

Transportation System Deficiencies

An analysis of the operational characteristics of the multi-modal transportation system serving the Chippewa-Eau Claire Metropolitan Planning Area reveals certain deficiencies in the performance of the system that signal the need for possible improvements. Traffic modeling, in conjunction with other data analysis, for the street and highway system serving the planning area helped to identify problem areas affecting safety and mobility. Additional analytical techniques have also been applied in evaluating the performance of public transit systems along with other modes of transportation. In addition, information gathered from community interaction through public participation meetings, advisory groups, and stakeholder interviews also help to identify system performance from a users perspective. All of these analytical approaches have been applied in the evaluation of the multi-modal transportation system and in the identification of system deficiencies.

Street and Highway System

Deficiencies in the street and highway system in the Chippewa-Eau Claire Metropolitan Planning Area (MPA) primarily represent inadequacies in the system's ability to accommodate travel demand in a safe and efficient manner. Identification of these deficiencies provides the background for proposing recommendations to improve the system. Problem areas were identified using the Chippewa-Eau Claire Regional Transportation Study (CERTS) computer model for traffic forecasting. A system deficiency analysis was conducted by consultants for the Wisconsin Department of Transportation, using the CERTS model, to identify current deficiencies, along with future deficiencies for the 2030 planning horizon.

Roadway deficiencies have been identified on various segments of the urban street and highway system. These deficiencies are determined from a Level of Service (LOS) deficiency analysis in which roadway segments are first assigned a LOS value based on a measure of the available capacity used by the volume of traffic on a given segment of roadway. Additional factors that influence roadway capacity are also considered in this evaluation. These factors include:

- Facility Type
- Area Type
- Number of Lanes
- Posted Speed
- Signal Density
- Cross-Section Type

The resulting level of service numeric value ranges correlate to a corresponding level of service letter designation, as presented in WisDOT's *Facilities Development Manual 11-5-3*.

Level of Service	Numeric Value
A (not congested)	1.01 to 2.00
B (not congested)	2.01 to 3.00
C (minimal congestion)	3.01 to 4.00
D (moderate congestion)	4.01 to 5.00
E (severe congestion)	5.01 to 6.00
F (extreme congestion)	6.01 and greater

However, a level of service value by itself does not indicate definitively whether a roadway segment is deficient. For example, a moderate level of congestion may be acceptable on a high traffic volume urban corridor, while the same level of congestion may not be acceptable on a rural freeway segment. Therefore, an acceptable LOS threshold has been established for various roadway classes. The LOS threshold is determined by the roadway segment's overall importance to the transportation system as a whole and is based on the state trunk highway sub-system attribute entered into the traffic model network. These sub-system attributes reflect WisDOT's priorities established in the TRANSLINKS 21 and Corridors 2020 Review and Update from June 1994. The model then compares the LOS value to the LOS threshold to determine the deficiency status of a particular roadway segment. Five levels of deficiency status are reported by this analysis:

Volume to Threshold Capacity Ratio	Reported Deficiency Status
< 0.75	Sufficient
0.75 to 0.89	Approaching
0.90 to 0.99	Potential
1.00 to 1.09	Deficient
> 1.10	Severely Deficient

Following the methodology outlined above, the deficiency analysis conducted on the street and highway system in the MPA found a total of 54.57 lane miles of roadway to be deficient for the 2001 Base Year EXISTING road network. Ninety percent of the system deficiency occurs on 33.49 lane miles of Hastings Way (USH 53) and 15.10 lane miles of STH 29. An additional 9.42 lane miles of roadway were determined to be potentially deficient. Map 29 depicts the deficient lane miles of roadway occurring in the 2001 Base Year in the MPA. If nothing is done to address these deficiencies on the existing road network by the

Insert Basic Freeway Segments here **8.5 x 11**

year 2030, the amount of deficient lane miles will almost double at 99.40 lane miles. Similarly, the amount of potential deficient lane miles will more than triple at 31.26 lane miles. Map 30 depicts the deficient lane miles on the existing road system in the year 2030. Appendix F lists the lane mileage for the individual road segments identified by the CERTS traffic forecasting model as deficient or potentially deficient.

Further analysis was conducted to evaluate the impact of road improvement projects that have been COMMITTED to in funding programs through the year 2010. These projects are identified on Map 31. The traffic forecasting analysis conducted with the COMMITTED road improvement projects in place by 2010 shows a 79% reduction in the amount of deficient lane miles for the future year 2030. The deficiency analysis conducted for the existing road system in the year 2030 with the COMMITTED projects completed identified a total of 20.21 deficient lane miles remaining. The potentially deficient lane miles were also reduced by 21%, from 31.26 lane miles to 24.85 lane miles. Map 32 depicts the deficient lane miles of roadway remaining after the implementation of the COMMITTED highway improvement projects. Appendix F lists the results of this traffic forecasting analysis.

The next level of analysis included those road improvement projects that are PLANNED to be implemented sometime between 2010 and 2030. The PLANNED projects are identified on Map 33 and were selected based on their ability to further reduce the transportation system deficiencies and with consideration for the level of ease of implementation. Ease of implementation refers to minimizing negative affects and gaining popular support. Factors such as financial and environmental constraints, social impacts, intergovernmental cooperation, and support for the project all lend themselves to determining the implementability of a project.

The deficiency analysis conducted with the addition of the PLANNED highway improvement projects indicates a further reduction in deficient lane miles of 34%, resulting in a total of 13.60 deficient lane miles remaining in the MPA in 2030. Map 34 depicts the location of the remaining deficient road mileage. Similarly, the addition of the PLANNED projects further reduce the amount of potentially deficient lane miles from 24.85 to 16.19, a 33% reduction. The individual road segments identified as deficient or potentially deficient are listed in Appendix F.

The continued growth and development projected for the MPA is expected to increase vehicle usage, resulting in an increase in vehicle miles traveled (VMT) in the MPA and vehicle hours traveled (VHT) by the year 2030. Traffic forecasts for the year 2030 for the existing road network project a 63% increase in VMT and an 83% increase in VHT due to the deficiencies noted within the EXISTING system. Traffic forecasts prepared for the COMMITTED and PLANNED projects indicate increases in VMT and VHT of only 33% and 56%, respectively. In other words, VMT is reduced by 18%, while VHT is reduced by 14% with the implementation of the COMMITTED and PLANNED projects by the year 2030.

Map 29 here 11 x 17

Map 30 here 11 x 17

Map 31 here 11 x 17

Map 32 here 11 x 17

Map 33 here 11 x 17

Map 34 here 11 x 17

Concentrations of **vehicular crashes** are also indicative of system operating deficiencies. A review of WisDOT's crash data for the years 2000 through 2002 for the Chippewa-Eau Claire MPA helped to identify those intersections experiencing the highest frequency of vehicular crashes. Map 35 identifies the top 19 intersection locations in the planning area with the highest average crash rates for the three-year period. These concentrations of crashes tend to indicate areas where inadequate street configurations and/or traffic congestion problems exist. This crash rate is expressed in crashes per one million vehicles entering the intersection. Crash rates of 1.5 to 2.0 are considered early warning signs of impending problem areas and should be monitored more closely to determine whether there exists a continuing trend that may require safety improvement measures. Crash rates greater than 2.0 are considered problem areas and should be studied for the application of the appropriate safety improvement.

Public Transit System

The *Transit Development Plan and Long Range Plan Element*, prepared for the Eau Claire Transit System in 2003, documents an extensive analytical process used in the performance evaluation of the fixed-route bus system. The study evaluated not only the existing service, but also addressed several long range issues relevant to a long-term service plan for the transit system.

Quantitative data gathered from boarding and alighting surveys was used to evaluate individual route and system-wide productivity for the Eau Claire Transit System. The data examined route performance in terms of passengers per revenue hour, passengers per mile, and cost per passenger. The results of this analysis is presented in the following Figures 1, 2 and 3.

Figure 1 ETC: Weekday Passengers per Revenue Hour, by Route

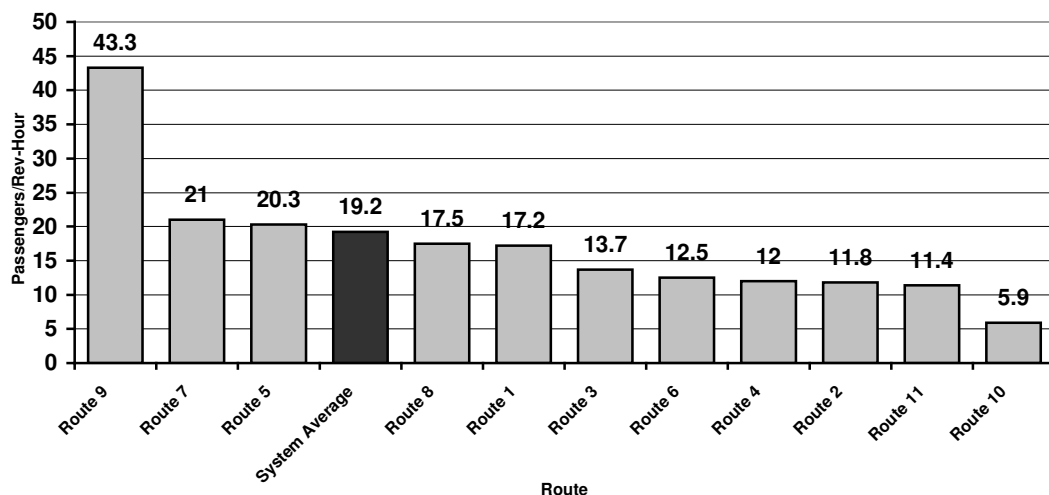


Figure 2 ETC: Weekday Passengers per Mile, by Route

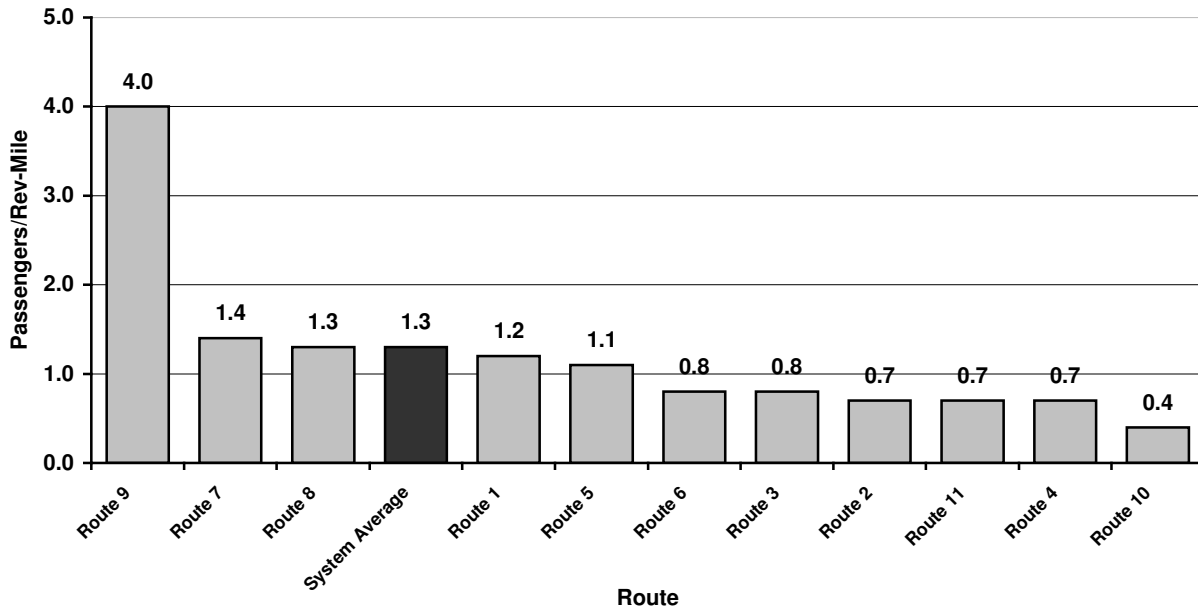
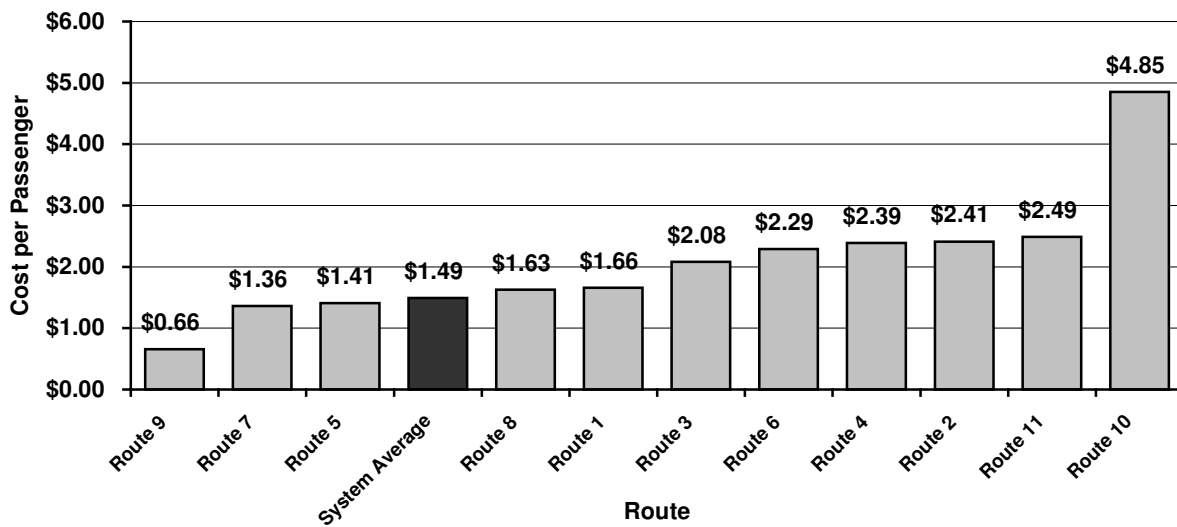


Figure 3 ETC: Weekday Cost per Passenger, by Route



As indicated from this analysis for weekday routes, Route 10-Alpine is the worst performing route, while Routes 3-North High, 6-Putnam Heights/Malls, 2-Mt. Washington/Delong, 4-Locust Lane, and 11-South Loop were identified with below average performance. These routes were identified with below average ridership, resulting in a higher average cost per passenger to operate.

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Map 35 backside here 11 x 17

A peer review of the Eau Claire Transit System compared the performance of ECT with seven similar-sized transit systems in Wisconsin and with ten transit systems nationwide with similar service characteristics. Overall, ECT's performance ranked at the top of the statewide peer group and fell within an acceptable mid-range level of its national peer group. The other Wisconsin transit systems that ECT was compared with include: La Crosse, Oshkosh, Sheboygan, Wausau, Waukesha, Janesville, and Beloit. The system trend analyses of performance indicators for the Wisconsin peer group is presented in Table 17.

Table 17 ECT Trend Analyses of Performance Indicators, Wisconsin Peers				
Service Dimensions	2001		Annual Percentage Change 1997 – 2001*	
	ECT	WI Peer Average	ECT	WI Peer Average
Farebox Recovery Ratio	16%	17%	-5%	-4%
Cost Per Passenger	\$2.27	\$3.53	-2%	9%
Cost Per Revenue Hour	\$50.63	\$55.62	4%	4%
Revenue Hours Per Capita	0.81	0.80	5%	2%
Trips Per Capita	17.93	12.93	15%	-1%
Passengers Per Revenue Hour	22.13	16.35	7%	-3%

*Based on a linear regression model of the data from 1997 to 2001. The slope from the model represents the average annual change. This was then converted into a percentage by comparing it to the variable's value in 1997.

Source: *Transit Development Plan and Long Range Plan Element*, City of Eau Claire, 2003

The results of this analysis indicates that ECT's revenue hours per capita, trips per capita, and passengers per revenue hour all increased between 1997 and 2001. However, farebox recovery ratios decreased for ECT, along with its Wisconsin peers. This suggests that operating costs outpaced growth in fare revenues.

In addition to the productivity deficiencies identified through the data analysis, public input received during the course of the transit system study identified several problematic issues that affected transit usage from the perspective of the user. The following concerns have been summarized from public comments received regarding the provision of public transit service by ECT.

- Lack of Sunday service.
- Lack of late night weekday and Saturday service.
- Limited service to Altoona.
- No service to Greyhound bus station.
- No service to Village of Lake Hallie, City of Chippewa Falls, or outlying areas.
- Bus schedule not coordinated with UWEC and high school class schedule.
- No bus stop signage.
- Lack of bus shelters.

- Increasing safety concerns at downtown transfer center due to traffic congestion and person-to-person interaction.
- Travel time on the bus is too long due to circuitous routing.
- Lack of information on the bus system, scheduling, and routing.
- Lack of coordination between transit service and new development.

While some of the concerns expressed may not directly reflect upon the performance of the transit system, others do tend to indicate a deficiency in the service and supporting transit facilities. Those issues that influence transit usage have a direct impact on the productivity of the system and reflect upon the overall performance of the system in serving the transit needs of the public.

The Chippewa Falls shared-ride taxi system (SRT) provides a demand-response service that adequately meets the needs of the City's transit users. The popularity of the door-to-door service continues to increase demand. The programmatic limitations of the transit service restrict the service area to within the City's corporate boundary and does not provide service to outlying areas. Performance indicators obtained from the 2004 annual report show the system productivity at 4.27 passengers per revenue hour, with a cost of \$5.29 per passenger. Faced with increasing operating costs, the City may need to reassess its fare structure and hours of service to be able to meet a growing demand for the SRT service.

Specialized Transportation

Specialized transportation services within the planning area are impacted by funding constraints and programmatic regulations that limit availability. Restricted hours of operation, trip prioritization, advanced registration and program eligibility requirements are restrictive measures used by special transportation providers in applying limited resources to the transportation needs of the mobility impaired. These restrictions are shared by all special transportation providers and result in accessibility limitations for special transportation users.

Bicycle Facilities

The *Bicycle Transportation Plan*, prepared as a separate component of the previous *Long Range Transportation Plan*, assessed the bicycling environment of the planning area to identify system deficiencies that need to be addressed to improve conditions for bicycle users. The general perception of bicycle users in the planning area is that the local road and street system affords a relatively safe and unlimited access to area bicyclists. However, bicycle travel via primary travel corridors is impeded by both natural and man-made barriers that affect directness of travel, bicycle route continuity and access to area destinations. In

general, the planning area lacks a continuous area-wide bikeway system and attendant bicycle facility improvements. Many of the needed facility improvements identified are directly related to street maintenance and capacity requirements to safely accommodate bicyclists. A strong emphasis was voiced by bicycle users and municipal officials, alike, for additional off-street bicycle paths. The re-evaluation of the earlier plan resulted in the updating of the bikeway system map and the re-confirmation of the need for supporting facilities. The current need for bicycle facility improvements identified 88 miles of urban arterials and collectors and 31 miles of rural arterials and collectors, along with the addition of 41 miles of off-street bicycle paths.

In addition to bikeway facility improvements, supporting facilities to accommodate bicycle parking at primary destinations were also identified as needed improvements for bicycle usage. The collection and analysis of crash data involving bicyclists also reinforced the need for the continuation and potential expansion of safety education and enforcement programs to improve safe bicycle usage. There were 42 bicycle/vehicular crashes reported between 2002 and 2004 in the MPA, resulting in 40 injuries, but no fatalities. These crashes occurred at various locations through the MPA and involved ages ranging from 6 to 58.

Pedestrian Facilities

Pedestrian facilities within the planning area are primarily located within the corporate boundaries of the Cities of Altoona, Chippewa Falls and Eau Claire. However, the paved shoulders of rural roads often facilitate bicycle and pedestrian travel even though their primary purpose is to improve the safety and maintenance of the road for vehicular traffic. Increasing rural development within the MPA is increasing not only vehicular traffic on many rural roadways, but also usage by bicyclists and pedestrians. Narrow rural roads with non-existent shoulders present a safety problem for motorists, as well as bicyclists and pedestrians.

The pedestrian facilities within the corporate limits consist of municipal sidewalks, pedestrian bridges over water bodies, and pedestrian overpasses and underpasses crossing major vehicular traffic arteries. In addition, developed bicycle trails also accommodate pedestrian travel through the urban area. In general, the urban area affords pedestrians an adequate measure of safety through existing pedestrian facilities and traffic control measures. However, inconsistent enforcement of municipal policies affecting the installation and maintenance of sidewalks leaves many developed areas without sidewalks or with discontinuous segments of sidewalks. Additionally, there are many areas where existing sidewalks are in disrepair and require maintenance or replacement. Winter snow removal on pedestrian walkways is another aspect of maintenance that often times receives a lower priority.

Pedestrian problems arise primarily from conflicts with vehicular traffic. Pedestrian/vehicular crash data provides an additional analytical approach that can help to identify system deficiencies. A review of available pedestrian/vehicular crash data for the planning area revealed no point concentrations of pedestrian conflicts. There were 52 pedestrian/vehicular crashes reported between 2002-2004 in the MPA, resulting in 53 injuries and one fatality. These crashes involved pedestrians ranging in age from 5 to 86. While there are no point concentrations of pedestrian/vehicular crashes, certain areas exhibiting high concentrations of both vehicles and pedestrians offer the greatest potential for such conflicts. These areas include the central business districts with their short blocks that increase the number of pedestrian crossings. The area of high student pedestrian activity from the University along Water Street, Summit Avenue and State Street represents another potential problem area. Conversely, pedestrian traffic along segments of Clairemont Avenue and Hastings Way often presents a potential conflict due to the longer distance between designated pedestrian crossing areas and the preferred convenience to cross the street in mid-block. To a lesser extent, conflicts may also occur near schools and parks during periods of peak use.

Access to Air Transportation Facilities

Intercity air transportation provided by the Chippewa Valley Regional Airport for passenger movement has experienced a slight growth in recent years. The Regional Airport Authority continues to pursue additional regional air carrier service for the Chippewa Valley Regional Airport. Any anticipated growth in air passenger service or expansion of air freight facilities is not expected to significantly impact the surface transportation connection to the airport. Melby Street, Starr Avenue and Eddy Lane are all urban minor arterials providing adequate access from USH 53 to the Chippewa Valley Regional Airport. There are currently no significant deficiencies associated with the municipal arterial street system serving the regional airport that would restrict access to the airport facilities, or impact any potential growth of air transportation services. The completion of the USH 53 bypass to an extended Melby Street in 2005 will alleviate any congestion problems that may be experienced on existing USH 53.

Freight Rail Transportation

Freight rail service to the MPA has been substantially reduced over the years. Nationwide rail consolidations and abandonments, as well as the growth of the trucking industry, have both contributed to this trend. While freight rail service to the planning area has somewhat stabilized in recent years, local rail system deficiencies have been identified that could impact the operating efficiency of the rail lines and the level of service provided.

The greatest concern for rail operations within the MPA are safety problems associated with the at-grade street crossings. The potential for conflicts between rail and vehicular traffic affects the safety and the operating efficiency of both the rail line and the local street system. While the number of at-grade street crossings have been drastically reduced in recent years due to abandonments, those that remain present potential problem areas.

A review of WisDOT's crash data for car/train collisions reveals the occurrence of 15 such collisions in the MPA between 1995 and 2004. The severity of those 15 collisions resulted in six personal injuries, but no fatalities. Only one of those collisions, resulting in no personal injury, occurred at a higher traffic volume arterial street crossing on Eddy Lane. The remaining 11 collisions occurred at local road crossings and resulted in six injuries and no fatalities. Map 36 depicts the locations of the reported car/train collisions in the planning area. It is apparent from this crash data that at-grade rail crossings present a safety problem, particularly on local roads which may not warrant the same level of warning and safety devices as the higher traffic volume arterial road system.

The presence of two rail lines serving the MPA, along with significant trucking activity, would appear to warrant further investigation into the potential development of an inter-modal facility linking highway and rail freight movement. While not necessarily considered an existing deficiency in the freight rail transportation system, the development of an inter-modal facility would certainly enhance the freight movement capabilities of both rail and trucking, as well as add to the multi-modal capacity of the planning area.

Intercity Passenger Transportation

Intercity bus and commercial air passenger service provide limited travel options, placing a greater demand on the automobile to accommodate the intercity travel needs of the residents of the Chippewa-Eau Claire MPA. Intercity bus companies have continued to eliminate routes providing connections to many statewide destinations, forcing many intercity bus passengers to travel miles and hours out of their way on circuitous routes to reach their final destination. Commercial air passenger service is limited to a feeder connection to the Minneapolis-St. Paul International Airport. The limitations of the air passenger service to the Twin Cities has created a market demand for a van shuttle service between Eau Claire and the Twin Cities' airport, increasing the dependence on the highway system to move people. Market influences and other factors have resulted in limited modal options for intercity passenger travel for residents of the planning area. The automobile, the highway system and an accurate and timely traveler information system will continue to serve the intercity travel needs of planning area residents. The reliance on the automobile for intercity passenger travel places a greater emphasis on a sound maintenance program for the state's highways and the need for further improvements in the development and delivery

of pertinent information to assist travelers in making safe and efficient travel decisions.

Freight Transportation

The movement of commodities into and out of the MPA is dominated by the trucking industry. National trends have impacted freight rail and air cargo activity and have led to the decline of these services in the planning area. The lack of waterborne or inter-modal freight shipping facilities further limit the options available to area shippers.

The streets and highways that accommodate truck traffic in the planning area are subject to the capacity and maintenance problems identified previously in this chapter. In addition, the lack of designated and signed truck routes through the planning area often result in misguided truck shipments traveling on local streets, further impacting street maintenance, safety and capacity problems. The diversified locations of many of the truck destinations within the MPA can add to the confusion and routing problems for truck drivers that are not familiar with the area.

While there is currently no inter-modal facility located in the planning area, the potential for the development of such a facility should be investigated. As discussed in the freight rail section, the presence of two rail lines serving the MPA would appear to offer a reasonable potential to maximize the combined freight shipping capabilities of truck and rail.

Transportation System Impacts on Air Quality

The Chippewa-Eau Claire Metropolitan Planning Area is currently in compliance with national air quality standards. An air quality analysis performed from travel model output provides an estimate of the level of automotive emissions for carbon monoxide (CO), hydrocarbons (HC), nitrous oxide (NO_x), and particulate matter (PM₁₀) for the transportation system for the year 2030. Estimates for the existing street and highway network indicate that future vehicular travel in the planning area will produce daily emissions of 20.6 tons of CO, 0.9 tons of HC, 5.7 tons of NO_x, and 0.2 tons of PM₁₀ from the consumption of approximately 170,500 gallons of fuel per day. Projections for the 2030 Planned Network indicate a 36% decrease in fuel consumption resulting in daily emissions of 13.9 tons of CO, 0.6 tons of HC, 3.8 tons of NO_x, and 0.1 ton of PM₁₀. These emission levels represent decreases of 33%, 33%, 33%, and 50%, respectively, over the 2030 highway network without the identified improvements.

The air quality analysis determined the level of automotive-related emissions for the 2030 Existing Network under the projected population and vehicle usage

Insert Map 36
Car-Train Collisions, 1995-2004

Page 2 of map 36 here

growth scenario developed for the planning area. The analysis then compared the relative impacts of the projected emission levels in 2030 resulting from the roadway improvements identified for the planning area. The results of this analysis is presented in Table 18. The table illustrates how the vehicular impacts on air quality are directly related to the vehicle miles traveled (VMT) and vehicle hours of travel (VHT). As indicated on Table 18, the impact of the COMMITTED roadway improvements result in a significant reduction in the projected level of VMT and VHT on the road system in 2030. The increased levels of efficiencies afforded by the COMMITTED projects provide a substantial decrease in harmful automotive emissions. While the addition of the PLANNED improvements to the 2030 road network further reduce VMT and VHT, the reductions are significantly less and therefore have less of an impact on further reducing automotive emissions.

The importance of the PLANNED projects to the urban-wide transportation system must be viewed in the broader supporting role of the local arterial and collector road system. While the local arterial and collector road system does not carry as high a volume of traffic as the urbanized state highway system, its importance to the growth and development plans of local municipalities cannot be underestimated. Capacity improvements on the local arterial and collector road system represent 75% of the PLANNED network improvements identified for 2030. The expansion of key local arterials and collectors corresponds to the completion of major state trunk highway improvements on STH 29, USH 53, USH 12, and STH 93. With the completion of these major projects, the emphasis for maintaining the safe and efficient movement of motor vehicles will shift to the local road network, along with the need to accommodate increasing traffic volumes resulting from local development plans. The primary contribution of the PLANNED project is not their ability to further lower automotive air emissions, but to accommodate planned development while maintaining the emission reduction levels already attained.

Table 18			
Chippewa-Eau Claire Metropolitan Planning Area			
Air Quality Analysis – Travel Model Output			
2030 Future Year			
	2030 Existing Network	2030 Committed Network	2030 Planned Network
Vehicles Miles Traveled(VMT)	2,576,438	1,673,973	1,654,247
Vehicle Hours Traveled (VHT)	98,027	65,342	64,438
Vehicular Crashes	3.5	2.2	2.2
Carbon Monoxide Emissions (tons/day)	20.6	14.1	13.9
Hydrocarbon Emissions (tons/day)	0.9	0.6	0.6
Nitrous Oxide (Ozone) Emissions (tons/day)	5.7	3.8	3.8
Particulate Matter (tons/day)	0.2	0.1	0.1
Fuel Use (gallons/day)	170,500	111,252	109,834
User Cost (\$ for fuel & crashes)	\$461,452	\$301,142	\$297,273

NOTE: Numerical data presented as PER DAY measurements.

Source: Wisconsin Dept. of Transportation Traffic Forecasting

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