilities. Apple Avenue also serves as the main continuous link to communities east of Muskegon.

6. Sherman Corridor - This high volume roadway serves as a major throughway for the Muskegon urban area accessing many major developments. Regular maintenance of this strip of roadway is a priority.

7. Michigan Adventure and other park areas – Safety and access for these special traffic generators must be monitored. Traffic impact on surrounding areas must also be considered, especially during peak season. Solutions such as public/private coordination should be considered.

8. Pontaluna Corridor - Continuing growth and tourism travel must be monitored in this area to ensure that traffic moves efficiently.

9. Sternberg/Airline and Sternberg/I-96 area/Sternberg Corridor - Continued growth will increase vehicle trips along this corridor. Improved access via widened roads, added lanes, an interchange, or other improvements may be needed.

10. Sternberg and Ellis Corridors - As truck traffic increases, these corridors should be considered for upgrade to all-season standards across the county.

11. White Lake Drive Corridor (Whitehall Road to Automobile Road) - This roadway and the approaches to the US-31 interchange will see increased traffic as growth continues.

12. Blackmer Corridor (Owens to Ellis) -This stretch must be monitored due to its importance as a truck route to the Village of Ravenna.

13. Brooks Corridor (Heights-Ravenna to Cline) -This roadway serves as an important corridor for truck traffic.

14. Scenic Drive, State Park accesses - Maintain the safe and efficient transport of visitors to and from State Park areas and analyze non-motorized route possibilities for that area.

15. Shoreline Drive Corridor - Continue efforts to maintain this roadway and to ensure smooth traffic exchange from Seaway Drive to Shoreline Drive.

16. Laketon Corridor and Lakeshore Drive - These corridors serve as an important access route to the Lake Michigan Shoreline, Muskegon Lake, and the Muskegon Lake Channel, as well as a major industrial employer. This corridor also serves as a vital link to the cross-lake ferry.

17. Expressway interchanges - Continued study must be aimed at possible interchange options at US-31 for the Muskegon Community College area, improvements to the Pontaluna interchange, and at I-96 for the Sternberg Corridor. Improvements to the I-96/US-31 interchange configuration should also be explored.

18. Improve access to and from factories and industrial parks - The diversification of the Muskegon economy has dictated that great importance is placed on truck access to support local industry.

19. Repair and maintenance of bridge crossings throughout the county - The disabling of any bridge in the MPO area could prove to be a serious traffic problem. Hence, these areas must be monitored to ensure that they remain efficient movers of vehicular traffic.

20. Ottawa Corridor (Eastern to Bayou) - This stretch of road parallels the lakefront and serves port and rail-related industry, recreation, and commerce. This roadway serves as an important multi-modal corridor.

21. Maintain priority for inter-modalism including Cross Lake Ferry service, bus service locally and with surrounding communities, and linking with existing AMTRAK rail service.

22. Maintain emphasis on providing non-motorized travel options to area residents.

23. New developments should provide the opportunity to foster public/private partnerships to finance necessary road improvements.

24. Maintain and enhance public transportation resources. Continue to improve and expand the services and facilities available to those who utilize public transportation.

25. Support and provide programs that increase vehicle occupancy rates, manage travel demand, or contribute to air quality improvement.

26. Comstock Street from US-31 to Mercury Drive

27. 168th Avenue from US-31 to Robbins Road

28. 174th Avenue from Van Wagoner Street to Wilson Street

29. Fruitport Road from M-104 to Apple Drive

30. Robbins Road from Mercury Drive to Moreland Avenue

31. US-31 Corridor from Holland to Muskegon County - Includes improvements along the existing corridor as well as monitoring M-231.

MDOT-Grand Region Illustrative Projects / Unfunded Needs for WestPlan 2045 LRTP

This following list was provided by MDOT Grand Region staff and provides illustrative / unfunded MDOT projects and studies that address corridors or areas that have been discussed at several WestPlan Technical Advisory and Policy Committee meetings.

MDOT-Grand Region Illustrative Projects / Unfunded Needs:

1. US-31 (Beacon Boulevard) in Grand Haven and Grand Haven Township:

    - Continue monitoring operations along the corridor and identify intersection improvements, where needed.

2. US-31 from I-96 to M-46:

    - Continue monitoring travel characteristics and operations on this section of freeway; evaluate feasibility of weave/merge lanes and ramp modifications at and between major freeway interchanges.

3. US-31 @ Sherman Boulevard (local road but may include improvements US-31):

    - Identify improvements for existing operational conditions; continue to explore future interchange modification and improvement options.

4. I-96 @ US-31:

   - Continue to evaluate operational improvements and ramp modifications; Interstate (I-96) Access changes may be required

5. LRBOI Casino Development/Proposed:

   - Review and monitor state and local transportation impacts from the proposed casino and other related developments around the area; identify improvement needs and options.

6. M-231 Corridor:

   - Continue analysis, with possible study, of local and MDOT improvement needs and options in and around the corridor, in coordination with the Macatawa Area Coordinating Council (MACC).

   - Continue expansion of ITS applications and infrastructure in the MPO area

CHAPTER 11: ENVIRONMENTAL JUSTICE

The projects in this plan must meet the principles of Executive Order 12898 relating to environmental justice (EJ). Specifically, the plan must identify and address any disproportionately high and adverse human health or environmental effects of its programs and policies on minority populations and low-income populations.

The process undertaken in analyzing the principles of Executive Order 12898 included mapping the areas of impoverished and minority population concentrations. These concentrations were overlaid with the LRTP's projects and subjected to a visual analysis of potential impacts. Analysis of potential impacts center on three potential major areas of concern:

- Disproportionally high adverse impact to impoverished and minority areas
- Minimizing/blocking access of low income areas and minority areas to the transportation system
- Neglect of the transportation system in low-income areas and minority areas

Identification of Impoverished Populations

The analysis performed to identify impoverished groups followed the same general methodology as the methodology used to determine Location Quotient (LQ) for minority populations. Impoverished populations were identified based on 2013 American Community Survey 5-year Estimates of poverty status for a 12 month period of time. The Census Bureau uses a set of money income thresholds that vary by family size and composition to determine who is in poverty. If a family's total income is less than the family's threshold, then that family and every individual in it is considered in poverty. Official poverty thresholds do not vary geographically, though they are updated for inflation using Consumer Price Index (CPI-U). (United States Census Bureau) No grouping was necessary for this analysis as totals were available for the population living below the poverty level.

The statistical notation used to determine Location Quotient (LQ) for impoverished populations is as follows:

EJ Zone = Impoverished Population in a Census Tract /Total Impoverished Pop. the State

Total Pop. in that Census Tract Total Pop. in the State

The method of interpreting the resulting calculated values are as follows:

LQ < 1.0: Such census tracts are considered Non-EJ zones. This implies that such census tracts having values less than one (1) have insufficient impoverished populations in the state as such will not be considered an EJ zone.

LQ = 1.0: Such census tracts have populations that are just sufficient for their constituents, or are exactly comparable to the state's concentration of these groups.

LQ > 1.0: Places with LQ greater than one (1) provides evidence that these groups have impoverished populations greater than their expected EJ populations. These census tracts would represent the selection set considered being EJ zones. A map illustrating the improve and expand projects overlaid on impoverished areas is included as ***Figure 14.*** A map illustrating the transit service areas overlaid on impoverished areas is included as ***Figure 15.***

Identification of Minority Groups

Minority population groups identified in this study included individuals who self-identified as being part of a minority racial or ethnic group in the 2010 U.S. Census. These figures were taken from the 2010 Census-Profile of General Population and Housing Characteristics. For this analysis, individuals belonging to a minority group were grouped into one category: minority. These aforementioned groups include individuals who self-identified as:

- Race (Not Hispanic or Latino)
- Black or African American
- American Indian or Alaska Native
- Asian
- Some other Race
- Hispanic or Latino (Of Any Race)
- Cuban
- Mexican
- Puerto Rican
- South or Central America
- Other Spanish culture or origin
- Native Hawaiian or Other Pacific Islander

The analysis performed utilized a methodology developed by the MDOT which, unlike methods performed in the past, compares a local community with a reference community such as the state. In past analysis, concentrations of minority or impoverished communities were determined as a simple ratio of the local communities' population. The state's methodology utilizes the **Location Quotient (LQ)** statistical technique, which strives to show if a local economy has a greater share than expected of a given economy, using the average of the local economy against the average of the larger economy.

The statistical notation for LQ is:

$$\text{EJ Zone} = \frac{\text{\# of Minority Group in a Census Tract}}{\text{Total Pop. in that Census Tract}} \Big/ \frac{\text{Total \# of that Minority Group in the State}}{\text{Total Pop. in the State}}$$

The method of interpreting the resulting calculated values are as follows:

LQ < 1.0: Such census tracts are considered Non-EJ zones. This implies that such census tracts having values less than one (1) have insufficient minority population in the state as such will not be considered an EJ zone.

LQ = 1.0: Such census tracts have populations that are just sufficient for their constituents, or are exactly comparable to the state's concentration of these groups.

LQ > 1.0: Places with LQ greater than one (1) provides evidence that these groups have racial populations greater than their expected EJ populations. These census tracts would represent the selection set considered being EJ zones.

A map illustrating improve and expand projects overlaid on impoverished areas is included as ***Figure 16.*** A map illustrating the transit service areas overlaid on impoverished areas is included as ***Figure 17.***

Analysis

Analysis of potential impacts center on three potential major areas of concern:

1. Disproportionately high adverse impact to low income areas and minority areas
2. Neglect of the transportation system in low-income areas and minority areas
3. Minimizing/blocking access of low income areas and minority areas to the transportation system

Of the identified improve and expand projects contained in the WestPlan 2045 Long-Range Transportation Plan, only one of the projects is contained in or near the low income areas. Also, none of the projects are contained in or near minority areas.

LOW INCOME AREAS

Neglect of the transportation system in low income areas

WestPlan staff reviewed the transit service areas to determine if coverage of low income areas is being served. The two public transit providers in the MPO are Harbor Transit, which covers northern Ottawa County with a call/demand service and Muskegon Area Transit System which primarily offers fixed route service. Maps included in this chapter show that the majority of fixed routes and call/demand systems within the MPO cover minority and low income communities.

The expansion projects listed in the Long Range Plan address deficiencies or expansion in the system. At this point in time there are very few deficiencies in the system within the low income areas of the WestPlan MPO.

Minimizing/blocking access of low-income areas to the transportation system

Minimizing access can be characterized as closing of streets or eliminating access to transit. None of the expansion projects identified in the plan will block access to the transportation system.

Disproportionately high adverse impact to low income areas

Of the identified projects contained in the WestPlan 2045 Long-Range Transportation Plan, there is one project, 174th Avenue, located in a low income area. After staff review it has been determined that there will be no negative impacts from noise, right of way acquisition, or pollution.

MINORITY AREAS

Neglect of the transportation system in minority areas

WestPlan staff reviewed the transit service areas to determine if coverage of minority and low income areas are being served. The two public transit providers in the MPO are Harbor Transit, which covers northern Ottawa County with a call/demand service and Muskegon Area Transit System which primarily offers fixed route service. Maps included in this chapter show that the majority of fixed routes and call/demand systems within the MPO cover minority and low income communities.

The expansion projects listed in the Long Range Plan address deficiencies or expansion in the system. At this point in time, there are very few deficiencies in the system within the minority areas of the WestPlan MPO.

Disproportionately high adverse impact to minority areas

As previously stated, there is no identified expansion project located in minority areas. The projects listed in the Long Range Plan address deficiencies or expansion in the system. The areas within the WestPlan MPO with a higher percentage of minority population tend to be within urbanized areas which are essentially built out and do not have capacity deficiencies. Since none of these projects are located in minority areas, there will be no negative impacts from noise, right of way acquisition, or pollution.

Also an analysis of the areas covered by transit was overlain with the identified minority areas. This analysis shows that all of the identified minority areas are covered by the existing transit coverage areas.

Minimizing/blocking access of minority areas to the transportation system

Minimizing access can be characterized as closing of streets or eliminating access to transit. None of the identified capacity projects are located within minority areas. Therefore there will be no blocking of access to the transportation system.

Conclusions

In conclusion, this analysis finds that the proposed roadway and transit projects do not result in violations of Executive Order 12898. Furthermore, to supplement the analysis done here, WestPlan's continuing public participation process undertaken during the design of the WestPlan 2045 Long-Range Transportation Plan made a concerted effort to reach out to traditionally disadvantaged populations to ascertain the potential effects and or impacts of the proposed projects.

Figure 14: Impoverished Areas and Improve and Expand Projects

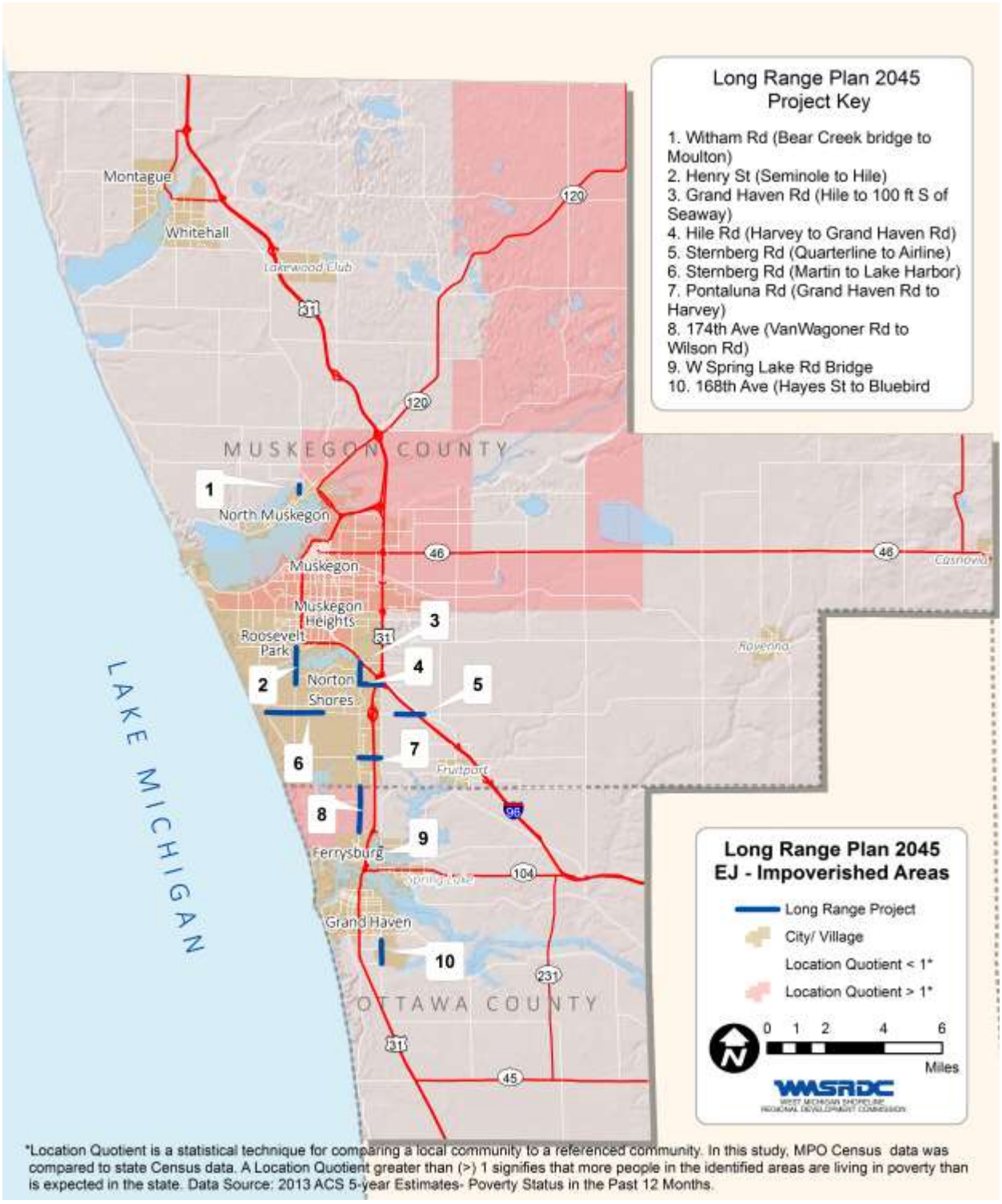


Figure 15: Transit Routes and Poverty

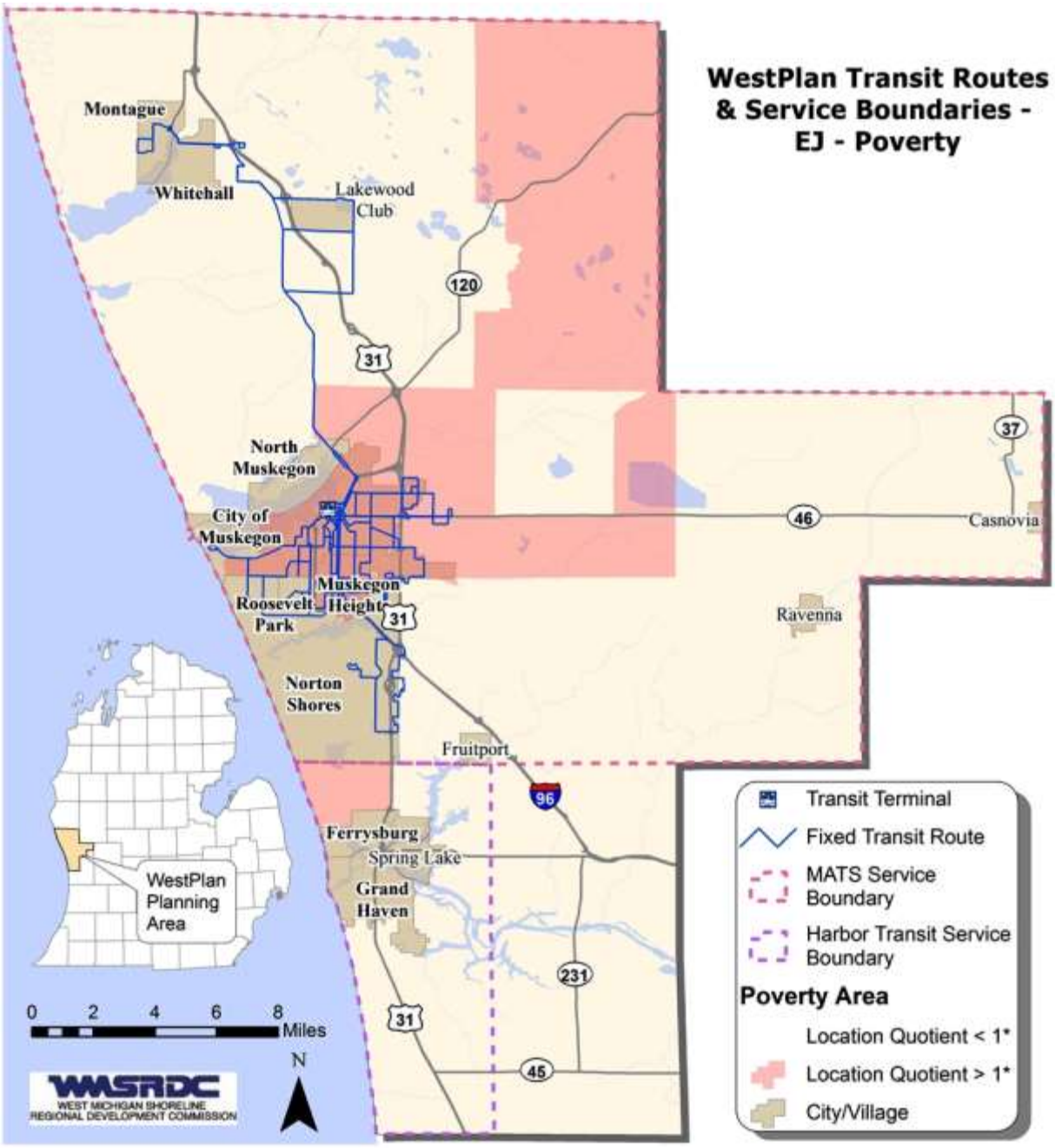


Figure 16: Improve and Expand Projects and Minority Areas

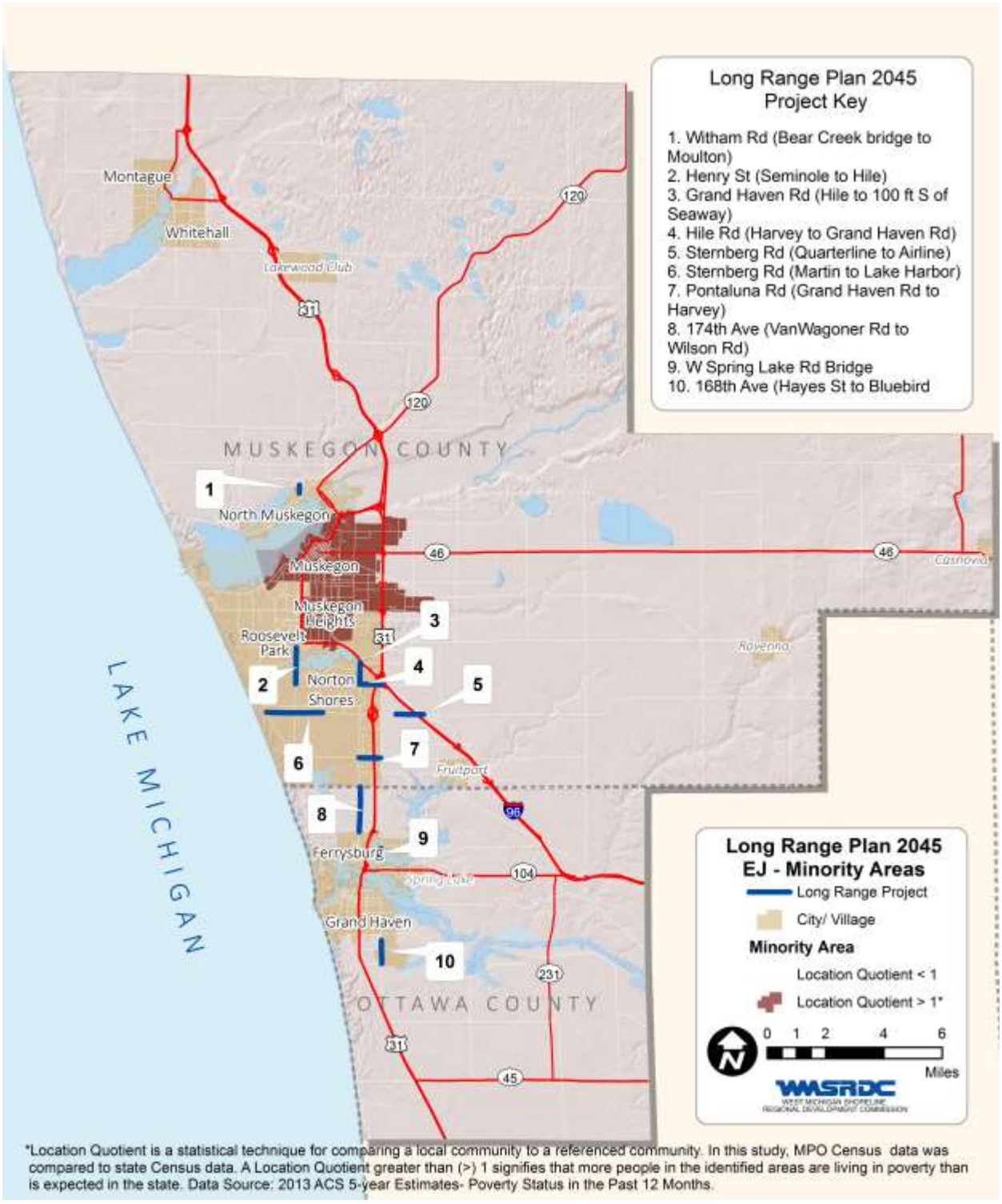
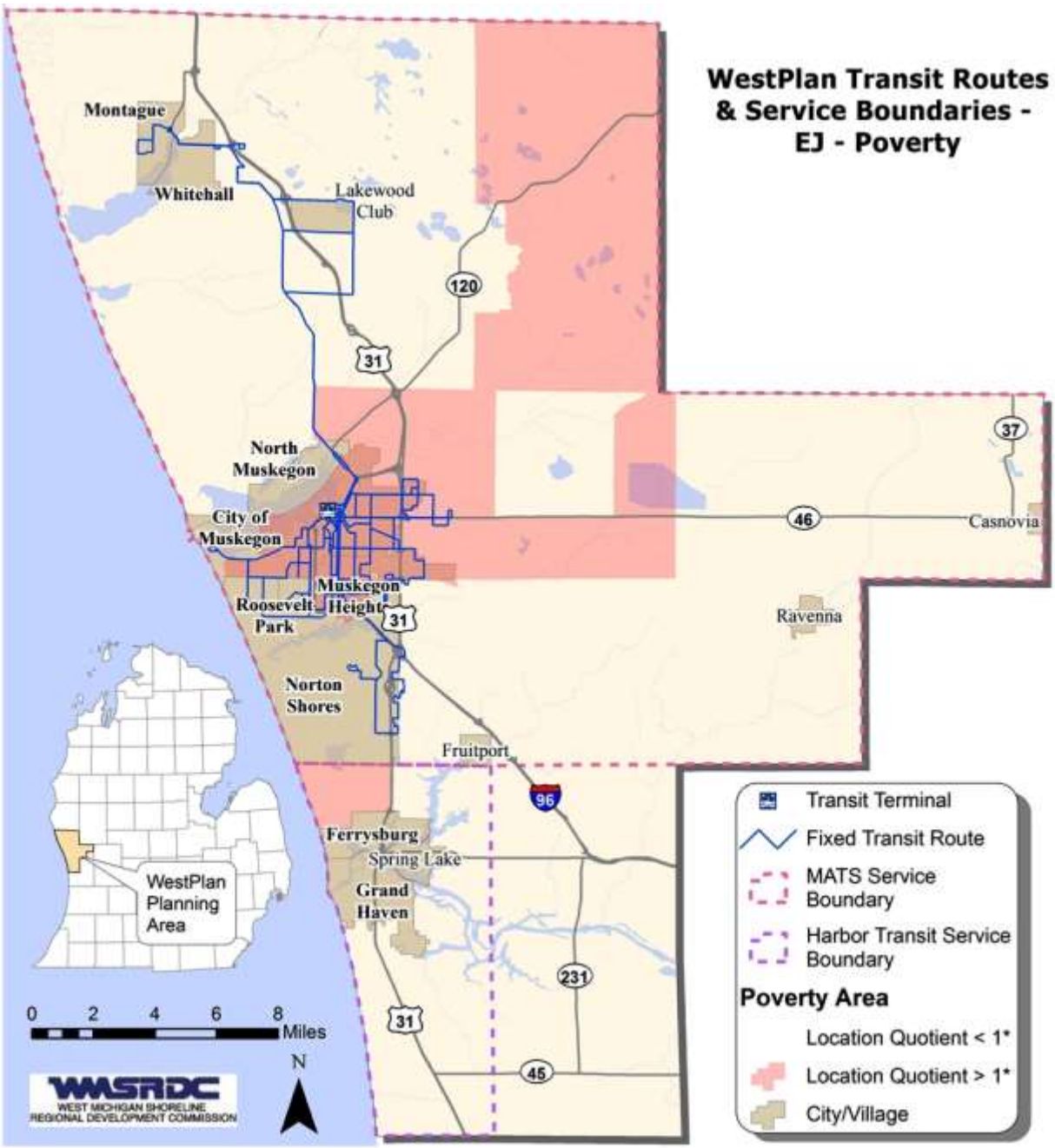


Figure 17: Transit Service Areas and Minority Areas



CHAPTER 12: ENVIRONMENTAL ASSESSMENT

Federal transportation legislation contains a requirement that the LRTP include "a discussion of types of potential environmental mitigation activities and potential areas to carry out these activities, including activities that may have the greatest potential to restore and maintain the environmental functions affected by the plan." The goal is to balance transportation needs with environmental protection.

The WMSRDC staff has conducted a preliminary assessment of transportation projects included in the 2045 Long Range Plan to identify any projects which may have negative environmental impacts. This assessment is done at this point so that communities can be notified well in advance that there may be impacts on the environment.

Factors Used in Environmental Assessment

WMSRDC staff compiled a list of each proposed transportation project in the plan and evaluated each listing using the following list of environmental factors.

Floodplains - Use of the land adjacent to a stream has a major impact on protecting water quality, avoiding flood damage, and maintaining wildlife habitat. This area adjacent to the stream channel serves as a natural reservoir for storing excess water during a flood.

Wetlands - Wetlands play a vital role in water resource protection, recreation, tourism, and the economy in West Michigan. Specifically, wetlands provide:

- Flood and storm control via hydrologic absorption and storage capacity
- Wildlife habitat for breeding, nesting, feeding grounds, and cover for many forms of wildlife
- Protection of subsurface water resources, valuable watersheds, and recharge for groundwater supplies
- Erosion control by serving as a sedimentation area and filtering basin, absorbing silt and organic matter

Critical Dune Areas – The purpose of Critical Dune areas is to preserve, protect and enhance the quality of Michigan's critical dunes.

Factors Not Evaluated

There are a number of other potential environmental factors which were considered for use in evaluating the projects in the Long Range Plan. However, complete and accurate data is not available for many of these factors. Listed below are a number of other potential factors which could be evaluated, should more complete information become available in the future.

Threatened and Endangered Species – The data available is insufficient to accurately map. As part of the consultation phase, the Fish and Wildlife Service was contacted. They did not respond, however in previous years they noted that the following threatened and/or endangered species may be present in the

WestPlan MPO: The Indiana Bat, the Karner Blue Butterfly, Bald Eagles, Pitcher's Thistle, the Piping Plover, and the Eastern Massassauga Rattlesnake.

Archeological sites – There is no complete data that is available to the public.

Unique habitat - The data available is incomplete and insufficient to accurately map.

Environmental Assessment Findings

The chart, ***Table 13***, and map, ***Figure 18***, and on the following pages show which projects are adjacent to the environmental features that were examined. This inventory in no way substitutes a project sponsor's responsibility to complete a more in depth environmental assessment.

From the preliminary review, it does appear that some of the projects are adjacent to the environmental features which were examined. Project sponsors are encouraged to follow the best practices which are outlined in the following sections.

Environmental factors may need to be examined in more detail in order to mitigate any negative impacts. These features may also influence project costs and timing. As previously stated, this assessment does not prevent any project from moving forward, but rather is to be used to identify potential problems.

Table 13: Environmental Assessment

Project Name	Critical Dunes	Wetlands	Floodplains
168th Avenue			☒
Henry Street			☒
Sternberg Road (Quarterline to Airline)			
Witham Road			☒
Sternberg Road (Martin to Lake Harbor)	☒	☒	
Pontaluna Road			
Grand Haven Road		☒	☒
Hile Road			
174th Avenue		☒	
West Spring Lake Road Bridge		☒	

Figure 18: Projects and Environment

*Location Quotient is a statistical technique for comparing a local community to a referenced community. In this study, MPO Census data was compared to state Census data. A Location Quotient greater than (>) 1 signifies that more people in the identified areas are living in poverty than is expected in the state. Data Source: 2013 ACS 5-year Estimates- Poverty Status in the Past 12 Months.

Planning/ Design Guidelines

Regardless of the type of project or the resources that may be impacted, the following guidelines should be considered during the planning, design, construction, and maintenance of transportation projects. They represent good planning practice and will help ensure a blending of sound construction techniques with desired environmental protection goals.

- Employ context sensitive solutions (CSS) principles from the earliest point possible in project development
- Identify the area of potential impact related to the transportation project, including the immediate project area, anticipated borrow/fill areas, haul roads, prep sites, and other contractor areas, as well as other related project development areas
- Conduct an inventory to determine if any environmentally sensitive resources could be impacted by the project
- Conduct a pre-construction meeting with local community officials, contractors, and subcontractors to discuss environmental protection
- If possible, avoid impacts to environmental resources by limiting the project scope or redesigning the project
- Where impacts cannot be avoided; mitigate them as much as possible
- Integrate stormwater management into the design of the site. If appropriate, utilize low-impact development practices that infiltrate stormwater into the ground (e.g., swales, rain gardens, native plantings).

Construction/Maintenance guidelines

- Insert special requirements addressing sensitivity of environmental resources into plans, specifications, and estimates provided to construction contractors
- Confine construction and staging areas to the smallest necessary and clearly mark area boundaries
- Install construction flagging or fencing around environmental resources to prevent encroachment
- Sequence construction activities to minimize land disturbance at all times, but especially during the rainy or winter season for natural resource protection and during the high-use season for resources open to the public
- When utilizing heavy equipment, pay close attention to the potential of uncovering archeological remains

- Before site disturbance occurs, implement erosion control best management practices to capture sediments and control runoff
- Incorporate stormwater management into the construction phase
- Properly handle, store, and dispose of hazardous materials (e.g., paint, solvents, epoxy) and utilize less hazardous materials when possible
- Keep equipment in good working condition and free of leaks. Avoid equipment maintenance or fueling near sensitive areas. If mobile fueling is required, keep a spill kit on the fueling truck.
- Identify and implement salt management techniques to reduce the impacts of salt on area waterways
- Conduct on-site monitoring during and immediately after construction to ensure environmental resources are protected as planned

CHAPTER 13: FINANCIAL RESOURCE ANALYSIS

Federal legislation requires the 2045 LRTP to be financially constrained, making for a plan which is more useful in guiding decision making for the future. It is required that the LRTP show that planned projects can be reasonably funded by the expected revenues. This means that the sum of the costs for the planned projects cannot exceed all reasonably available financial resources available to the WestPlan Metropolitan Planning Organization area. This analysis of the financial resources chapter of the plan will show that WestPlan is constraining its plans to the amount of funds realistically expected. The revenues for operation and maintenance of the transportation system come primarily from taxes and user fees at the local and state level.

Cooperative Revenue Estimation Process

The revenue estimates in this chapter were derived through a cooperative process which included the FHWA, MDOT, MTPA, MPO staff and committees, as well as local road and transit agencies. Local revenues were derived through review of Act 51 reports, historical TIP data, and in consultation with local agencies. State and Federal revenue estimates were provided by MDOT and FHWA.

Revenue Growth Rate

A 2% revenue growth rate was adopted by the Michigan Transportation Planning Association (MTPA) in June of 2019. WestPlan MPO concurs with these estimates and has used them in the development of this plan.

Year of Expenditure (Inflation) Factor

The WestPlan MPO is using the Financial Workgroup Sub-team's recommended inflation factor of 4% for project costs. This is the factor which is used by the MDOT as well as recommended by FHWA guidance as a default factor.

Anticipated Funding Sources

Federal Funding Sources

Funds through the federal gas and diesel tax are deposited in the Federal Highway Trust Fund through the current federal surface transportation bill. Michigan receives most of its federal highway funding from the following programs: The Interstate Maintenance Program, the National Highway System Program, the Surface Transportation Program, the Highway Bridge Replacement & Rehabilitation Program, and the Congestion Mitigation & Air Quality Program. State and local governments have substantial flexibility in the use of some of their federal transportation funds, to choose the best mode or combination of modes where their dollars will be invested. The most commonly used federal-aid programs within the WestPlan area are described below.

STP-Urban (STUL) (Muskegon/Northern Ottawa County MPO)

The Surface Transportation Program will continue to provide funds for urban projects through this category. The small MPO program is funded for areas of population between 50,000 and 200,000. Based on recent annual TIP expenditures, it has been estimated that revenues of $95,924,920 would be made available for this category over the life of the plan.

STP-Small Urban (ST) (Whitehall Area)

The Surface Transportation Program will continue to provide funds for projects through this category through the Small Urban Committee. This funding category is available for communities that have a population between 5,000 and 50,000. Based on current annual TIP expenditures, it has been estimated that revenues averaging $4,745,000 would be made available for this category over the life of the plan.

STP-Rural

The Surface Transportation Program will continue to work through the Rural Task Forces to provide funds for rural projects through this category. Rural Task Force 14, which covers Lake, Mason, Oceana, Newaygo, and Muskegon counties, has significant responsibilities for transportation programming in non-metropolitan areas. Only the rural areas of Muskegon County are included within the MPO boundaries. Based on current annual TIP allocations, it has been estimated that revenues averaging $22,877,353 would be made available for this category through 2045.

Highway Safety

The Safety category of funds is a statewide competitive category. The anticipated size of these safety projects range from approximately $100,000 to $200,000 each. Safety projects have not been a historically large portion of the funding within the MPO. It has been estimated that revenues averaging $3,796,000 would be made available for this category over 26 years covered by the plan.

STP-Transportation Alternatives

Enhancement funds are distributed on a competitive basis among states and local agencies. The Surface Transportation Program Enhancement category has provided funding for a number of transportation enhancement activities in recent years, including bike and pedestrian facilities, landscaping and streetscaping, historic preservation projects, and highway run-off prevention. As this is a statewide competitive category of funds, a funding target is not guaranteed. Based on past annual TIP allocations and estimates, it has been estimated that revenues averaging $7,592,000 would be made available for this category over the life of the plan.

Local/Critical Bridge (BRT)

The local bridge program is a statewide highly-competitive program where funds are available to replace bridges within the state. While this has not been significant portion MPO project funding in the past, due to deterioration of bridges and identified needs, it has been estimated that revenues averaging $7,592,000 would be made available for this category through 2045.

Congestion Mitigation Air Quality (CMAQ)

As both a non-attainment area (part of Muskegon County) and attainment area (Ottawa County) for ozone, the MPO is eligible for a portion of the Congestion Mitigation Air Quality funds which the State of Michigan receives. These funds are intended for transportation projects, which reduce traffic congestion or in other ways improve air quality in an area. The MPO expects to continue to receive a portion of the CMAQ funds allocated to the state. Based on current annual TIP allocations, it has been estimated that revenues averaging $35,682,400 would be made available for this category over the life of the plan.

Trunkline (STUL)

Funds that the MDOT spends on highway repairs are not allocated at a specific level of funding every year to each geographic area. Priorities are set on a statewide basis depending on the condition of the state trunkline system. These funds can be used for such things as rehabilitation and reconstruction. Based on figures given by MDOT, the total estimated trunkline revenues, including state match over the 26-year period are $375,562,594.

Federal Transit Funding

The public transit program funding is based on the following FTA-funded transit programs. ***Table 14*** and ***Table 15*** were provided by MDOT and show the estimated funding for both MATS and Harbor Transit through 2045.

Transit Section 5307 Operating

The FTA provides operating assistance to the Muskegon Area Transit System and Harbor Transit. Based on estimates provided by MDOT, it has been estimated that revenues averaging $76,444,215 would be made available for this category over the life of the plan. 5307 funding estimates from MDOT are shown in the tables on the following pages.

Transit Section 5310 Capital

The FTA provides funds for acquisition of capital items (5310) to private nonprofit organizations or public transit agencies to meet the special needs of the elderly and disabled. Based on current annual TIP expenditures, it has been estimated that revenues averaging $816,314 per year would be made available for this category over the life of the plan.

Transit Section 5311

The Formula Grants For Other than Urbanized Areas (5311) is a rural program that is formula based and provides funding to states for the purpose of supporting public transportation in rural areas, with population of less than 50,000. The goal of the program is to provide services to communities with population less than 50,000. Based on current annual TIP expenditures, it has been estimated that revenues averaging $64,585 per year would be made available for this category over the life of the plan.

Transit Section 5316

The Job Access and Reverse Commute (5316) also known as JARC, program was established to address the unique transportation challenges faced by welfare recipients and low-income persons seeking to obtain and maintain employment. Many new entry-level jobs are located in suburban areas, and low-income individuals have difficulty accessing these jobs from their inner city, urban, or rural neighborhoods. In addition, many entry level-jobs require working late at night or on weekends when conventional transit services are either reduced or non-existent. Although there are no projects in the current TIP, based on past funding it has been estimated that revenues averaging $20,000 per year would be made available for this category.

Transit Section 5317

The New Freedom formula grant program (5317) aims to provide additional tools to overcome existing barriers facing Americans with disabilities seeking integration into the work force and full participation in society. The New Freedom formula grant program seeks to reduce barriers to transportation services and expand the transportation mobility options available to people with disabilities beyond the requirements of the Americans with Disabilities Act (ADA) of 1990. Although there are no projects in the current TIP, based on past funding it has been estimated that revenues averaging $52,500 per year would be made available.

Transit Section 5339

This category section of funding provides capital funding to replace, rehabilitate, and purchase buses and related equipment and to construct bus related facilities. Based on current annual TIP expenditures, it has been estimated that revenues averaging $7,296,864 would be made available for this category over the life of the plan. 5339 funding estimates from MDOT are shown in the tables on the following pages.

Table 14: Harbor Transit Long Range Estimates

Harbor Transit - Long Range Plan Estimates

					Federal Formula Programs	
		Federal (formula) 5307, 5339	State Match	State Operating	Federal 5307	Federal 5339
2019 Base Amounts		$609,090	$62,859	$1,233,429	$556,016	$53,074
Growth rate*		2.00%	2.00%	1.43%	2.00%	2.00%
	Year					
	2020	$621,272	$64,116	$1,251,067	$567,136	$54,135
	2021	$633,697	$65,399	$1,268,957	$578,479	$55,218
	2022	$646,371	$66,706	$1,287,103	$590,049	$56,323
	2023	$659,299	$68,041	$1,305,509	$601,850	$57,449
	2024	$672,485	$69,401	$1,324,178	$613,887	$58,598
	2025	$685,934	$70,789	$1,343,113	$626,164	$59,770
	2026	$699,653	$72,205	$1,362,320	$638,688	$60,965
	2027	$713,646	$73,649	$1,381,801	$651,461	$62,185
	2028	$727,919	$75,122	$1,401,561	$664,491	$63,428
	2029	$742,477	$76,625	$1,421,603	$677,780	$64,697
	2030	$757,327	$78,157	$1,441,932	$691,336	$65,991
	2031	$772,473	$79,720	$1,462,552	$705,163	$67,311
	2032	$787,923	$81,315	$1,483,466	$719,266	$68,657
	2033	$803,681	$82,941	$1,504,680	$733,651	$70,030
	2034	$819,755	$84,600	$1,526,197	$748,324	$71,431
	2035	$836,150	$86,292	$1,548,021	$763,291	$72,859
	2036	$852,873	$88,018	$1,570,158	$778,557	$74,316
	2037	$869,931	$89,778	$1,592,611	$794,128	$75,803
	2038	$887,329	$91,574	$1,615,386	$810,010	$77,319
	2039	$905,076	$93,405	$1,638,486	$826,211	$78,865
	2040	$923,177	$95,273	$1,661,916	$842,735	$80,442
	2041	$941,641	$97,179	$1,685,681	$859,589	$82,051
	2042	$960,474	$99,122	$1,709,787	$876,781	$83,692
	2043	$979,683	$101,105	$1,734,237	$894,317	$85,366
	2044	$999,277	$103,127	$1,759,036	$912,203	$87,074
	2045	$1,019,262	$105,189	$1,784,190	$930,447	$88,815
	Total	**$20,918,784**	**$2,158,850**	**$39,065,550**	**$19,095,994**	**$1,822,791**

*Based on average 2008 - 2019, see 2019 growth rates - federal and state slrp

Table 15: MATS Long Range Plan Estimates

Long Range Plan Estimates - Muskegon Area Transit

		Federal (formula) 5307, 5339	State Match	State Operating	Federal Formula Programs Federal 5307	Federal 5339
2019 Base Amounts		$1,829,190	$62,859	$1,386,154	$1,669,802	$159,388
Growth rate*		2.00%	2.00%	1.43%	2.00%	2.00%
	Year					
	2020	$1,865,774	$64,116	$1,405,976	$1,703,198	$162,576
	2021	$1,903,089	$65,399	$1,426,081	$1,737,262	$165,827
	2022	$1,941,151	$66,706	$1,446,474	$1,772,007	$169,144
	2023	$1,979,974	$68,041	$1,467,159	$1,807,447	$172,527
	2024	$2,019,574	$69,401	$1,488,139	$1,843,596	$175,977
	2025	$2,059,965	$70,789	$1,509,420	$1,880,468	$179,497
	2026	$2,101,164	$72,205	$1,531,004	$1,918,078	$183,087
	2027	$2,143,188	$73,649	$1,552,898	$1,956,439	$186,748
	2028	$2,186,051	$75,122	$1,575,104	$1,995,568	$190,483
	2029	$2,229,772	$76,625	$1,597,628	$2,035,479	$194,293
	2030	$2,274,368	$78,157	$1,620,474	$2,076,189	$198,179
	2031	$2,319,855	$79,720	$1,643,647	$2,117,713	$202,143
	2032	$2,366,252	$81,315	$1,667,151	$2,160,067	$206,185
	2033	$2,413,577	$82,941	$1,690,992	$2,203,268	$210,309
	2034	$2,461,849	$84,600	$1,715,173	$2,247,334	$214,515
	2035	$2,511,086	$86,292	$1,739,700	$2,292,280	$218,806
	2036	$2,561,308	$88,018	$1,764,577	$2,338,126	$223,182
	2037	$2,612,534	$89,778	$1,789,811	$2,384,888	$227,645
	2038	$2,664,784	$91,574	$1,815,405	$2,432,586	$232,198
	2039	$2,718,080	$93,405	$1,841,365	$2,481,238	$236,842
	2040	$2,772,442	$95,273	$1,867,697	$2,530,863	$241,579
	2041	$2,827,891	$97,179	$1,894,405	$2,581,480	$246,411
	2042	$2,884,448	$99,122	$1,921,495	$2,633,110	$251,339
	2043	$2,942,137	$101,105	$1,948,972	$2,685,772	$256,366
	2044	$3,000,980	$103,127	$1,976,843	$2,739,487	$261,493
	2045	$3,061,000	$105,189	$2,005,112	$2,794,277	$266,723
	Total	**$62,822,294**	**$2,158,850**	**$43,902,704**	**$57,348,221**	**$5,474,073**

*Based on average 2008 - 2019, see 2019 growth rates - federal and state slrp

State Funding Sources

ACT 51 and other funds

Collection and distribution of gasoline and diesel fuel taxes in Michigan is regulated under State Act 51 of 1951. Michigan's fuel tax is collected and deposited into the Michigan Transportation Fund (MTF). Most states, as well as the federal government, distribute all or some portion of the tax for support of highways and mass transit improvements. MTF dollars are distributed to MDOT, county road commissions, cities and villages, and the Comprehensive Transportation Fund (CTF). The CTF was established to fund public transportation systems. In Michigan, a portion of the registration fees for automobiles and trucks are also deposited in the MTF.

In regards to other state funds, MDOT has previously conducted long-term revenue forecasts, using a model based on expected travel and tax structure data. Travel data includes the registered number of vehicles and forecasted vehicle miles of travel to predict revenue from gasoline taxes, diesel fuel taxes, liquid petroleum gas fuel taxes, vehicle registrations, and other related fees. These revenues contribute to the Michigan Transportation Fund (MTF). After portions of this fund are taken off the top, up to 10% is reserved for transit and deposited into CTF.

The remainder of the MTF is distributed by a specific formula established in the State of Michigan Public Act 51. MDOT receives 39.1%, county road commissions receive 39.1%, and 21.8% goes to cities and villages. None of this money goes directly to townships. Public roads in townships are under the jurisdiction of the respective county road commissions. MTF funds are the primary source for making the general 20% local match to 80% federal funds for transportation, and may also be used for a wide variety of transportation projects, including mostly small, light maintenance projects. Regular maintenance needs must also be funded both within cities and villages, and on county roads. Activities such as snow plowing, salt and sand application to road surfaces, lawn mowing, and tree trimming related to roadways, are categorized as maintenance. Maintenance may also include those activities that improve the quality of a road surface, but do not completely resurface a roadway such as filling potholes, improving signage, or road painting and marking.

State raised funds include, TEDF, Winter Maintenance, Local Bridge, and other funds. In order to estimate State funding revenues, planners obtained Act 51 reports from each of the MPO member agencies. Averages were computed and extrapolated out to 2045. Based on current annual funding levels, it has been estimated that revenues averaging $880,295,513 would be made available for this category over the life of the plan.

State Transit Operating Assistance and State Transit Capital Assistance (Comprehensive Transportation Fund)

The MDOT provides a percentage of the local match for operating assistance and for assistance for the purchase of capital equipment by the Muskegon Area Transit System and Harbor Transit. While this funding can increase with large purchases in any given year, based on recent allocations, this source provides approximately $106,285,954 to the WestPlan MPO area over the life of the plan.

Local Funding Sources

Cities and villages may provide additional local funding for transportation improvements. Typical funding sources at this level include a community's general fund, millages, general obligation bonds, contributions from county governments and other communities, tax increment financing, and special assessment districts. Local governments at this time are not permitted by the State of Michigan to assess or impose a gasoline tax or a vehicle registration fee. Some communities also accumulate interest on MTF revenue after it has been distributed to them. County road commissions supplement their budgets through contributions from townships. Some enter into maintenance agreements with MDOT for work on state trunklines within the county.

Several local communities allocate general fund money to assist in transportation projects. These funds are used in a variety of ways, including local road repairs, matching grants, transit assistance, non-motorized projects, and other transportation-related improvements, including general maintenance. The amount of funds provided by the local units of government can vary widely based on needs. However, it is estimated that local units of government on transportation projects may utilize approximately $9,699,063 per year, based on recent allocations. Also, local transit funding sources are estimated at approximately $2,500,000 per year.

Alternative Funding Sources

Several non-traditional sources of transportation funding may exist for use in appropriate occasions. There are sources related to historical or recreational uses that may pay for transportation improvements to a significant location or facility. There are also numerous community or civic foundations that may be willing to contribute to unique transportation endeavors, particularly of a transit or public service nature.

The private sector has also become a substantial source of funds in some areas, primarily when a developer pays for the construction of drives or access roads leading to a development. Improvements of this type are often included in the overall plans and cost of development. However, it is difficult to identify and project-in-advance the precise location and value of such private improvements to the system, which will be actuated by various market forces. These non-traditional funding sources have not played a significant role within the WestPlan MPO so no estimates have been projected.

Revenue Summary

Table 16: Revenue Projections is a summary of all estimated revenues through 2045 and is included on the following page.

Table 16: Revenue Projections

REVENUE PROJECTIONS

		FY 2020 Estimate	26 Year Total
Federal Highway Funds			
Local Jurisdiction Programs			
Surface Transportation Program		$2,527,000	$94,924,920
Surface Transportation Program - Small Urban		$125,000	$4,745,000
Surface Transportation Program - Rural		$602,670	$11,434,817
Highway Safety		$100,000	$3,796,000
Transportation Alternatives		$125,000	$4,745,000
Bridge		$200,000	$7,592,000
CMAQ		$940,000	$35,682,400
	Subtotal Local	**$4,619,670**	**$162,920,137**
MDOT Programs			
Trunkline and Operations/Maintenance		$13,335,388	$523,606,594
	Subtotal MDOT	$20,138,715	**$523,606,594**
	Total Federal Highway	**$24,758,385**	**$686,526,731**
Federal Transit Funds			
Section 5307		$2,270,334	$76,444,215
Section 5310 Capital		$816,314	$36,482,830
Section 5311		$64,585	$2,451,647
Section 5316		$20,000	$759,200
Section 5317 New Freedom		$52,520	$1,992,900
Section 5339		$527,587	$7,296,864
	Total Federal Transit	**$3,751,340**	**$125,427,656**
State-Raised Funds			
MTF (ACT 51),TEDF, Etc.		$23,190,082	$880,295,513
Transit Operating and State Match		$2,785,275	$106,285,954
	Total State-Raised	**$25,975,357**	**$986,581,467**
Local Funds			
Local Transit Funding		$2,500,000	$94,900,000
Millages, Taxes, Levies, General Fund Contributions,etc		$9,699,063	$368,176,431
	Total Local	**$12,199,063**	**$463,076,431**
	Grand Total	**$66,684,145**	**$2,261,612,285**

Federal and State funds assume a growth rate of 2.00% per year

Cost Estimates

Improve and Expand Projects

Through the planning process a number of improve and expand projects were identified for the WestPlan 2045 LRTP. These projects are discussed in more detail in Chapter 11. The total costs of these projects come to $25,770,000 in FY 2020 dollars. Estimated for year of construction this number increases to $66,645,908.

Operations and Maintenance of Local Roads

Activities such as snow plowing, salt and sand application to road surfaces, lawn mowing, and tree trimming related to roadways, are categorized as maintenance. Maintenance may also include those activities that improve the quality of a road surface, but do not completely resurface a roadway such as filling potholes, improving signage, or road painting and marking. Cost estimates for the operations and maintenance of local roads were developed in consultation with the local units of government. Act 51 reports were obtained for each entity and annual averages were extrapolated out through 2045. Based on recent cost averages, these costs are estimated to be around $880,295,513 for the MPO area over the life of the plan.

Operations and Maintenance of State Trunklines

In addition to collecting Act 51 reports from local jurisdictions, WestPlan staff requested estimates from MDOT for operations and maintenance funding through 2045. Operations and maintenance funds are used for projects such as culvert maintenance, winter maintenance (snow plowing), mowing, roadway surface maintenance (pothole patching, crack sealing, etc.) and other expenses necessary to operate and maintain the road network.

Cost estimates for the Operations and Maintenance of State Trunklines were developed by MDOT which in turn forwarded the figures on to MPO staff. Based on these figures it is estimated that costs would be $148,044,000 through 2045.

Operations and Maintenance of Transit /Transit Projects

Costs for transit needs, including replacement of vehicles and the construction, purchase, and renovation of an operations facility, as well as operations and maintenance must also be considered. The transit fleets will need to be replaced during the lifetime of this plan. Based on current annual TIP expenditures, and figures provided by MDOT, it has been estimated that transit costs will be $326,613,611 over the life of the plan.

Other Projects

Planning regulations suggest that pedestrian walkway and bicycle facilities, highway and transit enhancement activities; and safety improvements be included in the transportation plan. While no future projects have been identified at this time, current trends suggest that these activities will increase in importance and frequency in the future.

Demonstrations of Financial Constraint

This information is provided in order to present funding sources available in a summarized fashion. The information here is a summary of the preceding sections regarding federal, state, and local funding categories, as well as estimated expenses. Based on the analysis that was done with these estimates, the WestPlan MPO has determined that there is sufficient money to maintain the current system in the MPO area. The estimates also indicate that there is a significant balance in available funding for I/E projects. Based on this conclusion, the WestPlan Long-Range Transportation Plan is financially constrained. This information is shown in ***Table 17: Demonstration of Financial Constraint*** which is shown below.

Table 17: Demonstration of Financial Constraint

Total Federal, state, and local revenues estimated to be available for roadway construction, transit capital/operating and local road operations and maintenance	$2,261,612,285
Expenditures for Long Range Plan Improve and Expand Projects	($66,645,908)
Expenditures for Operations/Maintenance of State Trunkline Roads	($148,044,000)
Expenditures for Operations/Maintenance of Local Roads	($1,248,471,943)
Expenditures for Transit Projects/Operations/Maintenance of Transit	($326,613,610)
REMAINING BALANCE	$471,836,824

CHAPTER 14: AIR QUALITY CONFORMITY

The concept of transportation conformity was introduced in the CAA of 1977, which included a provision to ensure that transportation investments conform to a SIP for meeting the federal air quality standards. Conformity requirements were made substantially more rigorous in the CAA Amendments of 1990. The transportation conformity regulations that detail implementation of the CAA requirements were first issued in November 1993 and have been amended several times. The regulations establish the criteria and procedures for transportation agencies to demonstrate that air pollutant emissions from LRTPs, TIPs, and projects are consistent with ("conform to") the state's air quality goals in the SIP. This document has been prepared for state and local officials who are involved in decision-making on transportation investments.

Transportation conformity is required under CAA Section 176(c) to ensure that federally supported transportation activities are consistent with ("conform to") the purpose of a state's SIP. Transportation conformity establishes the framework for improving air quality to protect public health and the environment. Conformity to the purpose of the SIP means FHWA and FTA funding and approvals are given to highway and transit activities that will not cause new air quality violations, worsen existing air quality violations, or delay timely attainment of the relevant air quality standard, or any interim milestone.

Grand Rapids Orphan Maintenance Area

The conformity area covered by the **TRANSPORTATION CONFORMITY DETERMINATION REPORT FOR THE 1997 OZONE NAAQS – GRAND RAPIDS ORPHAN MAINTENANCE AREA** consists of two counties: Kent and Ottawa. This report is included as Appendix B to the WestPlan 2045 LRTP. Within the boundary are the metropolitan planning organizations (MPOs) of GVMC (core city Grand Rapids), parts of the WestPlan (core city Muskegon), and MACC (core city Holland/Zeeland), as well as the rural projects contained in the STIP in Kent and Ottawa counties.

Findings of the transportation conformity report are for transportation activities contained within the conformity area. This conformity determination was completed consistent with CAA requirements, existing associated regulations at 40 CFR Parts 51.390 and 93, and the *South Coast II* decision, according to EPA's *Transportation Conformity Guidance for the South Coast II Court Decision* issued on November 29, 2018.

This conformity report is to ensure that the part of the MACC in Ottawa County satisfies its obligation to the CAA. The 2040 LTRPs of GVMC and WestPlan have not changed since the previous analysis. This analysis also includes all three areas' TIPs and their latest amendments. This report evaluates transportation activities contained in:

- MACC 2045 LRTP in Ottawa County
- MACC 2020-2023 TIP in Ottawa County
- GVMC 2040 MTP

- GVMC 2020-2023 TIP
- WestPlan 2040 LRTP in Ottawa County
- WestPlan 2020-2023 TIP in Ottawa County
- STIP projects in Kent and Ottawa counties

Transportation conformity for the 1997 ozone NAAQS for the MACC 2045 LRTP, WestPlan 2040 LRTP, GVMC 2040, MTP, all three 2020-2023 TIPs, and the rural STIP in Ottawa and Kent counties can be demonstrated by showing the remaining requirements in Table 1 in 40 CFR 93.109 have been met. These requirements, which are laid out in Section 2.4 of EPA's guidance and addressed below, include: Latest planning assumptions (93.110), Consultation (93.112), Transportation Control Measures (93.113), and Fiscal constraint (93.108).

In conclusion, the conformity determination process completed for the MACC 2045 LRTP, GVMC 2040 MTP, WestPlan 2040 LRTP, all three 2020-2023 TIPs, and the 2020-2023 STIP for Kent and Ottawa counties demonstrates that these planning documents meet the CAA and Transportation Conformity rule requirements for the 1997 ozone NAAQS.

Muskegon County Air Quality Analysis for Non-Attainment Area

Transportation conformity provisions of the Clean Air Act Amendments require metropolitan planning organizations (MPOs) to make a determination that the Long-Range Transportation Plan (LRTP), Transportation Improvement Program (TIP), and projects conform to the State Implementation Plan (SIP), and that regional emissions will not negatively impact the region's ability to meet the National Ambient Air Quality Standards (NAAQS).

Conformity to the SIP means that the region's LRTPs and TIPs 1) will not cause any new violations of the NAAQS; 2) will not increase the frequency or severity of existing violation; and 3) will not delay attaining the NAAQS. A demonstration is conducted by comparing emissions estimates generated from implementation of LRTPs and TIPs for analysis years to the motor vehicle emissions budgets (MVEBs) contained in the maintenance SIP.

The conformity area covered by the **AIR QUALITY CONFORMITY ANALYSIS FOR MUSKEGON COUNTY NON-ATTAINMENT AREA** consists of portions of Muskegon County. The purpose of this report is to document the process and findings of the transportation conformity analysis for the non-attainment and maintenance areas.

Non-attainment and Maintenance Areas

Muskegon County is partially an ozone non-attainment area and entirely an ozone maintenance area. Within the boundaries is part of the West Michigan Metropolitan Transportation Planning Program (WestPlan) MPO.

Findings of the transportation conformity analysis are for projects within Muskegon County. Projects in the WestPlan FY 2020-2023 TIP are included in the modeling, but not in the project list; except one

project that changed from exempt to non-exempt since the TIP was reviewed. Projects evaluated for this analysis are contained in:

- WestPlan 2045 LRTP and
- A new non-exempt TIP project.

A MITC-IAWG was held on October 10, 2019, to review projects in Muskegon County; individuals attended in person or by conference call. At the meeting, the Allegan non-attainment area was also discussed since both MPO regions extend into Ottawa County, which is part of the Grand Rapids 1997 ozone maintenance area. A MITC-IAWG was also held on December 16, 2019, to review one TIP project.

The Public Participation Plan, adopted by the MPO Policy Committee, establishes the procedures by which the MPOs reach affected public agencies and the public. The same procedures were followed for this document, ensuring the public has an opportunity to review and comment before the MPO policy committee makes a determination.

A formal public comment period for the draft Air Quality Conformity Analysis was held from March 19 to April 1, 2020. Public comments received and responses to the comments are included in the document.

All projects in the WestPlan 2045 LRTP were evaluated for inclusion in the analysis. Projects classified as non-exempt must be analyzed. Projects with exempt classification that can be modeled with the travel demand model were modeled. Appendix C includes a complete list of the projects evaluated for inclusion in this analysis. Projects in the WestPlan FY 2020-2023 TIP are included in the modeling but not in the project list; except one project that changed from exempt to non-exempt since the TIP was reviewed.

Conclusion

Conformity has a two-step endorsement process. The MPOs must make a formal conformity determination through a resolution that the findings of this conformity analysis conform to the SIP; thus, emissions are at or below the budgets found in the SIP. Then FHWA, jointly with the FTA, after consultation with the EPA, issues a letter of concurrence with the determination.

The staff of WestPlan finds that the LRTP and TIP conform to the SIP for the 2015 ozone standard and 1997 ozone standard based on the results of this conformity analysis. This report makes the determination that the region's transportation plan and programs satisfy all applicable criteria and procedures in the conformity regulations.

This conformity analysis document is subject to a public comment period of March 19 to April 1, 2020. Comments received will be recognized, considered, and a response provided.

The MPO policy committee will make a formal conformity determination, through a resolution, at the WestPlan Policy Committee on April 15, 2020.