TRANSPORTATION FOR THE 21ST CENTURY

WISCONSIN STATE HIGHWAY PLAN 2020

SUMMARY REPORT

ACKNOWLEDGMENTS

This report was prepared by the Wisconsin Department of Transportation, Division of Transportation Investment Management, Bureau of Planning, in collaboration with the Bureau of State Highway Programs. It is the result of lengthy analytical and writing efforts that involved numerous individuals.

I would like to extend my sincere appreciation to those who provided guidance through their participation on the various technical committees, the External Advisory Group, and the SHP Steering Committee. Special thanks goes to the WisDOT transportation districts for their input as the plan was being developed, review of document drafts, and participation in the public involvement component of the plan.

Thanks also goes to the WisDOT Bureau of the Environment and the Wisconsin Department of Natural Resources for their contributions to the development and refinement of the System-plan Environmental Evaluation. Finally, I would like to thank the WisDOT Office of Public Affairs for assistance in producing the plan and background reports, and for preparing the SHP 2020 newsletters.

KEN LEONARD
DIRECTOR, BUREAU OF PLANNING
FEBRUARY 2000

Wisconsin Department of Transportation

Tommy G. Thompson
Governor

Charles H. Thompson
Secretary

OFFICE OF THE SECRETARY
P. O. Box 7910
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Dear Transportation Partner:

I am pleased to announce that the Wisconsin Department of Transportation has adopted the *Wisconsin State Highway Plan 2020*. Completion of the plan marks the end of a lengthy and complex effort to develop a new system-level plan to guide investments in our state trunk highways and bridges over the next two decades.

I want to personally thank you for your participation in the planning process. Hundreds of Wisconsin residents came to the public forums, focus groups, and public meetings held around the state to offer their ideas about highway needs and priorities. Numerous citizens voiced their opinions through letters and other means of correspondence. In finalizing the plan, we were responsive to the issues, questions and concerns raised throughout the planning process.

The State Highway Plan 2020 is just one of a number of modal plans resulting from Translinks 21, Wisconsin's multi-modal plan for the 21st Century. The State Highway Plan 2020 outlines a blueprint for investing in our state trunk highways and bridges over the next 21 years. The plan achieves five major goals to: preserve our transportation infrastructure, enhance traffic movement, ensure safety, foster economic development, and protect the environment. The plan required some difficult trade-offs. For instance, in order to reduce the overall financial, social, and environmental costs, the plan permits some additional congestion, particularly in urban areas. We are confident, however, that this plan provides the essential investments to keep Wisconsin moving into this new century.

Additional funding will be required in future years to address the significant needs that have been identified. These needs include high-cost improvements for southeastern Wisconsin freeways, preservation needs and some modest capacity improvements in the remainder of the state, increased funding for safety, increased consideration of other modes of travel in highway improvements, better land use planning, and efforts to improve the aesthetics of highway facilities in urban areas. It is important to note, that the department does not propose to fund improvements identified in the plan by decreasing funding for any other transportation-related programs.

The State Highway Plan 2020 is not a static document. Within its 21-year planning period many things will change, including transportation technologies, travel demand, environmental constraints, and the economic condition of the state. Therefore, we plan to review and update the plan every six years to make sure it remains consistent with regional and local plans and responds to changing conditions. Recommendations included in the State Highway Plan 2020 will also be integrated with the transit, rail, and pedestrian plans that are currently being developed.

Once again, thank you for the contributions you made to help us prepare the State Highway Plan 2020.

Sincerely,

Charles H. Thompson

Charles H. Thompson
Secretary

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Introduction

People depend on transportation. It directly affects Wisconsin's quality of life, connecting people to jobs, getting people where they want to go, bringing tourists to the state, and shipping products.

> People depend on transportation, …and the future of Wisconsin's transportation system…depends on decisions we make today.

The future of Wisconsin's transportation system depends on decisions we make today. Keeping the entire system in good operating condition – for all modes of transportation – over the next 21 years requires a set of action plans. This report focuses on just one of these plans, the *Wisconsin State Highway Plan 2020 (SHP 2020).*

Its focus is on the 11,800 miles of State Trunk Highway routes. These routes affect not just auto and commercial truck travel, but all modes of transportation. Bicycles, buses, pedestrians, cars, commercial trucks, passenger and freight trains, airports, and harbors are all dependent upon the connections provided by a reliable, efficient, and safe State Trunk Highway system.

What does the plan cover?

Answers to the following questions are covered in individual sections of this summary report:

- Why do we need this plan?
- What routes make up the State Trunk Highway system?
- What assumptions were necessary in order to develop the plan?
- What process was used to develop the SHP 2020?
- How does this plan relate to other plans such as the state's multimodal transportation plan (Translinks 21)?
- How were all modes of transportation considered when developing the plan?
- Why is timing so important when resurfacing and replacing pavement and bridges?
- What will traffic congestion be like in the year 2020?
- With dramatic improvements in highway safety over the past 50 years, why will education, engineering and enforcement continue to be so critical?
- Why is land use planning so critical to a safe and efficient highway system?
- Why are the needs of the Southeast freeway system important to the entire state?
- What are the plan's potential impacts on the environment?
- What will it cost to fully implement the plan?

The central focus of this plan is on the State Trunk Highway system. The SHP 2020 does not identify specific projects, but broad strategies and policies to improve the state highway system over the next 21 years. Given its focus, the plan does not identify improvement needs on roads under local jurisdiction.

Emphasis areas

The SHP 2020 responds to the key issues facing the State Trunk Highway system today, and into the future. Three areas are emphasized: pavement and bridge preservation, traffic movement, and safety. (See Figure 1.) The plan also considers the goals of economic development and environmental protection along with the three emphasis areas.

EMPHASIS AREAS

PRESERVATION — Because so much of the system is old, efforts to preserve the system must be increased by using tested techniques to ensure that roads & bridges continue to provide adequate service.

TRAFFIC MOVEMENT — Because traffic volumes continue to increase, greater efforts must be made to meet drivers' demands by using the latest technologies, managing access, considering land use & improving capacity.

SAFETY — Because traffic volumes are increasing, efforts must be increased to reduce crash rates by improving roadway design, enhancing driver education & targeting enforcement.

Figure 1. The plan embodies 3 major emphasis areas that resulted from the planning process.

Need for an action plan

Wisconsin has reached a critical juncture. We have constructed an efficient state highway network and made diligent efforts to preserve the system and its structure. The system, however, can only endure so much.

Even though we have invested in preserving the system, much of Wisconsin's State Trunk Highway network is old and deteriorating. Many of our highways are coming to the end of their physical and functional lives. Pavements, designed to last 50 to 60 years, are reaching the end of their life cycle. Many bridges – especially on the freeway system – are reaching the point of replacement. If these pavements and bridges are not replaced, increasingly expensive and frequent maintenance will be needed to keep them functioning.

Travel has increased by 60% since 1982 and will continue to increase, although at a more moderate pace. The State Trunk Highway system cannot keep up. The number of miles of congested roads and the amount of travel under congested conditions will increase dramatically over the next 21 years. Without action, travelers will spend more time in traffic, businesses will deal with costly and unreliable delivery systems, and tourists will seek other more accessible destinations.

Many highways and bridges are nearing the end of their physical and functional 'life'...

if they are not replaced,... increasingly expensive & frequent maintenance will be necessary to keep them functioning.

The choice is not whether to fix the system...
but how to fix it responsibly and cost-effectively.

Wisconsin's highways and bridges require additional investment to maintain what currently exists. There is currently a sizable "backlog" of improvement needs. These improvements were not made in recent years despite the need for them, due to reasons such as insufficient funding and environmental constraints. In addition, improvement needs will continue to "emerge" as pavements and bridges age, and congestion increases.

The choice is not whether to fix the system, but how to fix it responsibly and cost-effectively. If the challenges of that choice are met, the system can continue to provide the services that support Wisconsin's growing economy and high quality of life.

There is not one solution that will make the State Trunk Highway system better. There is not one way to fix the aging roadways and bridges. The plan recognizes that there must be strategy, foresight and flexibility in developing localized solutions.

To meet the needs of the highway system over the next 21 years, Wisconsin must take action on many fronts:

- It must continue its commitment to safety.
- It must increase its rate of investment in highway rehabilitation.
- It must make alternative transportation modes more viable.
- It must protect the system from the effects of unplanned and uncontrolled land development.
- It must use new technologies to manage the flow of traffic.
- In many locations, it must add capacity to avoid system failure.

This plan outlines the strategies and actions that are needed.

Description of system

The State Trunk Highway system includes approximately 11,800 miles of roadway and 4,600 bridges. It accounts for only 11% of the state's total roadway mileage, but it carries 60% of all traffic.

The SHP 2020 divides the State Trunk Highway system into five sub-systems based on their importance in supporting statewide mobility and economic activity – in other words, the type of travel needs they meet. (See Figure 2.) Different design standards are applied to each. For example, a highway that carries high volumes of auto and heavy truck traffic is built to higher standards than a lower-volume road that primarily serves motorists' shorter trip needs.

Two critical sub-systems are those that make up the approximately 3,650-mile Corridors 2020 network. The completion of planned multi-lane expansion of Corridors 2020 Backbone routes is a priority of this plan, as is the on-going maintenance and preservation of the Corridors 2020 system. (See Figure 3.)

The 5 sub-systems provide a way to prioritize needs:

- sub-systems are treated equally with regard to safety improvements & bridge preservation,
- pavement preservation and traffic movement improvements (managing congestion) vary according to sub-system.

Figure 2. The 11,800 mile State Trunk Highway system can be divided into five sub-systems.

STATE TRUNK HIGHWAY SUB-SYSTEMS:

1. **Corridors 2020 Backbone routes** This 1,550-mile network of key multi-lane routes connects major population and economic centers and provides economic links to national and international markets (e.g., Interstates 39,43, 90 and 94; and, Highways 10, 29, 41, 51, 53 and 151).
2. **Corridors 2020 Connector routes** This 2,100-mile system of two - and four-lane highways connects key communities and regional economic centers to the Corridors 2020 Backbone routes (e.g., Highways 2, 8, 12, 13, 14, 21, 26, 61 and 63).
3. **Other Principal Arterials** These 1,450 miles of roadways provide mobility within a specific region (e.g., Highway 10, west of Marshfield, Highway 35 along the Mississippi River) and serve as main thoroughfares in urban areas (East Washington Avenue/Highway 151 in Madison; Bluemound Road/Highway 18 in the Milwaukee area; and, Clairemont Avenue/Highway 12 in Eau Claire).
4. **Minor Arterials** These 5,000 miles of roadways are used primarily for trips within smaller geographic regions. They are generally rural two-lane highways that connect places of more than 1,000 people.
5. **Collectors and Local Function Roads** These sub-systems, totaling 1,700 miles, are used for short trips within an area and to access adjacent land.

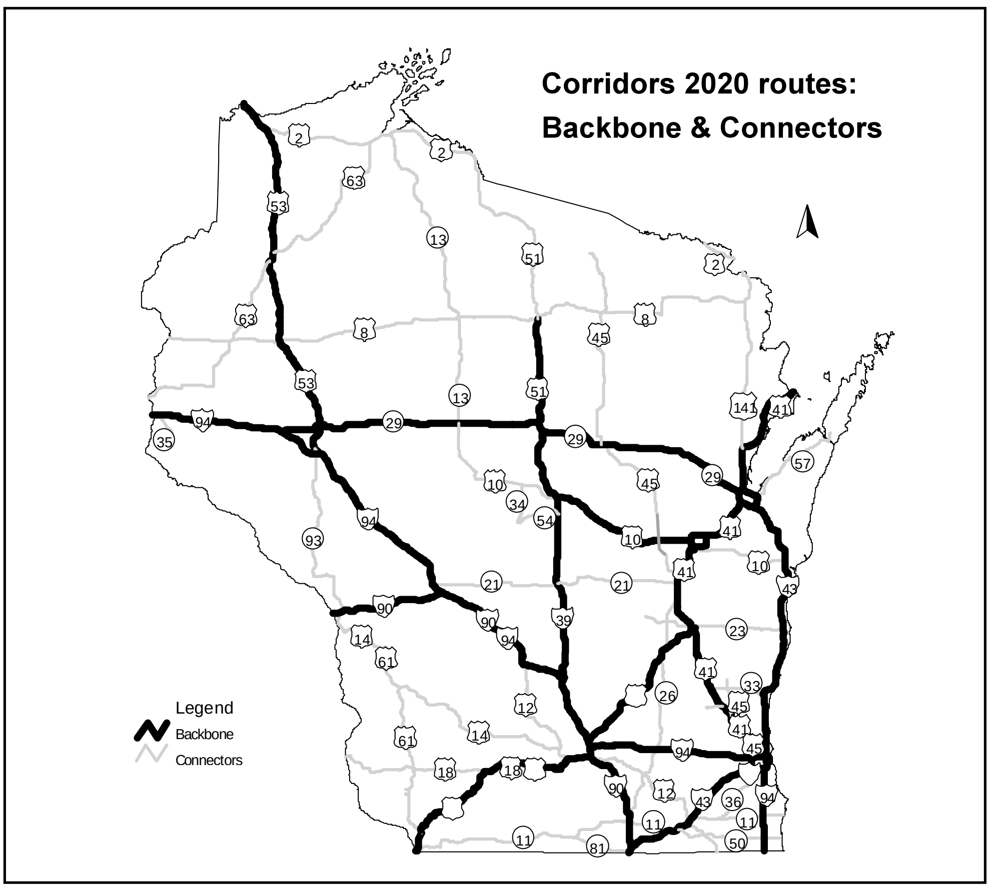


Figure 3. The Corridors 2020 system is designed to carry high volumes of auto and heavy truck traffic.

Key plan assumptions

In order to develop a 21-year plan, it was necessary to make assumptions regarding such factors as highway travel growth, costs, and funding. These assumptions were based on current conditions and past trends. As conditions change, the plan will need to be updated. This is why WisDOT anticipates updating the State Highway Plan every six years.

• Highway travel

The following assumptions were made in order to predict growth in travel, the amount of travel, and the potential of other modes (e.g., rail, bus, etc.) to carry people and goods:

⇒ Vehicle miles of travel on the State Trunk Highway system were forecasted to grow at an average annual rate of 1.5% through 2020. This is a slowing of growth compared with the 3.9% annual increase during the 1970-1997 period. While recent VMT growth has exceeded 1.5%, slower growth is projected for the latter part of the planning period. VMT forecasts are based on the latest projections of several key socio-economic variables that affect travel. Slower growth in these variables results in slower growth in travel. While short-term variations are normal, significant changes from the forecasted trends may result in more needs, especially those associated with traffic movement.

⇒ Improvements to other modes recommended in Translinks 21, and travel shifting to these modes due to those improvements, were assumed in order to ensure that the potential of other modes to carry state highway traffic was considered.

⇒ The impact of implementing locally-adopted metropolitan land use and transportation plans was also assumed in developing estimates of state highway travel.

• Costs and funding

In order to estimate the amount of revenue available to fund the plan, and the cost of improvement needs identified in the plan, the following assumptions were made:

⇒ Estimates of available revenue over the 21-year planning period assume a continuation of state revenues at the 2000 level. Federal revenues were adjusted to reflect authorizations through 2003, with the 2003 funding level continued for the balance of the planning period.

⇒ Estimates of available revenue over the 21-year planning period reflect the deduction of revenue required to fund Intelligent Transportation System (ITS) improvements and special maintenance activities such as highway signing and marking.

⇒ Cost estimates were based on recent expenditures for highway infrastructure improvements, but do not reflect the additional costs of complying with any new regulations, such as evolving storm water regulations or other potential environmental mitigation requirements.

⇒ In addition to improvement needs based on standard unit costs, the plan includes $244 million for amenities which make urban highways better neighbors within the state's communities. Amenities could include such things as lighting, landscaping, noise barriers, special pedestrian facilities, and more aesthetically-pleasing design.

⇒ WisDOT is not proposing to take funding away from other programs in order to pay for improvement needs identified in the SHP 2020.

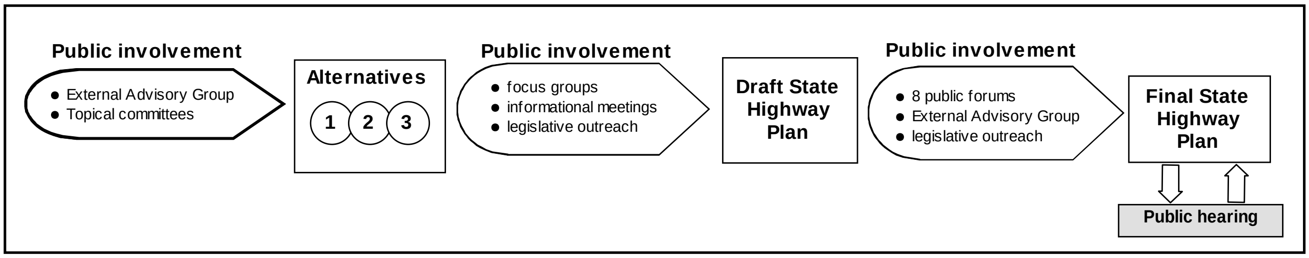
⇒ The performance results identified in the areas of pavement and bridges, traffic movement, and safety assumed full funding of the plan. If the plan is not fully funded, the performance results will be negatively affected. The failure to achieve expected results would reflect the extent to which the plan recommendations are not funded and implemented.

Comprehensive Planning Process

The 1994 Translinks 21 planning process looked at how one transportation mode affects another. It set the framework for a larger, systematic approach to developing long-range plans for each mode. It also reinforced WisDOT's partnerships with Metropolitan Planning Organizations (MPOs), which develop long-range plans for Wisconsin communities of over 50,000 people.

The State Highway Plan 2020 was developed within the broad, multimodal framework established in Translinks 21. An extensive public involvement process was used throughout the development of the plan. (See Figure 4.)

Figure 4. Overview of the complete plan development process.



Early public involvement led to three plan alternatives

Initial stages of the plan development process included WisDOT's work with an External Advisory Group, established to include a wide range of interests. It included representatives from other state agencies, local governments, environmental groups, legislators, local officials, businesses, and other parties interested in the plan development process.

As WisDOT staff conducted analyses and considered issues, they consulted with the External Advisory Group. To ensure consideration of local issues in the development of the plan, WisDOT closely examined and considered the long-range transportation plans prepared by the state's Metropolitan Planning Organizations, which address transportation issues at the local and regional levels.

These initial efforts helped the department research and identify needs, issues, and priorities for the state's highway system. Using this information, WisDOT developed three plan alternatives for consideration by the public and state policy makers. (See Figure 5.) Computer modeling was used to weigh the costs and performance results of improvement and investment options specified by each alternative.

Figure 5. Three plan alternatives were developed early in the planning process.

Early State Highway Plan Alternatives

1) Least costly - preservation of pavements & bridges along with safety improvements, with reduced investment in capacity expansion.
2) More costly – balanced preservation, capacity & safety investments on Corridors 2020 routes, but provided lower pavement and capacity investment on the rest of the system.
3) Most costly – provided the highest level of improvements across the entire State Trunk Highway system.

Alternatives refined into Draft Plan

The department conducted focus group research and held public informational meetings throughout the state to obtain feedback on the three plan alternatives. To ensure a broad public involvement process, WisDOT staff met with and involved groups traditionally under-represented in public participation efforts, such as minorities and low-income individuals. The comments and feedback received during these efforts helped WisDOT define and develop the Draft Plan.

The majority of meeting participants who provided feedback on the alternatives indicated a preference for a highway plan that included elements from both Alternatives 2 and 3. The Draft Plan was developed in response to that feedback, and represented a balance of elements from both alternatives in terms of the service provided by the State Trunk Highway system, and the cost of providing that service.

Determining the final plan

Asking the public for feedback on the Draft Plan was key to shaping the final plan. In addition to the eight public forums held around the state, informational meetings were also held with stakeholders and groups traditionally under-represented in the planning process.

Figure 6. Public input was critical in finalizing State Highway Plan 2020.

The Draft Plan was revised based on this feedback, and other input from the public involvement process. WisDOT reviewed and considered the comments and made changes to the plan to address major issues, questions and concerns that were raised. For example, information was added on the relationships between the State Trunk Highway system and other modes of transportation, as well as the relationship between state highways and local road systems. Discussion included how those relationships are considered during both the planning and programming processes. The SHP 2020 newsletter, *Public Comment Shapes the State Highway Plan*, highlights the changes made to the Draft Plan.

Prior to the public release of the plan, WisDOT staff made presentations to both the External Advisory Group and state legislators to ensure their understanding of the revisions made in response to public comment.

The revised plan was made available to the public in November 1999 and was presented at two public hearings. Transcriptions of the oral testimony taken at both the Draft Plan public forums and the official public hearings is available upon request.

As a result of the comments received at the briefings to the External Advisory Group and state legislators, and at the public hearings, the plan was further refined. Changes include the incorporation of some additional plan costs to more fully account for the cost of recommended safety initiatives, increased consideration of other modes of travel when highway improvements are made, and amenities in urban areas. Information was also added to better explain the plan's travel forecasts, to provide a more thorough discussion of transportation demand management practices, and to describe upcoming federal air quality regulations.

The final plan was adopted by the Secretary of the Wisconsin Department of Transportation in February of 2000.

Future steps

The SHP 2020 will be used as the framework for developing near-term budget proposals, and the six-year program of improvements for the State Trunk Highway system. (Figure 7 shows this process.)

This plan is not a static document. It will be reviewed and updated as Wisconsin's transportation situation changes between now and 2020. Unanticipated changes in economic growth, life styles, business shipping practices, or technology could alter future travel forecasts. Significantly different forecasts could dramatically affect how transportation dollars should be invested in future years. Therefore, WisDOT will carefully monitor travel patterns, and revised travel forecasts will be reflected in future plan updates.

The plan will be updated every six years to correspond with federal program funding legislation. With each update, the public will again be asked to provide feedback to further aid the department in developing and maintaining a transportation system that meets Wisconsin's needs.

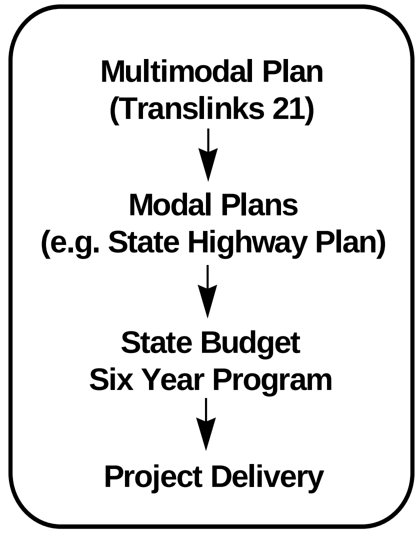


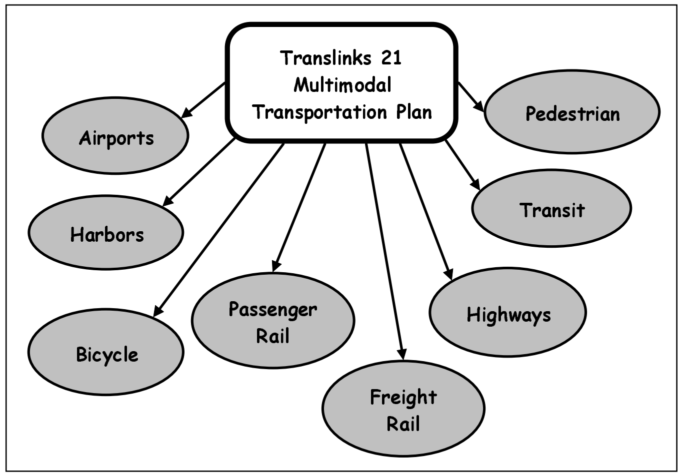
Figure 7. Plan-to-project delivery process

All modes of transportation are important…
…each one plays a key role in providing mobility.

OTHER MODES & LOCAL ROAD SYSTEMS

All modes of transportation are important because each one plays a key role in providing mobility. A diversity of transportation modes is critical to the efficient movement of people and goods – locally, statewide, nationally, and internationally. WisDOT is committed to supporting transportation choices for Wisconsin residents, visitors, and businesses.

Figure 8. Translinks 21 recommended the development of long-range plans for all modes of transportation.



Translinks 21 set the stage for developing long-range plans for each mode of transportation (See Figure 8.) As these long-range modal plans are completed, a comprehensive approach will be used to ensure that they are integrated.

The SHP 2020 considers other modes and local road systems by examining:

1. how other modes and the relationship with local road systems should be considered when planning and designing highway improvements, and
2. how improvements to other modes could affect future highway demand.

Planning & design considerations

When one mode interferes with another mode, such as pedestrians needing to cross a freeway or bicyclists needing to travel on a State Trunk Highway, accommodations may be needed. The State Highway Plan calls for designing state highway facilities with other modes of travel in mind.

For example, the plan recommends that the needs of bicyclists be considered when future highway projects are being planned. Accommodations for bicycles could be in the form of designated bicycle lanes, wider traffic lanes, or paved shoulders. These accommodations will be constructed on highway segments designated in the recently completed *Wisconsin Bicycle Transportation Plan 2020,* and on stretches of the State Trunk Highway system identified in MPO and county bicycle transportation plans. However, bicycle accommodations will also be considered on other State Trunk Highways, based on expected bicycle usage.

Figure 9. The plan calls for designing state highway facilities to accommodate local traffic – of all modes – including bicycles, pedestrians, and transit.

Statewide plans will be developed to further refine WisDOT policies regarding pedestrian and transit accommodations. The pedestrian planning process began in summer 1999, and the transit planning process will begin in 2000.

Local road systems

In addition to an effective State Trunk Highway system, safe and efficient travel is dependent on the proper functioning of roads under local jurisdiction. Though each system affects the other throughout the state, interdependence between the two is especially important in urban areas.

If the configuration of the local road system serves shorter-distance trips adequately, vehicles will not be forced to use freeways and expressways for those trips. This helps State Trunk Highways function properly because capacity is freed up for through-traffic and vehicles traveling longer distances.

Conversely, increased congestion on the State Highway system can cause drivers to leave these highways in search of parallel local roads that offer better traffic movement and shorter travel times. This diversion brings more noise, pollution, and congestion to local neighborhoods.

Local roads and state highways are mutually important to Wisconsin...
WisDOT administers 15 programs that provide funding for local road & bridge projects.

Figure 10. Sufficient local road crossings allow bicycles, pedestrians & vehicles to cross from one side of the highway to the other, without having to go through an interchange.

Highway traffic movement can be improved and diversion to local roads can be minimized by expanding highway capacity. However, expanded facilities can divide communities and create barriers to bicycle, pedestrian, and even vehicular travel. The effects of these barriers can be reduced by constructing sufficient crossings of the state highway to allow bicycles, pedestrians, and vehicles to cross from one side of the state highway to the other without having to go through an interchange. Thus, congestion is reduced and safety is improved at those interchanges.

Local roads and state highways are mutually important to Wisconsin. To assist local governments with roadway maintenance and improvements, WisDOT administers 15 programs that provide funding for local road and bridge projects. Counties and municipalities receive approximately 40% of all state and federal roadway improvement dollars. This funding allocation corresponds with the share of total vehicle miles of travel that occurs on local roads.

• Local roads database

Development of a database for identifying improvement needs on Wisconsin's local roads is an important goal for WisDOT and for local units of government. Currently, a lack of comprehensive data on the 100,000-mile local road system means that an assessment of local roads needs similar to this plan's assessment of State Trunk Highway needs is not possible.

However, WisDOT has been working in cooperation with local governments through the Local Roads and Streets Council to develop a comprehensive local roads database. WisDOT has committed significant resources for development of the database, including state funding for design. When the database is completed, and sufficient data has been gathered, the department will assist local governments in evaluating the condition and improvement needs of the local road system.

Effects on future travel of improving other modes

An important part of the transportation planning process was determining how improvements to other modes could affect future highway travel. Understanding the bigger picture required that some assumptions be made about improvements to other modes.

For all metropolitan areas, WisDOT relied on the MPOs for detailed land use and transportation planning. Their plans cover all transportation modes, and consider how improvements to other modes will affect future highway travel.

For inter-city highway travel, the SHP 2020 assumed the implementation of specific improvements to other modes recommended in Translinks 21. (See Figure 11.) Projections show that even aggressive implementation of these transportation investments in other modes will have only a modest effect on *inter-city* highway travel.

Translinks 21 recommended the following improvements to non-highway modes:

√ high speed rail service from Chicago to the Twin Cities going through Milwaukee and Madison;

√ passenger rail service from Milwaukee to Green Bay;

√ bus service connecting outlying communities to rail services;

√ inter-city bus service to communities with populations greater than 5,000; and

√ expanded truck/rail inter-modal freight shipments.

Figure 11. The plan assumes these improvements to non-highway modes of transportation will be implemented.

Projections show that even aggressive implementation of these non-highway investments... will have only a modest effect on *inter-city* highway travel.

Analysis showed that these improvements would reduce growth in inter-city automobile trips by only 0.7% between 2000 and 2020. And, while the proportion of freight shipped by rail would increase somewhat, the highway system would continue to carry nearly 50% of products moving through the state.

Continued development of other modes remains necessary, however. The state remains committed to providing transportation systems that complement each other and provide users with choices.

Preservation

Wisconsin's highway system is old. Many of the major roadways built or improved in the 1960s have been resurfaced two or more times. These roads and bridges are beginning to show their age. About 30% of state highway pavements need improvement today, and 7% of state highway bridges need rehabilitation or replacement.

Figure 12. Deteriorating roadway.

Today's pavements and bridges face increasing pressure. More, larger, and heavier trucks are using the State Trunk Highway system causing increased wear and tear on highway pavements. Between 1984 and 1997, the number of vehicle miles traveled by commercial trucks increased by 102%. Wisconsin's harsh winters are hard on pavement too. Pavement deterioration results from both freeze-thaw cycles and from de-icing compounds that are applied to the roads.

These increasing traffic volumes and weights, along with adverse conditions, mean that pavements on many state highways will reach the end of their life cycle within the planning period. Much of the system is beyond the point where minimal-cost maintenance techniques are cost-effective over the long term. For many sections of the State Trunk Highway system, more costly replacement or reconstruction is inevitable.

> *Failure to adequately fund the system in the near future will:*
>
> - *significantly reduce the service life of the system*
> - *cause greater disruption due to rough pavements & more frequent short-term maintenance activities.*

Failure to adequately fund the State Trunk Highway system in the near future will not only significantly reduce the system's service life but will also cause greater disruption for travelers as a result of rough pavements and more frequent short-term maintenance activities.

Pavement

• Pavement life cycle

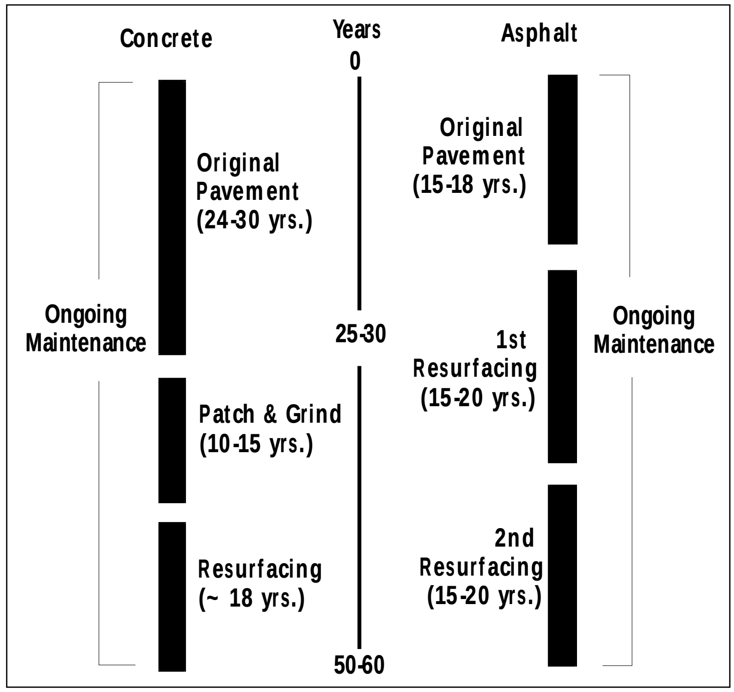
Wisconsin's pavements are designed to last about 50 to 60 years, provided they receive periodic preventive treatments. (See Figure 13.)

During the first years of a pavement's 'life,' relatively inexpensive maintenance (e.g., seal coating and patching) helps to keep moisture from penetrating the pavement and weakening the road's structure. As the pavement ages, moisture, traffic and climate begin to take their toll, resulting in cracks, potholes or uneven pavement surface. Wisconsin's weather conditions are a key contributor to shortening a pavement's life. The freeze/thaw cycles and winter de-icing techniques accelerate the normal pavement aging processes.

While patching can be done to extend the life of the original pavement, it is a short-term fix. Eventually, the pavement must be resurfaced.

Resurfacing places a new surface layer of pavement over the existing roadway. This treatment may extend the road's usefulness by 15 to 20 years. Then, the deterioration, maintenance and resurfacing cycle begins again.

Figure 13. Life cycle of a road.



But the system can only take so many short-term fixes – like a chair that has been glued too many times and loses structural soundness – it can't bear as much weight. Just as the chair will have to be replaced, the time will soon arrive when many of Wisconsin's State Trunk Highway pavements will need to be completely replaced through reconstruction.

Without action, the system will be hard-pressed to continue providing the service people have come to expect. Surfaces will get rougher, causing more vehicle and freight damage, less driver comfort, and less reliable delivery of goods.

If pavement preservation needs are not addressed, not only will pavement deficiencies increase, but the cost over time will be greater, and more frequent maintenance will be needed to keep these roads functioning.

• Pavement performance thresholds

Identifying the proper time for fixing the system is critical. WisDOT has established thresholds to determine when a pavement or bridge needs to be repaired or replaced.

> Identifying the proper time for fixing the system is critical...
>
> Performance thresholds on Corridors 2020 and Other Principal Arterials are designed to minimize total rehabilitation costs over the pavement life cycle.

WisDOT measures pavement performance in terms of roughness, structural integrity and rutting. Performance thresholds on Corridors 2020 and Other Principal Arterial routes are designed to trigger improvements that will minimize total life cycle rehabilitation costs and service disruptions. Lower cost improvements are called for on Minor Arterials, Collectors and Local Function roads, recognizing their lower traffic volumes as well as overall funding constraints.

The SHP 2020 recommends that current and emerging pavement deficiencies be treated on all sub-systems of the State Trunk Highway system – although treatment strategies differ for the different sub-systems.

The plan also calls for the reconstruction of those Minor Arterial highways where load limitations are currently imposed during spring freeze/thaw periods. This will allow legal load limits year-round.

Bridges

• Bridge life cycle

Most Wisconsin bridges will last 50 to 80 years, provided they receive several periodic treatments.

About 15 to 20 years after construction, the bridge deck (i.e., riding surface) should receive an overlay of new pavement. The new surface ensures that water and de-icing materials drain off the bridge rather than penetrating the surface and causing deterioration. This surface will deteriorate in 15 to 20 years, at which point the aging deck needs to be replaced because it cannot support an additional overlay.

Figure 14. When the supporting foundation deteriorates, complete bridge replacement is necessary.

> Bridges are critical to transportation.
>
> When they fail, routes must be posted with weight restrictions, or closed.

The new bridge deck will then receive one more overlay – normally as the bridge reaches 55 to 60 years of age. As this last overlay reaches the end of its 15 to 20 year life span, the entire bridge must be completely replaced, because the supporting foundation structure can no longer support the bridge structure and the vehicles on it.

Making investments to repair and replace the system's bridges will be imperative if the system is to continue providing necessary transportation connections. Bridges are critical to transportation. When they fail, routes must be posted with restrictions or closed. When restrictions are made, Wisconsin's economy and quality of life suffer. If needed investments are not made, bridge restrictions will increase.

• Bridge performance thresholds

Under the SHP 2020, bridge improvements (deck overlays, deck replacements, or bridge replacements) will be made as required to ensure that no bridges are posted to restrict truck travel. Restrictions on bridge use by trucks, or actual bridge failure, would have major adverse effects on shippers who would be forced to re-route or delay shipments.

Since all bridges are critical to State Trunk Highway travel, bridge performance thresholds do not vary by sub-system. These thresholds are designed to ensure that preservation improvements are made in a timely manner.

Plan results: pavement & bridge

Under SHP 2020 implementation, pavement deficiencies will be reduced from 30% in 2000 to 6% in 2020, and bridge deficiencies will be reduced from 7% in 2000 to 2% in 2020. (See Figures 15 and 16.)

Even at the funding levels recommended in the plan, improving the pavements on the system will be a long-term effort. Many years will pass before there is a noticeable improvement in the system, as shown in Figure 17. The reduction is gradual due to existing ('backlog') needs and needs that will emerge over the 21-year planning period. However, pavement deficiencies beyond 2020 will not necessarily remain at this low level. In fact, they are likely to increase because highway segments are at various stages in their pavements' life. This increased need will be reflected in subsequent updates of the SHP.

Ensuring the future of the State Trunk Highway system comes down to a choice between investing in the system for long-term preservation or incurring the costs of damaged vehicles, compromised safety, damaged freight, and lost productivity for years to come.

Performance impact of plan recommendations...

*Figure 15. – on **pavement** performance.*

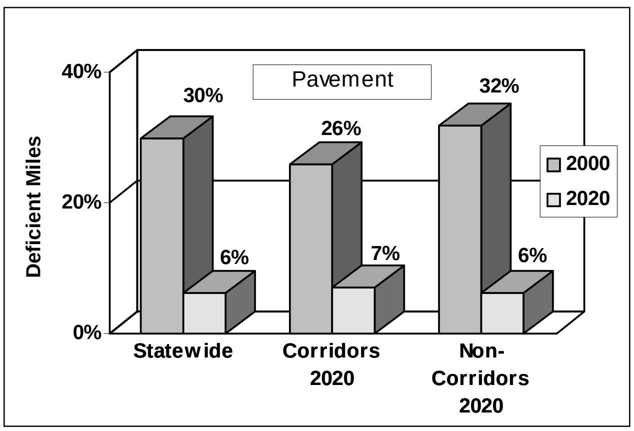


*Figure 16. – on **bridge** performance.*

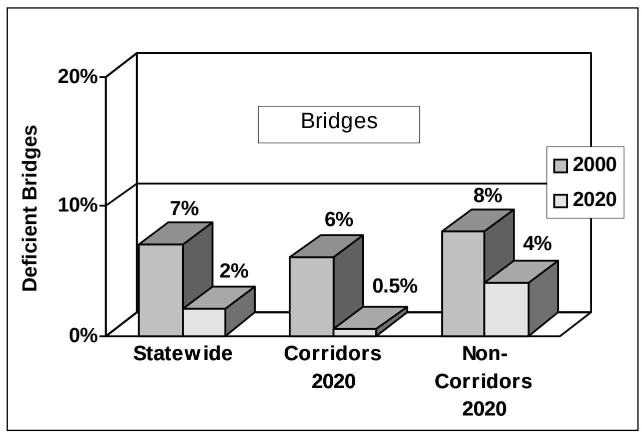


Figure 17. Implementation of the plan will gradually reduce statewide pavement deficiencies over the 21-year planning period.

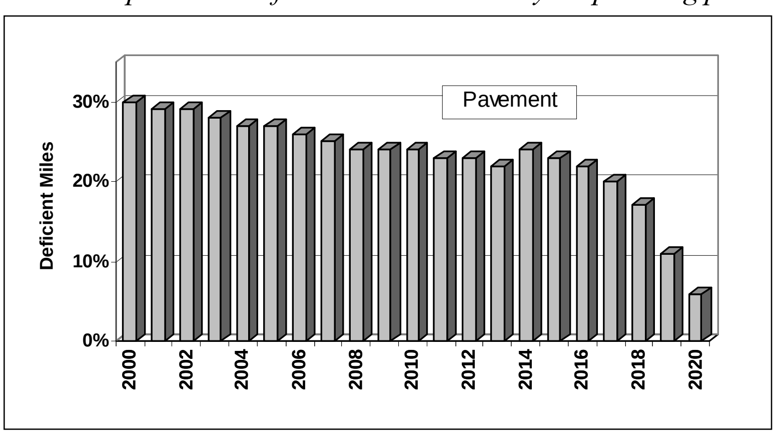


Figure 18. Urban traffic.

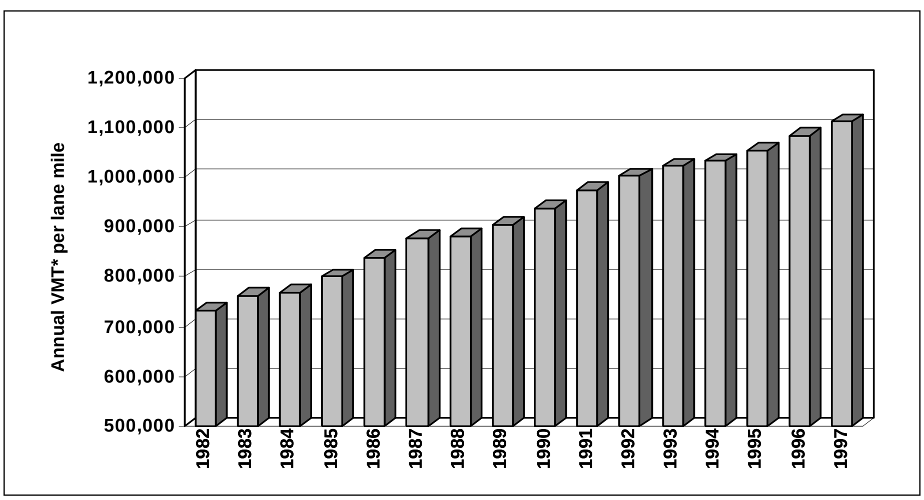
> The state is facing a traffic congestion problem,
> ...in part because the 60% increase in traffic volume from 1982 to 1997...
> was countered by only a 5% increase in State Trunk Highway lane miles.

TRAFFIC MOVEMENT

In many places, the State Trunk Highway system has outlived its functional life. Traffic volumes have increased by 60% since 1982. People now use their cars to take more trips. Jobs are located farther from homes. More women are working and driving to work sites. Manufacturers rely on just-in-time shipping to keep costs down and to increase efficiency.

The state is facing a traffic congestion problem, in part because the 60% increase in traffic volume from 1982 to 1997 was countered by only a 5% increase in State Trunk Highway lane miles. This situation translates into over a 50% increase in annual vehicle miles traveled *per lane mile*. (See Figure 19.)

Figure 19. Annual travel per lane mile has increased by over 50% since 1982.



*Vehicle Miles Traveled (VMT)

Traffic congestion limits a driver's ability to enter or exit the highway, change lanes, pass a slow-moving vehicle, or simply drive forward at a constant speed. As more vehicles travel on the roadways, speeds and the spacing between vehicles are reduced. Time for drivers to react is significantly shortened. Driver frustration increases. Dangerous driver actions become more common. As a result, the potential for crashes increases.

While traffic conditions vary depending on time of day, season, location, weather, and other factors, congestion typically occurs during travel periods most important to the state's economy. For example, Interstate 94 near the Zoo Interchange west of Milwaukee – the state's busiest stretch of highway – carries an average of 11,400 vehicles an hour during the morning and afternoon rush hours, but just 500 vehicles between 2:00 a.m. and 3:00 a.m. Highway 53 between Eau Claire and Spooner – a major tourism route – carries an average of 11,500 vehicles a day during July, but just 5,300 vehicles a day in January.

Congestion in 2020 with no improvements

Highway travel is expected to increase through the year 2020, though at a somewhat slower rate. If no improvements are made to the traffic-carrying capacity of the roadways between now and 2020, congestion on the State Trunk Highway system will grow considerably – especially in urban areas.

• Miles of congested highways

Miles of congested State Trunk Highways are expected to increase nearly 70%, from 1,350 miles in 2000 to 2,300 miles in 2020. Congested mileage on the Corridors 2020 network will nearly double over the next two decades. Map 1 (see following page) shows the expected location of moderate, severe, and extreme congestion in 2020, on all sub-systems.

> The most serious congestion concerns are on highways in southeastern Wisconsin...
>
> ...the state's gateway for commerce and tourism.
>
> These routes are the most heavily used in the state.

While there is congestion on segments of the State Trunk Highway system statewide, Map 1 indicates that the most serious congestion concerns are on highways in southeastern Wisconsin. These routes are the most heavily used in the state. They serve as a gateway for much of the commerce flowing into and out of the state, particularly for manufacturers in southeastern Wisconsin and in the Fox Valley who rely on just-in-time delivery of raw materials and finished products. These highways also help tourists reach destinations throughout the state.

• Amount of travel under congested conditions

Another way to view congestion is to look at changes in the amount of travel under congested conditions during daytime hours. Statewide, about 22% of all Corridors 2020 Backbone travel will be under congested conditions by 2020. Urban areas will be the hardest hit, as congested travel on urban segments of the Corridors 2020 network increases from 46% in 2000 to 62% in 2020.

> Statewide, urban areas will be the hardest hit...
>
> ...as congested travel on the (urban) Corridors 2020 system increases...
>
> from 46% in 2000 to 62% in 2020.

In terms of vehicle miles traveled on the Corridors 2020 Backbone routes in southeastern Wisconsin, about 35% of travel between 6:00 a.m. and 6:00 p.m. will be under congested conditions in 2000. Without improvements to the traffic-carrying capacity of the system, about 44% of travel on Backbone routes will occur under these same congested conditions by 2020.

Traffic movement performance thresholds

As with other improvement decisions, WisDOT's practice with regard to traffic movement is to establish performance thresholds. When a threshold is exceeded, an improvement to correct the situation is triggered. In the case of traffic movement, the thresholds indicate the amount of congestion that will be tolerated before capacity expansion is considered.

Some degree of congestion is unavoidable because of physical limitations, environmental constraints, and the cost of making improvements. One challenge in developing the State Highway Plan was identifying the levels of congestion that are acceptable on the different State Trunk Highway sub-systems.

Figure 20. Some degree of conges-tion is unavoidable.

• Traditional congestion policy

Traditionally, the threshold that triggered traffic movement improvements was the same across all State Trunk Highway sub-systems. This policy for addressing congestion called for considering capacity expansion whenever any highway became moderately congested. In practice, this was not always achievable, but it remained a stated goal.

• Plan congestion policy

To determine acceptable traffic movement performance thresholds for the SHP 2020, WisDOT had to balance the social, environmental, and financial costs incurred by using the more traditional performance thresholds with the costs of accepting more congestion on some portions of the system. The resulting performance thresholds differ from traditional WisDOT policy by allowing higher levels of congestion on some routes before calling for capacity improvements.

> In contrast to traditional policy,...
>
> this plan accepts higher levels of congestion on some portions of the state system...
>
> before calling for capacity improvements.

On non-Corridors 2020 routes the plan allows higher levels of congestion than it does on the Corridors 2020 system. Because the mobility and economic development of the entire state are dependent on Corridors 2020 routes, congestion on those routes should be minimized. Therefore, the plan follows traditional policy in setting performance thresholds for traffic movement on most Corridors 2020 routes. On non-Corridors 2020 routes, plan performance thresholds trigger improvements only when there is severe or extreme congestion.

Drivers in the more urban parts of the state tend to expect and accept higher levels of congestion than in rural areas. Therefore, on all sub-systems in metro areas, except the Corridors 2020 Backbone, plan performance thresholds allow slightly more congestion before an improvement is triggered.

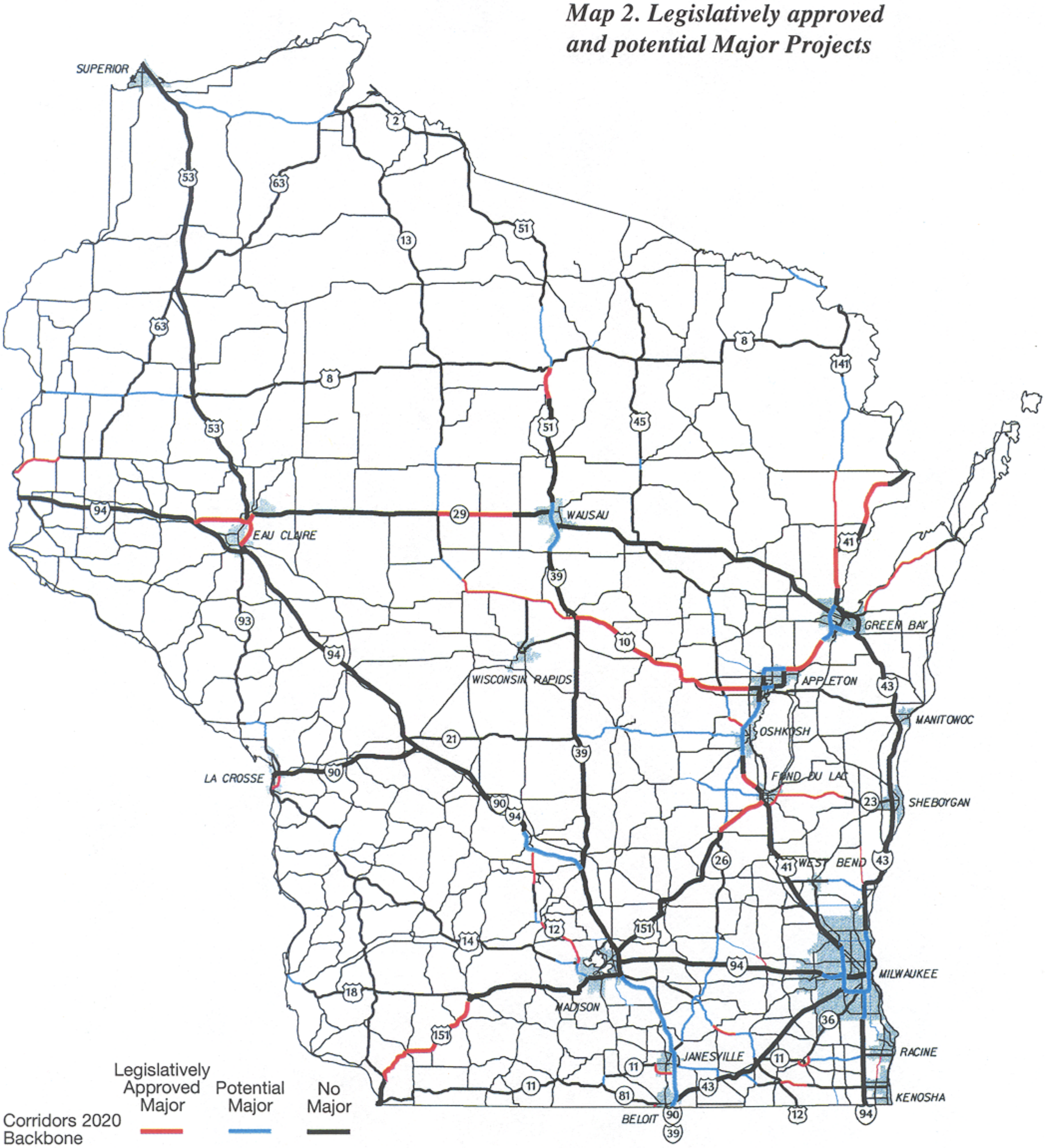
Plan results: traffic movement

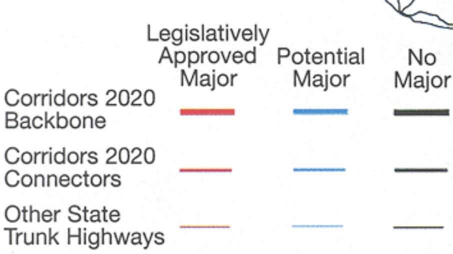
In 2000, 8% of the total State Trunk Highway system mileage is deficient under plan performance thresholds for traffic movement. Because travel is concentrated on Corridors 2020 routes, over 17% of this state highway network is deficient in 2000.

With the implementation of the SHP 2020, existing and emerging congestion is addressed such that deficient mileage, statewide, falls to 4% by 2020. Deficiencies on the Corridors 2020 sub-systems will fall to 7% by 2020. (See Figure 21.)

Map 1. Traffic congestion in year 2020
(assuming no capacity expansion)

Map 2. Legislatively approved and potential Major Projects





Note: Potential projects are subject to environmental analysis and legislative approval; they will be re-evaluated in future plans.

Vehicle miles traveled under congested conditions (as measured using plan thresholds) during daytime hours will fall statewide from 10% to 3% by 2020. On the Corridors 2020 sub-systems, daytime travel under congested conditions will fall from 14% to 5% by 2020.

Investments recommended in the plan will provide this improved performance even in light of a projected 29% increase in statewide highway travel.

Comparison with traditional policy

If the SHP 2020 followed WisDOT's traditional policy, rather than accepting more congestion, it would have to address traffic congestion on an additional 610 miles, or 36% more miles, of highways. For comparative purposes, Figure 22 shows what the level of traffic movement deficiencies would be at the beginning and end of the planning period, assuming plan implementation using traditional congestion policy. In comparison with Figure 21, the higher deficiencies shown for non-Corridors 2020 routes reflect the fact that the plan allows more congestion on those highways before a deficiency triggers an improvement need.

> If the plan followed traditional congestion policy,...
> an additional 610 miles (36% more)...
> of congested highways would need to be addressed.

Reduction in traffic movement deficiencies under plan implementation...

Figure 21.
*– assuming **plan** performance thresholds.*

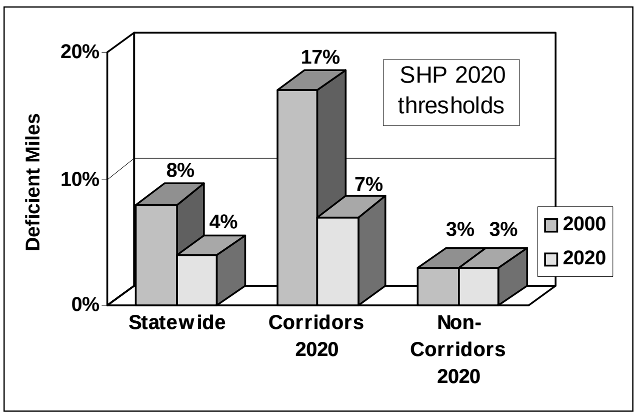
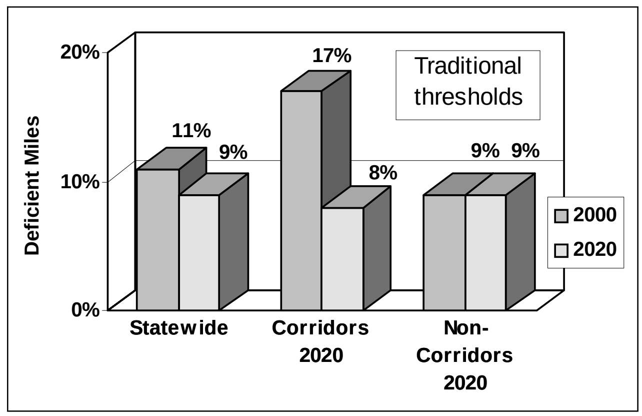


Figure 22.
*– assuming **traditional** performance thresholds.*



Improvement needs

• Capacity expansion

As shown previously in Map 1, with no improvements in capacity, traffic congestion by 2020 will be significant – especially in southeastern Wisconsin. The SHP 2020 – which accepts more congestion because it reflects social, environmental and financial constraints – recommends capacity expansion to alleviate slightly over one-half of this congestion.

Map 2, on the previous page, identifies major capacity expansion projects recommended over the 21-year planning period. The map shows potential, as well as legislatively-approved, Major Projects (capacity expansion projects that are generally greater than five miles in length). Final decisions on potential Major Projects will be made through established environmental and legislative processes.

When capacity expansion is required,...
WisDOT strives to expand within existing corridors...
in order to minimize adverse environmental & community impacts.

In metropolitan areas, the SHP 2020 is consistent with the major capacity expansion recommendations contained in the MPO long-range transportation plans. However, all major capacity expansion projects within metropolitan areas over 50,000 population will be subject to a detailed alternatives analysis to determine whether improvements to other modes could either eliminate or delay the need for the expansion, or alter the design of the project. Examples of improvements that would be subject to this type of analysis include such projects as adding lanes to the freeways in Milwaukee; USH 41 in Oshkosh, Appleton, and Green Bay; and the West Beltline (USH 12) in Madison.

When capacity expansion is required, WisDOT strives to expand within existing corridors in order to minimize adverse environmental and community impacts. The plan includes corridor preservation policies to increase the likelihood that capacity expansions can be made within existing corridors.

The capacity expansion called for in the plan is significant, but conservative. Given financial limitations and a desire to be consistent with MPO transportation plans, the SHP 2020 does not fund 28% of the potential major capacity improvements that were identified as needed. The unfunded projects, especially those in fast-growing areas, will be monitored and considered in subsequent updates of the State Highway Plan.

The improvements in traffic movement called for in the plan are significant...
but conservative...
...28% of potential major capacity improvements are not funded.

• Interchanges

The SHP 2020 calls for investing approximately $35 million per year for the construction and improvement of interchanges on the State Trunk Highway system. This figure excludes the construction of interchanges associated with Major Projects, and the rebuilding of the most complex interchanges on the southeastern Wisconsin freeway system (e.g., the Marquette, Stadium, Zoo, Hale, and Mitchell Interchanges in the Milwaukee area). It includes both new interchanges at intersections experiencing, or projected to experience, traffic flow or safety problems, and upgraded interchanges to provide additional capacity and improve traffic movement.

The plan's approach represents a 'level of effort' for interchange improvement rather than identifying specific projects that will be undertaken in the next two decades. This level is based on needs cited in transportation plans developed by the MPOs and on recommendations provided by WisDOT transportation district staff.

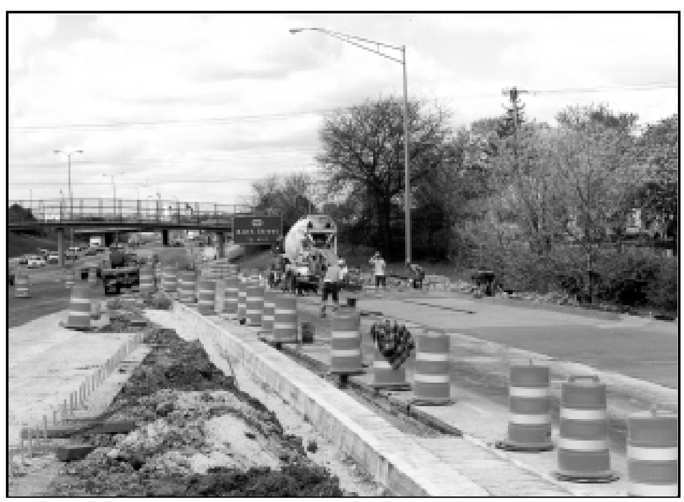


Figure 24. SHP 2020 calls for interchange upgrades to improve capacity and traffic flow.

• Bypasses

Highway bypasses around communities relieve congestion in downtown business districts, improving safety and mobility for those who work, shop, and live there. In addition, community bypasses allow for more efficient movement of people and goods across longer distances, since they enable vehicles to continuously travel at highway speeds without having to slow down or stop in urban areas.

WisDOT, together with a private consultant, developed a methodology to help evaluate community bypass needs. The department will use this process to identify possible bypass locations. Further detailed analysis will be necessary before any bypass decisions are finalized. Once the decision to bypass a community has been made, detailed alignment and environmental impact studies will be required.

Other traffic movement strategies

In addition to capacity expansion, there are other strategies that can be used to help alleviate congestion. The SHP 2020 recommends a number of land use planning, access management, corridor preservation, Intelligent Transportation Systems, and Transportation Demand Management actions that will produce traffic movement, economic development, and environmental benefits.

Other traffic movement strategies:

- Land use planning
- Access management
- Corridor preservation
- Intelligent Transportation Systems (ITS)
- Transportation Demand Management strategies (TDM)

• Local land use partnerships

Improving traffic movement goes beyond investment in highway facilities to issues of land use and corridor preservation. Well-planned development can reduce demands on the State Trunk Highway system.

Land use decisions are made primarily at the local level. Stronger partnerships between local and state governments, as called for in the SHP 2020, will assist local agencies in planning for development, thereby reducing pressures on the transportation system and lessening the environmental impact.

The plan calls for stronger partnerships between local & state governments.

This will allow local agencies to plan developments better,...

which will reduce pressures on the system & ensure the least environmental impact.

As a first step toward improved partnerships, the SHP 2020 recommendations for major capacity expansion projects in the largest urban areas were reviewed to ensure consistency with recommendations made in the MPO transportation plans. In this way, the plan is consistent with the local land use plans upon which the MPO transportation plans are based.

The SHP 2020 also calls for enhanced financial and technical assistance from the state to local governments for the purpose of preparing comprehensive plans which consider transportation, land use and other elements. The 1999-2001 state biennial budget establishes a grant program to aid

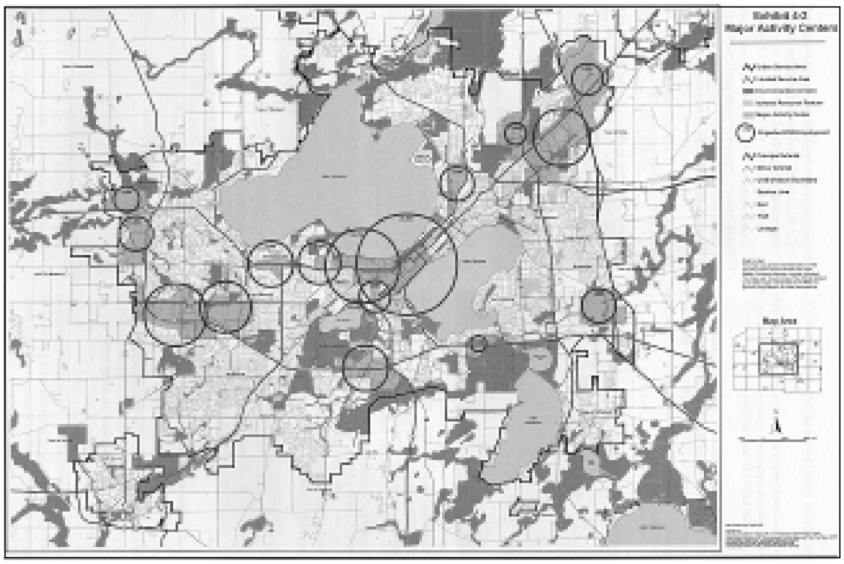


Figure 25. Land use plans identify activity centers & other uses that will affect traffic movement.

local governments in developing comprehensive plans. As part of this initiative, WisDOT will provide $1 million per year for grants to fund the transportation element of these local comprehensive plans. Further, WisDOT will maintain and expand, as resources allow, the technical assistance it currently offers to communities developing a plan.

> The plan calls for...
> enhanced financial & technical assistance from the state...
> to local governments...
> for preparing comprehensive land use plans.

Enhanced financial and technical assistance will support understanding of and planning for the effects of land use and transportation decisions. As a result, communities will be better equipped to structure developments to minimize sprawl, identify secondary land use impacts, and improve commuting patterns.

The SHP 2020 also recommends a statewide requirement that Transportation Impact Analyses be prepared prior to local approval of large developments. This requirement should help WisDOT and local governments plan for, and accommodate, the increased traffic resulting from such development.

• Corridor preservation

Preserving land for future transportation improvements is another important aspect of intergovernmental land use collaboration.

Planning that reserves land for new highways, or the expansion of existing roadways, will permit more efficient investment in transportation facilities. It can also reduce the pressure for urban sprawl by reducing the need for repeated relocation of important highway corridors.

> Reserving land will permit more efficient investment...
> & can also reduce the pressure for urban sprawl...
> by reducing the need for repeated relocation of important highway corridors.

Setbacks for new development are another useful tool for preserving space for future transportation improvements. Setbacks regulate the distance from the edge of the highway right-of-way to the edge of development, and are advantageous to both the system and its users. One benefit of setbacks is that they preserve space for possible future highway expansion without having to relocate the roadway. In addition, they allow drivers to get on and off the system more safely, and allow adjacent land owners to experience less vehicular noise and air pollution. WisDOT will work with surveyors, developers, and local governments to effectively enforce development setbacks along State Trunk Highways.

• Managing highway access

Managing access to the State Trunk Highway system has multiple benefits. It can reduce congestion, eliminate safety hazards, and facilitate more efficient access to adjacent land. Managing access involves a set of techniques designed to keep traffic flowing smoothly while allowing adequate, safe, and reasonably convenient access to land and land uses. When highway access is planned in conjunction with land use changes and development, the highway can generally accommodate more volume without compromising traffic flow.

Figure 26. Managing access helps traffic flow smoothly & eliminates safety hazards.

Through implementation of its adopted *Access Management System Plan*, WisDOT will plan for, and control, the number and location of driveways and streets intersecting the State Trunk Highway system. A variety of techniques such as designating access-controlled highways, purchasing access rights, arranging joint access easement agreements, and reviewing plans for land division will be used.

Access management also includes the design of driveways and intersections, as well as other engineering and traffic management techniques, such as median design, signalization, the provision of turn lanes, interchange spacing, and the provision of frontage roads.

• Using technology to improve traffic movement

Technology will provide a creative approach to relieving congestion on the State Trunk Highway system. A variety of existing and new Intelligent Transportation System (ITS) technologies will be used during the planning period. WisDOT is proposing new initiatives in traveler information systems, incident management systems, and commercial vehicle operations.

Traveler information systems will locate congestion, construction zones, and traffic incidents, and will provide information on alternate routes. They will also provide weather reports, road conditions and tourist information.

Incident management systems will help emergency personnel respond more quickly and efficiently to crashes and other incidents, thus reducing the duration of incident-related congestion.

Automated truck safety and weight inspection systems will help enhance efficiency of trucking, and the manufacturers and businesses that rely on freight that is moved by truck.

Wisconsin's largest metro areas – Milwaukee and Madison – are developing incident management systems which will require plans to manage diversion of freeway traffic onto local routes. In response to incidents on freeways, drivers may be given suggested local routes to avoid delays. This requires a close working relationship with local officials so that effective diversion plans can be designed. This is another area in which WisDOT recognizes the important role of the local road system, and the potential effects caused by congestion on state highways.

Figure 27. New technologies can improve the flow of traffic by providing travelers with up-to-the-minute road conditions.

• Transportation demand management

The goal of Transportation Demand Management (TDM) is to help alleviate congestion by reducing the number of single-occupant vehicles on streets and highways, especially during peak travel periods. Strategies include:

- encouraging carpooling and the use of public transit;
- increasing bicycle and pedestrian travel;
- encouraging businesses to alter work hours so their employees can commute during off-peak periods; and
- encouraging the use of telecommuting and video-conferencing to reduce the need for employee travel.

Figure 28. In Wisconsin's largest metropolitan areas, full buses can remove up to 58 vehicles from traffic per trip.

While there are many examples of site-specific successes, experience has shown that TDM strategies must be tailored to individual regions and sites in order to be effective. Most TDM measures are aimed at reducing urban travel, and are, therefore, not likely to be effective at the statewide level. However, WisDOT will continue to monitor TDM efforts around the country, and carefully evaluate the potential applicability of any systemwide TDM measures.

At the project level, WisDOT will consider the benefits of reducing urban congestion through TDM strategies prior to recommending capacity expansions. In addition, WisDOT will continue to support and administer its TDM grant program, which provides funding for innovative programs that address alternatives to solo driving, access to jobs, traffic congestion, and air quality problems.

WisDOT is committed to further reducing overall emissions on the state highway system, as well as other adverse environmental impacts associated with capacity expansion. Therefore, subsequent updates of the State Highway Plan will attempt to include, to the extent possible, alternative system-wide TDM strategies.

Safety

Wisconsin's roadways are safer today than they were fifty years ago. Better vehicle designs provide more control for drivers. Divided highways with wide medians, fewer roadside obstacles, and straighter lanes are more forgiving of driver error. Enforcement is tougher. Travelers are made more aware of safety issues through public education campaigns. Still, more than 700 people die each year on Wisconsin roadways.

The State Trunk Highway system carries nearly 60% of the state's total traffic volume, and 70% of all commercial truck travel in Wisconsin. However, the system's 11,800 miles account for only about 11% of all roadway miles in the state.

Considering the number of miles driven, drivers on the State Trunk Highway system are less likely to crash, less likely to be injured, and less likely to die than drivers on the 100,000 miles of local streets and roads in Wisconsin. (See Figure 29 for safety statistics.)

> Potential injury & fatality trends, coupled with rising traffic volumes,...
>
> demonstrate the importance of enhancing current engineering, education & enforcement efforts.

Figure 29. Highway safety in Wisconsin - 1997.

Performance Measure	STH System		Local Roads and Streets		Combined (STH & Local)	
CRASHES & FATALITIES BY *NUMBER*						
	Number	%	Number	%	Number	%
Single Vehicle Crashes	22,487	43%	29,312	57%	51,799	100%
Multiple Vehicle Crashes	29,353	38%	48,802	62%	78,155	100%
Total Crashes	51,840	40%	78,114	60%	129,954	100%
Fatal Crashes	335	53%	296	47%	631	100%
Persons Killed	397	55%	324	45%	721	100%
Injury Crashes	16,368	39%	25,594	61%	41,962	100%
Persons Injured	25,773	41%	37,393	59%	63,166	100%
Roadway Miles	11,835	11%	100,141	89%	111,976	100%
Hundred Million VMT	320.83	60%	216.46	40%	537.29	100%
CRASHES & FATALITIES BY *RATE*						
	Rate		***Rate***		***Rate***	
Fatality Rate*	1.24		1.50		1.34	
Injury Rate*	80		173		118	
Crash Rate*	162		361		242	

*Rates are per 100 million vehicle miles traveled (VMT).

Since traffic volumes will continue to rise, future safety initiatives become increasingly important. Even if Wisconsin is able to maintain its relatively low fatality rate (1.34 per 100 million miles of travel in 1997), the state will suffer more fatalities simply because more miles are being driven. For instance, the statewide number of fatalities would increase from 721 in 1997 to over 1,000 by 2020. Similarly, if the current injury rate is maintained, injuries would increase from 63,166 in 1997 to more than 90,000 injuries in 2020.

These potential injury and fatality trends demonstrate the importance of enhancing current engineering, education and enforcement efforts.

Figure 30. Despite improvements in highway safety, crashes will increase unless the rate is lowered.

Interactions

Traffic crashes can *usually* be avoided. They result from a chain of circumstances that reflect the interaction of drivers, roadways and vehicles.

Driver behavior (such as excessive speed; alcohol or other drug impairment; failure to yield or obey traffic signals; and aggressive driving) accounts for 75% to 85% of all highway crashes. Roadway factors, such as design and condition, account for 10% to 20% of crashes; and vehicle-related factors account for 5% of crashes.

Improving safety conditions requires attention to each element: drivers, roadways, and vehicles. The interaction of these three elements means that deficiency in one area can contribute to deficiency in another.

For instance, when an impaired driver travels a narrow and winding road, the potential for a crash increases. The 'bottom line' is that a safer traveling experience requires more forgiving roads, educated drivers, and targeted enforcement.

System use & crashes

The function of a roadway tends to change over time. For example, a rural two-lane highway may have been designed as a farm-to-market route and to serve about 5,000 vehicles per day. Decades later, however, lifestyle and economic changes may create traffic patterns that render the highway obsolete and unsafe. Travelers may now include the original farm vehicles as well as commuters, tourists, and truckers.

> The function of a roadway tends to change over time…
>
> increased congestion, coupled with the obsolete design of roadways… results in significant safety issues.

Significant safety issues result from increased congestion coupled with the obsolete design of roadways. In fact, this evolution of use and congestion has occurred on many segments of the State Trunk Highway system.

Engineering

The roadway, in and of itself, should not cause a crash. When roadways are designed, WisDOT considers the human element. Engineers take into account potential human interactions by anticipating how drivers (or pedestrians or bicyclists) will function or react within the roadway environment under various conditions. They make changes to the roadway design to enhance safety.

Safety improvements to roadways generally address 'geometric' characteristics. Such geometric improvements might include: widening lanes, straightening curves, lessening slopes on hills, adding turning lanes, improving the design of intersections, changing the location of median openings, or adding travel lanes.

'Geometric' improvements

When roadways are designed, WisDOT staff consider the human element...

...then, they make changes to enhance safety...including:

- *widening lanes,*
- *straightening curves,*
- *incorporating turn lanes,*
- *improving intersections, or*
- *adding travel lanes.*

Typically, multi-lane, divided highways are significantly safer than two-lane highways. For example, from 1995 through 1997, Wisconsin's multi-lane, divided rural State Trunk Highways were twice as safe as rural two-lane State Trunk Highways.

The SHP 2020 calls for safety improvements to be made along with pavement work where an existing need is identified, based on crash data, anywhere on the State Trunk Highway system. In addition, regardless of whether there is an existing crash problem, *potential* safety problems on Corridors 2020 routes and Other Principal Arterials will be addressed by routinely providing safety improvements based on engineering criteria when such routes are replaced or reconstructed.

Based on crash rate data, 21% of the total mileage of the State Trunk Highway system is currently deficient. Under the plan, 90% of these deficient locations will be treated by 2020. In addition, spot safety improvements (such as guard rails, reflective markings, lighting, signage, etc.) will be provided as necessary on remaining deficient highway segments.

Figure 31. Slow-moving vehicles mixed with higher speed traffic can result in highway safety concerns.

From an engineering perspective, 40% of the total mileage on the State Trunk Highway system is currently deficient in its geometric characteristics (i.e., does not meet current WisDOT design standards). The comparable figure for the Corridors 2020 sub-systems is 16%. Under the plan, geometric deficiencies fall to 31% statewide and to 2% on the Corridors 2020 sub-systems by 2020.

Through the SHP 2020, WisDOT renews its commitment to lowering the injury and fatality rates on Wisconsin's roadways. With safety as a top priority, the department will continue to engineer highway improvements to make the roadways more forgiving. WisDOT will also continue to explore roadway improvements specifically designed to address the needs of older drivers, such as enhanced roadway markings, signage improvements, and better roadway lighting.

WisDOT will continue to examine highway safety from a multimodal perspective. The state will foster a pedestrian- and bicycle-friendly environment. In addition, improved warning and protection devices will be provided at highway-rail crossings. Complete rail grade separations will be constructed as warranted on Corridors 2020 routes and on the passenger rail corridors designated in the 1994 Translinks 21 plan. WisDOT will continue to explore new technologies (such as improved traffic gates) to improve safety.

Education

Even if roadways are made more forgiving, driving skills must improve to reduce the rate of crashes. Roadway, driver, and crash data allow WisDOT to target public information efforts that educate drivers on the leading causes of crashes and ways to avoid or maneuver through such situations.

The department works with traffic safety advocates from around the state to coordinate and produce materials on such issues as impaired driving, seat belt usage, winter driving, speeding, and pedestrian and bicycle safety.

Through the plan, WisDOT also renews its commitment to developing and distributing such educational materials. It will continue to pioneer effective motorcyclist safety awareness and rider education programs. Professional staff will provide outreach and assistance in every county of the state through each county's Traffic Safety Commission.

Figure 32. Roadway signs demonstrate a committment to enhancing education.

Enforcement

Traffic laws exist to promote safe operation of the transportation system. Driver disregard for those laws creates safety problems for everyone on the system, particularly in high-risk areas.

WisDOT staff identify stretches of roadway that have high incidences of crashes. Law enforcement officials then take action (such as targeted speed limit enforcement and targeted impaired driver enforcement) to ensure safe driving behavior in those areas. These activities not only contribute to safer roadways but also raise driver awareness of safety issues.

Through the SHP 2020, the department continues its commitment to targeted safety enforcement. WisDOT will continue to work to decrease the incidence of speed-, alcohol-, and drug-related motor vehicle crashes and fatalities in Wisconsin.

Other safety strategies

• Passing lanes

Under certain conditions, the construction of regularly-spaced passing lanes can be an effective strategy to enhance safety on two-lane, rural arterial routes by significantly lowering crash rates. Fatal and injury crash rates could be reduced as much as 25%, while overall crash rates could be reduced up to 20%. In addition, passing lanes can help to reduce driver frustration.

> *Passing lanes can be an effective strategy to enhance safety and reduce driver frustration.*

Figure 33. Passing lanes can be an effective strategy to enhance safety on rural two-lane highways.

Passing lanes are generally effective when daily traffic volumes range between 3,500 and 12,000 vehicles, and when higher levels of truck or recreational vehicle traffic are present. When daily traffic grows to levels greater than 12,000 vehicles, additional lanes are generally needed.

WisDOT has developed guidelines and a long-range strategy on when passing lanes should be considered in the design of rural two-lane highways. Given the safety benefits of passing lanes, the SHP 2020 includes $76 million for implementing the guidelines and strategy.

• Access management

Managing access to state highways can help create safer roadways by reducing the potential for ‘conflicts’ between vehicles. This is done primarily by planning the location of, and limiting the number of, driveways and intersections. Other access management strategies that improve highway safety include highway design/engineering techniques such as the design of access points, the addition of turning lanes, and the placement of median openings.

Southeastern Wisconsin freeways

The 305 miles of freeways in southeastern Wisconsin are among the most heavily used highways in the state. (See Figure 34.) Vigilant maintenance efforts have kept the system patched together and in service, but the pavements, bridges, and interchanges are reaching the end of their life cycles. Increasingly expensive short-term maintenance activities do not represent the most cost-effective approach for insuring the integrity of these structures over the 21-year planning period.

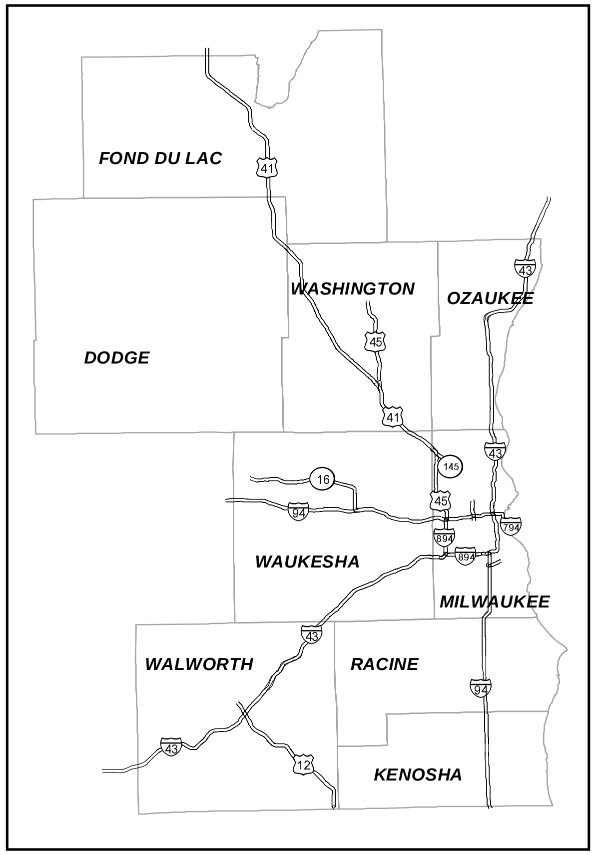
Economic significance

The Southeast (SE) freeway system meets many needs - both in the region and beyond. More than 38% of Wisconsin's population lives in the state's southeastern counties, and they rely on these freeways to get to work, school, and recreation.

Dependence on this system, however, extends well beyond southeastern Wisconsin. Manufacturers throughout the state use these routes and depend on the safe and timely travel of delivery trucks to transport materials and products to state, national, and international markets. In fact, one-third of all long-distance truck shipments to and from communities in the Fox Valley use these roadways.

Southeastern Wisconsin also serves as one of the primary tourist gateways to Wisconsin, helping fuel a $7.7 billion tourism industry.

Figure 34. Southeast Wisconsin freeway system.



Dependence on the SE freeway system extends beyond southeastern Wisconsin & the 2 million people who live there...

SE Wisconsin is one of the primary gateways for Wisconsin's economy...

helping fuel a $7.7 billion tourism industry,...& carrying 1/3 of all long-distance truck shipments to and from the Fox Valley.

Designed in the 1950s,..
& built in the 1960s...

most of the 305-mile SE freeway system has reached the end of its life span and requires rebuilding.

Deterioration

Designed in the 1950s and built in the 1960s, the physical condition of the system has deteriorated to such a point that action is required. Patching the system together cannot continue. It must be rebuilt. Wisconsin does not have the option of refusing to invest in this area's important roadways, bridges, and interchanges.

Today, 15% of the bridges and 36% of the pavements on SE freeways need improvement. If no action is taken, the numbers will grow dramatically by 2020 when nearly all the bridges and a great majority of the pavements will need rehabilitation or replacement. Deteriorating pavements and bridges magnify the congestion and safety issues growing in southeastern Wisconsin.

Growing congestion

Many of the freeways in SE Wisconsin are nearing capacity. In 2000, 29% are operating under congested conditions, with 21% in severe and extreme congestion. If no improvements are made, by 2020 nearly half of the system will be congested, with 32% severely and extremely congested.

Such conditions cause operational problems, raise safety concerns and could damage the economy of the state.

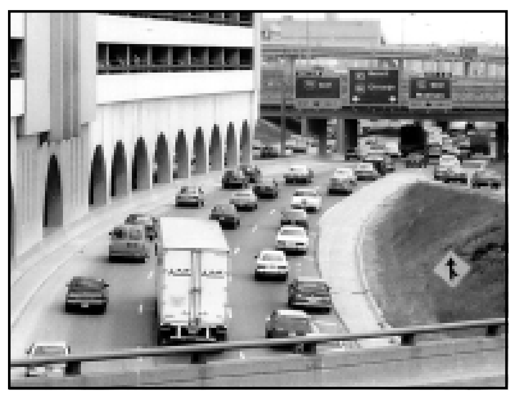


Figure 35. Many SE freeways are currently at capacity ...and the resulting levels of congestion affect operations, safety, and the entire state's economy.

Recommended improvements

Included in the SHP 2020 recommendations is an investment of $5.4 billion to address critical system rehabilitation and capacity issues in southeastern Wisconsin.

> *The great majority of the $5.4 billion investment required for SE freeways...*
>
> *is associated with replacement of existing roadways & bridges.*

The great majority of the $5.4 billion investment required for these important freeways is associated with the replacement of the existing roadways and bridges. Even on highway segments where additional capacity is proposed, the incremental cost of additional lanes is small compared with total project cost. This is because the condition of the existing roadways and bridges is such that they generally must be replaced. The incremental cost of additional lane capacity is only about 14% of the total cost of required freeway improvements. (See Figure 36.)

The improvements recommended for southeastern Wisconsin in the SHP 2020 are consistent with this area's locally-developed and approved regional transportation plan. The State Highway Plan calls for pavement and bridge preservation, as well as interchange reconstruction. The cost for additional lanes on some segments of the freeway system is also included in the plan, but the ultimate configuration of those lanes (i.e., whether to build busways, High Occupancy Vehicle lanes, etc.), and the need for investment in other modes, will be determined in the future following detailed planning studies.

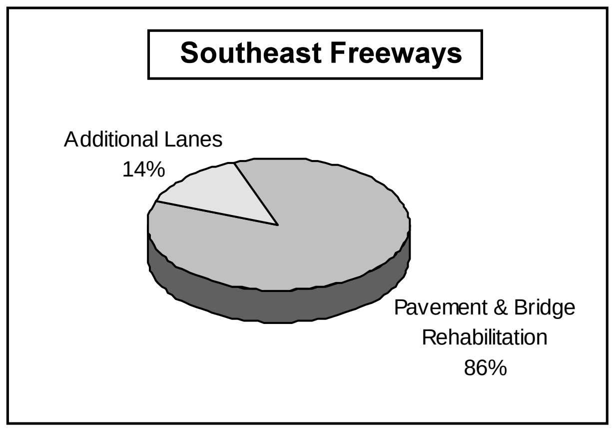


Figure 36. Incremental cost of additional lanes.

At this time, the SHP 2020 does not call for any additional capacity to relieve congestion on the five-mile segment of the I-94 East-West Corridor from the Zoo Interchange through the Marquette Interchange. The needs on this freeway segment will be re-evaluated as part of a new analysis of the needs of the entire SE freeway system to be conducted beginning in 2000 by the Southeastern Wisconsin Regional Planning Commission. The results of this analysis will be used to amend both the regional plan and the State Highway Plan.

Environmental evaluation

The future of Wisconsin's environment will be influenced by implementation of the State Highway Plan. The department has a responsibility to avoid, minimize and mitigate environmental impacts. WisDOT continues to take that responsibility seriously and strives to achieve a cost-effective and responsible balance between environmental and transportation needs.

The department has a responsibility to *avoid, minimize & mitigate* environmental impacts...

WisDOT continues to take this responsibility seriously.

The current environmental analysis of the SHP 2020 offers a broad base of system-level information from which to draw generalizations. Specific conclusions are not possible until project-level impacts are identified and analyzed. This occurs when each individual project is proposed.

The System-plan Environmental Evaluation, also known as a 'SEE,' builds on the environmental analysis conducted for the 1994 Translinks 21 process. The SEE analysis compares the impacts of the SHP 2020 with the impacts of all three of the original plan alternatives, which were briefly described in the *Comprehensive Planning Process* section of this report. The SEE evaluates issue areas that may be directly or indirectly affected by plan implementation. (See Figure 37.)

Environmental ISSUE AREAS

- air quality
- energy consumption
- sensitive lands & waters
- indirect land use impacts
- economic development impacts
- community impacts

Figure 37. The environmental evaulation for the SHP 2020 covers areas directly, or indirectly, affected by implementation of the plan.

Due to the complex nature of the SEE analysis, the SEE discussion in this summary report concentrates only on the comparison of the SHP 2020 with Alternative One. Alternative One can be thought of as the '**System Preservation Alternative**,' since it focuses on the preservation of pavement and bridges, and provides no additional capacity to accommodate growth other than the completion of projects already approved by the Legislature. (The complete SEE is available as part of the *Wisconsin State Highway Plan 2020 Technical Report*.)

• Air quality

It is estimated that under the SHP 2020, total air pollution emissions from vehicles traveling on the State Trunk Highway system will decrease by 14% between 2000 and 2020. Specifically, implementation of the plan is projected to result in 4% lower volatile organic compounds (VOC) emissions, 21% lower oxides of nitrogen (NO_x) and 13% less carbon monoxide (CO) than levels projected for 2000.

In comparison, under the System Preservation Alternative, overall emissions are estimated to decrease by approximately 12% between 2000 and 2020. Specifically, it is estimated that implementation of the System Preservation Alternative would reduce VOC emissions by 1.4%, NO_x emissions by 20%, and CO emissions by 11%, between 2000 and 2020.

The estimated emission decreases under the SHP 2020 and System Preservation Alternative are expected to occur despite the significant increases in vehicle miles of travel projected over the next 21 years. These decreases are attributed primarily to technological improvements in vehicles and fuels, replacement of older vehicles with newer, cleaner vehicles, and, to a lesser extent, reduced traffic congestion over the planning period (due to plan implementation).

> Emission decreases under the plan...are expected to occur despite the significant increases in vehicle miles of travel projected over the planning period.

Over time, implementation of the plan may generate additional travel by encouraging new businesses to locate within Wisconsin, and by contributing to further decentralized development, particularly in high-growth areas of the state. Increased travel caused by these two factors may ultimately result in increased vehicle emissions, which would slightly offset the 14% estimated reduction in air pollution emissions.

For the non-attainment areas (areas that do not meet federal air quality standards) located in the southeastern portion of the state, the SHP 2020 is consistent with locally-developed transportation plans and emission forecasts. In comparison, under the System Preservation Alternative, a number of major capacity expansion projects would not be constructed. Consequently, roadway congestion would increase. Therefore, emission forecasts would not be consistent with regional transportation plans that provide more congestion relief than the System Preservation Alternative.

Between now and 2020, construction of several large-scale major highway projects is planned for southeastern Wisconsin. This construction may temporarily increase vehicle emissions by diverting traffic from Interstate highways to surrounding arterials that operate under less efficient travel conditions. However, this traffic diversion would only be temporary, and some type of improvements would be required on these Interstate segments under the System Preservation Alternative as well.

Stricter particulate matter (PM) air quality standards have recently been developed by the United States Environmental Protection Agency (EPA). As a result, some areas of the state may not meet the stricter standards during the planning period. However, air quality testing for these new standards has not yet begun, and any areas that may be in violation of these new standards are not likely to be identified until 2003 to 2005.

Figure 38. Under certain conditions, air quality in southeastern Wisconsin doesn't meet national standards.

Similarly, it should be noted that the EPA has identified the need for, and the availability of, the technology to implement, more stringent tail pipe emission standards than those currently in effect (referred to as Tier 1 standards). In December 1999, the Tier 2 emission standards were finalized. These new standards will result in passenger cars being 77% cleaner than those on the road today, and light-duty trucks being as much as 95% cleaner. Implementation of the standards will begin with model year 2004 and be phased-in over a five-year period.

The EPA has also proposed stricter emissions standards for heavy duty vehicles (vehicles with a gross vehicle weight rating greater than 8,500 pounds) that would reduce emissions of NO_x and hydrocarbons by approximately 75% for gasoline-powered engines, and approximately 50% for diesel-powered engines. The standards would become effective beginning with model year 2004.

The EPA is also currently developing MOBILE6, a revised and updated mobile emissions model. Proposed updates to the model include, but are not limited to: updates of the basic emissions rates; impacts of aggressive driving; impacts of air conditioner use; and updates to the fleet characterization that will reflect the trend toward increased sales of light duty trucks. Although MOBILE6 may potentially affect estimates of emissions inventories for light duty vehicles and trucks, the impacts will not be known fully until the model is available and applied.

- **ENERGY CONSUMPTION**

Transportation has a direct relationship to energy consumption. Under the SHP 2020, the total gallons required to fuel the year 2020 vehicle miles traveled under projected highway system conditions are forecast to be slightly less than under the System Preservation Alternative, which would allow more congestion to occur.

The effects of the plan on energy consumption are similar to those stated for air quality. The changes in travel patterns encouraged by implementation of the plan may ultimately result in increased energy consumption that slightly offsets the original estimates made for the plan.

- **DIRECT LAND USE IMPACTS: SENSITIVE LANDS**

Direct impacts to sensitive lands include the potential loss of agricultural land, habitat fragmentation, and effects of highway improvements on endangered resources.

It is estimated that implementation of the SHP 2020 would convert a total of between 22,000 and 25,000 acres of land (about .06% to .07% of the state's current land area) directly to highway uses. Of that total, about 9,500 to 11,500 acres of agricultural land (approximately .06% to .07% of the current agricultural inventory) could be converted to highway uses.

Although these land conversions are notable, in both cases, on an annualized basis, they represent approximately 1% of the total number of acres that have been converted to residential and commercial uses each year over the last several years.

Analysis was also conducted to compare the number of sensitive habitats near proposed highway expansion projects. Habitats identified as containing endangered/threatened species or endangered natural communities (e.g., prairies) are three times as likely to be located within one mile of highway expansion recommended in the SHP 2020 than to be located within one mile of proposed capacity expansion in the System Preservation Alternative. However, the existence of such species or communities within these limits does not mean that the project will necessarily have any impact on these species/communities.

Figure 39. The SHP 2020 estimates the potential loss of sensitive lands and habitat fragmentation on a statewide basis.

● DIRECT LAND USE IMPACTS: SENSITIVE WATERS

Direct impacts to sensitive waters include the potential impacts due to highway improvements on water quality. Two categories were evaluated:

1) the filling of wetlands, and construction-related erosion and runoff, and
2) post-construction storm water runoff resulting from impervious highway surfaces.

Of the land that would be converted by implementing the plan, it is estimated that 900 to 1,100 acres would be wetlands (about .02% of current wetland inventory). However, WisDOT would mitigate this loss through wetland restoration or the creation of new wetlands. WisDOT's first priority is on-site compensation, which is wetland restoration or creation on the project site or as nearby as possible. If that is not feasible, then compensation at an off-site location is pursued.

Putting wetlands 'in the bank'

WisDOT was one of the first in the Midwest to create wetlands to be set aside, ...or put in a 'bank.'

These banked wetlands offset wetlands that are lost due to highway projects. Currently, 24 state-monitored wetland sites are banked, ...with a balance of approximately 1,700 acres.

WisDOT was one of the first transportation agencies in the Midwest to create wetlands to be set aside, or put in a 'bank.' These banked wetlands are used to offset wetlands that are lost due to highway projects. Currently, the 'bank' contains 24 state-monitored wetland sites with a balance of approximately 1,700 acres.

The SHP 2020 would also replace approximately 100 miles of seasonal highways with all-weather roads. Replacing these roads may significantly affect surrounding wetlands because it may require replacing the entire roadbed, affecting the drainage of surrounding wetlands.

The construction and use of highways can cause erosion and storm water runoff. Implementation of the plan over the 21-year planning period would require the statewide addition of approximately 2,800 new lane miles, and would include replacement of approximately 335 bridges over water.

Figure 40. Patrick Marsh was created to offset wetland loss. Surplus acres contributed to Wisconsin's first wetlands 'bank.'

In addition, approximately 215 new bridges over water would also be constructed as part of major capacity expansion projects.

Storm water runoff from highways is comprised of diverse substances, including oil, grease, de-icing materials, organic compounds, soil, fertilizer, animal waste and pesticides. While construction runoff pollutants would initially increase under the plan, the completed highway system may actually improve runoff coming from the highway system because of added long-term storm water management practices, especially in southeastern Wisconsin and the Fox Valley area.

Figure 41. During the next 21 years, WisDOT will replace approximately 335 bridges over water.

Currently, WisDOT employs 'best management practices' to comply with the Clean Water Act and reduce adverse effects of runoff. WisDOT has taken steps to ensure compliance with upcoming, more stringent federal regulations related to controlling construction site runoff.

As WisDOT takes additional steps to comply with upcoming urban runoff regulations, management practices put in place to handle highway runoff will consequently treat runoff from many other nearby sources. These practices could, in effect, improve the storm water management in some areas.

• Indirect land use impacts

Indirect land use impacts are defined as development that may occur as a result of new or improved transportation facilities.

Potential indirect transportation impacts on land use are discussed according to where they may occur:

- in urban areas,
- in the periphery of urban areas, or
- in rural areas.

While transportation improvements generally respond to changes in land use, they also have the potential to indirectly affect land development by either inducing new development or altering the pattern of development. However, land use changes are dependent on other factors as well. These include local land use plans, zoning, taxation, and the provision of public services (i.e., sewer and water).

In **urban areas**, adding capacity to State Trunk Highways may reduce congestion, thereby making business locations along these routes more desirable. In the case of freeways and expressways, new development may occur along frontage roads, and at interchanges. Similarly, new development may occur at bypass interchanges.

If urban State Trunk Highways are expanded, businesses may continue to stay in urban areas due to better access and traffic conditions. However, there is also a potential for residential and business displacement when land is needed to build or expand a roadway.

Implementation of the plan will probably have greater potential impacts, both negative and positive, on urban areas as compared with the System Preservation Alternative. Areas likely to feel the most impact are the Fox Valley, Madison and metropolitan Milwaukee.

The **periphery of urban areas** may be most susceptible to development, particularly when nearby urban areas are experiencing high growth. Improvements to State Trunk Highways in the urban periphery may hasten development by making commercial and residential development on available land more desirable. Peripheral area improvements may generate larger-scale effects than improvements in urban areas due to larger parcels of vacant and semi-vacant land being available, and may impact environmentally-sensitive lands. Often, the greatest potential for development is likely to be at freeway and bypass interchanges, and along frontage roads.

In the urban periphery, the SHP 2020 will probably have a greater impact than the System Preservation Alternative because it recommends more miles of freeway, expressway and arterial expansion, along with more bypasses, than does the System Preservation Alternative. Faster growing areas, such as Madison, the Fox Valley and metropolitan Milwaukee, may experience more impacts in the urban periphery than slower growing places.

Added capacity in **rural areas** may make long-distance commuting easier, thereby encouraging additional scattered residential development between communities and increased residential development in smaller outlying communities. It could also result in an increase in automobile- and truck-oriented commercial and industrial development around interchanges and intersections. The SHP 2020 is likely to have a greater impact than the System Preservation Alternative in rural areas because it recommends more freeway and expressway miles, as well as more rural interchanges.

Figure 42. Industrial development near a freeway interchange.

Therefore, overall, the SHP 2020 would result in more of these potential indirect land use impacts than would the System Preservation Alternative. However, it is important to note that these impacts could be avoided or minimized with proper local land use planning and access management measures.

Although the SHP 2020 does include a qualitative discussion of secondary land use impacts that may occur as a result of capacity expansion defined in the plan, it is currently not possible to develop quantitative estimates of land taken as a result of secondary impacts at the system level. Accordingly, WisDOT is working with various environmental groups and monitoring efforts of universities and other states in an attempt to develop reliable methodology to quantify system-level estimates of secondary land use. In future updates of the State Highway Plan, WisDOT will attempt, to the extent possible, to include these types of quantitative estimates.

- **ECONOMIC DEVELOPMENT IMPACTS**

Wisconsin's $7.7 billion tourism industry depends on the State Trunk Highway system to provide travelers with efficient connections to state tourism destinations. The SHP 2020 includes projects that would provide improvements in traffic movement for better access to Wisconsin's tourism destinations in northern and western Wisconsin. These projects would most likely foster greater increases in tourism revenue and employment than would occur under the System Preservation Alternative.

The majority of the state's manufacturing jobs (92%) are located within five miles of a Corridors 2020 route. During the past eight years, 87% of all new and expanded manufacturing facilities chose to locate on or near this same highway system, creating over 35,000 new jobs. These new jobs account for 90% of all new manufacturing jobs in the state over these eight years.

The majority of the state's manufacturing jobs (92%) are located within five miles of a Corridors 2020 route.

International trade is also a major component in the state's economy. Wisconsin exports totaled $10.6 billion in 1998. More exports means more demand for transportation services and infrastructure.

Implementation of the SHP 2020 would create a more efficient transportation system for Wisconsin businesses, thus making them more competitive and making Wisconsin more attractive to other businesses. It would also reduce congestion in southeastern Wisconsin, where manufacturing, retail and service industries are most concentrated.

Overall, recommended improvements included in the SHP 2020 would provide significantly better traffic movement and access than would improvements under the System Preservation Alternative.

• Community impacts

Transportation improvements may significantly affect communities by dividing neighborhoods, decreasing pedestrian and bicycle opportunities as highways become barriers, displacing existing homes and businesses, and degrading some communities.

Figure 43. Transportation improvements may affect communities by creating a barrier and dividing neighborhoods. This pedestrian and bicycle overpass reconnects the neighborhood, and provides an alternate route for bicycles and pedestrian traffic.

These types of impacts are most prevalent when a new transportation corridor is constructed in an urban area. However, urban capacity improvements included in the plan are generally along existing routes, and therefore will not necessarily result in significant negative community impacts.

In urban areas, improved or expanded access to the State Trunk Highway system may have a positive effect on communities. Improved transportation facilities may:

- help implement planned land uses;
- assist in business retention due to improved access;
- allow retrofitting of more aesthetically pleasing structures; and
- allow for better pedestrian and bicycle accommodations with improved neighborhood connections.

Improvements to the State Trunk Highway system may also affect communities through impacts to local roads. Local roads may see positive and negative impacts from nearby state highway improvements. Benefits may include less traffic, lower noise levels, and improved safety on parallel local facilities due to traffic diverting onto the state facility. Other potential benefits include concentration of business development where transportation and other services are most available. Concerns include concentrations of traffic at interchanges and intersections with local roads, and safety concerns associated with likely sudden speed changes between State Trunk Highways and adjacent local systems.

> *...reconstruction or modernization of highway facilities can improve connections between neighborhoods...*
>
> *& provide greater accommodation of bicycles and pedestrians.*

It is important to note that failure to maintain State Trunk Highway facilities may lead to increased traffic and congestion on that system, resulting in increased traffic and congestion and reduced safety on local roads due to driver diversion from the state facility. Furthermore, the negative impacts of State Trunk Highways on communities and local roads can be mitigated by strategies such as access management, zoning, and comprehensive and land use planning.

The SHP 2020 includes significantly more improvements in urban areas and the urban periphery than does the System Preservation Alternative. Therefore, the community impacts of those improvements are likely to be greater.

In addition, implementation of the SHP 2020 would result in more capacity improvements statewide than would the System Preservation Alternative. Accordingly, the plan has the potential to impact almost twice the number of archaeological sites and over 50% more historical sites over the 21-year planning period than would the System Preservation Alternative. However, effects on significant archaeological or historic resources could be avoided or minimized by project location and/or design changes.

Moreover, during the project development phase, WisDOT will comply with provisions of Section 44.40 of the Wisconsin Statutes and the recently revised Section 106 of the National Historical Preservation Act of 1966 to determine whether a proposed project will affect any known or eligible historical properties. If it is determined a project may have an adverse effect on a historical site, the state historic preservation officer will be notified.

In designing urban highway improvements, WisDOT will work in partnership with local communities to identify urban amenities and more aesthetically-pleasing designs to make State Trunk Highways better fit into their community or neighborhood surroundings.

Financing Issues

The SHP 2020 uses a conservative approach to reconcile the vision created for the State Trunk Highway system and the financing required for implementation. The system's needs are significant. In fact, the needs are higher than what the department could include in the plan and remain fiscally responsible. The identified needs can be funded through a combination of existing revenues, increased federal dollars, prudent cash management and gradual revenue increases.

Needs

As proposed, the SHP 2020 requires approximately $20.4 billion dollars over the 21-year life of the plan. (All costs and revenues are expressed in 1999 dollars.) The $20.4 billion includes the cost of all recommended preservation, safety, and traffic movement needs, but excludes the cost of conducting routine maintenance activities such as application of protective surface coatings, snow removal, filling potholes, and mowing. It should also be noted that because the plan's cost is expressed in constant 1999 dollars, the actual cost of implementing the plan over the 21-year planning period will be greater than $20.4 billion due to inflation.

> ...the overall emphasis of the SHP 2020 is one of *preservation*...
>
> rehabilitation work accounts for about 80% of the plan's total cost.

Of the $20.4 billion, $13.2 billion is needed to fund the program that focuses on rehabilitation of existing pavement and bridges, while $7.2 billion is needed for major capacity expansion and rehabilitation work completed in conjunction with those expansions. (See Figure 44.) Although the SHP 2020 does recommend a significant amount of capacity expansion, its overall emphasis is one of preservation. Combining the rehabilitation investments of the State Highway Rehabilitation Program and those associated with major capacity expansions, rehabilitation work accounts for about 80% of the plan's total cost.

Figure 44. Focus of the $20.4 billion investment.

State Highway Rehabilitation Program	**$ 13.21 billion**	
Pavement/Bridge Preservation and Safety*		$ 11.64 billion
Minor Capacity Expansion		$ 0.39
Rail Grade Crossings		$ 0.16
Interchanges		$ 0.73
Bicycle Accommodations		$ 0.06
Passing Lanes		$ 0.08
Urban Amenities		$ 0.15
Major Capacity Expansion Program	**$ 7.21 billion**	
Additional Lanes		$ 3.77 billion
Rehabilitation of Existing Lanes/Bridges		$ 3.35
Urban Amenities		$ 0.09
Total Investment	**$ 20.42 billion**	

* Includes Marquette, Stadium, Hale & Mitchell Interchanges in SE Wisconsin.

Revenue

WisDOT's current base funding levels (federal and state revenues) will generate approximately $15.3 billion from 2000 through 2020. This figure assumes that revenue increases based on the state's indexed fuel tax formula, and any increases in vehicle miles traveled, will be offset by inflation and increases in vehicle fuel efficiency over the 21-year planning period. The projected revenues, therefore, are not expected to increase above current funding levels in real dollars. The $15.3 billion revenue projection includes only revenue anticipated to be available to fund needs identified in the plan.

The $15.3 billion figure includes estimated increases in federal funding over the 21-year planning period resulting from the Transportation Equity Act for the 21st Century (TEA-21). In contrast to previous federal legislation, TEA-21 provides Wisconsin with a more equitable return on gas taxes that are sent to Washington.

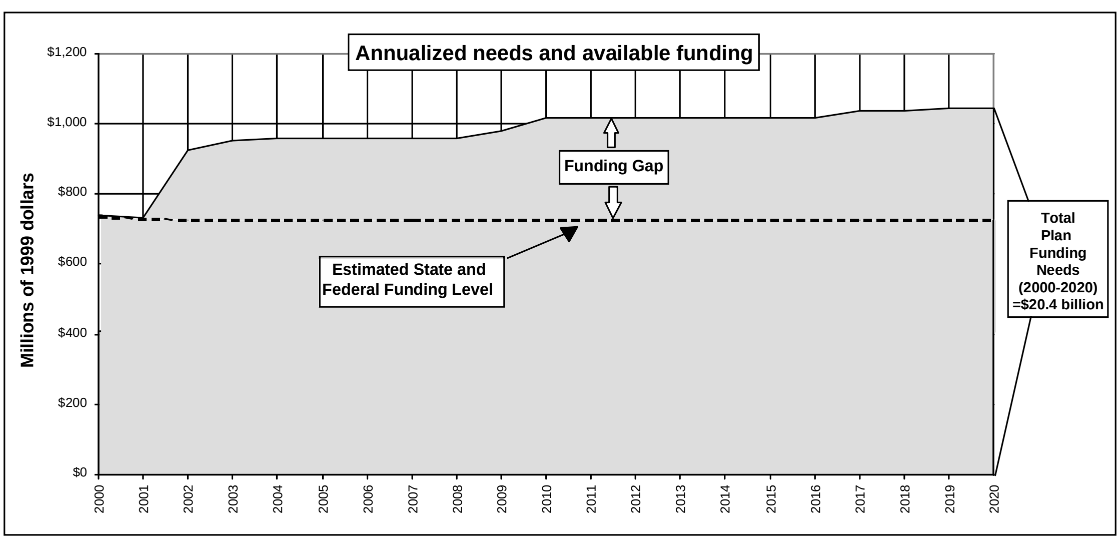
Under TEA-21, Wisconsin will generally receive a dollar for every dollar of federal gas tax sent to Washington, D.C. This is an improvement over the 92 cents per dollar that Wisconsin received during the previous six-year transportation act. Even with this additional federal revenue, there remains a $5.1 billion gap in funding required to fully address the identified needs over the 21-year planning period. (See Figure 45.)

> The plan identifies a $5.1 billion gap in funding… to fully address needs over the 21-year planning period.

In order to fully fund plan implementation, average annual revenue increases of 2.7% above the inflation rate would be required. In comparison, between 1984 and 1999, WisDOT experienced an average annual increase in highway funding of approximately 2.9% above inflation.

The SHP 2020 will require a substantial investment to be fully implemented over 21 years. However, WisDOT does not propose to fund identified improvement needs by decreasing the funding available for other programs including local, elderly and disabled transportation, or transit programs.

Figure 45. Gap between potential funds available and State Highway Plan 2020 needs.



* Funding from 2000 through 2020 assumes that state funding will remain constant & federal funding will continue at the level established by TEA-21.

Timing

Projects in the SHP 2020 range in scope, cost, and timing. Future highway funding requirements are driven by three major factors:

> *The plan requires a substantial investment over 21 years...*
>
> *...however, identified funding needs...will not affect the proportion of funding provided to other programs...*

1) the need to address current and emerging pavement and bridge preservation needs;
2) the need to address at least a portion of existing and predicted congestion problems, especially on the Corridors 2020 sub-systems; and,
3) the need to address high-cost improvements required on the SE freeway system.

After fiscal year 2001, significant increases in funding needs result, in part, from large-scale projects in southeastern Wisconsin moving to the construction phase. These large-scale projects include: Marquette Interchange reconstruction, I-94 East/West Corridor reconstruction, Zoo Interchange reconstruction, and I-894 capacity expansion.

These large-scale project needs in southeastern Wisconsin are in addition to other significant needs – statewide – in WisDOT highway programs (e.g., State Highway Rehabilitation, Major Projects and Backbone Rehabilitation).

Need for additional funding

Additional revenue will be needed to fund the $5.1 billion gap. Increases in federal funds may be available under the next transportation act (which is scheduled for reauthorization in 2004). If necessary, WisDOT could re-examine two other possible approaches for meeting the plan's investment levels:

(1) Short-term debt financing methods could be used. These techniques would allow short-term needs to be met. Real revenue growth will be needed to retire this debt.

(2) Real revenue growth will be needed for funding projects and retiring debt, if federal increases are not forthcoming.

Recommendations of the Transportation Finance Study Committee

WisDOT will continue to examine options presented by the Transportation Finance Study Committee, a committee established by statute to research and develop recommendations for addressing Wisconsin's short- and long-term transportation funding needs.

The Transportation Finance Study Committee spent over a year reviewing, debating, and developing a series of recommendations for consideration by the Legislature and Governor to address Wisconsin's transportation funding needs.

As shown in Figure 46, the Wisconsin Legislature did consider and enact many of the short-term recommendations for generating real revenue growth. Many of these options could yield substantial increases in transportation revenues, either alone or combined with other options.

Figure 46. Short-term funding recommendations.

The Transportation Finance Study Committee's **short-term recommendations** included:

- Increase vehicle registration fees for personal motor vehicles.*
- Increase vehicle registration fees for commercial trucks.*
- Modify the current motor vehicle fuel indexing formula, removing the consumption factor.
- Increase the current motor vehicle fuel tax.*
- Enact legislation to phase out other agency program funding from the Transportation Fund.
- Enact legislation to allow local governments to adopt a partial-cent sales tax to be dedicated to local mass transit.
- Enact a four-year moratorium on new transportation project enumeration.*
- Enact statutory language to phase in a transfer of sales tax revenue from the sale of automobiles and auto-related parts and services to the Transportation Fund.
- Enact statutory language to require the use of General Obligation Bonds if federal funds lag and state contributions are required to pay future transit capital costs.
- Enact statutory language enabling Wisconsin to increase the state fuel tax to account for any 'turnback' legislation passed at the federal level.

* Enacted in 1997-1999 budget

The process of quantifying long-term needs for the plan clearly shows that our future transportation needs are real. Current funding levels and increased federal funds will cover needs in the short-term, but large scale projects are on the horizon. Figure 47 presents the Committee's long-term funding recommendations, which could be considered for real revenue growth.

Figure 47. Long-term funding recommendations.

The Transportation Finance Study Committee's **long-term recommendations** included:

- Explore changing the motor vehicle registration fee system to a value-based system.
- Phase-in the transfer of sales tax revenue from the sale of new and used automobiles, and the sale of automobile-related parts and services, to the Transportation Fund.
- Transfer revenue from the 3 cents per gallon 'petroleum inspection fee' to the Transportation Fund after polluted sites are cleaned up.
- Explore congestion pricing for the East/West freeway in southeastern Wisconsin.

The Transportation Finance Study Committee recommendations provide a starting point. As the SHP 2020 is implemented, the financing issue will be revisited each biennium.

Implementation

The goal of the State Highway Plan is to establish a multi-year investment strategy that can be fully funded over the planning period. However, there may be periods of time when funding shortfalls may result in the need to prioritize plan-recommended investments by sub-systems or improvement types. If such shortfalls occur, decisions on investment priorities would ultimately be policy decisions, which would be made by the Governor and legislature. However, the plan includes prioritization policies that could be used to guide implementation of improvements.

> *The goal of the SHP 2020 is to establish a multi-year investment strategy,...*
>
> *that can be fully funded... however, if shortfalls occur,...*
>
> *the plan's prioritization policies will be used to guide implementation.*

Generally, the SHP 2020 gives highest priority to pavement and bridge preservation improvements, safety improvements, the completion of the Corridors 2020 Backbone routes, and bicycle and pedestrian accommodations. Secondary priority is given to improvements such as capacity expansion, new and upgraded interchanges, and new bypasses, when they are not associated with first priority needs. These priorities provide only a general framework for the more detailed analysis that goes into the development of the Six-Year Highway Improvement Program, in which final project development decisions are reflected.

The State Highway Plan 2020 recommends a number of strategies to meet Wisconsin's long-range highway needs in a responsible manner. WisDOT will work with the programming and design staff, MPOs, and local officials to implement the policies and actions contained in the plan.

Wisconsin State Highway Plan 2020
Other Documents Available

Background Reports:
Corridors 2020 Backbone System: An Overview (1998)
Economic Development & the State Trunk Highway System: Overview and Technical Reports (1998)
Highway Safety: An Overview (1998)
Intelligent Transportation System & the State Trunk Highway System: An Overview (1998)
Intercity Model Forecasts & Interactions (1998)
Land Use and Transportation: An Overview (1998)
State Trunk Highway Bridges: Overview and Technical Reports (1998)
State Trunk Highway Mobility: Overview and Technical Reports (1998)
State Trunk Highway Pavement: Overview and Technical Reports (1998)
State Trunk Highway Plan, Global Evaluation (Trends affecting transportation through 2020) (1997)
State Trunk Highway Safety and Geometrics: Technical Report (1998)
Transportation Finance: An Overview (1998)

Other Reports:
State Trunk Highway Plan, Alternatives Report (1998)
Wisconsin State Highway Plan 2020: Public Involvement Process
Volume 1: State Highway Plan Focus Group Study (1998)
Volume 2: Transcripts of Public Forums (2000)
Volume 3: Transcripts of Public Hearings (2000)
Wisconsin State Highway Plan 2020: Technical Report (2000)

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