

**SECTION 1  
PURPOSE AND NEED**

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The Purpose and Need describes the reasons why the project is being considered. The Purpose and Need for the WIS 23 corridor remains the same as stated in the 2014 Limited Scope Supplemental Final Environmental Impact Statement (2014 LS SFEIS). The supporting information regarding the needs has been updated to reflect current conditions. This LS SEIS has the following updates:

- The traffic forecasts were updated with a horizon (design) year of 2040.
- The variables used in the traffic forecasts were updated and made corridor specific.
- The crash analysis was updated and follows a new format.
- Variables used in the operations analysis were updated and made more corridor specific.

## 1.1 PROJECT LIMITS AND BACKGROUND

### A. Project Limits

The Wisconsin State Highway (WIS) 23 study evaluates a 19.1-mile section of rural highway that spans from US Highway 151 (US 151) in Fond du Lac County to County P in Sheboygan County, Wisconsin. The study seeks to investigate alternatives to improve traffic operations and safety for this primarily 2-lane corridor. Figure 1.1-1 shows the study limits.



**Figure 1.1-1 2018 LS SEIS Study Limits**

Except for the western 1-mile 4-lane section, the majority of WIS 23 is a rural 2-lane highway with a posted speed of 55 miles per hour (mph). The 2018 LS SEIS study corridor begins at the US 151/WIS 23 interchange, on the east side of the city of Fond du Lac. The highway then extends 19.1 miles east to County P on the northwest side of the city of Plymouth. East of County P to WIS 67 in Plymouth, WIS 23 was expanded to four lanes in 2004 and 2005. WIS 23 from WIS 67 to I-43 in the city of Sheboygan was previously expanded to four lanes. This leaves the Fond du Lac to Plymouth section as the remaining 2-lane segment between US 151 in the city of Fond du Lac and I-43 in the city of Sheboygan.

The project limits represent logical termini, spanning from one major US Highway (US 151) to a County Highway (County P) where the existing 4-lane WIS 23 begins. The 19.1-mile corridor is also of sufficient length to address environmental matters on a broad scope. The study corridor and range of alternatives being evaluated also have independent utility. The improvements would provide benefits that are usable to WIS 23 travelers and are a reasonable expenditure of funds even if no other transportation improvements are made in the surrounding area.

B. Background

Evaluation of this portion of the WIS 23 corridor started in 2003 and extends through this document. Within that time the Wisconsin Department of Transportation (WisDOT) and Federal Highway Administration (FHWA) prepared and released Environmental Impact Statements and Supplemental Environmental Impact Statements. The following timeline summarizes key events in the study history.

<u>October 1999</u>	Wisconsin State Legislature enumerates WIS 23 as a major project and authorizes WisDOT to begin construction. <sup>1</sup>
<u>November 2003</u>	Notice of Intent published.
<u>November 2004</u>	WisDOT and FHWA release a Draft Environmental Impact Statement (DEIS) for the WIS 23 corridor.
<u>December 2009</u>	WisDOT and FHWA release a Supplemental DEIS (SDEIS) to address added alternative components such as multi-use path, interchanges, and access management measures.
<u>June 2010</u>	WisDOT and FHWA release a Final Environmental Impact Statement (FEIS) for the WIS 23 corridor.
<u>September 2010</u>	WisDOT and FHWA issue a Record of Decision (ROD) for WIS 23 project, selecting a 4-lane expansion (Preferred Alternative) for implementation.
<u>June 2011</u>	1,000 Friends of Wisconsin files a complaint against WisDOT and the US Department of Transportation in the US District Court, Eastern District of Wisconsin.
<u>July 2013</u>	WisDOT and FHWA release a LS SDEIS that identified 4-lane expansion as the Preferred Alternative.
<u>March 2014</u>	WisDOT and FHWA release a combined Limited Scope SFEIS/ROD. The Limited Scope SFEIS identified 4-lane expansion as the Preferred Alternative. The ROD selects a 4-lane expansion as the Preferred Alternative.
<u>August 2014</u>	1,000 Friends of Wisconsin file an amended complaint.
<u>May 2015</u>	US District Court, Eastern District of Wisconsin vacates WIS 23 ROD.
<u>May 2015</u>	WisDOT cancels let construction project.
<u>April 2016</u>	WisDOT and FHWA's request to reinstate ROD is denied.
<u>November 2016</u>	WisDOT appeals and argues before US Court of Appeals, 7th Circuit to reinstate the ROD.
<u>June 2017</u>	US Court of Appeals, 7th Circuit dismisses appeal for jurisdictional reasons.
<u>August 2017</u>	WisDOT and FHWA publish Notice of Intent to prepare a new LS SEIS.

WisDOT and FHWA are preparing this new 2018 LS SEIS to evaluate and provide additional analysis on new or changed impacts since the March 2014 LS SFEIS. This 2018 LS SEIS will:

- Update and explain the methodology used to develop the traffic forecasts.
- Explain the role of demographic data in traffic forecasts.
- Address new or changed impacts to the human and natural environment since the March 2014 LS SFEIS.
- Review the evaluation of reasonable alternatives in light of updated demographic, traffic, and environmental data.

This 2018 LS SEIS was prepared in accordance with Title 23, Part 771.130 (a-d, f) of the Code of Federal Regulations (23 CFR 771.130).

<sup>1</sup> Wisconsin State Statute 84.013(3)(ra)

## 1.2 PROJECT PURPOSE

The purpose of the proposed action is to provide additional highway capacity [i.e., to provide appropriate and effective Level of Service (LOS)<sup>2</sup>] to serve existing and projected traffic volumes and improve operational efficiency and safety for local and through traffic while avoiding or minimizing environmental effects.

Objectives for a proposed action on WIS 23 include the following:

- Preserve the corridor for future transportation needs by coordinating local governmental land use plans with transportation improvement plans. These plans include nonmotorized transportation accommodations. Proper planning will help alleviate development pressures on WIS 23 while addressing environmental issues for the future highway project.
- Provide a safe and dependable highway connection to and from regional communities while reducing conflicts between local and through traffic.
- Improve the highway facility to meet current design standards for this Connector Route in Corridors 2030, part of the *Connections 2030 Statewide Long-Range Transportation Plan*.<sup>3</sup>
- Provide system continuity between the city of Sheboygan and the city of Fond du Lac. WIS 23 is a major east-west connecting highway between these population centers of east central Wisconsin.
- Improve safety at intersections, private driveways, and farm crossings.
- Increase the mobility by adding capacity (i.e., to provide appropriate and effective LOS) and minimizing public and private access.
- Improve the operational efficiency of the WIS 23 corridor, appropriate for the highway's function as a Corridors 2030 Connector route, promoting regional and statewide economic development.
- Maintain a rural highway-type facility while addressing the increased traffic needs of the expanding urban areas.
- Provide accommodations for nonmotorized transportation.
- Preserve right of way needed for future grade separations and interchanges so future safety improvements are easily implemented.

## 1.3 PROJECT NEED

This WIS 23 corridor study seeks to meet the long-term transportation needs of the highway and region. The proposed transportation facility should fulfill the following objectives and address the following deficiencies.

### A. System Linkage and Route Importance

WIS 23 is part of the National Highway System (NHS) as designated under the 1998 *Transportation Equity Act for the 21<sup>st</sup> Century* (TEA-21) and remains on the NHS under the FAST Act. NHS routes serve major population centers, intermodal transportation facilities, and major travel destinations and provide connections to the national defense highway network. WIS 23 provides an NHS link between two other north-south NHS routes (I-41 and I-43) providing alternate options for travel between major travel destinations to the north and south.

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<sup>2</sup> LOS is a measure of traffic congestion which ranges from A (excellent conditions) to F (extremely congested conditions)

<sup>3</sup> The Connections 2030 Long Range Transportation Plan includes Corridors 2030, the identification of a series of system-level priority corridors that are critical to Wisconsin's travel patterns and support the state's economy. WIS 23 is a Connector Route in Corridors 2030, part of the Connections 2030 Statewide Long-Range Transportation Plan. Additional information is available at: <http://wisconsindot.gov/Pages/projects/multimodal/c2030-maps.aspx>

WIS 23 is a state-designated long truck route. This designation further demonstrates its importance to commercial and economic development interests within the state. Trucks accounted for 22 to 26 percent of the average daily traffic (ADT) along the corridor based on counts performed in summer 2017.<sup>4</sup> WIS 23 is identified in the *Connections 2030 Statewide Long-Range Transportation Plan* as a Corridors 2030 Connector route (see Corridors 2030 map, Figure 1.3-1). Connector routes are 2-lane and 4-lane highways that connect key communities and regional economic centers to the Corridors 2030 Backbone routes. Backbone routes are a network of key multilane routes that connect major population and economic centers and provide economic links to national and international markets.

As a Connector route within this network, WIS 23 is a major link between Sheboygan and Fond du Lac and connects the Backbone routes of I-43 and I-41. When combined, these highways connect Sheboygan and Fond du Lac to other population, manufacturing, and trade centers such as Green Bay, Oshkosh, Madison, and Milwaukee, Wisconsin, and Chicago, Illinois.

The 115-mile Connector route link from the Madison metropolitan area to Sheboygan and nearby recreational areas travels on 4-lane divided expressways and freeways except for the 2-lane section of WIS 23 addressed in this document. Of the 33 miles between US 151 in Fond du Lac to I-43 in Sheboygan, 15 miles is already a 4-lane divided expressway facility and the remaining 18 miles between County K and County P is a 2-lane roadway (see Figure 1.3-2). As a Connector route and NHS route, WIS 23 should be upgraded in accordance with criteria that adequately serve the existing and planned future traffic of the highway in a manner that is conducive to safety, durability, and economy of maintenance.

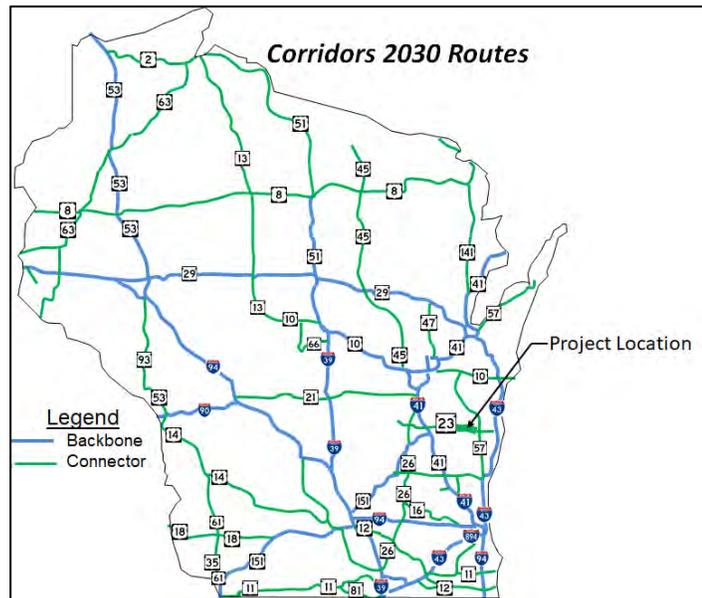


Figure 1.3-1 Corridors 2030 Routes

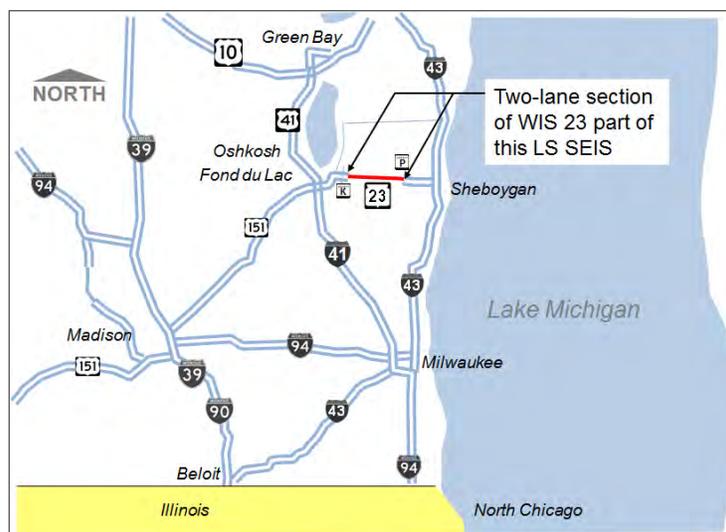


Figure 1.3-2 4-Lane Highways in Southeast and South Central Wisconsin

<sup>4</sup> The percentage of truck traffic in the 2014 LS SFEIS was based on 2009 vehicle classification data provided in the July 2012 traffic forecasts, which was for one location along WIS 23. For the analysis presented in this document, the daily and peak hour truck percentages were determined using data from short-term roadway counts performed in summer 2017, with the number of trucks (vs percentage) confirmed with Automated Traffic Recorder data. See Appendix A for more information.

### B. Transportation Demand/Regional Economic Development

WIS 23 provides a connection to economic sectors within the eastern Wisconsin region such as manufacturing, tourism, recreation, agriculture, and trade. Over \$20 billion worth of commodities originate or terminate in Fond du Lac and Sheboygan Counties.<sup>5</sup> WIS 23 provides important access to local businesses, with over 500 businesses located within 2 miles of the study corridor.

WIS 23 is an important freight corridor. It is estimated that in 2018, almost 2 million tons of freight valued at \$2.2 billion will have traveled on WIS 23 in Fond du Lac and Sheboygan Counties.<sup>6</sup> The daily truck percentage along the two-lane portion of WIS 23 ranges from 22 to 26 percent and peak hour truck traffic ranges from 13 to 17 percent for the two-lane portion of WIS 23. The share of truck traffic relative to all traffic on the corridor at these percentages is considered high. Increasing travel time and traffic hazards contribute to higher transportation costs for both commuters and truck traffic. Increased travel and shipping costs result in higher product costs. This makes existing local businesses less competitive and less likely to expand and makes it more difficult for communities in the region to attract new business and industry.

Highway improvements that lower transportation costs and increase accessibility create a positive perception of the region, increase its competitiveness, and enhance economic development opportunities. Certain industries may be attracted to corridor communities because of improved access to population centers, suppliers, or buyers. Conversely, failing to improve the existing deficient access conditions may prevent new business and employment opportunities from locating within the corridor. Local business groups indicated at the indirect and cumulative effects workshops that they have difficulty attracting industry and business investment to areas served by the 2-lane WIS 23 corridor.

Improved travel routes to recreational facilities benefit tourism in east central Wisconsin recreational areas through reduced travel time, increased safety, and more relaxed and predictable travel. Recreational destinations such as Elkhart Lake (in Plymouth), the golf courses of Kohler, and state parks and forests have been successful in drawing local, state, national, and international visitors. Future international events at these venues may draw even more travelers that will use WIS 23.

### C. Legislative and Transportation Planning History

In March 1989, WisDOT submitted its *Corridors 2020 Plan* to the Governor that described proposed Backbone and Connector components of the state's highway system. The purpose of the *Corridors 2020 Plan* was to create a network of superior quality highways to foster economic development and meet intercity mobility needs into the 21st century. As mentioned, WIS 23 was identified in the *Corridors 2020 Plan* as a Connector route and is functionally classified as a rural principal arterial.

As a Corridors 2030 Connector route, WIS 23 should meet current standards for roadway width, LOS, and alignment. An improved WIS 23 that meets these standards will meet the transportation needs of east central Wisconsin and integrate its economy and communities with the rest of Wisconsin and the nation.

In August 1989, WisDOT adopted a statewide plan for mapping access on the state highway system. The purpose of the access plan is to provide a high LOS for through traffic while providing reasonable access to abutting properties. The plan identified *Corridors 2020* (now *Corridors 2030*) Connector routes, like WIS 23, as highways for which managed access is essential for maintaining high LOS.

The Wisconsin State Legislature in the 1999 Biennial Budget enumerated WIS 23 as a major project. Authorization for a major project along the portion of WIS 23 from WIS 67 to US 41 in Sheboygan and Fond du Lac Counties is found in Wis Stats 84.013(3)(ra).

In October 2009, WisDOT released the *Connections 2030 Statewide Long-Range Transportation Plan*.<sup>7</sup> WIS 23 remains a Connector in Corridors 2030, which is included in the *Connections 2030* plan. Additionally, WIS 23 was designated a system-level priority corridor, named the Kettle Country Corridor.

In WisDOT's 6-year Highway Improvement Program, 2017-2022, WIS 23 is programmed for 2019 to 2021.<sup>8</sup>

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<sup>5</sup> 2015 IHS Transearch Database

<sup>6</sup> From freight component of the statewide travel demand model (model run in January 2018)

<sup>7</sup> <http://wisconsindot.gov/Pages/projects/multimodal/c2030-plan.aspx>. Accessed April 19, 2018.

<sup>8</sup> <http://wisconsindot.gov/Documents/projects/6yr-hwy-impr/maj-hwy/majorlist.pdf>. Accessed May 7, 2018

In the 2017 Wisconsin Budget, Wisconsin Act 59, Section 9145(2i), the legislature allocated construction contract let savings, up to \$19.4 million for the initial construction activities associated with WIS 23 in the 2017-2019 biennium.

In addition to statewide legislative and planning efforts, WisDOT strives for consistency and compatibility with local land use and transportation plans.

#### D. Existing and Future Traffic Volumes and Resulting Operation

##### 1. Traffic Volumes and Composition

For this WIS 23 study, traffic volumes are expressed as average annual daily traffic (AADT). The AADT volumes reflect average annual traffic conditions that account for daily and seasonal variations. The most recent traffic volumes, also referred to as the existing traffic volumes, were derived from WisDOT traffic count data taken during the summer of 2017 (see Appendix A and Appendix B).

The Northeast Region Travel Demand Model (NERTDM) was a key tool used in developing the traffic forecasts for this WIS 23 study. The NERTDM is based on current and projected land uses as well as existing and projected roadway networks. The computerized NERTDM uses Traffic Analysis Zones (TAZs) that produce trips on a computerized roadway network that distributes the trips. The model is validated and calibrated to existing travel patterns/volumes. Key inputs into the NERTDM include current and future households and employment. Roadway network inputs include speed, roadway classification, and number of lanes.

WisDOT, in close coordination and consultation with FHWA, agreed that the traffic forecasting analysis developed for and presented in this WIS 23 study incorporate information from the NERTDM. The traffic forecasting results are presented in Appendix B.

Since the 2012 forecasts used in the 2014 LS SFEIS, WisDOT has updated the NERTDM with updated Wisconsin Department of Administration (DOA) household forecast estimates, applied to TAZs. Other informational updates are not limited to and include:

- DOA 2040 household projections, released on April 11, 2014, for each municipality and county in Wisconsin. WisDOT worked with local land use and transportation officials to distribute the projected households to TAZs that are likely to develop by the horizon year.
- Base year employment data from the Wisconsin Department of Workforce Development and ESRI Business Analyst. WisDOT worked with local land use and transportation officials to distribute the current data to the TAZs.
- Future year employment data, primarily from Woods & Poole Economics, Inc. WisDOT worked with local land use and transportation officials to assign employment to TAZs that were likely to support the added employment in the horizon year.

The latest planning assumptions for residential and business land uses and household demographics were included in the forecast and operations analyses. This means the most accurate forecasts and operations results at the time of analysis are included in this 2018 LS SEIS.

Figure 1.3-3 illustrates the 2040 AADT volume forecasts for WIS 23 in the No-Build Alternative. The traffic counts performed in 2017 were generally lower than traffic counts performed on the corridor in 2012 and 2015. Even though traffic counts have gone down, the NERTDM indicates moderate future growth along the WIS 23 corridor.

The lower 2017 traffic counts combined with an updated NERTDM resulted in lower No-Build traffic volume forecasts than what were shown in the 2014 LS SFEIS.

Appendices A and B provide more detail regarding changes in the forecasting and operations analyses process.

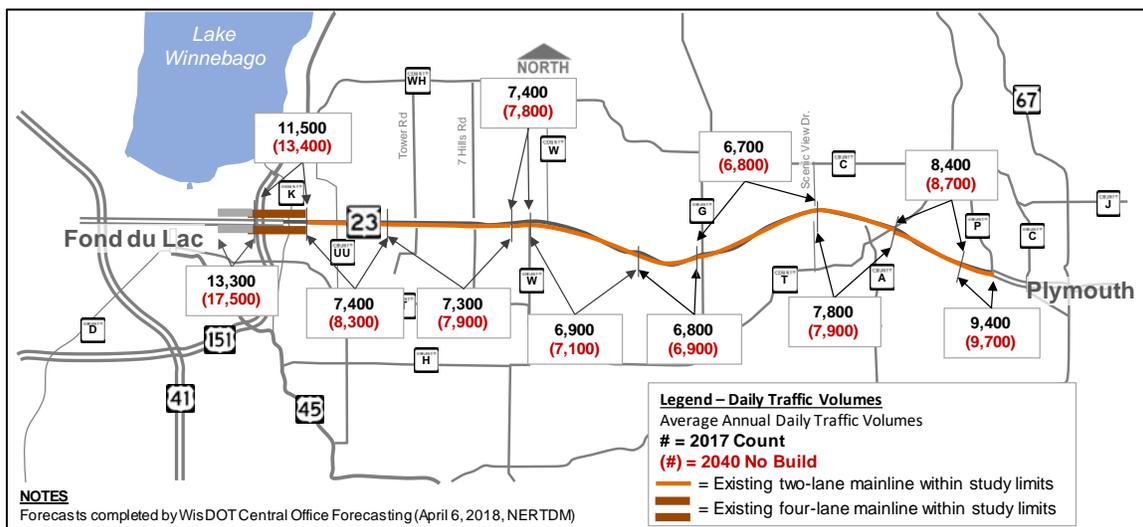


Figure 1.3-3 2040 WIS 23 Forecasts for No-Build Condition

The share of truck volume on WIS 23 is high. Daily truck volumes range from 22 to 26 percent, which provides an overall picture of the mix of traffic along the corridor. Truck volumes in the peak hour range from 13 to 17 percent, which is used in the operations analysis.<sup>9</sup> On 2-lane roadways, high truck volumes are particularly detrimental to roadway operational characteristics because passing requires use of the opposing traffic lane. The high number of trucks create “platoons” of traffic where vehicles are not able to travel the free-flow speed and have difficulty passing. The truck traffic limits the overall capacity of the existing road with the inability to pass, creating conflicts with slower local traffic, recreational vehicles, vehicles towing trailers, and farm machinery. Feedback from public involvement meetings indicated WIS 23 vehicles pass at inopportune times or with insufficient gaps. This mixture of traffic impedes traffic flow creating unsafe situations, lowers the efficiency of the roadway, and does not meet the goals of a *Corridors 2030 Plan* connector route.

2. Operation Levels

Roadway LOS is a measure of how well a highway serves the travel demands placed on it. Traffic and roadway design factors, such as AADT volumes, peak-hour volumes, peak-hour truck percentages, number of driving lanes, lane widths, vertical grades, passing opportunities, and number of access points, affect the mainline LOS. LOS ranges from A to F in order of decreasing operational quality. Each

<sup>9</sup> See Appendix A for more information on how truck percentages are used in the operations analysis.

LOS also corresponds to a numerical range that allows for more detailed comparison within each LOS level. Figure 1.3-4 describes the characteristics of the LOS levels for 2-lane roadways.

Level of Service	Flow Conditions	Percent Time Spent Following	Technical Descriptions
<b>A</b> 1.01-2.00		<35%	Highest quality of service. Free traffic flow with few restrictions on maneuverability or speed. <b>No delays</b>
<b>B</b> 2.01-3.00		35-50%	Stable traffic flow. Speed becoming slightly restricted. Low restriction on maneuverability. <b>No delays</b>
<b>C</b> 3.01-4.00		50-65%	Stable traffic flow, but less freedom to select speed, change lanes or pass. <b>Some delays</b>
<b>D</b> 4.01-5.00		65-80%	Traffic flow becoming unstable. Speeds subject to sudden change. Passing is difficult. <b>Some delays</b>
<b>E</b> 5.01-6.00		>80%	Unstable traffic flow. Speeds change quickly and maneuverability is low. <b>Significant delays</b>
<b>F</b> >6.00		Demand Exceeds Capacity	Heavily congested traffic. Demand exceeds capacity and speeds vary greatly. <b>Considerable delays</b>

Adapted from Caltrans graphic  
<http://www.dot.ca.gov/ser/downloads/LOS/LOS%20for%20two%20lane%20highways.gif>

**Figure 1.3-4 2-Lane LOS**

The operational analysis performed for this 2018 LS SEIS uses updated traffic variables that more accurately represent the traffic characteristics of this WIS 23 corridor than the analyses incorporated into the 2014 LS SFEIS. Specifically:

- The design hour factor (K), which is the percentage of the daily traffic that occurs during the peak hour, previously was based on statewide data of similarly classified roads. For the analysis presented in this document, the design hour factor was determined using data from an automatic traffic recording (ATR) station that lies on WIS 23 about 8 miles east of Plymouth. WisDOT Facilities Development Manual (FDM) policy recommends using the most applicable continuous traffic count site locations, or ATRs, for determining the design hour factors.<sup>10</sup> This data was

<sup>10</sup> FDM 11-5-3.5.1.1, accessed May 7, 2018.

confirmed and supplemented with data obtained from short-term traffic counts on the corridor performed in summer 2017. See Appendix A for more information.

- The percentage of truck traffic was previously based on 2009 vehicle classification data for one site along WIS 23. For the analysis presented in this document, the daily and peak hour truck percentage was determined using data from short-term coverage counts performed in summer 2017, with the number of trucks (vs percentage) confirmed with traffic volume data from the ATR along WIS 23 about 8 miles east of Plymouth. See Appendix A for more information.

Table 1.3-1 shows the 2017 daily traffic volume and the LOS, numeric LOS, and percent time spent following another vehicle along WIS 23 during the peak hours of the day for the 2-lane portion of WIS 23. For 2-lane roads, the percent time spent following another vehicle, and in some conditions, average speed,<sup>11</sup> are the metrics that determine the LOS. The 4-lane section west of County UU currently operates at LOS A.

**Table 1.3-1 2017 Level of Service in 2-Lane Sections of WIS 23**

	County UU to County G	County G to County P
Length	9.7 miles	8.0 miles
<b>Westbound</b>		
Weighted Average Daily Volume* (both directions-vehicles per day) <b>2017</b>	7,140	7,640
% Time Spent Following	67.7%	66.3%
Numeric LOS	4.18	4.09
LOS	D	D
<b>Eastbound</b>		
Weighted Average Daily Volume* (both directions-vehicles per day) <b>2017</b>	7,140	7,640
% Time Spent Following	67.5%	64.2%
Numeric LOS	4.17	3.95
LOS	D	C

This table divides the corridor into two sections because the 2017 volumes are slightly higher east of County G. Refer to Appendix A for more detail on segmentation and information on traffic analysis inputs.

\*Weighted Average Daily Volume, needed for the traffic operations analysis, is the sum of all forecasts multiplied by the length of highway they represent, divided by the total length of the analysis segment. Refer to Appendix A for sample calculations of the weighted average daily volume.

Within the four 15-minute periods of the peak hour, some periods have higher traffic volumes than others. The Highway Capacity Manual methodology accounts for traffic volume variations within the peak hour by using a peak-hour factor. WisDOT policy, as outlined in the FDM, is to account for peak hour traffic volume variations based on existing field data when performing traffic operations analysis for existing conditions. However, because it is difficult to predict how traffic volumes will vary within an hour in the future design year, WisDOT’s FDM policy assumes uniform traffic volumes throughout the hour for the design year.<sup>12</sup> This policy accounts for the flattening of volume variation that may occur during the design hour of the design year as roadways become more congested.

Table 1.3-2 provides the LOS for projected 2040 traffic volumes. The combination of the small increase in the weighted forecast average daily volumes (2 to 7 percent) and the leveling of volumes within the peak hour contributes to a projected 2040 LOS that will be about the same or slightly better than the LOS calculated for 2017 (0.07 to 0.15 difference in numeric LOS).

<sup>11</sup> Previous NEPA documents presented the average speed as calculated by Highway Capacity Software (HCS). Analysis of probe data (GPS data from phones or vehicles) for the WIS 23 corridor indicates that travel speeds on WIS 23 vary from those predicted by HCS. The probe data speeds, from the National Performance Management Research Data Set (NPMRDS), were downloaded from June 2017 to coincide with the dates of the mainline traffic counts along the two-lane sections of WIS 23. Average speeds from the NPMRDS probe data were found to be approximately 58 miles per hour along WIS 23. Average travel speeds predicted with HCS are around 48 miles per hour for 2017 conditions. The NPMRDS travel speed data is considered more reliable than HCS by WisDOT for use in evaluating speeds and travel times along WIS 23 because the probe data reflects observed, and not predicted, travel speeds. NPMRDS probe data was not available in the 2014 for use in the 2014 LS SFEIS. See Appendix A for more explanation and calculations for how the NPMRDS probe data was used in the traffic analysis for this 2018 LS SEIS.

<sup>12</sup> FDM 11-5-3.5.2.1, Accessed May 7, 2018.

Table 1.3-2 Projected 2040 No-Build Level of Service in 2-Lane Sections of WIS 23

	County UU to County G	County G to County P
Length	9.7 miles	8.0 miles
<b>Westbound</b>		
Weighted Forecast Average Daily Volume* (both directions -vehicles per day) <b>2040</b>	7,610	7,810
% Time Spent Following	66.6%	64.9%
Numeric LOS	4.11	3.99 <sup>#</sup>
LOS	D	C
<b>Eastbound</b>		
Weighted Forecast Average Daily Volume* (both directions -vehicles per day) <b>2040</b>	7,610	7,810
% Time Spent Following	66.3%	62.0%
Numeric LOS	4.09	3.80
LOS	D	C

Refer to Appendix A for more detail on segmentation and information on traffic analysis inputs.

\*Weighted Forecast Average Daily Volume, needed for the traffic operations analysis, is the sum of all daily forecast volumes multiplied by the length of highway they represent, divided by the total length of the analysis segment. Refer to Appendix A for sample calculations of the weighted forecast average daily volume.

<sup>#</sup> The numeric LOS range for LOS C is 3.01 to 4.00, and for LOS D the range is 4.01 to 5.00. For County G to County P westbound, the 2040 No-Build LOS of 3.99 is just 0.02 away from LOS D.

The majority of the WIS 23 corridor is outside of the urban areas of Fond du Lac and Sheboygan.<sup>13</sup> For a Corridors 2030 Connector route, the desirable LOS is C, or at or below the numeric LOS of 4.0, for rural and small urban areas as outlined in the FDM.<sup>14</sup> These thresholds are based on a balance of social, environmental, and dollar costs and may not match with every traveler's perception of when congestion warrants roadway improvements. Not all portions of the WIS 23 corridor meet the desired operational standards for a Corridors 2030 Connector route.

#### E. Existing Highway Geometric Characteristics

Roadway factors, such as type of facility, lane widths, shoulder widths, lateral clearances, and horizontal and vertical alignments, influence the capacity, safety, functionality, and utility of the road. These factors include:

##### 1. Typical Section

The existing WIS 23 highway is a 2-lane rural roadway with asphalt pavement that has 12-foot-wide lanes and 10-foot shoulders west of County UU.

East of County UU, WIS 23 shoulder widths range from 3 to 8 feet, with the majority being 8 feet. Generally, the clear zones are about 22 feet in cuts and 45 feet in fills. About a half-mile of WIS 23 westbound from Coary Lane to the east end of the project limits has outside shoulders that are approximately 3-feet wide.<sup>15</sup> These geometric characteristics of the existing highway are mostly satisfactory for a 2-lane facility.<sup>16</sup> As previously mentioned, a Corridors 2030 Connector should operate at LOS C, or below numeric LOS 4.0. The current 2-lane corridor operates at LOS D and is unable to satisfy the desired LOS C for a Corridors 2030 Connector. The existing 4-lane portions of WIS 23 fall within FDM standards.

##### 2. Horizontal and Vertical Geometrics

The overall horizontal and vertical geometrics of existing WIS 23 fall within WisDOT design standards in the FDM.<sup>17</sup> However, the locations of some side roads and access points join WIS 23 in less than optimal locations, such as in horizontal curves. Horizontal and vertical curves, in

<sup>13</sup> <http://wisconsin.gov/Pages/projects/data-plan/plan-res/boundaries.aspx>, Accessed April 10, 2018.

<sup>14</sup> Facilities Development Manual 11-5-3.2.1 Congestion and Facility LOS. Accessed March 23, 2018.

<sup>15</sup> This stretch of WIS 23 within the westbound climbing lane is adjacent to guardrail has deficient outside shoulder widths. Chapter 3.4.3 of *A Policy of Geometric Design of Highways and Streets, 6th Edition (AASHTO 2011)* states that a 4-foot minimum shoulder is acceptable for climbing lanes. This is consistent with Table 1.2 in FDM 11-14-1.10.2.5, which requires a minimum of 4 feet of horizontal clearance.

<sup>16</sup> Facilities Development Manual 11-15.1.10.1 and Attachment 1.9 for clear zones. The clear zone in areas with fills (22 feet) is less than the desirable 30 feet as noted in Attachment 1.9. Accessed May 7, 2018.

<sup>17</sup> Facilities Development Manual 11-10-5 for horizontal and vertical geometric elements. Access May 7, 2018.

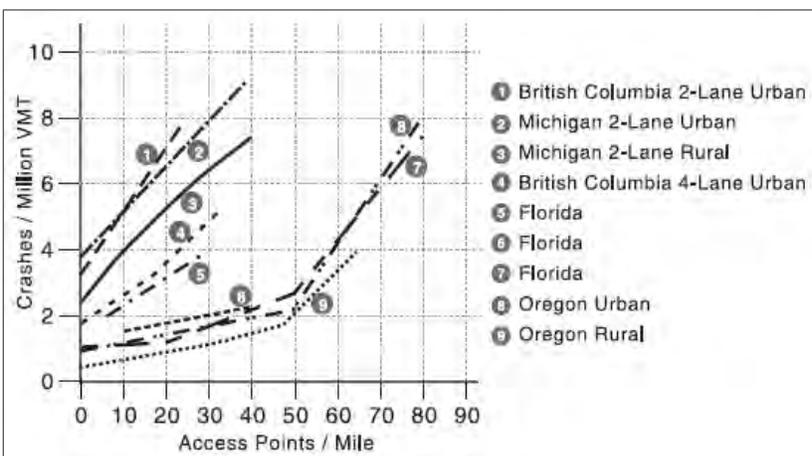
combination with the existing terrain, require portions of the roadway to be designated as no passing zones. Even when passing zones are available, traffic volumes often prevent passing opportunities on the remaining roadway because of the opposing vehicles. The inability to pass restricts speed and maneuverability for through-traffic.

#### F. Access

In August 1989, WisDOT adopted a statewide access plan for managing access on the state highway system. The purpose of the access plan is to provide a high LOS for through traffic and increase safety while providing reasonable access to abutting properties. The plan seeks to balance public investments in highway improvements, land development, tax base growth, and job creation. The plan identifies Corridors 2020 (now Corridors 2030) Backbone and Connector routes, like WIS 23, as a group of highways for which managed access is deemed essential to maintaining a required high LOS and safety. Because of the safety risks associated with access, WisDOT adopted a statewide policy for managing access on side roads. WIS 23 is a Tier 2A corridor in the State Access Management Plan (SAMP).<sup>18</sup> A goal for Tier 2A corridors is to maximize Interregional traffic movement.

Tier 2A is the second highest of the five corridor types identified in the SAMP. Tier 1, the highest tier, maximizes Interstate and Statewide traffic movement, while Tier 4, the lowest tier, balances traffic movement and property access.

There is a direct relationship between access points and crashes. Figure 1.3-5 shows trends identified under a variety of roadway conditions and environments across the United States and Canada<sup>19</sup> that shows the correlation of conflicts per mile and the crash rate on different roadway types. As access points increase, so does the crash rate. Driveways for residential and commercial properties as well as side roads are located along the entire 19.1-mile WIS 23 route. There are 235 access points within the project limits, which are summarized in Table 1.3-3.<sup>20</sup> This amounts to approximately 12.3 access points per mile. For WIS 23, 67 of the 235 access points are roadway (county or local) intersections; this is about 3.5 intersections per mile. The desirable access density of local roads for a principle arterial, such as WIS 23, is 2.6 access points per mile based on WisDOT's FDM.<sup>21</sup> For WIS 23, 168 of the 235 access points are private driveways or field entrances, which is about 8.8 access points per mile. The desirable access density of private driveways and field entrances for a principle arterial is 5.3 access points per mile.<sup>22</sup> Vehicles entering and exiting WIS 23 at access points interrupt the flow of traffic. Drivers must adjust their travel speed to accommodate entering and exiting vehicles, and each access point creates potential for conflict and subsequent crashes. One project



**Figure 1.3-5 Relationship Between Access Points and Crash Rates**

<sup>18</sup> <http://wisconsindot.gov/Documents/projects/data-plan/plan-res/samp.pdf>. Accessed April 13, 2018. The SAMP is described in Facilities Development Manual 11-7-5.

<sup>19</sup> Figure 4 from [https://safety.fhwa.dot.gov/intersection/other\\_topics/fhwasa10005/brief\\_13.cfm](https://safety.fhwa.dot.gov/intersection/other_topics/fhwasa10005/brief_13.cfm). Accessed May 5, 2018.

<sup>20</sup> This value has not been updated since the 2014 LS SFEIS to account for recent acquisitions. The recent acquisitions result in a net change of 3 fewer access points along the corridor, or a revised total of 232 access points along WIS 23.

<sup>21</sup> Facilities Development Manual 11-5-5, Attachment 5.1 Access Spacing Guidelines. Accessed May 7, 2018. For rural principal arterials, the desired access point density is 2.6 local road access points per mile or less (based on a minimum spacing of 2,000 feet between local road access points: 5,280 feet per mile / 2,000 feet per access point = 2.64 access points per mile, rounded to 2.6).

<sup>22</sup> Facilities Development Manual 11-5-5, Attachment 5.1 Access Spacing Guidelines. Accessed December 8, 2017. For rural principal arterials, the desired access point density is 5.3 private access points per mile or less (based on a minimum spacing of 1,000 feet between private access points: 5,280 feet per mile / 1,000 feet per access point = 5.28 access points per mile, rounded to 5.3).

objective is to reduce the number of hazardous movements from the sideroads/access points (left turns and crossings movements).

**Table 1.3-3 Existing WIS 23 Access Summary**

Access Type	No. of Access Points	WIS 23 Access Density (per mile)	Desirable Access Density
State Trunk Highway Intersections	0	0	--
County Trunk Highway Intersections	16	0.8	--
Local Roads and Street Intersections	51	2.7	--
<b>Subtotal</b>	67	3.5	2.6*
			<b>Desired Access Density</b>
Commercial, Residential Driveways	95	5	--
Field Entrances	73	3.8	--
<b>Subtotal</b>	168	8.8	5.3*
	235	12.3	

\*See discussion preceding this table for more information about the sources for these desired access density values.

#### G. Safety

An updated crash study report prepared for WIS 23 analyzed crashes from 2012 to 2016. In 2016 WisDOT instituted a new statewide crash rate policy that included the following changes:

- New peer group roadway categories, which are used to compare the subject highway (WIS 23) to statewide averages for similar highway types.
- The consolidation of crash severities to KAB segment crash rates. KAB is a severity measure that represents the sum of K-Level (fatal), A-Level (incapacitating injury), and B-Level (non-incapacitating injury) crashes.
- The consolidation of statewide crash rate averages into a 5-year average rather than a yearly average.

A total of 207 nondeer crashes occurred during the 5-year period from 2012 to 2016. Overall, the 2-lane portion of the corridor had a 5-year average crash rate of 57 crashes per 100 million vehicle miles traveled, which is below the 5-year statewide average crash rate for a 2-lane rural state trunk highway with AADT volumes similar to WIS 23.

While the overall corridor crash rate, excluding deer collisions, is below the statewide average for similar 2-lane rural highways, there are sections of the corridor that have higher and more severe crash rates. Table 1.3-4 summarizes the 2012-2016 WIS 23 crashes from US 151 to County P.

Table 1.3-4 Summary of WIS 23 Crashes Not Including Deer (2012-2016 Analysis)<sup>23</sup>

WIS 23 Segment	KAB Injury Crash Rate <sup>[1]</sup>		Total Crash Rate	
	WIS 23	2012-2016 Statewide	WIS 23	2012-2016 Statewide
US 151 to County K (Eastbound) <sup>[2]</sup>	25.3	48.24	228.0	400.87
US 151 to County K (Westbound) <sup>[2]</sup>	0.0	48.24	215.4	400.87
County K to Whispering Springs Blvd (Eastbound) <sup>[2]</sup>	33.3	21.57	216.1	187.67
County K to Whispering Springs Blvd (Westbound) <sup>[2]</sup>	33.3	21.57	133.0	187.67
Whispering Springs Blvd to 7 Hills Rd	12.3	18.36	57.5	90.57
7 Hills Rd to County W/Hinn Rd	27.4	18.36	68.4	90.57
County W/Hinn Rd to County W/Loehr Rd	41.1	18.36	177.9	90.57
County W/Loehr Rd to Hillview Rd	9.1	18.36	41.1	90.57
Hillview Rd to County G	7.0	18.36	42.2	90.57
County G to County T North <sup>[3]</sup>	16.9	17.53	50.8	75.77
County T North to County P/Pioneer Rd	11.1	18.36	60.2	90.57
Full Corridor US 151 to County P	14.4	<i>Not applicable (2 and 4 lane)</i>	71.1	<i>Not applicable (2 and 4 lane)</i>
Two-Lane Corridor Whispering Springs Blvd to County P	13.7	18.36	57.3	90.57

From 2012 to 2016 a total of 6 fatal crashes occurred along the corridor. These included:

- Two at intersections (an angle crash at County G and a run-off-the-road crash at Division Street).
- One approximately 500 feet east of Hilltop Drive where a westbound vehicle crossed the center line, turned sideways, and hit an eastbound vehicle.
- Two just east of 7 Hills Road, one of which involved a westbound vehicle attempting to pass a slower-moving truck hauling a boat and another that was a head-on collision between a westbound vehicle that crossed the centerline and hit an eastbound truck.
- One east of County S within the westbound climbing lane where a single vehicle lost control in snowy conditions and veered off the road.
- In addition to the fatal crashes, nine A-level (incapacitating) injury crashes and 27 B-level (non-incapacitating) injury crashes occurred along the corridor, the majority of which occurred within the two-lane portion (nine A-level and 21 B-level). WisDOT identifies A-level and B-level crashes as “Serious Injury” crashes.

<sup>23</sup> Notes:

Crash rates expressed as the number of crashes per 100 million vehicle miles traveled.

Highlighted cells represent higher than average crash rates for the WisDOT Meta-Manager Peer Group.

[1] KAB Injury Crash Rate includes K-Level (fatal), A-Level (incapacitating injury), and B-Level (non-incapacitating injury) crashes as defined by WisDOT guidance.

[2] Crash rates for these segments are expressed by direction of travel to be in conformance with WisDOT statewide crash rate calculations for divided highways. The statewide average crash rates for divided roadways differ for posted speeds of 45 mph or higher (For WIS 23, directly east of Wisconsin American Dr. = 45 mph) vs. 40 mph or lower (For WIS 23, directly west of Wisconsin American Dr. = 35 mph). Undivided highways are reported as two-way crash rates (For WIS 23, Whispering Springs Blvd. to County P).

[3] Statewide average crash rates for rural 2-lane highways vary based on the existing AADT volume of the roadway. Three thresholds are given in WisDOT’s guidance: AADT <2,000 vehicles per day (vpd), AADT between 2,000 and 7,000 vpd, and AADT over 7,000 vpd. For WIS 23, the five-year average AADT volume for all but one of the rural 2-lane segments is over 7,000 vpd. The County G to County T North segment is just under 7,000 vpd.

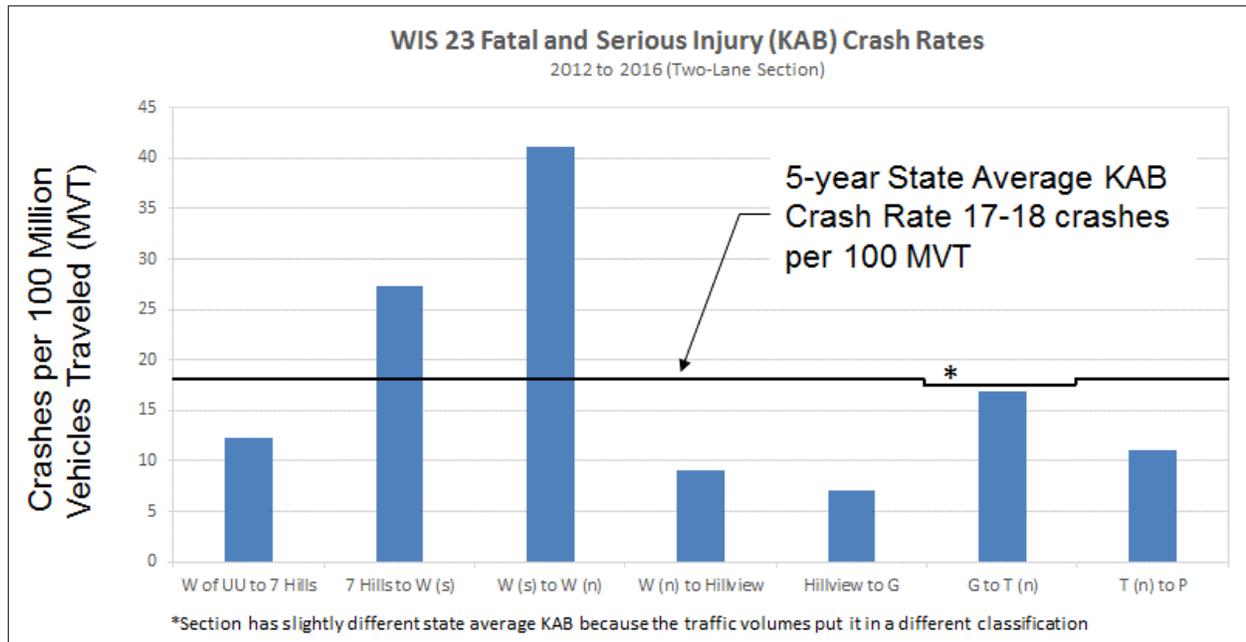
Approximately half of the KAB crashes can be tied to vehicles crossing the centerline and either colliding with another vehicle or departing the roadway altogether. Overall, 53 of the 207 corridor crashes (26 percent) involved vehicles crossing the centerline. Table 1.3-5 describes the trends associated with crashes where vehicles crossed the centerline.

**Table 1.3-5 Crashes with Vehicle Crossing Centerline (2012-2016)**

Category	Number	Percent of Total	Characteristics
Injury Severity	3	5.7%	Fatal Injury (K-level)
	4	7.5%	Incapacitating Injury (A-level)
	13	24.5%	Non-Incapacitating Injury (B-level)
Collision Type	10	18.9%	Single Vehicle (normal conditions)
	20	37.7%	Single Vehicle (wet, snowy, or icy conditions)
	15	28.3%	Sideswipe (traveling same or opposite direction)
	4	7.5%	Angle
	4	7.5%	Head-On
Other	2	3.8%	Intersection-related
	3	5.7%	Alcohol or drugs listed as potential contributing factor

Total number of crashes involving vehicle crossing centerline = 53

Figures 1.3-6 and -7 illustrate the 5-year fatal and serious injury (KAB) crash rates on sections of WIS 23 compared to the 2012-2016 5-year statewide average crash rate for similar roadways. The section of WIS 23 between 7 Hills Road and County W north has fatal and serious injury crash rates higher than the state average.



**Figure 1.3-6 WIS 23 Fatal and Serious Injury Crash Rate Compared to Statewide Average Crash Rate**

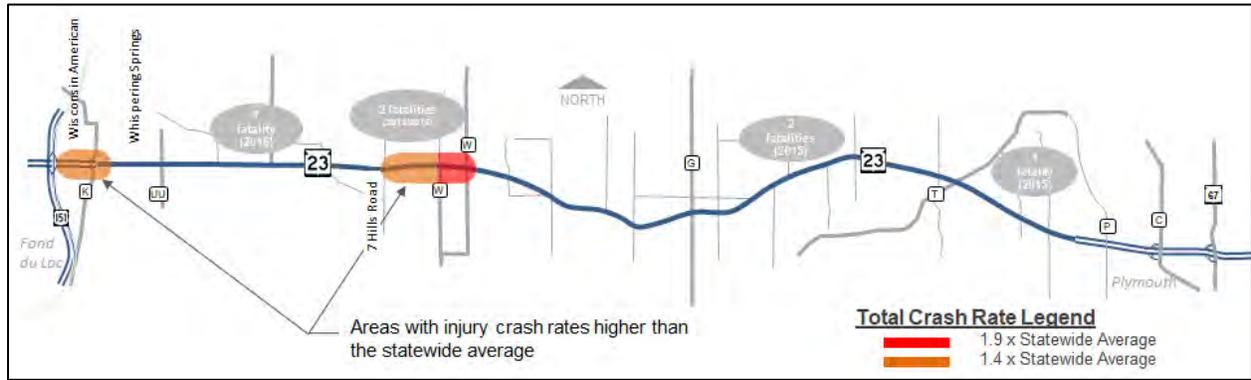


Figure 1.3-7 Areas with High Fatality and Injury Crash Rates 2012-2016

Table 1.3-6 Crash Type Frequency (2012-2016)

Number	Percent of Total	Type
5	2.4%	Head-On
13	6.3%	Sideswipe Traveling Opposite Direction
26	12.6%	Sideswipe Travelling Same Direction
29	14.0%	Angle (of which 24 occurred at intersections)
52	25.1%	Rear End (of which 13 involved stopped left-turning vehicles, 6 slowing left-turning vehicles, 2 involved farm vehicles, and 2 involved stopped or slowed school buses)
71	34.3%	Run-off-the-Road
11	5.3%	Other
Total = 207		

Of the nondeer crashes, 88, or 42 percent, were associated with intersections (Note: Intersection crashes span multiple crash types in Table 1.3-6, meaning many different crash types occurred at intersections). Intersections introduce turning movements where vehicles must cross through WIS 23 traffic. Intersections also introduce left-turning vehicles that stop in the through travel lane while waiting for a gap in traffic. This increases the opportunity for rear-end and sideswipe crashes. Intersections with the highest number of crashes from 2012 to 2016 generally correspond with intersections with the highest traffic volumes. Figure 1.3-8 schematically shows the location and number of intersection crashes, along with intersection crash rates where they have been calculated.

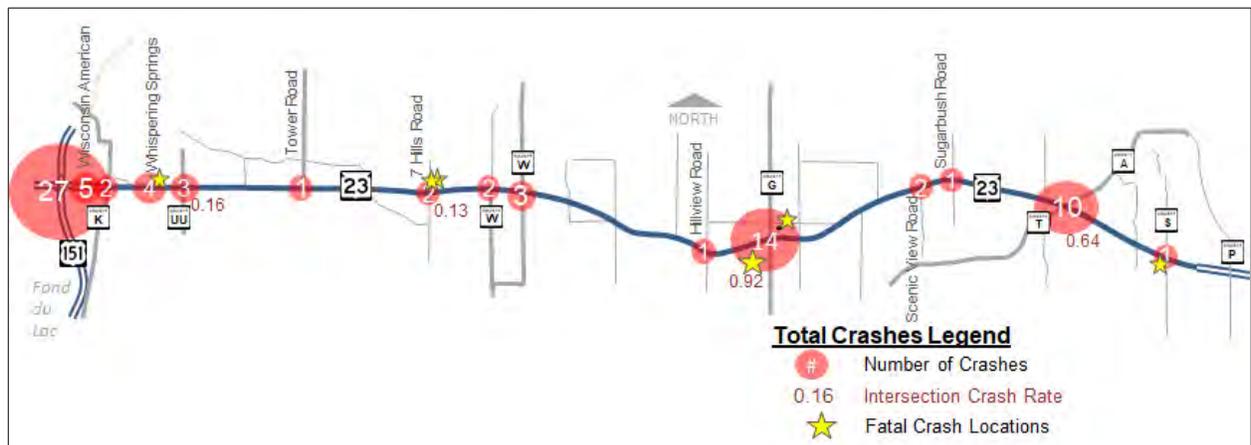


Figure 1.3-8 Intersection Crashes 2012-2016 (number per location)

Preliminary 2017 crash data was reviewed; however, corridor crash rates were not updated in this section to reflect the 5-year period of 2013-2017 because the 2013-2017 WisDOT statewide crash rates have not been finalized. With the preliminary 2017 crash data incorporated into a 5-year average, the resulting crash rate trends along WIS 23 show an increase in injury crashes. There were more KAB crashes in 2017 than in 2012, causing the five-year KAB crash rates to rise from 13.7 crashes per hundred million vehicle miles traveled (2012-2016 crash data) to 16.7 crashes per hundred million vehicle miles traveled (2013-2017 crash data). From 2012-2016 there were a total of 36 serious-injury crashes that included 68 occupant injuries (with varying occupant injury severities). In the year 2017 alone, there were 13 serious-injury crashes with 37 occupant injuries.

Many participants expressed safety concerns at the 2017 public involvement meeting and the indirect and cumulative effects workshop. Concerns cited include:

- Differences in travel speed.
- Farm equipment occupying half the travel lane, which is dangerous for both the equipment driver and the passenger vehicle.
- Drivers making passing maneuvers when there were not acceptable gaps in traffic.
- Some travelers were using alternate routes to avoid the perceived safety concerns on WIS 23.

On high-priority corridors such as WIS 23, it is desirable to reduce as many risk factors as possible that contribute to crashes, particularly at intersections.

#### H. Accommodations for Nonmotorized Travel

There are several factors that highlight the need for nonmotorized travel accommodations along the WIS 23 corridor. They include the lack of east-west facilities in the general corridor area, and the local governmental support for dedicated non-motorized accommodations along the WIS 23 corridor through resolutions and community plans.

##### 1. Background

The existing Old Plank Road Trail currently connects the city of Sheboygan with the town of Greenbush on the east 3.5 miles of the study corridor. The Old Plank Road Trail is connected to the Interurban Trail in the city of Sheboygan and the Ice Age Trail in the Kettle Moraine State Forest. It is also connected to numerous roadways that have bike lanes, paved shoulders, or planned bicycle facilities. The Old Plank Road Trail currently accommodates bicyclists, runners, walkers, in-line skaters, and horseback riders. Sheboygan County estimates there were 164,000 users of the trail in 2012. Currently there is a 16-mile gap between the end of the Old Plank Road Trail and the Prairie Trail in Fond du Lac. The Prairie Trail connects the Wild Goose State Trail south of the city and the Peebles Trail northeast of the city. If at some point the Old Plank Road Trail connected with the Prairie Trail and the Eisenbahn Trail was extended to other state trails, it would create a regional network of interconnected bicycle and pedestrian trails within Fond du Lac and Sheboygan Counties (see Figure 1.3-9).



**Figure 1.3-9 Regional Gap in Bicycle/Pedestrian Facilities**

## 2. Shortage of East-West Bicycle and Pedestrian Facilities on the WIS 23 Corridor

The 2014 LS SFEIS described the lack of east-west bicycle and pedestrian facilities along the WIS 23 corridor. Natural features along the WIS 23 corridor, including the Sheboygan River, Mullet Marsh, and the Kettle Moraine State Forest, make the local road network discontinuous in the east-west direction. For the 16-mile segment between the Old Plank Road Trail and Prairie Trail, the longest continuous stretch of east-west local roadway within 3 miles of the corridor is about 6 miles. Traveling the 16 miles from the Prairie Trail in Fond du Lac to the end of the existing Old Plank Road Trail in Greenbush, a cyclist would need to travel 19.5 miles on both WIS 23 and local roads, crossing WIS 23 twice.

The city of Fond du Lac's Comprehensive Plan includes the expansion of residential housing to County UU. There already are residential subdivisions on the north side of WIS 23 east of County K. Currently there is no good bicycle or pedestrian facility that connects these residential areas to the city's employment and retail centers. Pedestrians and cyclists must use WIS 23's road shoulder to access the central city. The shoulder widths on the existing WIS 23 facility, combined with the high traffic volumes, provide a poor bicycle LOS F.<sup>24</sup>

## 3. Local Government Support

Local governments realized the need for and importance of providing pedestrian and bicycle accommodations along the WIS 23 corridor. Many governments have expressed their support of the trail extension either by sending FHWA/WisDOT letters and resolutions in support of a trail connection and/or incorporating the trail in their official plans throughout the 14-year life of this study. The following paragraphs summarize some of the letters, resolutions, and plans that demonstrate local government support for the trail.

### a. January 2004 Fond du Lac County Resolution

Fond du Lac County sent a letter to WisDOT supporting the extension of the Sheboygan County's Old Plank Road Trail to Fond du Lac. The resolution No. 134-03, adopted January 20, 2004, supported a multipurpose recreation trail adjacent to WIS 23 between the east county line and Fond du Lac.

<sup>24</sup> Bicycle LOS was incorporated in the 2010 Highway Capacity Manual. It measures how well a roadway accommodates cyclists, with service levels ranging from A (excellent) to F (poor). Characteristics such as roadway cross section and adjacent traffic volume and speed factor into the calculation.

- b. Fond du Lac County Trail Map  
The Fond du Lac County Trail map shows the proposed WIS 23 Trail.
- c. December 2003, City of Fond du Lac Letter of Support  
The city of Fond du Lac sent a letter to WisDOT supporting the inclusion of a multi-modal facility as part of the WIS 23 project. The letter states, “it would be logical to extend the existing multi-modal trail from Greenbush to Fond du Lac as part of the upcoming project. This would not only connect two of the larger cities in this part of the state, it would also provide multi-modal connection to the trail along the US 151 Fond du Lac Bypass, and to other existing county and state trails.”
- d. 2003 Bicycle Transportation Facility Plan for the Bay-Lake Region, Bay-Lake Regional Planning Commission  
The Old Plank Road Trail extension to Fond du Lac is a listed facility improvement.
- e. March 2004 Town of Empire Resolution  
The town of Empire sent a letter to WisDOT stating that on March 10, 2004, the Town Board went on record in support of the consideration of extending the Old Plank Road Trail as part of the WIS 23 reconstruction.
- f. April 2006 WisDOT-Sheboygan County Trail Agreement  
WisDOT and Sheboygan County signed a State/County Trail Agreement. This agreement proposed that WisDOT would provide right of way for a bicycle/pedestrian trail to provide a safe traveling route for bicycles and pedestrians. Its usage would be restricted to nonmotorized transportation purposes. Sheboygan County would be responsible for surfacing the trail from its current trail end to the county line. The county would also maintain the trail and be responsible for all future operation and maintenance of the trail.
- g. 2009 WisDOT’s *Connections 2030 Statewide Long-Range Transportation Plan* for the Fond du Lac Metropolitan Planning Area  
The plan shows a trail connection or extension from US 151 south of WIS 23 east. According to the proposed future activities, under short term (2008–2013), the transportation plan supports the construction of a trail along WIS 23 from US 151 to the Old Plank Road Trail near Greenbush.
- h. 2011 Sheboygan County Comprehensive Plan  
The Old Plank Road Trail is incorporated in the plan. The plan states the proposed Old Plank Road Trail extension “would provide a connection to the City’s trail network. The length of this trail provides great connections between the cities in Sheboygan County.”
- i. 2015 City of Fond du Lac Bike and Pedestrian Plan  
The extension of the Old Plank Road Trail is incorporated into the plan. It states that the extension should be connected under US 151 to connect with the Prairie Trail.
- j. 2015 Fond du Lac Metropolitan Planning Organization Long Range Transportation/Land Use Plan Fond du Lac Urbanized Area  
The Old Plank Road Trail extension is listed in the plan, including the connection to the Prairie Trail.
- k. 2015 Sheboygan County Comprehensive Outdoor Recreation and Open Space Plan  
The extension of the Old Plank Road Trail is incorporated in the plan, with the statement, “With such prominence and visibility, continued investment into the Old Plank Road Trail will be an unwavering priority for the Planning & Conservation Department.”
- l. 2015 Sheboygan County Pedestrian and Bicycle Plan  
This plan incorporates the westward extension of the Old Plank Road Trail to Fond du Lac.

#### 4. FHWA Policy

FHWA continues to support accommodations for all modes of transportation. FHWA's policy<sup>25</sup> regarding pedestrian and bicycle accommodation includes the following verbiage:

*"The DOT policy is to incorporate safe and convenient walking and bicycling facilities into transportation projects. Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems. Because of the numerous individual and community benefits that walking and bicycling provide — including health, safety, environmental, transportation, and quality of life — transportation agencies are encouraged to go beyond minimum standards to provide safe and convenient facilities for these modes."*

### 1.4 RELATED AND ASSOCIATED PROJECTS

The WIS 23 corridor continues to experience needs while this corridor study and NEPA process is being performed. In response to these near-term and immediate needs, WisDOT has or will construct the following short-term projects.

- Access restrictions were installed at the County K/WIS 23 intersection in 2016. These restrictions prevented hazardous left-outs and through movements from the County K approaches.
- An overlay is planned for the Sheboygan portion of WIS 23 in 2018 as a short-term remedy for poor pavement conditions.

### 1.5 SUMMARY OF PURPOSE AND NEED

The purpose of the WIS 23 project is to provide additional highway capacity (i.e., to provide appropriate and effective LOS) to service existing and projected traffic volumes and improve operational efficiency and safety for local and through traffic while avoiding or minimizing environmental effects. Needs that support this purpose include:

System Linkage and Route Importance—WIS 23 is on the NHS and is a Corridors 2030 Connector route. It is a rural principal arterial between the city of Fond du Lac and the city of Sheboygan and a major east-west connecting highway between these and other population centers of east central Wisconsin. It provides a major link between I-43 and I-41. WIS 23 is a state-designated long truck route. As a Connector route and NHS route, WIS 23 should be upgraded in accordance with criteria that adequately serve the existing and planned future traffic of the highway in a manner that is conducive to safety, durability, and economy of maintenance.

Transportation Demand and Regional Economic Development—WIS 23 provides a connection to numerous economic sectors within the east Wisconsin region. It helps connect east central Wisconsin to the Fox Valley, Green Bay, Milwaukee, and Madison, Wisconsin, and Chicago, Illinois, economic centers. The current roadway does not adequately meet the regional transportation needs of these economic sectors and decreases the region's competitiveness.

Legislative and Planning History—As a Corridors 2030 Connector route in the *Connections 2030 Statewide Long-Range Transportation Plan*, WIS 23 warrants increasing attention to mobility and safety. Because of this, in the 1999 biennial budget, the legislature enumerated WIS 23 as a major project. Authorization for a major project along the portion of WIS 23 from WIS 67 to US 41 in Sheboygan and Fond du Lac Counties is found in Wisconsin State Statute 84.013(3)(ra).

Existing and Future Traffic Volumes and Resulting Operation—Portions of WIS 23 have existing and future traffic operations that warrant consideration of capacity expansion. The lack of adequate capacity creates service levels that are below desirable standards for a Connector route.

Existing Highway Geometric Characteristics—Much of the route is marked for no passing and when passing zones are available, opposing traffic volumes reduce passing opportunities and result in a lower LOS.

<sup>25</sup> United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, Signed on March 11, 2010 and announced March 15, 2010.

Access—The high number of access points impacts both highway safety and mobility. WIS 23 has greater numbers of driveway and side-road access than what is desired for a rural principle arterial. Local traffic and farm machinery enter and exit the highway from approximately 235 county and local roads, private driveways, and field access points.

Safety—While the overall WIS 23 crash rate is below the statewide average for a 2-lane rural state trunk highway, some sections particularly near high use intersections experience higher than average crash rates. The area from 7 Hills Road to County W/Loehr Road experiences fatal and injury crash rates higher than the state average. From 2012 to 2016 there were 53 crashes involving vehicles crossing the highway centerline. On high priority corridors such as WIS 23, it is desirable to reduce as many risk factors as possible that contribute to crashes, particularly at intersections.

Nonmotorized Travel Accommodations—Currently, there are no good east-west routes or accommodations on WIS 23 for nonmotorized travel between Fond du Lac's Prairie Trail and Sheboygan County's Old Plank Road Trail. Additionally, WIS 23 provides one of the few crossings of the Sheboygan River and other topographic features, yet there is a 16-mile gap on WIS 23 where pedestrian and bicycle facilities are not provided.