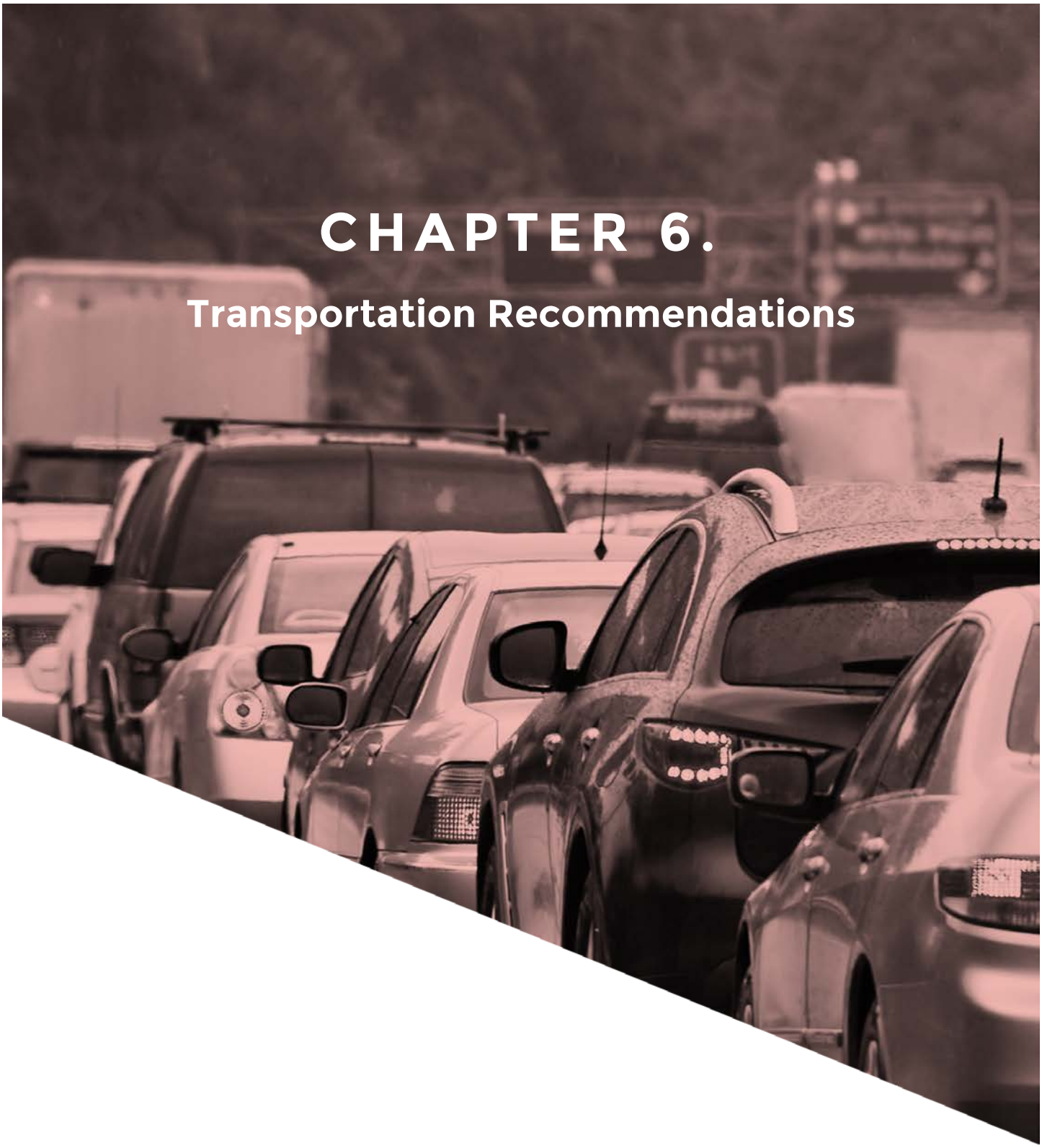


CHAPTER 6.

Transportation Recommendations

CURRENT STATE OF MICHIGAN'S TRANSPORTATION INFRASTRUCTURE

This long-term transportation plan will improve Michigan's deteriorating roads and bridges, making them safer for Michigan's families. The plan approved today is fiscally responsible and protects key investments essential to our state's comeback.

NONMOTORIZED

- Michigan has more than **20,000 miles** of trails, including **2,700 miles** of rail trails supporting transportation, recreation, and tourism.
- While Michigan's nonmotorized options continue to grow, it is still a patchwork system that can prevent safe connections between communities.

RAIL LINES

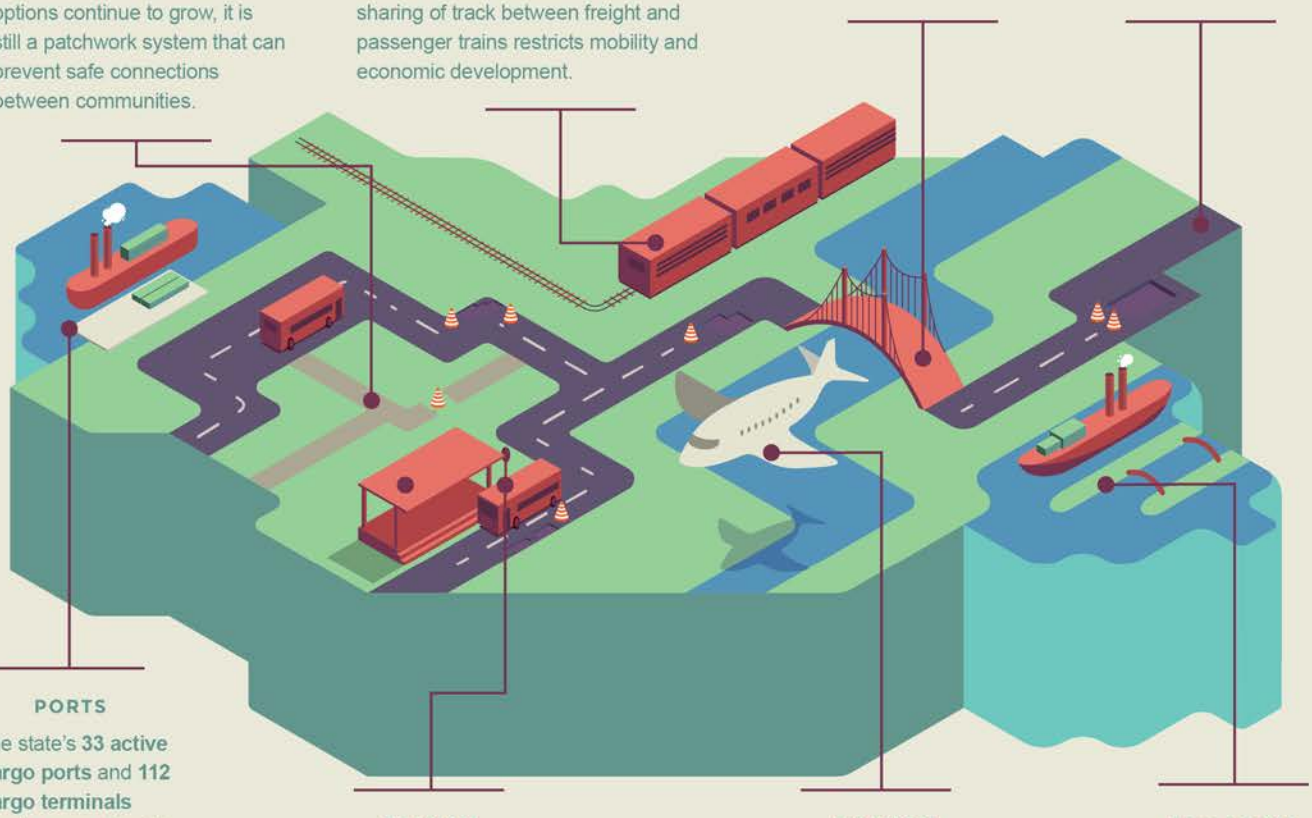
- Approximately **3,600 miles** of active rail lines carry **100 million tons** of freight cargo.
- Ridership on passenger rail routes has increased by nearly **40 percent** in the last ten years.
- The lack of passenger rail capacity and the sharing of track between freight and passenger trains restricts mobility and economic development.

BRIDGES

- Michigan has more than **11,000 bridges.**
- **1,200** of the state's bridges are structurally deficient or functionally obsolete.

ROADS

- Michigan's **600 road agencies** manage over **120,000 route miles.**
- **38 percent** of Michigan roads are in poor condition.



PORTS

- The state's **33 active cargo ports** and **112 cargo terminals** handle approximately **70 million tons** of cargo yearly.
- For the past few decades, many of Michigan's in-water navigation channels have not been maintained, limiting the efficiency of ports across the state.

TRANSIT

- More than **70 local transit systems** provide approximately **90 million passenger trips** annually.
- Three intercity passenger rail routes serve almost **750,000 riders** annually.
- Transit systems need funding to improve reliability and provide a broader range of service. Unfortunately, any publicly funded transit expansion in Michigan comes at the expense of other transit entities.

AVIATION

- More than **38.4 million passengers** are served through Michigan airports each year.
- Airports accommodate over **672.8 million pounds** of cargo and freight.
- Michigan's aviation system faces fiscal challenges, including decreased local resources for airport improvement and an increased reliance on state and federal grant programs.

SOO LOCKS

- **67 million tons** of cargo travel through the Soo Locks each year.
- A six-month shutdown would result in a national recession and **11 million U.S. jobs** lost.

Michigan has long been a leader in transportation innovation, building the nation's first mile of concrete highway (1909), installing the first traffic light (1918), deploying the first highway snow plow (1922), and building two of the nation's first three-level interchanges to service the Willow Run bomber plant (1940s), and opening of the Mackinac Bridge – the longest suspension bridge in the Western Hemisphere (1957).

Michigan has a history of many multimodal successes. Michigan is a recognized global leader in intelligent vehicle technology. It is also home to over 20,000 miles of nonmotorized trails, the most of any state in the country. In 1929, Michigan built the first crisscrossed aviation runways at Ford Airport in Dearborn, and in 2002, the new McNamara Terminal at Detroit Metropolitan Airport opened for business. In 2013, Michigan was the first state outside the Northeast Corridor to implement 110 mile-per-hour intercity train speeds between Kalamazoo and the Michigan/Indiana border. And the upcoming opening of the new Gordie Howe International Bridge has the potential to revolutionize the logistics industry in Michigan, making it an internationally competitive intermodal transportation and distribution hub.

EXHIBIT 11. Major Milestones of Michigan's Multimodal Transportation System

1909	The nation's first mile of concrete highway is built in Michigan
1918	Michigan installs its first traffic light
1922	The state deploys the first highway snow plow
1940s	Michigan builds two of the nation's first two-level interchanges to service the Willow Run bomber plant
1957	The Mackinac Bridge opened—the longest suspension bridge in the Western Hemisphere

Transit has been a big part of Michigan's intermodal transportation history, including state support for rural and specialized transit that predated federal transit programs. The recent Regional Transit Authority (RTA) ballot initiative narrowly failed voter approval. This proposal would have provided Southeast Michigan with a long-term solution for regional transit. Proponents will continue to work toward new strategies on RTA funding.

Michigan has been a transportation leader in asset management for roads and bridges, solidified by the formation of the TAMC in 2000. Because of transportation's robust history of asset management and data collection, transportation agencies across the state have very clear and scientifically sound information on the condition of their infrastructure, reported annually to the State Transportation Commission and the Michigan Legislature.

Although Michigan remains a leader in asset management planning, due to a lack of funding it has struggled with implementing its transportation asset management plan. As a result, Michigan has been unable to develop and maintain a world-class, intermodal transportation system.

According to the 2015 report from the TAMC, 39 percent of federal aid roads under local jurisdiction are in poor condition and 27 percent of all bridges in the state are structurally deficient or functionally obsolete. State highways, which were only rated 8 percent poor as recently as 2008, are currently 16 percent poor and projected to deteriorate even more rapidly in the years to come. Many bus transit systems are fragmented, inefficient, expensive, and unreliable. In addition, Michigan lacks robust rail transit as an option for travelers. Transit connectivity to city centers from Michigan's airports is inconvenient, if available at all. Meanwhile, marine infrastructure suffers from under funding. For example, the largest lock in the Soo Locks—the Poe Lock—is 50 years old; it is the only passage from Lake Huron to Lake Superior for 1,000 foot freighters and an unplanned closure would cause great economic harm to the nation.

The solid, scientific asset management data on declining road and bridge condition in Michigan means that an undeniably large investment will be needed to repair those roads and bridges. Deteriorating road and bridge conditions are a factor in road-related accidents and injuries; by improving Michigan's road and bridge condition, Michigan's residents and out-of-state visitors will be afforded a safer and more reliable transportation system. Transportation agencies across the state are very grateful for the transportation revenue package signed into law in 2015.[20] The asset management analysis predicted this added investment would not be enough to revive and sustain the condition of Michigan's roads, bridges, and transit over the long term, let alone prepare Michigan for the 21st century.

The past decade of piecemeal approaches to transportation funding, at both the state and the federal level, have undermined our state's progress.

The condition of Michigan's transportation systems did not erode overnight, but over several decades.

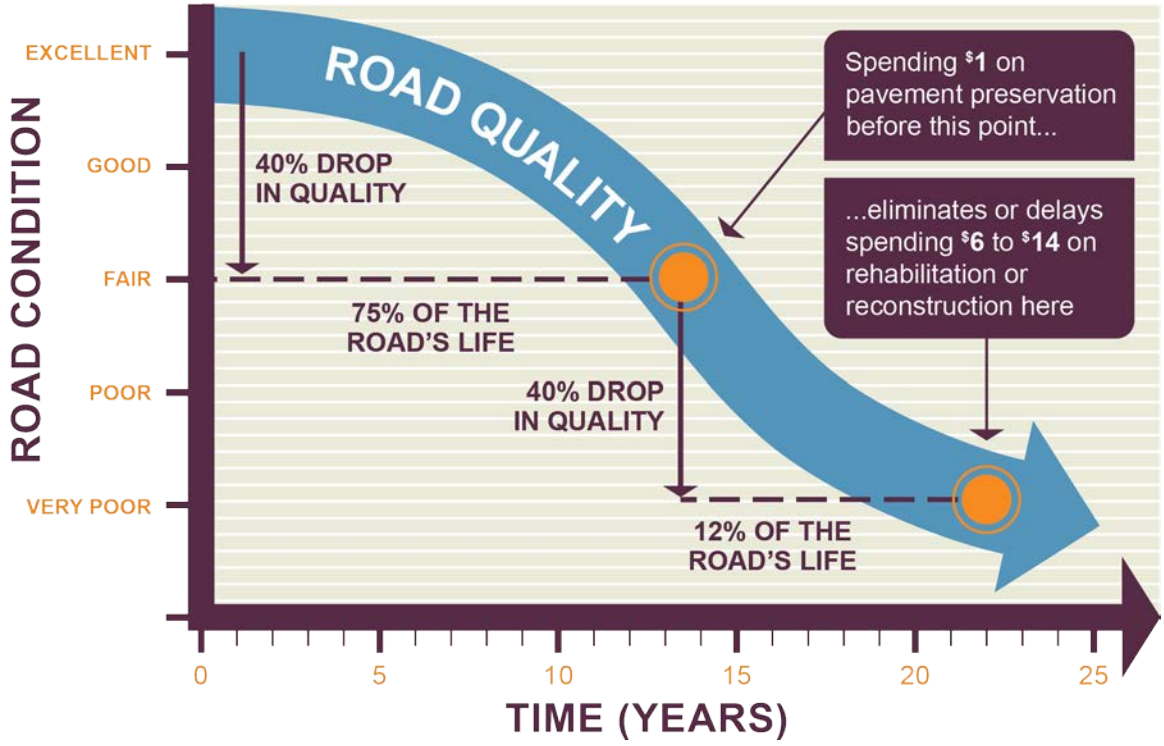
[20] In November 2015, the Michigan Legislature enacted a package of bills that provide new revenue for transportation. Beginning in 2017, there will be $450 million of new revenue, increasing to $1.2 billion (including $600 million of general funds) by 2021.

Shifting demographics have also made it difficult for transportation systems to remain reliable and efficient. It will take several decades to bring Michigan's intermodal systems back to a state of good repair that residents, businesses and travelers can rely on.

Sustainable funding sources at the state, federal, and local level are required to halt the continuing deterioration of transportation infrastructure and allow Michigan to take advantage of 21st century technology that will provide improvements to transportation service and safety.

Investment in transportation infrastructure provides a significant economic impact. On average, every $1.00 invested in the transportation sector infrastructure has an estimated economic impact of $4.24. The sizeable economic benefits associated with infrastructure investment are not the only reason to invest. There is also a case to be made for making infrastructure improvements sooner rather than later because deferring infrastructure investment will actually make a project more expensive as the costs of infrastructure repair and or replacement increases as quality declines. As shown in Exhibit 12, spending $1 on pavement preservation when a road is in fair condition eliminates or delays spending $6 to $14 on reconstruction when it is in very poor condition.

EXHIBIT 12. Road Condition and Preservation

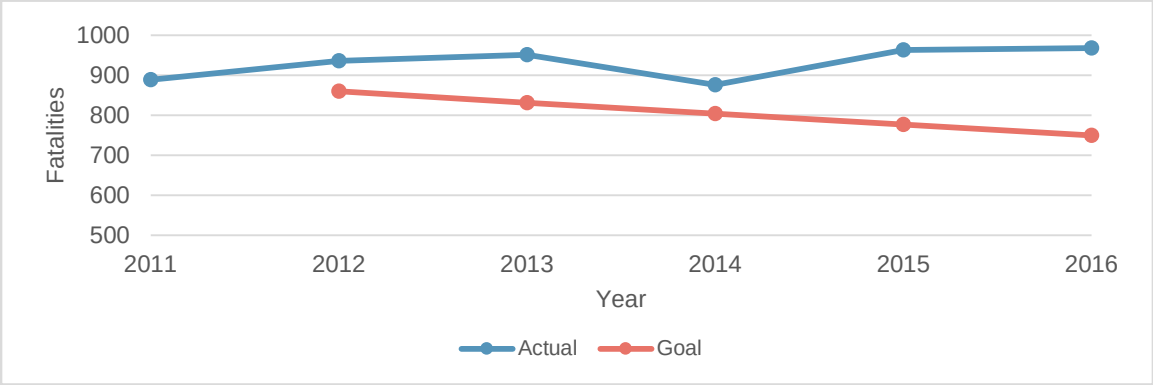


Source: AASHTO and TRIP 2009.

Value for money is important, but providing safe transportation systems is critical. As of November 29, 2016, there were 968 traffic deaths in Michigan in 2016 (MDOT n.d.). It is estimated that there will be more than 1,000 fatalities by the end of 2016. In addition to human suffering, fatalities and injuries cost Michigan nearly $9.6 billion in 2010 (U.S. DOT NHTSA 2015). Michigan currently has an active program titled, Toward Zero Deaths, that works to reduce traffic fatalities. The graph

below shows historical and current statewide motor vehicle fatalities—it is clear that without the proper investment in road and bridge condition, we are headed in the wrong direction.

EXHIBIT 13. Statewide Fatalities



Note: Actual projection expected to reach more than 1,000 deaths by the end of 2016.
Source: MDOT n.d.

The following recommendations outline ways to improve investment in Michigan's transportation infrastructure, while dramatically improving public safety through improved road and bridge conditions and the use of futuristic technology. These proposals offer a variety of high-quality, interconnected, efficient, and safe travel choices to improve the quality of life for all residents and Michigan's businesses. Michigan is poised to lead the development and deployment of 21st century transportation technologies, including intelligent vehicle technology and a robust intermodal transportation system. These recommendations chart a visionary path for Michigan's transportation planning, funding, and delivery systems to ensure safe, reliable, efficient, and cost-effective solutions.

Recommendations are organized by mode of transportation, future innovations, and sustainable funding opportunities.

Recommendations Key

EP	Economic Prosperity	HE	A Healthy Environment
QS	Reliable, High-quality Service	VI	Value for Investment
0-2	Implementation Start (in years)	0-2	Implementation Complete (in years)

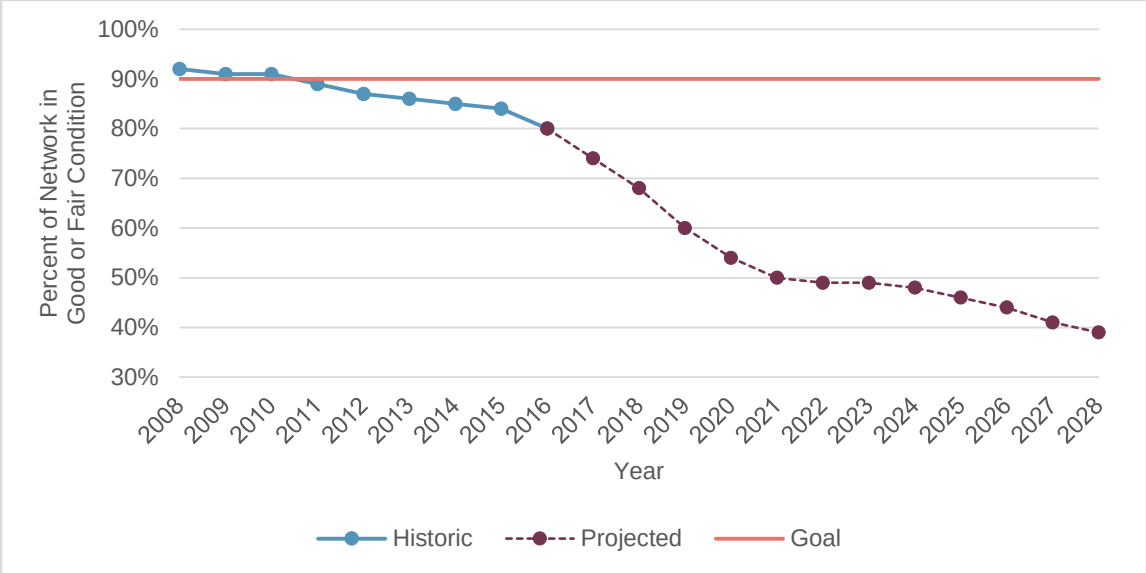
6.1 ROADS/BRIDGES – ROAD AND BRIDGE CONDITIONS

Where is Michigan today?

In 2007, Michigan achieved clear goals that were set for the condition of roads and bridges (90 percent good/fair), but has not been able to sustain that high level of performance since. While transportation agencies are certainly very grateful for the legislative action that will provide some new state funding for transportation beginning in 2017, the reality is that the need for investment, particularly in roads and bridges, will not be fully addressed by that action. Beginning in 2017, $450 million in new revenue from state gas taxes and vehicle registration fees will be distributed to more than 700 transportation agencies. That number rises to $600 million in 2018, but the full distribution of the entire $1.2 billion revenue package will not occur until 2021. Michigan's asset management agencies predict that without increased investment, road and bridge conditions will continue to deteriorate, and the conversation that has surrounded transportation funding in Michigan will remain necessary.

Michigan has 122,000 miles of roads, the ninth largest road network in the nation. Of all those miles, 36,500 miles are federally recognized as the most highly used portion of the system, carrying 96 percent of commercial traffic and 89 percent of all traffic in Michigan. It is imperative that Michigan repair these vital roads and bridges to ensure the safety of the traveling public.

EXHIBIT 14. Historical/Projected Trunkline Pavement Condition



Source: MDOT 2012.

Additional investment in highways and bridges will not only improve the condition of the systems that we use every day, it will also provide significant financial and safety benefits to the state and the public. Investing an additional $1.6 billion in state highway and bridge infrastructure annually would create or sustain 18,000 jobs, increase the gross state product by $1.5 billion annually, increase real personal income by $1.1 billion annually, and decrease economic loss due to fatalities.

What does a 21st century Michigan look like?

Michigan's road and bridge conditions are 95 percent good/fair for Interstates and principal arteries; 85 percent good/fair for other state highways; and 85 percent good/fair for county primary and major city roads. Michigan has the safest roads in the nation, striving for zero traffic fatalities in the next 30 to 50 years. More robust investment in transportation from new and sustainable sources of funding preserves vital infrastructure that is integral to Michigan's economic success. Appropriate reinvestment in the most highly used roads and bridges ensures a safe and reliable transportation system, supports new business growth and development, expands international commerce, and bolsters Michigan's manufacturing, tourism, and agriculture industries.

6.1.1 The Michigan Infrastructure Council and transportation agencies should work with the Michigan Legislature to identify and enact revenue options that will provide predictable and sustainable funding sufficient to return most higher level roads and bridges to good or fair condition. Given the magnitude of the need, a strong combination of state, federal and local funding will be needed to adequately solve the problem.

Estimated investment needed: $1 billion of state funds annually for Interstate and U.S. freeways and bridges; $600 million of state funds annually for other state highways and bridges; $600 million of state funds annually for other highly used roads and bridges under local jurisdiction[21]

[21] Estimates of investment required for state highways were generated by MDOT; estimates for roads under local jurisdiction were derived from "Michigan's Roads Crisis: How Much Will It Cost to Maintain Our Roads and Bridges? 2014 Update;" both estimates take into account the revenue from the new funding package.

6.2 ROADS/BRIDGES – BRIDGES AND CULVERTS

Where is Michigan today?

Michigan roads have hundreds of thousands of bridges, culverts, and other drainage infrastructure components, many of which are decades old and on the verge of failure. State agencies have identified at least 65,000 points throughout the state where Michigan's road and rail systems intersect with surface water systems. Many of these points may be undersized for current and future watershed conditions, increasing the potential for flooding. When flooding occurs or structures fail there are safety, environmental, economic, and social impacts.

What does a 21st century Michigan look like?

Michigan's road and rail systems are designed to ensure that rivers, streams, and drains remain free flowing to protect ecosystem health, as well as investments in transportation infrastructure.

How do we get there?

6.2.1 State, county, and local agencies should design and install road-stream crossings to ensure safe pedestrian and vehicle passage, and natural stream function and aquatic organism passage. Design approaches should match the life cycle of the road-stream crossing to future watershed conditions.

Estimated investment needed: $40 million of state funds

EP 6-10 11+

6.2.2 MDOT and MDNR should continue to follow state and federal required inspection processes for bridges, as well as hydraulic and drainage analysis for culverts. These agencies should complete regular statewide inspections of all in-service bridges to determine and record conditions using the newest available technologies and techniques. They should support research of new materials and accelerated processes for design and construction of bridges to maximize the life of structures while improving safety and reducing overall life-cycle costs. MDOT and MDNR should use asset management and preventative maintenance to extend the life of bridges.

Estimated investment needed: Will utilize existing staff resources

EP 3-5 6-10

6.2.3 MDOT should work with local road agencies to encourage inspection of culverts greater than five feet in diameter at least once every five years. Inspection results should be included in local road agencies' asset management plans.[22]

Estimated investment needed: $4 million of state funds annually

6.2.4 MDOT should undertake a pilot project to inspect and document all culverts running under state trunkline highways in one county, for the purpose of assessing data collection costs for a statewide asset management inventory of state highway culverts.

Estimated investment needed: Will utilize existing staff resources

6.3 ROADS/BRIDGES – SEASONAL WEIGHT RESTRICTIONS

Where is Michigan today?

Michigan's paved roads are made of concrete or asphalt, and while they may appear solid, they can become particularly fragile during the spring months, when frost is leaving the ground. As frost melts beneath a paved road, the road bed can become saturated with water, making it unstable and susceptible to damage by trucks and heavy equipment.

To protect paved roads during the spring, Michigan road agencies have seasonal weight restrictions that limit heavy loads. MDOT and local road agencies may have different load restrictions based on the structural capacity of their roads. The depth of frost governs the restriction time frame. Restrictions are lifted when the frost is completely gone.

Trucking companies can respond to weight restrictions in a variety of ways—by reducing loads, adding trips, traveling more complicated routes, delaying deliveries, or even shutting down and laying off workers until restrictions are lifted. All of these responses drive up transportation costs.[23]

Every day that can be subtracted from seasonal load and speed restrictions saves shippers money, but a few days' error in restricting loads can cause significant pavement damage, which costs taxpayers money. Because of different weather and soil conditions, there will always be variety in the duration of weight restrictions across the state, but MDOT uses automated ground-temperature collection coupled with statistical models of frost behavior to more precisely minimize the imposition

[22] Inspection costs are estimated at between $300 and $350 per culvert.
[23] According to a 2015 survey by the American Transportation Research Institute, the average marginal cost of operating a truck is $63.70 per hour.

of spring weight restrictions. Local road agencies typically follow MDOT's recommendations, but are not obligated to do so.

What does a 21st century Michigan look like?

Michigan's road agencies collaborate to develop consistent regional standards for identifying times when the roads can be reopened to transport goods by truck. Advances in technology allow transportation agencies to collect and report real-time data on weather and temperature conditions that has helped minimize the impact of seasonal weight restrictions. Based on asset management and economic priorities, a robust all-season network of roads adequately serves shippers.

How do we get there?

6.3.1 MDOT and local road agencies should work together to improve regional consistency and the permitting process in order to create coordinated seasonal weight restriction systems between road agencies.

Estimated investment needed: Will utilize existing staff resources

6.3.2 Based upon economic considerations, MDOT and local communities should evaluate and prioritize the need to convert additional roads to all-season conditions. Using the statewide asset management database (as referenced in Chapter 3), and in coordination with public agencies and private utilities, plan and fund the conversions to all-season roads in a timely and strategic manner.

Estimated investment needed: $450,000 per lane mile, for the incremental additional cost of reconstructing as an all-season road rather than a seasonally-restricted road

6.4 TRANSIT, PASSENGER, AND FREIGHT RAIL

Where is Michigan today?

Michigan's bus transit, passenger rail, and freight rail systems are part of an intermodal transportation system with a diverse mix of facilities in both public and private ownership. All three of these systems compete for state funding from the Comprehensive Transportation Fund (CTF); therefore, improvements in any one mode come at the expense of the others. Each of these three modes is addressed below:

- **Bus transit:** Michigan's bus transit system is diverse, with 79 public transit agencies, including 20 urban transit organizations and 38 specialized transportation providers. Residents make more than 100 million trips annually on local public bus transit in Michigan.

Operation of bus transit systems contributes an estimated $740 million to the economy each year and support over 5,000 jobs annually.

Transit provides mobility for those who do not own a car or cannot drive. Bus transit improves safety and air quality, reduces road traffic, and encourages economic development. Transit service in many Michigan communities needs improvement to better serve riders, such as county-wide service, Saturday/Sunday service, or service that crosses county lines. Investment is needed to ensure buses remain in a state of good repair to provide safe, efficient transit service.

There are also a number of efforts to expand transit service in urban areas. Unique partnerships can assist in these efforts, such as the QLine in Detroit, which is primarily privately funded. The bus rapid transit (BRT) service in Grand Rapids, along with other BRT systems nationwide, serve as a model for the four-county region of Southeast Michigan, and Lansing.

National models have shown that every dollar invested in light rail or rapid transit can return up to six dollars in economic benefits, including local economic development around transit stops.

Operations and capital improvements compete with other funding requirements from the CTF. The recent Southeast Michigan four-county RTA ballot initiative narrowly failed voter approval. This proposal would have provided Southeast Michigan with a long-term solution for regional transit, any publicly funded transit expansion in Michigan comes at the expense of all other transit in Michigan.

- **Intercity passenger rail:** In contrast to bus transit systems that are largely operated locally, intercity passenger rail service is provided by Amtrak, a federal entity. As required by federal law, the State of Michigan provides support for Amtrak passenger rail service from the CTF. Michigan also contracts with Amtrak for the operation of trains that add or extend service to three routes, linking Detroit/Pontiac, Grand Rapids, and Port Huron with Chicago. In 2012, MDOT acquired 135 miles of passenger rail track between Kalamazoo and Dearborn, which are being improved to expand existing 110-mile-per-hour (mph) passenger rail service in the Chicago-Detroit corridor. Improvements underway include double-tracking portions of the corridor; track rehabilitation; installation of new signals and positive train controls; station renovation, construction, or relocation in Pontiac, Troy, Dearborn, Jackson, and Battle Creek; and a multistate partnership to acquire new locomotives and rail cars. New stations have also been constructed in East Lansing and Grand Rapids to upgrade passenger service in other rail corridors.

  Population, employment, and income across Midwestern states are projected to grow over the long term, and this growth is expected to result in an increase in intercity travel throughout the Midwest. The lack of existing passenger rail capacity and the sharing of track between freight and passenger trains currently create operational problems that restrict both mobility and economic development.

- **Freight rail:** Most of Michigan's freight rail assets are privately owned and maintained, and most investments are made by private companies. The freight rail system includes approximately 3,600 miles of tracks across the state, operated by 24 freight railroads, including four Class I railroads, two regional railroads, and 15 short-line railroads. MDOT oversees approximately 665 miles of State-owned rail lines.

  Because most rail assets are privately held, the full need for additional investment is not known. MDOT uses CTF dollars to preserve state-owned rail lines, and provide freight economic development loans that encourage private investment. MDOT also provides dedicated Michigan Transportation Fund (MTF) and federal dollars to assist with safety enhancements at railroad crossings that benefit both railroads and road users. The ratio of public and private funding for rail projects varies depending on the project.

  The Commission's vision to reinvent Michigan as a center of international trade requires developing freight infrastructure that will meet the modern-day demands of a globalized economy. MDOT competes for federal funds to assist with rail capital enhancements that will improve freight rail services. For example, the State of Michigan is taking the lead in a partnership with the four Class I railroads to develop the Detroit Intermodal Freight Terminal (DIFT), which will consolidate and expand the intermodal terminal capacity serving Southeast Michigan. For this $539 million project, the State will provide 60 percent of the funding, with the private railroads providing 40 percent. The project, which will take several years to complete, will improve junction points among the railroads and provide improved access between the intermodal terminals and the highway system. Improved facilities and increased intermodal traffic will result in fewer long-distance truck trips on Michigan's highway system.

What does a 21st century Michigan look like?

Michigan has a reliable and safe rail system, consisting of an integrated freight network that serves a global economy, higher speed passenger rail, and a robust transit network that meets the needs of both urban and rural communities throughout the state.

- **Bus transit:** The four-county area in Southeast Michigan has a BRT solution. Transit systems are more reliable and provide a broader range of service, including county-wide, cross-county, and Saturday/Sunday service where appropriate. Buses are maintained in a state of good repair, emissions are reduced with clean diesel buses, repair costs are reduced, and reliability is increased. Urban areas of the state are served by BRT or commuter rail. Allowing BRT to have signal priority at intersections will make it a more efficient alternative, and reduce time between destinations. Greater use of mobile technology for transit systems allows more passengers easy access to information regarding the timing. These safe, efficient and cost-effective transit systems attract more riders.
- **Intercity passenger rail:** Rail service provides 110-mph service throughout the Detroit-Chicago corridor, and MDOT works with the railroads to install positive train control across the state, and initiates commuter rail service where appropriate, increasing ridership, creating jobs, and bringing economic opportunities and new talent to Michigan.

Good transit systems promote residential density and economic development along their corridors. Regional transit systems provide mobility and employment access to residents across a given region. Improvements to passenger rail service support economic development near rail stations, spurring investment that serves both existing neighborhoods and areas targeted for a transition from industrial uses to urban infill development. The introduction of passenger stations in existing or planned commercial settings strengthen business and development opportunities. Transit services, particularly in Michigan's large urbanized areas, are expanded to produce 21st century service, and Michigan cities will use these investments to compete nationally and globally.

- **Rail freight:** Investment in intermodal projects such as the DIFT in Southeast Michigan increases capacity and interconnectivity and helps provide for future intermodal freight demand to support Michigan's economic competitiveness. The DIFT creates 4,500 permanent jobs in Michigan, with 2,360 of those in the Detroit area, along with over 600 construction jobs in the peak construction year. Additionally, there is increased government revenue of more than $1 billion (2008 dollars) by 2030 as a result of increased business activity. Efficiencies and reliability are improved, therefore reducing operating costs to shippers, air pollution, and crashes (MDOT 2010).

  In rural areas like Northern Michigan and the Upper Peninsula, freight rail remains a critical option, particularly for exporting agricultural products and timber. The State preserves rail access in these underserved communities by working with private sector railroads to preserve and improve rail.

How do we get there?

6.4.1 The Michigan Legislature should enact alternative sources for transit funding or provide additional funding for the CTF to encourage robust bus transit, passenger rail, and rail freight systems in Michigan. Increasing the amount of available match funds from the State of Michigan will also allow transit agencies to seek greater federal capital funding.

Estimated investment needed: $430 million per year of state funds from the CTF

6.4.2 Transit agencies should integrate new technology into their transit services and work with MDOT to support their efforts to modernize their technology systems.

6.4.3 MDOT should continue to work in partnership with the railroads to develop components of the DIFT as warranted by increasing volumes of railroad traffic.

Estimated investment needed: A one-time investment of $539 million of public ($323 million) and private ($216 million) funding over several years

6.4.4 MDOT should identify current and future passenger and freight rail service needs and gaps in Michigan as part of its effort to update the federally required State Rail Plan and State Freight Plan.

Estimated investment needed: Will utilize existing MDOT staff resources

6.5 MARINE FREIGHT – SOO LOCKS

Where is Michigan today?

The Soo Locks are a critical part of the freight transportation infrastructure of the Great Lakes region. Located on the St. Mary's River between Michigan and Ontario, the Soo Locks are owned and operated by the U.S. Army Corps of Engineers and provide a vital link between Lake Superior, the other Great Lakes, and the rest of the world. Nearly 4,000 American, Canadian, and foreign flag vessels pass through the locks annually, carrying more than 65 million tons of iron ore, stone, low-sulfur coal, grain, cement, and other cargoes. Approximately 80 percent of the raw materials used by U.S. steel manufacturers, as well as much of the low-sulfur coal used by regional electric utilities, pass through the locks. The nearly 50-year-old Poe Lock is the only lock capable of accommodating the largest Great Lakes vessels that carry 70 percent of all cargo passing through the locks and account for 3.2 percent of the total U.S. GDP (U.S. Department of Homeland Security October 2015; Kowall 2016). This critical reliance on a 50-year old single lock is unwise and unsustainable.

The U.S. Department of Homeland Security recently completed an analysis of the impacts resulting from a six-month unscheduled closure of the Poe Lock. The findings are staggering: there would be a complete shutdown of Great Lakes steel production; 75 percent of U.S. integrated steel production would cease; 80 percent of iron ore mining would cease; and nearly 100 percent of the North American appliance, auto, construction equipment, farm equipment, mining equipment, and railcar manufacturing would cease. There would be 11 million job losses in the U.S., plus more in

Canada and Mexico, and a $1.1 trillion decrease in GDP (U.S. Department of Homeland Security October 2015). This would likely result in widespread bankruptcies and a recession.

Today, the construction of the new lock has been and remains stalled. In 1986, Congress authorized construction of a second large lock equal in size to the Poe Lock in order to provide the necessary capacity and redundancy. The new lock will be constructed on the site of two obsolete locks built during World War I that are now permanently closed. Except for some limited preliminary construction in 2009–2010, the project has stalled due to lack of federal funding. As originally authorized, the project required a nonfederal cost share of approximately 35 percent. Subsequent legislation in 2007 removed that requirement, and the project is now authorized for construction at full federal expense. A remaining obstacle is a low benefit-to-cost estimate for the project, the result of flawed assumptions in the original methodology. The U.S. Army Corps of Engineers is currently conducting an economic reevaluation based on more accurate assumptions. The study is scheduled to be completed in December 2017 and is expected to produce a significantly higher benefit-to-cost ratio, which will allow the Chief of Engineers to formally advance the project to Congress for funding.

What does a 21st century Michigan look like?

The Governor, Michigan's Congressional delegation, Michigan Legislature, and private stakeholders impacted by the Soo Locks work together to demonstrate the importance to national commerce of the new lock. As a result, a new lock is constructed with dimensions equal to the existing Poe Lock, providing long-term capacity, reliability, and redundancy for operation of the system. The potential for a long-term loss of 11 million jobs nationally and $1.1 trillion hit to the U.S. economy is eliminated. As a vital component of the Great Lakes' regional transportation system, the Soo Locks infrastructure is maintained and updated to accommodate commerce needs.

How do we get there?

6.5.1 The Michigan Legislature should pass a resolution to urge the federal government to expedite completion of the Economic Reevaluation Report currently being prepared by the U.S. Army Corps of Engineers and to provide the necessary funding to construct the new lock.

Estimated investment needed: Approximately $580 million of federal funding invested over several years

Implementation: Report should begin in the immediate term (0-2 years) and be completed in the short term (3-5 years)[24]

[24] New lock construction should be completed in the medium to long term (6-11+ years)

6.6 MARINE FREIGHT – PORT AUTHORITY LANDSIDE IMPROVEMENTS

Where is Michigan today?

Michigan's Port Authority Act (P.A. 639 of 1978) authorizes the establishment of port authorities in cities and counties. To date, the Detroit/Wayne County Port Authority is the only such authority established under this act. Currently, the act defines port facilities as various infrastructure components related to marine transportation, which are specifically owned by the port authority. This ownership provision is viewed as a constraint to further develop a port's commercial or recreational maritime activities, because it limits the port authority's ability to work with landside private sector partners. In 2014, there were 29 active cargo ports that handled 68.1million tons of cargo (MDOT 2015).

What does a 21st century Michigan look like?

Public port authorities help develop the marine transportation system that serves Michigan's businesses and industries. Port authorities work in partnership with the private sector to address the needs of commerce, without jeopardizing existing private sector operations or investments. Michigan sustains or increases the commercial activity generated by its ports each year.

How do we get there?

6.6.1 The Michigan Legislature should consider legislation that provides port authorities with the flexibility to form private sector partnerships for the purposes of developing contiguous and adjacent landside infrastructure consistent with the local vision for the port.

6.7 MARINE FREIGHT – ROUTINE PORT MAINTENANCE

Where is Michigan today?

Maintenance of Michigan's port infrastructure is critical for the efficient operation of our intermodal transportation system. There are two major components of port infrastructure: onshore marine terminal facilities, and the in-water navigation channels that serve them. With only a few exceptions, the vast majority of terminals in Michigan are owned and operated by private companies, which are responsible for their maintenance.

Many of Michigan's commercial ports are served by federal navigation channels that were authorized by Congress. The U.S. Army Corps of Engineers is responsible for maintaining these channels, typically by dredging them to their authorized depths, with funds from the Harbor Maintenance Trust Fund. For the past few decades, many of these channels have not been

maintained at their full authorized dimensions because the federal administration has only released about half of the taxes collected and deposited into the trust fund. Recent federal legislation will eventually ensure that all the taxes collected will be used for their intended purpose, and maintenance of the federal channels should no longer be a major issue.

These federal navigation channels do not extend all the way to the shore, and individual terminal owners are responsible for dredging at their own docks and out to the federal channels. If channel dimensions are not maintained, vessels must be light loaded, or worse, become commercially unusable.

While the U.S. Army Corps of Engineers annually assesses the dredging needs for the federal channels, there is a lack of information regarding maintenance needs at the docks themselves as well as in the private navigation channels serving those docks. The Conference of Great Lakes and St. Lawrence Governors and Premiers established the Maritime Task Force which completed a first-ever maritime transportation system asset inventory. While the conference does not have the authority to inspect the infrastructure at private marine terminals, it does have an interest in understanding the total needs for the marine transportation system. Toward that end, the conference established the Maritime Data Working Group to update the existing marine transportation system asset inventory, identify available data and data gaps, and document public and private sector investments. While the dredging needs for public navigation channels are readily identifiable, those for private docks will likely remain incomplete. Data that are ultimately collected can be used to guide future public policy and funding decisions to increase the efficiency of the freight transportation system.

What does a 21st century Michigan look like?

Michigan has an extensive system of congressionally authorized federal navigation channels that were constructed and are maintained by the U.S. Army Corps of Engineers. All public channels are maintained at their congressionally authorized depth. The private sector has developed most of the landside port infrastructure, including marine terminals, based on the existence of these public navigation channels. The public channels are properly maintained in order to preserve continued operations of Michigan's commercial ports.

How do we get there?

6.7.1 The Office of the Governor, Michigan's Congressional delegation, and the Michigan Legislature should encourage Congress to provide the necessary funds and encourage the U.S. Army Corps of Engineers to prioritize fully maintaining the federal navigation channels at their congressionally authorized dimensions to ensure that port conditions do not deteriorate.

Estimated investment needed: Will utilize existing staff resources

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6.7.2 The Conference of Great Lakes and St. Lawrence Governors and Premiers should specifically analyze the dredging needs for individual docks and nonfederal navigation channels, including privately owned facilities to the greatest degree possible.

Estimated investment needed: Will utilize existing staff resources

6.7.3 MDOT should encourage the appropriate state, county, and city road agencies to work together to perform infrastructure assessments that would evaluate the needs of “last mile” roads that serve as connectors linking port facilities with the highway system.

Estimated investment needed: Will utilize existing MDOT staff resources

6.8 AVIATION

Where is Michigan today?

Michigan’s aviation infrastructure is supported through a complex system of federal, state, and local partnerships and funding mechanisms. While most view Michigan’s aviation infrastructure simply as one of the 18 commercial service airports in cities like Detroit, Grand Rapids, and Flint, the state’s other 217 general aviation airports and public heliports contribute to a robust and vibrant overall aviation system able to connect travelers, businesses, emergency responders, and others within minutes.

The State of Michigan continually monitors pavement condition using a measure termed Pavement Condition Index and is described on a range of 0 or failed pavement to 100 or excellent pavement. The overall PCI for the state’s most utilized airports is 66. While airport pavements are critical and continually monitored, and maintained they are supplemented by unseen systems like weather observation stations, navigational aids, and instrument landing systems which aid in the safe arrival and departure of aircraft.

The continued rise in operating, maintenance, and construction costs coupled with major airlines reducing service to rural areas has increased the financial burden on local municipalities, which in most cases, own their airport. Programs like the Federal Aviation Administration Airport Improvement Program and the State of Michigan’s Airport Improvement Program support local municipalities that require assistance in maintaining their existing infrastructure.

In recent years and in response to reduced revenue collections, the Michigan Legislature sought to increase funds available for airport improvements by dedicating a portion of sales tax revenue to the State Aeronautics Fund and MDOT’s airport grant programs. This additional revenue helps support small community airports that serve as a lifeline to major hubs, and allows larger airports to attract additional federal grants.

What does a 21st century Michigan look like?

Michigan's airport infrastructure is included in the statewide asset management database. Michigan's future aviation system finds solutions for many of the fiscal challenges that exist today including decreased local resources available for airport improvement. The goal is to continue growing aviation's annual $10 billion contribution to the economy (MDOT 2016).

Additionally, airports are faced with new challenges, including larger and heavier aircraft at the large commercial service airports and increased very light jet (VLJ) business and personal aircraft at the general aviation airports. The proliferation of unmanned aerial systems, some of which can carry a large payload and possibly passengers, may also pose unprecedented challenges and opportunities for community airports across the state.

How do we get there?

6.8.1 MDOT will complete a comprehensive assessment of general aviation needs across Michigan as part of the ongoing Michigan Airport System Plan update, as well as examine existing capacity, use, costs, and revenues the State receives in order to determine whether the system of airports properly supports the future needs of Michigan communities.

Estimated investment needed: A one-time cost of $425,000 to update the plan, using state funds[25]

6.9 INTELLIGENT VEHICLE TECHNOLOGY

Where is Michigan today?

Michigan is the global leader in intelligent vehicle[26] technology that includes connected, autonomous, and automated technologies. Michigan is currently vying for federal designation as the nation's testing facility for intelligent vehicle technology, but it is in direct competition with California's Silicon Valley and other centers of innovation. Planet M, an initiative run by the MEDC and MDOT, is working to make the state the global center of mobility and innovative transportation technology. In partnership with numerous auto manufacturing companies, technology companies, private stakeholders, and Michigan universities, the State is working to lead the nation in advancing this technology. Planet M is Michigan's initiative to advance intelligent vehicle technology, such as the U.S. Department of Technology's testing facility in Oakland County, a deployment in the city of Detroit, and the Safety Pilot Model Deployment/Ann Arbor Connected Vehicle Test Environment. MDOT also partnered with the University of Michigan to develop the Mcity Test Facility and to

[25] A consultant contract is already in place to develop the Michigan Airport System Plan.

[26] "Intelligent vehicle technology" refers to connected, autonomous, or automated vehicle technology throughout this chapter.

continue development of the American Center for Mobility at the site of the former Willow Run Ford Motor Company manufacturing complex in Ypsilanti.

There are implications for infrastructure investment that accompany these new technologies, but the industry is so new, and advancing so rapidly, that it is difficult to identify all of them with any certainty. However, Michigan remains committed to keeping its global leadership position.

What does a 21st century Michigan look like?

Advancements in intelligent vehicle technology optimize the movement of people and goods and dramatically increase safety, supporting the Toward Zero Deaths program. Intelligent vehicles are the most transformative transportation advancement in generations, reshaping 21st century transportation. The technology changes cities, commuting, the freight industry, and even the vehicle ownership model. Intelligent vehicle technology is the key to Michigan achieving its zero fatality goal in the next 30 to 50 years. Michigan is the world leader of this technology transformation.

Intelligent vehicle technology is part of a larger discussion about the Internet of Things (IoT), a system of interrelated objects that can transfer information over a network without requiring human-to-human or human-to-computer interaction (see Chapter 4). The implications of the IoT for the transportation industry are significant; it transforms the way manufacturers make vehicles and requires a change in how transportation agencies deliver services to meet the ever-changing needs of 21st century mobility. Advancements in technology dramatically increase safety by eliminating human error and environmental risks, and provide mobility to a greater portion of the population, including the elderly, disabled, and children. These advancements also shape Michigan's economy. As a focal point of the global automotive industry, Michigan gains much from new vehicle research, development, and manufacturing.

How do we get there?

6.9.1 The Michigan Legislature, Governor, and relevant stakeholders should pass, sign, and support the implementation of currently proposed legislation that will enable Michigan to stay at the forefront of the intelligent vehicle industry.

6.9.2 MDOT and the MEDC should work with auto manufacturing companies, technology companies, private stakeholders, and Michigan universities to support the development of intelligent vehicle through investment in research, and develop a plan to invest in the installation of new technology.

Estimated investment needed: Will utilize existing staff resources

6.9.3 The Governor's Office and MDOT should promote Michigan as the focal point of the global intelligent vehicle industry.

Estimated investment needed: $20 million of state funds per year for continued installation and implementation of intelligent vehicle technology

6.9.4 MDOT and the MEDC should leverage unique partnerships between governmental agencies, companies, universities, and other organizations to advance Michigan's intelligent vehicle industry.

Estimated investment needed: $2 million of state funds for staff time and consultant contract

6.9.5 The Michigan Infrastructure Council (see Chapter 3) should include an emerging technologies group that is tasked with research, education, and coordination of implementing innovative technologies that impact infrastructure planning and delivery, particularly the emerging autonomous vehicle industry.

Estimated investment needed: Will utilize existing MDOT staff resources or consultant contract

6.10 SIGNALIZED INTERSECTION TECHNOLOGY

Where is Michigan today?

Traffic congestion is prevalent on many arterial corridors in Michigan. Since traffic signals serve as the primary points of delay along these routes, improving traffic signal efficiency offers the greatest potential for reducing motorist delay and increasing safety. Much of Michigan's traffic signal infrastructure is antiquated, particularly on county and city arterial networks. While traffic signal modernization is occurring throughout the state, there are hundreds of inefficient traffic signals still in operation.

What does a 21st century Michigan look like?

Recognizing that we cannot build our way out of congestion, Michigan improves the operation of what we have—without adding lanes. This is particularly relevant in urban areas where signalized arterial corridors are vital for moving traffic via multiple modes. Michigan leads the nation in traffic signal efficiency, maximizing the safety and capacity of signalized arterial corridors using state-of-

the-art technologies. Our traffic signals are "smarter," in order to respond to changing traffic demands, reduce motorist delay, and increase safety. Comparatively, improved signal timing typically requires little or no infrastructure costs and produces a very high benefit to cost ratio by operating the existing system with greater efficiency and reduced congestion. For example, improvements to an 11-intersection arterial in Saint Augustine, Florida, showed reductions of 36 percent in arterial delay, 49 percent in arterial stops, and 10 percent in travel time, resulting in an annual fuel savings of 26,000 gallons and a cost savings of $1.1 million (U.S. DOT FHA 2015).

How do we get there?

6.10.1 The Michigan Infrastructure Council should work with local road agencies to elevate traffic signal infrastructure as a key asset of similar importance to road condition and bridge condition and encourage each road agency to pursue a goal to modernize and optimize the timing of 90 percent of traffic signals in congested corridors with current and emerging technologies, including signal communications, interconnectivity, transit signal priority, and vehicle detection equipment.

Estimated investment needed: These investments are included in MDOT, county, local asset management plans, and annual budgets.[27]

6.11 NONMOTORIZED TRANSPORTATION

Where is Michigan today?

Many Michigan communities have undertaken robust local planning efforts to invest in nonmotorized transportation through local "complete streets"[28] policies and nonmotorized plans.

In fact, Michigan is a leader in local implementation of nonmotorized transportation innovations, like the development of rail trails that preserve railroad right-of-way for use by pedestrians and bicyclists; road diets, where four-lane roads are converted to three vehicle lanes and two bike lanes; and local Complete Streets policies.

[27] The cost to update intersection timing is currently estimated at $4,000 per signal, and the current cost to replace a signalized intersection with new technology is estimated at $150,000 per intersection (DeVries 2016).

[28] Complete streets is a transportation policy and design approach that requires streets to be planned, designed, operated, and maintained to enable safe, convenient and comfortable travel and access for users of all ages and abilities regardless of their mode of transportation.

Meanwhile, MDOT and Michigan's metropolitan planning organizations collaborate on regional-level nonmotorized planning initiatives, and statewide efforts, such as the Iron Belle Trail, are improving cross-community trail linkage efforts.

While Michigan's nonmotorized transportation options continue to grow, it is still a patchwork system that can prevent nonmotorized users from making safe connections between communities. More regional coordination and cooperation is necessary to fully develop recreational tourism options that might help visitors fully utilize our world-class trail system and on-road bicycle route system.

What does a 21st century Michigan look like?

Michigan holds a top-five ranking in the development of bicycle and pedestrian infrastructure. Communities offer robust nonmotorized transportation options for both transportation and recreation purposes. Stretching from one corner of the state to the other, the completed Iron Belle Trail is one of the longest designated state trails in the nation, a recreational tourism draw that will bring visitors from across the world to enjoy Michigan's pristine forests, cool rivers, and charming towns.

Across Michigan, communities have adopted complete streets planning principles at the regional level to help knit together disparate sections of on-road bicycle facilities and off-road trail networks that were previously a patchwork system. With strong regional nonmotorized planning processes in place, communities statewide have created seamless regional nonmotorized system linkages that help people of all ages and abilities stay active and connect to jobs, housing, and services, both on bike and on foot.

How do we get there?

6.11.1 MDOT should continue to work with road agencies to encourage full integration of bicycle and pedestrian planning into transportation infrastructure planning, including by implementing performance measures that evaluate the connectivity of nonmotorized facilities.

Estimated investment needed: Will utilize existing MDOT staff resources

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6.11.2 MDOT and MDNR should work with regional transportation coordinating bodies to encourage or incentivize communities to coordinate their nonmotorized investments and work toward improving connectivity across communities.

Estimated investment needed: Will utilize existing staff resources

6.11.3 MDOT and MDNR should study the potential to create new incentives or realign existing incentives to further enhance and encourage coordinated nonmotorized planning, both between communities and at the regional level.

Estimated investment needed: Will utilize existing staff resources

6.12 RIGHT-SIZING

Where is Michigan today?

Today, we are still using the road and bridge infrastructure that was built to support the state's booming 20th century manufacturing economy. Roads and bridges that once carried thousands of cars a day may currently carry much less traffic and present opportunities for right-sizing.

Right-sizing transportation infrastructure can take many forms. Right-sizing can involve adapting underused rights-of-way to safely serve bus, rail, bicycle, and pedestrian travel, as well as cars and trucks. It can mean managing operations to maximize the effectiveness of the existing system without adding new capacity. It can include modernizing existing infrastructure, incorporating new technology, updating to meet new safety standards, and adding capacity where appropriate.

Right-sizing infrastructure can also lead to a greater emphasis on placemaking and context-sensitive solutions that serve the needs of motorists, but are still aligned with local needs, whether a large urban downtown or a small town main street.

What does a 21st century Michigan look like?

In the 21st century, transportation infrastructure needs to support a greater variety of businesses and a new, more mobile workforce. New technology and continued innovation improve not just physical infrastructure but how the assets are used. More flexible designs and new transportation technology make transportation systems and the communities they serve safer and more adaptive, as well as technologically smarter and more connected. Better, more efficient, and more coordinated transportation alternatives make Michigan more attractive to young talent and better serve the mobility needs of an aging population. These modern transportation systems also better support Michigan's growing 21st century economy.

How do we get there?

6.12.1 MDOT should identify and work with stakeholders across all modes to complete a comprehensive assessment that determines the kind of transportation infrastructure that is needed—and where—to support the industries and communities Michigan expects to have in the future.

Estimated investment needed: Will utilize existing staff resources or a consultant contract

6.12.2 MDOT should continue to work with local agencies and transportation stakeholders to identify areas of the state where excess road infrastructure undermines the potential for community success, develop context sensitive solutions to transportation problems, and encourage the use of design solutions that make more effective and beneficial use of the excess road capacity.

Estimated investment needed: Will utilize existing staff resources or a consultant contract

6.12.3 The Michigan Infrastructure Council should work with local agencies to encourage and incent cross-collaboration and opportunities for consolidation to provide transparent, safe, efficient, and cost-effective solutions. To encourage right-sizing metrics for safety, operations and administration are utilized resulting in low-cost, high-quality outcomes.

Estimated investment needed: Will utilize existing staff resources

6.12.4 MDOT, metropolitan planning organizations, and regional planning organizations should encourage greater coordination between agencies and provide technical assistance to local agencies seeking solutions that help right-size their infrastructure.

Estimated investment needed: Will utilize existing staff resources

6.13 ACT 51 REVIEW

Where is Michigan today?

Public Act 51 of 1951 governs the distribution of transportation revenue in Michigan. The legislation provided reasonable formulas for the distribution of transportation revenue to state highways, county roads, and city and village streets based on the best data available to policymakers of the 1950s.

While so much has changed since 1951, Act 51 remains the formula by which transportation revenue is distributed in Michigan. There have been many amendments in the past 65 years, most notably the increase in state share to match federal funds in the late 1950s, creation of the CTF in the 1970s, the addition of the Transportation Economic Development Fund in the 1980s, and the creation of the TAMC at the start of this century. These amendments clearly reflect the times in which they were enacted.

The many amendments to Act 51 have created a complicated formula that is only fully understood by experts. Taxpayers and road users want greater transparency. Better data, as well as a greater federal emphasis on performance measurement, mean that transportation providers need to be more accountable for system performance. Technology and globalization now impact the future of transportation systems in ways that were unimaginable in 1951.

What does a 21st century Michigan look like?

Act 51 has been reviewed and updated to ensure that transportation funding is distributed in a way that serves Michigan's 21st century economy. Michigan's transportation funding mechanisms collect enough user fee revenues to preserve the system, and the State distributes fees to transportation agencies to appropriately meet needs. Road agencies across Michigan invest transportation funds to maximize public and road user benefits.

How do we get there?

6.13.1 The Michigan Infrastructure Council should work with the Michigan Legislature and transportation stakeholders to revise Act 51 to make the distribution of state transportation revenues simpler, equitable, more transparent, and more accountable, while improving system outcomes.

Estimated investment needed: Will utilize existing staff resources

6.14 LOCAL REVENUE GENERATION OPTIONS

Where is Michigan today?

Counties, cities, and villages depend heavily on state aid to tend to local roads and streets. The local agency shares of the MTF awarded through the Act 51 formula were once sufficient to maintain major local streets and cover much of the cost of minor local streets as well; however, fuel tax revenues have fallen as road maintenance costs have risen.

Most cities and villages and some counties supplement state street aid with local funds. Most counties require that townships contribute to the cost of improving county local roads. For the vast majority of municipalities, property taxes are the only locally controlled tax available for additional funding. Local funds may come from general purpose revenues or from a dedicated roads millage.

Using property taxes—including General Fund operating revenue or dedicated road millages—to fund local transportation infrastructure is problematic for several reasons. For example, some communities had large declines in taxable value during the recession or owing to outmigration, and the constitution limits the rate at which revenues recover with growth in the economy. Additionally, property taxes are paid by a community's residents and business owners and do not account for people who commute into municipalities for work or entertainment, nor do they vary with use and demand of transportation infrastructure in the way that fuel taxes and vehicle registration fees do.

What does a 21st century Michigan look like?

Transportation infrastructure has a significant impact on a community's economy, vitality, and sense of place. In the 21st century, local agencies have a greater variety of transportation revenue options. Good, reliable intermodal transportation systems attract economic development and help build strong, healthy communities for residents and businesses.

How do we get there?

6.14.1 The Michigan Legislature should enact legislation to enable new methods of generating local revenue to increase transportation investment including, but not limited to, a regional-option gasoline tax and impact fees from land developments that burden road systems or from permits for driveways that diminish traffic flow. Additional legislative considerations should include regional-option sales taxes, levied in addition to the Michigan sales tax, which are used for transit operations in many states and could be made eligible for road and transit infrastructure use as well as regional-option vehicle registration surtax. This existing authorization for the four-county Regional Transit Authority (RTA) area could be extended statewide to allow other regions to levy this surtax.

6.15 ROAD AND BRIDGE USER FEES

Where is Michigan today?

Road and bridge infrastructure is almost exclusively funded through a combination of user fees in the form of vehicle registration fees and federal and state gas taxes. Recent fluctuations in these once very predictable and reliable fees have exposed a need to identify and adopt a fair, stable, and predictable basis to supplement or supplant the motor fuels fee and registration tax.

The fuel taxes paid by each vehicle depend on the vehicle's fuel efficiency, and revenue falls as the overall efficiency of the vehicle fleet rises in response to new fuel-efficiency standards, or as fuel-burning vehicles are replaced by electric cars. This has been problematic for transportation agencies and will likely impact transportation revenue even more dramatically in the years to come.

Currently, other states are piloting a per-mile fee calculated by a device combining a GPS receiver with a cellular signal or dedicated radio transmitter, most notably in Washington, Oregon, and California. Such devices are in use for trucks in several European countries, as well. Although per-mile fees are more expensive to collect than fuel taxes, the hardware is regarded as proven.

What does a 21st century Michigan look like?

Michigan has a road and bridge user fee system that is equitable and serves as a stable funding source. A properly executed user fee system provides a long-term funding solution for deteriorating transportation infrastructure. The 21st century transportation system has a funding mechanism that keeps up with advancements in technology and infrastructure planning. The goal is to find a sustainable funding mechanism for transportation to replace the gas tax, which has been unreliable in the past.

How do we get there?

6.15.1 MDOT and the DTMB should pilot test a per-mile fee system (such as GPS-based) in Michigan and use that test to become the first state to distribute user fees among road jurisdictions or within regions based on the miles of travel in each jurisdiction or region.

Estimated investment needed: Between $1 million and $10 million to design and initiate the pilot, collect data and revenue, distribute revenue, and analyze the results[29]

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[29] Oregon is currently piloting a GPS fee of 1.5 cents per mile. The pilot is limited to 5,000 cars and light-duty commercial vehicles. Michigan's pilot project could potentially use the state vehicle fleet. As part of the pilot test, the State may refund fuel and registration taxes for vehicle owners electing to pay fees on a per-mile basis as calculated by on-board devices, including in-state truck operators.

6.16 TOLLING

Where is Michigan today?

State road user fees and federal aid are not sufficient to reconstruct the Interstate System in Michigan, nor in any other state. The cost of modernizing the system will be greater than the cost of original construction, now that it is in use and the nation's entire economy flows over it continuously. But neither Congress nor the Michigan Legislature is likely to restore the fuel tax to the purchasing power it had when the Interstate System was built.

Michigan's freeways were among the nation's first, and are now 50 to 60 years old. Reconstruction and improvement is years overdue, but due to budget constraints, most of the system is not programmed for work in the foreseeable future.

Federal law permits the use of tolls to finance infrastructure improvements in the following instances:

- Newly constructed lanes added to existing toll-free Interstate highways can be tolled so long as the facility has the same number of toll-free lanes after construction as it did before.
- The initial construction of highways, bridges, and tunnels on the Interstate System may be constructed as toll facilities, although Michigan is not contemplating the addition of new Interstate routes.
- Non-Interstate routes may be reconstructed as toll facilities. This includes routes such as US-23, US-131, M-10, etc.
- Any toll-free bridge can be reconstructed or replaced as a toll facility. Rhode Island is considering an innovative program where all Interstate bridges will be electronically tolled for commercial vehicles and the revenue used for investment in Interstate pavements and bridges.
- A range of tolling options are available under the federal Value Pricing Pilot program, as long as the tolls used on each facility vary with the level of congestion on the facility. There are a limited number of slots available for participation in this program, and while none of the slots are currently available, some are expected to open in the future.
- Toll-free Interstates can be reconstructed as toll facilities though the Interstate System Reconstruction and Rehabilitation Pilot Program (ISRRPP). Only three slots are available for participation in this program, and all three are taken now. However, it is expected that one or more slots will soon become available for other interested states, and Michigan could position itself to be assigned a slot in order to enable tolling.

Tolling under any of the existing federal authorities can only be accomplished if the Michigan Legislature authorizes the use of tolling in Michigan. Steps can be taken to secure a slot in one of the federal toll pilot programs prior to obtaining legislative approval. However, the use of toll finance needs to be authorized in state law before the state can move too far down the road to tolls.

What does a 21st century Michigan look like?

New revenue options, such as tolling, help Michigan compete with modern transportation systems across the world. Michigan is able to reconstruct freeways on a more immediate timeline, using toll-based revenue sources to cover the costs. Reasonably priced tolls cover the portion of the cost that is not covered by federal aid. Under a tolling system, the cost of freeway reconstruction would be removed from MDOT's budget, freeing existing road user fees that go to freeway reconstruction for use on the rest of Michigan's road system. Michigan's first toll road, US-23, is operational, generating $138 million a year.

How do we get there?

6.16.1 MDOT should position Michigan to apply for the Interstate System Reconstruction and Rehabilitation Pilot program (ISRRPP) if one of the openings becomes available.

Estimated investment needed: Will utilize existing staff resources to develop the application[30]

6.16.2 The Michigan Legislature should enact a bill authorizing toll finance as an option for road finance in Michigan to indicate to the Federal Highway Administration that Michigan is ready to implement a pilot tolling project through the ISRRPP.

Estimated investment needed: Will utilize existing staff resources

6.16.3 MDOT should work with the Office of the Governor and the Michigan Legislature to encourage Michigan's Congressional delegation to authorize toll finance on existing federal-aid roads.

Estimated investment needed: Will utilize existing staff resources

[30] If Michigan implemented tolling, there is an estimated $325,000 per mile of initial capital costs for electronically tolled Interstates. (That would cost about $87 million for the 270-mile length of Interstate 94 from Port Huron to New Buffalo).