

APPENDIX A.

Recommendations Table

Asset Type	Rec. #	Rec.	Implementation Start	Implementation Complete
Communications	4.1	Making Michigan a Smarter State		
Communications	4.1.1	The State of Michigan should create the Consortium on Advanced Networks (see recommendation 4.2.1 below) to develop a vision, a plan, and execution roadmap to enact the state's digital transformation by investing in emerging technologies, supporting academia in research related to the IoT, building an adaptive IoT workforce, and forming appropriate policies to create a smarter state.	Immediate term (0-2 years)	Immediate term (0-2 years)
Communications	4.1.2	The Michigan Economic Development Corporation (MEDC), in partnership with relevant state agencies, should create a fund to support efforts that will make Michigan a global leader in smart technology development and deployment.	Short term (3-5 years)	Short term (3-5 years)
Communications	4.1.3	The DTMB should actively participate in relevant workgroups and committees of the National Association of Chief Information Officers and the International Telecommunications Union to position Michigan as a technological leader.	Immediate term (0-2 years)	Immediate term (0-2 years)

Asset Type	Rec. #	Rec.	Implementation Start	Implementation Complete
Communications	4.1.4	The Michigan Infrastructure Council (see Chapter 3) should engage in P3s to ensure IoT adoption is included in infrastructure planning and retrofit technologies are considered, pursued, and incorporated as they become available for upgrades and maintenance activities to existing and future infrastructure.	Short term (3-5 years)	Short term (3-5 years)
Communications	4.2	Improving Broadband Access and Adoption		
Communications	4.2.1	The Governor should issue an executive order establishing the Michigan Consortium on Advanced Networks, an advisory body comprising stakeholders from the nonprofit, public, and private sectors and academia. The group would be charged with improving coordination among stakeholders in addressing mobile and fixed broadband access and adoption issues in the state, as well as making Michigan a smarter state.	Immediate term (0-2 years)	Long term (11+ years)
Communications	4.2.1.1	Policy coordination: Support local and state agencies in working with the private sector to increase mobile and fixed broadband access in Michigan.		
Communications	4.2.1.2	Technical assistance: Provide guidance for local and state agencies working with the private sector to increase mobile and fixed broadband access in Michigan.		
Communications	4.2.1.3	Asset management: Continue and expand efforts to map and research mobile and fixed broadband access and adoption.		
Communications	4.2.1.4	Digital literacy education: Expand, improve, and create pragmatic digital literacy programs at the state and local level.		
Communications	4.2.1.5	Funding options: Provide funding—and help identify funding and financing from all available sources and programs—to entice investors to provide affordable mobile and fixed broadband access to households and businesses statewide, making Michigan a top-five state for mobile and fixed broadband access and adoption.		

Asset Type	Rec. #	Rec.	Implementation Start	Implementation Complete
Communications	4.3	Securing Michigan's Digital Infrastructure		
Communications	4.3.1	DTMB should develop a ubiquitous enterprise log management as a service system, or cyber hub, ⁴⁶ that allows the cyber security ecosystem to understand new, emerging and historical cyber threats by leveraging advanced and predictive analytics.	Immediate term (0-2 years)	Immediate term (0-2 years)
Communications	4.3.2	DTMB should work to build a cyber-focused workforce, in partnership with the Merit Network, by continuing efforts of the Regional Cybersecurity Education Collaboration.	Immediate term (0-2 years)	Short term (3-5 years)
Communications	4.3.3	DTMB should increase Michigan Civilian Cyber Corps (MiC3) membership to 200 members and invest in development and training for the MiC3.	Short term (3-5 years)	Short term (3-5 years)
Communications	4.3.4	The Governor should create a shared virtual chief information security office to provide consulting and advisory services to multiple local governments.	Immediate term (0-2 years)	Immediate term (0-2 years)
Communications	4.3.5	DTMB should enhance threat intelligence gathering and sharing among states, federal agencies and private sector partners develop responses to common threats, in keeping with guidance published by the National Institute of Standards and Technology.	Short term (3-5 years)	Short term (3-5 years)
Communications	4.3.6	DTMB should advocate for changes to the state's Freedom of Information Act (FOIA) exemptions—which currently prevents Michigan agencies from communicating and coordinating with infrastructure asset owners about cyber and physical security threats/attacks—to allow for appropriate exemptions for agencies protecting Michigan's critical infrastructure.	Immediate term (0-2 years)	Immediate term (0-2 years)

⁴⁶ A cyber hub is designed to operationalize existing cyber data, information, and intelligence for the cyber security ecosystem to establish a common operating picture by leveraging predictive and real-time analytics. Cyber hubs provide decision making support to enable organizations to anticipate and respond to cyber events.

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Communications	4.3.7	Entities within the cyber security ecosystem should collaborate to develop a public awareness campaign and other learning opportunities to educate residents, consumers, and families about the reality of online risks and promote cyber safety practices among residents, particularly children and businesses.	Short term (3-5 years)	Short term (3-5 years)
Communications	4.3.8	Work with the cyber security ecosystem and other entities to design and encourage the adoption of a curriculum focusing on technology throughout the science, technology, engineering, and mathematics education system	Short term (3-5 years)	Short term (3-5 years)
Communications	4.3.9	Michigan should develop a next-generation solution to centrally manage identity and authentication management for workers, partners, and residents.	Short term (3-5 years)	Short term (3-5 years)
Energy	5.1	Resource Adequacy		
Energy	5.1.1	The Michigan Agency for Energy (MAE) and the MPSC should continue to work with MISO and other stakeholders to reform Michigan's current electric market structure by requiring all electric providers to protect their customers from massive outages due to lack of supply by securing adequate capacity resources.	Immediate term (0-2 years)	Ongoing efforts
Energy	5.1.2	MAE and the MPSC should closely monitor all proposed solutions to the energy supply concerns in the Upper Peninsula and work with stakeholders to ensure resolution implementation by 2019.	Immediate term (0-2 years)	Ongoing efforts
Energy	5.2	Energy Waste Reduction		
Energy	5.2.1	The Michigan Legislature should remove the artificial cap on how much utilities can spend on energy-efficiency programs and provide the MPSC with the ability to evaluate energy waste reduction like any other resource.	Immediate term (0-2 years)	Medium term (6-10 years)
Energy	5.2.2	The Michigan Legislature should ensure that there is no financial disincentive for the use of cost-effective energy waste reduction.	Immediate term (0-2 years)	Medium term (6-10 years)

Asset Type	Rec. #	Rec.	Implementation Start	Implementation Complete
Energy	5.2.3	The Michigan Legislature should remove the prohibition on on-bill financing for energy waste reduction efforts.	Immediate term (0-2 years)	Ongoing efforts
Energy	5.3	Cleaner Energy Sources		
Energy	5.3.1	The MPSC and MAE should continue to work together to ensure continued investment in energy waste reduction, meeting at least 15 percent or more of Michigan's energy needs by eliminating energy waste between now and 2025, as well as meeting any of its additional capacity needs from a combination of cleaner technologies, including renewables and natural gas.	Immediate term (0-2 years)	Medium term (6-10 years)
Energy	5.3.2	Through coordinated efforts, the MPSC, MAE, and MDEQ should continue to ensure that emissions from the electric power sector are reduced by helping utilities choose the cleanest energy sources for the future, in consideration with affordability and reliability.	Immediate term (0-2 years)	Medium term (6-10 years)
Energy	5.3.3	The MPSC and MAE should work to reduce barriers to additional cost-effective renewable energy investment by reducing barriers to interconnection, net metering, and siting.	Immediate term (0-2 years)	Ongoing efforts
Energy	5.4	Electric Reliability		
Energy	5.4.1	Michigan's utilities should take steps to expedite their response to outages and restore power to their customers in a timely manner by completing plans to deploy AMI while also evaluating additional measures, like vegetation management and other distribution investments. Smaller electric utilities that do not currently have plans to deploy AMI in their service territory should evaluate potential benefits and deploy where prudent and cost effective.	Immediate term (0-2 years)	Immediate term (0-2 years)
Energy	5.4.2	The MPSC and MAE should convene a stakeholder group with the aim of establishing a performance goal for CELID and CEMI metrics and requirements in order for utilities to provide information related to these metrics, as well as their current reliability reporting.	Immediate term (0-2 years)	Immediate term (0-2 years)

Asset Type	Rec. #	Rec.	Implementation Start	Implementation Complete
Energy	5.4.3	The MPSC should evaluate investments that provide greater insight into equipment condition and system loading, such as supervisory control and data acquisition, which will allow for greater insight into distribution system operation, enabling proactive maintenance to address problems prior to these issues resulting in an outage.	Immediate term (0-2 years)	Immediate term (0-2 years)
Energy	5.4.4	The MPSC should evaluate proposed new capital investments through a transparent, forward-looking distribution system planning process, and monitor proposed changes to the distribution system planning process for each utility as needed on an ongoing basis.	Immediate term (0-2 years)	Short term (3-5 years)
Energy	5.5	Natural Gas Safety		
Energy	5.5.1	The MPSC should consider further accelerating plans to replace at-risk natural gas distribution pipe beyond the currently planned 25- to 30-year window by evaluating utilities' current replacement timelines. Emphasis should be placed on coordinating replacements with local investment in other infrastructure asset categories to accelerate progress and leverage investment.	Immediate term (0-2 years)	Long term (11+ years)
Energy	5.6	Adaptable Regulation		
Energy	5.6.1	The Michigan Legislature, in consultation with MAE and the MPSC, should act to remove the barriers in the current CON process that prevent the MPSC from weighing all large investments against alternatives and determining the impact on reliability, affordability, adaptability, and protection of the environment.	Immediate term (0-2 years)	Immediate term (0-2 years)
Energy	5.6.2	The MPSC and MAE should continue efforts to ensure that Michigan's regulations are adaptable in the face of new technologies. The need for regulatory changes should be evaluated as new technologies emerge.	Immediate term (0-2 years)	Ongoing efforts

Asset Type	Rec. #	Rec.	Implementation Start	Implementation Complete
Energy	5.7	Information Security		
Energy	5.7.1	The Michigan Legislature, together with MAE and the MPSC, should revise FOIA exemptions to allow the appropriate agencies to communicate with infrastructure asset owners about physical and cyber security, and alleviate concerns related to the security of sensitive information when the State is working with infrastructure asset owners.	Immediate term (0-2 years)	Immediate term (0-2 years)
Energy	5.8	Business Attraction and Economic Development		
Energy	5.8.1	The MPSC and MAE should work together with utilities and companies to expand opportunities for industrial customers to participate in programs that help them reduce energy bills, such as demand response programs.	Immediate term (0-2 years)	Immediate term (0-2 years)
Energy	5.8.2	The MPSC, MAE, and MEDC should confer regularly to continue improving the factors that impact business decisions and engage stakeholders about additional opportunities for business attraction.	Immediate term (0-2 years)	Immediate term (0-2 years)
Transportation	6.1	Road and Bridge Conditions		
Transportation	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.	Immediate term (0-2 years)	Long term (11+ years)
Transportation	6.2	Bridges and Culverts		
Transportation	6.2.1	State, county, and local agencies should design and install road-stream crossings to ensure safe pedestrian and vehicle passage, along with natural stream function and aquatic organism passage.	Immediate term (0-2 years)	Long term (11+ years)

Asset Type	Rec. #	Rec.	Implementation Start	Implementation Complete
Transportation	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.	Short term (3-5 years)	Medium term (6-10 years)
Transportation	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.	Short term (3-5 years)	Medium term (6-10 years)
Transportation	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.	Immediate term (0-2 years)	Immediate term (0-2 years)
Transportation	6.3	Seasonal Weight Restrictions		
Transportation	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.	Short term (3-5 years)	Medium term (6-10 years)
Transportation	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.	Medium term (6-10 years)	Long term (11+ years)
Transportation	6.4	Transit, Passenger, and Freight Rail		
Transportation	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.	Immediate term (0-2 years)	Medium term (6-10 years)

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Transportation	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.	Immediate term (0-2 years)	Medium term (6-10 years)
Transportation	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.	Immediate term (0-2 years)	Long term (11+ years)
Transportation	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.	Immediate term (0-2 years)	Short term (3-5 years)
Transportation	6.5	Soo Locks		
Transportation	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.	Immediate term (0-2 years)	Short term (3-5 years)
Transportation	6.6	Port Authority Landside Improvements		
Transportation	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.	Immediate term (0-2 years)	Immediate term (0-2 years)
Transportation	6.7	Routine Port Maintenance		
Transportation	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.	Immediate term (0-2 years)	Ongoing efforts

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Transportation	6.7.2	The Conference of Great Lakes and St. Lawrence Governors and Premiers should analyze the dredging needs for individual docks and nonfederal navigation channels specifically, including privately owned facilities to the greatest degree possible.	Immediate term (0-2 years)	Ongoing efforts
Transportation	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.	Immediate term (0-2 years)	Ongoing efforts
Transportation	6.8	Aviation		
Transportation	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.	Immediate term (0-2 years)	Immediate term (0-2 years)
Transportation	6.9	Intelligent Vehicle Technology		
Transportation	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.	Immediate term (0-2 years)	Immediate term (0-2 years)
Transportation	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.	Immediate term (0-2 years)	Immediate term (0-2 years)
Transportation	6.9.3	The Governor's Office and MDOT should promote Michigan as the focal point of the global intelligent vehicle industry.	Immediate term (0-2 years)	Ongoing efforts

Asset Type	Rec. #	Rec.	Implementation Start	Implementation Complete
Transportation	6.9.4	MDOT and the MEDC should leverage unique partnerships between all governmental agencies, companies, universities, and other organizations to advance Michigan's intelligent vehicle industry.	Immediate term (0-2 years)	Ongoing efforts
Transportation	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.	Short term (3-5 years)	Ongoing efforts
Transportation	6.10	Signalized Intersection Technology		
Transportation	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,	Short term (3-5 years)	Medium term (6-10 years)
Transportation	6.11	Nonmotorized Transportation		
Transportation	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 measure the connectivity of nonmotorized facilities.	Immediate term (0-2 years)	Medium term (6-10 years)
Transportation	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.	Immediate term (0-2 years)	Medium term (6-10 years)

Asset Type	Rec. #	Rec.	Implementation Start	Implementation Complete
Transportation	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.	Immediate term (0-2 years)	Short term (3-5 years)
Transportation	6.12	Right-sizing		
Transportation	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.	Immediate term (0-2 years)	Short term (3-5 years)
Transportation	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.	Immediate term (0-2 years)	Ongoing efforts
Transportation	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.	Immediate term (0-2 years)	Ongoing efforts
Transportation	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.	Immediate term (0-2 years)	Ongoing efforts
Transportation	6.13	Act 51 Review		
Transportation	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.	Immediate term (0-2 years)	Medium term (6-10 years)

Asset Type	Rec. #	Rec.	Implementation Start	Implementation Complete
Transportation	6.14	Local Revenue Generation Options		
Transportation	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.	Immediate term (0-2 years)	Long term (11+ years)
Transportation	6.15	Road and Bridge User Fees		
Transportation	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.	Immediate term (0-2 years)	Medium term (6-10 years)
Transportation	6.16	Tolling		
Transportation	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.	Immediate term (0-2 years)	Short term (3-5 years)
Transportation	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.	Immediate term (0-2 years)	Medium term (6-10 years)
Transportation	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.	Immediate term (0-2 years)	Short term (3-5 years)

Asset Type	Rec. #	Rec.	Implementation Start	Implementation Complete
Water	7.1	Ensuring Public and Environmental Health		
Water	7.1.1	The MDEQ should provide financial assistance to communities in need to invest in replacing aging infrastructure where there are immediate risks to public health or the environment due to lagging water infrastructure investments.	Immediate term (0-2 years)	Long term (11+ years)
Water	7.1.2	The MDEQ should develop an outcome-based regulatory framework that ensures compliance is achieved, while enabling flexibility of means and methods through a permitting system that supports innovation to achieve public and environmental health goals. State and local programs should be revised to achieve these outcomes.	Short term (3-5 years)	Medium term (6-10 years)
Water	7.1.3	The MDEQ should use resources such as the recommendations of the National Drinking Water Advisory Council, municipal utilities, current U.S. Environmental Protection Agency (U.S. EPA) standards, and evolving research to inform legislative updates to the regulation of drinking water.	Immediate term (0-2 years)	Long term (11+ years)
Water	7.1.4	The MDEQ should provide grants and technical assistance to schools to develop and implement a science-based drinking water quality testing and remediation program for lead and other contaminants.	Immediate term (0-2 years)	Medium term (6-10 years)
Water	7.1.5	The MDEQ and MDHHS should incorporate science-based research in establishing drinking water standards and evaluate sources of drinking water contamination as technology advances, enabling better detection of pollutants to determine whether further controls are warranted in drinking water and wastewater systems.	Immediate term (0-2 years)	Ongoing efforts
Water	7.1.6	The MDEQ should continue to provide funding through the Clean Michigan Initiative (CMI) to assist with cleanup efforts of contaminated properties that threaten public health and drinking water supplies.	Immediate term (0-2 years)	Long term (11+ years)

Asset Type	Rec. #	Rec.	Implementation Start	Implementation Complete
Water	7.1.7	The MDEQ and MDHHS, local municipalities, and utilities should expand public outreach, engagement, and state and local communication efforts regarding regulatory standard to manage risk and ensure public and environmental health are maintained, and the necessity of water supply, sewer, and stormwater investments.	Immediate term (0-2 years)	Ongoing efforts
Water	7.1.8	The MDEQ and MDHHS, in partnership with drinking water system operators, regional partners, and federal agencies, should expand comprehensive real-time surface and groundwater monitoring to detect potential threats to water supplies, develop early responses, and provide regular public reporting.	Short term (3-5 years)	Long term (11+ years)
Water	7.2	Water Asset Management		
Water	7.2.1	The MDEQ should compile and evaluate asset management plans submitted under the first phase of the Stormwater, Asset Management, and Wastewater program. If necessary, the program should be updated to ensure that completed asset management plans are comprehensive and provide sufficient detail for planning purposes and meet MDEQ criteria.	Immediate term (0-2 years)	Medium term (6-10 years)
Water	7.2.2	The MDEQ should expand the current SAW program, to provide a portion of the funding necessary to complete condition assessments and the development of asset management plans for drinking water supply systems.	Immediate term (0-2 years)	Medium term (6-10 years)
Water	7.3	21st Century Infrastructure Systems		
Water	7.3.1	The Michigan Infrastructure Council and other asset management entities should partner with economic development entities to identify and prioritize areas for targeted infrastructure water, sewer, and stormwater replacements or upgrades.	Immediate term (0-2 years)	Medium term (6-10 years)

Asset Type	Rec. #	Rec.	Implementation Start	Implementation Complete
Water	7.3.2	The Michigan Department of Agriculture and Rural Development (MDARD) should help support access to wastewater treatment capacity, potable water, and drain infrastructure in rural communities to promote land-based industries such as food, fiber crops, tourism, and mining, in order to keep rural communities competitive in a global economy.	Immediate term (0-2 years)	Long term (11+ years)
Water	7.3	Understanding Risk		
Water	7.3.1	The State of Michigan, local municipalities, and utilities should expand public outreach, engagement, and state and local communication efforts regarding how regulatory standards are developed to manage risk and ensure public and environmental health are maintained, as well as why water supply, sewer, and stormwater investments are necessary	Immediate term (0-2 years)	Ongoing efforts
Water	7.3.2	The State of Michigan, in partnership with drinking water system operators, regional partners, and federal agencies, should expand comprehensive real-time surface and groundwater monitoring to detect potential threats to water supplies, develop early responses, and provide regular public reporting	Immediate term (0-2 years)	Long term (11+ years)
Water	7.4	Fiscally Sustainable Water, Sewer, and Stormwater Pricing Models		
Water	7.4.1	Through new policy, state auditing, regulatory processes, and technical support, Treasury and MDEQ should require self-sufficient transparent operation of enterprise organizations for water, sewer, and stormwater utilities that are supported by rate structures that cover all capital, operation, maintenance and replacement expenditures based on up-to-date asset management plans.	Medium term (6-10 years)	Medium term (6-10 years)
Water	7.4.2	Utilities should engage in customer outreach when developing financing and ratemaking processes for all water, sewer, and stormwater utilities to achieve greater degrees of transparency.	Short term (3-5 years)	Medium term (6-10 years)

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Water	7.4.3	The MDEQ and Treasury should evaluate and modify Michigan's Water Pollution Control Revolving Fund, better known as the State Revolving Fund (SRF), to increase opportunities for participation in the program.	Immediate term (0-2 years)	Immediate term (0-2 years)
Water	7.4.4	The Michigan Legislature should adopt legislation authorizing stormwater utilities that is consistent with the <i>Bolt v. City of Lansing</i> ⁴⁷ decision, establishes the requirements for structuring and charging a fee, and provides a streamlined process for local adoption.	Immediate term (0-2 years)	Immediate term (0-2 years)
Water	7.4.5	Water utility rate structures should incorporate incentives to promote water-use efficiencies to reduce operating costs and delay or eliminate the need for capital investment.	Immediate term (0-2 years)	Medium term (6-10 years)
Water	7.5	Green Infrastructure		
Water	7.5.1	The Michigan Department of Licensing and Regulatory Affairs (LARA), MDEQ, MDNR, and MDOT should encourage the integration of low-impact development/design standards and green infrastructure for stormwater management.	Immediate term (0-2 years)	Short term (3-5 years)
Water	7.5.2	To enhance community resiliency and optimize costs, the MDEQ and MDNR should facilitate the development of tools that enable stormwater and wastewater system owners, managers, and operators to fiscally and operationally manage green infrastructure through asset management plans.	Medium term (6-10 years)	Long term (11+ years)
Water	7.5.3	Treasury and the MDEQ should update and revise funding and financing mechanisms that support infrastructure investments to incent evaluation and implementation of both efficiency-oriented approaches and green infrastructure.	Immediate term (0-2 years)	Immediate term (0-2 years)

⁴⁷ The *Bolt v. City of Lansing* decision has precluded most municipalities in Michigan from establishing stormwater utilities. The decision requires stormwater assessment to be based on the unique contributions of individual properties.

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Water	7.5.4	The MDEQ should periodically review and revise its programs and permitting requirements to ensure that engineering and design practices for sanitary sewer overflow (SSO) and combined sewer overflow (CSO) correction and stormwater management are based on assumptions that anticipate increased storm intensity and/or frequency.	Immediate term (0-2 years)	Medium term (6-10 years)
Water	7.5.5	Drinking water, wastewater, and stormwater agencies should evaluate the resiliency of systems and facilities that enhance a community's readiness for increased storm intensity and/or frequency as well as their timely recovery as part of their asset management planning.	Immediate term (0-2 years)	Medium term (6-10 years)
Water	7.5.6	The MDEQ, MDARD, and county drain commissioners should develop draft revisions and then work with other stakeholders to provide recommendations to the Michigan Legislature to update the Michigan Drain Code (if appropriate) and municipal separate storm sewer system (MS4) program to better facilitate joint action and collaboration among jurisdictions to manage stormwater on a watershed basis. Chapter 22 of the drain code should be updated to allow petitions to request development of collaborative watershed management plans as well as watershed-based engineering and design studies.	Short term (3-5 years)	Medium term (6-10 years)
Water	7.5.7	The MDEQ, MDARD, and county drain commissioners should develop draft revisions then work with other stakeholders to provide recommendations to the Michigan Legislature to address inconsistencies between the drain code and MS4 programs, with a goal of more explicitly authorizing projects focused primarily on management of water quality, especially in urbanized areas.	Short term (3-5 years)	Medium term (6-10 years)

Asset Type	Rec. #	Rec.	Implementation Start	Implementation Complete
Water	7.5.8	Relevant state agencies, including the Department of Technology, Management, and Budget, and the MDEQ should assess properties to identify and implement opportunities to use green infrastructure to manage stormwater. The MDNR and MDOT should be the first agencies to conduct this evaluation.	Short term (3-5 years)	Medium term (6-10 years)
Water	7.6	Onsite Well and Wastewater Treatment Systems		
Water	7.6.1	The MDEQ, Michigan Department of Health and Human Services (MDHHS), and LARA should revise regulations to require county and municipal governments, as well as water and sewer utilities, to use planning and permitting processes, taxes, fees, and other policies to promote connection to public water supply and wastewater treatment systems when they are available or when a new or expanded municipal system would be cost effective.	Immediate term (0-2 years)	Immediate term (0-2 years)
Water	7.6.2	The MDEQ, MDHHS, and LARA, in partnership with local health departments, should encourage local governments to adopt ordinances requiring new homes and businesses with failed onsite wastewater treatment systems to connect to established community systems if they are available within 200 feet, consistent with Michigan Public Health Code (Act 368).	Immediate term (0-2 years)	Immediate term (0-2 years)
Water	7.6.3	The Michigan Legislature should pass new legislation that would enable local governments to adopt ordinances requiring homes and businesses to connect to community drinking water systems when onsite water wells fail if they are within 200 feet of an existing system.	Immediate term (0-2 years)	Immediate term (0-2 years)

Asset Type	Rec. #	Rec.	Implementation Start	Implementation Complete
Water	7.6.4	Communities should use Section 208 of the federal Clean Water Act to plan wastewater treatment facilities under an area-wide wastewater treatment management plan. In such cases, the MDEQ should use the permissive authority granted under Act 451, Part 21, Rule 39 to ensure that state or national permits (e.g., National Pollutant Discharge Elimination System) are addressed consistently with the approved Section 208 plan.	Immediate term (0-2 years)	Immediate term (0-2 years)
Water	7.6.5	The MDEQ and local health departments should strengthen permitting requirements to allow community systems only where a municipal system connection is not available, cost effective, or environmentally necessary. Community systems should be adaptable to future increases in the number of users, demonstrate a financially supported asset management plan, and provide for eventual connection to a municipal system.	Immediate term (0-2 years)	Immediate term (0-2 years)
Water	7.6.6	The MDEQ and MDHHS should work with the Michigan Legislature and local public health departments to update Michigan's Statewide Sanitary Code. The revised code should include 1) inspections of septic and community systems on a routine basis (e.g., every five years); 2) an approval route for alternative systems where public health or environmental quality is at risk; 3) minimum requirements for permitting; 4) a local health department-based, statewide registry of septic systems, including location, installation, and inspection dates; and 5) requirements for maintenance, pumping, repair, or replacement based on inspection results.	Immediate term (0-2 years)	Immediate term (0-2 years)
Water	7.6.7	The MDEQ and MDHHS should develop a financing mechanism such as a low-interest revolving loan fund or loan loss reserve program to support maintenance and replacement of existing onsite and community systems for system owners with a demonstrated need for financial assistance.	Immediate term (0-2 years)	Long term (11+ years)

Asset Type	Rec. #	Rec.	Implementation Start	Implementation Complete
Water	7.7	Embracing New Technology to Develop 21st Century Utilities		
Water	7.7.1	The MDEQ, municipalities, and local utilities should put in place a process to periodically review and update new technologies, procurement manuals, or standard operating practices to allow for open competition for technology and materials meeting relevant professional standards (e.g., American Water Works Association, Michigan Water Environment Association).	Short term (3-5 years)	Medium term (6-10 years)
Water	7.7.2	The MDEQ, municipalities, and local utilities should put in place a process to periodically review and update regulatory programs, implement methods of continuous improvement, and create standard work to further enable innovative approaches to achieve environmental protection and public health outcomes, as well as to control costs.	Short term (3-5 years)	Medium term (6-10 years)
Water	7.7.3	The MDEQ should work with municipal utilities to amend the current wastewater regulatory framework to advance the State of Michigan's Water Resource Recovery Facility framework and educate municipalities about the benefits of these approaches.	Medium term (6-10 years)	Medium term (6-10 years)
Water	7.7.4	The MDEQ should work with municipal utilities to amend the current drinking water regulatory framework to advance the development of 21 st century water utilities and inform municipalities about the benefits of these approaches.	Medium term (6-10 years)	Medium term (6-10 years)
Water	7.7.5	The MDEQ should encourage and incent strategies like resource recovery, as well as energy conservation and management options at wastewater and drinking water facilities, to help conserve resources and drive down costs. Revisions to Michigan's revolving loan fund could help incent those changes.	Medium term (6-10 years)	Medium term (6-10 years)
Water	7.7.6	The MDEQ should support innovation through partnerships and or funding with Michigan universities to expand research programs in the drinking water and wastewater fields.	Short term (3-5 years)	Ongoing efforts

Asset Type	Rec. #	Rec.	Implementation Start	Implementation Complete
Water	7.7.7	The MDEQ and water utilities should support new and emerging cost-effective technologies (such as smart metering and loss management technology) through permitting requirements that integrate water utilities with innovative communication and energy networks.	Immediate term (0-2 years)	Immediate term (0-2 years)
Water	7.8	Dams		
Water	7.8.1	The MDEQ's Dam Safety Program should maintain a publicly accessible geospatial data layer within the statewide asset management system that includes the number, condition, risk, and ownership of public, and private, regulated and nonregulated dams in the state. Working with partner organizations, the MDEQ should develop publicly available decision-support tools and training programs to assess risk, reinvestment and removal options for dams and low-head barriers.	Short term (3-5 years)	Long term (11+ years)