APPENDIX C

SRF No. 0034686

MEMORANDUM

TO: Todd Clarkowski, Mn/DOT
Terry Pederson, Wis/DOT

FROM: Beth Bartz
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DATE: October 27, 2003

RE: ST. CROIX RIVER CROSSING TH 36/STH 64: REVISED PROJECT NEEDS ASSESSMENT

This memorandum has been prepared through a collective effort with the Stakeholder Group to discuss the need for action, to identify project goals and to identify project objectives. This memorandum will provide the basis for the Purpose and Need sections of the 2003 Amended Scoping Document and Supplemental Environmental Impact Statement for the project. Additional information regarding transportation data discussed in this document can be found in Technical Memorandums "Downtown Stillwater Traffic Operations Study," dated December 29, 2000 and "St. Croix River Crossing Supplemental Environmental Impact Statement, Draft Technical Memorandum: Travel Demand Forecasts," dated April 30, 2003.

I. PROJECT NEED

Mn/DOT and WisDOT have identified the need to examine the future viability of the existing St. Croix River Crossing due to two factors:

- Existing and predicted increased future traffic congestion in downtown Stillwater during peak travel periods.
- Increasing unreliability and cost efficiency of the Lift Bridge as a state trunk highway facility due to structural aging and flooding.

In addition, segments of TH 36 and STH 64 exhibit higher than average crash rates for similar types of roadways.

A. Traffic Congestion in Downtown Stillwater

Intersection Operations

The Chestnut Street/Main Street intersection (see Figure 1) serves as the entry and exit point to and from the river crossing. During the weekday afternoon peak period this intersection handles, on average, 1,975 vehicles and 399 pedestrians per hour. During this peak period the intersection experiences a Level of Service (LOS) F with average delays of 129 seconds per vehicle.

Figure 1 - Stillwater Local Street System

The Nelson Street/Main Street intersection also operates at a Level of Service F during the afternoon peak hour with 119 seconds of average delay per vehicle. To the north, the Myrtle Street/Main Street intersection operates at a Level of Service D with an average delay of 43 seconds per vehicle.

Average hourly traffic counts on the river crossing conducted during July, 1998 (see Figure 2) indicate a morning peak traffic period at 6:00 a.m. and 7:00 a.m., and an afternoon peak at 3:00 p.m., 4:00 p.m. and 5:00 p.m. From this information and the level of service analysis congestion is estimated to occur, on average, a total of 4 hours each weekday.

Due to Stillwater's attractiveness as a tourist destination, the number of recreation opportunities in western Wisconsin, and the role of the St. Croix valley and the St. Croix National Scenic Riverway as a tourist and recreational destination, similar levels of congestion can also be experienced on weekends, especially during the summer season. Congestion is more typically experienced during the middle of the day during these times (see Figure 3) and is heavily influenced by community festivals as well as boat traffic on the St. Croix River and pedestrian traffic in downtown Stillwater.

Traffic diversion

Alternative routes to and through downtown Stillwater to avoid these intersections are limited by a discontinuous street system due to steep grades and ravines. Where alternate routes exist (Third/Fourth Streets, Myrtle Street) significant queues build during the afternoon peak hour as traffic attempts to avoid the TH 36 intersections at Nelson and Chestnut. Significant queues also develop on the STH 64 approach to the bridge during the peak period. Figure 4 maps the extent of queue lengths measured in July 2000. Use of diversion routes to avoid congested intersections also indicates that regional "through" traffic – traffic passing though the Stillwater area to reach destinations in western Wisconsin and beyond – has left the state trunk highway system where it is most appropriately located, and moved to local streets, increasing traffic volumes through residential neighborhoods and local commercial areas.

Travel time

The time required to travel through the project area during peak periods is another indicator of transportation mobility. Travel time studies conducted in July 2000 measured the time required to travel from the intersection of Greeley Street and TH 36 in Stillwater along TH 36 and TH 95 to the junction of STH 64 and STH 35 in Wisconsin during the weekday afternoon peak period (Wednesday – Friday, 2:30 p.m. – 6:30 p.m.). Eastbound travel times varied from 7.3 minutes (travel speed of 33 mph) to 22.4 minutes (travel speed of 11 mph) with an average travel time of 13.3 minutes (travel speed of 18 mph). Westbound travel times varied from 6.4 minutes (travel speed of 38 mph) to 22.4 minutes (travel speed of 11 mph) with an average 9.1 minutes (travel speed of 26 mph). These variations of up to 350 percent demonstrate significantly impaired mobility during the afternoon peak period.

Figure 2 - Average Weekday Hourly Traffic on the Stillwater Bridge

Figure 3 - Saturday and Sunday Hourly Traffic Volumes on the Stillwater Bridge

Figure 4 - Existing Queue Lengths During P.M. Peak Hour Bridge Raising

Travel times measured from the same origin-destination points along alternative routes (via Osgood and via Greeley) showed a similar range demonstrating that traffic has equalized between the primary and available alternative routes.

Traffic Volumes and Relation to Roadway Capacity

The congestion described above results from daily traffic volumes in excess of capacity, delays resulting from periods when the lift is raised for boat traffic, and geometric restrictions which prevent operational improvements. Average Annual Daily Traffic[1] (AADT) volumes counted on the St. Croix river crossing in 2002 were 16,300 vehicles per day. Summer season counts conducted during one week in 1999 exceeded 19,000 on a summer (non-event) weekday. The estimated (congestion-free) vehicle capacity for the current river crossing and arterial approaches is 11,200 vehicles a day.

Capacity Reduction and Delays Due to Lift Operations

Raising of the Lift Bridge for river navigation further interrupts traffic flow across the river crossing and through the Chestnut/Main intersection. During the navigation season (April through November) he Lift Bridge is raised, on average, 14 times a day with an average lift time of 6.6 minutes, although lift times exceeding 10 minutes were observed both in July 1998 and during field studies in July 2000. During the time the Lift Bridge is open, vehicle queues result along STH 64 in Wisconsin and on streets throughout downtown Stillwater and require up to 30 minutes to clear once traffic has been allowed to proceed across the Lift Bridge. Longer delays are experienced during weekends and summer months, most notably when events are scheduled in the area.

Roadway Geometrics

Restricted roadway geometrics on the river crossing and approach roadways limit abilities to increase capacity, reduce congestion and improve mobility. Limited lateral clearance caused by bridge trusses on both sides of the roadway encourages semi-trailer trucks and other large vehicles to crowd the center line limiting the capacity and travel speeds across the bridge. Geometric deficiencies also limit queuing distances between signals, effectiveness of signal improvements, and the turning movements of large vehicles. Specific geometric deficiencies are illustrated in Figure 5 and summarized as follows:

- The river crossing presently consists of one lane in each direction, which are substandard in width (less than 12 feet wide) and have no shoulders.
- Limited lateral clearance from bridge trusses encourages semi-trailer trucks and other vehicles to crowd the center line to avoid hitting the bridge structure on the sides.
- Spacing from the bridge to Chestnut and Main Streets is only 420 feet compared to 600 feet recommended for operations. Space for traffic queuing as well as for left turns at this intersection is severely restricted.

[1] Average Annual Daily Traffic is a measure of average daily traffic volume which accounts for seasonal variations in daily traffic.

Figure 5 - Geometric Deficiencies

- Restricted geometrics in downtown Stillwater limit traffic flow to one lane in each direction, limit the effectiveness of signal improvements, and severely limit the ability of larger vehicles including trucks, buses, and recreational vehicles to make turns at intersections. Capacity is further constricted by the existing narrow streets, the proximity of historic buildings to the streets, and very high levels of pedestrian traffic.
- Eastbound on TH 36, two lanes of traffic merge with one additional lane of northbound TH 95 traffic, and then are restricted to one lane heading north to Stillwater and across the river crossing. In Wisconsin, STH 64 is also a single-lane highway in each direction.
- There are several signalized intersections in Minnesota and numerous access points along the corridor in both Minnesota and Wisconsin that reduce the effective traffic capacity of the corridor.

Future Traffic Forecasts

Travel forecasts indicate that traffic volumes on the river crossing will increase to an average of 23,100 vehicles per day (with an average vehicle occupancy of 1.3 people) by 2030 under a No Build scenario. As traffic volumes on the river crossing are at a congested level during the current peak traffic periods, the peak traffic period is expected to broaden, potentially increasing hours of congestion to over 6 hours per day. (see Figure 6) This increase in volumes is anticipated to also decrease the level of intersection operations in downtown Stillwater, increasing average delay, queue lengths and travel times.

In a scenario where the TH 36 river crossing is unconstrained (i.e. not restricted by the capacity of the existing roadway system), forecast traffic volumes are expected to exceed an average of 43,000 vehicles per day. When the system is somewhat constrained, but has more capacity than existing, forecast volumes increase to an average of 36,000 vehicles per day. These forecasts indicate there is an unmet demand for crossing the St. Croix River at the TH 36 location under the No Build scenario. In other words, when a facility with a capacity less than 43,000 vehicles per day is provided, trips that would prefer to cross at TH 36 will divert to other crossings, the I-94 crossing in particular. Mobility goals are therefore not being achieved, as diverted vehicles are driving further distances and requiring more time for their trips due to capacity constraints at the TH 36 crossing. Diverted vehicles also reduce mobility in the I-94 corridor, increasing congestion and reducing capacity for future increases in traffic.

B. Facility Reliability

The river crossing is prone to frequent closures due to flooding, maintenance requirements, and vehicle incidents.

The river crossing is subject to flooding because of its low elevation requiring closure of the bridge and potentially subjecting the bridge to structural damage. Closure due to flooding has occurred several times in the past. Recent closures include a two-week period in the spring of 1997 and a four-and-a-half week period in the spring of 2001. The potential for ice floes or large floating objects to inflict serious structural damage to the Lift Bridge during high water requires monitoring of the bridge and river conditions during these periods.

Figure 6 - Existing and Forecast Traffic Volume on Stillwater Bridge

The bridge has also experienced frequent closures due to required repairs. At the age of 70+ years, the Lift Bridge is already beyond the normal operation life of a bridge structure. Recently, the Lift Bridge has been assessed to have the lowest sufficiency rating (an annual measure of structural condition) of trunk highway bridges in Minnesota. While $5 million in repairs to the Lift Bridge planned for 2005 will address some immediate needs, additional repairs as well as regular maintenance will be required in future years. A separate report presented the costs for maintenance and anticipated repairs if the Lift Bridge through the Year 2050. If unrestricted vehicle use continues, the annual operations and maintenance costs would be several times the amount for pedestrian/bicycle traffic only (estimated at $322,200 [2003 dollars] per year) and would probably significantly increase the risk of component failure, severely limiting the projected life of the Bridge.

C. Facility Safety

Three-year average crash rates in Minnesota and Wisconsin, severity rates in Minnesota, and non-fatal injury crash rates were examined to determine the comparative rate and severity of crashes in the corridor, when compared with statewide (and in Minnesota, metro-area-wide averages). Crash data for a three year period from 2000 to 2002 (inclusive) was examined.

Table 1 below shows the three-year crash rates and severity rates[2] for two segments of TH 36 in Minnesota with the comparable state and metropolitan area average crash rates and severity rates for similar types of facilities. Table 2 shows similar data over the same three year period for crash rates in Wisconsin, with the non-fatal injury crash rates shown (severity rates are not typically used by Wis/DOT).

The data shows that the crash rate in the western segment of the corridor is approximately equal to the statewide and metropolitan-area averages, the crash rate in the middle segment exceeds (is nearly double) the state and metro area averages, and the crash rate in the eastern segment (the Wisconsin approach road), is approximately 60 percent greater than the statewide average. Crash rates that are double the comparable averages should be noted, as they can indicate deficiencies on a system contributing to unsafe conditions.

The severity rates in Minnesota were higher than the state and metropolitan area average for the segment closest to the river. The non-fatal injury crash rates in Wisconsin were 30 percent greater than the state-wide average.

[2] Severity rate is a weighted average taking into account fatal crashes, personal injury crashes and property damage crashes.

TABLE 1
3-YEAR AVERAGE MINNESOTA (TH 36) CRASH AND SEVERITY RATES [(1) (2)]

	Roadway Crash Rate	State & Metro Average Crash Rate	Roadway Severity Rate	State & Metro Avg. Severity Rate
TH 36 from TH 5 to TH 95	1.8	1.9	2.6	2.9
TH 36 from TH 95 to the Lift Bridge	**4.4**	2.3	**5.6**	3.4

Data Source: Mn/DOT's Transportation Information System Database.

TH 36 rates exceeding the state/metro area average are shown in **bold.**

(1) For these highway segments, the statewide average crash and severity rates are the same as the metropolitan area average crash and severity rates. This is commonly the case, as the averages take into consideration the type of facility as well as the traffic volumes.

(2) Number of crashes per million vehicle miles of travel.

TABLE 2
WISCONSIN (STH 64) CRASH RATES & NON-FATAL INJURY CRASH RATES [(1) (2)]

	STH 64 Crash Rate	State Average Crash Rate	STH 64 Non-Fatal Injury Crash Rate	State Average Non-Fatal Injury Crash Rate
3 Yr. Avg.	**1.7**	1.1	**0.64**	0.44

Data Source: Wisconsin DOT.

STH 64 rates exceeding the state average are shown in **bold.**

(1) Number of crashes per million vehicle miles of travel.
(2) Wisconsin data excludes deer/vehicle crashes.

II. PROJECT GOALS

A. Project Proposal

Mn/DOT and WisDOT are responsible for providing transportation mobility on the state trunk highway system in a safe, reliable and cost-efficient manner and for integrating environmental, economic, social and historic resource concerns into transportation solutions. Additional emphasis on the mobility of this roadway have been placed on TH 36 east of I-694 through its

designation as a Interregional Corridor in Minnesota's *Statewide Transportation Plan*, on STH 64 through its designation as a Multi-Lane Connector in the Wisconsin *Corridors 2020 Plan*, and on both roadways by their placement on the National Highway System by FHWA.

Therefore, Mn/DOT and WisDOT, in cooperation with FHWA, propose to improve mobility on Minnesota TH 36 and Wisconsin STH 64 in the Stillwater-Houlton area by improving the state trunk highway system, potentially including a new river bridge, roadway expansion, geometric improvements, and/or transit improvements, while also addressing environmental, economic, social and historic resource concerns.

B. Project Goal

The goal is to manage congestion and improve mobility in a reliable, safe and cost efficient manner as part of a broader program of regional transportation improvements while avoiding (and when unavoidable, minimizing and mitigation for) impacts to the area's social, economic, cultural and environmental needs and objectives.

C. Project Area

Due to concerns raised by the cities of Oak Park Heights and Stillwater to potential traffic impacts to TH 36, frontage roads, and adjoining local roadways, an area to the west of a potential new river crossing ending at TH 5 will be included in the project area. Due to similar concerns in the Houlton community area, the project area will be continued to the east along STH 64 terminating at 150th Avenue west of Somerset, Wisconsin, where STH 64 has recently been expanded to 4-lanes. The project area will then be defined as the TH36/STH 64 roadway between TH 5 in Minnesota and 150th Avenue in Wisconsin, including all potential realignments for this roadway identified in the Scoping Document, the north and south frontage roads between TH 5 and Osgood Avenue in Stillwater/Oak Park Heights, potential interchange areas, and areas of improvements to local roads needed to continue access to developed property or local road realignment needed to accommodate the proposed design of a new TH 36/STH 64 facility. While the project area may change slightly to accommodate the elements described above as specific alternative designs are developed, the general project area is illustrated in Figure 7.

Study areas related to specific environmental issues (e.g. noise impacts, cumulative impacts, historic resource "Areas of Potential Effect") will be defined specifically for each issue analysis in the Supplemental EIS.

D. Project Objectives

The following project objectives have been established by the Stakeholders' Group as performance measures relating to the project purpose which can be used to evaluate existing conditions and project alternatives.

Figure 7 - General Project Area

Measurable Objectives related to Project Need

The following objectives have been identified as measurements of improving transportation needs as identified above.

- Sufficient intersection capacity and geometrics to accommodate 2030 average weekday afternoon peak hour traffic volumes at a Level of Service (LOS) B[3] if possible, with a minimum LOS C.
- Reduced volumes of regional "through" traffic on local streets.
- Sufficient roadway capacity and geometrics to accommodate 2030 average annual daily traffic (AADT) volumes.
- Reduced travel times during the weekday afternoon peak hour.
- Consistency of travel times during typical conditions.
- Fewer facility closures due to weather conditions (snow, ice, flooding) or facility maintenance or repairs.
- Fewer facility closures due to vehicle crashes or other incidents.
- Crash rates at or better than state average for facility type.
- Transportation benefit/cost ratio greater than or equal to 1.0.[4]

Additional Transportation Objectives

In addition to the measurable objectives related to the Project Need listed above, the following additional transportation objectives have been identified as necessary to fulfill Mn/DOT's and WisDOT's agency responsibilities to providing a state transportation network.

- Efficient access to other regional roadways (Minnesota Trunk Highway 95 and Wisconsin State Trunk Highway 35).
- Access to local arterials and collectors where appropriate.
- Provision of alternative mode facilities (bus, rail, pedestrian, bicycle) where they address a demonstrated need and are found to be cost effective.
- TH 36/ STH 64 mobility improvements should contribute to improvements in regional mobility, not simply transfer congestion problems from one location to another.
- Protect public rights to free navigation on the St. Croix River.

[3] Level of Service (LOS) is a indicator of intersection operations measuring an average delay per vehicle entering an intersection using the letters A - F, with LOS A representing minimal delay and LOS F represented significant vehicle delays.

[4] Includes measures of transportation performance such as vehicle miles traveled and vehicle hours traveled as compared estimated project costs. Additional information regarding the Benefit/Cost analysis methodology.

Environmental, Social and Historic Resource Objectives

While the integration of environmental, economic, social and historic resource concerns is always a necessary part of the DOT's work, it is of particular importance and sensitivity due to unique resources present within the project area. The project area contains the unique resources of the Lower St. Croix National Scenic Riverway – a waterway nationally recognized for its remarkable scenic, recreational and geologic values – as well as numerous historic resources reflecting the area's rich history as the "birthplace" of Minnesota.

The following objectives have been identified regarding these concerns:

- Support the outstandingly remarkable values of the Lower St. Croix National Scenic Riverway (scenic, recreational and geologic).
- Maintain, or potentially enhance, the visual integrity of the Lower St. Croix National Scenic Riverway.
- Maintain, or potentially improve, the existing water quality of the St. Croix River Watershed.
- Maintain, or potentially improve, the existing air quality of the St. Croix River Valley.
- Respect the integrity of area cultural resources including the Lift Bridge, the Stillwater Commercial Historic District and the Stillwater Cultural Landscape District.
- Avoid, or if not possible, minimize, impacts to area parklands including Lowell Park and Kolliner Park and future parklands at the Aiple property, the St. Croix Scenic Overlook, the Cover Park/ Xcel parkland dedication area, the recently donated parkland at Second and Nelson Streets in Stillwater and other parklands identified in the study area.
- Avoid, or if not possible, minimize impacts to the channel, shoreline and bluffs of the Lower St. Croix National Scenic Riverway.
- Avoid, or if not possible, minimize, impacts to threatened and endangered species.
- It is necessary to avoid and, if unavoidable, minimize impacts to business and property owners, residents and visitors throughout the project area.
- Avoid, or if not possible, minimize, impacts to land use plans of local communities.

The need to avoid, or if unavoidable, minimize impacts on national scenic riverways, park lands, cultural resources, wetlands, threatened and endangered species as well as other social, economic and environmental resources have been recognized by state and federal laws, regulations, and policies governing roadway design and construction. These laws, regulations and policies as well as the existing conditions and potential impacts of project alternatives will be discussed in the Draft Environmental Impact Statement.

BAB/