

Appendix D: Corridor Strategies and Compatibility Screening

Background

A transportation corridor plan can be advanced through a strategy or set of strategies that are implemented through a mix of policies, programs, activities, and projects. The corridor strategy should support the overall planning goals and objectives established for the statewide transportation system and address the unique and specific needs of each corridor.

This appendix presents and describes thirteen broad strategy groups and the respective policies, activities, projects, and programs that could be used for their implementation. The strategy groups discussed are consistent with the goals, objectives, and input from the MI stakeholders and can be applied to individual corridors identified as Corridors of Highest Significance in the *MI Transportation Plan*.

Chapter 5 and this appendix recommend specific broad policy-based strategies for each corridor. This appendix provides background information and details about each strategy and how they can be advanced.

This appendix includes:

- A menu of traditional and non-traditional transportation strategy groups;
- Example policies, programs, activities, and projects that could be used to implement the strategies;
- A compatibility screening for each strategy group and its applicability to Michigan; and
- A matrix summarizing the menu and compatibility screening evaluation.

The compatibility screening evaluates:

- The *MI Transportation Plan* goals/objectives or other strategies;
 - supported or advanced;
 - in conflict with;
- Partnerships needed - the levels of government, type agency(s) or private sector business(s) that would need to take ownership / responsibility / partnership with MDOT to fund and advance the strategy;
- Applicable to Michigan (High/Medium/Low);
- Potential effectiveness based on experiences in other parts of the US (High/Medium/Low);
- Difficulty to implement:
 - The administrative/ management (High/Medium/Low); and,
 - The relative cost (financial) (High = \$\$\$; Medium = \$\$; Low = \$).

It should be noted that the strategy groups are listed in alphabetical order. Financing and funding strategies will be identified and evaluated in a separate *MI Transportation Plan* document. General goals/objectives are provided for comparison purposes. They include:

- Access Management;
- Highway Mobility;
- Land Use / Integration / Sustainable Development;
- Modal Choice and Transit Mobility;
- Modernization;
- Reduced Travel Demand;
- Safety; and,
- System Preservation.

Strategy Groups Included

Not every possible transportation strategy is included in this appendix. Other corridor strategies may be available but are not as applicable to Michigan. The following strategy groups are discussed:

- A. Access Management;
- B. Asset Management;
- C. Congestion Pricing;
- D. Enhancement Programs;
- E. Highway and Bridge;
 - 1. Capacity additions and new facilities;
 - 2. Maintenance - Capital preventive;
 - 3. Maintenance – Scheduled;
 - 4. Modernization and rebuild;
 - 5. Operational improvements (see M for multi-modal based strategy);
 - 6. Pavement surface – service life;
 - 7. Rehabilitation and reconstruction;
 - 8. Safety;
- F. ITS and Incident Management;
- G. Land Use;

- H. Pedestrian and Bicycle;
- I. Ports - Water and Airports;
- J. Public Transit -Bus and Rail;
- K. Railroad;
- L. Transportation Demand Management – TDM; and
- M. Traffic Operational Improvements – also known as Transportation System Management (TSM) and Transportation Operations and Management System (TOMS.)

A. Access Management Strategy Group

Description:

Capital projects and policies that reduce or eliminate roadway access points, driveways or at-grade intersections; intended to improve safety, reduce congestion, and improve traffic mobility by removing conflict points.

Compatibility Screen:

- Goals/objectives being advanced – Safety, Mobility, Access Management, Land Use/Sustainability.
- Compatibility or conflict other goals/objectives or strategies – Compatible with all goals/objectives and strategies, may require land use changes and coordination with local governments.
- Agency Responsible / MOU needed – Would require MDOT to work with local governments to adopt or amend policies for access to roadways; may require zoning and land use policy changes; will require financial partnerships with local governments and possibly businesses.
- Applicability to Michigan (High/Medium/Low) –Applicability; would require cooperation and support at all governmental levels and private sector as well as with railroads.
- Potential effectiveness (High/Medium/Low) – Highly effective.
- Difficulty to implement:
 - Management (High/Medium/Low) – High - Would require education of the business community; local governments, residents and developers who may feel reduced traffic or easy access to their “front-door” will reduce sales or make access inconvenient.
 - Cost (High = \$\$\$; Medium = \$\$; Low = \$) – High cost to redesign and re-construct roadways, remove and compensate for access points or acquire right-of-way for redesign; Medium to low cost to add access management

concepts to new construction; can be implemented over time, in-conjunction with maintenance and preservation program.

Sample Programs, Activities, and Project Types:

- Driveway consolidation/shared driveways, access control - Adopting access control to a new roadway or retrofitting an existing roadway to consolidate or eliminate driveways, construct median barriers, restrict left turns, including only permitting right-in and right-out access.
- Access preservation along corridors - Adopting an access control plan for new or existing road (driveway control, median control, restricted side street / alley access).
- Construct frontage roads - Frontage roads along commercial and other heavily developed areas can provide numerous entrance and exit points while providing for the free and unobstructed movement of traffic along the main corridor.
- Local & state coordination - Working together with local governments and agencies that have the right to control access to a roadway during the development process, to coordinate and limit access points; developing educational programs for developers.

B. Asset Management Strategy Group

Description:

Policies, programs, and activities that address a strategic approach to managing and preserving assets including transportation infrastructure and resources (such as staff and equipment) through fact based investment decisions and focused management programs. Policies driven approach focused on getting the best results or performance for the preservation, improvement, and operation of infrastructure assets given the resources available.

Compatibility Screen:

- Goals/objectives being advanced – System Preservation;
- Compatibility or conflict other goals/objectives or strategies – Compatible with all goals/objectives and strategies;
- Agency Responsible / MOU needed – can be advanced by MDOT;
- Applicability to Michigan (High/Medium/Low) – High applicability;
- Potential effectiveness (High/Medium/Low) – Highly effective;
- Difficulty to implement:

- Management (High/Medium/Low) – Low cost to implement, this is currently a priority at MDOT;
- Cost (High = \$\$\$; Medium = \$\$; Low = \$) – Low costs.

Sample Programs, Activities, and Project Types:

- Management and decision making policies and processes – adopting well-defined policies that can be linked to clear objectives and performance measures.
- Research and evaluation tools – conducting and applying findings from economic analysis, trade-off analysis, and other system analyses throughout the planning and funding decision making process.
- Options analysis – policy to examine a range of options for solving infrastructure problems prior to decision making.
- Customer Service and Accountability – management focus for customer service and accountability for system performance and cost-effectiveness.
- Public / Private Partnerships – funding and management programs that included a shared responsibility for the development and maintenance of transportation facilities.

C. Congestion Pricing Strategy Group

Description:

Programs, policies, or management changes that reduce demand during times of day with the highest congestion by charging fees to use designated transportation facilities during the hours of heaviest congestion. See also TDM Strategies.

Compatibility Screen:

- Goals/objective being advanced – Highway mobility, and reduced demand during congested times of day.
- Compatibility or conflict other goals/objectives or strategies – Compatible with capacity adding and modernization, preservation, modal choice, TDM, TSM, and ITS. Potentially in conflict with affordable facilities because it may place a financial burden on low-income users.
- Agency Responsible / MOU needed – can be developed and implemented within existing MDOT agency structure.
- Applicability to Michigan (High/Medium/Low) – Could be used on existing facilities, or be incorporated into new roadways; may not easily win political or public acceptance.

- Potential effectiveness (High/Medium/Low) – Low - Studies have shown that this may not change behavior for individuals who can afford to pay the additional tolls; it has negative impacts on the poor and those with less disposable income.
- Difficulty to implement:
 - Management (High/Medium/Low) – Would need additional staff, possibly new legislation, and public education.
 - Cost (High = \$\$\$; Medium = \$\$; Low = \$) – High but could be raised through toll collection.

Sample Programs, Activities, and Project Types:

- Congestion Pricing and Electronic Toll Collection - As under ITS, but includes charging increased rates during rush hour/congested times.
- Congestion Pricing - Adjusting the toll or fare based on the time of day, charging more to use a facility during congested times than off-peak hours.
- Time of Day Restrictions - Restricting use or access to a facility during peak hours, such as restrictions on loading and unloading commercial vehicles within an urban area being restricted during rush hour; restriction on times (for example) when trucks may cross a border.
- HOT lanes – Lanes set aside for high occupancy vehicles (more than a single driver) that charge a varying toll for their use depending on the time of day.
- Goods Movement/Truck Management – Charging a higher fee or a fee for loading or unloading during peak congestion periods.

D. Enhancement Programs Strategy Group

Description:

Policies, programs, and activities that add unique, desired features or designs to new or existing facilities and can be advanced through a Context Sensitive Solutions approach.

Compatibility Screen:

- Goals/objectives being advanced – System preservation, land use integration / sustainability.
- Compatibility or conflict other goals/objectives or strategies – Compatible with all goals/objectives and strategies.
- Agency Responsible / MOU needed – Would require MDOT to work with local governments and public to identify desired enhancements.

- Applicability to Michigan (High/Medium/Low) – High applicability; could be accomplished with cooperation and support at all governmental levels, MPOs and the public.
- Potential effectiveness (High/Medium/Low) – Highly effective.
- Difficulty to implement:
 - Management (High/Medium/Low) – Would require education of the business community, local governments, the public and developers.
 - Cost (High = \$\$\$; Medium = \$\$; Low = \$) – Medium cost to redesign and re-construct; Medium to low cost for new construction; can be implemented in-conjunction with other capital improvement projects.

Sample Programs, Activities, and Project Types:

- Design aesthetics – working with the public to add unique design features to roadways, bridges, or other transportation facilities to create a “theme” for a part of the corridor.
- Pedestrian and Bicycle Facilities – adding a pedestrian or multi-use trail to a section of roadway or bridge.
- Context Sensitive Solutions – a process that involves engaging the public during project development.

E. Highway and Bridge Strategy Group

Highway and bridge strategies are broken-out and described in eight sub-categories.

1. Capacity additions and new facilities;
2. Maintenance - Capital preventive;
3. Maintenance – Scheduled;
4. Modernization and rebuild;
5. Operational improvements (see M for multi-modal based operational strategy);
6. Pavement surface – service life;
7. Rehabilitation and reconstruction; and
8. Safety.

1. Capacity Additions and New Facilities Strategy Group

Description:

Policies, programs, and capital improvement projects to improve roadway design or geometrics, add lane miles, or in other ways make improvements to a roadway or bridge to handle more capacity.

Compatibility Screen:

- Goals/objectives being advanced – Highway mobility and safety.
- Compatibility or conflict other goals/objectives or strategies – Compatible with Access Management and ITS deployment; in conflict with reducing dependency on personal vehicles and providing modal choices; in conflict with sustainable growth issues; studies have shown that increasing capacity “induces” or invites more traffic and may encourage sprawl.
- Agency Responsible / MOU needed – Can be managed within existing DOT structure.
- Applicability to Michigan (High/Medium/Low) – Is similar to current approach and strategy so it is applicable, realistic and is currently perceived as an accepted strategy.
- Potential effectiveness (High/Medium/Low) – May be problems keeping up with traffic growth, building additional capacity has been shown to attract more new drivers; may be difficult to solve all problems through capacity additions alone.
- Difficulty to implement:
 - Management (High/Medium/Low) – Can be managed by existing DOT structure.
 - Cost (High = \$\$\$; Medium = \$\$; Low = \$) – Costs to add capacity are high and may exceed available funding.

Sample Programs, Activities, and Project Types:

- Adding lanes - to Interstate highways, arterial roadways, etc.
- Adding lines, increased services, or facilities – Increasing the capacity or service for rail lines, scheduled bus or rail transit or freight services; increasing number of water ports.
- Safety projects – Adding capacity to address project locations that have the highest rate of crashes and fatalities, (congestion has been shown to correlate directly to increased crashes) increasing capacity at the facility may reduce congestion.

- Increased local roadway connectivity – Adding or improving access to local roadways or improving intersections and interchanges with local roadways.
- Adding or improving intersections or interchanges – interchanges and intersections require traffic to slow or stop, this may result in congestion and conflicts, by improving the design or adding turning lanes to an intersections or expanding an interchange, or grade separating an intersection to become an interchange, capacity may be improved as will mobility and safety.

2. Maintenance – Capital Preventive

Description:

Policies, programs, and capital improvement projects to repair roadway and bridge infrastructure, repair and replacement of signs, markings and signals with similar or in-kind facilities prior to their deterioration to extend their useful life and to avoid the need replace or rebuild.

Compatibility Screen:

- Goals/objectives being advanced – Maintaining in best condition existing facilities; addressing safety by keeping roads and bridges in good condition; asset management; sustainability - preserve current assets by extending their useful life.
- Compatibility or conflict other goals/objectives or strategies – Compatible with safety, sustainability; system preservation, asset management.
- Agency Responsible / MOU needed – Primarily can be advanced by DOT.
- Applicability to Michigan (High/Medium/Low) – Realistic for Michigan, similar to existing policies.
- Potential effectiveness (High/Medium/Low) – Highly effective, appears consistent with the current comments and opinions of the committees and the public.
- Difficulty to implement:
 - Management (High/Medium/Low) – Can be managed by existing MDOT structure.
 - Cost (High = \$\$\$; Medium = \$\$; Low = \$) – Medium to low cost, can be adjusted to be compatible with MDOT funding.

Sample Programs, Activities, and Project Types:

- Road and Bridges – Maintenance and Preservation – Rehabilitation, resurfacing, repaving, repainting, re-decking, pot-hole fixing, and similar projects to bring all

existing roadways and bridges into good condition; conducting other preventive maintenance activities to extend the useful life of existing infrastructure.

- Sign and Pavement Markings – Addressing reflectivity by repainting or replacing these items.
- Traffic Signal Maintenance – Keeping signals in good working order and correcting malfunctions.

3. Maintenance – Scheduled

Description:

Policies, programs, and capital improvement projects to repair, resurface, or replace roadway and bridge infrastructure with similar or in-kind facilities at regularly scheduled intervals; also includes programs and activities to remove snow, ice, and other debris from the infrastructure and adjoining rights of way; and, repair and replacement of signs, markings, and signals.

Compatibility Screen:

- Goals/objectives being advanced – Maintaining in best condition existing facilities; addressing safety by keeping roads and bridges clear; sustainability - preserve current assets by extending their useful life; asset management.
- Compatibility or conflict other goals/objectives or strategies – Compatible with all goals and objectives.
- Agency Responsible / MOU needed – Primarily can be advanced by DOT.
- Applicability to Michigan (High/Medium/Low) – Realistic for Michigan, similar to existing policies.
- Potential effectiveness (High/Medium/Low) – Highly effective, appears consistent with the current comments and opinions of the committees and the public.
- Difficulty to implement:
 - Management (High/Medium/Low) – Can be managed by existing MDOT structure.
 - Cost (High = \$\$\$; Medium = \$\$; Low = \$) – Medium to low cost, can be adjusted to be compatible with MDOT funding.

Sample Programs, Activities, and Project Types:

- Road and Bridges – Maintenance and Preservation – Scheduled resurfacing, repaving, repainting, re-decking, pot-hole fixing and similar projects to bring all existing roadways and bridges into good condition.

- Sign and Pavement Markings – Addressing reflectivity by repainting or replacing these items at regular scheduled intervals.
- Traffic Signal Maintenance – Keeping signals in good working order through continual scheduled maintenance.
- Snow and Ice Removal – Pre-treating or removing snow and ice from bridges and pavements.
- Debris, Obstruction, and Litter Removal – Collecting or otherwise removing items from roads and bridges that are not intended or necessary for the operation or maintenance of traffic or are obstructing the free flow of traffic; also removal of sediment in ditches and culverts.
- Mowing and Cutting of Vegetation – Cutting grass and other vegetation from right-of way; including cutting limbs and other vegetation that may be reduce sight-distance.

4. Modernization and Rebuild Strategy Group

Description:

Programs and projects to improve roadway design or geometrics or in other ways modernize a roadway or bridge.

Compatibility Screen:

- Goals/objectives being advanced – Highway mobility and safety;
- Compatibility or conflict other goals/objectives or strategies – Compatible with access management, ITS deployment, capacity addition, and maintenance and preservation;
- Agency Responsible / MOU needed – Can be managed within existing DOT structure;
- Applicability to Michigan (High/Medium/Low) – Is similar to current approach and strategy so it is applicable, realistic and is currently perceived as an accepted strategy;
- Potential effectiveness (High/Medium/Low) – Highly effective;
- Difficulty to implement:
 - Management (High/Medium/Low) – Can be managed by existing DOT structure;
 - Cost (High = \$\$\$; Medium = \$\$; Low = \$) – Medium, costs to modernize may be high and may exceed available funding; may be implemented during scheduled maintenance.

Sample Programs, Activities, and Project Types:

- Improved geometrics, pavements, design – Update and modernize widths, shoulders, curves, grades, clearance, pavement quality as needed to current standards or higher on all roadways and bridges. For example: In some cases, roadway segments and bridges were designed and built in the 1950s for 1950's traffic levels and need to be improved to deal with Twenty-first Century traffic demands.
- Bridge Clearance and Widening - Reconstructing roadways or bridges to bring bridge clearances and width to current design standards.
- Safety Projects – Addressing project locations that have the highest rate of crashes and fatalities, in some cases what is needed is to modernize the facility.
- Improving intersections or interchanges - mainline – interchanges and intersections designs may require traffic to slow or stop, this may result in congestion, by improving the design or adding turning lanes at an intersection, or grade separating an intersection to become an interchange, traffic mobility may be improved.
- Improving intersections or interchanges – local roadways – signs, signals, and design features of local roadways may require traffic to slow or stop and create congestion that backs-up onto the mainline. Working in partnerships with local governments, improvements to local roadways can improve mobility on the higher functional classified roadways.

5. Operational Improvements

(See M TRAFFIC OPERATIONAL IMPROVEMENTS, for multi-modal based operational strategy)

6. Pavement Surface – Service life

Description:

Policies, programs, and project that measure and maintain an agreed upon, standardized pavement riding surface through resurfacing or rehabilitating roadways and bridge surfaces.

Compatibility Screen:

- Goals/objectives being advanced – Asset management, mobility, system preservation;
- Compatibility or conflict other goals/objectives or strategies – Compatible with all goals / objectives and strategies;

- Agency Responsible / MOU needed – Can be managed by existing MDOT structure;
- Applicability to Michigan (High/Medium/Low) – High applicability; is similar to current approach and strategy so it is applicable, realistic and is currently perceived as an accepted strategy;
- Potential effectiveness (High/Medium/Low) – Highly effective;
- Difficulty to implement:
 - Management (High/Medium/Low) – Can be managed by existing DOT structure
 - Cost (High = \$\$\$; Medium = \$\$; Low = \$) –Medium to low cost for new construction; can be implemented over time, in-conjunction with maintenance strategies.

Sample Programs, Activities, and Project Types:

- Scheduled Resurfacing – Regular scheduled resurfacing;
- Resurfacing on an as-needed basis – Pavement resurfacing;
- Rehabilitation and reconstruction – Pavement removal and reconstruction as needed.

7. Rehabilitation and Reconstruction

Description:

Policies, programs and projects to rehabilitate or reconstruct a capital facility with a similar facility

Compatibility Screen:

- Goals/objectives being advanced – Safety, mobility, access management, system preservation;
- Compatibility or conflict other goals/objectives or strategies – Compatible with all goals/objectives and strategies;
- Agency Responsible / MOU needed – Can be managed by existing MDOT structure;
- Applicability to Michigan (High/Medium/Low) – High applicability;
- Potential effectiveness (High/Medium/Low) – Highly effective;
- Difficulty to implement:
 - Management (High/Medium/Low) – Low;
 - Cost (High = \$\$\$; Medium = \$\$; Low = \$) – Medium to low depending on the facility.

Sample Programs, Activities, and Project Types:

- Capital projects – Reconstructing or rehabilitating roadways or bridges to current size and capacity and current design standards.

8. Safety Strategy Group

Description:

This strategy includes policies, programs, and projects that will reduce the number and rate of crashes and fatalities.

Compatibility Screen:

- Goals/objectives being advanced – Safety;
- Compatibility or conflict other goals/objectives or strategies – Compatible with safety, mobility, preservation;
- Agency Responsible / MOU needed – Primarily can be advanced by DOT; would be stronger if received support and assistance from local governments and transit agencies;
- Applicability to Michigan (High/Medium/Low) – Realistic for Michigan;
- Potential effectiveness (High/Medium/Low) – Highly effective, appears consistent with the current comments and opinions of the committees and the public;
- Difficulty to implement:
 - Management (High/Medium/Low) – Can be managed by existing MDOT structure;
 - Cost (High = \$\$\$ / Medium = \$\$ / Low = \$) – High to Medium cost, can be adjusted to be compatible with MDOT funding, with “buy-in” and cooperation from local governments, business community, and other public agencies – Michigan may be able to leverage funds to make this strategy highly successful.

Sample Programs, Activities, and Project Types:

- Safety Improvement Projects – Addressing project locations that have the highest rate of crashes and fatalities, various capital or operational improvements including but not limited to modernization the facility design, adding turning lanes, access management or reducing congestion (congestion has been shown to correlate directly to increased crashes.)

- Adding Safety Features – adding features such as guardrail, medians, rumble strips, truck-lanes, lights or signals, or grade separations to existing roadways and bridges to improve roadway safety.
- Improved geometrics, pavements, design - Update and modernize widths, shoulders, curves, grades, sight distance, pavement quality as needed to current standards or higher on all roadways and bridges. In some cases, design deficiencies due to older standards may be the cause for the crashes.
- MPO, Local Government, and Public Education Safety Programs – Training courses or seminars to educate the public on how to drive more safely and advise those agencies and governments responsible for local roadways on low-cost projects to improve safety.
- MDOT's Strategic Highway Safety Plan – this plan identifies key safety needs in the state and guides investment decisions to achieve significant reductions in highway fatalities and serious injuries on all public roads. It is being implemented through MDOT's Safety Improvement Program.

F. Intelligent Transportation Systems (ITS) and Incident Management Strategy Group

Description:

Facilities, services, and technological enhancements to existing roadways to improve mobility and safety (Note: ITS addresses both re-occurring congestion such as that caused by daily rush-hour traffic and incident induced congestion such as that caused by crashes).

Compatibility Screen:

- Goals/objectives being advanced – Mobility and reduced congestion, modernization, safety;
- Compatibility or conflict other goals/objectives or strategies – Compatible with all other goals/objectives and strategies;
- Agency Responsible / MOU needed – Can be accomplished with MDOT structure would need extensive coordination with local governments, and state and local law enforcement agencies, staffing may need to be increased for traffic management centers;
- Applicability to Michigan (High/Medium/Low) – Can be used on Interstates and highly congested roadways; can be used at border crossings; can be coordinated with neighboring states;
- Potential effectiveness (High/Medium/Low) – Effectiveness has been shown to be a function of staffing, management, and coordination with local agencies;
- Difficulty to implement:

- Management (High/Medium/Low) – Will require major coordination with local governments, state and local law enforcement agencies; for example so all will use the same “frequencies” and agree to standardized management and response approaches;
- Cost (High = \$\$\$; Medium = \$\$; Low = \$) – High, technology integration is costly, will require development and long-term staffing of a “control” center.

Sample Programs, Activities, and Project Types:

- Traveler Information Systems (511) - A telephone based service, similar to a 911, but connected to roadways to provide two-way direct access to information about the roadway.
- Electronic fare payment / Electronic toll collection - Provide bar code stickers, cards or similar device or provide ability to read credit cards so that vehicles can be scanned at toll facilities and not need to be delayed for payment. Vehicle owners would be billed latter or billed in advance.
- Computerized signal control and enhancements - Linking or synchronizing traffic lights and other signals to improve the flow of traffic, timing the lights so that vehicles traveling the speed limit on the main roadway always encounter a green light.
- Weigh-in-Motion - Device embedded in a roadway that can calculate the weight of a commercial vehicle while it is traveling on the roadway – thereby eliminating the need to stop at a weigh-station.
- Real time motorist information - Changeable message signs along the roadway or specific radio frequency advertised along a roadway with announcements describing construction, special or unique conditions (such as weather advisories or delay ahead notifications) and instructions on how to avoid (typically) a crash site or congested location, etc.
- Initiative VII – MDOT ITS initiative.

Incident Management - Rapid detecting, verifying and responding to and managing incidents Program coordinated through a traffic operations center or through policy agreements among local governments to respond quickly to a crash and get traffic moving as soon as possible.

- Incident management - Pre-established policies and agreements among local and state agencies on the process and protocols on how to most efficiently manage and quickly clear a crash or other incident along a roadway.
- Institutional agreements/policies for rapid response - MOU’s among local governments and policies to quickly respond to Hazmat, and other incidents.

- Freeway service patrols – Special vehicles and staff patrolling the roadways, providing free or at-cost roadside services to vehicles that break-down, have a flat, or pull-off to the side of the roadway for an emergency.
- Alternative emergency route preplanning - Having alternative emergency routes pre-arranged so that when an incident occurs, traffic can be re-routed quickly.
- Emergency signal pre-emption - Linking or synchronizing traffic lights and other signals to so that emergency vehicles traveling on main roadways will always encounter a green light.

G. Land Use Planning Strategy Group

Description:

Land use or zoning ordinance that permit development patterns that are conducive to walking, bicycling, and using public transportation or in some way reducing the need to use an automobile for all trips (may also be called sustainable development).

Compatibility Screen:

- Goals/objectives being advanced – Land use integration with transportation; improved highway mobility, transit mobility, access management, modal choice.
- Compatibility or conflict other goals/objectives or strategies – Compatible with all goals/objectives and strategies, this strategy would need to be advanced for the success of increasing public transit usage, modal choice, access management.
- Agency Responsible / MOU needed – May require changes to state statutes, coordination needed with state and local governments responsible for zoning and land use.
- Applicability to Michigan (High/Medium/Low) – Would depend on the political “will” of the people, business, local governments, industries and home builders of Michigan; many groups may challenge – national “eminent domain / takings” cases have created a negative environment. May partially be funded or incentives tied to “impact fees” on new developments.
- Potential effectiveness (High/Medium/Low) – If it could be implemented, it would be effective for new developments, however, it would only be marginally effective for area of the state where there is existing development.
- Difficulty to implement:
 - Management (High/Medium/Low) – High – requires major statewide education and changes to legislation at many governmental levels
 - Cost (High = \$\$\$ / Medium = \$\$ / Low = \$) – Low to medium costs mainly for legal and administrative changes and for public education

Sample Programs, Activities, and Project Types:

- Land Use Policies / Growth Control – Policies and regulations that encourage high density along transit corridors, mixed use site design, jobs/housing balance, childcare integration; limiting or controlling growth boundaries.
- Compact Land Use / Nodal Development – Development pattern where housing, commercial, professional, and recreational developments are clustered into various nodes so people can walk within the node and transit stops can pick up larger numbers of people and move them from node to node.
- Site Design Standards – Transit friendly site design, bicycle/pedestrian compatibility, neo-traditional neighborhood design, and joint use with transit facilities.
- Transit Oriented Development (TOD) – Development patterns designed to foster greater use of transit. Includes designing residential and commercial centers to maximize access by Transit and Non-motorized transportation, and with other features to encourage transit ridership.
- Pedestrian Malls - Design of outdoor commercial areas where vehicles are prohibited or limited and travel is restricted to use by pedestrians, public transit vehicles or other non-motorized vehicles.
- PUDs / Cluster / Open Space Development – Land use patterns where housing and commercial development is clustered and open space is available adjacent to it.
- Traditional Neighborhood Design – Traditional Neighborhood Design (TND) projects are pedestrian-oriented developments that typically include neighborhood centers and parks, and a mix of uses.
- OTHER - Housing Incentive Programs – Incentives to encourage employees to live close to work (low-interest home loans, subsidized housing near transit facilities).

H. Pedestrian and Bicycle Facilities Strategy Group

Description:

Also known as, Active Transportation and Human Powered Transportation - Development of facilities and support for programs to promote: Activities such as but not limited to: Walking, Bicycling, Small-Wheeled Transport (skates, skateboards, push scooters and hand carts) and Wheelchair travel. The facilities in this strategy group would be designed and intended as facilities that link - for example: homes to schools, shopping, work, and other destinations - as an alternative or replacement for travel by vehicle. (This does not refer to recreational facilities.)

Compatibility Screen:

- Goals/objectives being advanced – Mobility, Modal choice, Reduced Travel Demand, Sustainable Development;
- Compatibility or conflict other goals/objectives or strategies – Would need to be implemented with Land Use policies; compatible with most other strategies, somewhat in conflict with highway capacity addition;
- Agency Responsible / MOU needed – Cooperation needed between DOT and local governments;
- Applicability to Michigan (High/Medium/Low) – Medium, use may be limited to mild-weather or urban areas;
- Potential effectiveness (High/Medium/Low) – Medium to low, (many people prefer use of a vehicle) would require change in behavior, would require reduction in sprawl, more compact development, public education programs, increased security coverage of new facilities;
- Difficulty to implement:
 - Management (High/Medium/Low) – Could be done with existing MDOT and local government structure, may be difficult to find or redirect funding or convince local officials of the need; possibly use “safe routes to school” earmarks;
 - Cost (High = \$\$\$; Medium = \$\$; Low = \$) – Medium, would require right of way acquisition, funding for design and construction and ongoing maintenance by state and local governments and other agencies.

Sample Programs, Activities, and Project Types:

- Safe Routes to School Program - Bicycle paths and lanes / sidewalks and pedestrian paths - Design, acquire right-of-way and build separate paths and lanes on existing roadways for non-motorized transportation including bicycles and pedestrians.
- Grade separation for bicycles/pedestrians - Design, acquire right-of-way, and build bicycle and pedestrian facilities that are separated from roadway facilities and other motorized traffic.
- Shared use paths/lanes - Design, acquire right-of-way, sign and build paths and lanes that are shared by bicyclist and pedestrians; or mark a lane on an existing roadway for bicyclist or pedestrians.
- Purchase / Provide “free” bicycles - Provide “free / loaned” bicycles inside urban areas as an option to driving; would need to be combined with facility availability and management / administrative agency.

I. Ports - Water and Airports Strategy Group

Description:

Capital projects, operational and management improvements and expansion of water port and airport facilities and services.

Compatibility Screen:

- Goals/objective being advanced – Improves highway and transit mobility; reduces congestions, expands service and modal choice;
- Compatibility or conflict other goals/objectives or strategies – Highly compatible with all strategies;
- Agency Responsible / MOU needed – MDOT and private sector businesses and agencies;
- Applicability to Michigan (High/Medium/Low) – May only be effective in areas with existing services;
- Potential effectiveness (High/Medium/Low) – Medium to Low because modal choice is a decision driven by the private sector market and based on cost and amount of time available or needed;
- Difficulty to implement:
 - Management (High/Medium/Low) – Medium, could be developed by existing MDOT structure and staffing;
 - Cost (High = \$\$\$; Medium = \$\$; Low = \$) – Medium to high cost for new engineering designs needed for facilities and potentially high construction costs for new facilities; costs would probably exceed current funding levels and availability.

Sample Programs, Activities, and Project Types:

Water and Air Ports Capital and Operational Improvements

- Intermodal facilities – Improving or providing facilities that facilitate transfer to other modes;
- Connectivity - Improving or providing improved roadway access to water and airport facilities;
- Tax Incentives – Providing tax incentives to ship by water;
- Intermodal parking facilities - Providing free or low-cost, long-term parking lots adjacent to public transit/airport shuttle facilities;
- New Technology – Supporting innovative technology research and design testing by funding research or offering locations in the state to as a test location

for new technology; Incorporating pre-pass and other electronic pre-clearance technology to improve operations;

- Pedestrian connectivity - Improving or providing pedestrian access to airport facilities;
- Express bus routes - Providing direct service with limited stops between specific locations.

J. Public Transit Strategy Group – Bus and Rail

Description:

Capital projects, operational and management improvements and expansion to public transit facilities and services.

Compatibility Screen:

- Goals/objective being advanced – Improves highway and transit mobility; reduces congestion, expands transit service, modal choice;
- Compatibility or conflict other goals/objectives or strategies – Highly compatible with and would need to be implemented with Land Use Strategy;
- Agency Responsible / MOU needed – MDOT and local public transit agencies;
- Applicability to Michigan (High/Medium/Low) – May only be effective in urban areas with existing public transit services or areas where the public is accustomed to using public transit;
- Potential effectiveness (High/Medium/Low) – Medium to Low because it requires higher density development pattern and a change to public behavior – it only works if more people can and will take public transit; land use patterns and sprawl may not be conducive or efficient in areas where there is considerable distance between single family homes to allow for a single stop to pick up numerous passengers within reasonable walking distance of the stop.
- Difficulty to implement:
 - Management (High/Medium/Low) – Medium, could be developed by existing MDOT structure, may need additional staffing at transit agencies;
 - Cost (High = \$\$\$; Medium = \$\$; Low = \$) – Medium to high cost for new engineering designs needed for facilities and potentially high construction costs for new facilities; costs would probably exceed current funding levels and availability. Would need to supplement FTA funding with FHWA funding; possibly increase fares and local matches.

Sample Programs, Activities, and Project Types:

Public Transit Capital Improvements

- Exclusive rights of way (light rail, bus rapid transit, bus lanes) - Providing a lane or ramp or facility exclusively for the use of bus, or light rail so that avoids congestion with other traffic.
- Bus bypass ramps - Special lanes or ramps so buses do not need to stop for ramp meters.
- Park and Ride/ Rail / Intermodal parking facilities - Providing free or low-cost parking lots adjacent to public transit or rail facilities.
- Pedestrian connectivity - Improving or providing pedestrian access to rail and bus facilities and stop.
- Providing shelters and other amenities at stops.
- On-demand transit - establishing on-call public transit service.
- Providing additional buses or rail trains or track – along heavily traveled passenger corridors.
- Supporting or subsidizing inter-city routes – along heavily traveled passenger corridors.

Public Transit Service & Operational Improvements

- Express bus routes - Providing direct service with limited stops between specific locations.
- Shuttle/trolley routes – Providing connector service between express routes or two or more popular, highly traveled locations.
- Para-transit and other service enhancements or expansions - Providing specialized services to people with special needs or providing on-call service or routing to the door.
- Real-time Transit Information Systems – Providing information possibly as kiosks or changeable message signs that tell when a bus or train will arrive.
- Rail – Commuter & Light Rail – Improvements to rail lines, stations, and service or operating times to attract more riders.

K. Railroad Strategy Group

Description:

Capital projects, operational and management improvements and expansion to railroad facilities and services.

Compatibility Screen:

- Goals/objective being advanced – Improves highway and transit mobility; reduces congestions, expands railroad service, modal choice.
- Compatibility or conflict other goals/objectives or strategies – Highly compatible with and would need to be implemented with Land Use Strategy, somewhat in conflict with capacity additions.
- Agency Responsible / MOU needed – MDOT and private sector railroads would need to jointly develop programs and agreements.
- Applicability to Michigan (High/Medium/Low) – May only be effective in areas with existing services, it is very expensive to add new lines; before state uses transportation funds typically used for roadway would need to justify its for private sector rail business and would need to demonstrate the public benefit of such.
- Potential effectiveness (High/Medium/Low) – May be limited in effectiveness because the private market place controls transportation modal decisions (shippers will use rail if it provides the best price to move their goods combined with the time/delivery reliability needed); also current development patterns may not be conducive – shippers and receivers will need to have easy access to pick-up drop-off locations without excessive expense for drayage.
- Difficulty to implement:
 - Management (High/Medium/Low) – Medium, could be developed by existing MDOT structure; may require considerable education of officials to be convinced spending public funds for a private business is wise.
 - Cost (High = \$\$\$; Medium = \$\$; Low = \$) – Medium to high cost for new engineering designs needed for facilities and potentially high construction costs for new facilities; costs would probably exceed current funding levels and availability.

Sample Programs, Activities, and Project Types:

Rail road Capital and Operational Improvements - for Freight and Passenger

- Rail grade separation – Constructing Bridges or underpasses to separate railroad and highway traffic to avoid conflicts, congestion, delays and improve safety.
- Sidings – Adding parallel track segments to provide pull-offs so trains can pass each other or reduce “choke-points”.
- Intermodal facilities – Improving or providing facilities that facilitate transfer to other modes.

- Connectivity – Improving or providing improved roadway access to intermodal facilities; improving or providing improved parking or pedestrian access to passenger rail facilities.
- Providing amenities – Providing free or low-cost staging facilities, service plazas, and other amenities adjacent to intermodal facilities; parking adjacent to passenger rail facilities.
- Rail Freight New Technology – Supporting innovative technology research and design testing by funding research or offering locations in the state to as a test location for new technology.

L. Transportation Demand Management (TDM) Strategy Group

Description:

Programs, policies and administrative or management changes that reducing demand on roadways by promoting or encouraging activities such as ride sharing, and employer incentives to discourage use of driving to work in a single occupancy vehicle and result in more efficient use of existing resources.

Compatibility Screen:

- Goals/objectives being advanced – Reduced congestion, improved safety and mobility by making better use of existing facilities without extensive capital improvements.
- Compatibility or conflict other goals/objectives or strategies – Programs and activities from this strategy group can easily be combined with or integrated into any other strategy group.
- Agency Responsible / MOU needed – Extensive involvement is needed from all local governments, public agencies such as transit agencies and private sector businesses; may also require commitment and support from the highest levels of state government.
- Applicability to Michigan (High/Medium/Low) – Programs and activities require people to change their behavior and attitudes about travel. Studies and experiences have shown that programs may not be very effective in changing behavior.
- Potential effectiveness (High/Medium/Low) – Somewhat low because of the difficulty in changing travel behavior.
- Difficulty to implement:
 - Management (High/Medium/Low) – High - Extensive management needed to win support for business and government agencies, educate the public and promote the concepts and programs.

- Cost (High = \$\$\$; Medium = \$\$; Low = \$) – Low compared to capital programs. Primary costs are for staffing, writing and publication of program and educational materials, and administrative needs.

Sample Programs, Activities, and Project Types:

- Ridesharing programs including carpool / vanpool program (third party) – Providing or improving carpooling and vanpooling opportunities; providing matching assistance, promoting the program, targeted outreach.
- Parking Management /Park & Ride Lots - Includes a variety of strategies including supply restrictions, maximum ratios or caps; preferential vanpool, carpool parking; requiring permits or metering on-street parking; providing and encouraging Park-&-Ride lots; adjusting cost to park to discourage use by commuters and encourage short term “shoppers”.
- Reduction or eliminate employer parking or subsidies - Reducing employer paid or free parking; reduce employer discounts or subsidies for parking fees.
- Flexible transportation allowance/commuter Choice programs - Commuter financial incentives to encourage alternative commute modes; such as employer subsidies for bus passes or vanpools or parking for carpools. Employer-based transit passes.
- Guaranteed Ride Home (GRH) – programs provide an occasional subsidized ride to commuters who use alternative modes, for example, if a bus rider must return home in an emergency, or a carpooler must stay at work later than expected.
- Employer trip reduction ordinances - Also called Commute Trip Reduction (CTR) or Vehicle Trip Reduction programs – Employers give commuters resources and incentives to reduce their automobile trips.
- Telecommuting – Employers permitting or encouraging employees to work from home.
- Restricted hours for events – Restricting the start/finish time of major recreation and social event to be outside congested time periods.
- Flexible work hours and telecommuting – Alternative work schedule (also called variable work hours) including flextime, compressed workweek (CWW), and staggered shifts that are usually implemented as an employee and manager option (both employees and their managers must agree).

**M. Traffic Operational Improvements/Transportation Systems Management (TSM)/
Transportation System Management and Operations (TSMO) Strategy Group**

Description:

Capital projects, policies and system operational changes that result in more efficient use of existing transportation resources by making improvements or changes to signs, signals, markings, incident management, speed, access, etc. This strategy incorporates other groups listed including access management, congestion pricing, ITS, and modernization.

Compatibility Screen:

- Goals/objectives being advanced – Sustainability, mobility, safety.
- Compatibility or conflict other goals/objectives or strategies – Like TDM, compatible with all other strategies; project and policies from this strategy group can be combined with or integrated into any other strategy group .
- Agency Responsible / MOU needed - Can be advanced by DOT.
- Applicability to Michigan (High/Medium/Low) – Realistic for Michigan; highly applicable, consistent with existing capital program.
- Potential effectiveness (High/Medium/Low) – Highly effective, appears consistent with the current comments and opinions of the committees and the public; does not require changes to personal habits.
- Difficulty to implement:
 - Management (High/Medium/Low) – Low, can be managed by existing MDOT structure
 - Cost (High = \$\$\$; Medium = \$\$; Low = \$) – Medium, can be incorporated with other strategies when adding capacity or doing preservation and maintenance to existing roadways. These improvement may increase costs (in some cases a lot and in some cases marginally) to a planned project.

Sample Programs, Activities, and Project Types:

- Signs, Signals, Marking – Adding or improving roadway and bridge signage or roadway markings; adjusting the timing of traffic signals.
- Transit traffic signal and emergency vehicle preemption - Connecting traffic signals to buses and emergency vehicles so that when they approach, the signal is green and they can proceed.
- Ramp metering - Add signals at ramps to provide a spacing of traffic entering the roadway.

- Computerized signal systems - Upgrade signal control capabilities, interconnect and coordinate signals, remove unwarranted signals, super-street treatment.
- Incident Management – Removing crashes or obstructions as soon as possible to avoid incident related congestion delays (see also ITS).
- Access Management – Limiting or restricting access to a roadway to improve mobility (see also Access Management Strategies).
- Design Improvements – Changing lane designs or configurations such as adding turning lanes, improving intersection or interchange geometrics as needed to address traffic mobility demands.
- At-grade Intersection improvements or replacements - Add turn lanes, channelize or prohibit left turns; replace with intersection or grade separation.
- Intersection and roadway widening (urban) - Remove on-street parking; add left turn lanes; improve shoulders, add acceleration /deceleration lanes; add bus turnarounds or pull-offs.
- Intersection and roadway widening (rural) - Add truck climbing lanes; add slow moving vehicle turnabouts.
- Modern roundabouts and other Traffic calming - Build roundabouts or replace intersections with them; design streets with curves or speed bumps to slow traffic.
- One-way streets - Convert to one-way streets or one-way pairs.
- Reversible lanes - Add lanes and signals that can be reversed as needed to serve direction of congestion.
- Railroad grade separations - Separating the railroad and road crossing so vehicles do not need to stop.
- HOV Preferential Treatment - High Occupancy Vehicles (HOV) are vehicles carrying more than just the driver and are given preferential treatment because they reduce the number of vehicles on the roadway.
- HOV/HOT Lanes - High Occupancy Vehicle and High Occupancy Toll (HOT) lanes are usually are less congested and have better access and mobility.
- HOV ramp bypass lanes - HOV lanes or ramps to freeways that bypass ramp meters or provide preferential access.

Strategy Compatibility/Conflict - Evaluation Summary

		IMPLEMENTATION				GOALS AND OBJECTIVES									
Strategy Group		Responsible Agencies & businesses	Michigan applicable	Effective	Management Difficulty	Cost	Access Management	Highway Mobility	Land Use Sustainable	Modal Choice	Modernize	Reduce Travel Demand	Safety	System Preservation	Transit Mobility
A	Access Management	DOT, State and Local Governments	+	+	-	\$\$	+	+	0	0	0	0	+	0	+
B	Asset Management	DOT	+	+	0	\$	0	0	0	0	0	0	0	0	0
H	Ped. & Bicycle	DOT, State and Local Governments	+	+	0	\$\$	0	+	+	+	0	+	0	0	0
C	Congestion Pricing	DOT, Toll Authority	-	+	-	\$\$	0	+	+	+	0	+	0	0	0
D	Enhancement	DOT, Local, Public	+	+	0	\$	0	0	0	0	0	0	0	0	0
E 1	Hwy & Bridge Capacity	DOT	+	+	0	\$\$\$	0	+	-	-	0	-	+	0	-



E 2	Maintenance Capital	DOT, Public Transit Agencies	+	+	0	\$\$	0	0	0	0	0	0	+	+	0
E 3	Maintenance Scheduled	DOT, Public Transit Agencies	+	+	0	\$\$	0	0	0	0	0	0	+	+	0
E 4	Modernize	DOT, Local Govts.	+	+	0	\$\$	0	+	0	0	+	0	+	+	0
E 6	Pavement Surface	DOT	+	+	0	\$	0	+	0	0	0	0	+	+	0
E 7	Rehab & Reconstruct	DOT	+	+	0	\$\$	0	+	0	0	0	0	+	+	0
E 8	Safety	DOT	+	+	+	\$\$	0	+	0	0	0	0	+	+	+
F	ITS Incident Management	DOT, State & Local Police, Local Govts.	+	+	-	\$\$\$	+	+	0	0	+	0	+	0	+
G	Land Use	State & Local Governments	+	+	-	\$	+	+	+	+	0	0	0	0	+
H	Ped. & Bicycle	DOT, State and Local Governments	+	+	0	\$\$	0	+	+	+	0	+	0	0	0



I	Ports Water/Air	Private sector	+	0	0	N/A	0	+	+	+	0	+	0	0	+
J	Public Transit – Bus and Rail	DOT, State and Local Governments, Public Transit Agencies	+	+	0	\$\$\$	0	+	+	+	0	+	0	0	+
K	Railroad	Private sector	+	0	0	N/A	0	+	+	+	0	+	0	+	+
L	TDM	DOT, Local Govts, Businesses	+	-	-	\$	0	+	+	+	0	+	+	+	+
E 5 & M	Traffic Operations &TSMO	DOT, Local Govts, Businesses	+	+	+	\$\$	+	+	0	0	+	+	+	+	0
		Responsible Agencies & businesses	Michigan applicable	Effective	Management Difficulty	Cost	Access Management	Highway Mobility	Land Use Sustainable	Modal Choice	Modernize	Reduce Travel Demand	Safety	System Preservation	Transit Mobility

Key:

Management Difficulty to Implement (Easy = +; Average= 0; Difficult = -)

Cost to Implement (High = \$\$\$; Medium = \$\$; Low = \$)

Goal Compatibility (Advances Goal = +; Neutral = 0; Counter to Goal =)





MITransportation

MICHIGAN LONG RANGE TRANSPORTATION PLAN



*Providing the highest quality integrated transportation services
for economic benefit and improved quality of life.*



Wilbur Smith Associates