WISCONSIN DEPARTMENT OF
TRANSPORTATION SOUTHWEST REGION

WIS 33 CORRIDOR STUDY

US 12 TO GARRISON ROAD
BARABOO TO PORTAGE
SAUK AND COLUMBIA COUNTIES, WI
WisDOT ID: 5090-04-09

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Executive Summary

Within the study area, WIS 33 is predominantly a two-lane rural roadway with urban segments at either end. Urban segments are located in the village of West Baraboo and the cities of Baraboo and Portage. The rural segments connect the cities of Baraboo and Portage, and also include a short segment located east of the city of Portage.

WIS 33 is a Tier 2B highway in the State Access Management Plan with access encouraged primarily via at-grade public road intersections. Increased traffic volumes are expected along all segments of WIS 33, however, Levels of Service (LOS) should remain acceptable (LOS D or better) through 2046 with the exception of a few intersections in the cities of Portage and Baraboo and the rural segment near the interchanges with I-90/94 and I-39. In its entirety, WIS 33 extends east/west across Wisconsin connecting La Crosse to Port Washington and is an important regional route with connections to several interstate routes such as I-90/94, I-39, I-41, and I-43. The corridor also serves as an alternate route between I-39 and I-90/94 within the study area. In addition, WisDOT's Connections 2030 long-range transportation plan identifies WIS 33 as a possible candidate for passing lanes between I-90/94 and County T (Taft Road).

The study area contains numerous natural features including prominent rivers, hills, floodplains, forests and wetlands containing several unique and protected natural communities and species. In addition, both the cities of Baraboo and Portage have a long history dating back to pioneer days with numerous cultural and historic resources located on the WIS 33 corridor. Where cultural and natural features are absent, the WIS 33 corridor contains some of the most fertile agricultural soils in the state. The context of the study corridor provides numerous constraints that limit options for addressing safety and operational issues.

Reason for Study

WIS 33 is a part of the state highway network serving south central Wisconsin and is a direct link between the cities of Portage and Baraboo providing direct connections to US 12, I-39, and I-90/94. Within the two cities, WIS 33 acts as an arterial route providing direct access to area businesses and services for the traveling public. Experience around Wisconsin has shown that unmanaged and unprotected highways can suffer deterioration of operational efficiency and safety as traffic volumes increase or land use activities intensify. WisDOT would like to assess the long-term function of WIS 33 and be able to proactively program any necessary improvements ahead of safety and operational problems.

The study has three primary purposes:

- Collect and evaluate the existing environmental, transportation, and socio-economic data pertaining to WIS 33 within and between the cities of Baraboo and Portage.
- Prepare recommendations to preserve or improve traffic operations and safety conditions, including access, to extend the functional life of the existing highway for as long as possible without the need for capacity expansion.

- Prepare a study report (this document) to be used as a source of information for future transportation decisions related to the corridor.

There are a few specific conditions within the study area that could contribute to the need for corridor preservation along WIS 33:

- A projected increase in traffic from regional and local sources between 2016 and 2046 and changes to travel patterns as a result of other highway projects in the study area.
- Safety issues related to numerous public and private driveways within the city of Baraboo and to a lesser degree along the other segments of the highway within the study corridor.
- Declining intersection operations at some locations already experiencing excessive delay or safety challenges.
- Issues stemming from increased traffic and fewer gaps to enter WIS 33 from public road and driveway connections.

Agency Coordination and Public Involvement

Four meetings were held with agencies and local officials, two each in the cities of Baraboo and Portage as part of the needs identification and strategies development phases of the study. In addition, four public involvement meetings were held in the two cities with similar information during these two phases of the study. A stakeholder meeting was held with the City of Baraboo, and other one-on-one meetings were also conducted. Corridor newsletters were sent to abutting property owners to inform them of the opportunities to attend meetings and calls were fielded from interested individuals throughout the course of the study.

Meeting notes and comments were recorded and are attached to this report. They include local issues and priorities that were considered by the study team.

Traffic Operations

Traffic volumes are projected to increase on all segments of WIS 33 within the study area and will lead to a further reduction in gaps necessary for safe access to WIS 33 from side roads and private driveways.

Level of Service (LOS) analyses were conducted based on existing and forecasted traffic volumes for the rural segments of WIS 33 using HCS Plus software and the 2010 Highway Capacity Manual (HCM) methodology. Synchro software, which also uses HCM methodology, was used to determine LOS for the intersections within the urban segments. LOS analysis for WIS 33 determined traffic operations during the peak hour of traffic in both the morning and evening representing the periods of heaviest traffic. The existing and future peak hour LOS for the study segments is as follows:

- Between US 12 and County T (Taft Road) intersections generally operate at LOS B or better, with three notable exceptions at Mulberry, Connie, and Elizabeth Streets. In 2046 these three intersections will have approaches at LOS F, with the other intersections still operating at LOS B.
- Between County T (Taft Road) and the Wisconsin River, the rural segments of WIS 33 currently experience LOS B to LOS D. In 2046, the portion located between the two interstates will be at LOS E with the other rural portions between LOS C to LOS D.

- Within the city of Portage (Wisconsin River to the railroad overpass), most intersections on this urban segment operate at LOS B with MacFarlane at LOS C in the PM. In 2046, intersections should continue to operate at either LOS B or LOS C.
- East of the city of Portage (between the railroad overpass and Garrison Road), the mostly rural segment operates at LOS C to LOS D and will operate at LOS D in 2046. Within this segment, East Albert Street operates at LOS D in the PM and is expected to operate at LOS F in 2046 PM.

Intersections with the worst peak hour LOS or with an approach with a poor LOS within the study area include Mulberry Street, Connie Street, and Elizabeth Street in the city of Baraboo and East Albert Street just east of the city of Portage. Mulberry Street is at LOS F in the PM peak hour with Connie at LOS D in both the AM and PM and Elizabeth at LOS E in the AM. All four of these intersections are projected to experience LOS F in 2046.

A preliminary signal risk assessment was conducted on two intersections within the rural segments of WIS 33 and nine intersections within the urban segments. Based on a preliminary review, East Albert Street and Wauona Trail could be further studied, with East Albert Street a current candidate, and Wauona Trail in the future. Further study would evaluate these intersections for meeting the Federal Highway Administration (FHWA) eight traffic signal warrants in order to reach a final conclusion.

A safety analysis was conducted using historical crash data for the five years 2010 to 2014. A total of 434 non-deer crashes occurred on WIS 33 within the study area during this period. Intersection related crashes accounted for 225 (52 percent) of the total crashes. Three of the four segments had crash rates above statewide averages for similar state highways, with two fatalities in the Portage segment putting it above the fatal crash rate. The only segment that did not exceed statewide averages was the rural segment between the cities of Baraboo and Portage.

Forty-five of the corridor's 63 intersections experienced crashes over the timeframe studied; however, none demonstrated a definitive crash pattern. The four intersections with the highest crash rates included WIS 33 with Mulberry Street, Ash Street, East Street, and East Albert Street. The intersections with the highest crash severity included Mulberry Street, East Street, and County X.

Strategies and Recommendations

Even with increased traffic projected into 2046, it is anticipated that WIS 33 should be able to accommodate traffic demands without the need for capacity expansion making the corridor an ideal candidate for corridor preservation. This study did not identify or evaluate capacity expansion or new alignment corridors. Strategies have been developed focusing on extending the useful life of the facility as long as possible. This would be achieved through treatments that maintain or enhance safety for the traveling public. Treatments include addressing current geometric deficiencies, reducing vehicle conflicts, and promoting an access management plan as development changes continue to occur within the study area.

In order to meet current WisDOT standards that have a demonstrated impact on safety, numerous intersections have been identified for recommended improvements. These include adding bypass lanes, improving turning radii, relocations away from curves to improve sightlines, adding lighting, and adding

dedicated left and right turn lanes where appropriate. In addition to the intersections, the measures listed below have been tailored to address the most pressing safety and operational issues on the WIS 33 corridor.

Village of West Baraboo and the city of Baraboo

Within the village of West Baraboo and the city of Baraboo, WIS 33 is a four-lane undivided roadway serving numerous residential and commercial properties. Issues identified from local officials and the public included vehicle speed and pedestrian conflicts at crossings. The primary recommendation of this study is the conversion of the existing roadway to a three-lane facility with one travel lane in each direction separated by a center two-way-left-turn-lane (TWLTL). In addition, bike lanes would be provided in each direction. Left-turn lanes would be added or extended where appropriate, and right turn lanes are added at some locations to improve intersection capacity. The conversion of the facility would be completed in conjunction with a long-term access management strategy to improve driveway spacing and location. Uniform striping of pedestrian crossings and the modification of offset intersections through the addition of medians or other improvements could be future enhancements that would complement the strategy for this segment.

Rural Segment between Baraboo and Portage

Within the rural segment, the primary recommendations include geometric improvements addressing the public road intersections to bring them to current standards. Lighting may be provided at some locations to improve safety. Higher volume intersections could see the addition of left and right turn lanes to separate turning vehicles from through traffic. County U is recommended to be relocated further west away from the Baraboo River. In addition, providing six foot paved shoulders for the entire length of the segment would allow for relocating the fog-line rumble strips outside of the travel lane markings. An eight to ten foot paved shoulder between County U and County X would enhance bicycle connectivity between these two highways eliminating the barrier effect of WIS 33.

The segment was evaluated for passing lanes to determine if they would benefit travel along the corridor. Passing lanes could be located east of County X and west of the I-90/94 interchange on this segment. With passing lanes, the corridor level of service would continue to operate within acceptable levels.

Access management for the rural segment would be limited by the lack of opportunities to consolidate or relocate driveways in a reasonable manner. Some opportunities to realign driveways across from one another or to a side road do exist. However, the bulk of private driveways would likely remain in their current state unless a change in use or safety issue arises. In this segment the existing State Highway Connection (STH) permit process should be followed to ensure access remains safe.

City of Portage

The city of Portage experiences lower traffic volumes than the city of Baraboo, but has a greater presence of truck traffic through its downtown area which was a concern expressed by local officials and the public. Traffic forecasts for the city show that the current two-lane WIS 33 corridor should be able to accommodate traffic through 2046. The eastbound approach to the WIS 33/US 51 (DeWitt Street)

intersection is the only approach in this segment of WIS 33 that shows a decline in the level of service in 2046, though the intersection still operates acceptably. As such, recommendations focus primarily on opportunities to reduce private access points through relocation or consolidation over time as a long-term measure.

If capacity becomes a concern beyond 2046, an alternative travel pattern could be explored further that would create one-way pairs between WIS 33 and Conant Street to the north. This would split traffic among the two corridors and reduce the number of movements at signalized intersections. Changes in turn patterns would also benefit pedestrians in the downtown area.

East of Portage

The remaining corridor segment is comprised of suburban and rural characteristics, resulting in a mix between higher speed through traffic and lower speed turning traffic with local destinations. East Albert Street and Wauona Trail intersect with WIS 33 in this segment and operate as diversion routes to bypass the downtown area from the east. East Albert Street was identified as an intersection of concern for safety due to visibility issues. The study recommends replacing the at-grade intersection with a roundabout at this location to improve safety, address vehicle speed, and minimize impacts. In addition, the study recommends consolidation of the County F and County EE intersections relocated further east away from the curve on WIS 33.

Access management would also be a consideration for the numerous private driveways located along WIS 33 east of County EE. A local road system as lands to the south redevelop, would provide opportunities to relocate driveways off of WIS 33 as a long-term measure.

Part I Study Background and Introduction

The Wisconsin Department of Transportation, Southwest Region (WisDOT) initiated the WIS 33 Corridor Preservation Study in March 2015. TranSmart Technologies, Inc. was contracted by WisDOT to assist in the study process. The study took place over an 18-month period and included thorough investigation of existing social, cultural, natural, and physical features, extensive data collection, and traffic operational analysis. The study included the development of strategies and recommendations with agency and public input throughout the entire study process. The study was concluded with the WIS 33 Corridor Study Report, released in March 2017. The core study team consisted of the following individuals:

- Tom Kratt, Project Manager, WisDOT Southwest Region – La Crosse Office
- Francis Schelfhout, Planner, WisDOT Southwest Region – La Crosse Office
- Tom Koprowski, Planner, WisDOT Southwest Region – Madison Office
- Charles Wade, AICP, Consultant Project Manager, TranSmart Technologies, Inc.
- Manfred Enburg, PE, Sr. Advisor, TranSmart Technologies, Inc.
- Gary Rylander, PE, PTOE, Sr. Advisor, TranSmart Technologies, Inc.
- Jim Hanson, PE, PTOE, Document Review, TranSmart Technologies, Inc.
- Sue LeBrun, PE, PTOE, Safety & Geometric Studies, TranSmart Technologies, Inc.
- Seth Johnson, PE, PTOE, Traffic Operations Analysis, TranSmart Technologies, Inc.
- Megan Knutson, Environmental & Study Documentation, TranSmart Technologies, Inc.
- Glen Ausse, GISP, GIS Analysis / Mapping Support, TranSmart Technologies, Inc.
- Matthew Roland, Study Documentation, TranSmart Technologies, Inc.
- Charles McCarthy, PE, Traffic Modelling, TranSmart Technologies, Inc.
- Nick Becker, PE, Existing Facilities, Public Involvement Support, AECOM, Inc.
- Nathan Guequierre, Bike and Pedestrian Support, AECOM, Inc.

Other organizations and individuals also provided important input to the study effort or provided meeting space, including the City of Portage, City of Baraboo, and Village of West Baraboo. The Portage and Baraboo School Districts also hosted study meetings and provided use of their facilities.

1.0 Report Structure

The WIS 33 Corridor Study Report is divided into three parts to facilitate decision making regarding the study area:

- Part I—Study background and introduction
- Part II—Inventory of existing conditions
- Part III—Strategies and recommendations/access management plan

Part I – Study background and introduction

This section of the report introduces the scope and intent of the study, and provides general background information and context for the WIS 33 corridor within the study area.

Part II – Inventory of existing conditions

The inventory includes information to facilitate future decision making related to WIS 33. A companion flash drive with geospatial and other data collected from various sources is also included in this part of the report as Appendix A. The inventory includes information relating to both environmental and socioeconomic conditions within the study area.

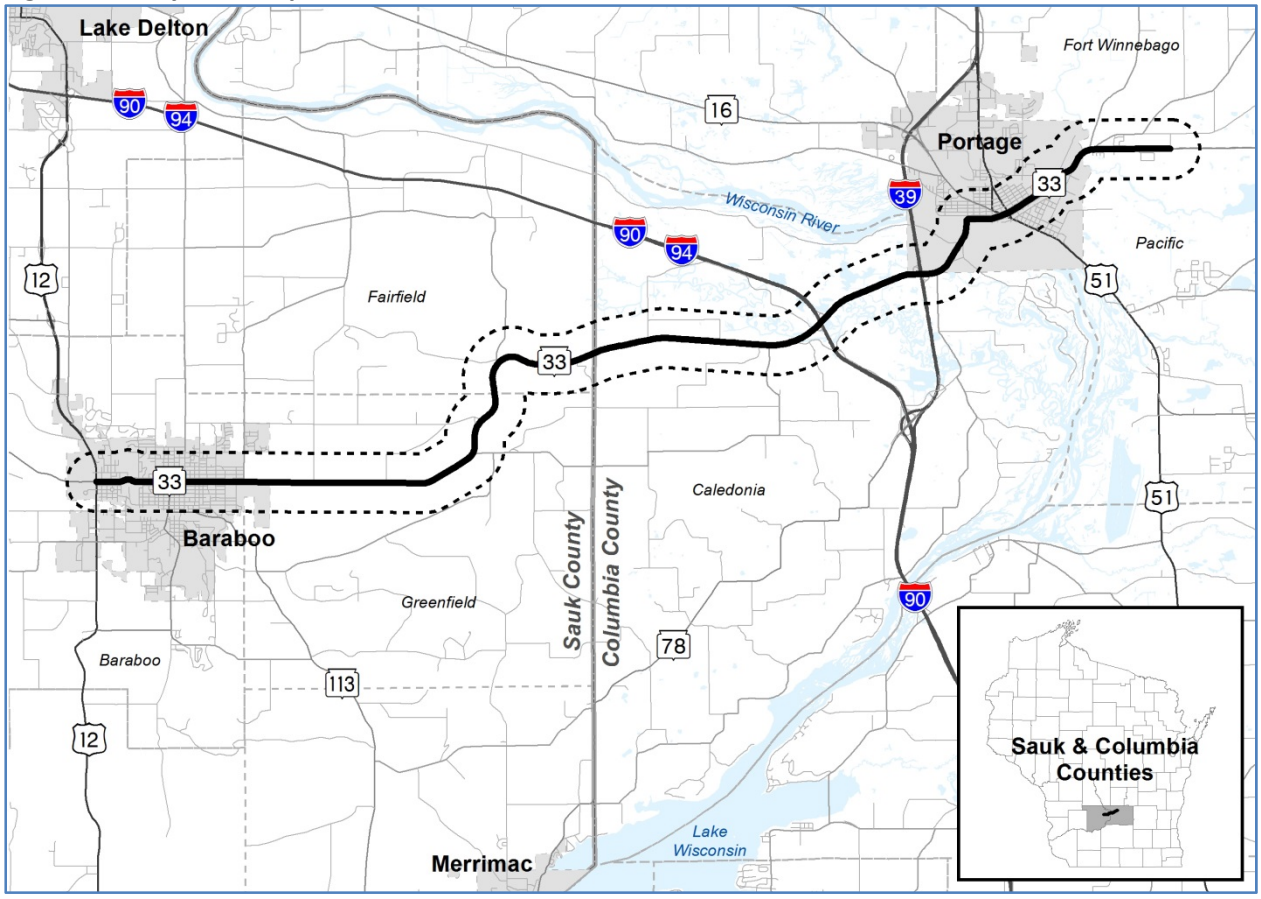
Part III – Strategies and recommendations/access management plan

The final part of the report includes strategies and recommendations developed from findings and analysis of the study team. Both short- and long-term strategies and recommendations were considered during the course of the study. These strategies include minor and other geometric enhancements to the existing facility, intersections, and local road system to maintain safety and traffic operations at projected future traffic volumes. In addition to addressing current deficiencies along WIS 33, a review of access conditions and the development of an advisory access management plan are also included in the study recommendations.

2.0 Study Area and Background

The area of study is located along the WIS 33 corridor between US 12 in the village of West Baraboo (Sauk County) to Garrison Road east of the city of Portage (Columbia County) and includes all areas within ½ mile of WIS 33 between the study termini. In addition to the corridor itself, the study also considers the influence of regional traffic patterns (see Figure 1).

Figure 1 Study area map



WIS 33 is a rural two-lane highway throughout the 21.3-mile study corridor, with a few short urban segments that are exceptions. At the western terminus through the village of West Baraboo and city of Baraboo, WIS 33 is a four-lane undivided urban street with several closely spaced intersecting streets and numerous private driveways. Within the city of Portage, WIS 33 is a two-lane urban street intersected by numerous public road intersections and private driveways. Within the city of Portage, parking is permitted along both sides of the roadway east of MacFarlane Road and through the downtown area.

2.1 Importance of WIS 33

WIS 33 is a direct link between the cities of Portage and Baraboo and provides direct connections to I-39, I-90/I-94 and US 12. Within the village of West Baraboo and cities of Baraboo and Portage, the WIS 33 corridor is classified as a principal arterial included as part of the National Highway System (NHS) under MAP-21. In the rural areas, WIS 33 is a minor arterial.

WIS 33 is also identified as an alternate route for I-39 and I-90/I-94 for the short segment that connects these interstates. It is part of the Badger State Corridor and the Wisconsin River Corridor in WisDOT's Connections 2030 Long-Range Multimodal Transportation Plan. Connections 2030 routes consist of a network of high-quality routes connecting major economic and tourism centers within the state.

WIS 33 serves as an important corridor for the communities it passes through. Within Baraboo and Portage, WIS 33 acts as a main route providing direct access to area businesses and services for the traveling public. WIS 33 also serves as a primary commuting and truck route through the Portage and Baraboo areas.

In rural portions of the study area, the WIS 33 corridor provides access between agricultural operations and the movement of products and equipment to and from markets. Located along the Baraboo River, crossing the Wisconsin River just west of the city of Portage and the Fox River to the east of the city of Portage, WIS 33 also provides access to numerous recreational resources in the study area and the larger region including parks, historical sites, wildlife refuges, river and fishing access, and trail facilities.

2.2 Origin of WIS 33 Corridor

WIS 33 began its life as a trail between the resource rich river cities of Baraboo and Portage. In 1828 a ferry crossing was created over the Wisconsin River at the south end of Portage. Travelers would follow the trail through the lower narrows gap in the Baraboo Hills to the ferry crossing to reach Portage and points beyond. In 1857 a permanent bridge was built to replace the ferry and regular stagecoach service between the cities began in 1859. Stagecoaches continued to use this path until a railroad line was completed in 1871 indirectly connecting Baraboo with Portage. Eventually a road was created west of Baraboo connecting it to Camp Douglas. In 1919 this road was extended east from Baraboo to Portage and on to Fox Lake becoming modern day WIS 33. The alignment of WIS 33 between Baraboo and Portage has remained largely unchanged since 1919 (Sources: Sauk County Historical Society, Columbia County Historical Society, wisconsinhighways.org).

2.3 Connections 2030 Future Vision

The study area is part of the Badger State Corridor and the Wisconsin River Corridor in WisDOT's *Connections 2030 Long-Range Multimodal Transportation Plan* (see http://wisconsindot.gov/Pages/projects/multimodal/c2030-maps.aspx). The Badger State Corridor includes the area from Eau Claire to Madison and the Wisconsin River Corridor includes the area from Madison to Wausau. The plan outlines a future vision for the corridor through 2030 that includes air travel, intercity bus, transit, bicycle, and pedestrian modes occurring within the corridor in addition to the more common vehicular modes. The plan identifies this corridor study for the near term and the possible construction of passing lanes from I-39 to County T (Sauk Co) if supported by environmental document. A copy of the corridor maps from the plan is included in Appendix A. *The focus of this study does not include capacity expansion.*

Connections 2030 includes Corridors 2030, an update of the Corridors 2020 statewide route system. Corridors 2020 was first published in 1988 to identify links between important economic and population centers throughout Wisconsin. The updated Corridors 2030 system has approximately 1,450 miles of

Backbone routes and 2,300 miles of Connector routes statewide; it identifies the WIS 33 study corridor as a Connector route.

State Access Management Plan

In the State Access Management Plan, WIS 33 within the study area has been designated as a Tier 2B highway between the cities of Baraboo and Portage. Tier 2B access management in rural areas entails highway access primarily via at-grade public road intersections and bypass lanes may not be required for public safety.

2.4 Current and Recent Projects and Activities

This study is separate from the other projects currently ongoing in the area. The recommendations of the study will consider and be compatible with the other projects currently under way. Other projects that are currently in progress involve US 12, US 51, I-90/I-94, and I-39.

The US 12 Baraboo Bypass is a 5.7-mile extension of the already completed segment of US 12 located just north of the Baraboo area and connecting to I-90/94. When the extension opens in the fall of 2017, US 12 will be a freeway between I-90/94 and Ski-Hi Road and an expressway for the remaining length. New interchanges would be provided at WIS 136 and County W. When the bypass opens, the existing US 12 corridor will be transferred to Sauk County.

The US 51 rehabilitation project in the city of Portage would improve US 51 (Wisconsin and DeWitt Streets) between Southtown Road and East Pleasant Street. The project would improve the intersection geometry at DeWitt Street/Wisconsin Street as well as Wisconsin Street with West Edgewater Drive. Other intersections would also be improved along both Wisconsin and DeWitt Streets to include turn lanes and improve curb radii to accommodate trucks. Existing pedestrian crossings would be brought to ADA standards as part of the project. Other enhancements include relocation of private driveways to enhance safety and vehicular movement on US 51. The project is currently in design with an anticipated construction start in 2020. This project crosses the WIS 33 corridor at the DeWitt Street/Cook Street intersection.

The I-39/90/94 and I-90/94 corridors were under various stages of study for corridor preservation or capacity expansion. Of the study and construction projects extending from the Illinois State line to the US 12/WIS 16 interchange in Wisconsin Dells, the I-90/94 study crossed the WIS 33 study area. The I-90/94 study extended from the I-39/90/94 system interchange located south of the city of Portage north to the US 12/16 interchange located north of the Wisconsin Dells. This study was undertaken by the Department to analyze the existing and future conditions and needs of the corridor, and was to conclude with an environmental document in 2018. WisDOT and FHWA cancelled these studies in March, 2017.

Another project along I-90/94 extends ten miles from the WIS 33 interchange north along I-90/94 to the County CS interchange and will include safety improvements, new signs and structure repair or maintenance. It is scheduled for construction in the 2017 to 2018 timeframe.

3.0 Reason for Study

Experience around the state has demonstrated that unmanaged and unprotected highways can suffer deterioration of operational efficiency and safety as traffic volumes increase and land use activities intensify. WisDOT would like to assess the long-term function of WIS 33 and be able to program any needed improvements now before safety or operational problems occur.

This study has three primary objectives:

1. The study serves as a mechanism to collect environmental, transportation, and socio-economic data pertaining to WIS 33 between Baraboo and Portage. The study report is a source of information for future transportation decisions related to the corridor.
2. A needs analysis was conducted to identify existing operational deficiencies and future corridor needs.
3. Options were developed to preserve the function of WIS 33, increase safety, and identify long-term strategies and recommendations that will preserve and extend the functional life of the existing highway for as long as possible. These recommendations provide the guidelines when future transportation improvements are scheduled in the corridor.

3.1 Study Goal

The goal of this study is to identify strategies to preserve the highway for as long as possible and to delay the need for capacity expansion. The study reviews the existing design elements of the WIS 33 corridor in combination with existing and future traffic, Level of Service (LOS), and corridor and intersection crash history to identify trends that could be addressed through design changes. The corridor can be preserved through enhancement of deficient highway segments and intersections to address existing and future safety and traffic operation concerns, and through an examination of direct access, and associated development patterns. A long-term access management approach is a component of the study.

3.2 Specific Study Needs

There are several specific conditions that are anticipated to contribute to the need for corridor preservation along WIS 33, including:

- A projected trend of increased traffic between 2016 and 2046 (the study plan horizon).
- Higher crash rates along WIS 33 than on similar state highways.
- Reduced intersection function at existing locations not designed to accommodate higher numbers of entering vehicles.
- Anticipated safety problems stemming from increased traffic and fewer gaps from local road and driveway connections.

3.3 Existing and Future Traffic Volumes

For purposes of analysis, the WIS 33 corridor was divided into four segments based on highway characteristics. The segments, shown in Figure 2, consist of the following:

- Segment 1 — US 12 to County T (Taft Avenue) represents an urban segment in the village of West Baraboo and city of Baraboo.
- Segment 2 — County T (Taft Avenue) to the Wisconsin River is a rural segment that crosses the I-90/94 and I-39 interstate corridors. The interchanges are not included in this study.
- Segment 3 — Wisconsin River to the Canadian Pacific Railroad crossing on the eastern edge of the city of Portage. This segment has an urban character to it.
- Segment 4 — A short segment of suburban to rural land uses located between the Canadian Pacific Railroad crossing and Garrison Road.

Figure 2 WIS 33 corridor segments

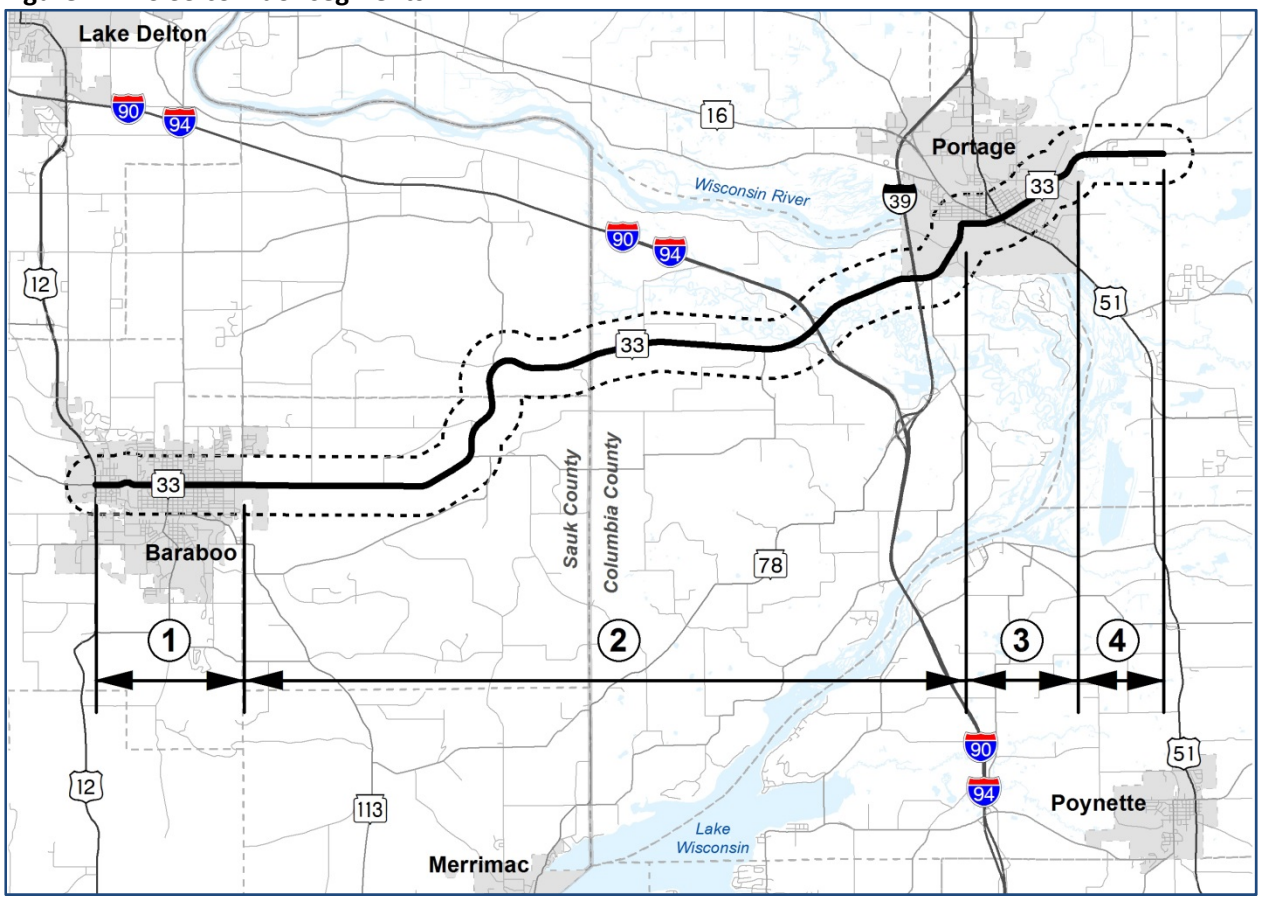


Table 1 shows the distribution of traffic volumes on the varying corridor segments. Historic traffic count data along WIS 33 depicts a general decrease in traffic between 2006 and 2016. In 2006, traffic volumes in Segment 1 ranged between 13,800 and 16,600 Annual Average Daily Traffic (AADT). Segment 1 has the highest volumes within the study corridor. By contrast, the city of Portage (Segment 3) had a range of 6,000 to 9,300 AADT for the same year. The highest volumes in Portage are at the Wisconsin River and the Fox River crossings. Traffic volumes in the downtown area (on either side of the WIS 16 and US 51 intersections) ranged between 6,000 and 7,500 AADT. The rural segment (Segment 2) located between the two communities ranged between 6,600 and 8,400 AADT in 2006. The highest volumes were located in the vicinity of the interchanges with I-90/94 and I-39. East of the city of Portage, traffic volumes ranged between 6,200 and 7,800 AADT.

As part of the study, 2016 traffic counts were conducted for locations along WIS 33 to determine the current traffic volumes and vehicle mix along the corridor. As can be seen in the table, traffic volumes collected in 2016 show a decline in traffic for every segment from 2006 volumes. Within the corridor, traffic volumes generally experienced a decline between 2006 and 2010. Even though traffic volumes have been slowly increasing in recent years, most segments are still below 2006 count levels.

Traffic forecasts were developed for the study area by WisDOT assuming a relatively stable rate of growth based on current conditions. The relocation of county offices in the city of Portage to a new location was considered in the forecast effort (See Appendix B). Projected traffic volumes based on the forecasts are also shown in Table 1, and vary by segment. The area of greatest change in traffic will be on the rural segment in the vicinity of the interstates. City of Portage traffic will increase more rapidly than in the Baraboo area, however, Segment 1 will continue to have the highest traffic volumes in the study corridor.

Table 1 Historic and forecast segment traffic volumes (AADT)

Segment	2006*	2016*	2026	2036	2046
Segment 1	13,800-16,600	10,200-11,900	10,700-12,500	11,200-13,100	11,700-13,700
Segment 2	6,600-8,400	6,100-8,500	6,800-9,500	7,500-10,300	8,100-11,200
Segment 3	6,000-9,300	5,200-8,100	5,600-8,900	5,900-9,500	5,100-10,100
Segment 4	6,200-7,800	7,400	7,800	8,200	8,700

*Actual counts

3.4 Level of Service

Level of Service (LOS) is a measure of how smoothly traffic is moving on a highway and is measured differently depending on the characteristics of the roadway under study. Generally LOS is translated to a letter between A and F where LOS A is the best and LOS F is the worst. A more thorough discussion of LOS is included in Part II of this report in the Traffic Operations Analysis section.

A peak-hour level of service (LOS) analysis was conducted based on existing and forecast traffic volumes for the study corridor. HCS Plus software using the Highway Capacity Manual (HCM 2010) methodology was used to determine LOS values for the rural segments (Segments 2 and 4 as shown in Figure 2). For urban segments (Segments 1 and 3 as shown in Figure 2), Synchro models were developed. LOS analysis focused on the existing and future traffic at intersections within these segments.

Existing peak hour LOS (2016) for the rural segment located between Baraboo and Portage (Segment 2) varied between LOS B just east of County T to LOS D for the remaining length of the rural segment. In 2046, this segment's LOS will decline from LOS B to LOS C east of County T and from LOS D to LOS E near the I-90/94 interchange.

The 2016 LOS for the rural segment east of the city of Portage (Segment 4) is LOS D between the city and Foote Drive and LOS C from Foote Drive to the eastern study limit at Garrison Road. Between Foote Drive and Garrison Road the LOS will drop from LOS C to LOS D in 2046, with the western half of the segment remaining at LOS D. East Albert Street is located in this segment and operates at LOS D in 2016 PM, and is expected to reach LOS F in 2046 PM.

Within the village and city of Baraboo (Segment 1), LOS was evaluated for the side road approaches of unsignalized intersections, and for overall LOS of the signalized intersections in both the morning and evening peak hours. Generally, the signalized intersections operate at LOS B in 2016 and will only slightly worsen to LOS C in 2046. During the peak hour it can be challenging to enter WIS 33 from unsignalized side roads, and this is reflected in LOS between D and F in 2016 and worsening in 2046.

The Portage urban segment (Segment 3) is anticipated to continue an acceptable LOS through 2046. Currently signalized intersections operate at LOS B overall, with only DeWitt Street projected to decline to LOS C. The unsignalized intersections of Pierce Street and MacFarlane Road currently operate at LOS B and should operate at LOS B or LOS C in 2046.

3.5 Safety

As part of the study's technical analysis, a five-year crash analysis was conducted for the US 12 corridor (see Appendix C). The years studied included 2010 through 2015 and do not include reported collisions involving deer. The corridor crashes were compared to statewide averages for similar highways in Wisconsin as reported by WisDOT.

As shown in Table 2 below, three of the four segments studied experienced crash rates higher than similar state highways across Wisconsin. The rural segment located between the cities of Baraboo and Portage was the only segment with a crash rate lower than the statewide crash rate, however, this is also the only segment to have had crashes resulting in fatalities over the time period studied.

Crash severity includes a combination of the crashes that resulted in fatalities or resulted in injuries that either incapacitated one or more occupants or if not incapacitated was an injury that was observable at the scene (type K, A or B crashes). Segment 3, located in the city of Portage, was the only segment that had a calculated KAB crash rate above the statewide average. The city of Baraboo (Segment 1) and the segment east of the city of Portage (Segment 4) were approaching the statewide KAB rate.

Table 2 Segment crash rates (excluding deer crashes)

Segment	No. of Crashes	Crash Rate	State Avg. Crash Rate	KAB Crash Rate*	State Avg. KAB Crash Rate
Segment 1 – US 12 to County T	229	**384**	283	35.2	35.7
Segment 2 – County T to Wisconsin River	98	49	88.5	10	17.75
Segment 3 – Wisconsin River to East Cook Street	76	**397**	283	**52.2**	35.7
Segment 4 – East Cook Street to Garrison Road	31	**91**	88.5	17.65	17.75

*KAB Rate includes fatal, A injury and B injury crashes.

Of the 434 crashes occurring on WIS 33, 225 (52 percent) were intersection-related. A total of 45 intersections had at least one crash between 2010 and 2014. Of the public road intersections experiencing crashes, 31 were further reviewed to determine crash rates and any identifiable crash trends.

WIS 33 intersections at East Street, Ash Street, Mulberry Street (Segment 1) and East Albert Street (Segment 4) had the highest overall crash rates in the study. Although none of the intersections on the corridor exceeded a severity rate of 30 percent, Mulberry Street and County X were approaching that rate. A detailed discussion of the safety analysis and findings is included in Appendix C.

Part II Inventory of Existing Conditions/Environmental Information

This part of the report includes a summary of corridor research for socio-economic, environmental, and existing transportation-related conditions within the study area.

4.0 Information Resources

Information used to compile this document was obtained from data collection efforts along WIS 33 or from a variety of public sources. State agencies and local governments were important sources of information, specifically for local plans, land information/GIS data, and traffic data. For this reason, the study included notification of and coordination with federal, state, local agencies, and Native American tribes to obtain information and provide data or input into the study.

4.1 Agency Coordination and Review

Agency coordination letters were sent to several groups. Federal, state, local agencies, and community officials were invited to provide comments and attend stakeholder, local official, and public involvement meetings at the start of the study and again to review the draft strategies and recommendations.

A study kickoff meeting was held at the Baraboo City Services Center and the Portage City Hall to identify any ongoing plans or projects as well as any concerns that should be addressed as part of the study. At these meetings local officials expressed concerns about pedestrian safety and crossings in the city of Baraboo and concerns related to the perceived high truck use of WIS 33 in the city of Portage. Speeding and offset intersections were also brought up as a safety concern in the Village of West Baraboo and city of Baraboo. Safety at specific intersections and direct access to WIS 33 throughout the entire corridor were concerns of area officials.

A stakeholder coordination meeting was held with officials from the Village of West Baraboo and City of Baraboo preceding the release of the corridor-wide draft strategies. At this meeting, discussions were held to review draft access and geometric concepts for Segment 1 that addressed many of the concerns that were raised early in the study.

A second set of local officials meetings were held at the Baraboo Civic Center and Portage City Hall to present the draft study recommendations. At these meetings local officials reiterated earlier concerns about drivers speeding on the east and west sides of Portage and provided comments on whether or not they felt specific recommendations addressed the corridor needs. The County U intersection east of the city of Baraboo was mentioned as a place of concern because of the higher than typical emergency responses that have been needed at this intersection. Study recommendations were generally positively received.

4.2 Public Involvement

The WIS 33 Corridor Study included public involvement activities throughout the study process to identify important issues related to WIS 33 and the surrounding area. Table 3 below lists public involvement activities related to this study. Public involvement included two public involvement and two local officials meetings at the beginning and near the end of the study. Duplicate meetings were held at each end of the study corridor to ensure ample opportunity for participation. Public

involvement also included meetings with local officials preceding the public involvement meetings, again located at each end of the corridor (see Appendix D).

Other study outreach activities included:

- Interactive input exercise at public and local officials study kickoff meetings to facilitate needs identification and input.
- Written comment forms at the second round of local officials and public involvement meetings.
- Two study newsletters to adjacent property owners providing information about the study and inviting them to public meetings.
- A Frequently Asked Questions (FAQ) sheet included with study mailings and available at meetings.
- News releases in local newspapers preceding the public involvement meetings.
- Telephone interviews with property owners and agency officials to discuss specific issues.
- Email correspondence with other state and federal agencies as part of agency coordination and information sharing.
- Copies of local official and public meeting notices sent to federal, state, and tribal officials.

Table 3 Study public involvement activities

Date	Activity	Invited/Attendees
January 2016	Study Newsletter	State, federal & tribal agencies, local officials, property owners
February 3, 2016	Local officials / agency kickoff meeting	USACE, Local officials, WisDOT study and consultant staff
February 8 & 10, 2016	Public involvement kickoff meeting	Local officials, WisDOT study and consultant staff, general public
September 27, 2016	Stakeholder meeting	Baraboo officials, TranSmart staff
October 2016	Study Newsletter	State, federal & tribal agencies, local officials, property owners
October 18 & 20, 2016	Local officials meeting	Local officials, WisDOT, TranSmart
November 7 & 9, 2016	Public involvement meeting	NPS, Local officials, WisDOT study and consultant staff, general public

4.3 Spatial Information

Spatial information was obtained through cooperation with several agencies including:

- Sauk County Land Information Office
- Columbia County Land Information Office
- Wisconsin Department of Natural Resources
- Wisconsin Department of Transportation
- Wisconsin Historical Society
- Wisconsin Department of Agriculture Trade and Consumer Protection
- National Resource Conservation Service

Spatial information is included as a supplement to this document on a flash drive that includes Geographic Information Systems (GIS) data and Adobe Acrobat (PDF) maps created as part of the study process. The flash drive is intended to serve as a resource that can be used in future decisions in the corridor (see Appendix A).

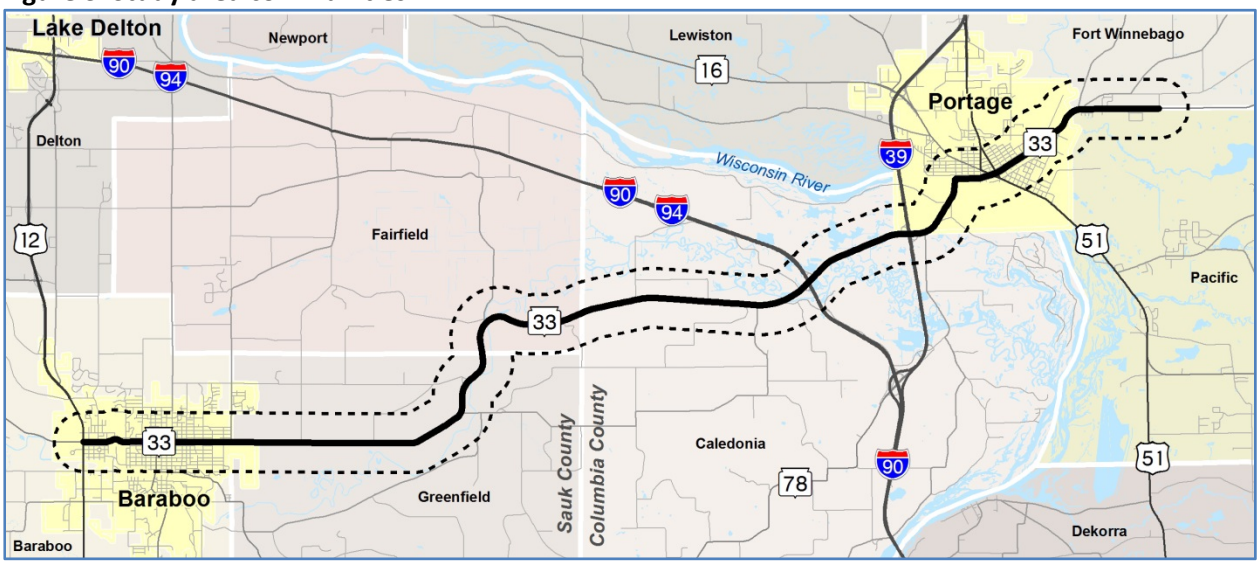
5.0 Existing Conditions

5.1 Socioeconomic Conditions

General Economics and Economic Development

The study area includes the village of West Baraboo, city of Baraboo, city of Portage, and six towns adjacent to WIS 33 (See Figure 3). The study area includes portions of both Sauk and Columbia Counties and is located roughly ten miles to the southeast of the Wisconsin Dells area, a well-known destination for tourism generating traffic as far away as neighboring states.

Figure 3 Study area communities



Tourism is important within the study area with area attractions such as Devils Lake State Park located south of the Baraboo area; circus related attractions within the city of Baraboo; Cascade Mountain, a commercial skiing and tubing attraction, located just south of WIS 33 near the I-90/94 interchange; and the Historic Indian Agency House located just east of the city of Portage. Also, several natural areas located along the Wisconsin and the Baraboo Rivers makes the corridor and the communities along it attractive for hiking, fishing, hunting, and other outdoor recreation activities.

Baraboo was first settled in 1838 and grew rapidly, becoming the county seat in 1846. Its proximity to both the Baraboo and Wisconsin Rivers made it an attractive area to be settled and for the development of the sawmill industry. Today the three top industries in Baraboo are education, manufacturing, and retail trade (Source: Wisconsin Historical Society website).

Portage had its first permanent settlers in 1792 due to its prime location for fur trade. It is located between the Fox and Wisconsin River which made it desirable to set up a trading post. The proximity to the Fox-Wisconsin portage made it a strategic location for the American government to construct Fort Winnebago in 1828. The canal between the two rivers was constructed in 1837. This site continued to be important for trade and transportation throughout the 19th Century. Portage was incorporated in 1854 with the railroad arriving three years later. The lumber industry and the farming community brought more residents to the area (Source: Wisconsin Historical Society website).

Table 4 lists the largest employers located within three miles of the study corridor. Several of the top employers include manufacturing, dairy, and public services. Other notable employment sectors include the gaming industry, food manufacturing and packaging services, and wholesale and retail services.

Table 4 Largest WIS 33 corridor employers in 2010

Employer Name	Location	No. of Employees	Revenues ($ millions)	Description
Flambeau Injection Molding	Baraboo	250 - 499	$100 - 499	Manufacturing
Ho Chunk Casino	Baraboo	100 - 249	$100 - 499	Casino
R. R. Donnelley	Baraboo	1,000+	$50 - 99	Commercial Gravure Printing
Sauk County Courthouse	Baraboo	1,000+	n/a	Legislative Bodies
Seneca Food Corporation	Baraboo	250 - 499	$50 - 99	Food Manufacturing
St. Clare Hospital	Baraboo	250 - 499	$50 - 99	General Medical and Surgical Hospitals
Sysco Baraboo LLC	Baraboo	1,000+	n/a	Packaged Frozen Food Merchant Wholesalers
Teel Plastics	Baraboo	100 - 249	$50 - 99	Plastics Product Manufacturing
Walmart Supercenter	Baraboo	250 - 499	$50 - 99	Department Stores
Associated Milk Producers Inc.	Portage	250 - 499	$500 - 999	Dairy Product Merchant Wholesalers
Cardinal FG Company	Portage	100 - 249	$50 - 99	Flat Glass Manufacturing
Cascade Mountain Ski Area	Portage	250 - 499	$20 - 49	Traveler Accommodation
Columbia Correctional Institution	Portage	250 - 499	n/a	Legislative Bodies
Divine Savior	Portage	1,000+	$50 - 99	General Medical and Surgical Hospitals
Lexington Logistics LLC	Portage	250 - 499	$50 - 99	Surgical and Medical Instrument Manufacturing
Northwoods Inc. – Wisconsin	Portage	100 - 249	n/a	Social Advocacy Organizations
Penda Form	Portage	250 - 499	$100 - 499	Plastics Product Manufacturing
Poly One Corporation	Portage	100 - 249	$100 - 499	Plastics Material and Resin Manufacturing
Saint – Gobain Corporation	Portage	250 - 499	$500 - 999	Industrial Supplies Merchant Wholesalers
Spectrum Brands	Portage	100 - 249	$20 - 49	General Merchandise Stores
Walmart Supercenter	Portage	250 - 499	$50 - 99	Department Stores

Source: Wisconsin Dept. of Workforce Development – Infogroup, Omaha, NE. This list of major employers was extracted from the America's Labor Market Information System (ALMIS) Employer Database, 2014 1st Edition.

Between 2000 and 2010, the average median household incomes of the corridor communities grew faster than the state as a whole, with incomes in Columbia County growing faster than in Sauk County. Table 5 lists median household income data for all corridor communities, the counties, and state. Median household incomes in the Town of Caledonia, Town of Greenfield, and the Town of Baraboo grew the most, at 36.6, 34.4, and 30.7 percent, respectively, while household incomes in the Village of West Baraboo decreased slightly. Incomes in the City of Baraboo increased more rapidly than the City of Portage, though Columbia County's growth was nearly ten times that of Sauk County.

Table 5 Median household incomes ($) in corridor communities

Community	2000	2010	Percent Change (2000 to 2010)
Columbia County	45,064	55,910	24.1%
Sauk County	49,091	50,390	2.6%
City of Baraboo	38,375	47,452	23.7%
City of Portage	35,815	39,259	9.6%
Town of Baraboo	48,419	63,295	30.7%
Town of Caledonia	56,042	76,563	36.6%
Town of Fairfield	50,625	62,969	24.4%
Town of Fort Winnebago	55,673	65,563	17.8%
Town of Greenfield	49,659	66,719	34.4%
Town of Pacific	49,122	54,848	11.7%
Village of West Baraboo	41,618	41,389	-0.6%
State of Wisconsin	43,791	51,589	17.8%

Source: U.S. Census Bureau

Community and Residential Elements and Environmental Justice

The size and composition of communities in the WIS 33 study corridor are important considerations for future corridor planning. Community factors influence corridor conditions such as traffic volumes and travel patterns and can present opportunities for and constraints on future improvements. In this section, community populations and other demographic data are provided to enhance understanding of the corridor. Population data is useful for tracking the rate of community change, while detailed data on minority, low income, and elderly populations serve to identify the locations of populations that may be particularly sensitive or vulnerable to corridor changes.

Population and Housing Units

With a 7.9 percent population increase between 2000 and 2010, the communities within the WIS 33 study area have grown faster than the state as a whole (6.0 percent since 2000). In addition, both Columbia and Sauk Counties have grown by 8.3 and 12.2 percent respectively since 2000. Between the two study area cities, Baraboo has experienced the greatest percentage growth since 2000 at 12.5 percent and the largest nominal growth with 2,847 residents. Among the towns in the corridor, the Town of Caledonia has seen the largest percentage growth at 17.7 percent. The towns of Fort Winnebago and Baraboo both saw declining population between 2000 and 2010.Table 6 details the population growth of each community in the study corridor.

Table 6 Corridor community populations

Community	1990	2000	2010	Percent Change (2000 to 2010)
City of Baraboo	9,203	10,711	12,050	12.5
City of Portage	8,640	9,728	10,324	6.1
Village of West Baraboo	1,021	1,248	1,414	13.3
Town of Baraboo	1,503	1,828	1,672	-8.5
Town of Caledonia	1,031	1,171	1,378	17.7
Town of Fairfield	826	1,023	1,077	5.3
Town of Fort Winnebago	825	855	825	-3.5
Town of Greenfield	758	911	932	2.3
Town of Pacific	1,944	2,518	2,707	7.5
Corridor Communities Total	25,751	29,993	32,371	7.9
Columbia County	45,088	52,468	56,833	8.3
Sauk County	46,975	55,225	61,976	12.2
State of Wisconsin	4,891,769	5,363,675	5,687,289	6.0

Source: U.S. Census Bureau

Growth of populations and housing units in each community are strongly correlated. Table 7 below details the growth of housing units in study corridor communities. The Town of Caledonia showed the largest percentage increase in housing with an 18.2 percent growth between 2000 and 2010 while the Town of Pacific had the second largest at 15.4 percent. The City of Baraboo showed the most absolute growth in housing in the corridor during the same period adding 612 units. The sum of housing units in all corridor communities grew by 1,648 (13.1%).

Table 7 Housing units in study area communities

Community	1990	2000	2010	Percentage Change (2000 – 2010)
City of Baraboo	3,829	4,467	5,079	13.7
City of Portage	3,556	3,970	4,493	13.2
Village of West Baraboo	400	477	542	13.6
Town of Baraboo	538	685	781	14.0
Town of Caledonia	626	713	843	18.2
Town of Fairfield	305	421	436	3.6
Town of Fort Winnebago	287	343	372	8.5
Town of Greenfield	292	397	404	1.8
Town of Pacific	847	1,108	1,279	15.4
Corridor Communities Total	10,680	12,581	14,229	13.1
Columbia County	19,258	22,685	26,137	15.2
Sauk County	17,801	21,644	29,708	37.3
State of Wisconsin	2,055,774	2,321,144	2,624,358	13.1

Source: U.S. Census Bureau

Environmental Justice Analysis: Minority, Senior, and Low Income Populations

The communities in the study area are not markedly different from the counties in which they are located. As data in Table 8 indicate, the minority populations in these communities are small in comparison to white populations. The proportion of the population in the study area communities that is from racial minorities is smaller than that of Sauk and Columbia Counties, but greater than the state as a whole.

Table 8 Demographic characteristics of study area communities

Community	White	African American	Asian	Hispanic or Latino	American Indian	65 years and older
City of Baraboo	11,115	159	64	446	98	166
City of Portage	9,099	504	79	414	83	145
Village of West Baraboo	1,267	14	22	70	27	14
Town of Baraboo	1,592	9	11	41	5	14
Town of Caledonia	1,332	7	0	21	8	10
Town of Fairfield	1,053	0	7	13	3	1
Town of Fort Winnebago	809	3	0	5	3	5
Town of Greenfield	885	1	2	33	7	4
Town of Pacific	2,620	4	21	43	3	16
Corridor Communities Total	29,772	701	206	1,086	237	375
Columbia County	53,628	697	298	1,444	233	533
Sauk County	57,331	330	332	2,675	690	618
State of Wisconsin	4,738,411	350,898	128,052	336,056	48,511	85,058

Source: U.S. Census Bureau

An analysis was conducted to identify concentrations of minority populations within the study area. Census block level data was used because it is the smallest level of data available from the U.S. Census Bureau that contains demographic data. The data was evaluated through a multi-step process. First, the study area population was examined to determine a baseline for comparison. The population shares for each minority group within the study area were determined to establish study area thresholds for each minority group. Second, the share of a specific minority group for each block was determined by comparing the total number of persons in the block identified by race, according to the census data, with the total number of persons in the block. Shares of minority groups by census block were then compared to the shares of these groups at the study area level.

Figure 4 Census blocks with concentrations of minority populations

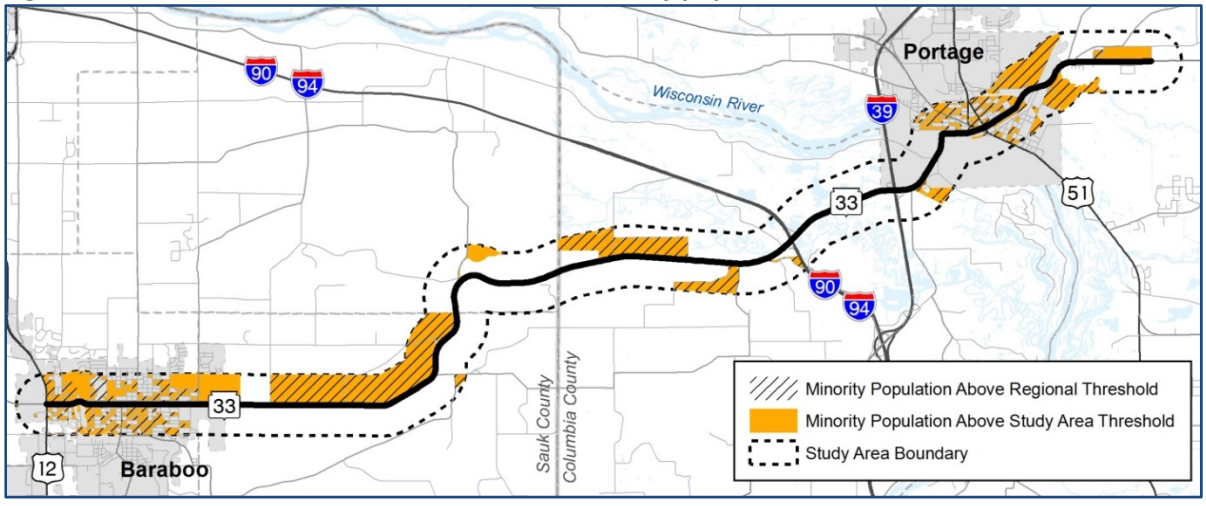


Table 9 shows the study area demographic data. The population shares reflect the thresholds at which a higher percentage of minorities indicates a potential concentration. Figure 4 depicts those blocks where percentages of minorities are higher than the study area shares, or thresholds. The WisDOT Southwest Region population data in the table are included for comparative purposes, showing how the study area compares to the Southwest Region as a whole.

Table 9 Study area demographic data

Population	Populations in study area	Share of populations in study area (%)	Populations in WisDOT Southwest Region	Share of populations in region (%)
White	15,784	93.0	1,159,178	87.9
Black	206	1.2	40,380	3.1
Hispanic	567	3.3	61,778	4.7
Asian	99	0.6	32,189	2.4
Am. Indian	113	0.7	4,831	0.4
Other	194	1.1	20,288	1.5
Total	16,963	100.0	1,318,644	100.0

Source: U.S. Census Bureau, 2010 Census

When compared to statewide populations, Table 9 above indicates very low thresholds for identifying concentrations of minority populations in the study area. Therefore, relatively small minority concentrations within census blocks could exceed the shares of minority populations found in the study area as a whole. As can be seen in Figure 1, there are several census blocks located along the WIS 33 corridor with minority concentrations higher than the study area thresholds. A limitation of the approach is that even though the concentrations might be higher than the comparison, the actual population within each block is relatively low. In the event a future improvement project occurs, a more thorough review would be necessary to determine the specific locations of project impacts in comparison to the presence of minority populations. This analysis helps to identify where along WIS 33 such an in depth analysis may be needed.

Study area communities experienced an overall population increase of approximately 7.9 percent between 2000 and 2010. The senior population has increased as well, with the average percent increase within the corridor communities being approximately 11.7 percent. Table 10 below illustrates the changes in the population 65 years and older between 2000 and 2010. Both the City of Portage and the Village of West Baraboo have seen a slight decline in senior populations over this time. The rural areas including the towns of Fort Winnebago, Fairfield, Pacific, and Baraboo have seen the greatest change in aging population.

Table 10 Population 65 years and older in study area communities

Community	2000	2010	Change
City of Baraboo	1,685	1,881	11.6%
City of Portage	1,480	1,439	-2.8%
Village of West Baraboo	146	143	-2.1%
Town of Baraboo	189	246	30.2%
Town of Caledonia	150	179	19.3%
Town of Fairfield	113	168	48.7%
Town of Fort Winnebago	92	137	48.9%
Town of Greenfield	96	121	26.0%
Town of Pacific	424	572	34.9%
Corridor Communities Total	4,375	4,886	11.7%
Columbia County	7,567	8,294	9.6%
Sauk County	7,993	9,288	16.2%
State of Wisconsin	702,553	777,314	10.6%

Source: U.S. Census Bureau, 2010 Census

Senior Housing Centers

Senior housing is defined as places where persons over the age of 65 reside in age-restricted developments. These developments and facilities include rental and condominium communities for active seniors, retirement homes, assisted-living centers, and nursing homes with 24-hour on-site medical assistance. Table 11 lists the known senior living centers/nursing homes located in the cities of Baraboo and Portage. Several smaller housing opportunities for seniors may exist within study corridor communities.

Table 11 Senior Living Centers/Nursing Homes in cities of Baraboo and Portage

Facility Name	Street Address	City
St. Clair Meadows Care Center (Meadow Lane)	1414 Jefferson Street	Baraboo
Meadow Ridge Assisted Living	1700 Jefferson Street	Baraboo
Our House Assisted Care	1200 Washington Avenue	Baraboo
The Artisan Senior Living	1114 Silver Drive	Baraboo
Walnut Grove	1200 Silver Drive	Baraboo
Oak Park Place	800 Waldo Street	Baraboo
Meadow View	1600 Jefferson Street	Baraboo
Greenbriar Apartments	1350 Jefferson Street	Baraboo
Tivoli at Divine Savior Healthcare	2805 Hunter Trail	Portage
American Way of Portage	601 & 621 Latton Lane	Portage
American Way of Portage	611 & 613 East Albert Street	Portage
Hamilton Park Place	2525 Hamilton Street	Portage
Our House Senior Living	2876 Village Road	Portage
Our House Senior Living	215 Northridge Drive	Portage
Heritage House of Portage	2685 Airport Road	Portage

Source: Wisconsin Dept. of Health Services, Aging and Disability Resource Centers (ADRC)

Low Income Populations

According to the 2010 Census, the greatest concentrations of persons living in poverty include the Baraboo area communities (village of West Baraboo, town and city of Baraboo) and the city of Portage. The city of Portage and the Village of West Baraboo saw the greatest increase in poverty populations between 2000 and 2010, at 9.0 and 9.9 percent. Over this same period, the counties of Columbia and Sauk saw increases of between 3.5 and 2.2 percent, similar to the state as a whole, which increased by 2.9 percent over the same time. Many rural towns are well below state and county percentages (see Table 12), with three study area towns experiencing a decrease in poverty populations between 2000 and 2010.

Table 12 Populations below poverty level (percent) in corridor communities

Community	2000 (%)	2010 (%)	Change (%)
City of Baraboo	6.6	9.7	3.1
City of Portage	7.2	17.1	9.9
Village of West Baraboo	6.2	15.2	9.0
Town of Baraboo	5.4	10.4	5.0
Town of Caledonia	6.7	1.6	-5.1
Town of Fairfield	2.0	3.8	1.8
Town of Fort Winnebago	3.2	1.8	-1.4
Town of Greenfield	2.4	3.9	1.5
Town of Pacific	4.9	3.8	-1.1
Columbia County	5.2	8.7	3.5
Sauk County	7.2	9.4	2.2
State of Wisconsin	8.7	11.6	2.9

Source: U.S. Census Bureau, 2010 Census

Manufactured Housing Neighborhoods

Manufactured housing neighborhoods typically offer housing choices that are less costly than traditional site-built housing. As a result, manufactured housing neighborhoods may be characterized by the predominance of low-income households. Retirees on fixed incomes and working-class families are common residents of these areas. Though study area communities such as the Village of West Baraboo do have manufactured housing neighborhoods, none are located in close proximity to WIS 33.

Schools

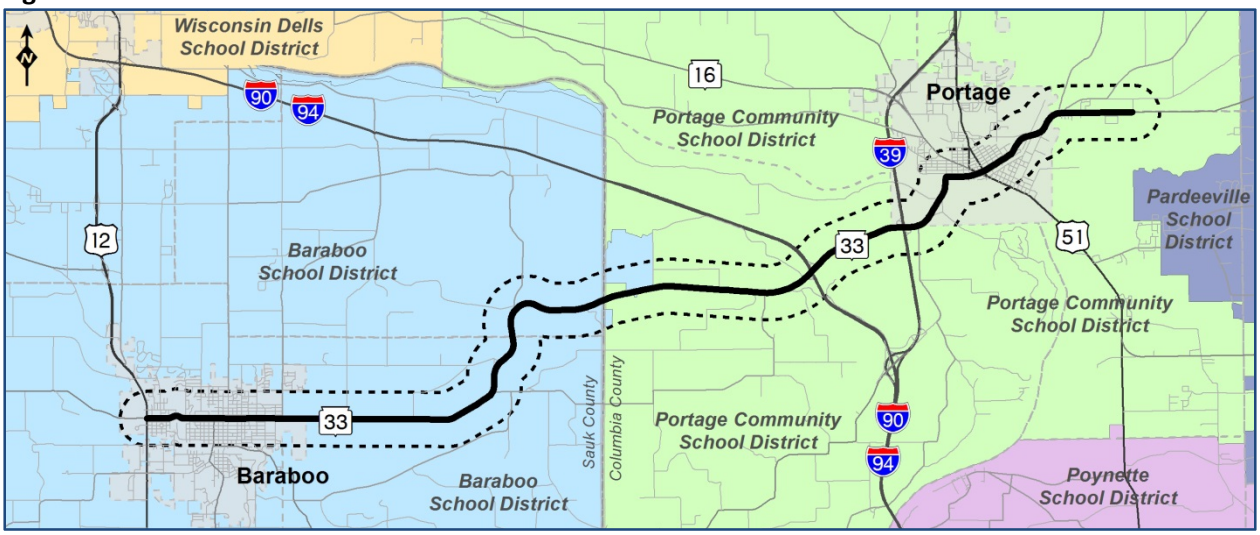
The study area is served primarily by two public school districts: Portage Community School District and Baraboo School District. There are other private schools within the study area as noted in Table 13. In addition, the University of Wisconsin–Baraboo has a campus located on the north side of the Village of West Baraboo.

Table 13 Schools in the study area

School	Location/District	Distance from WIS 33
Baraboo High School	Baraboo School District	0.2 miles
Jack Young Middle School	Baraboo School District	0.4 miles
East Elementary School	Baraboo School District	0.1 miles
West Elementary School	Baraboo School District	0.2 miles
Gordon L Willson Elementary School	Baraboo School District	0.2 miles
St. John's Lutheran School	Baraboo	0.2 miles
St. Joseph's Catholic School	Baraboo	0.4 miles
Rusch Elementary School	Portage Community School District	0.3 miles
St. John's Lutheran School	Portage	0.4 miles
St Mary's Catholic School	Portage	0.13 miles
UW-Baraboo	Village of West Baraboo	0.5 miles

Eleven schools are located near WIS 33 within the study area. Eight schools in the Baraboo area and three schools in the Portage area are located close to WIS 33. The proximity of schools to WIS 33 requires students to cross the highway between the schools and nearby neighborhoods on a regular basis.

Figure 5 School district boundaries



Agriculture

According to the 2012 U.S. Census of Agriculture, Sauk County was home to roughly 1,665 farms in 2012, and Columbia County had 1,564 farms. Agriculture makes up roughly 60 percent of the land area within the two counties with 332,649 acres used for farm activities in Sauk County and 307,973 acres in Columbia. The market value of Sauk and Columbia County's agricultural products were valued at $207 and $214.3 million respectively in 2012. Table 14 below summarizes the acreages of the primary crops and the total numbers of selected farm animals on farms in Sauk and Columbia Counties. Corn for grain, forage, and soybeans are the top three crops by acreage in both counties.

Table 14 Land in crops (acres) and selected farm animal totals for Sauk and Columbia counties

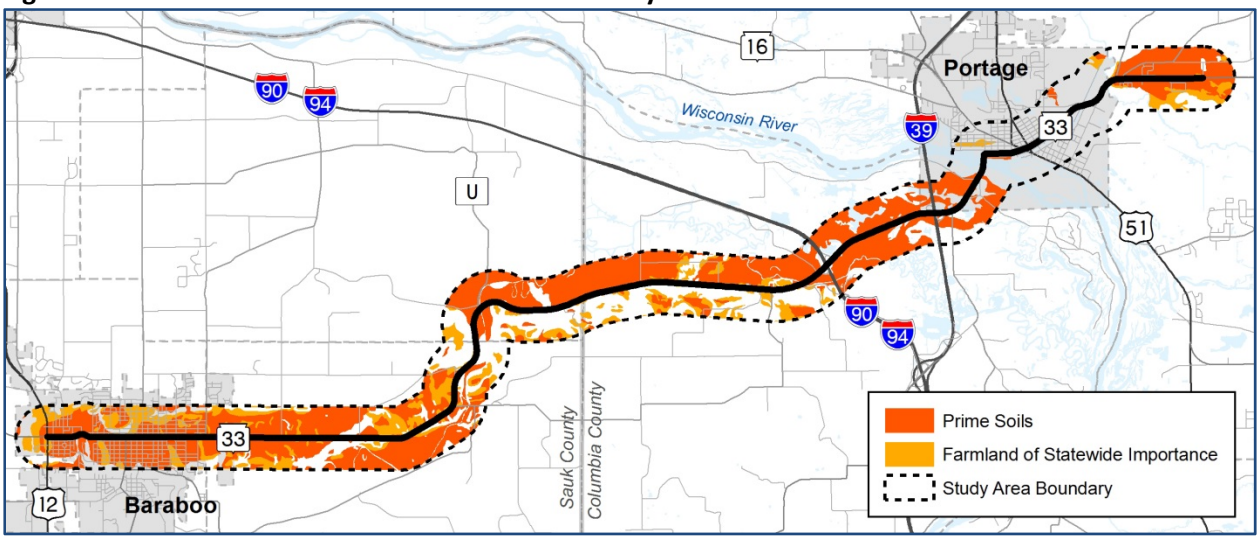
Product	Sauk County	Columbia County
Corn for grain (acres)	80,683	123,396
Forage (acres)	53,690	31,173
Soybeans (acres)	30,025	37,294
Corn for silage (acres)	17,059	12,510
Wheat (acres)	4,438	7,987
Poultry (layers)	82,193	(D)
Cattle	80,663	52,560
Hogs & Pigs	45,405	5,375
Sheep & Lambs	2,748	3,151
Poultry (broilers)	2,735	(D)
Pheasants	4,966	(D)

Source: 2012 Census of Agriculture
(D) Data withheld to avoid disclosing data for individual operations.

The success of agriculture in both Sauk and Columbia counties is partly due to the fact that they have high quality farmable soils. These soils are defined as Prime Farmland Soils by the U.S. Department of Agriculture, lands that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. In addition to prime farmland soils, soils of statewide importance are also identified as important for farm activities. Soils of statewide importance are those that are nearly prime farmland and are able to produce high crop yields when treated and managed well.

Throughout the study area, agriculture is the most prominent land-use activity outside of the incorporated areas. The WIS 33 study corridor spans a total of approximately 14,014 total acres. Approximately 62.8 percent or 8,801 acres of this area is considered as either prime soils or farmland of statewide importance. Within the study area, prime soils make up approximately 3,667 acres in Sauk County and 3,137 acres in Columbia County while farmland of statewide importance make up 1,325 and 670 acres respectively. Figure 6 illustrates the prime soils located in the WIS 33 study area.

Figure 6 Prime soils locations within the WIS 33 study area



Archeological and Historic Resources

A preliminary investigation of historic and archaeological resources along WIS 33 was conducted. Data was obtained from the Wisconsin Historical Society's (WHS) Architecture and History Inventory (AHI) database and Archaeological Sites Inventory (ASI). There are numerous historic structures and sites located in both the Baraboo and Portage areas that are adjacent to WIS 33. In addition to individual sites, the study corridor cities of Baraboo and Portage both contain Historic Districts. Historic Districts represent a group of buildings, properties, or sites that have been designated as historically or architecturally significant, and can vary greatly in size. The Downtown Baraboo Historic District is located south of the Study corridor. In Portage, WIS 33 passes through the Portage Retail Historic District (see Figure 7).

Figure 7 Portage Retail Historic District

Source: Portage Chamber of Commerce

Historic Sites

Prominent historic and potentially historic sites located adjacent or close to the corridor are noted in Table 15. Figures 8 through 10 show approximate locations of sites with potential historic value within the study corridor; numbers correspond to the prominent sites listed in Table 15.

Sites listed on the NRHP must meet a specific determination of eligibility that begins with the State Historic Preservation Office (SHPO) and concludes with the National Park Service (NPS). Any site that is deemed eligible, or potentially eligible, is protected. Criteria for eligibility include:

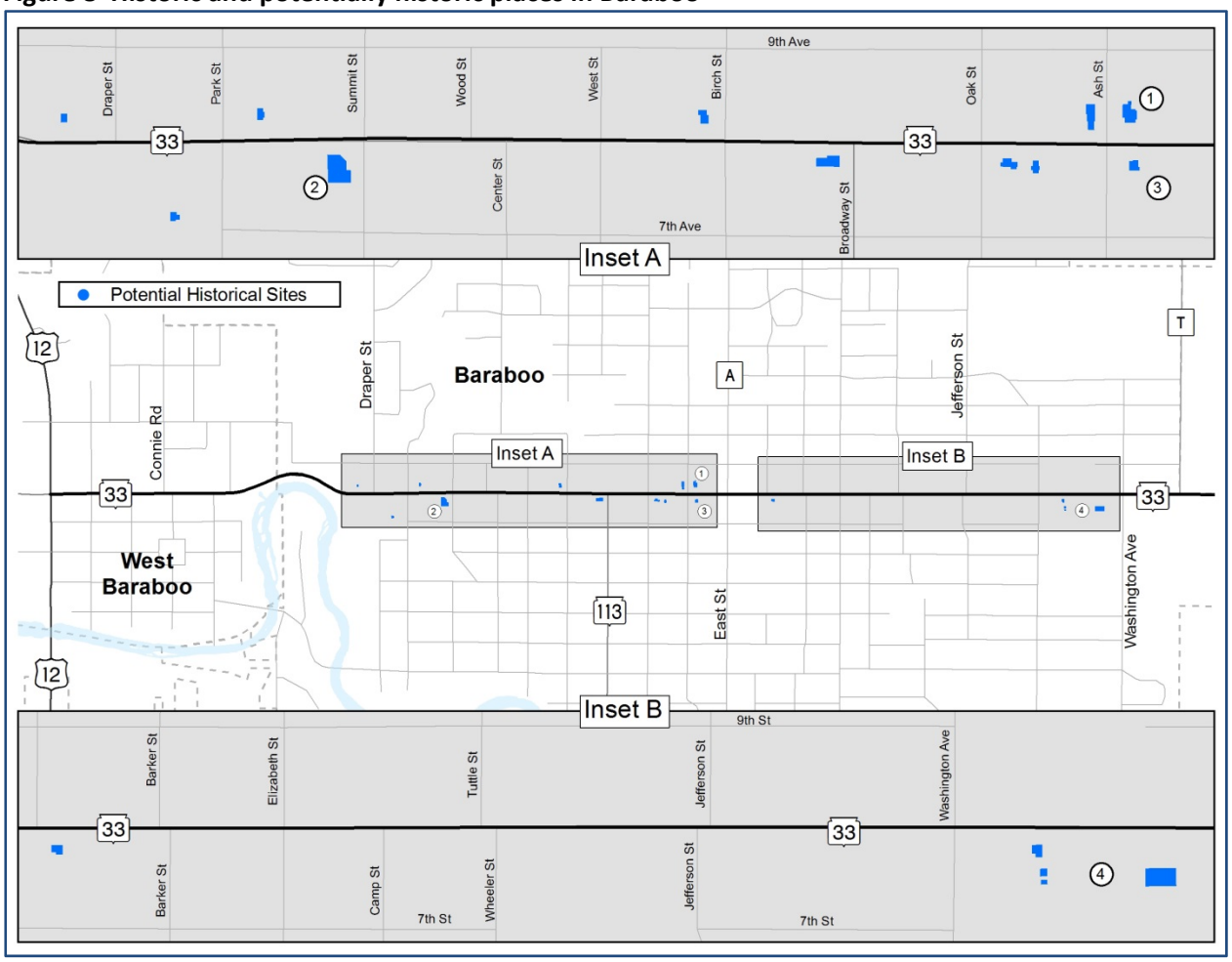
- Structures that are at least 50 years old and have not been significantly altered in architectural integrity
- Structures or places that have national, state, or local historical significance due to events, people, or specific activities

Table 15 Prominent historic and potentially historic places

Number	Location	Description	NRHP Date Listed
1	201 8th Street, Baraboo	Charles Ringling House	March 21, 1997
2	617 8th Avenue, Baraboo	Colonel D.S. Vittum House	n.l.
3	221 8th Street, Baraboo	Scneller House	n.l.
4	WIS 33 between Lincoln Street and Washington Street, Baraboo	Sauk County Fairgrounds Building	n.l.
5	Man Mound Road, South side, 1 Mile West of Johnson Road, Baraboo	Man Mound Park	Nov. 30, 1978
6	506 West Edgewater, Portage	Zona Gale House	Oct. 24, 1980
7	305 West Cook Street, Portage	St. Mary's Catholic Church	n.l.
8	301 East Cook Street, Portage	Zona Gale Center for the Arts	n.l.
9	505 East Cook Street, Portage	Henry Merrell House	July 8, 1993
10	1824 State Highway 33, Portage	Fort Winnebago Surgeon's Quarters	Oct. 28, 1970
11	Fort Winnebago Site	State Highway 33	May 17, 1979
12	1490 Agency House Road, Portage	Old Indian Agency House	Feb. 1, 1972
n/a	Roughly bounded by Adams, Pleasant, Lock and Franklin Streets, Portage	Church Hill Historic District (61 contributing structures/20 non-contributing)	Jan. 25, 1997
n/a	Junction of East Mullet and Dodge Streets, Portage	Industrial Waterfront Historic District (6 contributing structures)	March 17, 1995
n/a	Along WIS 33 between Wisconsin and Main Streets, Portage	Retail Historic District (63 contributing structures/20 non-contributing)	April 27, 1995
n/a	Along WIS 16 and MacFarlane Road, Portage	Society Hill Historic District (195 contributing structures/38 non-contributing)	March 5, 1992
n/a	Between the Fox and Wisconsin Rivers, Portage	Portage Canal	August 26, 1977

Source: Wisconsin Historical Society

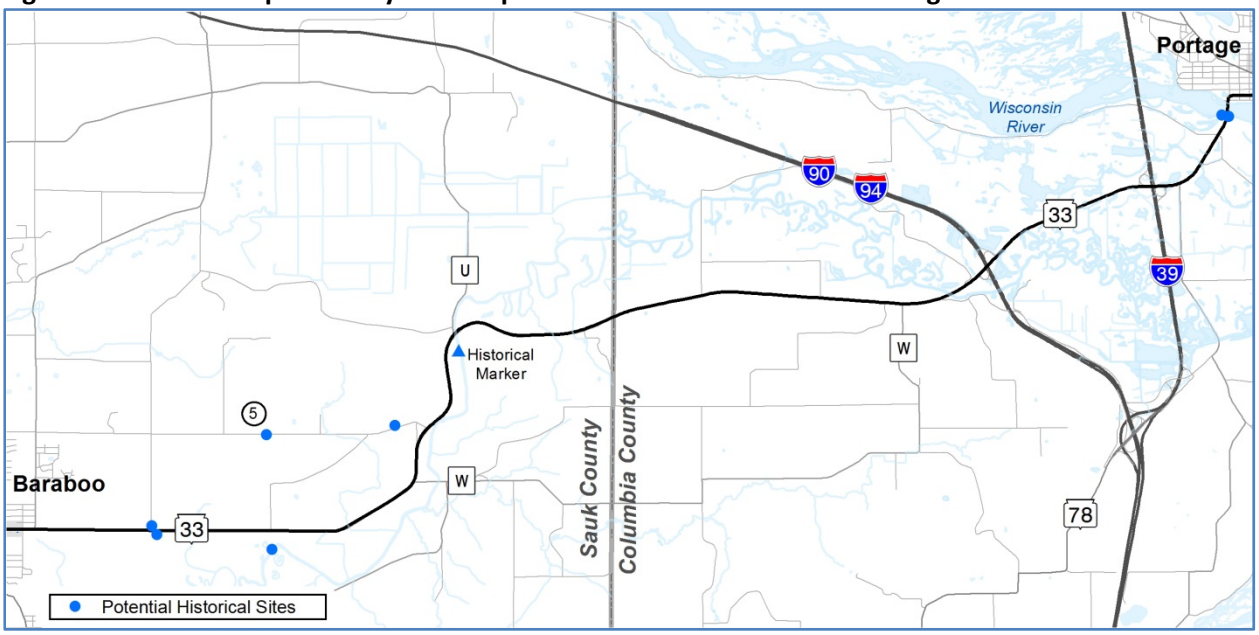
Figure 8 Historic and potentially historic places in Baraboo



The city of Baraboo is named after the Baraboo Range and is most notable as the headquarters of the Ringling Brothers and Barnum Bailey Circus. Though the circus no longer operates, the Ringling Brothers left behind several historic buildings of note in the city including the AI Ringling Theatre located at 136 4th Avenue (south of the study corridor), and other notable residences. The Downtown Baraboo Historic District (also south of the study corridor) includes the Sauk County Courthouse bounded by the Baraboo Town Square and surrounded by 75 commercial and civic buildings dating back as far as the late 1800's.

Between the city of Baraboo and Portage, a notable historic site includes Man Mound Park, located along Man Mound Road and North of WIS 33. The park contains a prehistoric effigy mound in the shape of a horned humanoid figure. Man Mound is the only surviving anthropologic effigy mound in North America and was preserved as a park in 1908.

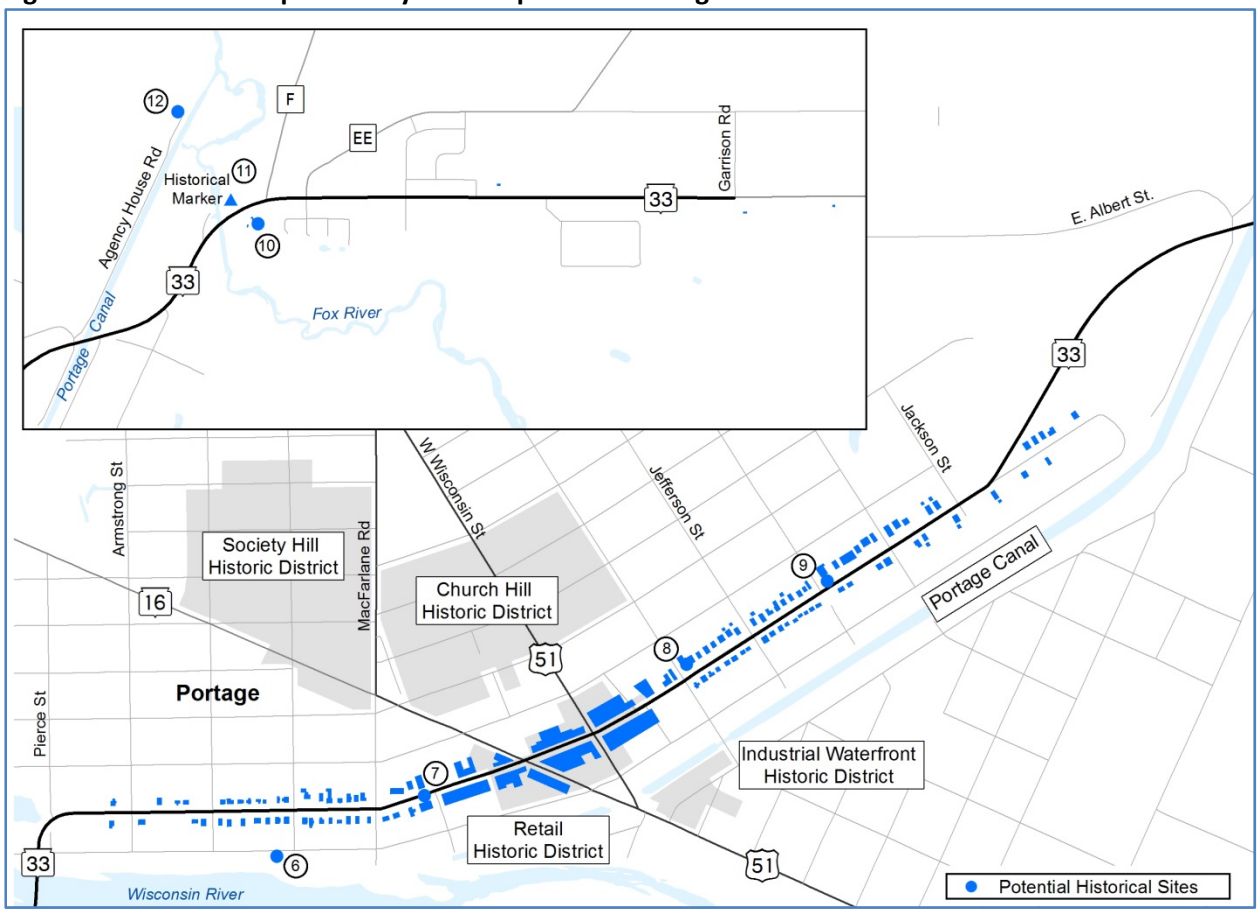
Figure 9 Historic and potentially historic places between Baraboo and Portage



The city of Portage was named for the overland trail that connected the Fox River with the Wisconsin River and dates from a time period when Rivers were the primary mode of travel. Travelers would portage their canoes along this narrow point between the two rivers. The connection was an important location for interregional travel and was later the site of Fort Winnebago. In 1876 the Portage Canal was constructed to connect the two rivers.

Portage contains several notable historic sites and districts either located directly on WIS 33 or in close proximity. Notable sites that draw tourist traffic include the Fort Winnebago Surgeon's Quarters located on WIS 33 just east of the city, and the Old Indian Agency House accessible from the WIS 33/East Albert Street intersection. Both of these sites are located near the historic Portage Canal which crosses WIS 33 just east of East Albert Street. WIS 33 (Cook Street) includes the Portage Retail Historic District located in the downtown area and includes several historic buildings dating back to the early 1900's.

Figure 10 Historic and potentially historic places in Portage



Archaeological Sites

Table 16 provides results from the Wisconsin Historical Society (WHS) ASI database including cemeteries and burial sites located adjacent to WIS 33. Archeological sites are listed in the database if they have evidence of human burial or are places of cultural value, such as Native American activity or early European settlement. Sites can be prehistoric or historic and are generally protected under state and federal law. Consultation is required for many archeological and burial sites and at a minimum is requested by the WHS for any of the other sites. Cemeteries and some burial sites have also been identified by field survey and the ASI database.

Table 16 Previously recorded archeological resources

Location	ASI Number	Name	Description
Village of West Baraboo	10635	Lyons Village Site and Cemetery	Cemetery
Village of West Baraboo	63347	Rowan Cabins	Other
City of Baraboo	10646	Fair Ground Mounds	Burial
Town of Greenfield	26981	Burton Campsite	Campsite
Town of Greenfield	10675	Garrisonville Bear Effigy	Burial
Town of Greenfield	11343	McGann Mounds	Burial
Town of Greenfield	10674	Garrisonville	Burial
Town of Greenfield	10678	Cook Mounds	Burial
Town of Greenfield	24727	Cook Gravestone	Burial
Town of Fairfield	10665	Lower Narrows Group 1	Burial

Location	ASI Number	Name	Description
City of Portage	23973	Portage Levee	Other
City of Portage	10977	Red Bridge Burials	Burial
City of Portage	10984	Pawnee Blanc Mounds	Burial
City of Portage	62607	Portage Burial Mounds	Burial
City of Portage	62606	Whitney-Merrell Cabins	Other
City of Portage	62303	Portage Canal	Other
Town of Caledonia	13437	Welsh Cemetery	Cemetery
Town of Winnebago	11453	Fort Winnebago	Other
Town of Winnebago	10936	Fort Winnebago Village	Other

Source: Wisconsin Historical Society

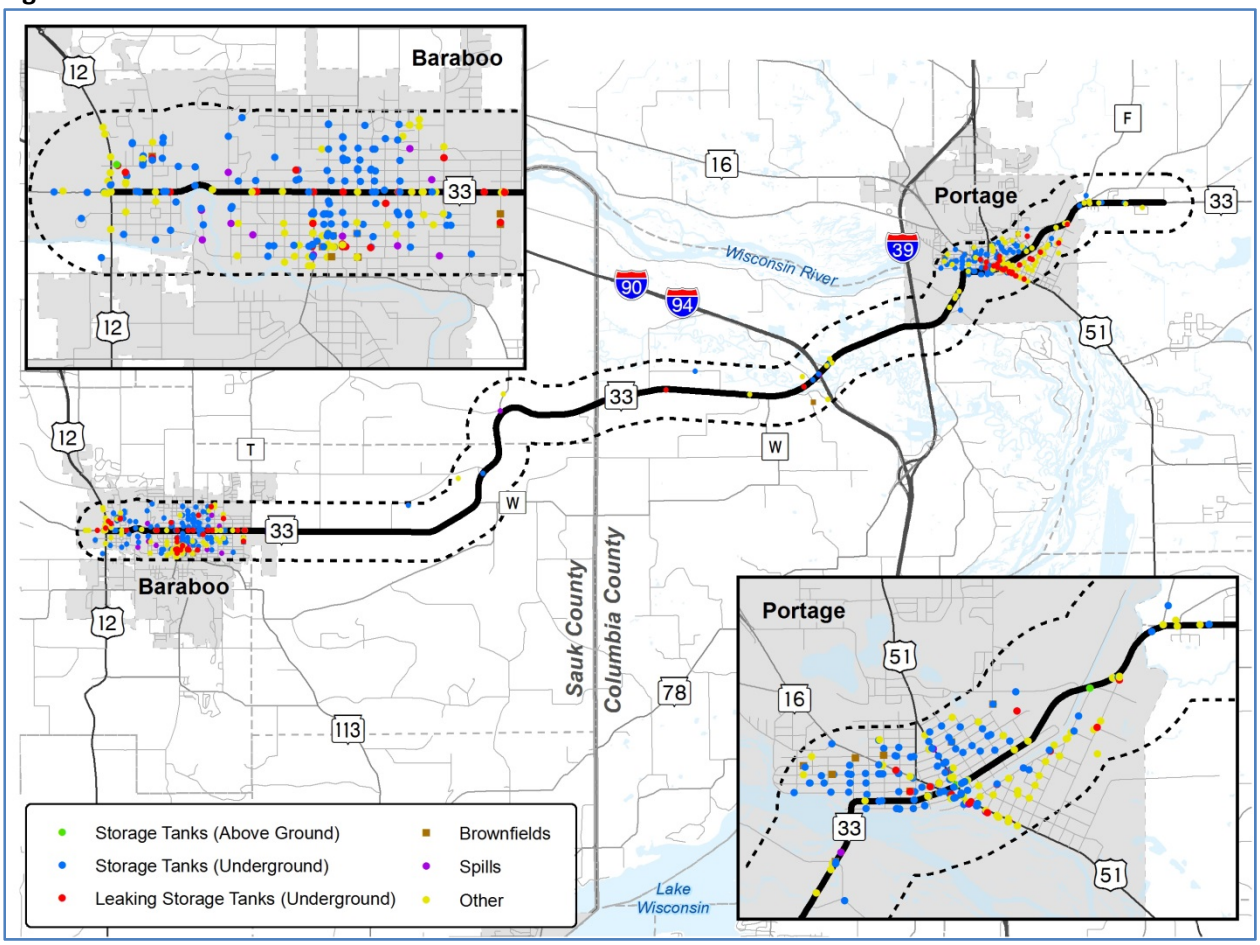
The review of sites along the length of the corridor is not intended to replace a comprehensive environmental review and documentation. Historic and cultural resource surveys should be conducted prior to any WIS 33 improvements to determine the presence of important archeological, historical, or architectural resources. Such studies might be required under the National Environmental Policy Act (NEPA) Wisconsin Environmental Policy Act (WEPA), Section 106 of the National Historic Preservation Act, and Section 4(f) of the Department of Transportation Act of 1966.

Hazardous Materials

A search of databases containing information on sites with the potential to contain hazardous substances was obtained from Environmental Data Resources, Inc. (EDR). The search included Federal, State and Tribal databases and is included in Appendix A. The search was conducted for the study area, and identified a total of 758 sites located within 0.5 mile of the WIS 33 centerline (Figure 11). Of these sites, further review of GIS data determined that there are 172 sites located adjacent to WIS 33 with the potential to contain hazardous materials. In addition to sites with sufficient information to be mapped, there were 412 sites identified in various databases that could not be located due to insufficient information. The breakdown of sites located adjacent WIS 33 includes the following:

- Sixty-two sites that contain registered aboveground/underground storage tanks (AST/UST)
- Four sites listed as Brownfields
- Two Drycleaners (EDR Database) that may use or store hazardous chemicals
- Fifteen Gas Stations (EDR Database) which store and handle fuel
- Seven sites that are either regulated or monitored by the Environmental Protection Agency (FINDS)
- Two sites that have been inspected for and that may contain lead (LEAD)
- Fifteen sites that had a report of leaking underground storage tanks (LUST)
- Twenty-four sites that formerly appeared as leaking underground storage tank sites in historic databases, but that no longer appear in government records (RGA LUST)
- Eight sites identified on the State Hazardous Waste Sites listing (SHWIMS)
- Five sites that may have had a discharge of a hazardous material into the environment (SPILLS)
- Eight sites that either manufacture or store hazardous materials (Tier 2)
- One site known to have or is currently or has a high potential to cause environmental pollution (WRRSER)
- Nineteen sites that are included in other hazardous materials related databases

Figure 11 Potential hazardous materials sites



The searched databases include both current and past sites, sites that have undergone remediation and have been closed by the appropriate regulatory agency, and sites that are currently open. Listed sites include those that have stored hazardous substances and/or petroleum products and have an existing release, a past release, or material threat of a release into the soil, groundwater, or surface water. However, the listing of a site on a particular database does not always indicate a violation or a release at that site, and sites that have reported violations or releases do not necessarily pose an environmental hazard to the surrounding area. Likewise, sites that have undergone remediation or have not reported violations or releases may still pose a threat.

This assessment is for planning and reference purposes and is not intended to fulfill the requirements for a Phase 1 Environmental Site Assessment as described in ASTM Practice E 1527-05.

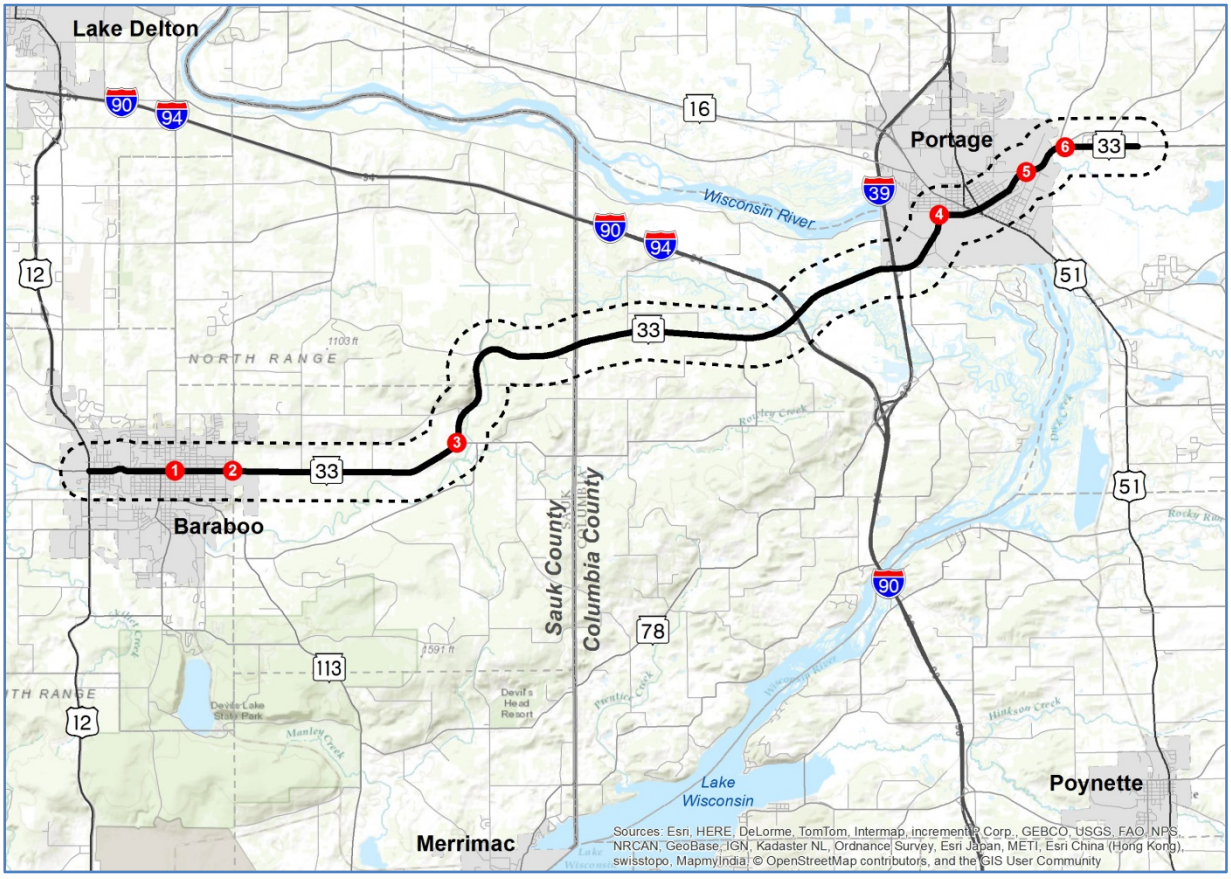
Aesthetics

The WIS 33 study corridor falls within the two ecological landscapes, the Western Coulee and Ridges and the Central Sand Hills. These areas of the state have fertile soils, prosperous agriculture, and aquatic resources that support a diversity of species and recreational activities. Most of the original native forests, prairies, and wetlands have been removed or drastically altered by human activities, however,

some areas such as the Pine Island and Swan Lake Wildlife Area have had minimal alterations to their landscape.

WIS 33 itself is largely flat or gradually sloping within the study area. The surrounding terrain varies between relatively flat and rolling hills that are part of the Baraboo Range. The rolling terrain begins at Man Mound Road and parallels the south side of WIS 33 to the I-90/94 corridor. The remaining areas of the study corridor are relatively flat comprised of either agricultural, open lands, or wooded floodplains. Figure 12 provides an overview of the corridor and its topography; locations have been numbered on the exhibit to correspond with photographs provided in this section.

Figure 12 Topographic features in the WIS 33 study area



The western terminus of the study area is located within the urbanized setting of the Village of West Baraboo and city of Baraboo. In this area, WIS 33 is a four-lane undivided roadway passing through a mix of highway dependent commercial and residential neighborhoods (Photo 1, Figure 13).

Figure 13 Image of WIS 33 in the city of Baraboo (Park Street looking east) (photo 1)

Just east of the city of Baraboo, at County T, WIS 33 becomes a rural two-lane state highway characterized by medium-sized family farms that support large fields of row crops. The Baraboo River and associated floodplains and open lands can be seen to the south of WIS 33 in this area (Photo 2, Figure 14).

Figure 14 WIS 33 at County T looking east (photo 2)

East of County X (Photo 3, Figure 15), the hills of the Baraboo Range become more prominent with a crossing of the Baraboo River at County U where it will parallel WIS 33 on the north side of the highway.

East of County U to the I-90/94 interstate, the corridor is characterized by wooded hills located adjacent and to the south of WIS 33 with agricultural fields located on the north side of the highway.

Figure 15 WIS 33 at County X looking north (photo 3)

Between the I-90/94 and I-39 interchanges, low-lying wooded and open areas are located along both sides of WIS 33. The Baraboo River crosses WIS 33 just west of the I-90/94 corridor near Cascade Mountain Road and follows WIS 33 on the south side of the highway before heading south along the I-39 corridor to empty into the Wisconsin River.

The easterly approach to the city of Portage from WIS 33 includes the crossing of the Wisconsin River, where the highway rapidly enters a residential neighborhood (Photo 4, Figure 16). Within the city of Portage WIS 33 includes two historic neighborhoods on either side of a historic downtown setting.

Figure 16 WIS 33 at Pierce Street looking east (photo 4)

WIS 33 Departs the east side of the city of Portage passing by the Columbia County Jail located along the north side of WIS 33, before crossing over a railroad corridor and descending into a rural/suburban area with a rich historical background. East of the city of Portage, WIS 33 crosses over both the historic Portage Canal and the Fox River (Photo 5, Figure 17).

Figure 17 WIS 33 at East Albert Street looking west (photo 5)

Just east of the Fox River crossing, WIS 33 passes through a suburban residential area which transitions back to a rural agricultural feel by the time the eastern termini of Garrison Road is reached (Photo 6, Figure 18).

Figure 18 WIS 33 at County EE, looking east (photo 6)

5.2 Environmental Conditions

Wetlands

Wetlands can be defined as an area where water is at or near the soil surface during a period of time long enough to support hydrophytic (water-loving) vegetation. In Wisconsin, these areas vary greatly from seasonally-saturated to permanently-inundated areas.

Wisconsin currently contains an estimated 5,385,290 acres of wetland or roughly 15.5 percent of the surface area of the state. Approximately 15.2 percent of the surface area of Columbia County and 6.0 percent of Sauk County is considered wetland, representing 1.4 percent and 0.6 percent respectively of the states total wetland area. An estimated 2,208 acres of wetlands were identified within the study area, representing roughly 15.8 percent. These wetlands represent approximately 0.04 percent of Wisconsin's estimated wetlands or 2.05 percent of Columbia and Sauk Counties' wetlands. Table 17 below lists wetland types that exist in the study area.

Locations of wetlands within ½ mile of the WIS 33 study corridor centerline were identified using the Wisconsin Wetland Inventory (WWI), aerial photography and topographic maps. WWI wetland classifications were converted to WisDOT wetland bank types. *Wetland boundaries were not determined based on regulatory wetland delineation methods. The information gathered is meant to give an estimate of the wetland acreage and type that may be located within the study area and is intended for planning purposes only.*

Table 17 Wetland types in the study area

WisDOT Wetland Type	Wisconsin Wetland Inventory (subclasses and modifiers)	Approximate acreage
M Wet Meadow	E(1,2)(H, K)(a,f,g,w) F0Kw, F2Kw	648
RPF Riparian Forested	T(3,5)(K,H)(a,w) T(3,5)/E1(K,H)(a,f,g,w,wv)	1,185
SS Shrub Scrub	S3(K,H)(g,w),T3/S3K S3/E(1,2)(K,H)(g,w)	375

Source: Wisconsin Wetlands Inventory, WDNR

Based on the wetland data reviewed, approximately 1,185 acres of riparian forested wetlands, 375 acres of shrub scrub, and 648 acres of wet meadow are located within the WIS 33 study corridor.

Riparian Forested Wetland (RPF)

This classification of wetlands includes wooded riparian wetlands, floodplain forests, shrub carrs, and alder thickets in a riverine or lacustrine system. These wetlands range from temporarily or permanently saturated to seasonally inundated and are dominated by deciduous hardwoods greater than 20 feet in height. Vegetation representative of RPF wetlands include silver maple, green ash, river birch, eastern cottonwood, American elm, and black willow. The herbaceous undergrowth can range in diversity dependent on the degree and length of saturation or inundation.

Shrub Scrub (SS)

This classification of wetlands includes shrub swamp, shrub carr, and alder thickets characterized by vegetation dominated by young trees and shrubs less than 20 feet in height. Hydrology ranges from

temporarily or permanently saturated to seasonal or permanent inundation. The shrub layer of these wetland communities are dominated by willow, dogwood, and alder; the herbaceous layer is typically dominated by a diversity of sedges, rushes, grasses, and forbs.

Wet Meadow (M)

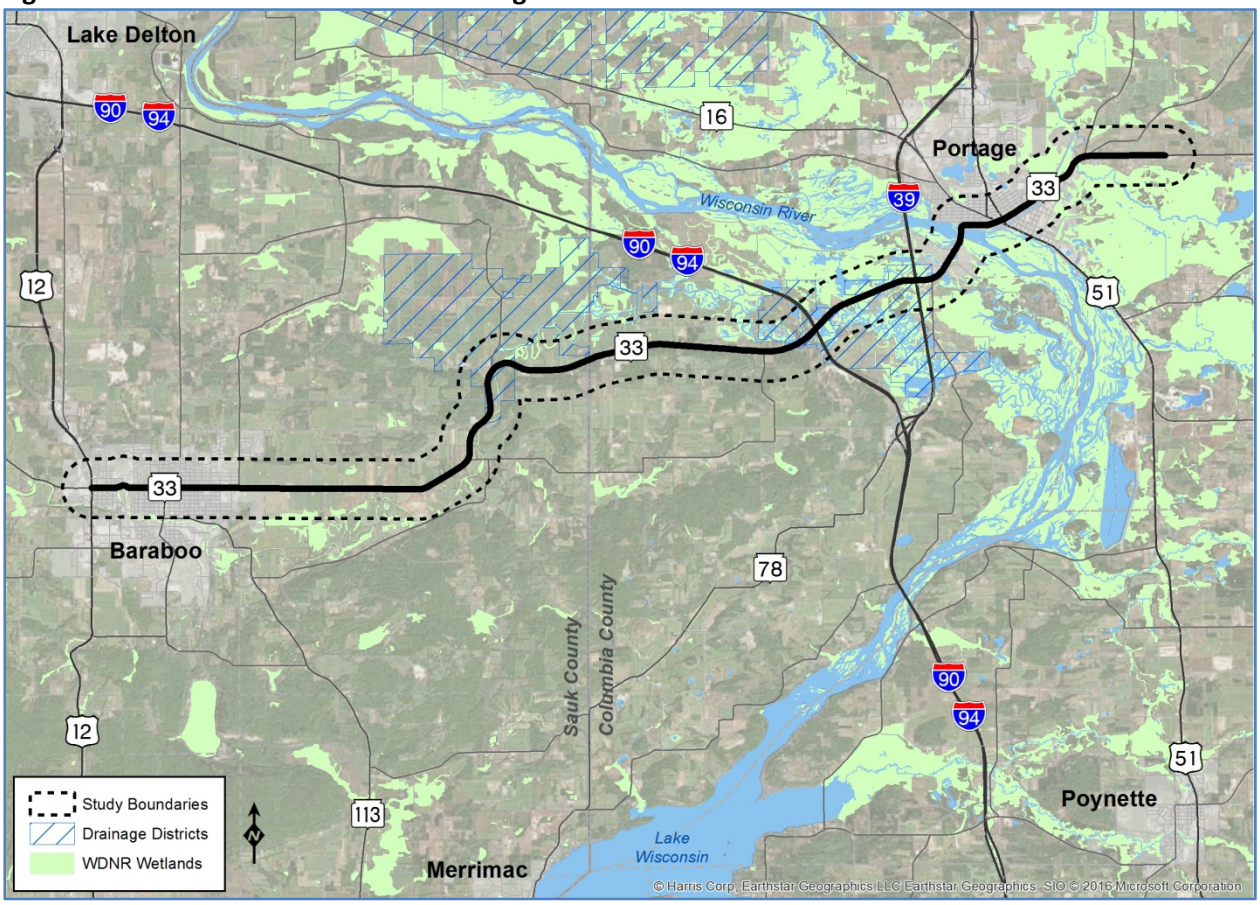
This classification includes wet and sedge meadows, wet prairies, vernal pools, and fens dominated by herbaceous plants and characterized by hydrology ranging from seasonal saturation to temporary inundation. Depending on the location and land uses surrounding these wetlands, vegetation may be comprised of a rich diversity of sedges, grasses, rushes, and forbs, or instead may be dominated by a monotypic stand of cattail or wide spread distribution of reed canary grass.

The wetlands described above are important features to the ecosystem and landscape of the WIS 33 study corridor, floodplains of the Wisconsin, Baraboo and Fox Rivers, as well as the state of Wisconsin as a whole. WisDOT has partnered with WDNR to develop a cooperative agreement between the agencies to mitigate wetland impacts.

Drainage Districts

Nearly one-third of Wisconsin's farms use small-scale drains to remove excess water from agricultural fields. These systems are regulated through the creation of drainage districts under the oversight of a county drainage board. The WIS 33 corridor passes through the Lower Baraboo Drainage District and the Leach Creek Subdistrict of the Lower Baraboo Drainage District, which fall under the oversight of the Columbia County Drainage Board. Figure 19 includes the locations of drainage districts in the vicinity of the study area.

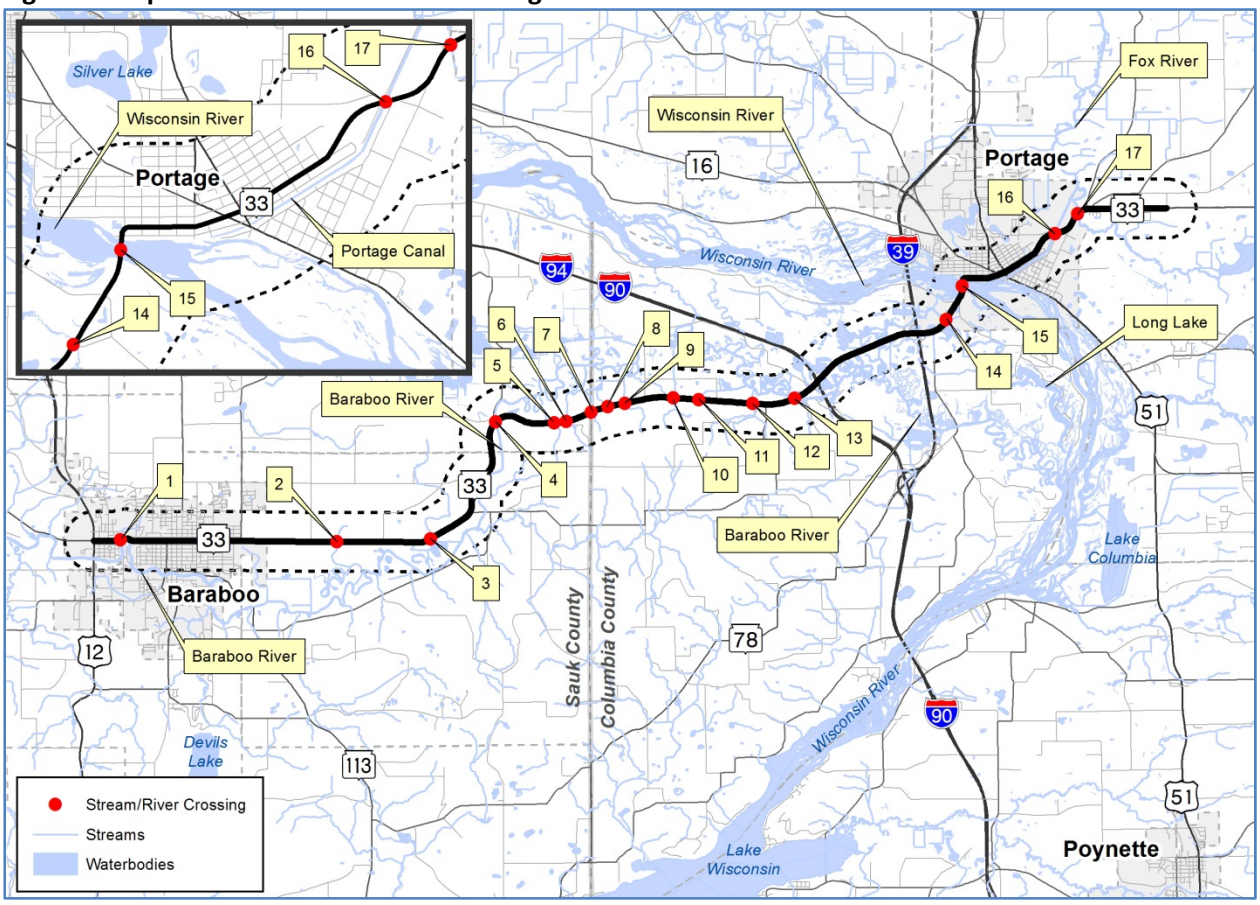
Figure 19 Wetland boundaries and drainage districts



Open Water, Streams, and Floodplains

WisDOT FDM Procedure 24-5-5 discusses potential impacts that highway projects could have on rivers, streams, and lakes. *Rivers or streams* are defined as either naturally occurring or human-made watercourses that have distinguishable beds and banks and a flow gradient (horizontal movement of water). They are components of a drainage basin in a watershed and usually serve as habitat for aquatic species. *Lakes* are bodies of water formed in depressions of the earth's surface. Figure 20 includes open water features located in the study area.

Figure 20 Open Water features and crossings of WIS 33



Open Water

There are several small ponds located within the study area ranging in size from as small as 2.5 acres, to more than 12 acres. Ponds located along WIS 33 include oxbows associated with the Baraboo, Wisconsin or Fox Rivers and manmade ponds for drainage. There are no named lakes located within ½ mile of the study area, however, Devils Lake is located to the south of the Baraboo Area, and Silver Lake is located within the city of Portage and north of WIS 33. Lake Wisconsin is a large water feature along the Wisconsin River located seven miles to the south of WIS 33. Lake Columbia, located along US 51 south of the city of portage is a manmade impoundment used for cooling the Wisconsin Power & Light Plant.

Streams

The WIS 33 corridor is located in both the Mississippi River Greater Basin and the Lake Michigan Greater Basin. The dividing line between these two Basins passes through the city of Portage just north of the Wisconsin River. The WIS 33 study area drains into the Lower Baraboo River Watershed and the Buffalo and Puckaway Lakes Watershed. The Wisconsin River is the dominant river in the study corridor located just south and west of the city of Portage. The Baraboo River parallels the WIS 33 corridor crossing the highway twice before emptying into the Wisconsin River. East of the city of Portage, the Fox River crosses WIS 33 just west of the Portage Canal. The Wisconsin River and the Fox River are both on the WDNR list of impaired waterways, indicating pollution concerns. Several smaller creeks and tributaries

feed into these larger rivers. Table 18 lists streams within the study area that cross WIS 33. The crossing number in the table corresponds to the crossings shown in Figure 20 above.

Table 18 Stream crossings

Crossing Number	WBIC #	Stream Name	Location	Community
1	1274100	Unnamed	280 feet east of Hill Street	Baraboo
2		Unnamed	2,310 feet east of Rocky Hill Road	Greenfield
3	1273300	Unnamed	4,250 feet east of Johnson Road	Greenfield
4	1271100	Baraboo River	175 feet east of County U	Fairfield
5		Unnamed	1,750 feet west of Breezy Hill Road	Fairfield
6		Unnamed	650 feet west of Breezy Hill Road	Fairfield
7		Unnamed	1,750 feet east of Breezy Hill Road	Caledonia
8		Unnamed	3,300 feet east of Breezy Hill Road	Caledonia
9		Unnamed	1,780 feet west of Tritz Road	Caledonia
10		Unnamed	2,650 feet east of Tritz Road	Caledonia
11		Unnamed	1,600 feet west of Main Street Road	Caledonia
12	1271500	Unnamed	3,300 feet east of Main Street Road	Caledonia
13	1271100	Baraboo River	500 feet east of Cascade Mountian Road	Caledonia
14		Unnamed	50 feet west of Caledonia Street	Portage
15	1179900	Wisconsin River	165 to 725 feet west of Edgewater Street	Portage
16	179500	Portage Canal	200 feet east of Agency House Road	Portage
17	117900	Fox River	375 feet east of Wauona Trail	Portage

Source: WDNR Surface Water Data Viewer

Based on WDNR trout stream maps (see Appendix A) there are three Class I trout streams within the study area. Class I trout streams are defined by WDNR as high quality trout waters that have sufficient natural reproduction to sustain populations of wild trout, at or near carry capacity. Consequently, streams in this category require no stocking of hatchery trout. These streams or stream sections are often small and may contain small or slow-growing trout, especially in the headwaters (Source: WDNR).

The first trout stream in the study area is located on the east end of the City of Baraboo, it is identified as Creek 6-9 and terminates about 400 feet south of the WIS 33/County T intersection. The other two include Boulder Creek and Rowley Creek that feed into the Baraboo River about 1,200 feet south of the WIS 33/County X intersection.

Floodplains

Floods are Wisconsin's most common natural disaster and therefore require land use plans to minimize their effects. Benefits of floodplain management include the reduction and filtration of sediments into area surface waters, storage of floodwaters during regional storms, habitat for fish and wildlife, and reductions in direct and indirect costs due to floods.

The Federal Emergency Management Agency (FEMA) designates floodplain areas. A flood is defined as a general and temporary condition of partial or complete inundation of normally dry land areas. The area inundated during a flood event is called the floodplain.

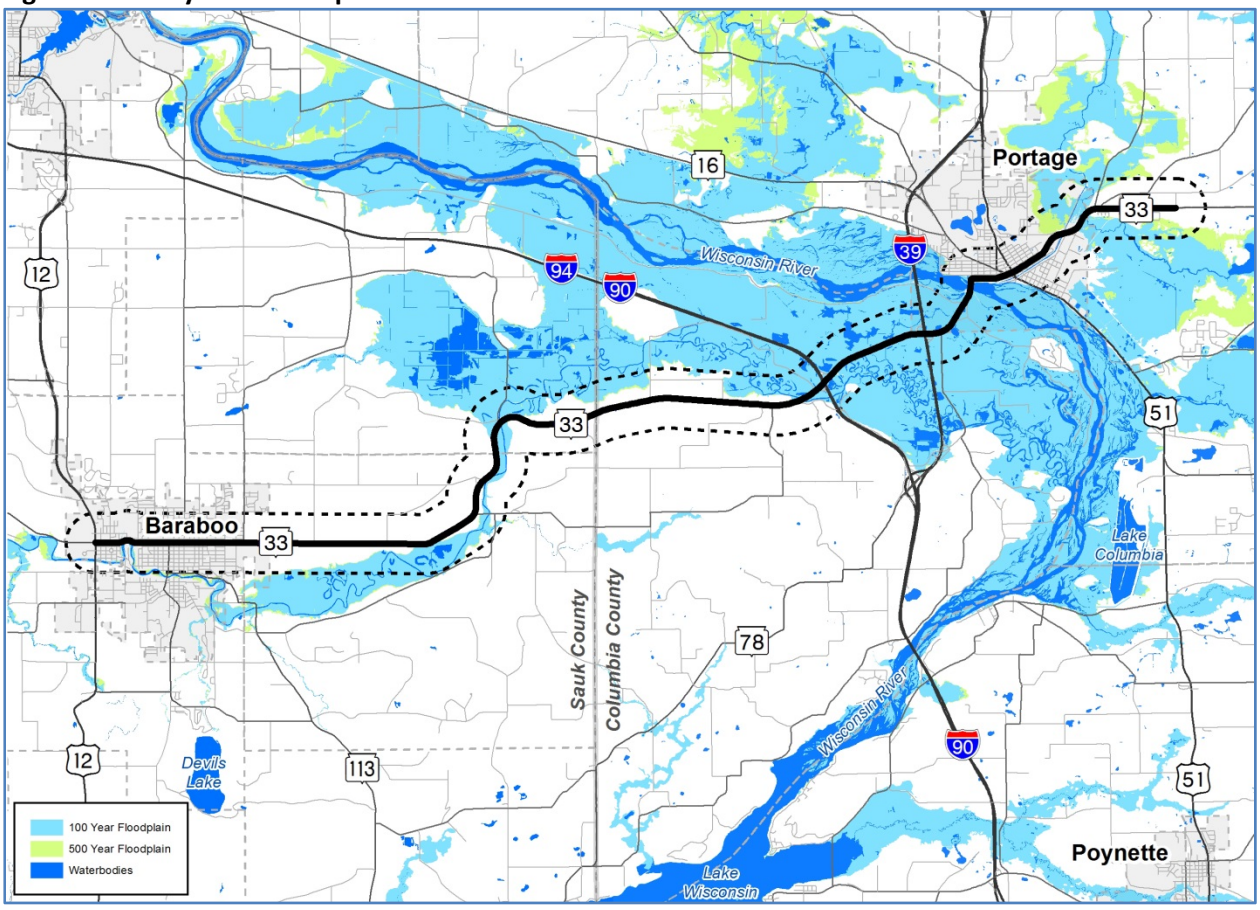
The floodplain includes the floodway, the flood fringe, and other flood-affected areas. The floodway is the channel of a river and the adjoining land needed to carry the 100-year flood discharge. Because the floodway is characterized by rapidly moving and treacherous water, development is severely restricted in a floodway. The flood fringe, which is landward of the floodway, stores excess floodwater until it can

be infiltrated or discharged back into the channel. During a regional flood event, also known as the 100-year, one percent or base flood, the entire floodplain or Special Flood Hazard Area (SFHA) is inundated to a height called the regional flood elevation (RFE). (*Source*: WDNR Floodplain & Shore land Zoning Guidebook)

Floodplain areas generally contain important elements of the natural resource base such as woodlands, wetlands, and wildlife habitat. Therefore, they constitute prime locations necessary for park, recreation, and open space areas. Every effort should be made to discourage incompatible urban development of floodplains and encourage compatible park, recreation, and open space uses (Source: WDNR Floodplain & Shore land Zoning Guidebook).

Thirty-five percent (4,385 acres with an additional 433 acres protected by levee) of the WIS 33 study corridor lies within the 100-year floodplain (see Figure 21). Floodplains in the WIS 33 study corridor tend to be located near the Baraboo, Fox, and Wisconsin Rivers and associated wetlands. Forty five percent of the city of Portage lies within a floodplain (Source: Federal Emergency Management Agency).

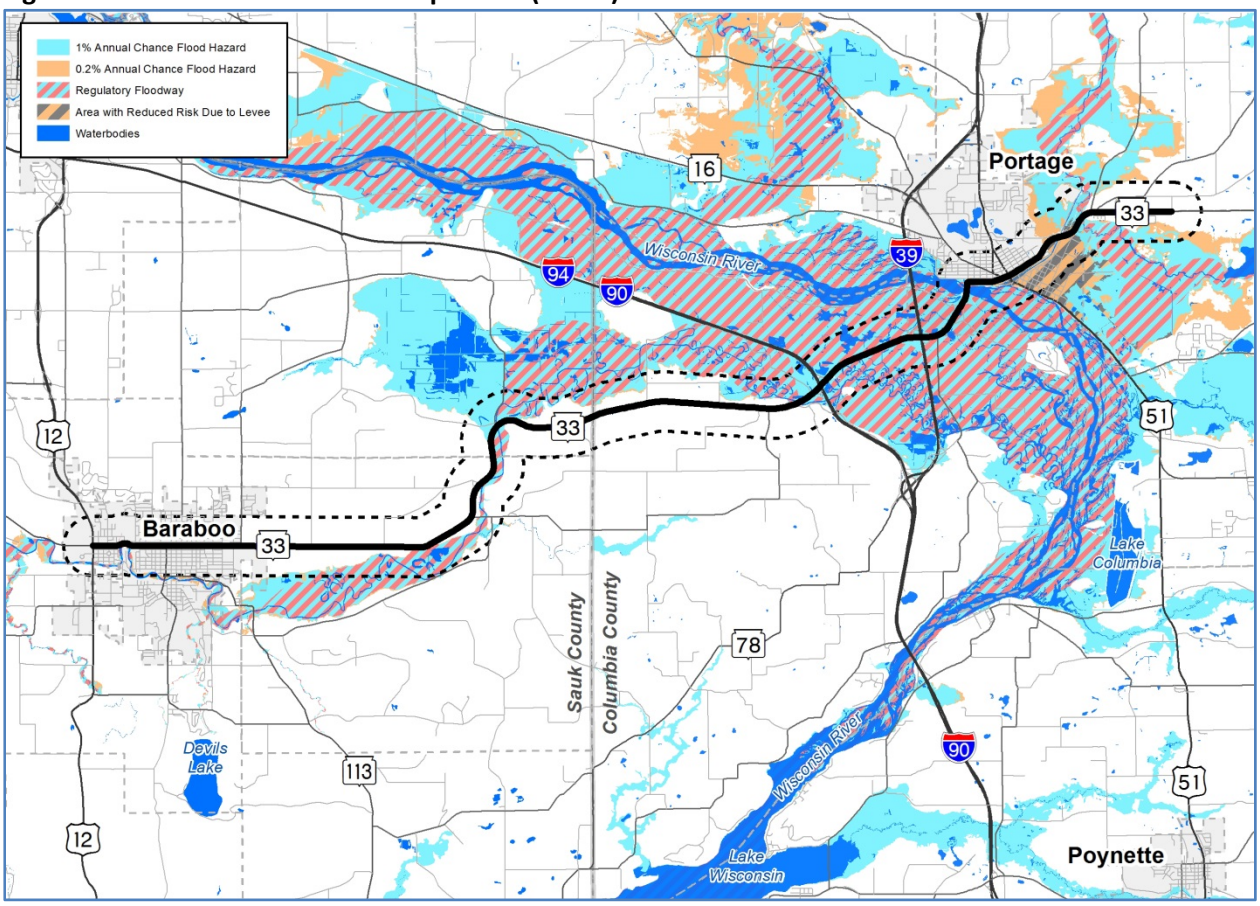
Figure 21 Study Area Floodplains



Flood maps, known officially as Flood Insurance Rate Maps (FIRMs), show areas of high and moderate to low flood risk. Communities use the maps to set minimum building requirements for coastal areas and floodplains, lenders use them to determine flood insurance requirements, and the Federal Emergency Management Agency (FEMA) uses them to help determine the cost of flood insurance (Source: Federal Emergency Management Agency).

Flood maps show areas of high, moderate, and low flood risk as a series of zones. High-risk zones, also known as Special Flood Hazard Areas (SFHA's), begin with the letters "A" or "V." Moderate- to low-risk zones, known as Non-Special Flood Hazard Areas (NSFHA's), begin with the letters "X", "B" or "C." There are also areas where the flood hazard is undetermined, labeled as Zone D (See Figure 22).

Figure 22 Flood Insurance Rate Map Zones (FEMA)



Upland Habitat

The study corridor falls within the Western Coulee and Ridges Ecological Landscape and the Central Sand Hills Ecological Landscape. The Western Coulee and Ridges Ecological Landscape is large area in western Wisconsin that is composed of Paleozoic sandstones and Cambrian and Ordovician age dolomites. Precambrian quartzite occurs in the Baraboo Hills which are near the eastern edge of the area. The soils include loess, loamy to clayey residuum, and loamy colluvium over limestone or sandstone. The Central Sand Hills Ecological Landscape is a small area for central Wisconsin. It is composed of Precambrian rhyolite bluffs and Ordovician St. Peter sandstone with a thin dolomite cap. Soils for this landscape include sands and organic soils that underlie wetlands.

Historically, vegetation in the Central Sand Hills consisted of 75 percent oak forests and oak opening with the remaining mostly scattered wetlands consisting of mostly marsh and sedge meadow. Currently vegetation consists of agricultural cropland, forested upland, and nonnative grassland. Remaining forests occupy only about 34 percent of the land area and consist primarily of oak and pine.

In the Western Coulees and Ridges vegetation has historically consisted of 70 percent oak forest, oak openings, and oak woodland. Maple-basswood forest and upland brush covered most of the remaining area. Currently vegetation consists of agricultural cropland, forested lands, and nonnative grassland. Remaining forests include roughly 36 percent oak species with the rest of the area consisting of northern or central hardwoods and aspen-birch (Source: WDNR Ecological Landscapes).

Natural Communities

Twelve natural communities have been identified by the WDNR Natural Heritage Inventory (NHI) that are located within the WIS 33 study area. Natural communities are important for supporting species under distress and others of concern to the state. Definitions of these community types can be found online at the Wisconsin Department of Natural Resources Endangered Resources Program website (http://dnr.wi.gov/topic/endangeredresources/communities.asp). Additional consultation with federal, state, and local agencies may be necessary to determine the likelihood of communities still occurring and to verify that other sensitive communities do not exist within the study corridor. The twelve natural communities found in the WIS 33 corridor include:

- Tallgrass prairies (these include the mesic, wet-mesic, and dry-mesic)
- Dry prairie or goat prairie
- Dry sand prairie
- Lowland (wet and wet-mesic) prairies
- Marshes
- Shrub
- Oak savannas
- Dry hardwood forest
- Dry-mesic hardwood forest
- Herbaceous communities
- Southern mesic forest, or northern hardwoods
- Upland forests

Threatened, Endangered and Species of Special Concern

According to information provided by the Wisconsin Department of Natural Resources (WDNR) in its 2016 update to the Natural Heritage Inventory (NHI), 104 threatened, endangered, and special concern species may be present within the WIS 33 study corridor. These species have either been previously identified in the vicinity of the study area, or may be present because they are known to exist within Columbia and Sauk Counties.

The documented occurrence of a species does not mean that the species or natural area is still located within the study corridor and, likewise, the absence of documentation does not eliminate the potential for other threatened, endangered, and special concern species, and natural areas to be located within the corridor. Due to the sensitivity of these species and/or communities, the exact location cannot be disclosed and further regulatory communication is recommended to avoid impacts to these species if construction is to occur within the study area. Additional information regarding these species and sensitive communities can be found on the WDNR NHI website. *Information contained within this report*

or derived from the website should be used as guidance during planning and is not intended to fulfill WEPA or NEPA requirements.

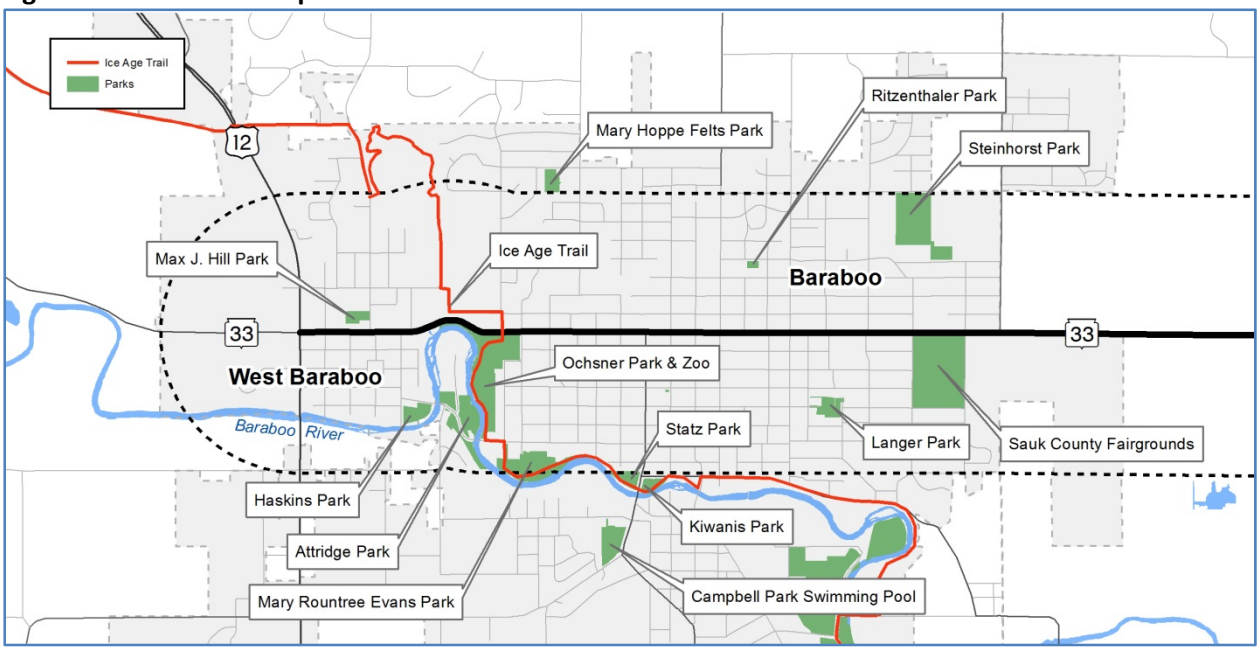
Within the study area the 104 species include 15 species listed as endangered, 35 species listed as threatened, and 54 species of special concern. Species include 16 species of birds, 39 plants, 21 aquatic species (fish, frogs, snails, mussels, and turtles), 17 insect species, five reptile species (snakes and lizard), and six mammals. A detailed listing of the species listed in the NHI database is included in Appendix A.

In addition to listings of threatened and endangered species, Bald Eagle nests have been observed in study area towns along the entire rural portions of the corridor.

Unique Areas (Section 4(f) and Section 6(f) Protected Lands)

The WIS 33 corridor is located within the Baraboo Range, which has been designated a National Natural Landmark by the National Park Service (NPS) covering more than 50,000 acres. The range contains the largest block of non-fragmented deciduous forest (oak, maple, and basswood forests) remaining in the upper Midwest. (*Source:* WDNR) The discontinuous hills that comprise the range can rise as high as 700 feet above the surrounding landscape. Because of the diverse natural features within the area, several parks, state recreation areas and trails, public and private conservation areas, and other protected lands are located within the study area, some immediately adjacent to WIS 33. Figures 23 through 25 show the locations of known federal and state-owned lands, public and private conservation lands, parks and recreation facilities within and surrounding the study area.

Figure 23 Baraboo area parks and recreation areas

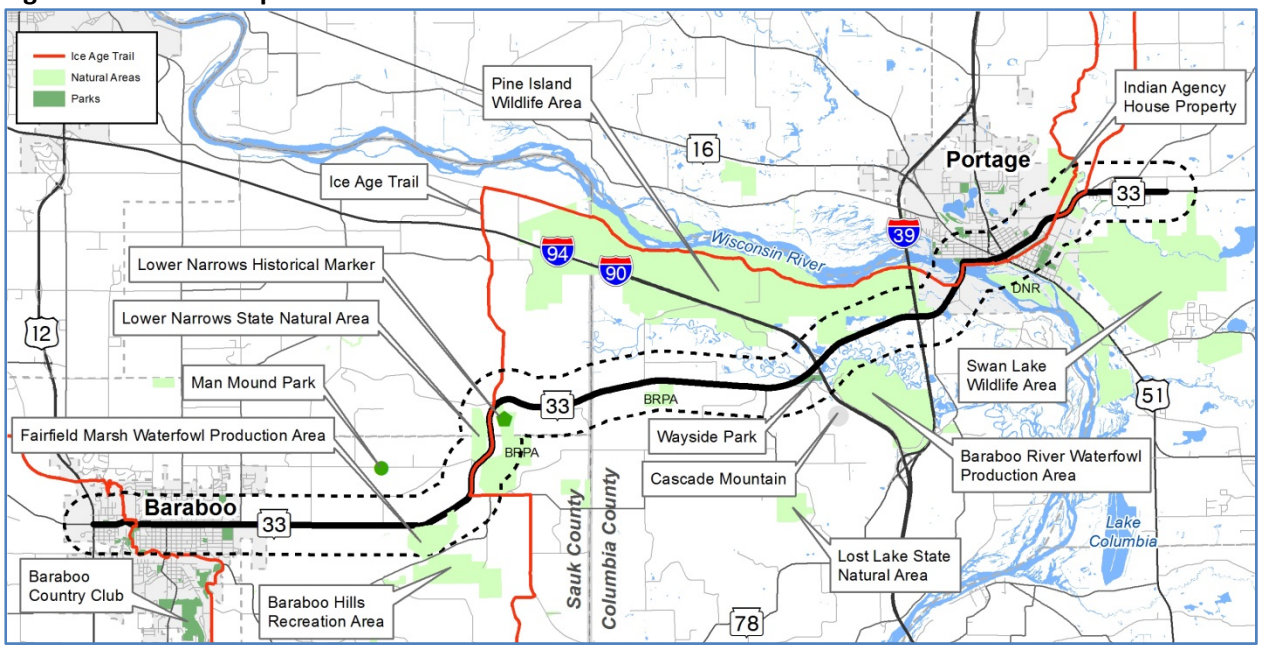


Highway projects must include evaluations of affected lands in order to protect certain types of publically-owned properties. According to WisDOT's Facilities Development Manual (FDM), section 4(f) evaluations are required for all federally-funded transportation related actions. Unless there is no feasible or prudent alternative, section 4(f) of the U.S. Department of Transportation Act forbids the use of federal funds on projects that would take land from, or result in adverse impacts on, public parks,

recreation areas, historic sites, wildlife refuges, or other areas of natural or community significance. See FDM Procedure 21-25-1 for definitions of protected places and a description of the evaluation process.

Additionally, section 6(f) of the Land and Water Conservation (LAWCON) Fund Act of 1965 requires that, except under certain circumstances, property acquired or developed with LAWCON funds shall not be converted to uses other than for public outdoor recreation uses. See FDM Procedure 21-25-5 for a detailed discussion of section 6(f) requirements.

Figure 24 Rural area parks and recreation areas



Parks

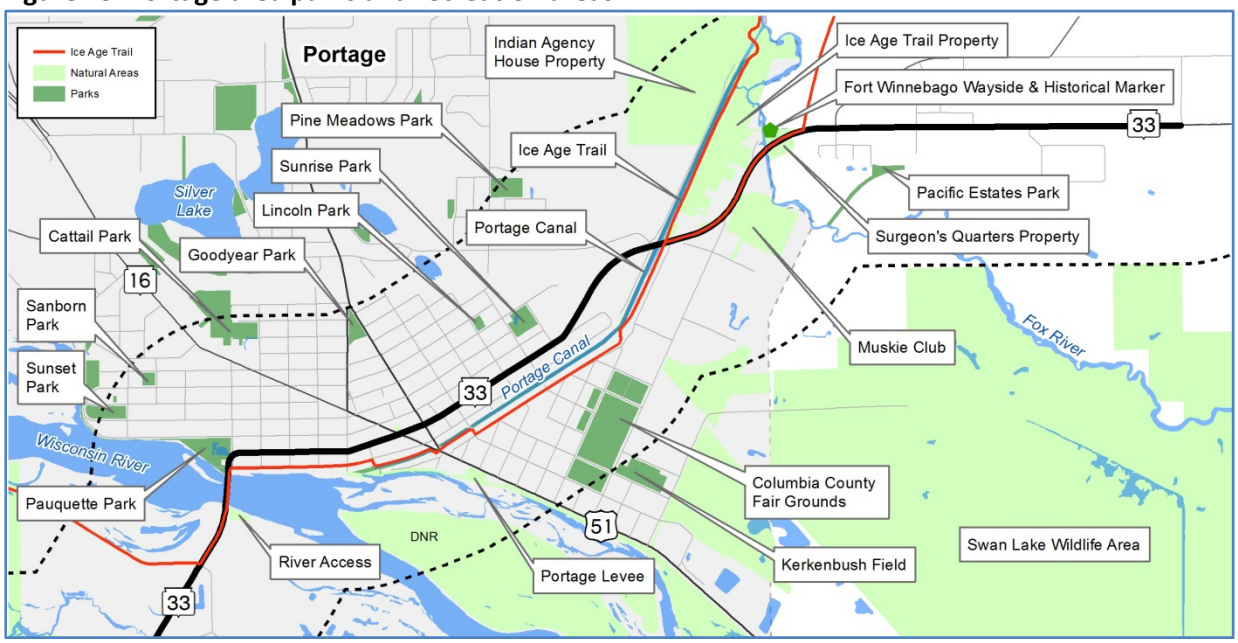
The following Parks are located within the study area (within ½ mile of WIS 33):

- *Max J. Hill Park* is a 2.2 acre park located at 625 Connie Road and a block north of WIS 33 in the Village of West Baraboo. Amenities include a reserve able picnic shelter with electrical, restroom and a playground.
- *Haskins Park*, in the village of West Baraboo, is located at 155 Shaw Street and accessible from WIS 33 via Willow Street. Haskins Park (5.4 acres) is located along the Baraboo River and provides opportunities for fishing as well as a reserve able shelter with electric, restrooms, volleyball court, horseshoe pit, playground, gazebo, and a pier/boat launch.
- *Attridge Park* is a 9.4 acre park located at 900 Second Avenue in the city of Baraboo. A bridge over the Baraboo River connects the park to the riverwalk, which is also a segment of the Ice Age National Scenic Trail. The park includes sand volleyball courts, fishing along the river, basketball courts and playground. The park also has restrooms.
- *Ochsner Park & Zoo* is a 26 acre park located 903 Park Street in Baraboo. The park borders the south side of WIS 33 at Draper Street and runs along the Baraboo River. It that has a two acre zoo, three shelters and picnic grills, large playground area, and access to the Baraboo Riverwalk.

- *Ritzenthaler Park* is a neighborhood park accessible from WIS 33 via Elizabeth Street (0.7 acres). It is located at 500 12th Street and includes a basketball court, playground and shelter.
- *Langer Park*, located at 501 Remington Street (3 acres), is four blocks south of WIS 33 in the city of Baraboo. This park includes a baseball/softball field, and playground equipment. The park has a supervised skating rink with a warming house and shelter.
- *Steinhorst Park* is located in a newer part of the city at 1700 Parkgate Drive. The 17 acre park has three soccer fields, shelter with restrooms, a playground, and a sledding hill.
- *Sauk County Fairgrounds*, though not technically a park, is listed here as it is open to the public seasonally for the annual county fair and for other special events throughout the year. This 32 acre site is located adjacent to the south side of WIS 33 between Lincoln and Washington Streets.
- *Wayside Park*, is located in the southwest quadrant of the I-90/94/WIS 33 interchange area across from Tritz Road. This site, informally known as Wayside Park was a former wayside owned by WisDOT. This green space located along the Baraboo River has a sheltered picnic table with no other amenities. It is most commonly used as an informal park & ride for commuters due to its proximity to the interstate corridor as the paved roadway is maintained.
- *Pauquette Park* is located at the WIS 33/West Conant Street intersection. This 8.8 acre park located at the west entrance to Portage was named for Pierre Pauquette and is a famous fur trading location of the French with Native Americans. This park has two shelters, restrooms, picnic tables, basketball court, band gazebo, play equipment, skating and fishing pond, flower gardens, and a walking path.
- *Sunset Park* is located within the western neighborhoods of the city of Portage at 1217 West Pleasant Street. This 4.5 acre park near the Wisconsin River is accessible from Peirce and West Conant Streets from WIS 33. Amenities include shelters with electricity, restrooms, sand volleyball, horseshoe pit, tennis court and playground.
- *Sanborn Park* is a 1.3 acre park located at 922 West Franklin Street and northwest of the WIS 33 corridor in Portage. Park amenities include a shelter, basketball court, softball diamond and playground equipment.
- *Cattail Park* is located in Portage on the northern edge of the study area and adjacent to a large wetlands complex. This one acre Park located at 510 West Burns Street includes a small shelter, play equipment and open play area.
- *Goodyear Park* is a triangle shaped park located at the intersections of De Witt Street (US 51) and MacFarlane Road in Portage. This three acre park has a small shelter, playground and open play area. Two monuments and a splash pad are also located in the park.
- *Lincoln Park* is a small one acre neighborhood park located within the neighborhoods along the north side of the study area. The Park is accessible from WIS 33 via Monroe Street. At 404 East Carrol Street, this park has a small shelter, basketball court, and playground.
- *Sunrise Park* is a five acre park located at 513 Hamilton Street and is a popular sledding hill for the community. The park is located two blocks north of the WIS 33 corridor. Other amenities at the park include a ball field, shelter, playground and nature walk.

- *Pine Meadows Park*, located at 805 Hamilton Street is on the northern edge of the study area and accessible from WIS 33 via East Albert Street. This park primarily serves the neighborhood to the north of East Albert Street as the railroad corridor creates a barrier to the rest of the city to the south. This five acre park includes a small shelter with electricity, a tennis court, and a youth softball diamond.
- *Columbia County Fairgrounds,* though not technically a park, is listed here as it is open to the public seasonally for the annual county fair and for other special events throughout the year. The site is 41 acres.
- *Riverside Park* (Portage Levee), is a wayside park located at 300 East Wisconsin Street south of the WIS 33 corridor along the Wisconsin River. The 2.1 acre park includes a large open shelter with benches and picnic tables.
- *Fort Winnebago Wayside*, listed as a park on the city of Portage website, this area contains a historical monument and open area. It is located at 1825 State Highway 33.
- *Pacific Estates Park* is an open space dedicated as part of the subdivision located along the south side of WIS 33. There are no amenities for the unimproved site.

Figure 25 Portage area parks and recreation areas



Recreation Areas

Several recreational areas are located with the study corridor (within 1/2 mile of WIS 33):

- The *Ice Age National Scenic Trail* is one of eight Congressionally-designated National Scenic Trails located in the United States. This trail includes 31 Wisconsin counties that are located along the terminal moraine. The trail continues to evolve as new lands and easements are secured. It is intended as a non-motorized footpath with several miles of trail already constructed and connecting segments following local roads. Within Columbia County there are more than 12 miles of trail that include prairie, wetlands and waterways. Within the study area, portions of the trail follow the existing Riverwalk along the Baraboo River in Baraboo, and the

Portage Canal in the city of Portage. Between the two communities, the trail primarily follows local roads as well as WIS 33 as can be seen in Figures 23 through 25).

- *Cascade Mountain* is a private Ski area with direct access to WIS 33 via Cascade Mountain Road. Though not a public facility, it is noteworthy in that it has a substantial regional draw in the winter months for skiing and tubing.

Conservancy Lands

For the purposes of this report, conservancy lands consist of lands under state or federal protection including natural areas, waterfowl protection areas and wildlife areas. Portions of these properties may be open to the public for nature-based outdoor activities including hiking, cross-country skiing, hunting, trapping, bird watching or other activities and include:

- *Fairfield Marsh Waterfowl Protection Area* is located along the south side of WIS 33 south of County X. The property was formed as part of a local/state conservation partnership with a goal to preserve lands within a greater 16,000 acres study area (Source: WDNR).
- *Lower Narrows State Natural Area (SNA)* is located along both sides of WIS 33 generally between County U and County X. Access to the area is via Man Mound Road from WIS 33. The natural area includes the unique geological features of the Baraboo Range. The Narrows, for which the area is named, is approximately 900 feet wide and 230 feet high and represents a break in the range caused by a prehistoric river. The area contains many unique species of plants and animals (Source: WDNR).
- *Pine Island State Wildlife Area* straddles the Wisconsin River in Sauk and Columbia counties and is located west of the city of Portage. The 5,499 acre property is accessed from WIS 33 via Levee Road. The unimproved property was designated as an Important Bird Area (IBA) because of the extensive grasslands located within it. It is also used for canoeing, fishing, hunting and other activities (Source: WDNR).
- *Baraboo River Waterfowl Production Area* is a floodplain area located between Cascade Mountain Road and I-39. The 1,000 acre property is managed by the US Fish and Wildlife Service. Access to the property from WIS 33 is via Cascade Mountain Road. There are no trail facilities as the property is primarily dedicated for waterfowl protection. (Source: US Fish & Wildlife)
- *Swan Lake Wildlife Area* is a 2,466 acre property is located southeast of the city of Portage access via County P surrounded by residential properties. It was designated in 1963 and is used locally for birding, hunting, trapping and wildlife viewing (Source: WDNR).

Air Quality

Wisconsin Act 121 enacted March 7, 2012 and published March 12, 2012 repealed NR 411 of the Wisconsin Administrative Code removing the Wisconsin DNR's authority for regulation of indirect source pollution.

According to the U.S. Environmental Protection Agency (EPA), both Columbia and Sauk Counties are in attainment for the air pollutants that the EPA regulates (Source: Wisconsin Administrative Code; U.S. Environmental Protection Agency).

5.3 Transportation Corridor Conditions

A summary of the transportation related corridor conditions has been prepared from field surveys of existing conditions and a review of as-built plans (which can be found in Appendix A). Included are discussions of the existing highway condition, cross section, access spacing in the rural segments, access controls, multimodal accommodations, and encroachments.

Existing Highway Condition

An analysis of the WIS 33 facility was conducted by AECOM to identify geometric deficiencies within the current corridor. The full report *Existing Conditions Evaluation*, which provides detailed data not included in this section's summary, can be found in Appendix A. The WisDOT *Facilities Development Manual* (FDM) was the primary reference used to compare the existing corridor to current desirable standards for this type of facility.

Study length and termini

The western study limit starts at the WIS 33 (Linn Street)/US 12 (West Pine Street) intersection in the village of West Baraboo. The eastern limit of the study is the WIS 33/Garrison Road intersection located east of the city of Portage. The entire length of the corridor in both Sauk and Columbia Counties is 21 miles.

The WIS 33 corridor passes through the village of West Baraboo and the cities of Baraboo and Portage. The study area also includes the towns of Baraboo, Greenfield, and Fairfield in Sauk County and Caledonia, Pacific and Fort Winnebago in Columbia County.

The study corridor has been further divided into two urban segments and two rural segments with the following characteristics:

- Segment 1 – US 12 to County T (Taft Avenue) in the village of West Baraboo and the city of Baraboo (2.5 miles of urban four-lane undivided roadway)
- Segment 2 – County T (Taft Avenue) to the Wisconsin River (14 miles of rural two-lane undivided roadway)
- Segment 3 – Wisconsin River to Canadian Pacific Railroad crossing in the city of Portage (two miles of urban two-lane undivided roadway with adjacent parking in some locations)
- Segment 4 – Canadian Pacific Railroad crossing to Garrison Road (2.5 miles of rural two-lane undivided roadway)

Functional and other classifications

WIS 33 is classified as a minor arterial in the two rural segments and as a principal arterial in the two urban segments. It is also identified as a Long Truck Route (Wis. Admin. Rule Chapter Trans 276) throughout the entire length of the study corridor. WIS 33 is currently designated as an Over-Size Over-Weight (OSOW) freight route for a short segment between I-90/94 and I-39. An OSOW route is a route that can be used by vehicles hauling unusually long, wide, or heavy loads. These loads typically require a

permit with WisDOT from trucking operators because of the unique circumstances and associated safety considerations required.

The Statewide Access Management Plan (SAMP) designates WIS 33 as a Tier 2B corridor. The SAMP tiers correlate to access control standards to maximize system mobility and operational criteria. Tier 2B corridors should maximize interregional traffic through widely spaced connections, and should have a long-term plan for removing existing access as opportunities arise.

Present WIS 33 facility

The WIS 33 corridor was first designated as a state trunk highway in 1918. Currently, it is one of several highways that span the entire width of the state connecting La Crosse with Port Washington (Source: www.wisconsinhighways.org). Within the study area, WIS 33 is connecting highway in two locations, whereby the signed route is located on roads maintained by the cities of Portage and Baraboo as well as the village of West Baraboo.

As-built plans were obtained, where available, to ascertain historical changes to the corridor over the past several years. Because plans for some portions of the corridor were not available, the plans combined with field measurements were the primary source of data used to determine the existing geometry of the corridor. Copies of the plans can be found in Appendix A.

Posted speed

Posted speeds along WIS 33 vary between 25 miles per hour (MPH) to 55 mph depending on the context of the highway (rural vs. urban) as shown in the following table. The village of West Baraboo has a 15 mph school zone located in the vicinity of Willow and Hill Streets. The city of Baraboo has two school zones located between Draper Street to Broadway Street and Elizabeth Street to Jefferson Street. The city of Portage has a short school zone in the vicinity of the MacFarlane Road intersection along WIS 33.

Table 19 WIS 33 Posted Speed Limits

Travel Direction	Limits of Speed Zone*	Posted Limit
Eastbound	US 12 to Lincoln Avenue	25 mph
Westbound	Washington Avenue to US 12	25 mph
Eastbound / Westbound	Washington / Lincoln Avenues to city of Baraboo Limits	30 mph
Eastbound / Westbound	City of Baraboo limits to Cascade Mountain Road	55 mph
Eastbound / Westbound	Cascade Mountain Road to 1,500 feet east of I-90/94	45 mph
Eastbound / Westbound	1,500 feet east of I-90/94 to Fairfield Street	55 mph
Eastbound / Westbound	Fairfield Street to East Cook Street	25 mph
Eastbound / Westbound	East Cooke Street to Foote Drive	45 mph
Eastbound / Westbound	Foote Drive to Garrison Road	55 mph

* Distances and locations are approximate

Superelevation and horizontal curves

The existing superelevation (SE) along the corridor ranges from 3.02 percent to 6.0 percent where data was available from as-built plans. Where gaps in plans existed, the curves were driven with the use of a digital ball bank indicator.

There are 25 horizontal curves in the study corridor. Five curves were found to not meet minimum standards for superelevation, as defined in the WisDOT Facilities Development Manual (FDM), and are

listed in the following table. Data on all of the horizontal curves can be found in the *Existing Conditions Evaluation Report* located in Appendix A.

Table 20 Deficient Horizontal Curves

Location	PI Station	Radius (ft)	Intended Design Speed	Superelevation from As-Built Plans	Superelevation required per Design Speed	Actual Design Speed
East of I-90/94	361+21.49	3,837.32	60 mph	3.2%	3.7%	50 mph
East of I-39	451+03.14	2,264.24	60 mph	4.5%	5.0%	50 mph
East of I-39	460+96.16	1,917.64	60 mph	5.0%	5.5%	55 mph
W of WI River	495+02.54	1,510.34	30-60 mph	5.7%	6.0%	55 mph
Fox River	90+28.97	1,637.85	50 mph	4.8%	4.9%	50 mph

Vertical alignment

Eighty-one vertical curves have been identified in the WIS 33 study corridor. Of the curves reviewed, three were found to have k values between minimum and desirable standards, with two curves deficient beyond the minimum values. Data on all of the vertical curves can be found in the *Existing Conditions Evaluation Report* located in Appendix A.

Table 21 Vertical curves with less-than-desirable K values

Location	Station	Design Speed	Sag or Crest	K Value Existing	K Value Minimum*	K Value Desirable*
West of Wood Street	50+20.00	30 mph	Sag	36.70	37	37
Birch Street	62+00.00	30 mph	Crest	24.04	19	31
Lincoln Avenue	121+25.33	35 mph	Sag	35.55	49	49
East of Jackson Street	540+00.00	30 mph	Crest	21.58	19	31
West of Cook Street	541+00.00	30 mph	Crest	30.30	19	31

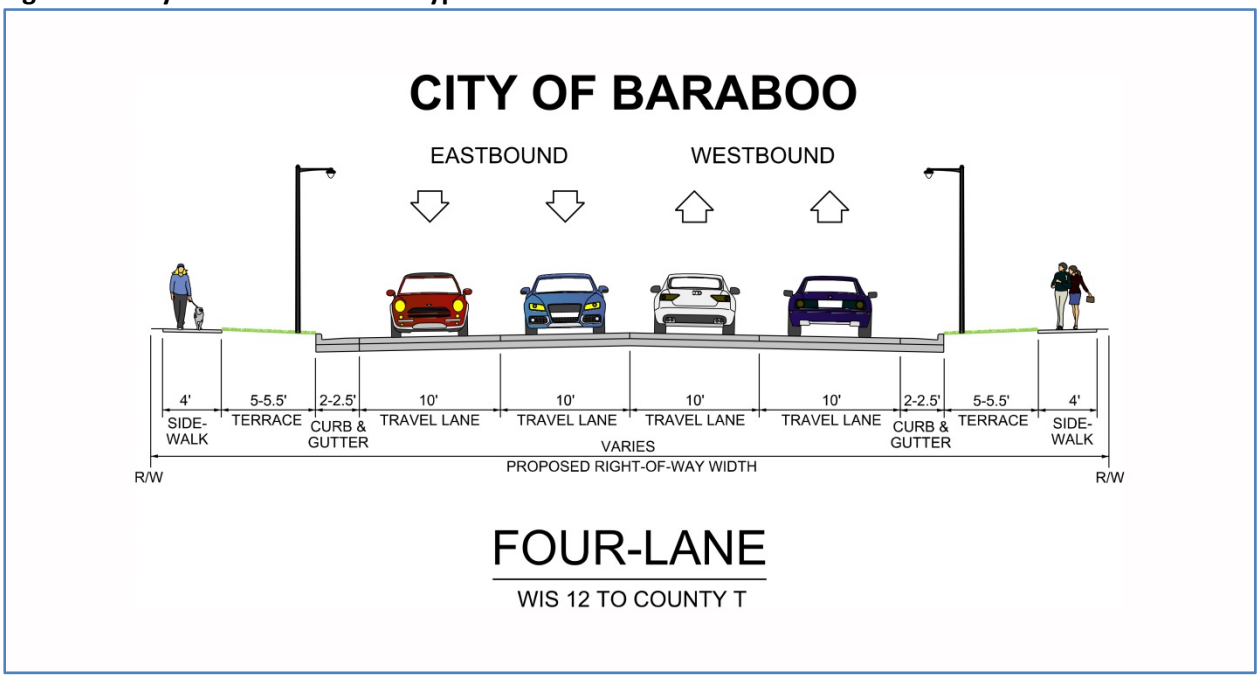
* per the Facilities Development Manual

The grades between vertical curves can affect multiple aspects of the roadway. Acceleration and sightline issues of the motorist can be affected, and improper grades can cause excessive erosion or ponding of the roadway itself. Vertical curves were analyzed to ensure maximum grades were not exceeded. Only one tangent grade was noted to exceed maximum grades, located just east of Johnson Road. The current grade of four percent exceeds the three percent maximum for this location.

Cross Section

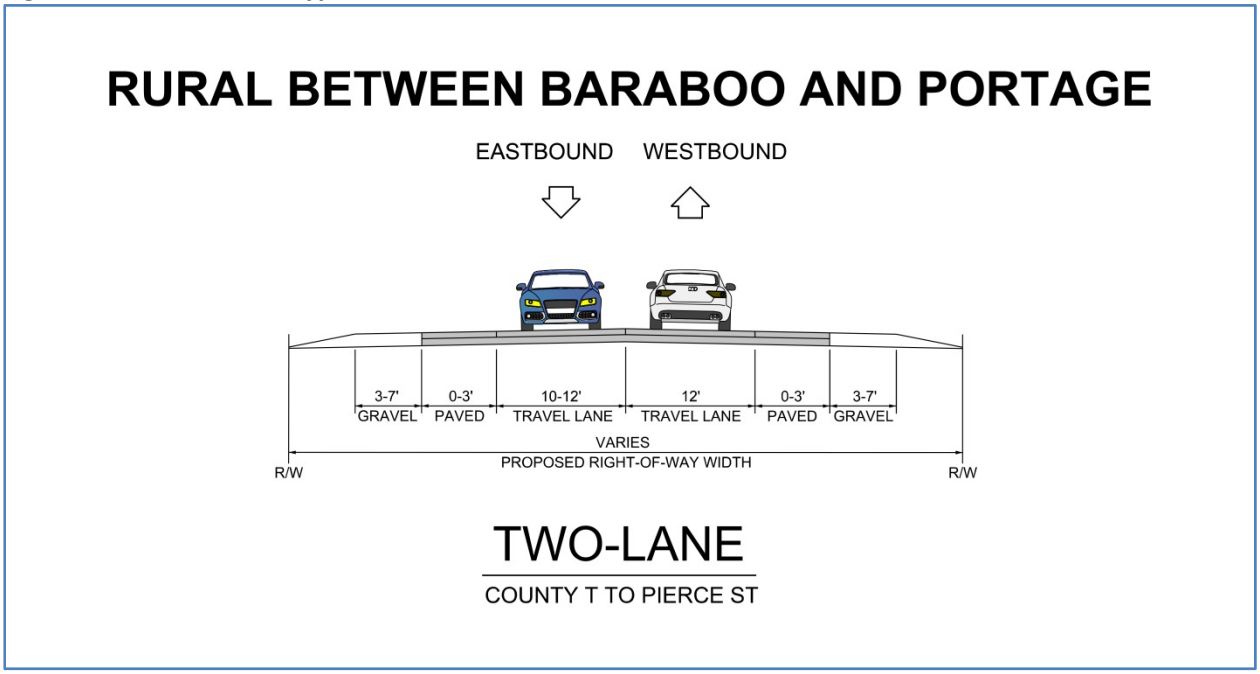
Design features of the roadway's cross section were determined by consulting as-built plans, which can be found in Appendix A. In the City of Baraboo, WIS 33 is a four-lane undivided highway with four 10 foot wide travel lanes and a two to 2.5 foot curb and gutter (see Figure 26).

Figure 26 City of Baraboo WIS 33 Typical Section



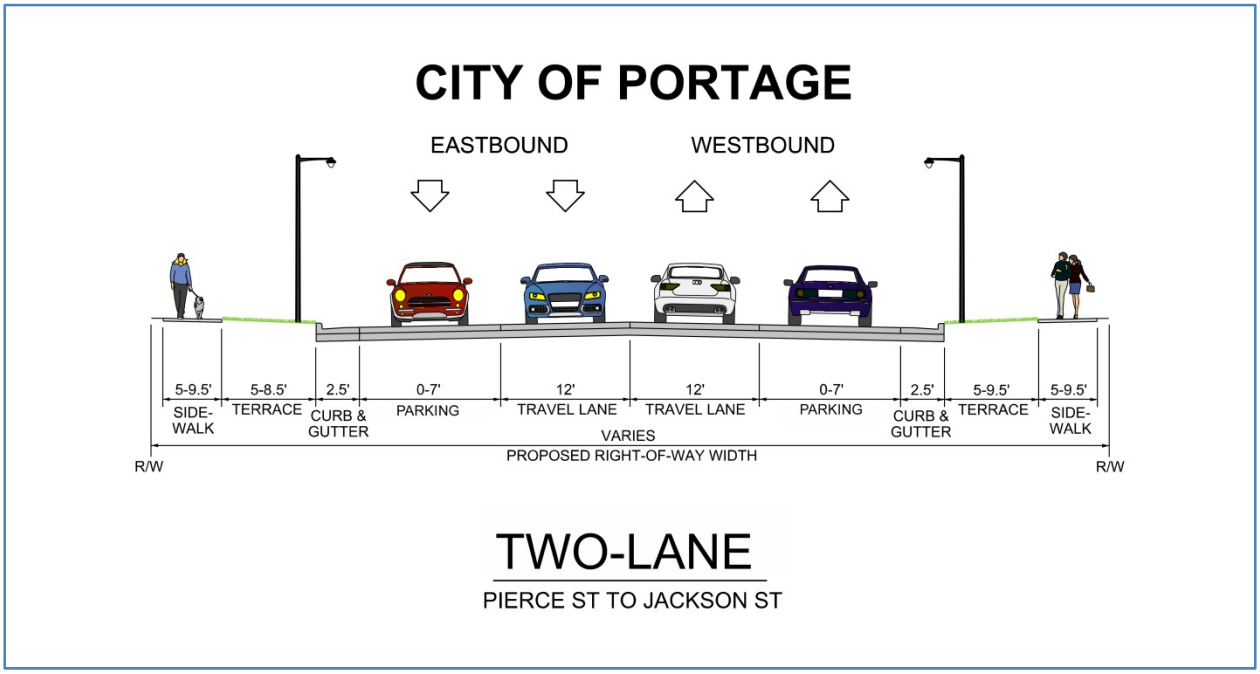
Along the rural segment of WIS 33 between the cities of Baraboo and Portage, WIS 33 is a two-lane rural state highway with 12 foot travel lanes, paved shoulders up to three feet wide, and gravel shoulder that varies between three and seven feet. The eastbound lane is a narrow as ten feet in some locations (see Figure 27).

Figure 27 Rural WIS 33 Typical Section



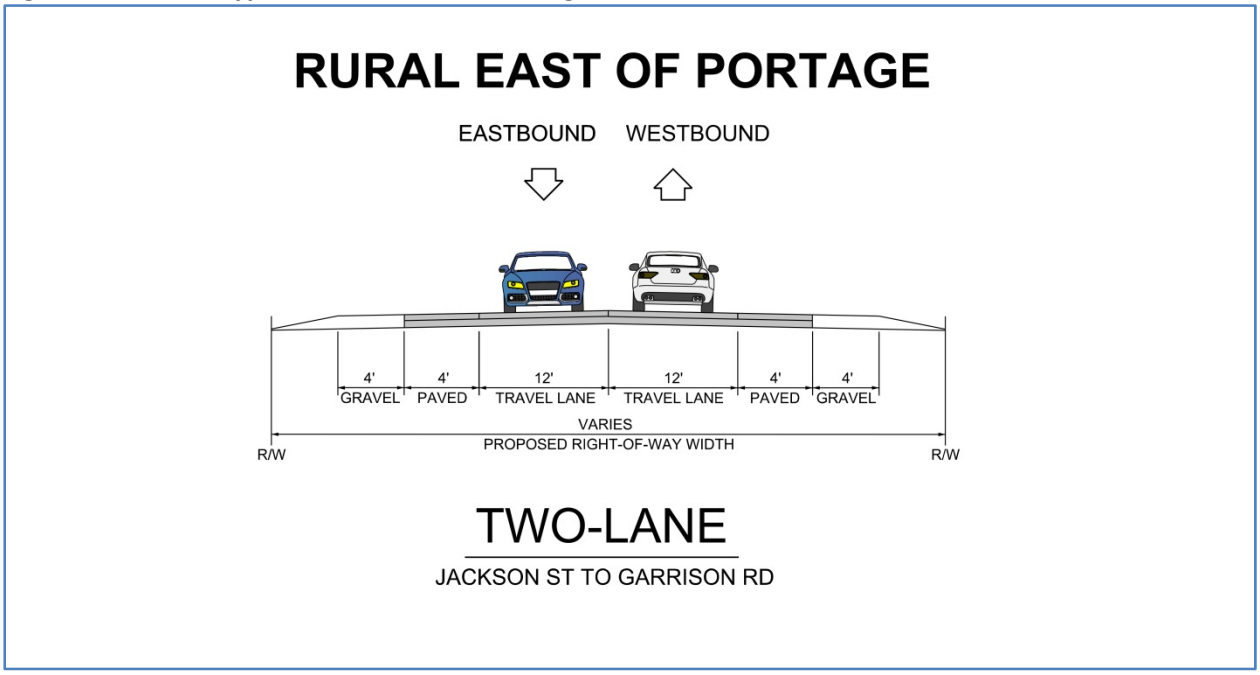
Within the city of Portage, the typical section can vary depending on location within the downtown or the adjacent corridor segments, but typically consists of two 12 foot travel lanes with two adjacent parking lanes up to seven feet wide in each direction (see Figure 28).

Figure 28 City of Portage WIS 33 Typical Section



East of the city of Portage, WIS 33 becomes a two-lane rural highway with 12 foot travel lanes in each direction, four foot paved shoulders, and four foot gravel shoulder (see Figure 29).

Figure 29 WIS 33 Typical Section east of Portage



Number of roadways and lanes

The study corridor is comprised of a single roadway comprised of two lanes (one travel lane in each direction) with the exception of the Village of West Baraboo and City of Baraboo where the urban roadway consists of two travel lanes in each direction between US 12 and County T (Taft Road) for a total of four lanes. This four-lane segment is approximately 2.7 miles in length.

Lane width

Lane widths vary along WIS 33 depending on the segment and corridor context (urban or rural). Within the four-lane undivided segment through the city of Baraboo, all travel lanes are ten feet wide. Between Baraboo and Portage, the typical lane width of the two-lane rural roadway is 12 feet, but can be as narrow as ten feet in a few locations. Within Portage, lane widths are 12 feet wide, but may also include 7 foot wide outside unmarked lanes or parking lanes depending on location. East of Portage, lane widths are typically 12 feet wide.

Shoulder width

WIS 33 is a rural two lane roadway throughout the majority of the study area with the exception of the urban segments in Baraboo and Portage. The typical shoulder width between Baraboo and Portage ranges from zero to three feet of paved shoulder. In addition, crushed aggregate extends another three to seven feet beyond the paved shoulder. The typical shoulder width east of Portage is eight feet comprised of four feet of paved shoulder and four feet of crushed aggregate. The urban segments of WIS 33 in Baraboo and Portage have curb-and-gutter throughout.

Crown slope

Crown slope is typically two percent for the entire WIS 33 corridor. Two percent is considered normal crown where there is no superelevation.

Vertical clearance

There are no structures over the WIS 33 corridor within the study area.

Pavement structure

As-built plans were reviewed to determine the pavement structure existing along various segments of WIS 33 within the study area. Portions of the corridor do not have as-built plans available, therefore the pavement structure was observed in the field.

Between US 12 and County T (Taft Road) the typical WIS 33 pavement structure consists of eight to ten inches of concrete pavement over six inches of crushed aggregate base. An asphaltic overlay was placed over the concrete pavement between Ash Street and Lincoln Street.

Between County T (Taft Road) and I-90/94, the typical pavement structure consists of 4.5 to 5.5 inches of asphaltic concrete over nine to ten inches of crushed aggregate base. Recycled materials have been used in the base course in some locations along this segment.

As-built plans do not exist between I-90/94 and the Wisconsin River, however, asphaltic concrete has been observed, with the exception of the I-39 interchange area to County U, where concrete was observed.

Between the Wisconsin River and WIS 16, as-built plans were not available, however, asphalt was observed. It is possible that this is an overlay of a concrete pavement. Between WIS 16 and Adams Street the pavement structure consists of eight inches of concrete over 12 inches of crushed aggregate base.

From the railroad bridge to the study limit at Garrison Road, the WIS 33 pavement structure is comprised of five inches of asphaltic concrete over ten inches of crushed aggregate base with the use of recycled materials in the base course in some locations.

Right of way

The right of way width along WIS 33 averages 66 feet in the cities of Baraboo and Portage and the rural section east of the city of Portage. In the village of West Baraboo it is slightly wider varying between 66 feet to roughly 90 feet. There are also two locations in the city of Baraboo with slightly wider sections near County T and Berkley Boulevard. The rural section located between the cities of Baraboo and Portage varies greatly. The section from the city of Baraboo to the Sauk/Columbia county line averages between 100 and 140 feet in width with the right of way following slope intercepts lines rather than parallel to the roadway centerline. The section from the county line to the city of Portage has an average right of way width of 66 feet, with wider sections between Tritz Road and the Baraboo River (roughly 125 feet to greater than 165 feet), near the I-90/94 interchange, and between I-39 and the Wisconsin River (roughly 150 feet or greater).

Clear zones

Clear zone is defined as the total roadside border area starting at the traveled way that is available for safe use and recovery of errant vehicles. Keeping the clear zone free of obstructions can improve safety for motorists through increased recovery area and reduced crash severity and improve driver comfort. Desirable clear zone width varies depending upon the travel speed and degree of slopes present, but is generally 30 feet for the rural segments of WIS 33 in the study area. Within the urban areas, there are several existing encroachments and other obstructions present including retaining walls, signs, decorative landscaping, trees and utility poles. Several intersections along WIS 33 also have obstructions in the vision triangle. A detailed description of the encroachments and other obstructions present are included in the *Existing Conditions Evaluation Report* located in Appendix A.

Encroachments

Existing right of way data, aerial photography and field reviews were used to determine possible encroachment locations. Ninety-nine locations, listed in Table 22, were found to have encroachments into state-owned right of way consisting of signs and awnings, decorative landscaping, retaining walls, stone monuments and other miscellaneous items. Photographs can be found in the *Existing Conditions Evaluation Report* (Appendix A).

Table 22 Possible encroachments into the WIS 33 right of way

Location*	Description
State Road 136	Temporary real estate sign
433 Linn Street	Boulders and signs
408 Linn Street	Business sign
312 Linn Street	Wood retaining wall
242 Linn Street	Business sign

Location*	Description
401 Linn Street	Business signs
333 Linn Street	Business sign
City of Baraboo Park	Stone wall
633 8th Avenue	Business sign
617 8th Avenue	Stone retaining wall
603 8th Avenue	Business sign
316 8th Avenue	Stone retaining wall
312 8th Avenue	Stone retaining wall
327 8th Avenue	Wood decorative fence
1005 Birch Street	Stone retaining wall
234 8th Avenue	Stone retaining wall
233 8th Avenue	Stone retaining wall
227 8th Avenue	Stone retaining wall
218 8th Avenue	Stone retaining wall with railing
214 8th Avenue	Stone retaining wall with railing
210 8th Avenue	Stone retaining wall with railing
202 8th Avenue	Stone retaining wall with railing
201 8th Avenue	Business sign
215 8th Avenue	Business sign
221 8th Avenue	Concrete retaining wall
918 Ash Street	Concrete retaining wall
220 8th Street	Brick Columns
401 8th Street	Concrete retaining wall
407 8th Street	Concrete retaining wall
415 8th Street	Concrete retaining wall
421 8th Street	Concrete retaining wall
508 8th Street	Concrete decorative block retaining wall
435 8th Street	Concrete block retaining wall
514 8th Street	Concrete decorative block retaining wall
703 8th Street	Concrete retaining wall
717 8th Street	Concrete retaining wall
1212 8th Street	Man Mound County Park information sign
1219 8th Street	Business sign
1215 8th Street	Business sign
1211 8th Street	Concrete decorative block retaining wall
E12551 State Road 33	Flag pole and decorative landscaping
E14531 State Road 33	Wood fence, business sign, and cow statue
W10636 Cascade Mountain Road	Business sign, utility cabinet
W1201 West State Road 33	Fence, parking stalls and business sign, small shed
City of Portage Pauquette Park	Stone decorative fence gateway
609 West Cook Street	Concrete decorative block retaining wall
525 West Cook Street	Concrete decorative block landscaping wall
238 West Cook Street	Business sign
242 West Cook Street	Business sign
239 West Cook Street	Business sign
222 West Cook Street	Business sign
220 West Cook Street	Business sign
218 West Cook Street	Business sign
201/207 West Cook Street	Business sign
238 West Wisconsin Street	Business sign
135/137 West Cook Street	Wood awning
131 West Cook Street	Metal awning
127 West Cook Street	Metal awning / business sign
130/130 ½ West Cook Street	Metal awning / business sign
123 West Cook Street	Fabric / metal awning
119 West Cook Street	Fabric / metal awning

Location*	Description
111 West Cook Street	Metal awning / business sign
109 West Cook Street	Fabric / metal awning
107 West Cook Street	Fabric / metal awning
101 West Cook Street	Business sign
102 East Cook Street	Fabric / metal awning
112 East Cook Street	Business sign
122 and 112 ½ East Cook Street	Fabric / metal awning
124 East Cook Street	Fabric / metal awning, business sign
126 East Cook Street	Fabric / metal awning
130 East Cook Street	Fabric / metal awning
301 De Witt Street	Concrete stairs
111 East Cook Street	Wood awning, business sign
113 East Cook Street	Business sign
117 East Cook Street	Metal awning
123 East Cook Street	Awning
141 East Cook Street	Business sign
145 East Cook Street	Business sign
151 East Cook Street	Fabric / metal awning, business sign
309 East Cook Street	Concrete decorative block retaining wall
315 East Cook Street	Concrete decorative block retaining wall
323 East Cook Street	Stone landscaping wall
331 East Cook Street	Concrete block retaining wall
424 East Cook Street	Wood fence and gateway
432 East Cook Street	Metal pedestrian railing
Monroe Street (unknown)	Metal chain-link fence
506 East Cook Street	Wood decorative fence
505 East Cook Street	Business sign
Agency House Road (intersection)	Wood information sign (Historic Portage Canal)
1220 Superior Street	Business sign
West Wauona Trail	Commercial billboards, parking stalls
W8558 State Road 33	Concrete block landscaping wall and plantings
W8407 Foote Drive	Wood fence

* Property address does not indicate the ownership of the feature identified

Structures

Structures were identified in the WIS 33 corridor by examining available as-built plans and verifying with a field survey. Eight structures were identified within the study corridor and had been rated in past inspections for existing condition of various elements of the structure. All structures are rated in Fair condition with structural elements in sound condition. Table 23 lists the structures identified. In addition, three cattle pass structures and three drainage structures are located along WIS 33. Per WisDOT FDM, the minimum clear roadway width across a structure for a two-lane arterial is 40 feet with a desirable width of 44 feet. Structures B-56-110, B-11-071, and B-11-122 meet the minimum standards.

Table 23 WIS 33 Structures

Structure ID	Type	Location	Description
C-56-3041	Cattle Pass	Johnson Road	
C-56-3042	Cattle Pass	East of Johnson Road	
C-56-3043	Cattle Pass	West of Man Mound Road	
C-56-024	Drainage	Baraboo River East of Man Mound Road	44 foot wide, two-lane
B-56-110	Bridge	Baraboo River (County U)	47 foot wide, two-lane, good condition
C-56-3044	Drainage	West of Breezy Hill Road	
C-56-3045	Drainage	West of Breezy Hill Road	

Structure ID	Type	Location	Description
B-11-021	Bridge	Baraboo River (I-90/94)	37 foot wide, two-lane, satisfactory condition
B-11-071	Bridge	Wisconsin River	50.7 foot wide, two-lane, good condition
B-11-002	Bridge	CP Railroad (SOO Line)	33 foot wide, two-lane, good condition
B-11-003	Bridge	Portage Canal	32 foot wide, two-lane, satisfactory condition
B-11-122	Bridge	Fox River	42 foot wide, two-lane, satisfactory condition

Connecting Roadways and Private Driveways

WIS 33 experiences both urban and rural access environments with dramatically differing characteristics. Within the village of West Baraboo and city of Baraboo, numerous public road and private driveways intersect with WIS 33 making this the most dense access segment in the study corridor. The city of Portage has fewer connections than the city of Baraboo, however access density is still typical of an urban environment, especially for roadway connections. The remaining rural segments intersect primarily with county and local roads (with the exception of the I-90/94 and I-39 interstate ramps) and WIS 33 provides direct access for agricultural fields, farms, residences, and commercial activities. The number of connections by type and access density (points per mile) for each study segment is included in Table 24.

Table 24 WIS 33 access points per mile

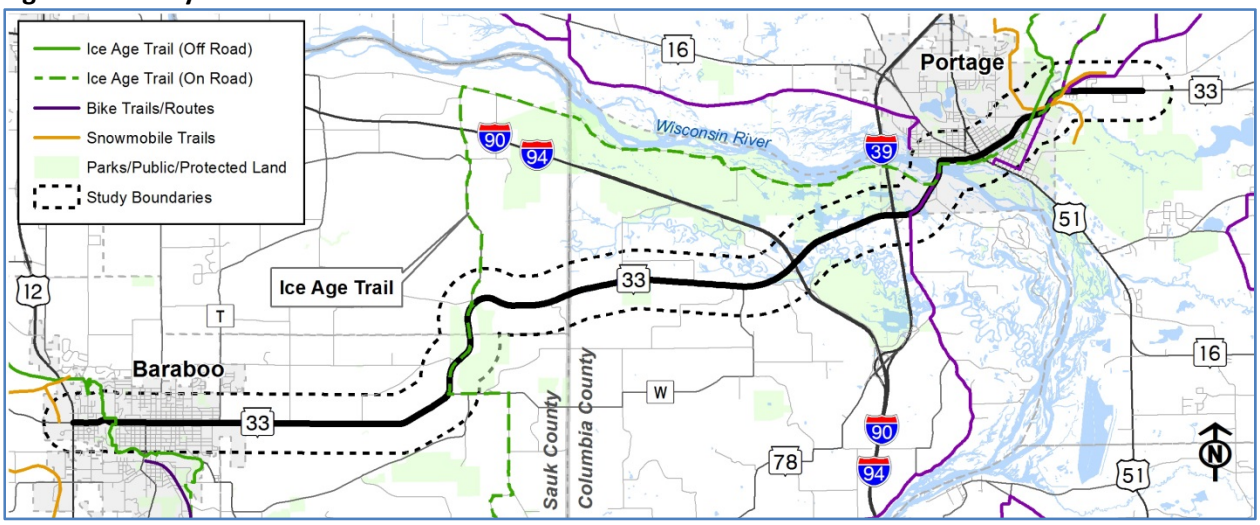
WIS Segment	No. of public road connections	No. of private driveways	Segment Length (miles)	Access points per mile
US 12 to County T/Taft	27	136	2.5	65.2
County T/Taft to the Wisconsin River	20	155	14.5	12.1
The Wisconsin River to RR overpass	19	58	1.5	51.3
RR overpass to Garrison Road	13	46	2.5	23.6

A detailed driveway inventory and discussion of the access conditions along WIS 33 are included in the Access Inventory and Management Plan (Section 9.0) located in PART III of this report.

Multimodal Accommodations

Facilities serving other travel modes such as pedestrians and bicyclists within the WIS 33 corridor primarily include on-street routes suitable for bicycles on connecting roadways, off-street trails, and sidewalks in both the cities of Baraboo and Portage. In the winter months, snowmobile trails and crossings of WIS 33 are also present. Regional trails located within the study area are illustrated in Figure 30.

Figure 30 Study area trails



A review of pedestrian and bicycle conditions and facilities was conducted for the village and city of Baraboo and the city of Portage. Technical memorandum for each community are included as part of Appendix E. Recommendations from each review were incorporated into the corridor strategies and are included in Part III of this report.

Pedestrian Facilities

Sidewalks and crosswalks are the dominant features for pedestrian use in both the cities of Baraboo and Portage. In the village of Baraboo, sidewalks are present along both sides of WIS 33 between Mulberry Street and Hill Street. In the city of Baraboo, sidewalks are present on the north side of WIS 33 between Hill Street and Draper Street. East of Draper Street, sidewalks exist on both sides of the corridor for nearly the entire length of the urban segment. All connecting streets provide sidewalks on at least one side of the street with the exception of Tuttle Street, Lincoln Avenue, and County T.

Within Baraboo, there are multiple opportunities to cross WIS 33 at designated crosswalks. Differing crosswalk striping patterns are used in an effort to guide pedestrians to safe locations. The presence of off-set intersections in the city of Baraboo causes some locations to be safer than others for pedestrian crossings. Both the village and city of Baraboo have invested in pedestrian flashing beacons at strategic locations to alert motorists of pedestrians crossing WIS 33. Crossing guards are also used during morning and afternoon periods when children are present.

Within the city of Portage, sidewalks and sidewalk connections are present between Pierce Street and Cook Street. Curb extensions are also used in the downtown area to shorten crossing distances and enhance pedestrian visibility. Higher volume, signalized intersections include pedestrian signalheads to facilitate crossings of the corridor. Crosswalk markings and curb treatments vary along WIS 33 in the city of Portage. The presence of skewed intersections and angled streets results in unsafe midblock crossings in some locations due to the additional distance pedestrians need to travel to access safe crosswalks at skewed intersections.

Pedestrians are not accommodated in the rural segments of WIS 33. Pedestrians using the corridor rely on the paved shoulder width or gravel shoulder for travel in these areas.

Bicycle Facilities

WIS 33 does not include designated on-street bicycle accommodations within the study corridor and is not desirable for biking in the rural segments. In the city of Baraboo, the presence of narrow travel lanes, curb and gutter, and numerous driveways provide challenges for cyclists using WIS 33. Because of the parallel street grid, cyclists can use the local street system to get to the majority of locations, avoiding conflicts with traffic and crossing WIS 33 at strategic locations. WIS 33 has been identified as a planned or existing priority corridor for bicycle use within the city of Baraboo connecting with other priority corridors along US 12 and County A. Maps of planned and existing bicycling linkages for Sauk and Columbia Counties can be found in Appendix F.

East of the city of Baraboo, County X and County U are desirable routes for cyclists touring the Baraboo Range area with conditions suitable for bicycling. Cyclists must negotiate the WIS 33 corridor for a distance of 1.6 miles between these two connections. Though WIS 33 has paved shoulders in this area, high traffic volumes make the corridor undesirable for bike traffic, creating a gap between these two biking routes.

County U, located just east of I-39, provides a bicycle connection between the city of Portage and a southern route along the Wisconsin River. Cyclists must negotiate WIS 33 for approximately one mile between County U and the local street grid within the city of Portage. This segment of WIS 33 is currently undesirable for bike travel due to high traffic volumes, but has been identified as a priority connection between County U and through the Portage area.

East of Portage, WIS 33 intersects with County F and County EE which are both signed bicycle routes. In this area WIS 33 is undesirable for bike travel with no direct connection between these routes and the Portage downtown.

Recreational Trails

The Ice Age National Scenic Trail is a federally managed trail network falling under the National Park System. The trail system is intended for foot traffic only and is being constructed in segments as lands become available. Currently, the trail corridor includes recommended on-street segments that connect the off-street segments that have already been constructed. In some cases, the trail runs concurrently with other trails and paths. In the study area, the trail crosses WIS 33 in both the Baraboo and Portage areas, and follows WIS 33 between County U and County X, at the Wisconsin River, and again east of the Portage Canal.

Snowmobile Trails

Designated snowmobile routes are concentrated near the eastern and western ends of the study corridor with the only crossing of the WIS 33 study corridor located between East Albert Street and County F, east of the city of Portage. Maps of county snowmobile routes can be found in Appendix F.

Transit

Study area communities do not provide fixed route bus service within the study area. Other services include shared taxi, local charter bus companies and limousine services. Greyhound Bus (intercity bus service) stops at the M&G Travel Mart Shell Station in Baraboo and at the Amtrak station in Portage.

The Sauk County Aging and Disability Resource Center (ADRC) operates a deviated fixed route service connecting Baraboo, Bluffview, Prairie du Sac, and Sauk City. Riders call a hotline to be picked up within ½ mile of the route.

Passenger Rail

The Amtrak Empire Builder Route (connecting Chicago with the Pacific Northwest) stops in the city of Portage with one train per day. The station is located at 400 West Oneida Street. There are no amenities at this station. From WIS 33, travel to the station is via DeWitt Street to the Oneida Street intersection (Source: www.amtrak.com).

Airports

The Baraboo-Dells Airport, located at S3440 County Highway BD in Baraboo, is owned by the village of Lake Delton, City of Wisconsin Dells, and City of Baraboo. The City of Baraboo is the managing owner of the airport. The airport is a transport/corporate airport primarily serving corporate jets and small cargo jets, and small engine aircraft for local or regional commuter service.

The Portage Municipal Airport is located at 1011 Silver Lake Drive in Portage and is a general utility airport supporting small engine and twin engine aircraft typically used for charter, business, or personal use.

In addition to the two airports mentioned above, there are two private airports located near the study corridor: Thiessen Field Airport in Baraboo and Coleman Airport in Portage.

6.0 Comprehensive Plan Review and Analysis

Community comprehensive plans and other planning documents were reviewed to gain knowledge of local intentions concerning future land use, development, and resource management within the WIS 33 study corridor. Table 25 below lists all of the plans that were consulted for this review. Table 26, found at the end of this section, summarizes the potential effects that expected future land use changes could have on WIS 33. All of the communities within the study corridor have either adopted or revised comprehensive plans. In addition, plans exist for state and locally managed recreational areas and natural areas. In the review, special attention was paid to discern the potential effects of future local actions on WIS 33. Please refer to Appendix G to view the future land use maps for each of the communities reviewed in the summary that follows. Complete plan documents that were available at the time of the study can be viewed in Appendix A.

Table 25 Study area comprehensive plans

Community	Plan Name	Date Adopted	Date of Last Update
Sauk County	Sauk County Comprehensive Plan	Dec. 15, 2009	
Columbia County	Columbia County Comprehensive Plan 2030	Sep. 19, 2007	Jul. 20, 2016
City of Baraboo	City of Baraboo Comprehensive Plan	Jul. 12, 2005	
City of Portage	Comprehensive Plan 2008-2028	Aug. 14, 2008	
Village of West Baraboo	Comprehensive Plan 2016-2036	Sep. 13, 2016	
Town of Baraboo	Comprehensive Plan 2005-2025	Aug. 1, 2005	
Town of Greenfield	Comprehensive Plan 2005-2025	Jan. 17, 2006	Aug. 1, 2012
Town of Fairfield	Comprehensive Plan 2005-2025	Jan. 2, 2006	
Town of Caledonia	Comprehensive Plan 2030	Jul. 8, 2009	
Town of Fort Winnebago	Comprehensive Plan 2030	Mar. 3, 2008	
Town of Pacific	2012 Update to Comprehensive Plan	Jan. 11, 2005	Feb. 2, 2012

Sauk County

The emphases of the Sauk County Comprehensive plan include agriculture, rural heritage, transportation, public facilities, sustainable economic development, public institutions, natural resources, and ecological services. Sauk County has a strong farmland preservation plan and has a strong agricultural heritage. Within the study corridor, WIS 33 is the dividing line between active agricultural lands to the north and forested lands to the south.

Sauk County lands within the study area fall under either Resource Conservancy (RC) in the town of Greenfield, or Agriculture Conservancy (AGCONS-Fair) overlay zoning in the town of Fairfield which also has its own zoning ordinance. Refer to the town plan descriptions for a discussion of future land use in the study corridor.

Columbia County

The Columbia County Plan strives to maintain a moderate level of growth in population and housing and preserve prime agricultural lands and irreplaceable natural, recreational and cultural resources, of which there are many in the study corridor. Land use changes to higher density development and resulting traffic pressures should be mitigated by the several rural acres along the corridor that are enrolled in the Farmland Preservation Program, Managed Forest Law, or that fall under the agriculture or forestry

zoning in the unincorporated areas. The entire study area is designated as future environmental corridor in the County's future land use map. Future Residential development is identified along the north side of WIS 33 near Garrison Road.

Columbia County manages new roads through its Land Division and Subdivision Ordinance which designates the standards for newly constructed roads as part of development as well as the functional classification and type of facility. Columbia County also has a County Highway Access Control Ordinance that preserves infrastructure investments through access standards, based on the type of roadway.

The plan identifies the potential for traffic congestion on WIS 33 and areas may require future improvements to address the congestion issues and calls for WisDOT to improve highways with turn and passing lanes. In addition, the plan recommends a feasibility study of a WIS 33 southern bypass of the city of Portage generally beginning at the I-39 interchange and extending past the WIS 33/County EE intersection.

City of Baraboo

The city of Baraboo existing land use along WIS 33 is currently a mix of residential and commercial uses in an urban density. The future land use plan focuses future growth on the north, south, and east sides of the city. In the vicinity of WIS 33, future residential and commercial activities would replace the existing low density residential and agricultural uses between County T and Rocky Point Road.

The WIS 33 corridor is recognized as a source of increasing traffic volumes in the city's comprehensive plan. The comprehensive plan calls for changes to WIS 33 including landscaped medians, providing bike lanes, and dedicated left turn lanes. It also calls for the city to coordinate with WisDOT and FHWA to update the functional classification map to increase the possibility to get state and federal funding for roads, including adding more east/west collector routes along the north and south sides of the city.

City of Portage

The comprehensive plan recognizes that the city has an abundant mix of natural and other resources and that there are significant challenges for future development due to the presence of these resources. The plan anticipates that the majority of future development will be residential and will occur as either traditional neighborhood or conventional development located on the northwest and north sides of the city.

The comprehensive plan calls for continued coordination between the city and WisDOT for access to the regional highway system. Some of the projects in the plan, such as the DeWitt Street reconstruction project are in the implementation stages or have been completed. Key transportation goals include a study of truck traffic, other traffic operations, and safety to ensure a WIS 33 corridor that is pedestrian and economically friendly.

Village of West Baraboo

The Village of West Baraboo is primarily located in a north/south orientation along the US 12 corridor with the majority of neighborhoods bounded by US 12 on the west and the City of Baraboo to the east. Future land use plans are intertwined with Lake Delton to the north and the city of Baraboo to the east.

Together, the three communities would likely see an increase in commercial land uses along US 12 to the north of the village with residential development along the north side of the city of Baraboo.

Transportation related issues identified in the plan call for improved crossings of WIS 33 at Hill and Willow Streets as well as addressing sidewalk gaps along the north side of WIS 33 between Mulberry Street and US 12. In addition, a goal of the plan is to add bikeways along US 12 and WIS 33.

Town of Baraboo

The town of West Baraboo is located primarily to the west of County T and surrounds the village of West Baraboo and the majority of the city of Baraboo. Future development in the town is consistent with the city of Baraboo and village of West Baraboo plans that call for future development on the north of the city or as mixed use between the city and Devil's Lake State Park within the town's sanitary district. The comprehensive plan recognizes the need for multi-jurisdictional transportation planning, and discusses the need to connect County A to US 12, consistent with other community plans in this area.

The town is considering adopting an impact fee ordinance and using the money to fund transportation improvements. This program would be called TRIP or Town Road Improvement Program. The comprehensive plan also promotes a "fix it first" policy on roadways; meaning existing roads should be repaired before new roads are constructed.

Town of Greenfield

The Town of Greenfield's comprehensive plan contains three main parts The Agricultural Preservation District, The Forest Preservation District, and The Environmental Conservancy District. Together, these districts constitute the future land use vision for the town. The WIS 33 corridor passes through the Agricultural Preservation District and touches the Environmental Conservancy District at the northern border with the Town of Fairfield.

The Agricultural Preservation District would limit conflicts between development and agricultural by providing design standards and buffers between these land uses. Residential development would be designed with conservation principles to limit its encroachment upon agricultural lands. Clustered housing and density-based zoning options are the plans preferred type.

The Forest Preservation District was created to protect the forest resources located within the Town and associated with the Baraboo Range. In this district, residential development would be designed and implemented to limit degradation of the forest resources. Clustered housing and density-based zoning options are the primary tools to support this district.

The Environmental Conservancy District includes mapped floodplains, steep slopes, hydric soils and wetlands. In addition, this section contains guidelines for forests and animal habitats. This land generally has limited capability for development because of existing controls at the local, county, and state levels.

Transportation measures within the plan include coordination with state and county entities to manage traffic on the appropriate facilities within the town.

Town of Fairfield

The Town of Fairfield is located along and south of the I-90/94 corridor and bounded by Columbia County to the east. The town includes a short portion of WIS 33 located in the southeast portion of the town. In this area, land use is planned to stay primarily in agricultural conservancy or environmental conservancy. These two districts are characterized by low density development when permitted.

Town of Caledonia

Caledonia has the distinction of being the largest town in Columbia County and is bordered on three sides by the Wisconsin River with Sauk County on its western border. Because of the town's location along the Wisconsin River and the Baraboo Range, the town contains a mix of prime agricultural soils, woodlands, floodplains and environmental corridors which limit the development potential within the study area.

Existing land uses in the town consist primarily of agriculture or open space interspersed with rural residential uses. Commercial activities are concentrated at the I-39/90/94 system interchange with some commercial activities in the proximity of the I-39/WIS 33 intersection. Future land use allows for pockets of commercial activities located along WIS 33, however, most future residential activities are planned along the Wisconsin River with commercial continuing to expand around the I-39/90/94 interchange area.

The comprehensive plan calls for regulating access to the state highway system through subdivision ordinances.

Town of Fort Winnebago

The Town of Fort Winnebago is located northeast of the City of Portage, with WIS 33 as the southern town line. Existing land use within the town and along WIS 33 is typically agriculture or open space, with a suburban residential area located north of WIS 33 in the vicinity of County F. Future land use generally maintains the existing condition within the study corridor. Areas along County F and adjacent to the Fox River, which are the site of Fort Winnebago and the Ice Age Trail are shown as recreational in the future.

The town currently has an access control ordinance and the plan recommends review of the ordinance as well as continued coordination with the county and state. The comprehensive plan identifies a new local road connection between County F, County EE and WIS 33.

Town of Pacific

The Town of Pacific is located southeast of the city of Portage with WIS 33 as the northern town limit. Existing land use within the study corridor includes suburban residential development along WIS 33 with natural, wetlands, and open water, including 100 year floodplains located in close proximity to the south. The future land use plan for the corridor maintains the existing condition as either residential, agriculture, or open space.

The town's plan acknowledges the WIS 33 southern bypass of Portage from the Columbia County plan. WIS 33 would relocate to its current alignment before entering the town. There are no planned new local road connections to WIS 33 or other changes to town roads within the study area.

Summary of Potential Transportation Effects

The potential effects of transportation and land use decisions form community comprehensive plans have been summarized in the following table.

Table 26 Potential comprehensive plan effects on WIS 33

Community	Major Roads in Study Area	Potential Transportation Effects
Columbia County	I-90/94, I-39, US 51, WIS 16, WIS 33, County F, County U, County W	• Reduce congestion on WIS 33 and add passing and turn lanes. • Compatibility of Access Control Ordinance with state guidelines. • Recommendation to study a WIS 33 south bypass of the city of Portage.
Sauk County	US 12, WIS 33, WIS 123, County A, County T, County X, County U	• Maintains the current environment in the vicinity of WIS 33
City of Baraboo	US 12, WIS 33, WIS 123, County A, County T	• Eastside Redevelopment may add traffic to WIS 33/County T intersection • Proposed north side east/west collector between Man Mound Road and US 12 may change traffic patterns at WIS 33 intersections east of the city. • Desire to accommodate bike and pedestrian users of the WIS 33 corridor in the city.
City of Portage	I-39, US 51, WIS 16, WIS 33	• Expand PATHS system • Reduce downtown truck traffic – coordinate a study with WisDOT • Acknowledge County Plan to study a southern bypass of the city. • Identify a new site for the city airport.
Village of West Baraboo	US 12, WIS 33	• Access Management overlay zone along WIS 33 guides new access points and development. • WIS 33 redevelopment to reflect transportation changes from the US 12 bypass. • Infill development and corridor enhancements may add traffic from increased commercial development density.
Town of Baraboo	US 12, WIS 33, WIS 113, WIS 123, WIS 136	• Eastside redevelopment located south of the city of Baraboo along the town line. • Northern development could add traffic to WIS 33 intersections with County A and County T.
Town of Greenfield	WIS 33, WIS 113, County X, County W	• Preserve low density uses or preserve resources therefore minimal development induced traffic potential to WIS 33.
Town of Fairfield	WIS 33, County U	• Preserve low density uses or preserve resources therefore minimal development induced traffic potential to WIS 33.
Town of Caledonia	I-90/94, I-39, WIS 33, County U, County W	• Development planned for areas outside of the WIS 33 corridor, therefore minimal development induced traffic potential to WIS 33.
Town of Fort Winnebago	WIS 33, County F, County EE	• Plan maps show a new local road between County F and County E along WIS 33.
Town of Pacific	WIS 33	• Environmental constraints limit development potential along WIS 33.

7.0 Traffic Operations Analysis

Current and forecasted traffic conditions along the WIS 33 study corridor have been measured and analyzed. In section 7.1, the existing and forecasted traffic volumes on four segments and at intersections are described. Section 7.2 presents the results of level of service (LOS) analysis of traffic within the four segments and at several key intersections. Section 7.3 provides a signal risk assessment, describing existing conditions and recommending potential improvements. Section 7.4 describes safety conditions on the corridor, presenting crash data for the four segments and highlighted intersections. Section 7.5 shows the results of an Interactive Highway Safety Design Model (IHSDM) analysis. Section 7.6 summarizes travel time studies undertaken on the corridor. Finally, Section 7.7 summarizes findings of truck movements through Portage.

7.1 Existing and Future Traffic Volumes

Historic and Existing Traffic Volumes

Mainline Traffic

Historic traffic volumes between 2005 and 2014 from WisDOT's Tradas database were reviewed for select locations along WIS 33 within the study area (see Exhibit 1). As part of the study, traffic counts were conducted in 2016 at select locations along WIS 33 to determine current average daily traffic (ADT), peak traffic hours and volumes, and vehicle types and shares.

For the purposes of analysis, the corridor was divided into four segments: two urban segments and two rural segments. Segmentation has been determined by WisDOT roadway classifications, traffic volumes and speed limit zones within the corridor. The segments are described as follows:

- Segment 1 — Urban 2.5 mile segment in West Baraboo and Baraboo, between US 12 and County T (Taft Avenue)
- Segment 2 — Rural 14.5 mile segment between County T (Taft Avenue) and the Wisconsin River
- Segment 3 — Urban 1.5 mile segment in Portage between the Wisconsin River and the railroad overpass
- Segment 4 — Rural 2.5 mile segment between the railroad overpass and Garrison Road

Table 27 below shows the distribution of historic and current traffic volumes on the WIS 33 corridor segments.

Table 27 Historic and current traffic volumes (AADT) on WIS 33 segments

Segment	2005	2008	2011	2014	2016
US 12 to County T/Taft[1]	16,600	15,300	18,100	11,900	11,900
County T/Taft to the Wisconsin River[2]	8,100	6,100	8,800	8,800	8,500
The Wisconsin River to RR overpass[3]	7,500	5,500	7,000	7,000	5,200
RR overpass to Garrison Road[4]	8,700	8,300	9,100	8,400	7,400

[1]At East Street; [2]Between I 90/94 and I 39; [3]Between MacFarlane and WIS 16 (Wisconsin Street); [4]West of County F

Map 1
Exhibit 1

Historic Traffic Volumes (WisDOT Tradas Data)

WIS 33 Corridor Preservation Study

Scale 1" = 4000'

TranSmart TECHNOLOGIES

West Baraboo

Baraboo

Sauk County

Columbia County

WIS 33
(2004) 16600
(2005) 16100
(2006) 16100
(2007) 16100
(2008) 13100
(2009) 13100
(2010) 13100
(2011) 12100
(2012) 0
(2013) 12100
(2014) 14800

CTH BD
(2004) 18000
(2005) 18300
(2006) 18600
(2007) 18900
(2008) 18900
(2009) 19400
(2010) 18200
(2011) 13300
(2012) 0
(2013) 4600
(2014) 4500

WIS 33
(2004) 18700
(2005) 16300
(2006) 16300
(2007) 16300
(2008) 14700
(2009) 14700
(2010) 14700
(2011) 12900
(2012) 0
(2013) 12900
(2014) 13100

WIS 33
(2004) 16500
(2005) 15700
(2006) 15700
(2007) 15700
(2008) 14700
(2009) 14700
(2010) 14700
(2011) 12600
(2012) 0
(2013) 12600
(2014) 12900

CTH T
(2004) 1400
(2005) 1400
(2006) 1400
(2007) 1400
(2008) 1400
(2009) 1400
(2010) 1400
(2011) 1100
(2012) 0
(2013) 1100
(2014) 1100

Elizabeth St
(2004) 2000
(2005) 2000
(2006) 2000
(2007) 2000
(2008) 1900
(2009) 1900
(2010) 1900
(2011) 1700
(2012) 0
(2013) 1700
(2014) 1700

CTH U
(2004) 340
(2005) 340
(2006) 340
(2007) 340
(2008) 340
(2009) 340
(2010) 340
(2011) 440
(2012) 0
(2013) 440
(2014) 440

WIS 33
(2004) 6800
(2005) 6600
(2006) 6600
(2007) 6600
(2008) 5200
(2009) 5200
(2010) 5200
(2011) 5200
(2012) 0
(2013) 5200
(2014) 5200

Connie Rd
(2004) 2400
(2005) 2400
(2006) 2400
(2007) 2400
(2008) 2400
(2009) 2400
(2010) 2400
(2011) 2100
(2012) 0
(2013) 2100
(2014) 2100

Draper St
(2004) 2300
(2005) 2300
(2006) 2300
(2007) 2300
(2008) 2300
(2009) 2300
(2010) 2300
(2011) 3200
(2012) 0
(2013) 3200
(2014) 3200

CTH A
(2004) 5000
(2005) 4100
(2006) 4100
(2007) 4100
(2008) 4700
(2009) 4700
(2010) 4700
(2011) 4700
(2012) 0
(2013) 4700
(2014) 3900

Jefferson St
(2004) 2500
(2005) 2500
(2006) 2500
(2007) 2500
(2008) 2500
(2009) 2500
(2010) 2500
(2011) 2400
(2012) 0
(2013) 2400
(2014) 2400

Man Mound Rd
(2004) 370
(2005) 370
(2006) 370
(2007) 370
(2008) 370
(2009) 370
(2010) 370
(2011) 340
(2012) 0
(2013) 340
(2014) 340

WIS 33
(2004) 16000
(2005) 15600
(2006) 15600
(2007) 15600
(2008) 14400
(2009) 14400
(2010) 14400
(2011) 12600
(2012) 0
(2013) 12600
(2014) 13300

USH 12
(2004) 19100
(2005) 22400
(2006) 22400
(2007) 22400
(2008) 18700
(2009) 18700
(2010) 18700
(2011) 17900
(2012) 0
(2013) 17900
(2014) 18500

CTH T
(2004) 2300
(2005) 1800
(2006) 1800
(2007) 1800
(2008) 1800
(2009) 1800
(2010) 1800
(2011) 1600
(2012) 0
(2013) 1600
(2014) 1600

WIS 33
(2004) 6700
(2005) 6300
(2006) 6300
(2007) 6300
(2008) 0
(2009) 0
(2010) 0
(2011) 6400
(2012) 0
(2013) 6400
(2014) 5500

CTH W
(2004) 770
(2005) 770
(2006) 770
(2007) 770
(2008) 770
(2009) 770
(2010) 770
(2011) 650
(2012) 0
(2013) 650
(2014) 650

WIS 33
(2004) 8500
(2005) 7200
(2006) 7200
(2007) 7200
(2008) 6700
(2009) 6700
(2010) 6700
(2011) 7400
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(2014) 7400

WIS 33
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(2005) 13800
(2006) 13800
(2007) 13800
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(2009) 12500
(2010) 12500
(2011) 12200
(2012) 0
(2013) 12200
(2014) 12800

East St
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(2011) 0
(2012) 0
(2013) 0
(2014) 0

WIS 33
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(2012) 0
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(2014) 13300

Elizabeth St
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(2006) 1700
(2007) 1700
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(2009) 1700
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(2011) 2700
(2012) 0
(2013) 2700
(2014) 2700

WIS 33
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(2012) 0
(2013) 7300
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WIS 33
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(2012) 0
(2013) 6600
(2014) 5800

Durward's Glen Rd
(2004) 220
(2005) 220
(2006) 220
(2007) 220
(2008) 220
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(2010) 220
(2011) 230
(2012) 0
(2013) 230
(2014) 230

WIS 33
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(2010) 12200
(2011) 13400
(2012) 0
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(2014) 11200

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(2010) 19600
(2011) 18700
(2012) 0
(2013) 18700
(2014) 18700

Willow St
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(2006) 1600
(2007) 1600
(2008) 1500
(2009) 1500
(2010) 1500
(2011) 1400
(2012) 0
(2013) 1400
(2014) 1400

Park St
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(2005) 1400
(2006) 1400
(2007) 1400
(2008) 1400
(2009) 1400
(2010) 1400
(2011) 1400
(2012) 0
(2013) 1400
(2014) 1400

USH 12
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(2010) 12100
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(2012) 0
(2013) 12100
(2014) 12100

STH 113
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(2005) 9900
(2006) 9900
(2007) 9900
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(2011) 8100
(2012) 0
(2013) 8100
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STH 123
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(2010) 2500
(2011) 1700
(2012) 0
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(2014) 1700

WIS 33
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(2010) 15300
(2011) 18100
(2012) 0
(2013) 18100
(2014) 11900

STH 113
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(2007) 1400
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(2009) 1400
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(2011) 0
(2012) 0
(2013) 0
(2014) 0

CTH W
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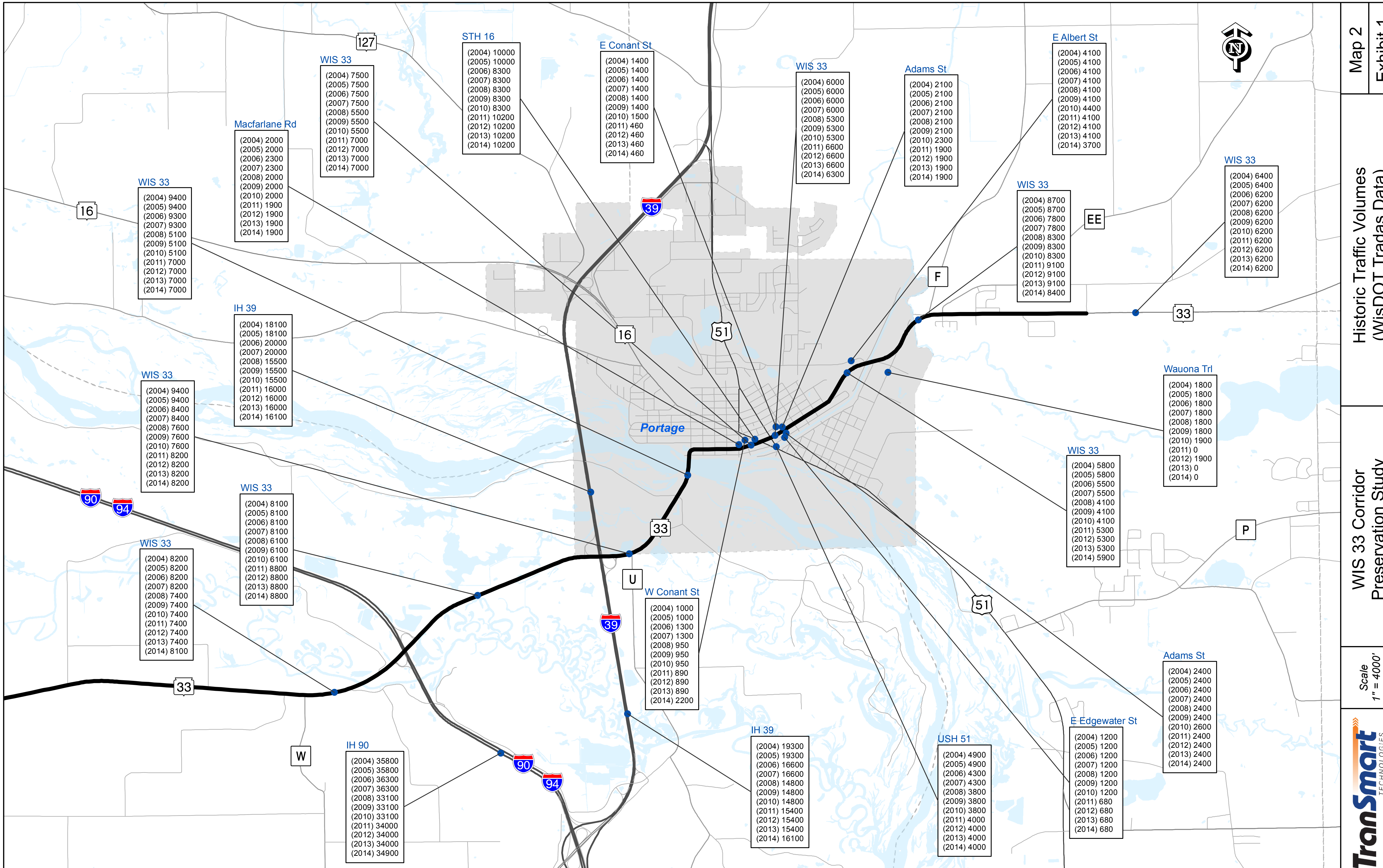
Map 2
Exhibit 1
Historic Traffic Volumes
(WisDOT Tradas Data)
WIS 33 Corridor
Preservation Study
Scale
1" = 4000'
TranSmart
TECHNOLOGIES
Portage
STH 16
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(2014) 10200
WIS 33
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(2010) 5500
(2011) 7000
(2012) 7000
(2013) 7000
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E Conant St
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(2006) 2100
(2007) 2100
(2008) 2100
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(2010) 2300
(2011) 1900
(2012) 1900
(2013) 1900
(2014) 1900
E Albert St
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Macfarlane Rd
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(2006) 2300
(2007) 2300
(2008) 2000
(2009) 2000
(2010) 2000
(2011) 1900
(2012) 1900
(2013) 1900
(2014) 1900
WIS 33
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(2009) 5100
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(2013) 7000
(2014) 7000
WIS 33
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(2013) 16000
(2014) 16100
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Wauona Trl
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WIS 33
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(2006) 8200
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(2013) 7400
(2014) 8100
W Conant St
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(2005) 1000
(2006) 1300
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(2008) 950
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IH 90
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(2010) 33100
(2011) 34000
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(2014) 34900
IH 39
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(2006) 16600
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E Edgewater St
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(2006) 1200
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(2009) 1200
(2010) 1200
(2011) 680
(2012) 680
(2013) 680
(2014) 680
Adams St
(2004) 2400
(2005) 2400
(2006) 2400
(2007) 2400
(2008) 2400
(2009) 2400
(2010) 2600
(2011) 2400
(2012) 2400
(2013) 2400
(2014) 2400
127
16
39
51
EE
F
33
P
90
94
U
W

Intersection Traffic

Morning and evening peak-hour turn counts were conducted for 18 intersections along the WIS 33 corridor in between March and April 2016. Table 28 below shows the number of vehicles counted by turn movement for each intersection approach leg.

Table 28 2016 peak-hour intersection turning movement counts

AM volumes	Eastbound WIS 33			Westbound WIS 33			Northbound			Southbound		
PM volumes	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**
Mulberry Street	*6*	*422*	*4*	*48*	*380*	*13*	*1*	*4*	*32*	*21*	*5*	*42*
	18	**467**	**7**	**39**	**558**	**52**	**8**	**3**	**46**	**39**	**6**	**63**
Connie Street	*19*	*454*	*-*	*-*	*403*	*39*	*-*	*-*	*-*	*78*	*-*	*73*
	36	**523**	**-**	**-**	**593**	**60**	**-**	**-**	**-**	**56**	**-**	**68**
Draper Street	*103*	*405*	*-*	*-*	*357*	*246*	*-*	*-*	*-*	*194*	*-*	*75*
	67	**505**	**-**	**-**	**583**	**67**	**-**	**-**	**-**	**102**	**-**	**52**
Broadway Street	*-*	*425*	*122*	*166*	*367*	*-*	*185*	*0*	*125*	*-*	*-*	*-*
	-	**434**	**128**	**156**	**385**	**-**	**250**	**0**	**207**	**-**	**-**	**-**
East Street	*31*	*427*	*39*	*20*	*436*	*54*	*59*	*149*	*22*	*58*	*135*	*67*
	58	**509**	**58**	**27**	**504**	**37**	**33**	**18**	**12**	**29**	**118**	**60**
Elizabeth Street	*80*	*412*	*16*	*22*	*429*	*11*	*27*	*20*	*33*	*11*	*17*	*36*
	45	**517**	**19**	**37**	**503**	**5**	**11**	**8**	**29**	**6**	**9**	**58**
County T/Taft Avenue	*33*	*218*	*-*	*-*	*236*	*6*	*-*	*-*	*-*	*13*	*-*	*116*
	106	**255**	**-**	**-**	**270**	**6**	**-**	**-**	**-**	**11**	**-**	**66**
Cascade Mountain Road	*-*	*294*	*1*	*14*	*254*	*-*	*1*	*0*	*5*	*-*	*-*	*-*
	-	**263**	**5**	**40**	**313**	**-**	**5**	**0**	**33**	**-**	**-**	**-**
Fairfield/Caledonia Rd.	*6*	*214*	*0*	*13*	*377*	*11*	*0*	*1*	*32*	*1*	*2*	*1*
	3	**452**	**0**	**22**	**288**	**22**	**0**	**0**	**14**	**16**	**0**	**7**
Pierce Street	*23*	*196*	*-*	*-*	*363*	*5*	*-*	*-*	*-*	*9*	*-*	*45*
	61	**332**	**-**	**-**	**300**	**13**	**-**	**-**	**-**	**7**	**-**	**32**
MacFarlane Road	*35*	*159*	*1*	*0*	*252*	*9*	*6*	*9*	*3*	*17*	*12*	*58*
	42	**289**	**3**	**2**	**241**	**10**	**8**	**13**	**6**	**17**	**36**	**46**
WIS 16/Wisconsin Street	*8*	*129*	*47*	*5*	*164*	*43*	*89*	*75*	*3*	*41*	*301*	*9*
	5	**230**	**87**	**12**	**165**	**35**	**69**	**166**	**8**	**50**	**444**	**18**
US 51/DeWitt Street	*44*	*108*	*10*	*10*	*206*	*38*	*4*	*326*	*18*	*3*	*12*	*11*
	70	**213**	**12**	**17**	**179**	**39**	**15**	**290**	**32**	**16**	**37**	**18**
East Albert Street	*29*	*139*	*-*	*-*	*200*	*220*	*-*	*-*	*-*	*76*	*-*	*31*
	19	**272**	**-**	**-**	**200**	**107**	**-**	**-**	**-**	**207**	**-**	**24**
Wauona Trail	*-*	*147*	*23*	*19*	*404*	*-*	*16*	*0*	*11*	*-*	*-*	*-*
	-	**357**	**30**	**23**	**293**	**-**	**22**	**0**	**37**	**-**	**-**	**-**
County F	*17*	*136*	*-*	*-*	*375*	*1*	*-*	*-*	*-*	*6*	*-*	*31*
	28	**356**	**-**	**-**	**283**	**15**	**-**	**-**	**-**	**8**	**-**	**22**
US 51 & Wauona Trail	*15*	*321*	*-*	*-*	*551*	*31*	*-*	*-*	*-*	*24*	*-*	*22*
	35	**459**	**-**	**-**	**489**	**47**	**-**	**-**	**-**	**30**	**-**	**23**
US 51 & Haertel Street	*20*	*20*	*23*	*20*	*50*	*129*	*11*	*514*	*4*	*52*	*334*	*12*
	13	**58**	**20**	**15**	**17**	**75**	**18**	**572**	**0**	**118**	**575**	**24**

Exhibit 2 on the following pages shows AM and PM peak hour turning movement locations and counts along the corridor. The resulting data was used as the basis for LOS analysis and WisDOT forecasts, and can be used to confirm problem intersections along WIS 33. Detailed count reports including forecast information for each intersection in the table below are included in Appendix A.

Map 1
Exhibit 2

2016 Peak-Hour Intersection Volumes

WIS 33 Corridor Preservation Study

Not to Scale

TranSmart TECHNOLOGIES

Village of West Baraboo

City of Baraboo

Baraboo River

12

33

T

Mulberry St

Connie St

Draper St

Broadway St

East St

Elizabeth St

Taft St

2016
73 (68)
78 (56)
39 (60)
403 (593)
19 (36)
454 (523)
WIS 33 & Connie Street

2016
367 (385)
166 (156)
425 (434)
122 (128)
185 (250)
125 (207)
WIS 33 & Broadway Street

2016
42 (63)
5 (6)
21 (39)
13 (52)
380 (558)
48 (39)
6 (18)
422 (467)
4 (7)
1 (8)
4 (3)
32 (46)
WIS 33 & Mulberry Street

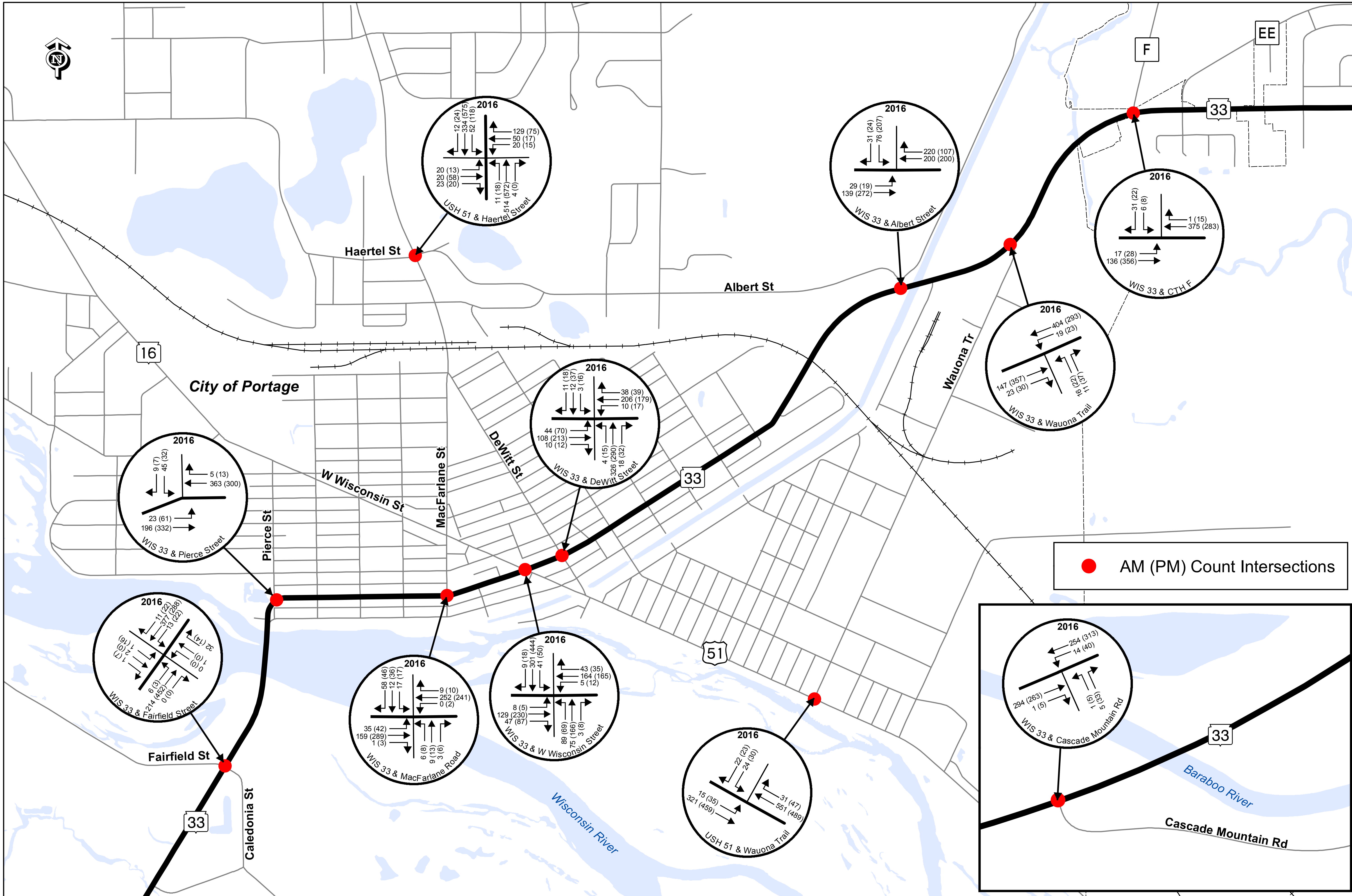
2016
75 (52)
194 (102)
246 (67)
357 (583)
103 (67)
405 (505)
WIS 33 & Draper Street

2016
67 (60)
135 (118)
58 (29)
54 (37)
436 (504)
20 (27)
31 (58)
427 (509)
39 (58)
59 (33)
149 (18)
22 (12)
WIS 33 & East Street

2016
36 (58)
17 (9)
11 (6)
11 (5)
429 (503)
22 (37)
80 (45)
412 (517)
16 (19)
27 (11)
20 (8)
33 (29)
WIS 33 & Elizabeth Street

2016
116 (66)
13 (11)
6 (6)
236 (270)
33 (106)
218 (255)
WIS 33 & Taft Street

AM (PM) Count Intersections



Map 2

Exhibit 2

2016 Peak-Hour Intersection Volumes

WIS 33 Corridor Preservation Study

Not to Scale

TranSmart Technologies

WisDOT Forecasts

WisDOT has forecasted AADT traffic volumes for WIS 33 through 2046 based on counts conducted in 2016. Forecast AADT volumes by segment can be seen in Table 29 below. The forecast assumes that no major new traffic generators will be developed in the WIS 33 study corridor through 2046, except for the new Columbia County Center in Portage. WisDOT forecast sheets can be found in Appendix B.

Table 29 Current and forecast WisDOT traffic volumes (AADT) on WIS 33 segments

Segment	2016	2026	2036	2046
US 12 to County T (Taft Avenue)	10,200-11,900	10,700-12,500	11,200-13,100	11,700-13,700
County T to the Wisconsin River	6,100-8,500	6,800-9,500	7,500-10,300	8,100-11,200
Wisconsin River to RR overpass	5,200-8,100	5,600-8,900	5,900-9,500	5,100-10,100
RR overpass to Garrison Road	7,400	8,000	8,400	8,900

Future intersection volumes within the corridor were estimated based on the WisDOT forecast for 2046 (Appendix A). These volumes can be seen in Table 30 or Exhibit 3 on the following pages.

Table 30 2046 peak-hour WisDOT forecasts

AM volumes	Eastbound WIS 33			Westbound WIS 33			Northbound			Southbound		
PM volumes	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**
Mulberry Street	*7*	*485*	*4*	*56*	*436*	*16*	*1*	*4*	*38*	*24*	*5*	*49*
	21	**537**	**8**	**46**	**641**	**60**	**9**	**3**	**53**	**45**	**7**	**73**
Connie Street	*22*	*522*	*-*	*-*	*463*	*45*	*-*	*-*	*-*	*90*	*-*	*84*
	41	*602*	**-**	**-**	**682**	**69**	**-**	**-**	**-**	**65**	**-**	**78**
Draper Street	*135*	*451*	*-*	*-*	*396*	*300*	*-*	*-*	*-*	*258*	*-*	*106*
	91	**563**	**-**	**-**	**660**	**90**	**-**	**-**	**-**	**136**	**-**	**71**
Broadway Street	*-*	*489*	*140*	*191*	*422*	*-*	*213*	*-*	*144*	*-*	*-*	*-*
	-	**499**	**147**	**179**	**443**	**-**	**288**	**-**	**238**	**-**	**-**	**-**
East Street	*41*	*489*	*42*	*22*	*496*	*69*	*64*	*178*	*24*	*78*	*171*	*92*
	74	**581**	**33**	**29**	**577**	**48**	**36**	**128**	**13**	**40**	**151**	**82**
Elizabeth Street	*92*	*472*	*20*	*27*	*492*	*12*	*36*	*27*	*44*	*12*	*22*	*41*
	52	**592**	**24**	**46**	**577**	**6**	**15**	**11**	**39**	**7**	**11**	**67**
County T (Taft Avenue)	*36*	*260*	*-*	*-*	*305*	*11*	*-*	*-*	*-*	*27*	*-*	*125*
	115	**310**	**-**	**-**	**341**	**18**	**-**	**-**	**-**	**20**	**-**	**71**
Cascade Mountain Road	*-*	*396*	*2*	*15*	*346*	*-*	*2*	*-*	*6*	*-*	*-*	*-*
	-	**354**	**8**	**44**	**431**	**-**	**8**	**-**	**36**	**-**	**-**	**-**
Fairfield/Caledonia Rd.	*9*	*298*	*0*	*16*	*480*	*13*	*0*	*1*	*36*	*1*	*2*	*2*
	6	**585**	**0**	**26**	**388**	**25**	**0**	**0**	**16**	**17**	**0**	**10**
Pierce Street	*28*	*265*	*-*	*-*	*420*	*6*	*-*	*-*	*-*	*10*	*-*	*52*
	74	**402**	**-**	**-**	**378**	**14**	**-**	**-**	**-**	**8**	**-**	**42**
MacFarlane Road	*42*	*205*	*1*	*0*	*292*	*11*	*7*	*11*	*3*	*20*	*14*	*71*
	50	**334**	**3**	**2**	**297**	**13**	**9**	**16**	**7**	**21**	**42**	**57**
WIS 16/Wisconsin Street	*9*	*157*	*72*	*6*	*189*	*49*	*107*	*212*	*4*	*47*	*390*	*10*
	6	**267**	**105**	**16**	**196**	**39**	**96**	**231**	**10**	**57**	**523**	**20**
US 51/DeWitt Street	*50*	*132*	*12*	*12*	*239*	*44*	*5*	*390*	*22*	*11*	*23*	*13*
	78	**246**	**15**	**20**	**212**	**50**	**18**	**351**	**39**	**20**	**45**	**21**
East Albert Street	*44*	*169*	*-*	*-*	*260*	*290*	*-*	*-*	*-*	*101*	*-*	*46*
	30	**349**	**-**	**-**	**243**	**141**	**-**	**-**	**-**	**274**	**-**	**38**
Wauona Trail	*-*	*181*	*30*	*21*	*510*	*-*	*20*	*-*	*12*	*-*	*-*	*-*
	-	**458**	**38**	**25**	**358**	**-**	**29**	**-**	**40**	**-**	**-**	**-**
County F	*22*	*162*	*-*	*-*	*467*	*1*	*-*	*-*	*-*	*9*	*-*	*37*
	36	**440**	**-**	**-**	**338**	**18**	**-**	**-**	**-**	**11**	**-**	**27**
US 51 & Wauona Trail	*17*	*388*	*-*	*-*	*699*	*38*	*-*	*-*	*-*	*30*	*-*	*24*
	39	**580**	**-**	**-**	**595**	**58**	**-**	**-**	**-**	**36**	**-**	**25**
US 51 & Haertel Street	*23*	*23*	*26*	*25*	*57*	*160*	*13*	*659*	*4*	*65*	*458*	*15*
	16	**66**	**23**	**18**	**20**	**91**	**21**	**757**	**6**	**147**	**738**	**27**

Map 1
Exhibit 3

2046 Forecast Peak-Hour Intersection Volumes

WIS 33 Corridor Preservation Study

Not to Scale

TranSmart TECHNOLOGIES

Village of West Baraboo

City of Baraboo

Baraboo River

12

33

T

Mulberry St

Connie St

Draper St

Broadway St

East St

Elizabeth St

Taft St

2046
84 (78)
90 (65)
45 (69)
463 (682)
22 (41)
522 (602)
WIS 33 & Connie Street

2046
422 (443)
191 (179)
489 (499)
140 (147)
213 (288)
144 (238)
WIS 33 & Broadway Street

2046
49 (73)
5 (7)
24 (45)
16 (60)
436 (641)
56 (46)
7 (21)
485 (537)
4 (8)
1 (9)
4 (3)
38 (53)
WIS 33 & Mulberry Street

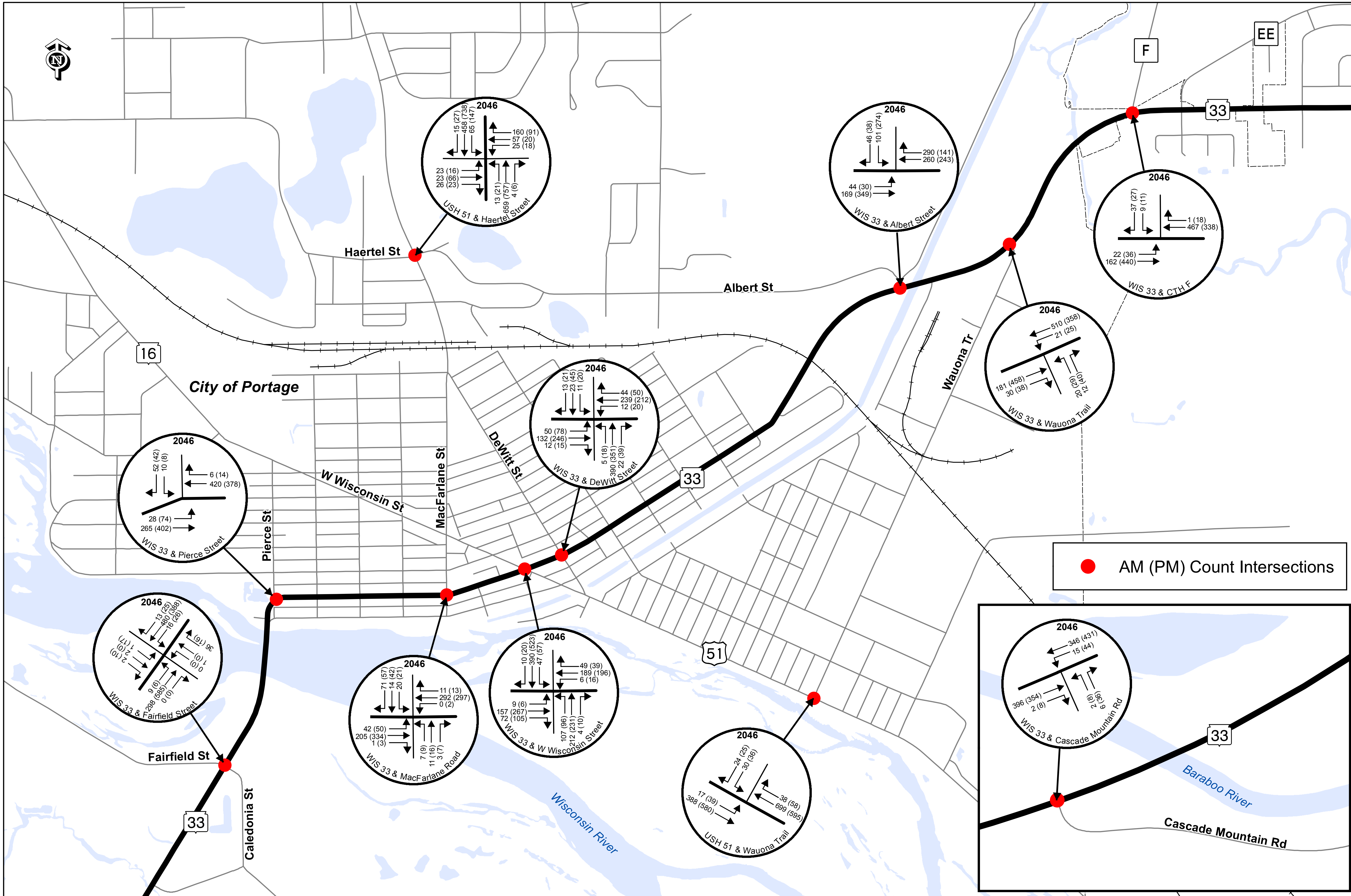
2046
106 (71)
258 (136)
300 (90)
396 (660)
135 (91)
451 (563)
WIS 33 & Draper Street

2046
92 (82)
171 (151)
78 (40)
69 (48)
496 (577)
22 (29)
41 (74)
489 (581)
42 (33)
64 (36)
178 (128)
24 (13)
WIS 33 & East Street

2046
41 (67)
22 (11)
12 (7)
12 (6)
492 (577)
27 (46)
92 (52)
472 (592)
20 (24)
36 (15)
27 (11)
44 (39)
WIS 33 & Elizabeth Street

2046
125 (71)
27 (20)
11 (18)
305 (341)
36 (115)
260 (310)
WIS 33 & Taft Street

AM (PM) Count Intersections



City of Portage
Haertel St
Albert St
W Wisconsin St
Pierce St
MacFarlane St
DeWitt St
Wauona Tr
Fairfield St
Caledonia St
Wisconsin River
Baraboo River
Cascade Mountain Rd
16
33
51
F
EE
AM (PM) Count Intersections
2046
USH 51 & Haertel Street
15 (27) 458 (738) 65 (147)
160 (91) 57 (20) 25 (18)
23 (16) 23 (66) 26 (23)
13 (21) 659 (757) 4 (6)
WIS 33 & Albert Street
46 (38) 101 (274)
290 (141) 260 (243)
44 (30) 169 (349)
WIS 33 & CTH F
37 (27) 9 (11)
1 (18) 467 (338)
22 (36) 162 (440)
WIS 33 & Wauona Trail
510 (358) 21 (25)
181 (458) 30 (38)
20 (29) 12 (40)
WIS 33 & DeWitt Street
13 (21) 23 (45) 11 (20)
44 (50) 239 (212) 12 (20)
50 (78) 132 (246) 12 (15)
5 (18) 390 (351) 22 (39)
WIS 33 & Pierce Street
52 (42) 10 (8)
6 (14) 420 (378)
28 (74) 265 (402)
WIS 33 & Fairfield Street
13 (25) 480 (388) 16 (26)
36 (18) 1 (0) 0 (0)
1 (17) 2 (9) 2 (10)
9 (6) 298 (585) 0 (0)
WIS 33 & MacFarlane Road
71 (57) 14 (42) 20 (21)
11 (13) 292 (297) 0 (2)
42 (50) 205 (334) 1 (3)
7 (9) 11 (16) 3 (7)
WIS 33 & W Wisconsin Street
10 (20) 390 (523) 47 (57)
49 (39) 189 (196) 6 (16)
9 (6) 157 (267) 72 (105)
107 (96) 212 (231) 4 (10)
USH 51 & Wauona Trail
24 (25) 30 (36)
38 (58) 699 (595)
17 (39) 388 (580)
WIS 33 & Cascade Mountain Rd
346 (431) 15 (44)
396 (354) 2 (8)
2 (8) 6 (36)

Map 2
Exhibit 3

2046 Forecast Peak-Hour Intersection Volumes

WIS 33 Corridor Preservation Study

Not to Scale

TranSmart Technologies

7.2 Level of Service Analysis

Analyses were performed to determine the long-term function of WIS 33 in its existing configuration. *All traffic capacity and operational analyses were performed using HCS Plus software and the 2010 Highway Capacity Manual (HCM) methodology in accordance with the WisDOT Facilities Development Manual (FDM Procedure 11-5-3).* Synchro software, which also uses HCM methodology, was used to determine LOS for the urban segments. Each of the rural segments and intersections on the WIS 33 study corridor was evaluated by determining a level of service (LOS) from the analysis. LOS analysis for WIS 33 determined traffic operations during the peak hour of traffic in both the AM and the PM. For the other 22 hours of the day traffic operations along WIS 33 would likely be considerably better than the analysis findings.

LOS is a letter grade assigned to a transportation facility to designate the quality of operations or extent of delay. The grades range from A (best) to F (worst):

- LOS A — primarily free-flow operations at average travel speeds; unimpeded maneuvering; delay at intersections is minimal
- LOS B — reasonably unimpeded operations; average travel speeds; maneuvering is only slightly restricted; unsubstantial delay at intersections
- LOS C — stable operations; maneuvering and lane-changing is more restricted than at LOS B; lower travel speeds but good flow
- LOS D — typical operations goal; generally stable operations; small increases in flow can cause larger increases in delay and decreases in speed
- LOS E — congestion; unstable operations; significant delays; low travel speeds; commonly occurs when a facility is near capacity
- LOS F — extremely low speeds; significant congestion; extensive queuing; usually indicates an over-capacity condition

WisDOT has established level of service goals for the acceptable functioning of highway facilities in urban and rural areas. For a Non-Corridor 2030 Route like WIS 33, the acceptable LOS in rural areas, where WIS 33 is a minor arterial, is LOS D or better. In urban areas, where WIS 33 is a principal arterial, the acceptable LOS is also LOS D or better (see WisDOT FDM 11-5-3.2). When the level of service on a facility is lower than normally acceptable standards, WisDOT may consider improving it through incremental improvements or capacity expansion. Implementing large-scale improvement and capacity expansion projects depend on priorities set by the state legislature.

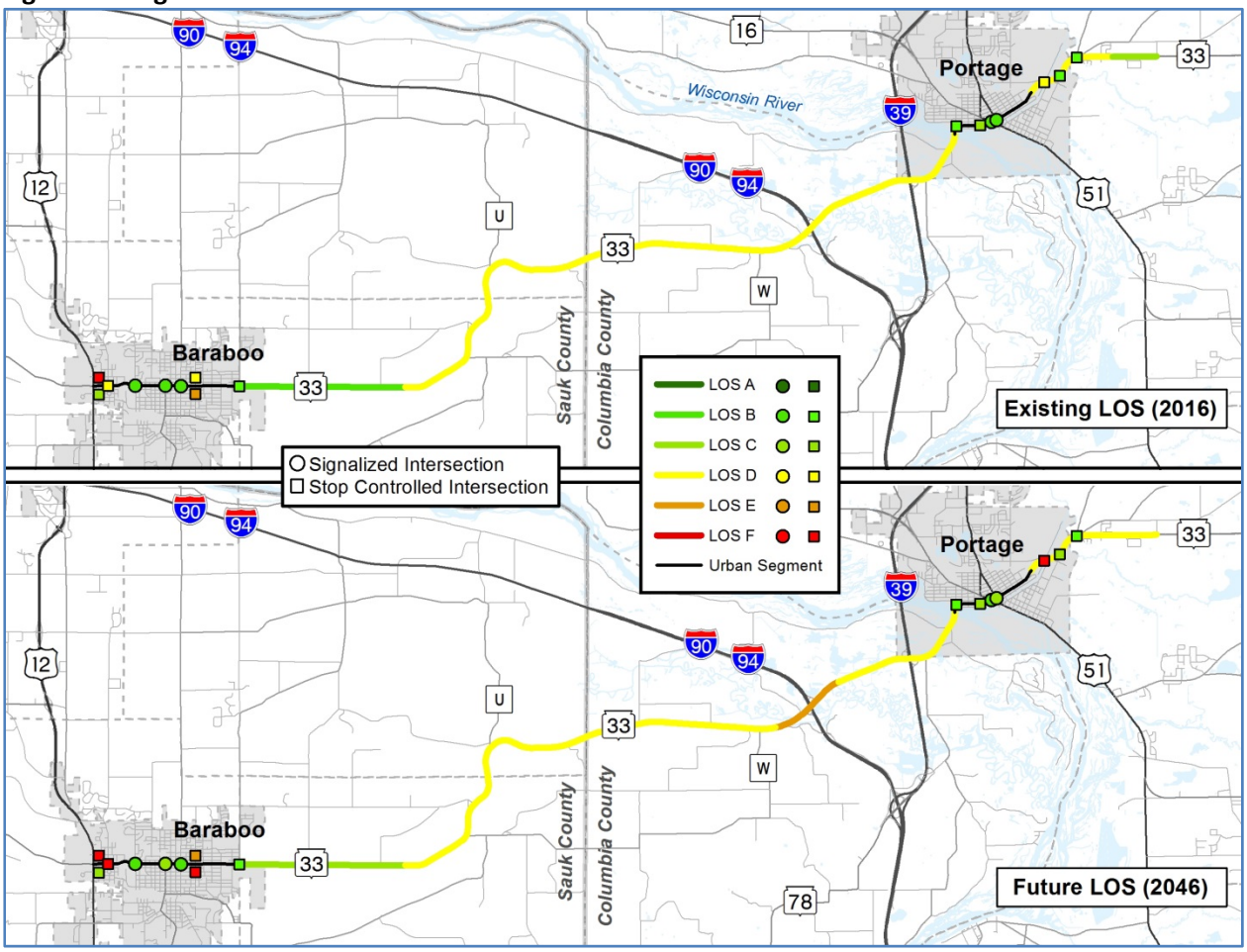
Mainline Segment Level of Service Analysis

A level of service analysis was conducted based on existing and projected traffic volumes for the WIS 33 study corridor. Table 31 on the following page details the peak-hour levels of service and percent time spent following (PTSF) for the two rural segments analyzed through 2046. The analysis used WisDOT standards to determine LOS values for those segments. PTSF is a primary determinant of LOS values for a Class II rural 2-lane corridor such as WIS 33, where traffic usually travels at speeds at or above the posted speed limit but platooning occurs and unsafe passing maneuvers are more likely. Figure 31 illustrates the LOS of each segment and key intersections of the WIS 33 corridor for 2016 and 2046.

Table 31 WIS 33 segment Levels of Service (LOS) and PTSF

Segment	2016 LOS	2016 PTSF (%)	2046 LOS	2046 PTSF (%)
County T to No Passing Zone (EB)	B	55	C	65
No Passing Zone to Cascade Mountain Road (EB)	D	78	D	84
Cascade Mountain Road to east of Johnson St. (WB)	D	77	D	84
East of Johnson St. to County T (WB)	B	55	C	65
Cascade Mountain Road to Adesa (EB or WB)	D	80	E	85
Adesa to Wisconsin River (EB or WB)	D	77	D	83
RR overpass to Stonehaven Drive (EB)	D	74	D	81
RR overpass to Stonehaven Drive (WB)	D	75	D	81
Stonehaven Drive to Saddle Ridge Road (EB)	C	68	D	75
Stonehaven Drive to Saddle Ridge Road (WB)	C	64	D	72

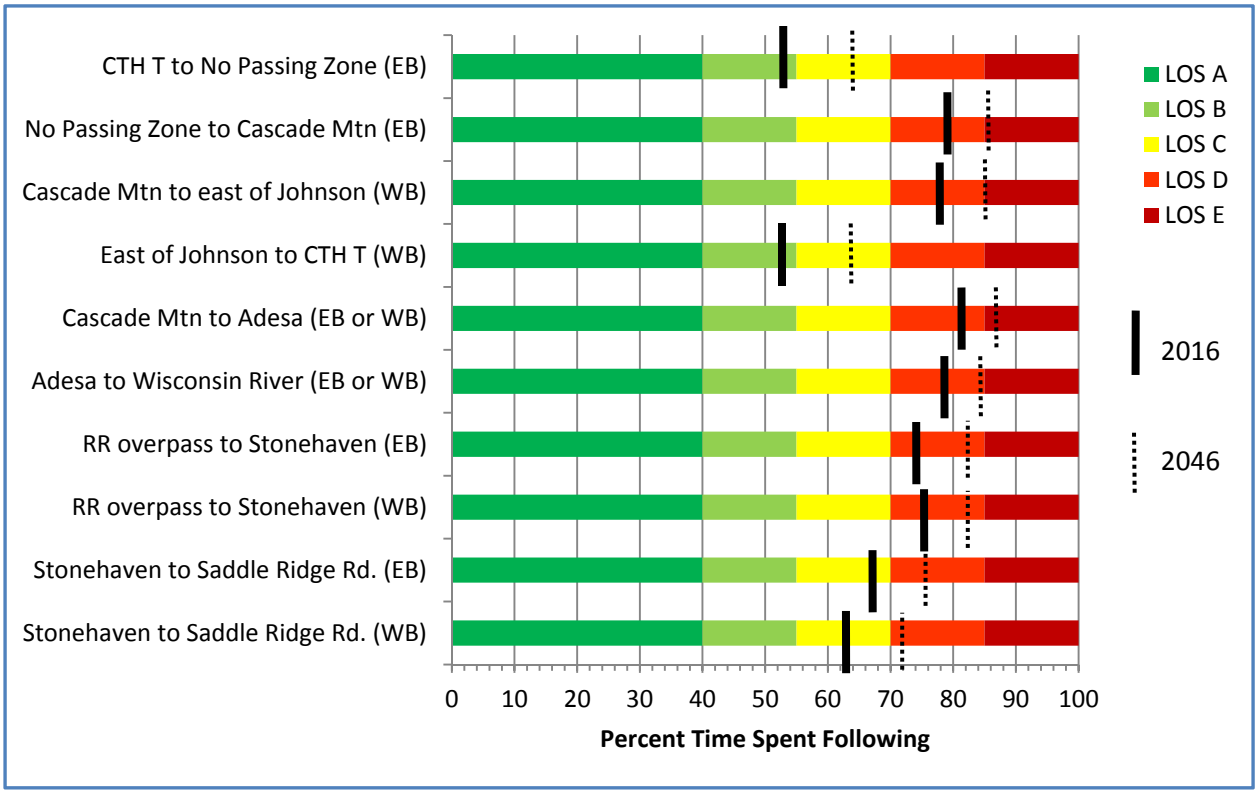
Figure 31 Segment and intersection levels of service



*This graphic illustrates worst case LOS for Intersections.

Figure 32 below shows LOS for ranges of percent time spent following (PTSF) for a Class II highway (such as WIS 33), as provided in *Highway Capacity Manual 2010*. Vertical solid and dashed lines on the bars represent PTSF values (as listed in Table 31) for the base and forecast years on WIS 33.

Figure 32 WIS 33 level of service as a function of percent time spent following



As indicated by the bar graphs in Figure 32, PTSF values above 85 are associated with LOS E. Rural segments were further divided based on the LOS. The base year (2016) design hour Level of Service is LOS B for both the eastbound and westbound direction of travel in the segment located approximately 2.5 miles east of the city of Baraboo (see Figure 31). The 2.5 mile segment of WIS 33 east of Baraboo has a higher LOS than the other rural segments due to the lower traffic volume and higher percentage of passing zones (resulting from the straight alignment on WIS 33). The segments from Stonehaven Drive to Saddle Ridge Road (east of Portage) currently experience LOS C. The remaining rural segments currently experience LOS D. All of the WIS 33 rural segments currently have acceptable Levels of Service (LOS D or better).

In 2046, the 2.5 mile segment east of the city of Baraboo is expected to have a LOS C due to increasing traffic volume. All of the other segments are expected to have LOS D by the year 2046, with the exception of the segment between Cascade Mountain Road and the Adesa driveway, which will have LOS E, and will be the only segment with an unacceptable Levels of Service (worse than LOS D).

Intersection Level of Service Analysis

The WIS 33 study corridor includes five signalized intersections, three in Baraboo and two in Portage. Most of the intersections on the WIS 33 study corridor are unsignalized (two-way stop controlled). Both types of intersections (signalized and unsignalized) were analyzed using Synchro, which uses HCM methodology. 2016 turn counts and WisDOT forecasts for 2046 were analyzed using Synchro software to estimate levels of service and delay. Table 32 shows performance indicators for 16 select intersections along the corridor during AM and PM peak hours. Although most intersections along the

WIS 33 corridor currently function at acceptable LOS, two intersections currently have side road approaches experiencing LOS E or F in the AM or PM peak hour, and four intersections are expected to have side road approaches experiencing LOS E or F in the AM or PM peak hour in 2046. Intersection levels of service along the corridor are illustrated in Figure 31.

Table 32 Peak-hour LOS for overall intersection (signalized) or worst approach (stop controlled)

	2016		2046	
Intersections (AM/PM)	**LOS**	**Delay (sec)**	**LOS**	**Delay (sec)**
Mulberry Street	C/F	24/62	D/F	32/143
Connie Street	D/D	26/31	E/F	37/50
Draper Street (signal)	B/B		B/B	
Broadway Street (signal)	B/B		B/B	
East Street (signal)	B/B		B/B	
Elizabeth Street	E/C	41/23	F/E	136/38
County T/Taft Avenue	B/B	11/12	B/B	13/14
Pierce Street	B/B	12/12	B/B	13/12
MacFarlane Road	B/C	15/17	C/C	18/21
WIS 16/Wisconsin Street (signal)	B/B		B/B	
US 51/DeWitt Street (signal)	B/B		C/C	
East Albert Street	C/D	17/30	D/F	31/140
Wauona Trail	B/B	12/14	B/C	13/17
County F	B/B	12/12	B/B	13/13
US 51 & Wauona Trail	C/C	20/21	D/D	28/29

Note: For stop-controlled intersections, LOS listed is for worst approach (WIS 33 thru and right movements are free-flow). For signalized intersections, LOS listed is for overall intersection function.

Analysis of 2016 traffic indicates that two intersections currently have side road approaches experiencing LOS E or F during the AM or PM peak hour: Mulberry Street (PM) and Elizabeth Street(AM). At Connie Road, southbound vehicles experience LOS D in the AM and PM peak hours. East Albert Street east of Portage was the only other intersection on the corridor that had a LOS lower than C in 2016. During the PM peak hour, southbound vehicles currently experience an average wait time of 30 seconds.

By the year 2046, the four intersections listed above are expected to have side road approaches experiencing LOS F in either the AM or PM peak hour. With LOS F, the average wait times are expected to be 50 seconds up to two minutes if no improvements are made. Vehicle ques at these intersections for the worst approach are: Mulberry Street (100 feet), Connie Road (75 feet), Elizabeth Street (175 feet), and East Albert Street (375 feet).

At the five signalized intersections on WIS 33, the 2016 volumes are resulting in overall intersection LOS B during the peak hours. Even in the year 2046, the volumes are still expected to result in LOS B or C at the WIS 33 signalized intersections. The unsignalized intersection at US 51/Wauona Trail is expected to have LOS D in 2046.

WisDOT forecasts indicate only a 10 to 25 percent increase in traffic volumes between 2016 and 2046, depending on the location. As traffic volumes increase along WIS 33, it is anticipated that some intersections will need to be improved to accommodate additional capacity needs. In addition, other

intersections may experience issues related to gaps on WIS 33. As traffic increases, the number and size of gaps on WIS 33 will decrease, resulting in greater difficulty entering the highway from side roads.

This would result in longer wait times that could increase the likelihood of high-risk driver behavior and potentially more crashes.

There are numerous intersections along the rural WIS 33 segments that were not included in the traffic counts conducted in 2016. Their two-way average daily volumes (ADTs) are estimated to be well below 400, and in most cases well under 100. At these volumes, side roads along WIS 33 are projected to experience LOS B or better from 2016 through 2046 for the rural segments studied.

7.3 Preliminary Signal Risk Assessment

Intersections within the WIS 33 study corridor were evaluated at a preliminary level to identify those that could be candidates for a future traffic signal. The evaluation was completed by comparing major road and side road current and future ADT's to minimum threshold volumes in Tables 33 and 34. Minimum threshold volumes are identified in the WisDOT FDM 11-50-50. *The conclusions from this study are not determining factors for the installation of a new traffic signal. More in depth analyses that evaluate the Federal Highway Administration's (FHWA) eight traffic signal warrants would be required to reach a final conclusion.*

Table 33 Minimum threshold traffic volumes (rural)

Lanes per approach		Case 1		Case 2	
Major Street	Minor Street	Major Street (2-way ADT)	Minor Street (2-way ADT)	Major Street (2-way ADT)	Minor Street (2-way ADT)
1	1	5,600	3,400	8,400	1,700
2	1	6,700	3,400	10,100	1,700

Sources: WisDOT FDM Procedure 11-50-50; and Institute of Traffic Engineers, Manual of Traffic Signal Design. Applies to WIS 33 intersections having speeds >40mph (or in areas with population < 10,000.)

Based on the thresholds in Table 1 above, two rural unsignalized intersections were evaluated against the minimum threshold volumes for traffic signals. These intersections are shown in Table 34 below, along with the year the thresholds were met for Case 1 and Case 2 and the ADT values during that year. The intersection at East Albert Street met the criteria for Case 1 in 2016, while East Albert Street and Wauona both met Case 2 criteria in 2046. Both intersections have single lane approaches. With additional data collection as well as a formal intersection control evaluation (ICE), these intersections could be evaluated to determine if traffic signals are warranted. An ICE was conducted for the East Albert Street intersection in 2009 and is included in Appendix A. That evaluation determined East Albert Street met warrants for a change in intersection control.

Table 34 Signal risk assessment for WIS 33 intersections

		Case 1		Case 2	
Intersections	Urban/ Rural	Year reached	ADT (WIS 33/minor)	Year reached	ADT (WIS 33/minor)
East Albert Street	Rural	2016	8,000/3,700	2046	8,700/5,000
Wauona Trail	Rural	–	–	2046	8,700/2,300

The following table lists more appropriate thresholds for urban intersections or those with speeds less than 40 mph.

Table 35 Minimum threshold traffic volumes (urban)

Lanes per approach		Case 1		Case 2	
Major Street	Minor Street	Major Street (2-way ADT)	Minor Street (2-way ADT)	Major Street (2-way ADT)	Minor Street (2-way ADT)
1	1	8,000	4,800	12,000	2,400
2	1	9,600	4,800	14,400	2,400

Sources: WisDOT FDM Procedure 11-50-50; and Institute of Traffic Engineers, Manual of Traffic Signal Design. Applies to WIS 33 intersections having speeds <40 mph (or in areas with population >10,000).

Based on the thresholds in Table 35 above, nine urban unsignalized intersections were evaluated against the minimum threshold volumes for traffic signals. These intersections are shown in Table 36 below, along with their ADT values for 2016 and 2046 on WIS 33 and the side road.

Table 36 WIS 33 intersections compared to minimum threshold traffic volumes

WIS 33 Intersections	Urban/ Rural	2016 ADT (WIS 33/minor)	2046 ADT (WIS 33/minor)	Minimum Needed
Mulberry Street[1]	Urban	10,200/1,800	11,700/2,100	14,400/2,400
Connie Street[1]	Urban	10,200/2,100	11,700/**2,400**	14,400/2,400
Ash Street[1]	Urban	11,900/2,500	13,700/**2,900**	14,400/2,400
Elizabeth Street[1]	Urban	11,900/2,700	13,700/**3,100**	14,400/2,400
Jefferson Street[1]	Urban	11,900/2,400	13,700/**2,750**	14,400/2,400
Washington Street[1]	Urban	11,900/2,200	13,700/**2,500**	14,400/2,400
County T (Taft)[1]	Urban	11,900/1,600	13,700/1,850	14,400/2,400
MacFarlane Road[2]	Urban	5,200/1,900	5,900/2,200	12,000/2,400
Adams Street[2]	Urban	5,500/1,900	5,900/2,200	12,000/2,400

[1]Major street has two approach lanes, refer to second line of Table 35

[2]Major street has one approach lane, refer to first line of reference Table 35

2016 ADT volumes at the intersections above ranged from 5,200 to 11,900 on WIS 33 and 1,600 to 2,700 on the side roads, so none of these intersections currently meet the minimum threshold traffic volumes to further investigate traffic signal warrants based on volumes. 2046 ADT projected volumes range from 5,900 to 13,700 on WIS 33 and 1,850 to 3,100 on the side roads. None of these intersections would meet the minimum threshold volumes to further investigate traffic signal warrants based on volumes assuming WIS 33 remains four-lanes. WisDOT regularly makes ADT counts on WIS 33 every three years, therefore if actual counts exceed projected volumes, the comparison above should be made again with actual ADT counts.

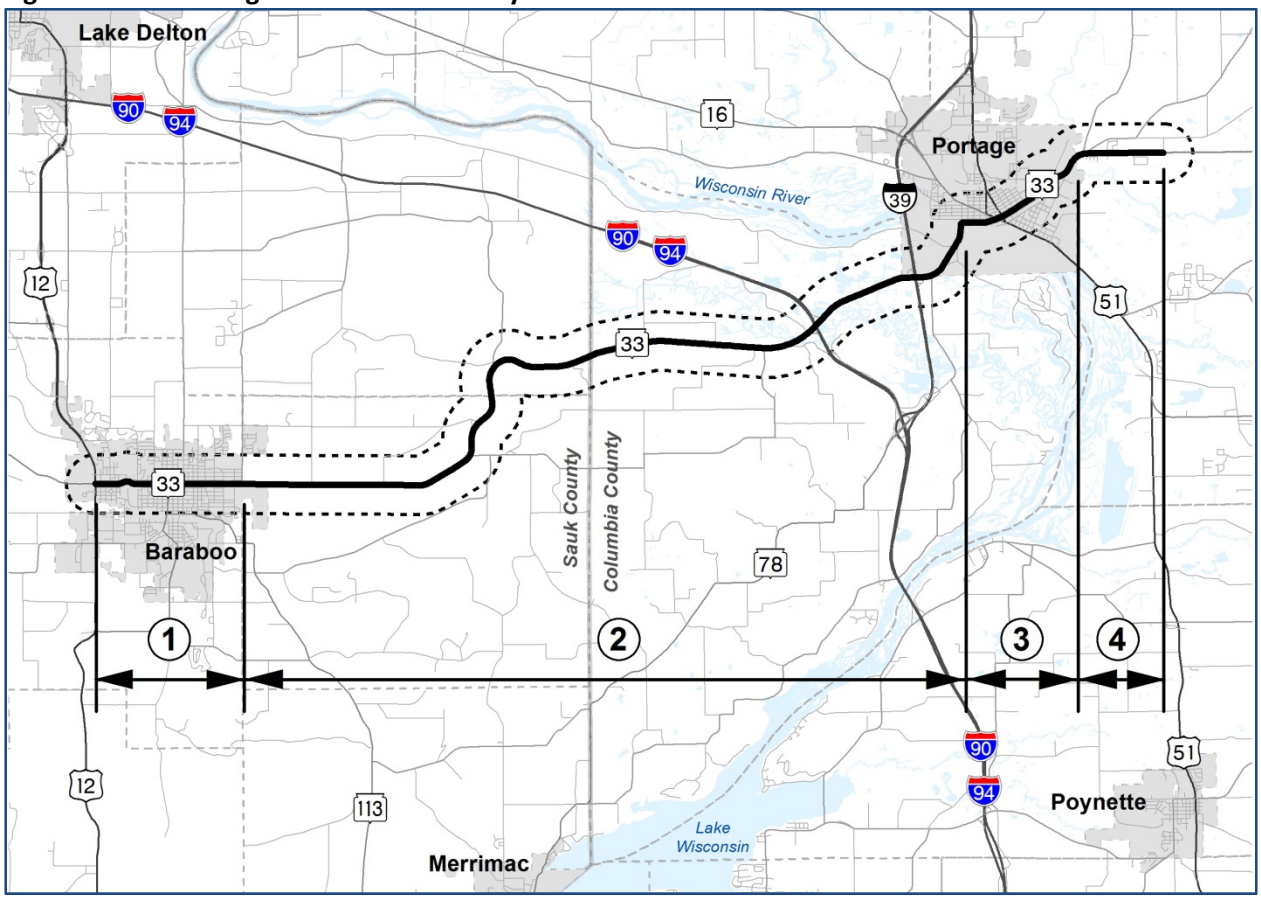
7.4 Safety Analysis

Crash Analysis

This section summarizes the findings of the *Safety Analysis Report*, which can be found in its entirety in Appendix C. Crash data for the corridor for the five-year period from 2010 through 2014 was provided by WisDOT. For the purposes of analysis, the corridor was divided into four segments (see Figure 33): two rural segments and two urban segments. Segmentation has been determined by WisDOT Meta-manager roadway classifications and the needs of traffic operations analysis (as determined by traffic volumes and speed zones within the corridor). The segments are described as follows:

- Segment 1—Located in West Barboo/city of Baraboo. This is a 2.5-mile long urban segment from US 12 to CTH T (Taft Avenue) with a posted speed limit of 25 mph and three signalized intersections. This segment is 44 feet wide, with four 10 foot lanes.
- Segment 2—Located east of the city of Baraboo, is 14.5 miles long, starting at County T (Taft Avenue) and ending at the Wisconsin River bridge just west of the city of Portage. It is a 2-lane rural highway with a posted speed limit of 55 mph in most locations. It has a 45 mph posted speed limit at various spots near I-90/94 and I-39.
- Segment 3—Located in the city of Portage between the Wisconsin River bridge and the Canadian Pacific Railroad overpass, this 1.5 mile urban segment of 2-lane highway has on-street parking in many locations and has two signalized intersections. The posted speed limit is 25 mph in this segment.
- Segment 4—Located east of the city of Portage, between the Canadian Pacific Railroad overpass and Garrison Road, this 2.5 mile rural segment of 2-lane highway has no signalized intersections and a posted speed limit of 55 mph.

Figure 33 WIS 33 segments for crash analysis



Crash rates were calculated for each of the four segments and for 31 intersections within the corridor. A five-year crash analysis was performed for crashes occurring between 2010 and 2014. The crash rates

generated from the analysis were compared to statewide averages for similar highway segments (as classified by WisDOT) over the same period of time.

In addition to crash rates, the types and severity of crashes and the factors that contributed to crashes were analyzed to determine if there were patterns that indicated possible safety issues as a result of the existing geometry of the highway or intersections.

Corridor Crash Rates

A total of 434 non-deer crashes occurred within the study area in the five-year period between 2010 and 2014. Intersection-related crashes accounted for 225 (52 percent) of the total non-deer crashes as shown in Table 37 below. Of the total crashes, 98 (22.5%) were single vehicle non-collision type crashes.

Table 37 WIS 33 segment and intersection crash totals

Segment	Non-Intersection Crashes	Intersection Crashes	Total
1—US 12 to Taft/CTH T (Baraboo)	83	146	229
2—Taft/CTH T to Wisconsin River	72	26	98
3—Wisconsin River to E Cook St (Portage)	39	37	76
4—East Cook St to Garrison	15	16	31
Entire Corridor	209	225	434

Table 38 below shows WIS 33 segment crash data and rates (per 100 million vehicle miles). Only Segment 2 had fatal crashes (3 fatal crashes in the 5-year study period). This caused Segment 2 to have a KAB (fatal, A Injury and B Injury) crash rate above the state average rate for that functional peer group (rural 2-lane highway with ADT >7,000). Segments 1, 3 and 4 had overall crash rates above state averages for Low Speed 2-lane Highways Posted at 40 mph or lower (Segments 1 and 3) and Rural 2-lane highway with ADT >7,000 (Segment 4). Segment rates above statewide rates are noted with bold type/underlined.

Table 38 WIS 33 segment crash data and rates 2010-2014 (excluding deer crashes)

Segment	Crashes	Crash Rate	State Avg. Crash Rate*	(K) Fatal Crashes	A Injury Crashes	B Injury Crashes	C Injury Crashes	KAB Crash Rate	State Avg. KAB Crash Rate*
1—US 12 to Taft/County T	229	**384**	283	0	4	17	39	35.2	35.7
2—Taft/CTH T to WI River	98	49	88.5	3	4	13	12	10	17.75
3—WI River to E Cook St	76	**397**	283	0	1	9	8	**52.2**	35.7
4—East Cook St to Garrison	31	**91**	88.5	0	2	4	5	17.65	17.75

*Low speed 2-lane highways posted at 40 mph or lower for Segments 1 and 3. Rural 2-lane highways with ADT >7,000 for Segments 2 and 4. Crash rates are given in units of crashes per 100 million vehicle miles traveled (HMVMT). KAB includes fatal, A Injury and B Injury crashes.

In addition to corridor crash rate analysis, a supplemental review of crash data was conducted to evaluate the effectiveness of the centerline and fog-line rumble strips installed in 2012 between County T and Cascade Mountain Road (the majority of Segment 2). The review compared three years of crash data before the installation (2009-2011) with three years of data after the installation (2013-2015). Crashes that were non-preventable by the rumble strips were eliminated. Columbia County saw a 71% reduction while Sauk County experienced no reduction. A brief technical memo is included in Appendix C with more detail.

Intersection Crashes

There are 63 public road intersections within the corridor, 45 of which experienced crashes during the years studied. Crash rates for each of the intersections, as shown in Table 39, are well below a crash rate of 1.5 per million entering vehicles, a threshold that is generally considered to indicate a potential safety issue that may require further evaluation. However, additional criteria such as how the crash rates of individual intersections within a corridor compare against each other and crash severity are also considered when evaluating intersection safety. An intersection's crash severity rate is the percentage of crashes at that location that result in at least one injury or fatality. Intersections with higher crash rates compared to others in a corridor and those with severity rates above 30 percent may also be candidates for further study.

Table 39 WIS 33 Intersection crash rates

WIS 33 Intersection	Community	Total Crashes[1]	Entering Daily Traffic Volume	Intersection Crash Rate[2]	Severity
East Street	Baraboo	26	17,650	0.81	0.19
Mulberry Street	West Baraboo	14	13,925	0.55	0.24
Ash Street	Baraboo	14	14,675	0.52	0.15
East Albert Street	Portage	8	8,900	0.49	0.12
Draper Street	Baraboo	12	15,000	0.44	0.15
County X	Fairfield/Greenfield	5	6,275	0.44	0.26
County U (Sauk County)	Fairfield/Greenfield	5	7,245	0.38	0.15
Caledonia Street/Fairfield Road	Portage	6	8,650	0.38	0.13
DeWitt Street (USH 51)	Portage	7	10,400	0.37	0
Pierce Street	Portage	5	7,680	0.36	0.14
Park Street	Baraboo	8	13,200	0.33	0.17
Willow Street	West Baraboo	8	13,900	0.32	0
Washington Street	Baraboo	6	10,275	0.32	0.05
MacFarlane Road	Portage	5	8,600	0.32	0
County F	Portage	5	8,550	0.32	0.13
Oak Street	Baraboo	7	14,175	0.27	0.12
Wisconsin Street (WIS 16)	Portage	8	16,275	0.27	0.07
Jefferson Street	Baraboo	6	12,425	0.26	0.04
Adams Street	Portage	4	8,450	0.26	0.06
Tritz Road (east)	Caledonia	4	9,150	0.24	0.12
Connie Road	West Baraboo	6	13,775	0.24	0.08
Summit Street	Baraboo	6	13,650	0.24	0.08
Broadway Street	Baraboo	7	16,000	0.24	0.07
Birch Street	Baraboo	5	13,150	0.21	0.08
Elizabeth Street	Baraboo	6	15,850	0.21	0.07
Lock Street	Portage	3	7,650	0.21	0.14
County T/Taft Road	Baraboo	3	7,850	0.21	0.14
Tuttle Street	Baraboo	4	11,225	0.20	0.10
Cascade Mountain Road	Caledonia	3	9,150	0.18	0.06
County U (Columbia County)	Portage	3	8,950	0.18	0
County EE/Pacific Estates Road	Portage	2	7,650	0.14	0.14

[1]Five-year total (2010-2014)

[2]per million entering vehicles (MEV)

7.5 IHSDM Analysis

The Federal Highway Administration's Interactive Highway Safety Design Model (IHSDM) was used to evaluate the rural two-lane roadway segments of WIS 33. The IHSDM was used to predict crash rates, evaluate design and design consistency, and analyze traffic. Table 40 below identifies WIS 33 corridor intersections that are expected to experience at least one crash per year, based on the IHSDM.

Table 40 IHSDM expected outcomes 2016-2021

Sub-segment of WIS 33	Expected crashes	Crash Rate*	Highest Crash Rate Sub-segments
East of Johnson Street to east of County U	38	1.33	Curve east of Johnson Street Curve at County X Curve at County U
County U to Sauk/Columbia County line	19	2.36	Curve east of County U Curve 0.32 miles west of Breezy Hill Road
I-90/94 to Wisconsin River	29	1.70	East of I-94 West of I-39
Railroad overpass to Garrison Road	21	1.36	Curve at County F West of County EE

*Crashes per mile per year

7.6 Travel Time Study

A travel time study of the WIS 33 corridor between the study termini (US 12 and Garrison Road) was conducted in March 2016 (see Appendix A for detailed travel time data). Travel times along the corridor in each direction were consistent, averaging 28 minutes 42 seconds for eastbound and 28 minutes 38 seconds for westbound. (These were average travel times for at least six morning samples over three days and six afternoon samples over three days for each direction). Travel times for the entire corridor differed slightly by time of day. For eastbound travel of the corridor, afternoon peak-hour travel times averaged six seconds faster than morning travel times. For westbound travel, the morning peak-hour travel times were two seconds faster than the afternoon travel times. The largest variations on eastbound sub-segments were on the Wisconsin River to East Albert Street and East Albert Street to Garrison Road sub-segments; each was six seconds faster in the afternoon. The largest variations on the westbound sub-segments were on the Wisconsin River to County T and County T to US 12 sub-segments; Wisconsin River to County T averaged 19 seconds faster in the afternoon. County T to US 12 averaged 20 seconds faster in the morning.

Travel times were converted to miles per hour (mph) to compare actual travel speeds to posted speed limit for each segment:

- In the village and city of Baraboo (Segment 1) the posted speed is between 15 and 25 mph with a short segment posted at 30 mph between Washington Avenue and County T (Taft Avenue). The average travel speed was 26 mph for eastbound and 25 mph for westbound.
- Between the city of Baraboo and the city of Portage WIS 33 is posted at 55 mph with the exception of a short segment posted at 45 mph in the vicinity of the I-90/94 interchange. The average travel speed for this segment ranged between 56 and 57 mph for this segment.

- Within the city of Portage (Segment 3) the posted speed is 25 mph except for a very short segment posted at 15 mph at MacFarlane Road. The average travel speed was 23 mph for eastbound vehicles and 25 mph for westbound vehicles.
- East of the city of Portage (Segment 4) the posted speed limit is 45 mph between the Canadian Pacific Railroad crossing and Foote/Stonehaven Drive (a length of 1.6 miles) where it then changes to 55 mph for the remaining length of the study corridor (0.9 miles). The average travel speed was 49 to 51 mph for this segment (a distance of 2.5 miles).

7.7 Truck Origins and Movements through Portage

Heavy vehicles (single-unit trucks, buses, and semi-trucks) make up a large portion of all traffic in the WIS 33 study corridor, especially in the city of Portage, and thus their presence is a consideration for economic vitality, highway safety and function within the WIS 33 corridor communities. Based on tube count data collected in March 2016, heavy vehicles were estimated to make up 11 percent of all vehicles on the study corridor in the city of Baraboo. For the other corridor segments, heavy vehicles make up approximately 15 to 17.3 percent between the cities of Baraboo and Portage, 14 to 19.6 percent in the city of Portage, and 16.2 percent east of the city of Portage).

On a March 2016 weekday morning (6:00 to 9:00 am), 350 total heavy vehicles were counted entering the city of Portage:

- 30% from WIS 33 eastbound
- 21% from County F/WIS 33 westbound
- 25% from US 51 northbound
- 14% from US 51 southbound
- 10% from WIS 16 southbound

During that same time period, 316 heavy vehicles were counted exiting the city of Portage:

- 28% to WIS 33 westbound
- 26% to County F/WIS 33 eastbound
- 23% to US 51 southbound
- 12% to US 51 northbound
- 11% to WIS 16 northbound

On a March 2016 weekday afternoon (3:00 to 6:00 pm), 252 total heavy vehicles were counted entering the city of Portage:

- 32% from WIS 33 eastbound
- 31% from County F/WIS 33 westbound
- 19% from US 51 northbound
- 9% from US 51 southbound
- 9% from WIS 16 southbound

During that same time period, 240 heavy vehicles were counted exiting the city of Portage:

- 37% to WIS 33 westbound
- 27% to CTH F/WIS 33 eastbound
- 16% to US 51 southbound
- 10% to US 51 northbound
- 10% to IWS 16 northbound

The amount of heavy vehicle traffic on Main Street in the city of Portage is a concern of local residents. The busiest segment for heavy vehicle traffic on WIS 33 is located between MacFarlane Road and WIS 16 (Wisconsin Street). Turn count data from March 2016 showed there were 92 westbound and 86 eastbound heavy vehicles in the three-hour period 6:00 and 9:00 am. Turn count data from March 2016 showed there were 82 westbound and 82 eastbound heavy vehicles in the three-hour period 3:00 and 6:00 pm.

Part III Strategies and Recommendations & Access Management Plan

Part III of the study report provides short and long-term strategies and recommendations for the study corridor. Discussion is organized into the following sections:

1. Mainline and intersection improvement strategies
2. Long-term access management
3. Other strategies

Part III identifies strategies and recommendations that would extend the useful life of the existing WIS 33 corridor in its current location. Implementation of one strategy does not preclude the implementation of the others. Strategies can also be implemented incrementally over time as warranted, and once all strategies are completed, would function as an integrated system.

The traffic analysis and forecasts reveal that portions of the corridor may experience a decline in operational performance below acceptable levels (LOS D or worse) by 2046. The strategies and recommendations were conceived with the assumption that capacity expansion or new corridors would not be implemented prior to the study planning horizon of 2046 due to competition with higher priority projects or funding limitations. Therefore, bypass corridors and capacity expansion were not part of this study.

Regardless of any possible enabling legislation, it is anticipated that even if WisDOT was tasked to consider a new alignment or capacity expansion project for WIS 33, the effort would take several years to study, follow the necessary environmental requirements, coordinate with other agencies, conduct preliminary and final design, acquire real estate, mitigate effects, and construct. It is likely corridor operational performance would reach problematic levels before such an undertaking could be completed. Study strategies for preserving the long-term function of the existing corridor would delay the need to consider capacity expansion alternatives on WIS 33 within the study area.

As stated in earlier sections of this report, specific corridor issues that were considered as part of the strategies and recommendations and the access management plan include:

- Minimize impacts to WIS 33 traffic flow from entering/exiting vehicles as traffic volumes increase between now and 2046.
- Maintain or improve safety through the management of driveways and public road connections to WIS 33.
- Mitigate safety issues at some locations along the corridor through geometric enhancements to be implemented at a future time when warranted.

8.0 Improvement Strategies

Because WIS 33 has differing characteristics as a result of its location in both rural and urban communities, strategies include both mainline and intersection improvements in both the urban and rural areas. Strategies in the discussion that follows are focused on addressing level of service and safety without expanding the capacity of the roadway. *The recommendations in this study are intended as a starting point for more detailed analysis in the future as safety and operational issues emerge over time. The information provided should assist in the scoping process if a specific strategy is carried forward as a future project.*

8.1 Mainline Strategies

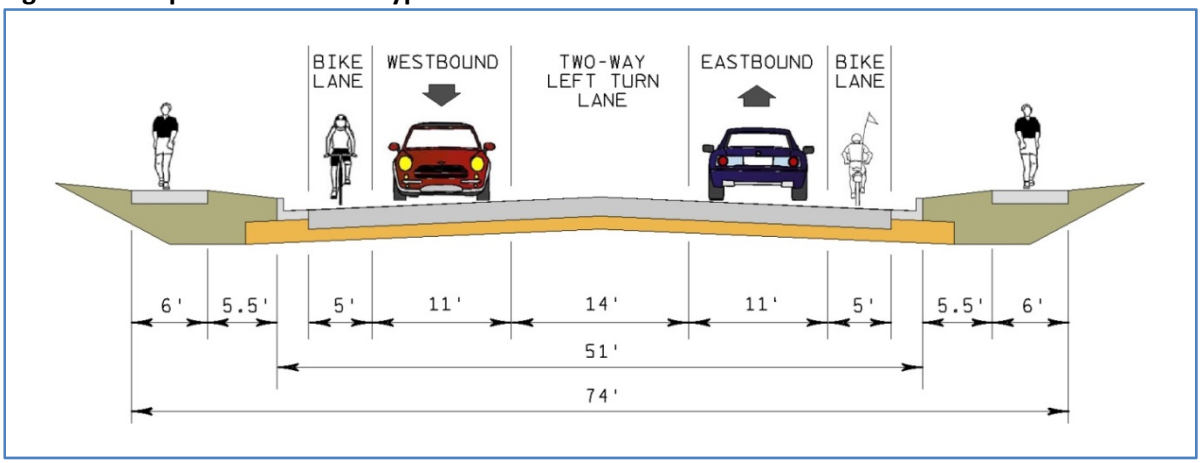
With the exception of the village and city of Baraboo, WIS 33 would be maintained as a two-lane facility. Within the village of West Baraboo and the city of Baraboo, WIS 33 is currently a four-lane undivided roadway with numerous public road connections and private driveways. For this segment, WIS 33 is recommended to be reduced from four travel lanes to three lanes (two travel lanes with a center two-way-left-turn-lane). For the rural segment located between County T and the I-90/94 interchange, the addition of passing lanes may delay the rate at which level of service declines over time. Level of Service analysis from HCS Plus software can be found in Appendix A. The remaining segments of WIS 33 remain unchanged with the focus on intersection improvements to address safety related issues.

Baraboo Road Diet Recommendation

Between US 12 and County T the existing four-lane WIS 33 facility is recommended to be converted to a three-lane roadway. The proposed new facility would consist of two 11 foot wide travel lanes with a 14 foot wide center turn lane. The reduction from four to three lanes would allow for the addition of five foot wide bike lanes on both sides of the facility. The curb and gutter would be maintained throughout the length of the concept. In addition, six foot wide sidewalks and a 5.5 foot wide grass terrace area would separate pedestrians from vehicular traffic, accommodate lighting and signage, and allow for adequate storage space for snow in the winter months (see

Figure 34). The posted speed would remain similar to the current posted speed typical of an urban environment (15 mph to 30 mph). Implementation of the recommendation may require easements or acquisition to accommodate desirable widths for terrace and sidewalks along the majority of the corridor.

Figure 34 Proposed Road Diet Typical Section

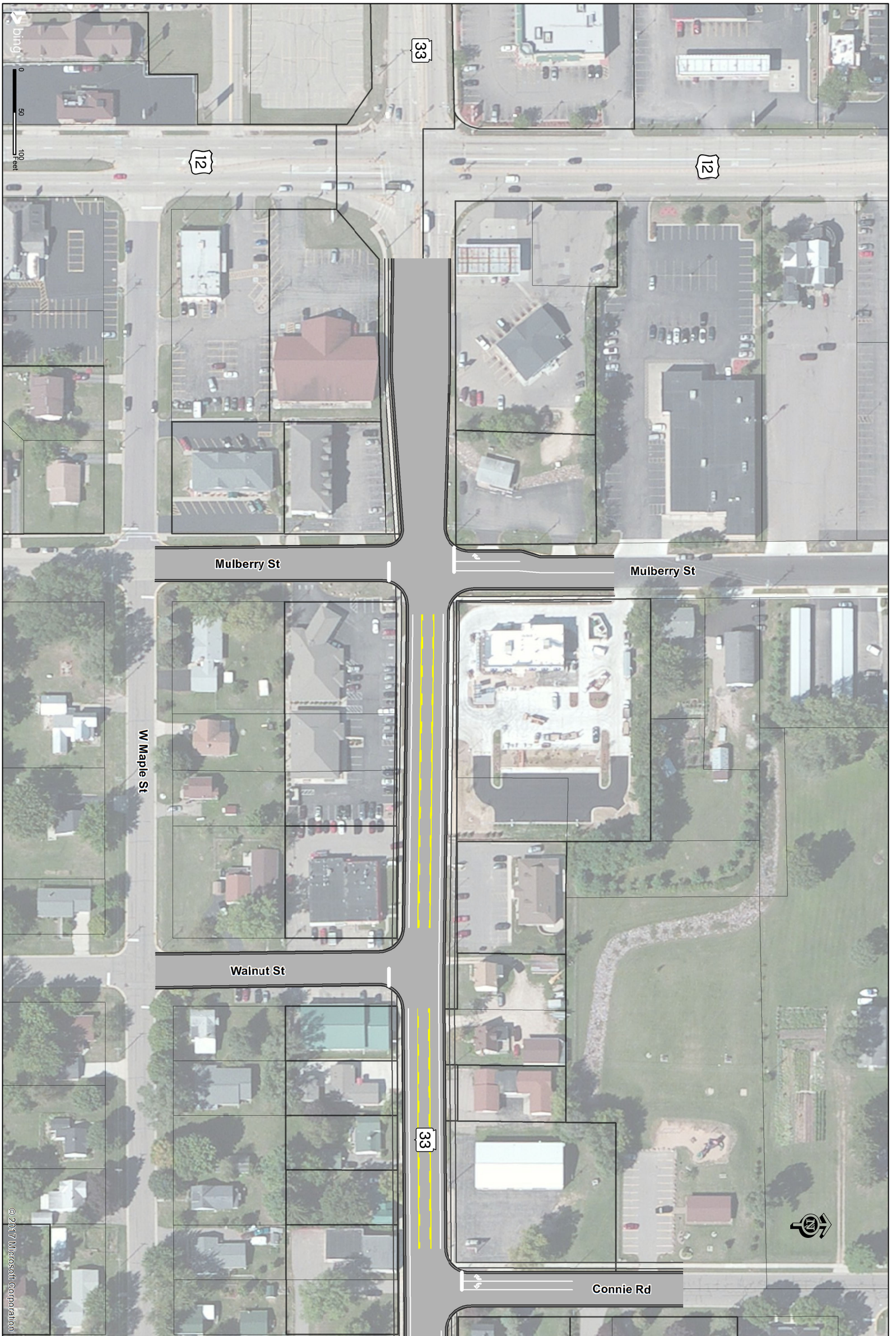


The three-lane concept should be able to accommodate existing and forecasted traffic. According to the *FHWA's Road Diet Information Guide*, FHWA advises that roadways with ADT's less than 20,000 vehicles per day (vpd) or less may be good candidates for a Road Diet. Forecasted volumes for this segment of WIS 33 are not anticipated to exceed 13,700 AADT. When combined with access management including a reduction of the number of driveways (as discussed later) the concept should allow for the mobility of vehicular traffic through the village and city, and provide greater compatibility with local goals for pedestrian safety. The concept could accommodate the addition of medians and pedestrian refuge areas in key locations if needed in the future. It would enhance the safety of the corridor by reducing the number of conflict points for left turns onto side roads and improves sight distance for the same maneuver by removing the potential for hidden vehicles in the outside lane. According to the *FHWA's Road Diet Information Guide*, this type of treatment can result in a reduction of left-turn crashes by up to 19 and 47 percent.

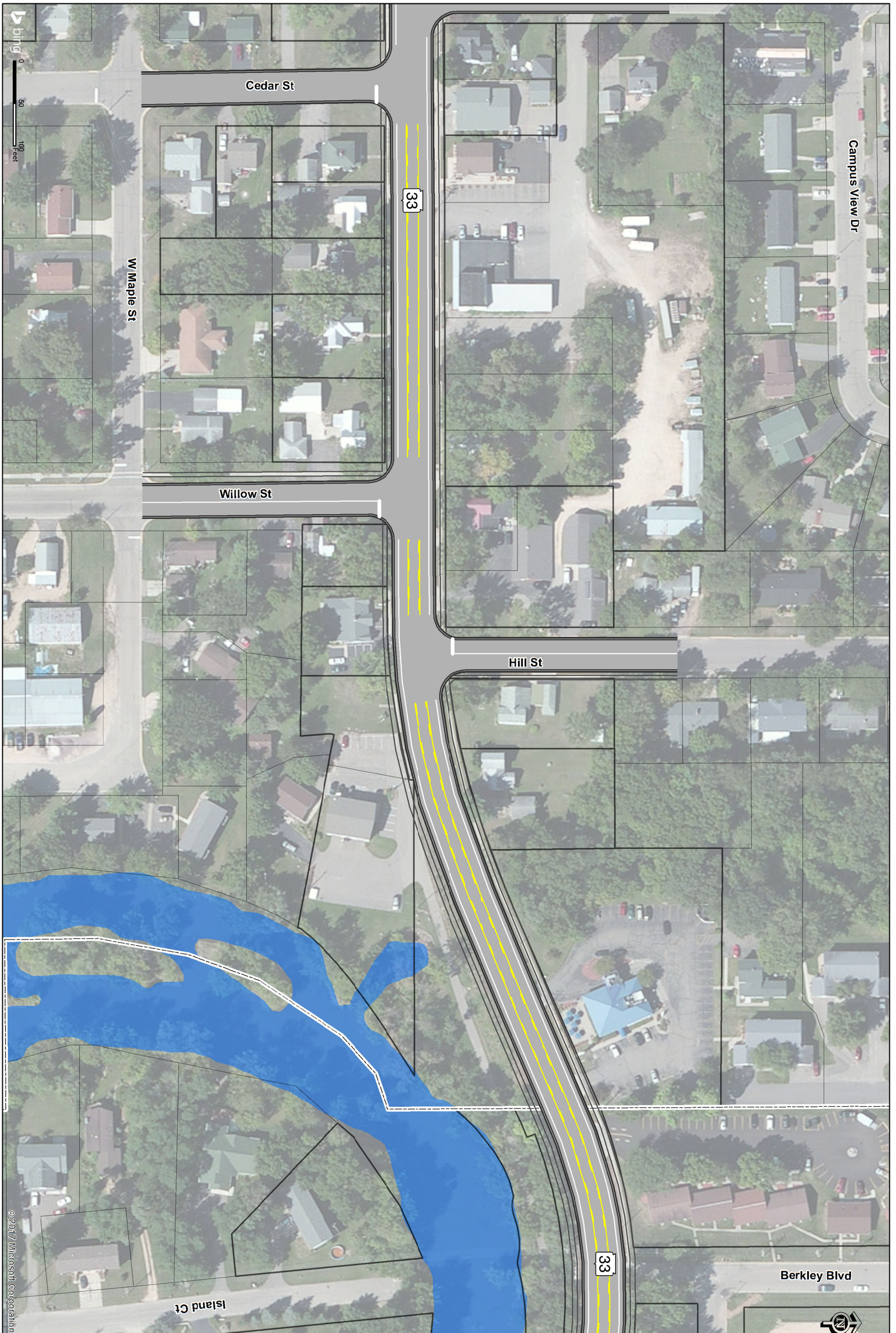
As can be seen in Exhibit 4, additional treatments should be considered as part of the road diet concept in some locations to maintain acceptable operations in the future. These include:

- Evaluate Ash, Elizabeth, Jefferson, and Washington Streets for signals due to the reduction of WIS 33 from two approach lanes to one.
- Evaluate private driveways in the vicinity of proposed turn lanes for removal or adjustments to the TWTL concept where appropriate.
- Addition of an eastbound left-turn lane and a westbound right-turn lane at Draper Street to maintain LOS B in 2046.
- Addition of an eastbound right-turn lane and maintaining the westbound left-turn lane at the Broadway Street intersection.
- Provide northbound and southbound right-turn lanes and eastbound and westbound left-turn lanes at the East Street intersection.
- Add northbound and southbound right-turn lanes on Elizabeth Street to improve operations for right-turning vehicles in the future by separating them from crossing and left-turning vehicles.
- Realign the south leg of Jefferson Street with the north leg to eliminate the unsafe off-set intersection and remove overlapping left-turns onto WIS 33 from this intersection.

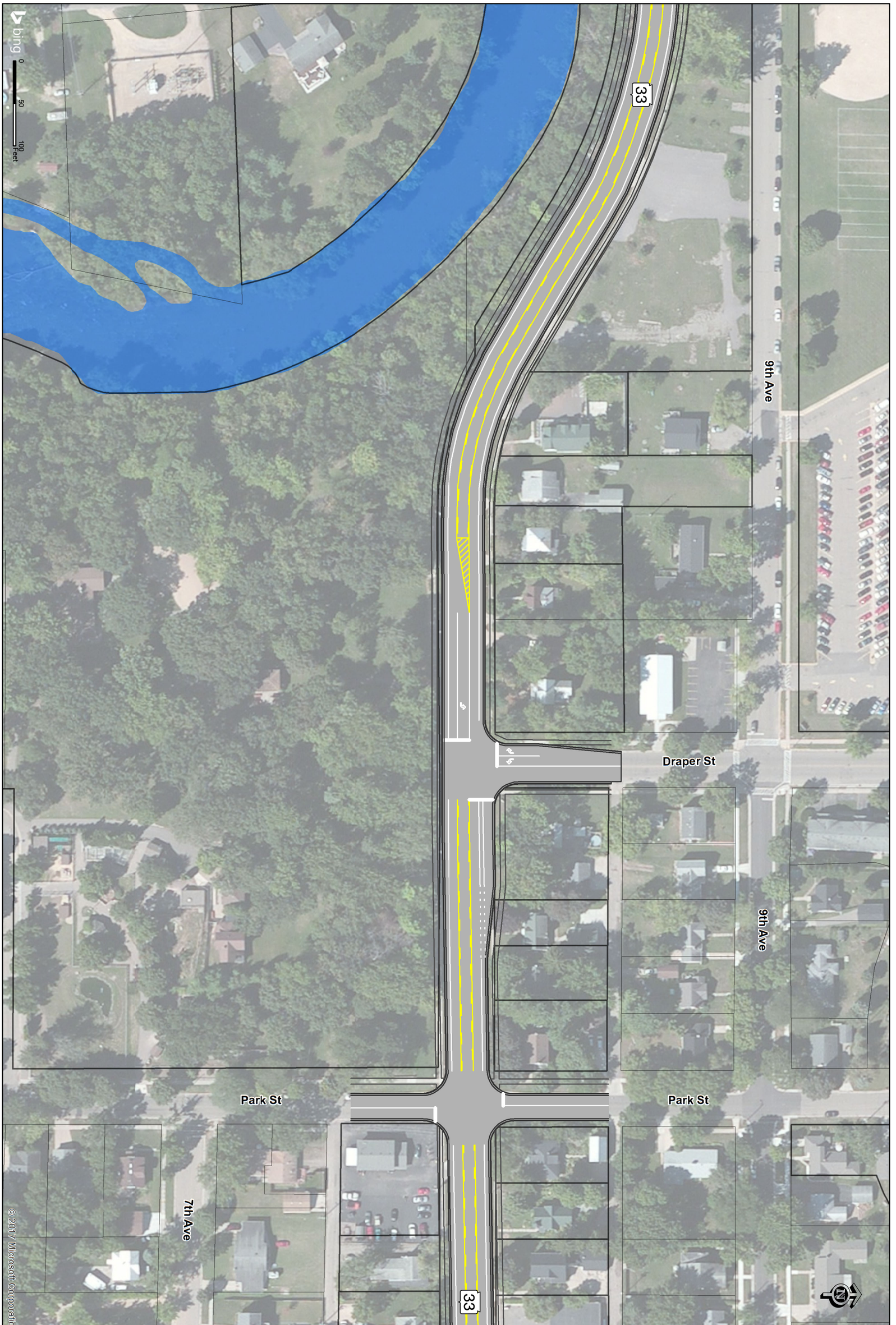
- Provide an eastbound left-turn lane onto County T (Taft Avenue).



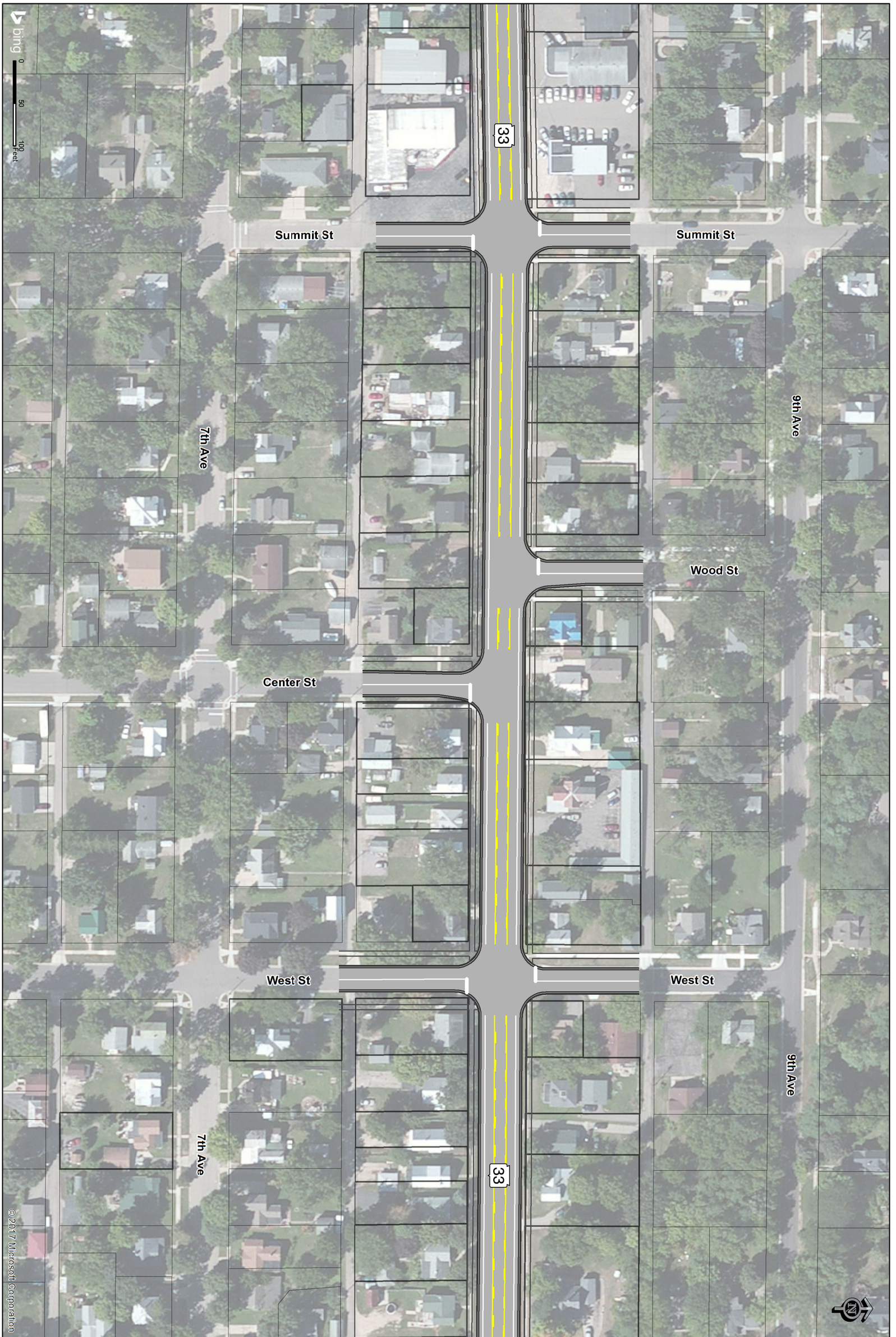
TranSmart TECHNOLOGIES	Scale 1" = 100'	WIS 33 Corridor Preservation Study	Baraboo Road Diet Recommendation	Map 1 Exhibit 4



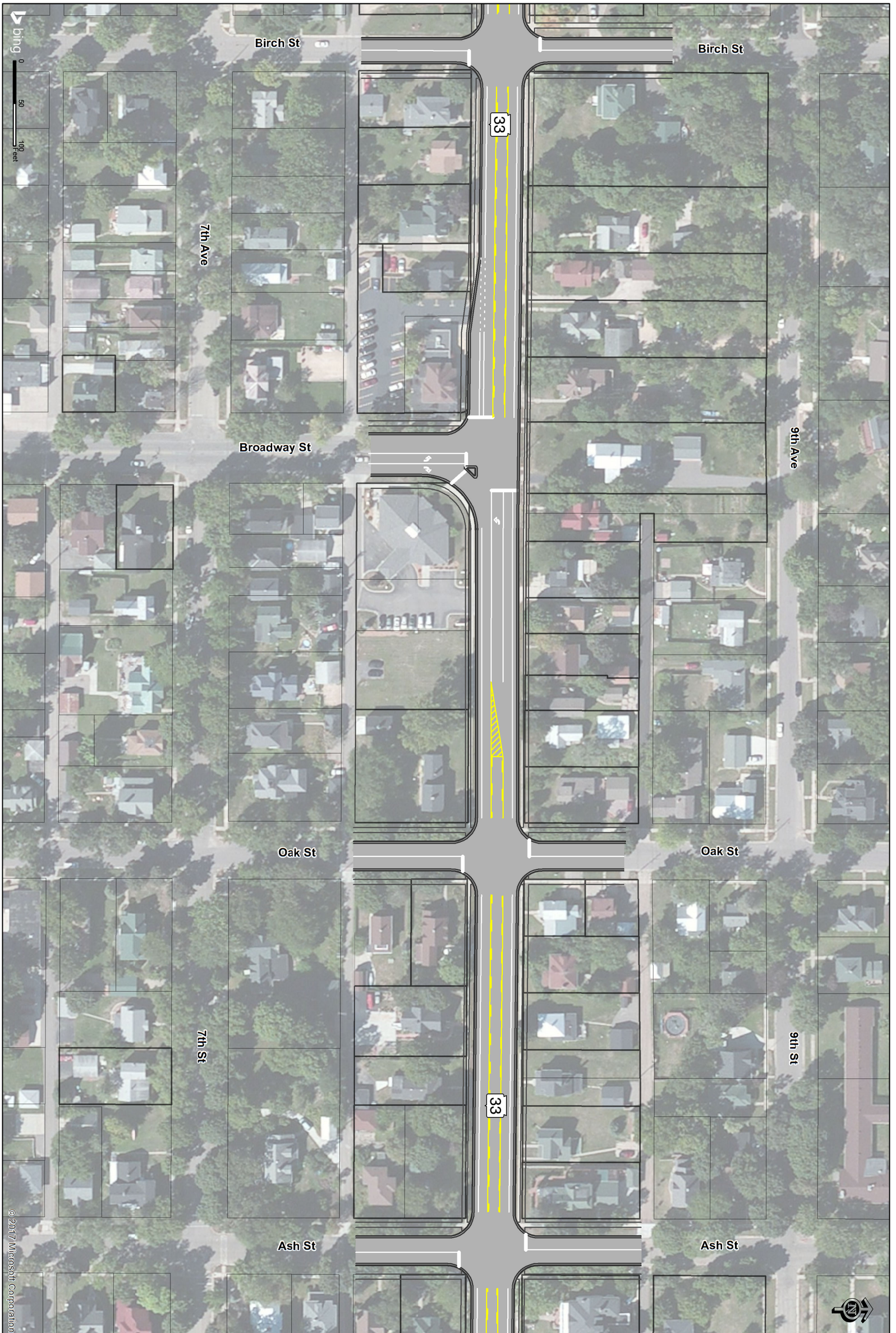
TranSmart TECHNOLOGIES	Scale 1" = 100'	WIS 33 Corridor Preservation Study	Baraboo Road Diet Recommendation	Map 2 Exhibit 4



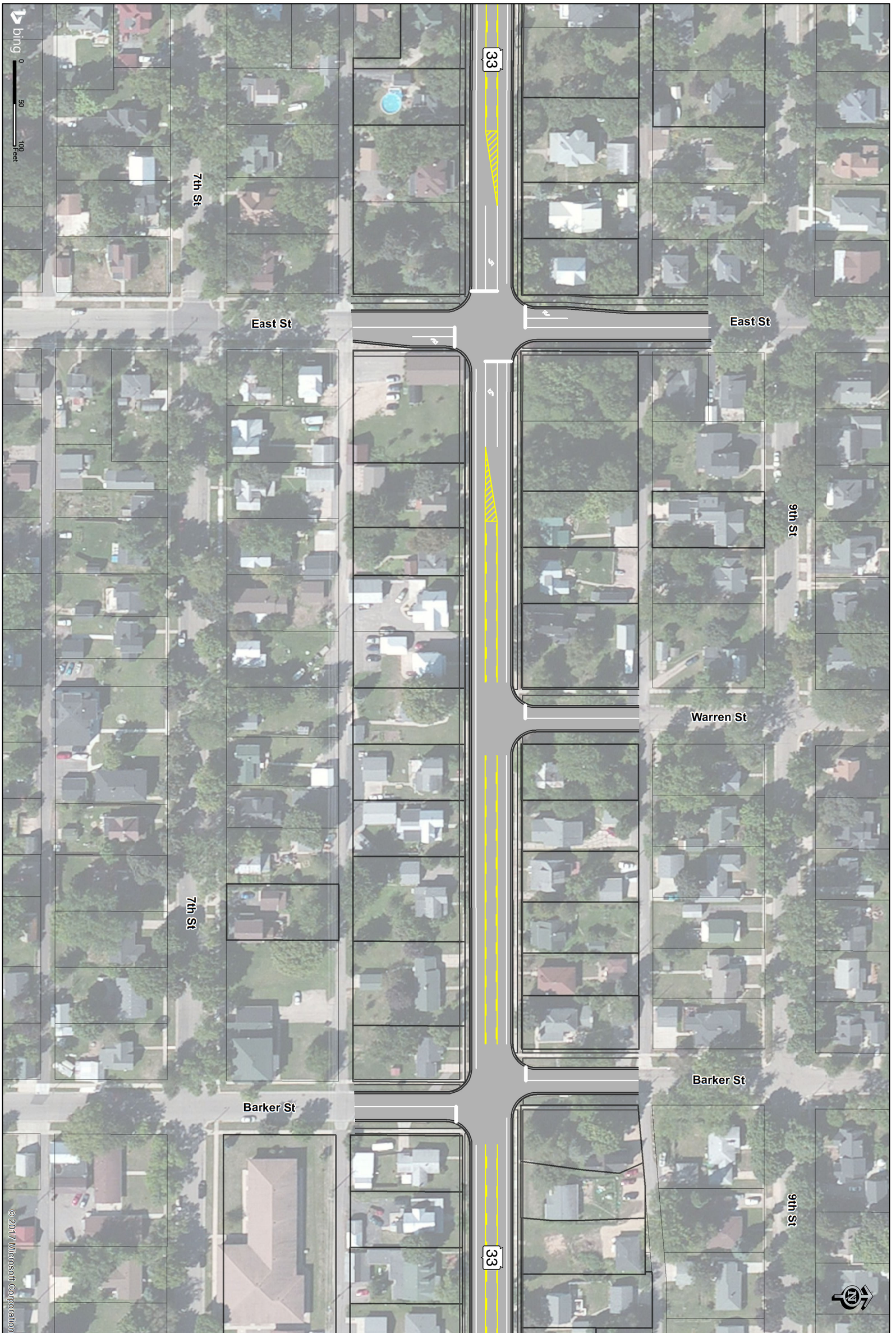
TranSmart TECHNOLOGIES	Scale 1" = 100'	WIS 33 Corridor Preservation Study	Baraboo Road Diet Recommendation	Map 3 Exhibit 4



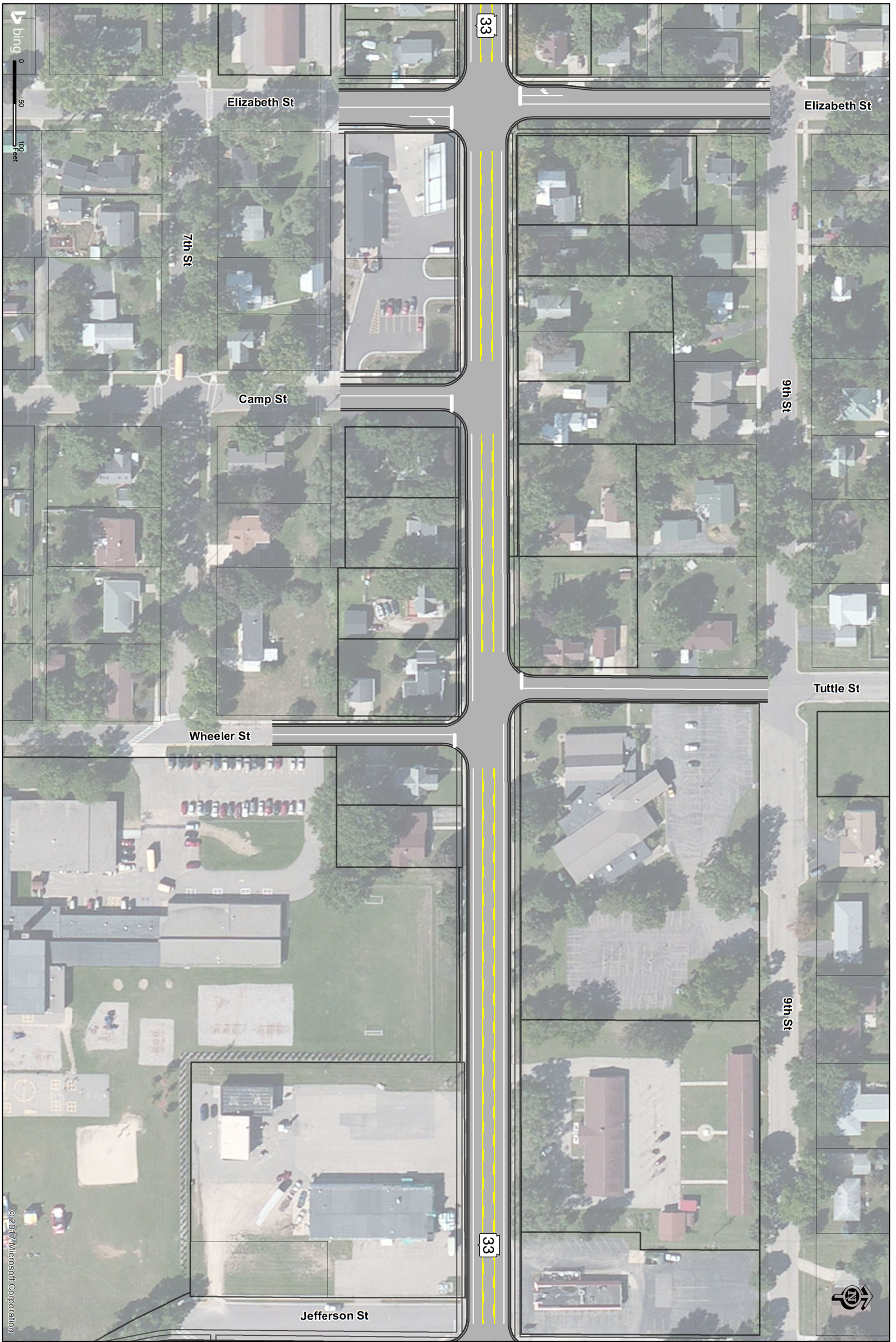
TranSmart TECHNOLOGIES	Scale 1" = 100'	WIS 33 Corridor Preservation Study	Baraboo Road Diet Recommendation	Map 4 Exhibit 4



TranSmart TECHNOLOGIES	Scale 1" = 100'	WIS 33 Corridor Preservation Study	Baraboo Road Diet Recommendation	Map 5 Exhibit 4



TranSmart TECHNOLOGIES	Scale 1" = 100'	WIS 33 Corridor Preservation Study	Baraboo Road Diet Recommendation	Map 6 Exhibit 4



TranSmart TECHNOLOGIES	Scale 1" = 100'	WIS 33 Corridor Preservation Study	Baraboo Road Diet Recommendation	Map 7 Exhibit 4

TranSmart TECHNOLOGIES	Scale 1" = 100'	WIS 33 Corridor Preservation Study	Baraboo Road Diet Recommendation	Map 8 Exhibit 4

TranSmart TECHNOLOGIES	Scale 1" = 100'	WIS 33 Corridor Preservation Study	Baraboo Road Diet Recommendation	Map 9 Exhibit 4

The road diet concept does not resolve poor LOS projected in the future at the stop controlled intersections of WIS 33 with Mulberry Street, Connie Road, and Elizabeth Street. One or more approaches are still projected to experience difficulty accessing WIS 33, however, the presence of a center turn lane may provide opportunities for a two stage crossing onto WIS 33 at these locations. The LOS analysis assumed that there would not be a two stage turn onto WIS 33 from the side road, resulting in a conservative estimate of future LOS at these unsignalized intersections. A preliminary analysis of Elizabeth Street determined that even though operations would degrade at this intersection, it would likely not meet the necessary warrants for signalization prior to 2046. Another consideration for these intersections is that a connected local street grid allows the motorist access to other public road intersections along WIS 33 to execute left-turns.

Passing Lane Study

WIS 33 was identified as a potential candidate corridor for the addition of passing lanes in WisDOT's Connections 2030 plan. Passing lanes can improve corridor level of service in certain circumstances on two-lane rural highways. They can be used to improve a highway's level of service by reducing vehicle percent time spent following (PTSF) and improve travel time in locations wherever slow-moving vehicles are common. WisDOT FDM Chapter 11-15-10, Passing Lanes and Climbing Lanes, provides criteria to determine the conditions where the addition of passing lanes could are appropriate. This chapter identifies the following general guidelines for locating passing lanes:

1. Passing lanes should be constructed in segments of highway that have a minimal number of entrances, and preferably no side roads. Commercial driveways could be particularly problematic. Avoid segments having side roads with traffic volume at or above 500 ADT.
2. Driveways and field entrances should be avoided in the merge taper area on either side of the highway. No driveways or intersections should be located closer than 500 feet from the end of the downstream taper. Passing lane approach and merge taper lengths should be 700 feet.
3. Avoid passing lanes on horizontal curves greater than three degrees, if possible.
4. Minimize the occurrence of four-lane segments of undivided highways (overlapping passing lane areas).
5. A widened segment of roadway, with protected left-turn lanes, may be constructed in a passing lane section when left-turn volumes are significant.
6. If the comparative cost for construction of passing lanes in rolling and level terrain is nearly the same, it may be desirable to construct them in the rolling terrain at locations where passing sight distance is unavailable.

The optimal length of a passing lane is a function of the highway's design hour volume (DHV). Optimal passing lane lengths are shown in Table 41 Optimal passing lane length.

Table 41 Optimal passing lane length

Two-way total DHV	Length of passing lane (miles)
Less than 600	½ – 1
600 – 1,000	¾ – 1 ½
1,000 – 1,400	1 – 2

Source: FDM 11-15-10 Passing Lanes and Climbing Lanes

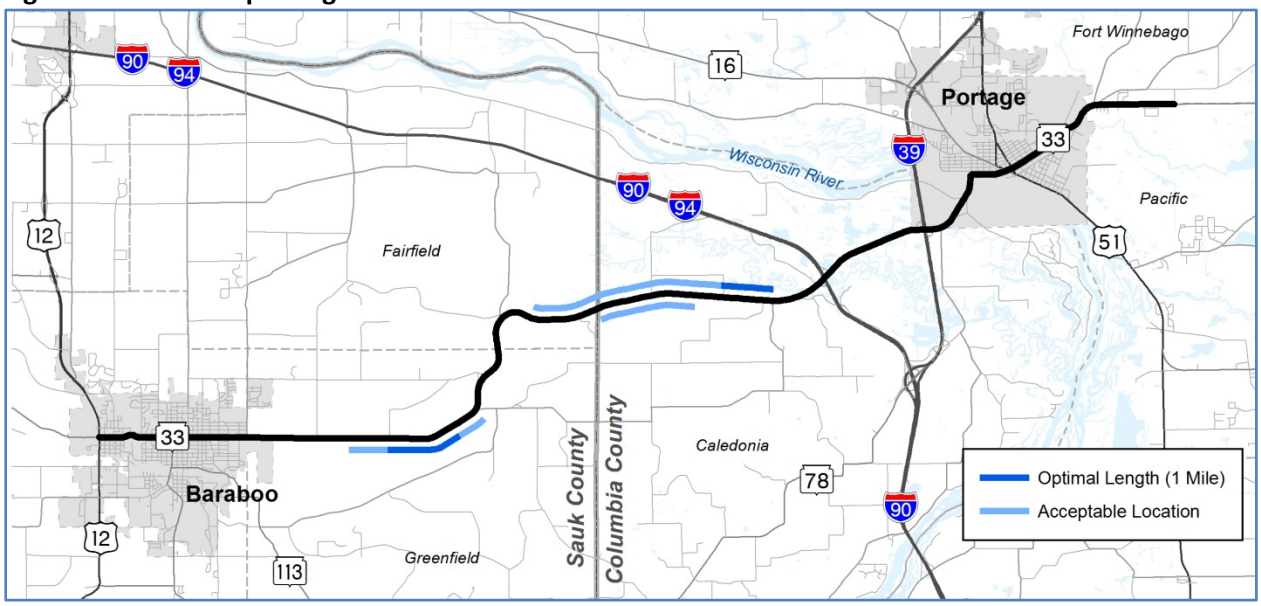
An initial evaluation of the corridor using HCM 2010 methodology determined that the addition of passing lanes on WIS 33 would reduce vehicle platooning and therefore improve corridor operations. However, the FDM guidelines must be considered when studying the application of passing lanes.

The rural segment of WIS 33 between County T on the east side of the city of Baraboo and the I-90/94 interchange does not experience major deviations from the posted speed limit. The travel time runs average between 56 and 57 mph in both directions and during both the morning and evening commutes. Drivers appear to be travelling slightly faster than the posted speed limit.

Typically, passing lanes are placed in locations where vehicles increase their speed to pass slower moving vehicles. Terrain, access points, and the location of passing lanes in relation to urbanized areas are all important factors to consider when siting passing lanes. These considerations will maximize their benefits to traffic operations and ensure they operate safely.

Passing lanes should be situated in strategic locations to maximize their benefit, such as on the departure side of urbanized areas near speed limit transition areas. When considering geometric constraints (terrain, access, and geographic location), optimal location for an eastbound passing lane would be in the vicinity of Johnson Road, with an acceptable alternative location starting at the Columbia County Line. For the westbound direction of travel, the optimum location starts at County W, west of the I-90/94 interchange, with acceptable locations throughout the segment up to the curve before County U in Sauk County (see Figure 35). The westbound passing lane location is currently an area where passing is occurring do to the relatively straight alignment of WIS 33 in this location.

Figure 35 Potential passing lane locations



8.2 Intersections

The WIS 33 corridor contains 24 rural intersections, 39 urban intersections and two interchanges (I-90/94 and I-39). Existing and future safety and operations conditions vary at all the intersections throughout the corridor (see traffic and operations section). Conceptual-level improvement strategies were developed for 17 of the rural intersections along the corridor to apply current design standards and address potential traffic operations issues. Intersections within the city of Baraboo were addressed as part of the road diet concept and are discussed in the Mainline Strategies section of this report. Within the city of Portage, the WIS 33/DeWitt Street (US 51) intersection was the only intersection projected to experience operational issues under forecasted traffic. This signalized intersection could experience delays and queuing for eastbound WIS 33 traffic.

For the intersections in the rural segment, field review and analysis of geometric conditions determined safety and operations of the corridor would improve with the addition of left-turn lanes and tee intersection bypass lanes at some locations. In some cases, intersections could be relocated to improve sight distance and safety. Several of the rural intersections were analyzed for left-turn lane warrants in accordance with FDM Chapter 11-25-5 and tee intersection bypass lanes in accordance with FDM Chapter 11-25-1. Intersections that meet left-turn lane warrants and would benefit from a tee (three-leg) intersection bypass lane are identified in the discussion of the proposed recommendation for each intersection that follows.

In the majority of cases, intersections do not meet current best practices for the appropriate intersection design and have been recommended for improvements to incorporate the current standards when needed. These standards include updating the existing intersection geometry to a higher intersection type per the WisDOT FDM Chapter 11-25-1 (see SDD 9a1: At-Grade Side Road Intersections). Of the six rural intersection types in the WisDOT FDM, the WIS 33 rural intersections could be upgraded to Type B1 and B2 or Type A2. Many of the intersections currently fall into Type D, providing little more than a taper for turning vehicles. The primary difference between these intersection types involves the presence and length of right-turn lanes and tapers. The study has also included exclusive left-turn lanes in some cases where appropriate. Factors such as the projected volume of traffic using the intersection, presence and type of truck traffic, crash history, and location of the intersection were some of the considerations in determining the appropriate intersection type.

Regardless of the intersection improvement recommendation, implementation would occur over time on a case by case basis as safety or operational concerns arise. Implementation of one intersection improvement does not preclude the implementations of the others at a later point in time as needed. Special consideration should be made for recommendations at Sauk County U, Cascade Mountain Road, County F and County EE, where the study recommendations include changes to local road connections, or may impact a structure over the Baraboo River. These locations may require a more proactive assessment for their implementation.

Rocky Point Road

Rocky Point Road is the first rural three-leg intersection that eastbound drivers encounter upon leaving the city of Baraboo. This low volume, stop controlled intersection is not currently experiencing operations or safety-related issues. There were no crashes reported at this intersection between 2010

and 2014. Based on future traffic volumes on WIS 33 at this location, the intersection could be modified to meet current standards as a Type B2 intersection (see Figure 36).

Figure 36 Rocky Point Road proposed improvements

A Type B2 intersection would replace the existing westbound taper with a right-turn lane allowing westbound drivers to diverge from the WIS 33 through traffic and safely decelerate before making the right-turn. This improvement would not preclude the addition of an eastbound bypass lane if it is determined in the future that it is warranted. Currently, the low volume intersection does not experience a high number of eastbound left-turns or crashes involving this movement, therefore, an eastbound bypass lane was not recommended as part of this study.

Johnson Road

Johnson Road is a low volume, stop controlled, three-leg intersection that does not currently experience operations or safety-related issues and did not have reported crashes between 2010 and 2014. Feedback from public involvement identified this intersection as a location where eastbound drivers pass on the shoulder between the guardrail and left-turning vehicles.

Because the study did not find supporting data for this comment, recommendations were not carried forward for this intersection as part of this study. This intersection may be monitored in the future to determine if a bypass lane may be needed. Because of the existing cattle pass located just west of the intersection and the steep grade to the south, substantial grading, fill, and coordination for the cattle pass could be needed to construct a bypass lane at this intersection. In addition, two driveways on the

south side of WIS 33 are located in close proximity to the intersection and would need to be considered as part of potential intersection improvements.

County X

The WIS 33/County X intersection is located on the curve of WIS 33 where it turns northward to pass within the Baraboo Range Narrows. County X has an average annual daily traffic (AADT) volume of only 650 vehicles.

The intersection experienced five crashes during the study period, with all five of the crashes occurring at dusk or dark. The majority of the crashes were weather related with the road conditions being either wet or snow covered. From this information, it does not appear that the intersection geometry was a contributing factor in the crashes. The study recommends lighting the intersection as all of the crashes did occur during non-daylight hours.

The study recommends modifying the intersection to Type B1 (see Figure 37). The location of the intersection on a curve, and the volume of traffic on WIS 33 in this area would see a benefit from providing a westbound left-turn lane to allow turning vehicles the opportunity to exit the through traffic lane before executing their turn. In addition, extending the eastbound right-turn lane would provide additional distance for vehicles to safely decelerate prior to turning. Through traffic would be able to maintain consistent speeds while negotiating the curve which could reduce the incidence of crashes during inclement weather.

This improvement would require widening WIS 33 and restriping the intersection in the vicinity of County X to accommodate the turn lanes. With the addition of a westbound left-turn lane, the existing 320 foot bypass lane could be eliminated. In addition, the location of the intersection on the outside of the curve will require consideration of the super elevation at this location. There are two private driveways on the north side of WIS 33 in the vicinity of the intersection that would need to be considered as part of future improvements.

Figure 37 County X proposed improvements

Man Mound Road

Man Mound Road meets WIS 33 as a three-leg intersection located on the outside of a curve within the Baraboo Range Narrows area. Man Mound Road is an east/west route paralleling and connecting WIS 33 with the north side of the city of Baraboo. Input received from public involvement meetings identified this route as a shortcut to County A and ultimately to the Wisconsin Dells area, as westbound vehicles do not need to travel through the city of Baraboo using this route. Man Mound Road is named after the prehistoric mound and park located 1.6 miles west of the WIS 33 intersection. The road has an AADT of 340 vehicles and did not have a reported crash between 2010 and 2014.

Study recommendations for this intersection include modifying the intersection to a Type B2 with a westbound right-turn lane (see Figure 38). This allows right-turning vehicles the opportunity to decelerate safely prior to turning and removes slowing vehicles from the curved section of WIS 33. The location of the intersection on the outside of the curve will require consideration of the super elevation at this location. Because of the low volume and absence of reportable crashes, an eastbound bypass lane was not included in the study recommendation. Adding a bypass lane would not be precluded by this improvement if it is determined that it would be needed in future studies.

Figure 38 Man Mound Road proposed improvements

Sauk County U

The three-leg WIS 33/County U intersection is located on the north side of the Baraboo Range Narrows. It is located on the outside of the curve where WIS 33 turns eastward, less than 230 feet west of the structure over the Baraboo River. County U (440 AADT) intersects with Fairfield Road 600 feet north of the WIS 33 intersection. In addition, a pull-out for a roadside marker is located on the inside of the WIS 33 curve 120 feet west of the intersection.

The intersection experienced five intersection related crashes between 2010 and 2014. There were also five run-off-road crashes in close proximity related to the curve on WIS 33. Two crashes involved southbound vehicles turning left onto WIS 33 and being struck by westbound vehicles, resulting in minor injuries. The five intersection related crashes all occurred during non-daylight hours (dark or dusk).

Because of its location on the curve and the proximity of Fairfield Road to the north and the Baraboo River crossing to the east, the study recommendation for this intersection includes relocating it approximately 800 feet further west on WIS 33 (see Figure 39). This would allow the intersection to be modified to a Type B1 and the construction of both a westbound right-turn lane and an eastbound bypass lane. The modifications could be made at the new location without impacting the structure or the Baraboo River.

This concept would create a new County U alignment through an existing agricultural field avoiding impacts to the hillside located just west of the field. Fairfield Road would also be realigned to connect

with the new County U providing greater separation from the WIS 33 intersection. The concept would include lighting the intersection. The existing road segments would need to be removed and private access, drainage, and agricultural impacts would need to be considerations if this concept were further studied.

Figure 39 Sauk County U proposed improvements

Tritz Road (west intersection)

Tritz Road intersects WIS 33 in two locations roughly three miles apart. The westernmost intersection serves primarily agricultural, open space and sparsely developed residential land uses. It is a low volume, three-leg intersection located on the north side of a relatively straight section of WIS 33.

It did not have a reportable crash between 2010 and 2014, but is recommended to be modified to a Type B2 with a westbound right-turn lane (see Figure 40). Adding the turn lane would allow westbound vehicles the opportunity to declare safely to make turns without impacting through traffic on WIS 33. The inclusion of an eastbound bypass lane is not precluded, but would require monitoring the intersection to determine future need and may require impacts to the wooded hillside located adjacent to the south side of WIS 33.

Figure 40 Tritz Road (west intersection) proposed improvements

Pig Tail Alley Road

This low volume road connects to WIS 33 via a three-leg intersection from the south. It did not have a reportable crash between 2010 and 2014, but is recommended to be modified to a Type B2 when safety becomes an issue for this location (see Figure 41). Similar to the other intersections of this type in the study corridor, the recommendation includes adding a right-turn lane to reduce conflicts between vehicles slowing to turn and through traffic. A westbound bypass lane would not be precluded when needed. In addition, a driveway on the north side of WIS 33 would also need to be a consideration of intersection design.

Figure 41 Pig Tail Alley Road proposed improvements

County W

The WIS 33/County W intersection is located on the south side of WIS 33 between Pig Tail Alley Road and Cascade Mountain Road. This three-leg intersection did not have a reportable crash between 2010 and 2014. The intersection has a westbound bypass lane and a wider paved eastbound shoulder to allow turning vehicles to get out of the through traffic lane when slowing to turn. A driveway leading to a cemetery is located along the south side of WIS 33, roughly 200 feet west of the intersection. The cemetery itself is set back from WIS 33 roughly 130 feet.

The study recommendation for County W would be to improve the intersection to a Type B1 intersection, which maintains the bypass lane and formalizes the paved shoulder into a right-turn lane (see Figure 42). This concept also extends the turn lane by 75 feet. The location of the cemetery driveway would be a consideration for this recommendation. Cemetery access to the state highway is protected under Wis. Stats. s. 86.09.

Figure 42 County W proposed improvements

Cascade Mountain Road

Cascade Mountain Road is located approximately ½ mile west of the I-90/94 interchange and is the primary entrance from the interstate to Cascade Mountain Ski Resort which is located less than a mile south of WIS 33. WIS 33 crosses the Baraboo River less than 500 feet east of the intersection. This three-leg intersection has a 245 foot westbound bypass lane and a 75 foot eastbound taper allowing some opportunities for right-turning vehicles to exit the through traffic lane before turning. This intersection experienced three crashes between 2010 and 2014. With higher numbers of vehicles per day passing through the intersection, even with three crashes, the calculated crash rate places this intersection in the bottom three intersections of the 31 intersections experiencing crashes on the corridor.

The study recommendation for this intersection includes modifying it to a Type B1 with both eastbound right and westbound left-turn lanes (see Figure 43). In addition, this intersection would be lighted. The improvements would eliminate the need for the westbound bypass lane, but would require widening the structure over the Baraboo River to accommodate the addition of a left turn lane. A right-turn lane would allow eastbound vehicles to safely exit the WIS 33 traffic stream and slow before turning.

Figure 43 Cascade Mountain Road proposed improvements

Tritz Road (east intersection)

This four-leg intersection is the second of two connections of Tritz Road to WIS 33. It is located less than 1,000 feet west of the WIS 33/I-90/94 interchange and provides access to commercial businesses on the north side of WIS 33 including a gas station. The south leg provides access to a former wayside, now being used as an informal park and ride site. This intersection experienced four crashes between 2010 and 2014.

The proposed improvement from this study would be the addition of both eastbound and westbound right turn lanes (see Figure 44). Right-turn lanes would allow vehicles slowing to turn, the ability to safely exit the WIS 33 traffic stream.

Figure 44 Tritz Road (east) proposed improvements

Columbia County U

County U is a three-leg intersection located less than 800 feet east of the WIS 33/I-39 northbound ramp connection. Currently, the northbound to eastbound movement at the interchange is free flow (yield to WIS 33 eastbound traffic) with traffic merging in very close proximity County U intersection. The eastbound shoulder of County U is paved to a width of ten feet allowing right-turning vehicles extra space to execute turns onto County U. WIS 33 westbound adds an additional lane at the County U intersection that extends through the I-39 northbound ramp connection.

County U experienced three crashes during the period studied, two of which were rear end crashes. The proposed improvements to the intersection include modifying it to a Type B2 with an eastbound right-turn lane that extends to the I-39 northbound offramp (see Figure 45). The concept also extends the westbound outside lane past the County U intersection. The driveway located on the north side of the intersection should also be a consideration in the future design.

An ideal location for the WIS 33/County U intersection would be a location further east at least 1,300 feet from the I-39 ramp connection. If traffic increases over time, on County U or I-39 to the city of Portage, this area could see increased weaving movements as ramp vehicles overlap with vehicles slowing to turn onto County U. A long-term consideration may be to re-evaluate the free-flow ramp movement or relocate County U to mitigate excessive weaving and crash potential.

Figure 45 Columbia County U proposed improvements

Caledonia Street (west)

Caledonia Street intersects with WIS 33 in two locations, approximately ⅓ mile apart. This southernmost location is a three-leg intersection providing one of the two connections to Blackhawk Road and the residential neighborhoods it serves. This intersection did not have a reportable crash between 2010 and 2014.

The proposed improvement would upgrade this intersection to a Type B2 with an eastbound right-turn lane (see Figure 46).

Figure 46 Caledonia Street proposed improvements

Fairfield Street/Caledonia Street (east)

This four-leg intersection is located approximately ¼ mile west of the Wisconsin River. Fairfield Street connects to WIS 33 from the north while Caledonia Street connects from the south. The intersection experienced six crashes between 2010 and 2014. Four involved vehicles stopped on WIS 33 (waiting to turn left onto Fairfield or Caledonia) that were struck from behind. Two crashes involved westbound left-turning vehicles being sideswiped by westbound vehicles trying to pass them on the right.

The proposed improvement for this intersection includes modifying it to a Type B1 with eastbound and westbound exclusive left-turn lanes. In addition, an eastbound right-turn lane would be added (see Figure 47). The addition of turn lanes should reduce the incidence of rear end crashes involving left-turning vehicles on WIS 33.

Figure 47 Fairfiled Street proposed improvements

East Albert Street/Agency House Road

This is the first intersection east of the city of Portage and is located adjacent to the Historic Portage Canal. This four-leg intersection connects East Albert Street to the north and Agency House Road to the south. Less than 100 feet north of WIS 33, East Albert Street is intersected again by the northern leg of Agency House Road, a rustic road that provides access to the Historic Indian Agency House. The south leg (Agency House Road) is a seldom used gravel access road that travels along the canal and ends at the Canadian Pacific Railroad corridor. The WIS 33/East Albert Street intersection experienced eight crashes between 2010 and 2014 placing it fourth highest of the intersections studied for crash rate.

East Albert Street provides an east/west connection between WIS 33 and US 51 effectively bypassing the city downtown area. Public input has identified this intersection as a local priority for future improvements with a primary issue related to the obstruction to driver line of site by the structure over the Portage Canal. An Intersection Control Evaluation (ICE) was conducted for this intersection in 2009 and found that a change in intersection control to either a signal or roundabout was warranted (see Appendix A)

This intersection was evaluated for both a traditional stop controlled intersection and as a roundabout. As noted previously, it was identified as part of the signal risk assessment as a potential candidate for further study to determine if signal warrants would be met, but a full signal warrant analysis was beyond the scope of this planning level study. Both concepts would involve lighting the intersection and relocating Agency House Road slightly. The stop controlled intersection would require relocating the intersection 1,300 feet west of its current location to allow for turn lanes to be constructed without impacting the Historic Portage Canal. This location was undesirable because of the impacts to wetlands that would be needed for fill, and the location on a curve with an incline. The roundabout option would shift the intersection less than 300 feet without impacting the Canal. Because the roundabout option does not have left-turns, the line of sight issue with the structure would be mitigated with this concept. The roundabout is therefore recommended as the best study concept for this intersection (see Figure 48).

Figure 48 East Albert Street proposed improvements

Wauona Trail

Wauona Trail connects to WIS 33 approximately ¼ mile east of the Portage Canal and runs southerly to connect with US 51/WIS 16 on the south side of the city of Portage. Aside from WIS 33, it is the only other crossing of the Canadian Pacific Railroad that connects these two corridors. Input received from the public indicated that some traffic may be diverting along this route for that reason. The intersection did not have a reportable crash within the time period studied.

The proposed improvements from this study include modifying the intersection to a Type A2 including a westbound exclusive left-turn lane and an eastbound right-turn lane (see Figure 49).

Figure 49 Wauona Trail proposed improvements

County F and County EE intersections

County F and County EE intersect WIS 33 within 1,260 feet of each other and mark the transition area between the open historic canal area and an area of suburban development. The County F intersection experienced five crashes and the County EE intersection experienced two crashes between 2010 and 2014. These included angle, rear end, and head-on crashes.

Because of the close proximity of the two intersections, and the location of County F on a curve, the study developed an initial concept to consolidate these two intersections into a single four-leg intersection. The new intersection would be a Type A2 located at the existing County EE/Pacific Estates Road connection (see Figure 50). The intersection would include eastbound and westbound exclusive

left-turn lanes and right-turn lanes. County F would be the primary intersection with WIS 33, with County EE connecting to County F.

Considerations of the private driveways located between County F and County EE would also need to be further studied. Access relocated to the county roadways would be preferred. In addition, any design relocating County F would need to consider access to the existing farm operation and impacts to the agricultural fields to the north. The concept was not analyzed in detail as part of this study and is shown for schematic purposes only. Further study would be needed to determine the opportunities to minimize impacts to agricultural operations. Public input indicated that the property owner located along the north side of WIS 33 between County F and County EE currently permits the farm operator located on County F to travel along the rear lot line between the two County highways in order to avoid travelling on WIS 33.

Figure 50 County F/EE proposed improvements

9.0 Access Inventory and Management Plan

9.1 Access Management Background

WisDOT defines access management as "the systematic control of the location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a highway". WisDOT and other agency experience across the country demonstrates that the benefits of access management are substantial and cost effective in the majority of situations. In fact, the Federal Highway Administration (FHWA) identifies Corridor Access Management specifically as a proven safety countermeasure. WisDOT's access management goal is:

> "Protect the safety and capacity of, traffic flow on, and public investment in, State Trunk Highways through a sound set of access management policies, and work with the public and local governments to provide access where it is possible with minimal conflicts".

In order to achieve this goal, WisDOT recognizes a balance must be sought between the interests of highway users and property owners, public investments in highway improvement and maintenance, and desirable land development. This balance requires that access reasonably and suitably accommodates landowners' use of their property. Because of this, the intent of access management is not to limit, restrict, or otherwise reduce access below a point that is necessary and adaptable to serve the needs of landowners.

WisDOT employs a number of tools across the state to manage access on state highways. These tools include:

- Statutory control of highway access (§ 84.25)
- Purchase of access rights (§ 84.09)
- Driveway permitting (§ 86.073)
- Access covenants
- Land use/access management plans
- Traffic impact analysis (TIA)
- Joint access easement agreements
- Official mapping (§ 84.295 (10))
- Early review of local rezoning and/or site plan development
- Input into local zoning ordinances and land use plans that affect state highways
- Freeway or expressway designation (§ 84.295)
- Subdivision plat review (Chapter 236)
- Scenic easements
- Access spacing and design guidelines
- Interchange and frontage road spacing and design guidelines

The focus of this section of the report is the development of an Access Management Plan for the WIS 33 corridor. Access management plans have been increasingly used across Wisconsin by state and local governments in order to create a long-term vision that preserves the safe and efficient operations of the highway system.

The goal of an access management plan is to develop long-term strategies that, when implemented, function well together as a system and delay the need for costly capacity expansion or bypass projects.

An access management plan is a proactive tool to address anticipated safety, operational, and congestion issues that are expected to arise as traffic volumes grow and land uses intensify.

Access management can be undertaken by WisDOT as a singular or cooperative effort, and is most successful when local units of government support the plan through resolution. This study has included public and agency involvement, but does not require support via resolution. This plan is intended to be a reference in land use and access decisions that fall under the jurisdiction of local units of government, as well as meet WisDOT's regional mobility goals for WIS 33 and other connecting state highways in the region.

In addition to existing and future land use considerations, the access management plan encourages relocation of as much direct access as possible to well-spaced public road connections. This is achieved through identifying opportunities to:

- Consolidate private driveways in order to reduce the number of access points
- Relocate private driveways to local road connections, wherever possible
- Develop a plan for well-spaced public road connections, where possible
- Provide local road connectivity to separate traffic with local and regional destinations

It is important to note that an access management plan represents a long-term vision that is often tied to land development or parcel consolidation. Many of the private driveway access concepts identified in the plan would not be implemented without property owner consent (unless safety warrants action) or until such time as land use changes result in a change in the character of the access. For instance, residential and field driveways in general do not influence highway function to the same degree that a commercial driveway generating several trips a day would. Residential and field entrances would be the lowest priority for consolidation or relocation unless WisDOT worked cooperatively with property owners to proactively address an access issue or safety concern.

Rural Access Guidelines

The access recommendations in this study were developed using WisDOT recommended guidelines for access spacing along a state highway. The WisDOT Facilities Development Manual (FDM) Procedure 11-5-5 Attachment 5.1, Access Spacing Guidelines, specifies recommended spacing distances between intersecting roadways (public and private) on rural arterial highways. Table 42 below provides a summary of WisDOT spacing guidelines for intersecting roadways on a minor arterial such as WIS 33.

Table 42 WisDOT access spacing guidelines for rural arterials

Type	Intersecting Roadway Design year ADT	Spacing between roadways
Freeway		2 miles
Expressway		2 miles
Principal arterial	>3,000	2 miles
	<3,000	1 mile
Minor arterial	>5,000	2 miles
	3,000 – 5,000	1 mile
	<3,000	2,000 feet
Major collector		2,000 feet
Minor collector		2,000 feet
Local		2,000 feet
Private	>100	1,000 feet
	<100	500 feet

Because WIS 33 is a minor arterial outside of Baraboo and Portage, WisDOT recommends generous spacing between access points in order to preserve its function as an important regional highway. WIS 33 has average daily traffic (ADT) above 5,000 vehicles, therefore other minor arterials intersecting it should be spaced at least two miles apart, while major collectors, minor collectors and local roads should be no closer than 2,000 feet. Higher volume private roads and driveways should be separated by 1,000 feet. Low volume private driveways can be spaced 500 feet apart.

Access Spacing from Interchanges

WIS 33 intersects the I-90/94 and I-39 corridors at two partial cloverleaf interchanges located approximately one mile west of Portage. The two interchanges are separated by roughly 1.6 miles. The ramps at both interchanges are currently stop controlled, with right-turns yielding to WIS 33 traffic.

Interchanges represent a substantial investment to construct and upgrade. Adequate spacing and access control along the intersecting highway is important to helping preserve their long-term function. As development and traffic pressures increase over time, signalization may become necessary and improperly controlled cross roads can result in heavy weaving, delay, and traffic ques that could spill back onto the freeway. Increased spacing between access points can provide adequate distances for weaving on the cross road, provide space for merging maneuvers, and space for the storage of turning vehicles at access connections.

Public road connections and private driveways should be separated from interchange ramps by a desirable distance of 1,320 feet if possible. Figure 51 graphically depicts WisDOT access spacing guidelines for rural or urban crossroads near expressway or freeway ramps. (Source: WisDOT FDM 11-5-5, Attachment 5.2)

Figure 51 WisDOT access control guidelines for expressways and freeways

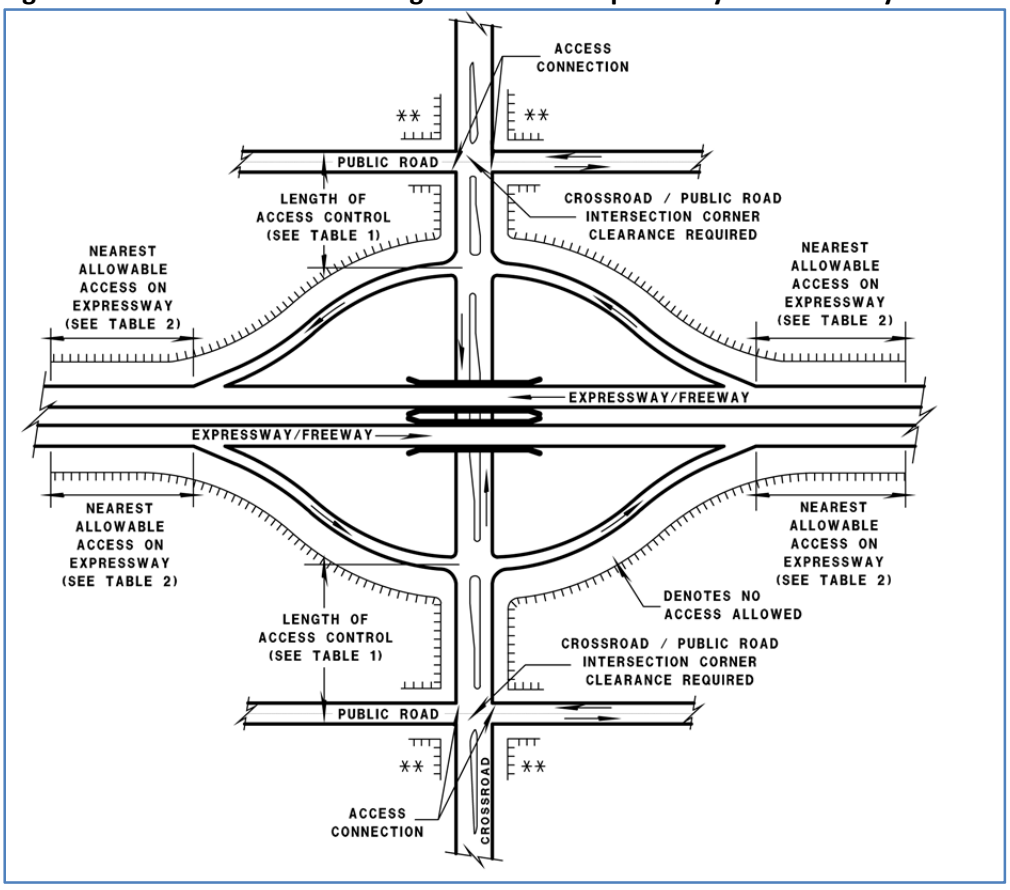


TABLE 1 - Distance of Access Control on Crossroad

Area Type	Desirable	*Minimum
Rural or Urban	1,320 ft	1,000 ft (1200-ft if location is or is likely to be signalized)

TABLE 2 - Distance of Access Control on Expressways

Area Type	Median opening at at-grade intersection	Desirable	*Minimum
Rural or Urban	**None** (intersection is right-in and/or right-out)	2,640 ft	1,500 ft
	Full or restricted (allows left-in, and/or left-out, and/or thru movements	2,640 ft	2,640 ft

* An approved traffic impact analysis is required to justify a less than desirable distance of access control. See text.

**Access control here is based on the functional area of the intersection. See FDM 11-25-1.

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Urban Access Guidelines

Due to the complex and varied nature of urban highway environments, WisDOT's Facility Development Manual (FDM) does not provide urban access spacing guidelines. As a general rule, WisDOT applies the recommendations of the Transportation Research Board's Access Management Handbook 2nd Edition for determining appropriate connections to state highways within urban environments. WisDOT generally applies the TRB criteria for right-turn conflict overlap found on page 370 of the handbook which varies by speed as noted in Table 43 below. More thorough access review is undertaken as part of improvement projects to ensure appropriate design and safety features are implemented.

Table 43 Minimum distance to reduce collisions caused by overlapping right-turns

Speed (mph)	Minimum Spacing
30	185 feet
35	245 feet
40	300 feet
45	350 feet

Source: Access Management Manual 2nd Edition

WisDOT's FDM Chapter 11-5-5, *Access Control*, refers to guidance on corner clearance for driveways as well as the placement of median openings as additional considerations for access decisions in urban areas. All access decisions should consider not only the immediate impacts of access changes, but also the long-term impacts to future land use and development potential. In addition, consideration should be include the potential need to signalize an intersection in the future, with a minimum spacing desired of no less than 1,200 feet between adjacent intersections. This allows for signal progression if needed in the long-term.

9.2 Access Inventory and Analysis

All public road connections (intersections), private and public access points (driveways), and field entrances were inventoried as the initial step in creating an access management plan for the WIS 33 corridor. Each access point was measured with a global positioning system (GPS). The current land use activity was also noted based on visual observation at the time of the inventory. Table 44 provides a compilation of data for all access points along the corridor including spacing. As WIS 33 is an undivided highway, distances are measured to the nearest access point on either side. In addition, many offset public road connections were treated as separate access points.

The distances between public road connections in the rural segments were evaluated per WisDOT FDM 11-5-5, Attachment 5.1 guidelines and according to their functional class: arterial, collector, and local road. A total of 18 rural intersections were determined to have spacing that fell below WisDOT recommendations for minimum spacing (66% of roadway intersections). The recommended minimum spacing was determined to be 2,000 feet in rural areas and varied in urban areas based on the length of the upstream and downstream intersection functional areas. In urban areas 30 public road connections (63%) had one or more driveways located in either the upstream or downstream intersection functional area.

The WIS 33 corridor has 396 non-roadway access points that include 301 private driveways, 30 public access points, and 65 field entrances. The majority of non-roadway access points were determined to have spacing that fell below WisDOT recommendations for minimum spacing (94% of non-roadway access points). In rural areas, the recommended minimum spacing was determined to be either 1,000 feet or 500 feet depending on expected daily traffic; while spacing in urban areas was based primarily on the right-turn overlap distance or the adjacent public road intersection functional area.

Exhibit 5 in the next section, provides a graphical inventory of all existing access locations on the corridor. Driveway colors show the observed land use associated with each driveway and are explained on the map legend. Access locations identified on the map sheets do not necessarily portray permitted driveway uses, only observed conditions. Access point numbering included in Table 44 corresponds to

access numbering in Exhibit 5. The exhibit also includes access related recommendations, which are discussed in the next section of the report, following the access inventory tables.

Table 44 Access inventory and recommendations

ID	Access Point	Side of WIS 33	Access type	Spacing to nearest AP to west (feet)	Spacing to nearest AP to east (feet)	Minimum spacing (feet)	Meets minimum standards	Use	Notes	Recommendation
1	Private Driveway	South	RIRO	130	325	185	No[1]	Commercial		Shift away from intersection
2	Mullberry Street	South	Offset Four-leg	325	16	200	Yes[2]	Pub. Rd.	Slightly offset west of north leg by 16 feet	Future median if needed
177	Private Driveway	North	RIRO	181	283	185	No[2]		Distance to 176	None
176	Mullberry Street	North	Offset Four-leg	16	100	200	No[2]	Pub. Rd.	Slightly offset east of south leg by 16 feet	Future median if needed
3	Private Driveway	South	Full	100	82	185	No[1+2]	Commercial		Consolidate w/cross access
175	Private Driveway	North	Full	82	39	185	No[1+2]	Commercial		None
4	Private Driveway	South	Full	39	102	185	No[1]	Commercial		Consolidate w/cross access
5	Private Driveway	South	Full	102	10	185	No[1+2]	Commercial		Consolidate w/cross access
174	Private Driveway	North	Full	10	126	185	No[1+2]	Commercial		Consolidate if parcels develop
173	Private Driveway	North	Full	126	10	185	No[1+2]	Residential	Offset from Walnut Street	Align with public road in future
6	Walnut Street	South	T-Intersection	10	65	200	No[2]	Pub. Rd.		None
172	Private Driveway	North	Full	65	62	185	No[1]	Residential		Consolidate if parcels develop
7	Private Driveway	South	Full	62	20	185	No[1]	Residential		None
171	Private Driveway	North	Full	20	82	185	No[1]	Commercial		Consolidate if parcels develop
8	Private Driveway	South	Full	82	7	185	No[1]	Residential	Shared Apron w/9	None
9	Private Driveway	South	Full	7	8	185	No[1]	Residential	Shared Apron w/8	None
170	Private Driveway	North	Full	8	42	185	No[1]	Commercial		Relocate to side road
169	Private Driveway	North	Full	42	95	185	No[1]	Commercial		Relocate to side road
10	Private Driveway	South	Full	95	7	185	No[1+2]	Commercial		Relocate to side road
168	Connie Road	North	T-Intersection	7	105	200	No[2]	Pub. Rd.		Future median if needed
11	Cedar Street	South	T-Intersection	105	8	200	No[2]	Pub. Rd.	Offset east of Connie Road	None
167	Private Driveway	North	Full	8	40	185	No[1+2]	Commercial		Consolidate driveways
166	Private Driveway	North	Full	40	24	185	No[1+2]	Commercial		Consolidate driveways
165	Private Driveway	North	Full	24	53	185	No[1+2]	Commercial		Consolidate driveways
12	Private Driveway	South	Full	53	4	185	No[1]	Residential		Consolidate if parcels develop
164	Private Driveway	North	Full	4	46	185	No[1]	Commercial		Consolidate driveways
163	Private Driveway	North	Full	46	31	185	No[1]	Commercial		Consolidate driveways
13	Private Driveway	South	Full	31	14	185	No[1]	Residential		Consolidate if parcels develop
162	Private Driveway	North	Full	14	44	185	No[1]	Commercial		Consolidate driveways
161	Private Driveway	North	Full	44	6	185	No[1]	Commercial		Consolidate driveways
14	Private Driveway	South	Full	6	32	185	No[1]	Residential		Consolidate if parcels develop
160	Private Driveway	North	Full	32	164	185	No[1]	Commercial		Consolidate if parcels develop
159	Private Driveway	North	Full	164	20	185	No[1+2]	Residential		None

Table Notes: [1]Right Turn Overlap (same side of highway), [2]Intersection Functional Area, [3]Rural Spacing from WisDOT FDM

ID	Access Point	Side of WIS 33	Access type	Spacing to nearest AP to west (feet)	Spacing to nearest AP to east (feet)	Minimum spacing (feet)	Meets minimum standards	Use	Notes	Recommendation
15	Willow Street	South	T-Intersection	20	49	200	Yes[2]	Pub. Rd.	Offset west of Hill Street by 194 feet	None
158	Private Driveway	North	Full	49	76	185	No[1]	Residential		None
157	Private Driveway	North	Full	76	26	185	No[1]	Commercial		Close driveway
16	Private Driveway	South	Full	26	37	185	No[1]	Commercial		Consolidate if parcels develop
156	Hill Street	North	T-Intersection	37	6	200	No[2]	Pub. Rd.	Offset east of Willow Street by 194 feet	None
17	Private Driveway	South	Full	6	126	185	No[1]	Commercial		Align with public road in future
18	Private Driveway	South	Full	126	56	185	No[1]	Commercial		Consolidate if parcels develop
155	Private Driveway	North	Full	56	245	185	Yes[1]	Residential		None
154	Private Driveway	North	Full	245	115	185	No[1]	Commercial		Consolidate with circulation
153	Private Driveway	North	Full	115	67	185	No[1]	Commercial		Consolidate with circulation
152	Private Driveway	North	Full	67	155	185	No[1]	Commercial		Consolidate with circulation
151	Private Driveway	North	Full	155	274	185	Yes[1]	Pub. Rd.	Old driveway and connection	Check for sightline and close?
150	Private Driveway	North	Full	274	206	185	Yes[1]	Commercial	Connects to 9th Ave	Close driveway
149	Private Driveway	North	Full	206	119	185	No[1]	Commercial	Connects to 9th Ave	Close driveway
148	Private Driveway	North	Full	119	128	185	No[1]	Public		Consolidate if parcels develop
147	Private Driveway	North	Full	128	66	185	No[1+2]	Residential		Consolidate if parcels develop
146	Private Driveway	North	Full	66	71	185	No[1+2]	Residential		Consolidate if parcels develop
145	Private Driveway	North	Full	71	20	185	No[1+2]	Residential		Consolidate if parcels develop
144	Private Driveway	North	Full	20	144	185	No[1+2]	Residential		Consolidate if parcels develop
143	Draper Street	North	T-Intersection	144	396	302	Yes[2]	Pub. Rd.		None
19	Park Street	South	Four-Leg	396	0	200	Yes[2]	Pub. Rd.		None
142	Park Street	North	Four-Leg	0	82	200	Yes[2]	Pub. Rd.		None
20	Private Driveway	South	Full	82	92	185	No[1+2]	Commercial		Close, provide access via alley
21	Private Driveway	South	Full	92	56	185	No[1+2]	Residential		Close, provide access via alley
141	Private Driveway	North	Full	56	44	185	No[1]	Residential		Close, provide access via alley
140	Private Driveway	North	Full	44	50	185	No[1]	Commercial		Access via alley in future
22	Private Driveway	South	Full	50	32	185	No[1+2]	Commercial		Access via alley in future
139	Private Driveway	North	Full	32	23	185	No[1+2]	Commercial		Close, provide access via alley
23	Private Driveway	South	Full	23	16	185	No[1+2]	Commercial		Close, provide access via alley
138	Private Driveway	North	Full	16	34	185	No[1+2]	Commercial		Access via alley in future
24	Private Driveway	South	Full	34	45	185	No[1+2]	Commercial		Access via alley in future
137	Private Driveway	North	Full	45	58	185	No[1+2]	Commercial		Close, provide access via alley
136	Summit Street	North	Four-Leg	58	0	200	Yes[2]	Pub. Rd.		None

Table Notes: [1]Right Turn Overlap (same side of highway), [2]Intersection Functional Area, [3]Rural Spacing from WisDOT FDM

ID	Access Point	Side of WIS 33	Access type	Spacing to nearest AP to west (feet)	Spacing to nearest AP to east (feet)	Minimum spacing (feet)	Meets minimum standards	Use	Notes	Recommendation
25	Summit Street	South	Four-Leg	0	253	200	No[2]	Pub. Rd.		None
135	Private Driveway	North	Full	253	143	185	No[1]	Residential		Close, provide access via alley
134	Wood Street	North	T-Intersection	143	42	200	No[2]	Pub. Rd.	Offset 130 feet west of Center Street	None
26	Private Driveway	South	Full	42	51	185	No[2]	Residential		None
133	Private Driveway	North	Full	51	17	185	No[1+2]	Residential		None
132	Private Driveway	North	Full	17	21	185	No[1+2]	Residential		Close, provide access via alley
27	Center Street	South	T-Intersection	21	90	200	No[2]	Pub. Rd.	Offset 130 feet east of Wood Street	None
131	Private Driveway	North	Full	90	78	185	No[1]	Residential		Close, provide access via alley
130	Private Driveway	North	Full	78	101	185	No[1+2]	Commercial		None
28	Private Driveway	South	Full	101	80	185	No[2]	Residential		None
29	West Street	South	Four-Leg	80	0	200	No[2]	Pub. Rd.		None
129	West Street	North	Four-Leg	0	171	200	No[2]	Pub. Rd.		None
128	Private Driveway	North	Full	171	120	185	No[1+2]	Residential		Close, provide access via alley
127	Private Driveway	North	Full	120	173	185	No[1+2]	Residential		None
30	Birch Street	South	Four-Leg	173	0	200	Yes[2]	Pub. Rd.		None
126	Birch Street	North	Four-Leg	0	231	200	Yes[2]	Pub. Rd.		None
31	Private Driveway	South	Full	231	61	185	No[2]	Residential		Allow right-out only
125	Private Driveway	North	Full	61	6	185	No[2]	Residential		Close, provide access via 9th Ave.
32	Private Driveway	South	Full	6	38	185	No[1+2]	Commercial		Close, provide access via side road
33	Private Driveway	South	Full	38	52	185	No[1+2]	Commercial		Close, provide access via side road
34	Private Driveway	South	Full	52	80	185	No[1+2]	Commercial		Close, provide access via side road
35	STH 113	South	T-Intersection	80	36	322	No[2]	Pub. Rd.		None
124	Private Driveway	North	Full	36	137	185	No[1+2]	Residential		Close, provide access via 9th Ave.
123	Private Driveway	North	Full	137	8	185	No[2]	Residential		Close, provide access via alley
36	Private Driveway	South	Full	8	295	185	No[1+2]	Commercial		Allow right-out only
37	Oak Street	South	Four-Leg	295	0	200	Yes[2]	Pub. Rd.		None
122	Oak Street	North	Four-Leg	0	115	200	Yes[2]	Pub. Rd.		None
38	Private Driveway	South	Full	115	349	185	No[1+2]	Residential		Relocate to side road in future
121	Ash Street	North	Four-Leg	349	0	200	Yes[2]	Pub. Rd.		None

Table Notes: [1]Right Turn Overlap (same side of highway), [2]Intersection Functional Area, [3]Rural Spacing from WisDOT FDM

ID	Access Point	Side of WIS 33	Access type	Spacing to nearest AP to west (feet)	Spacing to nearest AP to east (feet)	Minimum spacing (feet)	Meets minimum standards	Use	Notes	Recommendation
39	Ash Street	South	Four-Leg	0	252	200	Yes[2]	Pub. Rd.		None
40	Private Driveway	South	Full	252	213	185	No[2]	Residential		Remove unused curb cut
41	East Street	South	Four-Leg	213	0	307	No[2]	Pub. Rd.		None
120	East Street	North	Four-Leg	0	339	300	Yes[2]	Pub. Rd.		None
119	Private Driveway	North	Full	339	40	185	No[1]	Residential		Close, provide access via alley
42	Private Driveway	South	Full	40	83	185	Yes[1]	Commercial		Close, provide access via alley
118	Warren Street	North	T-Intersection	83	151	200	No[2]	Pub. Rd.		None
117	Private Driveway	North	Full	151	30	185	No[1+2]	Residential		Close, provide access via alley
43	Private Driveway	South	Full	30	30	185	No[2]	Residential		None
116	Private Driveway	North	Full	30	65	185	No[1]	Residential		Close, provide access via alley
115	Private Driveway	North	Full	65	11	185	No[1+2]	Residential		Close, provide access via alley
44	Private Driveway	South	Full	11	127	185	No[1+2]	Residential		Close, provide access via alley
45	Private Driveway	South	Full	127	12	185	No[1+2]	Residential		Close, provide access via alley
114	Barker Street	North	Offset Four-Leg	12	32	200	Yes[2]	Pub. Rd.		None
46	Barker Street	South	Offset Four-Leg	32	262	200	No[2]	Pub. Rd.		None
113	Private Driveway	North	Full	262	24	185	No[1+2]	Residential		Close, provide access via alley
47	Private Driveway	South	Full	24	116	185	No[2]	Residential		Close, provide access via alley
112	Elizabeth Street	North	Four-Leg	116	0	200	No[2]	Pub. Rd.		None
48	Elizabeth Street	South	Four-Leg	0	50	200	No[2]	Pub. Rd.		None
49	Private Driveway	South	Full	50	39	185	No[1+2]	Commercial		Close, provide access via side roads
50	Private Driveway	South	Full	39	39	185	No[1+2]	Commercial		Close, provide access via side roads
111	Private Driveway	North	Full	39	19	185	No[1+2]	Residential		None
110	Private Driveway	North	Full	19	14	185	No[1+2]	Residential		None
51	Private Driveway	South	Full	14	49	185	No[1+2]	Commercial		Close, provide access via side roads
109	Private Driveway	North	Full	49	0	185	No[1+2]	Residential		None
52	Private Driveway	South	Full	0	106	185	No[1+2]	Commercial		Close, provide access via side roads
108	Private Driveway	North	Full	106	25	185	No[2]	Residential		Align with public road in future
53	Camp Street	South	T-Intersection	25	175	200	No[2]	Pub. Rd.		None
54	Private Driveway	South	Full	175	89	185	No[1]	Residential		None
55	Private Driveway	South	Full	89	32	185	No[1+2]	Residential		None
56	Private Driveway	South	Full	32	37	185	No[1+2]	Residential		Close, provide access via side road

Table Notes: [1]Right Turn Overlap (same side of highway), [2]Intersection Functional Area, [3]Rural Spacing from WisDOT FDM

ID	Access Point	Side of WIS 33	Access type	Spacing to nearest AP to west (feet)	Spacing to nearest AP to east (feet)	Minimum spacing (feet)	Meets minimum standards	Use	Notes	Recommendation
107	Tuttle Street	North	Offset Four-Leg	37	55	200	Yes[2]	Pub. Rd.		None
57	Wheeler Street	South	Offset Four-Leg	55	97	200	No[2]	Pub. Rd.		None
58	Private Driveway	South	Full	97	228	185	No[1+2]	Residential		None
106	Private Driveway	North	Full	228	15	185	No[1]	Institution		Remove unused curb cut
59	Public Driveway	South	Full	15	64	185	Yes[1]	Public		Remove unused curb cut
105	Private Driveway	North	Full	64	34	185	No[1]	Commercial		None
60	Private Driveway	South	Full	34	50	185	No[1]	Commercial		Close, provide access via side road
61	Private Driveway	South	Full	50	72	185	No[1]	Commercial		Close, provide access via side road
104	Private Driveway	North	Full	72	43	185	No[1+2]	Commercial		Consolidate with cross access
103	Private Driveway	North	Full	43	23	185	No[1+2]	Commercial		Consolidate with cross access
62	Private Driveway	South	Full	23	63	185	No[1+2]	Commercial		Close, provide access via side road
63	Jefferson Street	South	Offset Four-Leg	63	46	200	No[2]	Pub. Rd.		None
102	Jefferson Street	North	Offset Four-Leg	46	131	200	Yes[2]	Pub. Rd.		None
64	Private Driveway	South	Full	131	71	185	No[1+2]	Commercial		Consolidate with cross access
65	Private Driveway	South	Full	71	38	185	No[1]	Commercial		Consolidate with cross access
101	Private Driveway	North	Full	38	110	185	No[1]	Commercial		Close, provide access via side road
66	Private Driveway	South	Full	110	19	185	No[1]	Residential		None
67	Private Driveway	South	Full	19	16	185	No[1]	Residential		None
500	Private Driveway	North	Full	16	44	185	No[1]	Commercial		Consolidate with cross access
68	Private Driveway	South	Full	44	5	185	No[1]	Residential		None
100	Private Driveway	North	Full	5	89	185	No[1]	Commercial		Consolidate with cross access
99	Private Driveway	North	Full	89	14	185	No[1]	Commercial		Consolidate with cross access
69	Private Driveway	South	Full	14	54	185	No[1]	Commercial		None
98	Private Driveway	North	Full	54	66	185	No[1]	Commercial		Consolidate with cross access
97	Private Driveway	North	Full	66	20	185	No[1]	Commercial		Consolidate with cross access
70	Private Driveway	South	Full	20	31	185	No[1+2]	Commercial		None
96	Private Driveway	North	Full	31	141	185	No[1+2]	Commercial		Consolidate with cross access
95	Washington Avenue	North	Four-Leg	141	0	200	No[2]	Pub. Rd.		None
71	Washington Avenue	South	Four-Leg	0	121	200	No[2]	Pub. Rd.		None
73	Private Driveway	South	Full	121	25	185	No[1+2]	Commercial		Close, provide access via side road
94	Private Driveway	North	Full	25	78	185	No[1+2]	Commercial		Close if redevelops

Table Notes: [1]Right Turn Overlap (same side of highway), [2]Intersection Functional Area, [3]Rural Spacing from WisDOT FDM

ID	Access Point	Side of WIS 33	Access type	Spacing to nearest AP to west (feet)	Spacing to nearest AP to east (feet)	Minimum spacing (feet)	Meets minimum standards	Use	Notes	Recommendation
74	Private Driveway	South	Full	78	32	185	No[1]	Commercial		Close, provide access via side road
93	Private Driveway	North	Full	32	57	185	No[1]	Commercial		Close if redevelops
75	Public Driveway	South	Full	57	6	185	No[1]	Public		Consolidate with cross access
92	Private Driveway	North	Full	6	111	185	No[1]	Commercial		Close if redevelops
91	Private Driveway	North	Full	111	20	185	No[1]	Commercial		Close if redevelops
76	Public Driveway	South	Full	20	127	185	No[1]	Public		Remove unused curb cut
90	Private Driveway	North	Full	127	115	185	No[1]	Commercial		Close if redevelops
89	Private Driveway	North	Full	115	187	185	Yes[1]	Commercial		Close, provide access via side road
88	Private Driveway	North	Full	187	110	185	No[1+2]	Commercial		Close, provide access via side road
77	Lincoln Avenue	South	Four-Leg	110	0	200	Yes[2]	Pub. Rd.		None
87	Lincoln Avenue	North	Four-Leg	0	128	200	No[2]	Pub. Rd.		None
86	Private Driveway	North	Full	128	165	185	No[1+2]	Commercial		Consolidate with cross access
85	Private Driveway	North	Full	165	60	185	No[1]	Commercial		Consolidate with cross access
78	Private Driveway	South	Full	60	21	185	Yes[1]	Commercial		Consolidate with cross access
84	Private Driveway	North	Full	21	56	185	No[1]	Commercial		Consolidate with cross access
79	Private Driveway	South	Full	56	83	185	No[1]	Commercial		Consolidate with cross access
80	Private Driveway	South	Full	83	7	185	No[1]	Commercial		Consolidate with cross access
83	Private Driveway	North	Full	7	147	185	No[1]	Commercial		Close, provide access via side road
82	County T	North	T-Intersection	147	37	2000	No[3]	Pub. Rd.		None
81	Private Driveway	South	Full	37	943	185	No[3]	Agriculture		Consolidate with cross access
178	Field Entrance	South	Full	943	602	500	Yes[3]	Agriculture		None
179	Private Driveway	South	Full	602	353	500	No[3]	Residential		None
180	Field Entrance	South	Full	353	392	500	No[3]	Agriculture		None
181	Private Driveway	South	Full	392	172	500	No[3]	Residential		Provide future local roads
182	Private Driveway	South	Full	172	145	500	No[3]	Residential		Provide future local roads
349	Field Entrance	North	Full	145	46	500	No[3]	Agriculture		Provide future local roads
183	Private Driveway	South	Full	46	125	500	No[3]	Residential		Provide future local roads
184	Private Driveway	South	Full	125	115	500	No[3]	Residential		Provide future local roads
185	Private Driveway	South	Full	115	160	500	No[3]	Residential		Provide future local roads
186	Private Driveway	South	Full	160	156	500	No[3]	Residential		Provide future local roads
187	Private Driveway	South	Full	156	17	500	No[3]	Residential		Provide future local roads
348	Private Driveway	North	Full	17	729	500	No[3]	Residential		Provide future local roads

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ID	Access Point	Side of WIS 33	Access type	Spacing to nearest AP to west (feet)	Spacing to nearest AP to east (feet)	Minimum spacing (feet)	Meets minimum standards	Use	Notes	Recommendation
347	Private Driveway	North	Full	729	142	500	No[3]	Residential		Provide future local roads
346	Private Driveway	North	Full	142	151	500	No[3]	Residential		Provide future local roads
188	Private Driveway	South	Full	151	129	1,000	No[3]	Agriculture	Commercial Farm Op.	Close driveway
345	Private Driveway	North	Full	129	16	1,000	No[3]	Agriculture	Commercial Farm Op.	Realign across highway
189	Private Driveway	South	Full	16	151	1,000	No[3]	Agriculture	Commercial Farm Op.	Realign across highway
344	Private Driveway	North	Full	151	403	1,000	No[3]	Agriculture	Commercial Farm Op.	None
190	Field Entrance	South	Full	403	744	500	No[3]	Agriculture		None
191	Private Driveway	South	Full	744	310	500	No[3]	Commercial	Residential Business	None
192	Private Driveway	South	Full	310	198	500	No[3]	Residential		None
193	Field Entrance	South	Full	198	35	500	No[3]	Agriculture		None
343	Rocky Point Road	North	T-Intersection	35	364	2,000	Yes[3]	Pub. Rd.	To closest road >2,000 feet	None
194	Private Driveway	South	Full	364	606	500	No[3]	Residential		None
195	Field Entrance	South	Full	606	450	500	No[3]	Agriculture		None
196	Private Driveway	South	Full	450	0	500	No[3]	Residential		None
342	Private Driveway	North	Full	0	588	500	No[3]	Agriculture		None
197	Field Entrance	South	Full	588	816	500	Yes[3]	Agriculture		None
341	Private Driveway	North	Full	816	406	500	No[3]	Agriculture		Close driveway
340	Private Driveway	North	Full	406	104	500	No[3]	Agriculture		None
198	Field Entrance	South	Full	104	294	500	No[3]	Agriculture		None
199	Private Driveway	South	Full	294	317	500	No[3]	Residential		None
200	Field Entrance	South	Full	317	696	500	No[3]	Agriculture		None
339	Private Driveway	North	Full	696	810	500	Yes[3]	Residential		None
201	Field Entrance	South	Full	810	180	500	No[3]	Agriculture		None
202	Private Driveway	South	Full	180	102	500	No[3]	Residential		None
203	Field Entrance	South	Full	102	20	500	No[3]	Agriculture		None
338	Private Driveway	North	Full	20	574	500	No[3]	Residential		None
204	Private Driveway	South	Full	574	15	500	No[3]	Commercial		None
337	Private Driveway	North	Full	15	224	500	No[3]	Residential		None
336	Johnson Road	North	T-Intersection	224	298	2,000	Yes[3]	Pub. Rd.	To closest road >2,000 feet	None
205	Private Driveway	South	Full	298	206	500	No[3]	Residential		None
206	Field Entrance	South	Full	206	117	500	No[3]	Agriculture		Close driveway
335	Private Driveway	North	Full	117	113	500	No[3]	Agriculture		Close, provide access via side road
207	Private Driveway	South	Full	113	533	500	No[3]	Residential		None
334	Private Driveway	North	Full	533	64	500	No[3]	Residential		None
208	Private Driveway	South	Full	64	272	500	No[3]	Residential		None

Table Notes: [1]Right Turn Overlap (same side of highway), [2]Intersection Functional Area, [3]Rural Spacing from WisDOT FDM

ID	Access Point	Side of WIS 33	Access type	Spacing to nearest AP to west (feet)	Spacing to nearest AP to east (feet)	Minimum spacing (feet)	Meets minimum standards	Use	Notes	Recommendation
333	Private Driveway	North	Full	272	390	500	No[3]	Residential		None
332	Private Driveway	North	Full	390	81	500	No[3]	Residential		None
209	Private Driveway	South	Full	81	155	500	No[3]	Residential		Realign across highway
331	Field Entrance	North	Full	155	1,132	500	No[3]	Agriculture		None
330	Private Driveway	North	Full	1,132	239	500	No[3]	Residential		None
329	Private Driveway	North	Full	239	201	500	No[3]	Residential		None
210	Public Driveway	South	Full	201	971	500	No[3]	Recreation	Recreation Lands	None
328	Field Entrance	North	Full	971	569	500	Yes[3]	Agriculture		None
211	Field Entrance	South	Full	569	26	500	No[3]	Agriculture		Close driveway
327	Field Entrance	North	Full	26	144	500	No[3]	Agriculture		None
212	Field Entrance	South	Full	144	96	500	No[3]	Agriculture		Close driveway
326	Private Driveway	North	Full	96	358	500	No[3]	Residential		None
213	Private Driveway	South	Full	358	167	500	No[3]	Residential		None
214	Field Entrance	South	Full	167	277	500	No[3]	Agriculture		None
324	Private Driveway	North	Full	277	75	500	No[3]	Residential		None
215	Field Entrance	South	Full	75	57	500	No[3]	Agriculture		None
323	Field Entrance	North	Full	57	195	500	No[3]	Agriculture		None
322	Field Entrance	North	Full	195	83	500	No[3]	Agriculture		None
216	Public Driveway	South	Full	83	28	1,000	No[3]	Recreation		None
321	Field Entrance	North	Full	28	183	500	No[3]	Agriculture		Close driveway
320	Field Entrance	North	Full	183	275	500	No[3]	Agriculture		None
217	Private Driveway	South	Full	275	266	500	No[3]	Residential		None
319	Field Entrance	North	Full	266	122	500	No[3]	Agriculture		None
318	Private Driveway	North	Full	122	24	500	No[3]	Residential		None
218	Private Driveway	South	Full	24	262	500	No[3]	Residential		None
317	Private Driveway	North	Full	262	619	500	No[3]	Residential		None
219	County X	South	T-Intersection	619	553	2,000	Yes[3]	Pub. Rd.	To closest road >2,000 feet	None
316	Private Driveway	North	Full	553	366	500	No[3]	Residential		None
220	Field Entrance	South	Full	366	346	500	No[3]	Agriculture		None
315	Field Entrance	North	Full	346	455	500	No[3]	Agriculture		None
314	Field Entrance	North	Full	455	0	500	No[3]	Agriculture		None
221	Field Entrance	South	Full	0	1,050	500	No[3]	Agriculture		None
313	Man Mound Road	North	T-Intersection	1,050	1,159	2,000	Yes[3]	Pub. Rd.	To closest road >2,000 feet	None
312	Public Driveway	North	Full	1,159	370	500	No[3]	Recreation		Close driveway
222	Field Entrance	South	Full	370	313	500	No[3]	Agriculture		Close driveway
223	Field Entrance	South	Full	313	145	500	No[3]	Agriculture		None

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ID	Access Point	Side of WIS 33	Access type	Spacing to nearest AP to west (feet)	Spacing to nearest AP to east (feet)	Minimum spacing (feet)	Meets minimum standards	Use	Notes	Recommendation
311	Field Entrance	North	Full	145	3,524	500	No[3]	Agriculture		None
224	Public Driveway	South	Full	3,524	203	500	No[3]	Marker		None
225	Public Driveway	South	Full	203	168	500	No[3]	Marker		None
226	Field Entrance	South	Full	168	0	500	No[3]	Agriculture		None
310	County U	North	T-Intersection	0	930	2,000	Yes[3]	Pub. Rd.	To closest road >2,000 feet	None
309	Private Driveway	North	Full	930	238	500	No[3]	Residential		None
227	Private Driveway	South	Full	238	1,700	500	No[3]	Residential		None
228	Field Entrance	South	Full	1,700	380	500	No[3]	Agriculture		None
229	Private Driveway	South	Full	380	163	500	No[3]	Residential		None
230	Private Driveway	South	Full	163	13	500	No[3]	Residential		None
308	Field Entrance	North	Full	13	184	500	No[3]	Agriculture		None
231	Private Driveway	South	Full	184	252	500	No[3]	Residential		None
307	Private Driveway	North	Full	252	1,040	500	No[3]	Residential		None
232	Private Driveway	South	Full	1,040	585	500	Yes[3]	Residential		None
233	Field Entrance	South	Full	585	12	500	No[3]	Agriculture		None
306	Field Entrance	North	Full	12	441	500	No[3]	Agriculture		None
305	Private Driveway	North	Full	441	515	500	No[3]	Residential		None
234	Private Driveway	South	Full	515	473	500	No[3]	Residential		None
235	Field Entrance	South	Full	473	0	500	No[3]	Agriculture		None
304	Field Entrance	North	Full	0	122	500	No[3]	Agriculture		None
303	Field Entrance	North	Full	122	276	500	No[3]	Agriculture		None
236	Private Driveway	South	Full	276	293	500	No[3]	Agriculture		None
237	Breezy Hill Road	South	T-Intersection	293	0	2,000	Yes[3]	Pub. Rd.	To closest road >2,000 feet	None
302	Field Entrance	North	Full	0	1,522	500	No[3]	Agriculture		None
238	Private Driveway	South	Full	1,522	283	500	No[3]	Residential		None
301	Field Entrance	North	Full	283	79	500	No[3]	Agriculture		None
239	Field Entrance	South	Full	79	1,488	500	No[3]	Agriculture		None
240	Private Driveway	South	Full	1,488	567	1,000	Yes[3]	Commercial	Active Quarry	Realign across highway
300	Private Driveway	North	Full	567	876	1,000	No[3]	Agriculture	Commercial Farm Op.	Realign across highway
299	Field Entrance	North	Full	876	16	500	No[3]	Agriculture		None
241	Private Driveway	South	Full	16	492	500	No[3]	Residential		None
242	Private Driveway	South	Full	492	146	1,000	No[3]	Commercial	Active Quarry	None
298	Field Entrance	North	Full	146	400	500	No[3]	Agriculture		None
297	Private Driveway	North	Full	400	199	500	No[3]	Residential		None
296	Private Driveway	North	Full	199	631	500	No[3]	Agriculture		Close driveway
295	Tritz Road	North	T-Intersection	631	624	2,000	Yes[3]	Pub. Rd.	To closest road >2,000 feet	None

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ID	Access Point	Side of WIS 33	Access type	Spacing to nearest AP to west (feet)	Spacing to nearest AP to east (feet)	Minimum spacing (feet)	Meets minimum standards	Use	Notes	Recommendation
243	Private Driveway	South	Full	624	266	500	No[3]	Residential		None
294	Private Driveway	North	Full	266	892	500	No[3]	Residential		None
293	Field Entrance	North	Full	892	172	500	No[3]	Agriculture		None
244	Private Driveway	South	Full	172	1,469	500	No[3]	Residential		None
292	Private Driveway	North	Full	1,469	325	1,000	No[3]	Commercial		None
245	Private Driveway	South	Full	325	679	500	No[3]	Agriculture		None
291	Private Driveway	North	Full	679	97	500	No[3]	Residential		None
246	Field Entrance	South	Full	97	1,490	500	No[3]	Agriculture		None
247	Private Driveway	South	Full	1,490	332	500	No[3]	Residential		None
290	Private Driveway	North	Full	332	21	1,000	No[3]	Commercial		Close, provide access via side road
248	Field Entrance	South	Full	21	126	500	No[3]	Agriculture		Close driveway
289	Main Street Road	North	T-Intersection	126	2,650	2,000	Yes[3]	Pub. Rd.	To closest road >2,000 feet	None
249	Field Entrance	South	Full	2,650	91	500	No[3]	Agriculture		None
288	Private Driveway	North	Full	91	792	500	No[3]	Residential		None
250	Pig Tail Alley Road	South	T-Intersection	792	86	2,000	No[3]	Pub. Rd.		None
287	Private Driveway	North	Full	86	630	500	No[3]	Residential		None
251	Private Driveway	South	Full	630	217	500	No[3]	Cemetery		Close, provide access via side road
252	County W	South	T-Intersection	217	813	2,000	No[3]	Pub. Rd.		None
286	Field Entrance	North	Full	813	287	500	No[3]	Agriculture		None
285	Private Driveway	North	Full	287	0	500	No[3]	Residential		None
253	Private Driveway	South	Full	0	1,068	500	No[3]	Residential		None
254	Cascade Mountain Road	South	T-Intersection	1,068	1,778	2,000	No[3]	Pub. Rd.		None
284	Private Driveway	North	Full	1,778	331	1,000	No[3]	Commercial	Cross Access to 283	Close with cross access
283	Tritz Road	North	Full	331	0	2,000	No[3]	Pub. Rd.		None
255	Public Driveway	South	Full	0	3,290	1,000	No[3]	Wayside	654 feet to I-90 Ramp	None
282	Private Driveway	North	Full	3,290	0	500	Yes[3]	Commercial	834 feet to I-90 Ramp	None
256	Private Driveway	South	Full	0	504	1,000	No[3]	Commercial		None
281	Public Driveway	North	Full	504	27	500	Yes[3]	Recreation	Excludes Field Entrance	None
280	Field Entrance	North	Full	27	1,091	500	No[3]	Agriculture	Field Entr. off of 281 apron	None
279	Field Entrance	North	Full	1,091	17	500	No[3]	Agriculture		None
257	Field Entrance	South	Full	17	402	500	No[3]	Agriculture		None
258	Field Entrance	South	Full	402	1,082	500	No[3]	Agriculture		None
259	Field Entrance	North	Full	1,082	12	500	No[3]	Agriculture		None
278	Field Entrance	South	Full	12	1,853	500	No[3]	Agriculture		None

Table Notes: [1]Right Turn Overlap (same side of highway), [2]Intersection Functional Area, [3]Rural Spacing from WisDOT FDM

ID	Access Point	Side of WIS 33	Access type	Spacing to nearest AP to west (feet)	Spacing to nearest AP to east (feet)	Minimum spacing (feet)	Meets minimum standards	Use	Notes	Recommendation
277	Field Entrance	North	Full	1,853	679	500	Yes[3]	Agriculture		None
260	Private Driveway	South	Full	679	1,318	500	Yes[3]	Residential		None
276	Public Driveway	North	Full	1,318	127	500	No[3]	Recreation		None
261	Field Entrance	South	Full	127	690	500	No[3]	Agriculture	690 feet to I-39 Ramp	None
262	County U	South	T-Intersection	532	159	2,000	No[3]	Pub. Rd.	532 feet to I-39 Ramp	None
275	Field Entrance	North	Full	159	451	500	No[3]	Agriculture		None
274	Public Driveway	North	Full	451	544	500	No[3]	Residential		None
263	Private Driveway	South	Full	544	44	500	No[3]	Residential		None
273	Private Driveway	North	Full	44	452	500	No[3]	Residential		None
264	Caledonia Street	South	T-Intersection	452	342	2,000	No[3]	Pub. Rd.		None
272	Private Driveway	North	Full	342	686	500	No[3]	Residential		None
271	Private Driveway	North	Full	686	568	500	No[3]	Residential		None
270	Private Driveway	North	Full	568	183	1,000	No[3]	Commercial		Close, provide access via side road
269	Fairfield Street	North	Four-Leg	183	0	2,000	No[3]	Pub. Rd.		None
265	Wood Street	South	Four-Leg	0	923	2,000	No[3]	Pub. Rd.		None
268	Field Entrance	North	Full	923	129	500	No[3]	Agricultural	Pole Barn Access	None
266	Public Driveway	South	Full	129	35	500	No[3]	Recreation		None
267	Private Driveway	North	Full	35	857	500	No[3]	Residential		None
351	W Edgewater Street	South	RI Only	857	51	200	Yes[2]	Pub. Rd.		None
499	W Edgewater Street	North	T-Intersection	51	269	200	Yes[2]	Pub. Rd.		None
498	Pierce Street	North	T-Intersection	269	80	200	No[2]	Pub. Rd.		None
497	Private Driveway	North	Full	80	96	185	No[2]	Residential		Close, provide access via alley
352	Private Driveway	South	Full	96	144	185	Yes[1]	Residential		Close, provide access via alley
353	Private Driveway	South	Full	144	206	185	No[1]	Residential		Remove unused curb cut
496	Armstrong Street	North	Four-Leg	206	0	200	No[2]	Pub. Rd.		None
354	Armstrong Street	South	Four-Leg	0	52	200	Yes[2]	Pub. Rd.		None
495	Private Driveway	North	Full	52	94	185	No[1+2]	Residential		Close, provide access via side road
494	Private Driveway	North	Full	94	16	185	No[1+2]	Residential		None
493	Private Driveway	North	Full	16	172	185	No[1+2]	Residential		Close driveway
492	Private Driveway	North	Full	172	60	185	No[1]	Residential		Close, provide access via alley
491	Private Driveway	North	Full	60	156	185	No[1+2]	Residential		Close, provide access via alley
490	Cass Street	North	Four-Leg	156	0	200	Yes[2]	Pub. Rd.		None
355	Cass Street	South	Four-Leg	0	67	200	Yes[2]	Pub. Rd.		None
356	Private Driveway	South	Full	67	101	185	No[1+2]	Residential		Close, provide access via alley

Table Notes: [1]Right Turn Overlap (same side of highway), [2]Intersection Functional Area, [3]Rural Spacing from WisDOT FDM

ID	Access Point	Side of WIS 33	Access type	Spacing to nearest AP to west (feet)	Spacing to nearest AP to east (feet)	Minimum spacing (feet)	Meets minimum standards	Use	Notes	Recommendation
357	Private Driveway	South	Full	101	122	185	No[1+2]	Residential		Close, provide access via alley
358	Private Driveway	South	Full	122	103	185	No[1]	Residential		Close, provide access via alley
359	Private Driveway	South	Full	103	156	185	No[1+2]	Residential		Close, provide access via alley
360	Dunn Street	South	Offset Four-Leg	156	8	200	No[2]	Pub. Rd.		None
489	Dunn Street	North	Offset Four-Leg	8	210	200	Yes[2]	Pub. Rd.		None
488	Private Driveway	North	Full	210	0	185	Yes[1]	Residential		Close, provide access via alley
361	Private Driveway	South	Full	0	345	185	Yes[1]	Residential		Close, provide access via alley
362	Macfarlane Road	South	Four-Leg	345	0	200	Yes[2]	Pub. Rd.		None
487	Macfarlane Road	North	Four-Leg	0	86	200	Yes[2]	Pub. Rd.		None
363	Private Driveway	South	Full	86	165	185	No[1+2]	Residential		Close, provide access via alley
364	Private Driveway	South	Full	165	32	185	No[1+2]	Residential		Close, provide access via alley
486	Private Driveway	North	Full	32	122	185	No[1+2]	Church		Close driveway
365	Lock Street	South	T-Intersection	122	39	200	No[2]	Pub. Rd.		None
485	Public Driveway	North	Full	39	54	185	No[1]	Parking		Consolidate driveways
484	Public Driveway	North	Full	54	54	185	No[1]	Parking		Consolidate driveways
483	Public Driveway	North	Full	54	177	185	No[1]	Parking		Consolidate driveways
482	Public Driveway	North	Full	177	61	185	Yes[1]	Pub. Rd.	Alleyway	None
366	Public Driveway	South	Full	61	257	185	No[2]	Parking		None
481	State Highway 16	North	Four-Leg	257	0	265	Yes[2]	Pub. Rd.		None
367	State Highway 16	South	Four-Leg	0	505	355	No[2]	Pub. Rd.		None
480	US Highway 51	North	Four-Leg	505	0	332	Yes[2]	Pub. Rd.		None
368	US Highway 51	South	Four-Leg	0	399	317	Yes[2]	Pub. Rd.		None
479	Main Street	North	T-Intersection	399	60	200	No[2]	Pub. Rd.	Offset 60 feet	None
369	Marachowsky Place	South	T-Intersection	60	76	200	Yes[2]	Pub. Rd.	Offset 60 feet	None
478	Private Driveway	North	Full	76	45	185	No[1+2]	Commercial		None
370	Public Driveway	South	Full	45	65	185	No[1+2]	Parking		None
477	Private Driveway	North	Full	65	72	185	No[1+2]	Commercial		None
476	Adams Street	North	Four-Leg	72	0	200	No[2]	Pub. Rd.		None
371	Adams Street	South	Four-Leg	0	83	200	No[2]	Pub. Rd.		None
475	Private Driveway	North	Full	83	0	185	No[1+2]	Commercial		None
372	Public Driveway	South	Full	0	59	185	No[1+2]	Residential		None
373	Public Driveway	South	Full	59	65	185	No[1]	Residential		None
474	Private Driveway	North	Full	65	53	185	No[1]	Residential		None
374	Public Driveway	South	Full	53	24	185	No[1]	Residential		Close, provide access via alley
375	Public Driveway	South	Full	24	43	185	No[1]	Residential		Close, provide access via alley
473	Private Driveway	North	Full	43	63	185	No[1]	Residential		None

Table Notes: [1]Right Turn Overlap (same side of highway), [2]Intersection Functional Area, [3]Rural Spacing from WisDOT FDM

ID	Access Point	Side of WIS 33	Access type	Spacing to nearest AP to west (feet)	Spacing to nearest AP to east (feet)	Minimum spacing (feet)	Meets minimum standards	Use	Notes	Recommendation
472	Private Driveway	North	Full	63	9	185	No[1]	Residential		None
376	Public Driveway	South	Full	9	50	185	No[1+2]	Residential		Close, provide access via alley
377	Public Driveway	South	Full	50	99	185	No[1+2]	Residential		Close, provide access via alley
378	Jefferson Street	South	Four-Leg	99	0	200	No[2]	Pub. Rd.		None
471	Jefferson Street	North	Four-Leg	0	150	200	Yes[2]	Pub. Rd.		None
379	Private Driveway	South	Full	150	24	185	No[1]	Residential		None
380	Private Driveway	South	Full	24	83	185	No[1]	Residential		None
381	Private Driveway	South	Full	83	16	185	No[1]	Residential		Close driveway
382	Private Driveway	South	Full	16	286	185	No[1]	Residential		None
470	Monroe Street	North	T-Intersection	286	158	200	No[2]	Pub. Rd.		None
469	Private Driveway	North	Full	158	5	185	No[2]	Residential		None
383	Private Driveway	South	Full	5	30	185	Yes[1]	Residential		None
384	Private Driveway	South	Full	30	81	185	No[1]	Residential		None
385	Private Driveway	South	Full	81	16	185	No[1]	Residential		None
386	Private Driveway	South	Full	16	54	185	No[1]	Residential		None
387	Private Driveway	South	Full	54	60	185	No[1]	Residential		None
388	Private Driveway	South	Full	60	141	185	No[1]	Residential		None
389	Hamilton Street	South	Four-Leg	141	0	200	No[2]	Pub. Rd.		None
468	Hamilton Street	North	Four-Leg	0	109	200	Yes[2]	Pub. Rd.		None
390	Private Driveway	South	Full	109	91	185	No[1+2]	Residential		None
391	Private Driveway	South	Full	91	15	185	No[1]	Residential		Close, provide access via alley
392	Private Driveway	South	Full	15	128	185	No[1]	Residential		Close, provide access via alley
467	Private Driveway	North	Full	128	102	185	No[1]	Residential		None
393	Private Driveway	South	Full	102	43	185	No[2]	Residential		Close, provide access via alley
466	Public Driveway	North	Full	43	57	185	No[1+2]	Parking		None
465	Jackson Street	North	Four-Leg	57	0	200	Yes[2]	Pub. Rd.		None
394	Jackson Street	South	Four-Leg	0	152	200	No[2]	Pub. Rd.		None
395	Private Driveway	South	Full	152	17	185	No[1]	Residential		None
396	Private Driveway	South	Full	17	252	185	No[1]	Residential		None
397	Private Driveway	South	Full	252	29	185	No[1]	Residential		None
398	Private Driveway	South	Full	29	61	185	No[1]	Residential		None
399	Private Driveway	South	Full	61	55	185	No[1]	Residential		None
400	East Cook Street	South	T-Intersection	55	260	200	No[2]	Pub. Rd.		None
464	Public Driveway	North	Full	260	30	185	Yes[1]	Alley Way		None
401	Private Driveway	South	Full	30	2,046	185	Yes[1]	Residential		None
402	Old Agency House Road	South	Four-Leg	2,046	18	2,000	No[3]	Pub. Rd.	Offset 18 feet	None

Table Notes: [1]Right Turn Overlap (same side of highway), [2]Intersection Functional Area, [3]Rural Spacing from WisDOT FDM

ID	Access Point	Side of WIS 33	Access type	Spacing to nearest AP to west (feet)	Spacing to nearest AP to east (feet)	Minimum spacing (feet)	Meets minimum standards	Use	Notes	Recommendation
463	East Albert Street	North	Four-Leg	18	400	2,000	No[3]	Pub. Rd.	Offset 18 feet	None
403	Superior Street	South	T-Intersection	400	504	2,000	No[3]	Pub. Rd.		None
462	Public Driveway	North	Full	504	467	500	No[3]	Recreation	Ice Age Trailhead	None
461	Private Driveway	North	Full	467	137	1,000	No[3]	Commercial		Consolidate, align with public road in future
404	Wauona Trail	South	T-Intersection	137	36	2,000	No[3]	Pub. Rd.		None
460	Private Driveway	North	Full	36	367	500	No[3]	Residential		Consolidate, align with public road in future
459	Field Entrance	North	Full	367	16	500	No[3]	Agriculture		None
405	Field Entrance	South	Full	16	146	500	No[3]	Agriculture		None
458	Field Entrance	South	Full	146	160	500	No[3]	Agriculture		None
457	Private Driveway	North	Full	160	13	500	No[3]	Residential		None
406	Private Driveway	North	Full	13	116	500	No[3]	Residential		None
407	Private Driveway	South	Full	116	92	500	No[3]	Residential		None
456	Private Driveway	North	Full	92	84	500	No[3]	Residential		None
408	Private Driveway	South	Full	84	139	500	No[3]	Residential		None
455	Wauona Trail	North	Full	139	249	2,000	No[3]	Pub. Rd.		None
409	Field Entrance	South	Full	249	385	500	No[3]	Agriculture		None
410	Private Driveway	South	Full	385	15	1,000	No[3]	Recreation	Historic Site	None
454	Public Driveway	North	Full	15	27	500	No[3]	Marker		None
453	Public Driveway	North	Full	27	337	500	No[3]	Marker		None
411	Private Driveway	South	Full	337	93	500	No[3]	Residential		None
452	County F	North	T-Intersection	93	217	2,000	No[3]	Pub. Rd.		Consolidate with County EE
451	Private Driveway	North	Full	217	168	1,000	No[3]	Commercial		Relocate to side road
450	Private Driveway	North	Full	168	127	1,000	No[3]	Commercial		Relocate to side road
449	Private Driveway	North	Full	127	123	1,000	No[3]	Commercial		Relocate to side road
448	County EE	North	Four-Leg	123	0	2,000	No[3]	Pub. Rd.		None
412	Pacific Estates Road	South	Four-Leg	0	201	2,000	No[3]	Pub. Rd.		None
447	Private Driveway	North	Full	201	118	500	No[3]	Residential		None
446	Private Driveway	North	Full	118	33	500	No[3]	Residential		None
445	Private Driveway	North	Full	33	198	500	No[3]	Residential		None
444	Private Driveway	North	Full	198	91	500	No[3]	Residential		None
443	Private Driveway	North	Full	91	99	500	No[3]	Residential		None
442	Private Driveway	North	Full	99	105	500	No[3]	Residential		None
441	Private Driveway	North	Full	105	31	500	No[3]	Residential		None
413	Private Driveway	South	Full	31	148	1,000	No[3]	Pr. School		None

Table Notes: [1]Right Turn Overlap (same side of highway), [2]Intersection Functional Area, [3]Rural Spacing from WisDOT FDM

ID	Access Point	Side of WIS 33	Access type	Spacing to nearest AP to west (feet)	Spacing to nearest AP to east (feet)	Minimum spacing (feet)	Meets minimum standards	Use	Notes	Recommendation
440	Private Driveway	North	Full	148	130	500	No[3]	Residential		None
439	Private Driveway	North	Full	130	51	500	No[3]	Residential		None
414	Private Driveway	South	Full	51	339	500	No[3]	Residential		None
415	Carimaunee Drive	South	Four-Leg	339	0	2,000	No[3]	Pub. Rd.		None
438	Carimaunee Drive	North	Four-Leg	0	206	2,000	No[3]	Pub. Rd.		None
416	Private Driveway	South	Full	206	225	500	No[3]	Residential		Relocate to future local road
417	Private Driveway	South	Full	225	87	500	No[3]	Residential		Relocate to future local road
418	Private Driveway	South	Full	87	362	500	No[3]	Residential		Relocate to future local road
419	Field Entrance	South	Full	362	212	500	No[3]	Residential		None
437	Foote Drive	North	Offset Four-Leg	212	30	2,000	No[3]	Pub. Rd.	Offset by 30 feet	None
420	Stonehaven Drive	South	Offset Four-Leg	30	363	2,000	No[3]	Pub. Rd.	Offset by 30 feet	None
436	Private Driveway	North	Full	363	75	500	No[3]	Residential		None
421	Private Driveway	South	Full	75	140	500	No[3]	Residential		None
435	Private Driveway	North	Full	140	208	1,000	No[3]	Commercial		None
422	Private Driveway	South	Full	208	230	500	No[3]	Residential		None
423	Private Driveway	South	Full	230	287	500	No[3]	Residential		None
434	Field Entrance	North	Full	287	27	500	Yes[3]	Agriculture		None
424	Private Driveway	South	Full	27	397	500	No[3]	Residential		Close driveway
425	Private Driveway	South	Full	397	1,019	1,000	No[3]	Church		None
426	Private Driveway	South	Full	1,019	234	500	Yes[3]	Residential		None
427	Private Driveway	South	Full	234	434	500	No[3]	Residential		None
428	Private Driveway	South	Full	434	347	500	No[3]	Residential		None
429	Private Driveway	South	Full	347	233	500	No[3]	Residential		None
433	Garrison Road	North	T-Intersection	233	206	2,000	Yes[3]	Pub. Rd.		None

Table Notes: [1]Right Turn Overlap (same side of highway), [2]Intersection Functional Area, [3]Rural Spacing from WisDOT FDM

9.3 Access Management Recommendations

An access management plan has been created in accordance with WisDOT guidelines to assist the Department and local communities to develop a long-term vision for the WIS 33 corridor. The plan is advisory only, and can act as a guide to local officials when considering the appropriate type, scale, and location of future development along the corridor. The WIS 33 corridor has been analyzed for access deficiencies that could impact the function of the highway and long-term recommendations have been created to preserve the corridor.

The access management plan is located in Exhibit 5 and compliments the improvement strategies discussed in Section 8.0. The recommendations implement a combination of access management strategies that have proven effective in improving safety and traffic operations. Some of the strategies may be implemented in the short-term, but many would be applied longer-term as land use or driveway changes occur in the future. The access management concepts that are recommended for the WIS 33 corridor include:

- Remove unused curb cuts.
- Remove duplicative access serving a single parcel where practical.
- Consolidate closely spaced driveways on multiple small parcels if/when redevelopment occurs.
- Relocate driveways from WIS 33 to a connecting road, alleyway, or local road system when possible.
- In the rural highway segments, review access spacing guidelines as part of the driveway permitting process when a new connection permit is requested.
- Recommend cross access between adjacent commercial parcels where activities are complimentary.
- Realign driveways located on opposites sides of the highway across from each other or across from a local road connection to create a single four-leg connection when possible.
- Remove driveways from upstream and downstream intersection functional areas.
- Use medians at offset intersections to restrict unsafe movements when safety warrants.
- Insure adequate spacing of public road connections based on their functional class.
- Recommend new local roads or road connections as part of future development to provide opportunities to relocate existing access away from WIS 33.

Access Plan Symbols

Access management recommendations are depicted graphically on Exhibit 5. On the exhibit, existing access points are identified as numbered circles. The color and/or shape of the access point indicate the type of land use or activity that was observed in the field. The definitions used in the access management plan are for planning purposes and may differ slightly from WisDOT State Trunk Highway (STH) connection classifications. These include:

- Agriculture – this driveway type serves an active farm or agricultural operation. Farm operations can vary greatly in size and may or may not include a residence. The driveway may

serve farm machinery, large trucks, staff vehicles, or residential vehicles if present. The number of vehicles the driveway serves in a typical day can vary widely by operation and season.

- Field Entrance – Field entrances are typically very low volume driveways providing access to crops fields. They may or may not have driveway aprons, or other formal design features. Activities at field entrances are typically concentrated around planting and harvesting cycles and can vary. Field entrances primarily serve farm machinery or heavy trucks.
- Commercial – these driveways serve a wide range of vehicles from automobiles to heavy trucks depending on the type of goods and services associated with the business. They typically have numerous vehicles entering and exiting throughout the day. Commercial driveways are a focus of access management because the higher volumes can be a source of greater conflicts with vehicles on the roadway. There are a wide range of best practices and design guidelines that apply to commercial driveways, focused on managing on-site circulation and the roadway interface.
- Public – These driveways serve institutional activities ranging from churches, government offices, parks, cemeteries, fairgrounds, and parking lots. There use and impacts can vary greatly depending on the activity they provide access to. There use may be similar to a commercial driveway or may less than those of a residential driveway.
- School – School driveways typically experience high volumes in the morning and afternoon during the school year or greater use during special events. These driveways can serve automobiles for staff and students, as well as buses transporting students. Because they are often associated with children, safety is a primary concern for school driveways.
- Side-road – This is a public road connection. WIS 33 does not currently have direct private road connections. Public road spacing is an important access management consideration directly related to traffic operations and safety. Side-road traffic volumes vary greatly and can range from less than 100 to several hundred vehicles per day depending on location. There are specific criteria and design standards that apply to public road connections to ensure adequate capacity and safety. The access management plan is focused on the location and spacing of these connections.
- Residential – Residential driveways along WIS 33 serve primarily a single family and typically have morning and evening peak periods on weekdays. They have a more varied use pattern on weekends. Their volume is often less than ten trips a day, making them less of a focus for access management than the higher volume access points.

Each access point on the exhibit is numbered. The numbers on the map sheets correspond to Table 44 in the access inventory section. If a driveway number has an *, it indicates that the driveway did not meet desirable spacing. In urban areas with small parcels that have developed over a long period of time, it is common to have many driveways that do not meet desirable spacing. Spacing is only one of many factors that are considered when applying access management principles.

Each map in the access exhibit contains a table that describes the access management techniques recommended. These recommendations are also included in Table 44 in an abbreviated form. Some access points are encircled by an orange oval. The ovals indicate that the driveways should be considered together in future access related decisions such as consolidation and cross access. These

locations typically have a note in the table with more details. Many access points (driveways) have a red "X" placed on them. This indicates that the location of the driveway is not ideal. In the majority of cases, a red "X" does not indicate that a driveway should be closed in the short-term. Refer to the map tables for clarification of the proposed recommendation.

Some of the access changes recommended require providing an alternative access location or connection to a future local road. Future roads were identified in concept only as red dashed lines. Further study would be needed to determine the feasibility of any new local road connections proposed in the plan.

Note that several access points are labeled as not meeting desirable spacing but lack any specific recommendation. This is especially true for the rural segment between the cities of Baraboo and Portage. In cases where reasonable options are not readily available, the State Trunk Highway (STH) connection permit process continues to be the appropriate mechanism to ensure any future access changes meet WisDOT criteria.

The *WIS 33 Corridor Study* considers a wide range of access management techniques to preserve WIS 33 for as long as possible. The study is only one of several access management tools WisDOT employs to ensure Wisconsin's highways are as safe as possible for the traveling public. For more information on access management, visit WisDOT's access management website pages at the following link: http://wisconsindot.gov/Pages/doing-bus/real-estate/access-mgmt/default.aspx

1	If / when redevelopment occurs arrange site to move driveway away from US 12 intersection
2	Reduce the number of driveways and align with driveways on the north side of WIS 33. If possible prepare a cross-access agreement
3	Only if parcels consolidate, reduce access and driveways and promote internal circulation, otherwise evaluate access as parcels develop
4	After new US 12 is completed, evaluate Mulberry St and Connie Rd for medians to limit left-turns if safety warrants
5	Relocate access to Cedar Street when possible
5A	Close and move to Connie Road

Legend

- Vision Obstructed
- Remove Access
- Does Not Meet Min Spacing
- Agricultural
- Field Entrance
- Commercial
- Public
- School
- Sideroad
- Residential

bing 0 50 100 Feet

Map 1
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 100'

TranSmart TECHNOLOGIES

Campus View Dr

Hill St

Berkley Blvd

W Maple St

Willow St

Koch St

Island Ct

33

Legend

- Vision Obstructed
- Remove Access
- Does Not Meet Min Spacing
- Agricultural
- Field Entrance
- Commercial
- Public
- School
- Sideroad
- Residential

6	Consolidate driveways and remove unused curb cuts. Relocate utility pole and consolidate to one central driveway
7	If parcels develop, promote access internally and from existing connection to Connie Rd
8	Promote cross-access agreements and reduce driveways if these lots redevelop to commercial
9	Close driveway 157 and promote use of driveway 158
10	If these parcels consolidate or redevelop promote one driveway located across from Hill St
11	Construct an internal circulating roadway with access from the new road

bing 0 50 100 Feet

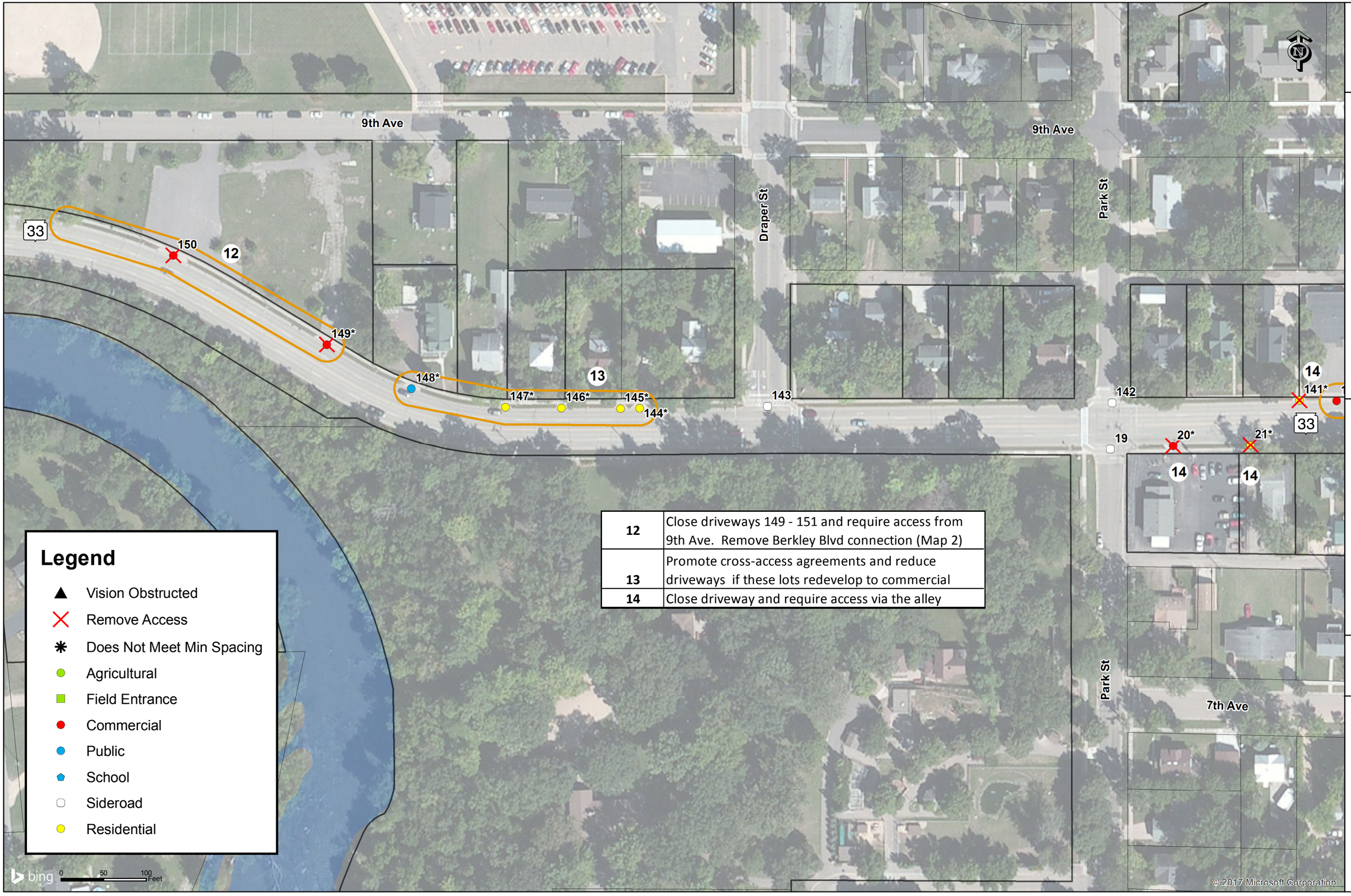
Map 2
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 100'

TranSmart TECHNOLOGIES



Map 3
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 100'

TranSmart TECHNOLOGIES

15	Offset road connections are not currently experiencing safety issues. Add a median to limit turns if / when necessary
16	Relocate access to the alley or side road when possible
17	Close driveway and require access via the alley
18	For small corner lots relocate driveway to the side road if the structure is razed and rebuilt
19	Close driveway and reconstruct garage for alley access

Legend

- Vision Obstructed
- Remove Access
- Does Not Meet Min Spacing
- Agricultural
- Field Entrance
- Commercial
- Public
- School
- Sideroad
- Residential

bing 0 50 100 Feet

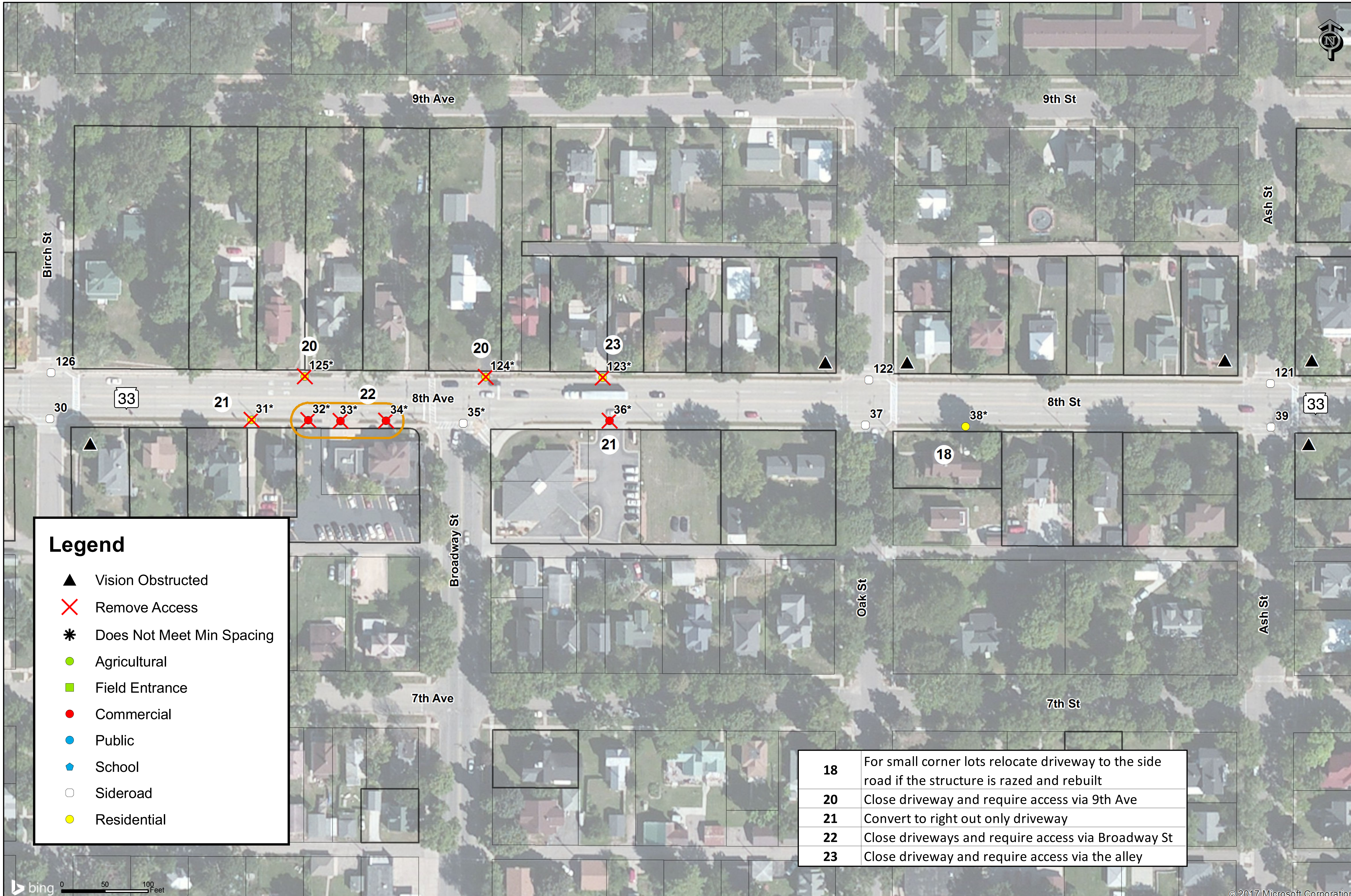
Map 4
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 100'

TranSmart TECHNOLOGIES



18	For small corner lots relocate driveway to the side road if the structure is razed and rebuilt
20	Close driveway and require access via 9th Ave
21	Convert to right out only driveway
22	Close driveways and require access via Broadway St
23	Close driveway and require access via the alley

Map 5
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale
1" = 100'

TranSmart TECHNOLOGIES

24	Remove unused curb cut
25	Close driveway and require access via the alley
26	Close driveway and construct a new garage for alley access

Legend

- Vision Obstructed
- Remove Access
- Does Not Meet Min Spacing
- Agricultural
- Field Entrance
- Commercial
- Public
- School
- Sideroad
- Residential

bing 0 50 100 Feet

Map 6
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 100'

TranSmart TECHNOLOGIES

Map 7
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale
1" = 100'

TranSmart TECHNOLOGIES

9th St
Elizabeth St
Tuttle St
8th St
7th St
Camp St
Wheeler St
Jefferson St

Legend

- Vision Obstructed
- Remove Access
- Does Not Meet Min Spacing
- Agricultural
- Field Entrance
- Commercial
- Public
- School
- Sideroad
- Residential

27	Close driveway and require access via the alley
28	Revise site to provide access from Camp St and Elizabeth St and close WIS 33 driveways
29	If land use changes realign driveway with Camp St
30	Offset road connections are not currently experiencing safety issues. Add a median to limit turns if / when necessary
31	Close driveway and require access via Wheeler St
32	Remove unused curb cut
33	Coordinate with Baraboo Development Plan (Tuttle St to the east side of Baraboo)
34	Promote cross access agreement and access via Jefferson St and 9th St

bing 0 50 100 Feet

9th St

Jefferson St

Washington Ave

7th St

102 101* 500* 100* 99* 98* 97* 96* 95* 94* 93* 92* 91* 90*

64* 65* 66* 67* 68* 69* 70* 71* 73* 74* 75* 76*

33 33

35 36 36 36 37 38 38 39

S

Legend

- Vision Obstructed
- Remove Access
- Does Not Meet Min Spacing
- Agricultural
- Field Entrance
- Commercial
- Public
- School
- Sideroad
- Residential

35	Same owner. If the vacant lot develops provide one shared driveway for both parcels at driveway 65
36	Promote cross-access agreements and consolidate driveways.
37	Close driveway and require access via Washington Ave
38	Coordinate with Baraboo Development Plan. Promote a 9th St extension with access via Washington Ave or Lincoln Ave
39	Coordinate with Baraboo Development Plan. If parcels consolidate promote access via Washington Ave and one WIS 33 driveway

0 50 100 Feet

Map 8
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 100'

TranSmart TECHNOLOGIES

40	Promote access via Lincoln Ave and 9th St
41	Coordinate with Baraboo Development Plan. Create four-lane intersection at Taft Ave and promote internal circulation
42	Consolidate driveways if redeveloped and promote cross-access agreements with access via Lincoln Ave, Taft Ave, or 9th St
43	Close driveway and require access via Taft Ave

9th St

Taft Ave

8th St

Lincoln Ave

33

40 40 42 43 41 41 44

89 88* 87* 86* 85* 84* 83* 82* 81* 80* 79* 78 77

S

Legend

- Vision Obstructed
- Remove Access
- Does Not Meet Min Spacing
- Agricultural
- Field Entrance
- Commercial
- Public
- School
- Sideroad
- Residential

bing 0 50 100 Feet

Map 9
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 100'

TranSmart TECHNOLOGIES

Taft Ave

Rocky Point Rd

33

82* 81* 178 179* 180* 349* 184* 348* 181* 182* 183* 185* 186* 187* 347* 346* 345* 344* 190* 191* 192* 343 193* 194* 195* 342* 196*

44 45 46 47

Legend

- Vision Obstructed
- Remove Access
- Does Not Meet Min Spacing
- Agricultural
- Field Entrance
- Commercial
- Public
- School
- Sideroad
- Residential

bing 0 250 500 Feet

44	Coordinate with Baraboo Development Plan. See comment 41 (Map 9)
45	If future development occurs, promote a local road system and relocate access
46	If future development occurs, promote a local road system and relocate access
47	Realign driveway 189 across from driveway 345 if warranted by safety or use change

Map 10
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 500'

TranSmart TECHNOLOGIES

Johnson Rd

33 197 341* 340* 339 338* 337* 336 335* 334* 333* 332* 331* 33

198* 199* 200* 201* 202* 203* 204* 205* 206* 207* 208* 209*

48 49

Legend

- Vision Obstructed
- Remove Access
- Does Not Meet Min Spacing
- Agricultural
- Field Entrance
- Commercial
- Public
- School
- Sideroad
- Residential

48	Close driveway and require access via Johnson Rd
49	Realign driveway 209 across from driveway 332 if warranted by safety or use change

bing 0 250 500 Feet

Map 11
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 500'

TranSmart TECHNOLOGIES

51	Remove driveway 212. Parcel has access via driveway 213

Map 12
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 500'

TranSmart TECHNOLOGIES

Man Mound Rd
Johnson Rd
33
X
51
313
312*
314*
221*
315*
220*
316*
219
317*
318*
319*
218*
217*
320*
321*
322*
216*
323*
324*
215*
214*
213*
212*
211*
326*
327*
328
330*
329*
210*

Legend

- Vision Obstructed
- Remove Access
- Does Not Meet Min Spacing
- Agricultural
- Field Entrance
- Commercial
- Public
- School
- Sideroad
- Residential

0 250 500 Feet

bing

Map 13
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 500'

TranSmart TECHNOLOGIES

Map 14
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale
1" = 500'

TranSmart TECHNOLOGIES

Main Street Rd

295
294*
243*
33
293*
244*
292*
245*
291*
246*
247*
290*
248*
289
33

Pig Tail Alley Rd

Legend

- Vision Obstructed
- Remove Access
- Does Not Meet Min Spacing
- Agricultural
- Field Entrance
- Commercial
- Public
- School
- Sideroad
- Residential

bing 0 250 500 Feet

Map 15
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 500'

TranSmart TECHNOLOGIES

Map 16
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale
1" = 500'

TranSmart TECHNOLOGIES

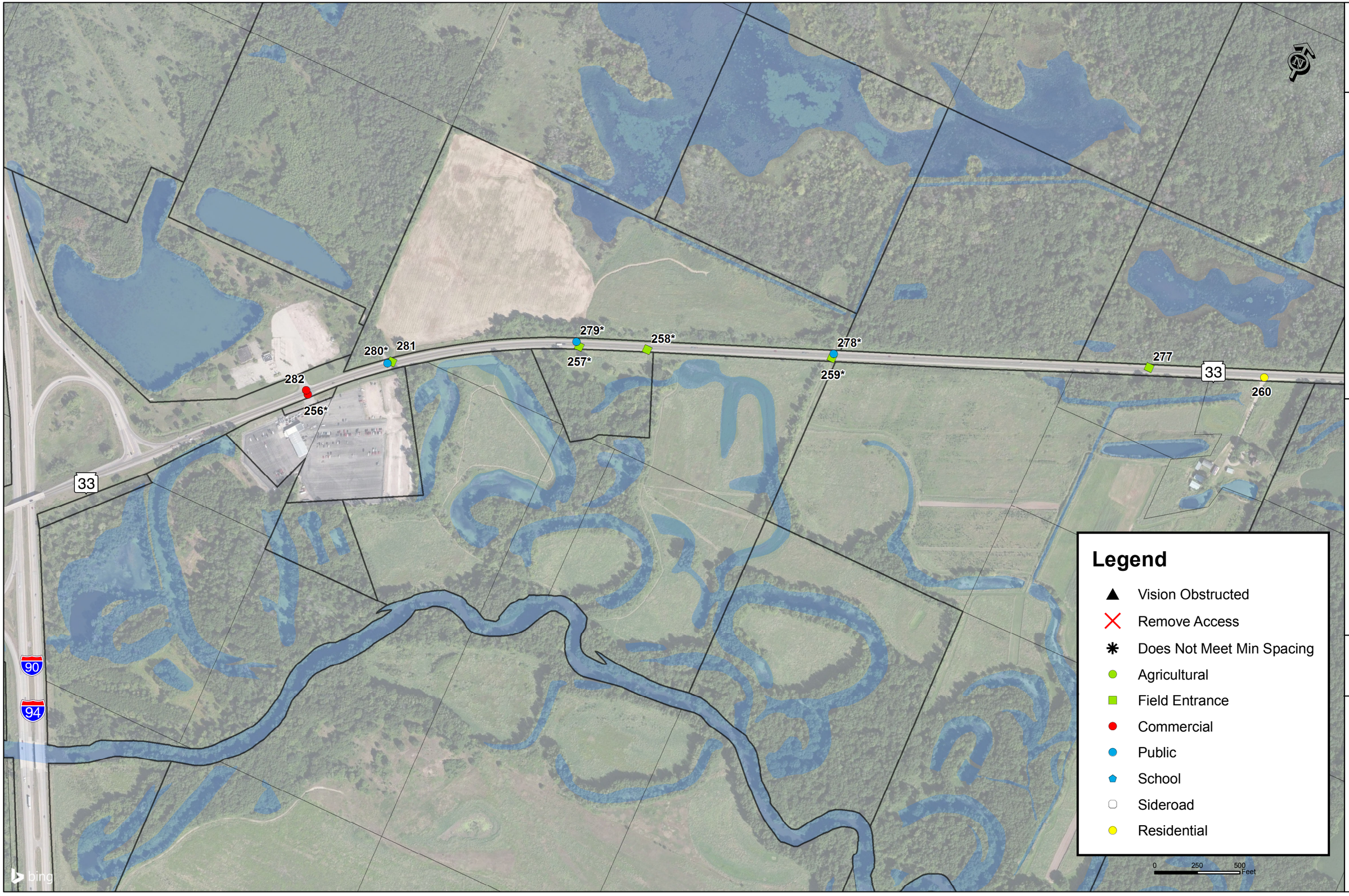
Tritz Rd
90
33
54
283*
284*
255*
Cascade Mountain Rd
254*
288*
249*
287*
250*
251*
252*
53
286*
285*
253*
Fox Glen Rd

Legend

- Vision Obstructed
- Remove Access
- Does Not Meet Min Spacing
- Agricultural
- Field Entrance
- Commercial
- Public
- School
- Sideroad
- Residential

53	Close cemetery driveway to WIS 33, has access via County W
54	If parcels are redeveloped promote internal circulation and access via Tritz Rd only

bing 0 250 500 Feet



Map 17
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 500'

TranSmart TECHNOLOGIES

55	Close driveway and require access via Fairfield St

Map 18
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 500'

TranSmart TECHNOLOGIES

56	Close driveway and require access via the alley
57	Remove unused curb cut
58	Close driveway and require access via Armstrong St

West Conant St

West Cook St

West Edgewater St

Pierce St

Armstrong St

Cass St

Wisconsin River

497* 498* 352 353* 496* 495* 494* 493* 354 492* 491* 490 355 356* 357*

499 351

33

Legend

- Vision Obstructed
- Remove Access
- Does Not Meet Min Spacing
- Agricultural
- Field Entrance
- Commercial
- Public
- School
- Sideroad
- Residential

0 50 100 Feet

bing

Map 19
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 100'

TranSmart TECHNOLOGIES

60	Promote access via the alley wherever possible
61	Evaluate parking lot layout and consolidate parking lot entrances to one if possible

West Conant St

West Wisconsin St

West Cook St

West Edgewater St

MacFarlane Rd

Dunn St

Lock St

33

60

61

358*

359*

360*

361

363*

364*

365*

482

483*

484*

485*

486*

487

488

489

Legend

- Vision Obstructed
- Remove Access
- Does Not Meet Min Spacing
- Agricultural
- Field Entrance
- Commercial
- Public
- School
- Sideroad
- Residential

0 50 100 Feet

bing

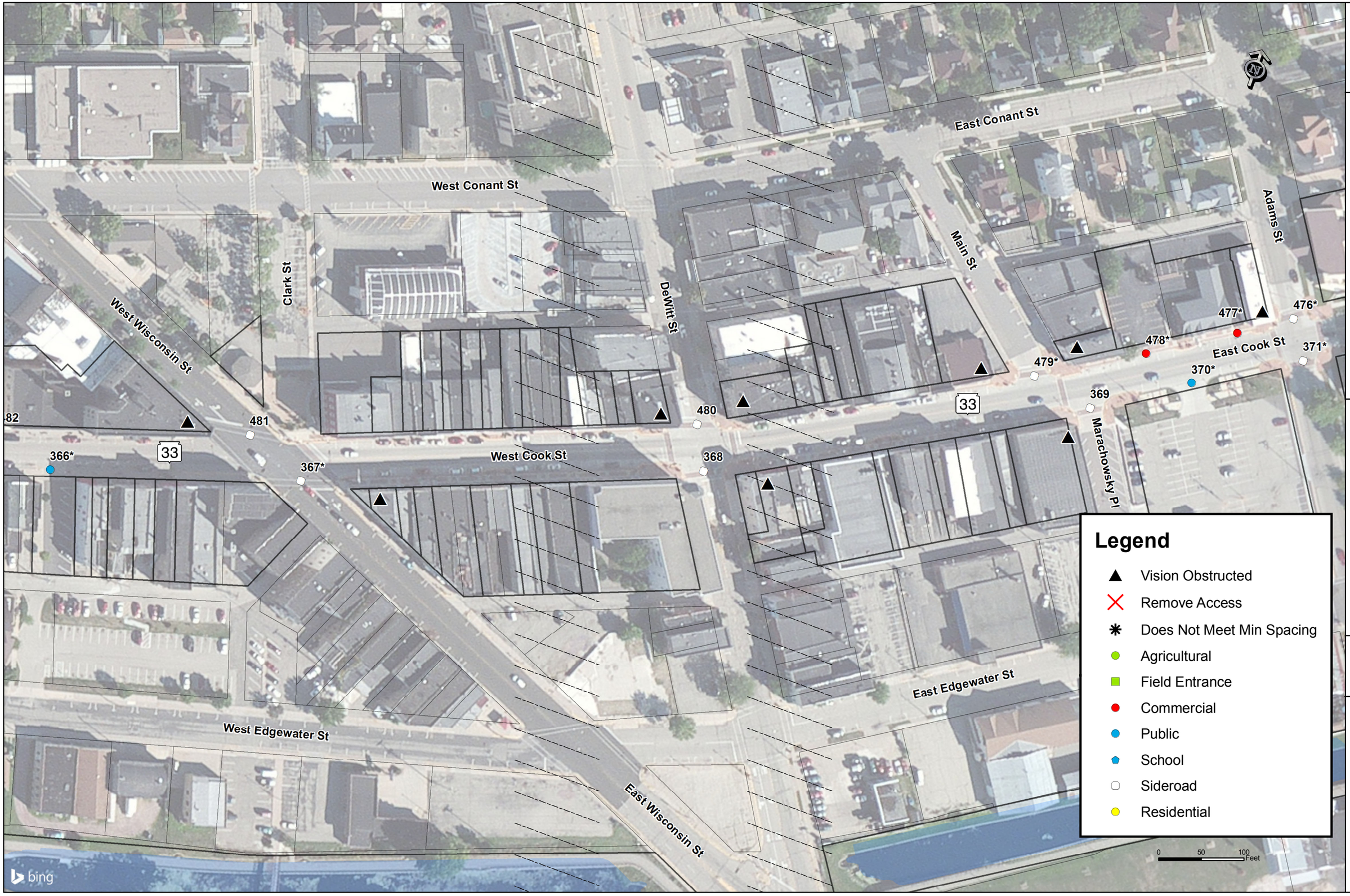
Map 20 Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 100'

TranSmart TECHNOLOGIES



Map 21
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 100'

TranSmart TECHNOLOGIES

62	Promote access via the alley wherever possible

East Conant St

East Cook St

East Edgewater St

Jefferson St

Monroe St

Monroe St

475* 474* 473* 472* 471 470*

372* 373* 374* 375* 376* 377* 378* 379* 380* 381* 382* 383 384* 385* 386* 387* 388* 469*

33 33

62 62 62

Legend

- Vision Obstructed
- Remove Access
- Does Not Meet Min Spacing
- Agricultural
- Field Entrance
- Commercial
- Public
- School
- Sideroad
- Residential

0 50 100 Feet

bing

Map 22 Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 100'

TranSmart TECHNOLOGIES

64	Close driveway and require access via the alley
65	Promote access via the alley wherever possible
66	Reconfigure parking lot if safety issues at WIS 33 driveway for access from the alley

East Conant St

Hamilton St

Jackson St

East Edgewater St

33

65

66

64

468

389*

390*

391*

392*

467*

466*

393*

465

394*

395*

396*

397*

398*

399*

400*

401

464

Legend

- Vision Obstructed
- Remove Access
- Does Not Meet Min Spacing
- Agricultural
- Field Entrance
- Commercial
- Public
- School
- Sideroad
- Residential

0 50 100 Feet

bing

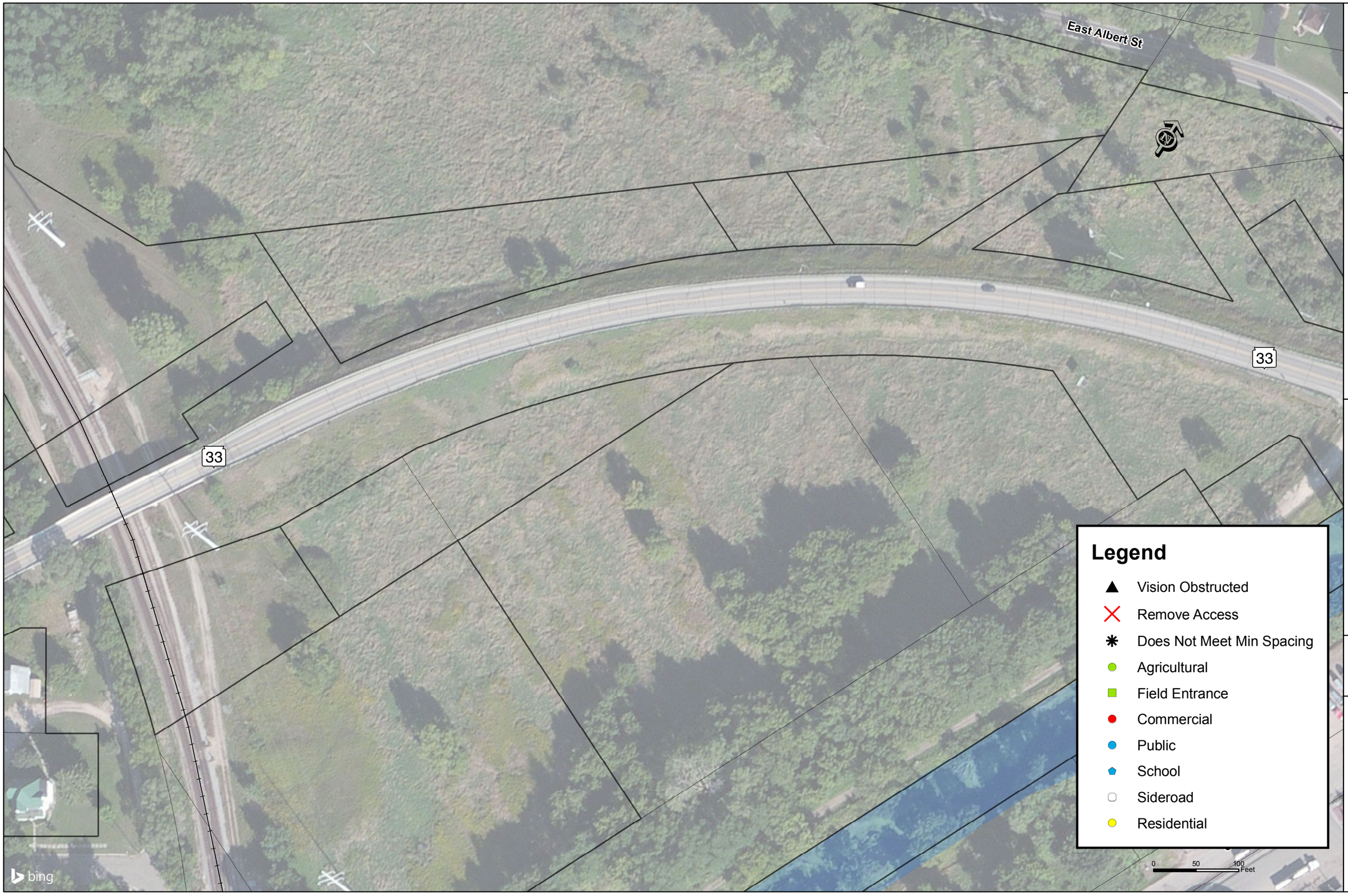
Map 23
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 100'

TranSmart TECHNOLOGIES



Map 24
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 100'

TranSmart TECHNOLOGIES

67	If redeveloped consolidate driveways and realign access across from Wauona Trail

Agency House Rd

East Albert St

Superior St

463*

402*

403*

462*

460*

461*

404*

67

33

33

Legend

- Vision Obstructed
- Remove Access
- Does Not Meet Min Spacing
- Agricultural
- Field Entrance
- Commercial
- Public
- School
- Sideroad
- Residential

0 50 100 Feet

bing

Map 25
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 100'

TranSmart TECHNOLOGIES

Map 26
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale
1" = 100'

TranSmart TECHNOLOGIES

68	Relocate access to the new alignment of County F with County EE
68A	Convert to private driveway for farm operation

68A

F

68

EE

33

453*

454*

410*

452*

411*

451*

450*

449*

448*

412*

447*

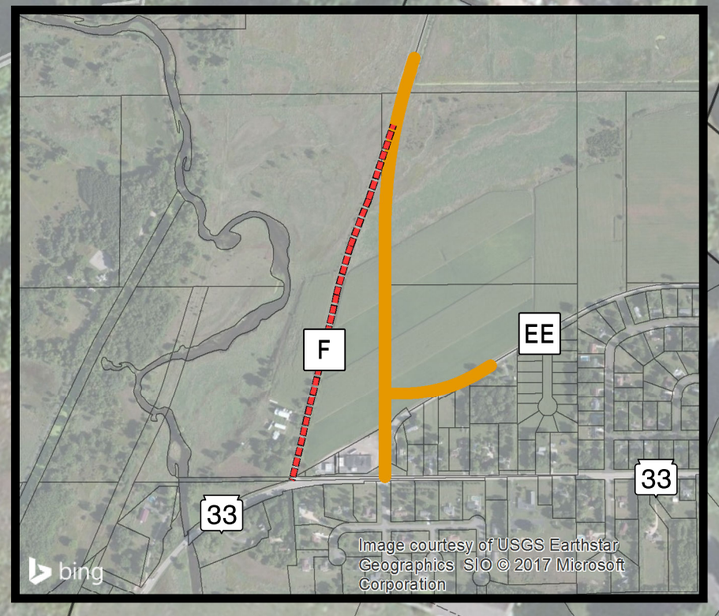
Pacific Estates Rd

Sandhill Crane Rd

Legend

- Vision Obstructed
- Remove Access
- Does Not Meet Min Spacing
- Agricultural
- Field Entrance
- Commercial
- Public
- School
- Sideroad
- Residential

bing 0 50 100 Feet



Map 27
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 100'

TranSmart TECHNOLOGIES

69	If this area develops, create a local road system to Stonehaven Dr or Carimaunee Dr and relocate WIS 33 driveways to the local system

Map 28
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 100'

TranSmart TECHNOLOGIES

69	If this area develops, create a local road system to Stonehaven Dr or Carimaunee Dr and relocate WIS 33 driveways to the local system

Cardinal Dr

Foote Dr

33

417*

418*

419*

437*

420*

436*

421*

435*

69

Stonehaven Dr

Rocky Rd

Legend

- Vision Obstructed
- Remove Access
- Does Not Meet Min Spacing
- Agricultural
- Field Entrance
- Commercial
- Public
- School
- Sideroad
- Residential

bing 0 50 100 Feet

Map 29
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale 1" = 100'

TranSmart TECHNOLOGIES

Map 30
Exhibit 5

Access Management Recommendations

WIS 33 Corridor Preservation Study

Scale
1" = 500'

TranSmart TECHNOLOGIES

Military Rd

Garrison Rd

Quarry Rd

33

422* 423* 434 424* 425* 426 427* 428* 429* 433 430* 431* 432*

Legend

- Vision Obstructed
- Remove Access
- Does Not Meet Min Spacing
- Agricultural
- Field Entrance
- Commercial
- Public
- School
- Sideroad
- Residential

bing

0 250 500 Feet

10.0 Other Strategies Considered

This section of the report documents additional strategies identified as a result of public comments, local official input, or issues that were identified that warranted additional study.

10.1 Spot Corridor Strategies

US 12/WIS 33 Intersection

The US 12/WIS 33 intersection was not evaluated in detail for this study as it is part of the US 12 bypass project currently under construction. The future bypass corridor will extend US 12 as a freeway between the already completed seven mile stretch to Ski Hi Road located south of the Baraboo area. Upon completion of the bypass, the existing US 12 corridor is slated to be jurisdictionally transferred to Sauk County as County BT. A future study is planned as part of the transfer. It will determine if portions of the median north of the US 12/WIS 33 intersection can be removed to improve access and if a roundabout at the US 12/WIS 33 intersection is reasonable. The study would also consider right-of-way impacts from construction of a roundabout.

The *WIS 33 Corridor Study* recommends including both Mulberry Street and Connie Road in the evaluation of a roundabout at US 12, both of which currently experience poor level of service for southbound left-turns onto WIS 33.

Address Encroachments and Vision Obstructions

Numerous locations along WIS 33 currently have encroachments or other obstructions that block the line of sight for motorists trying to enter WIS 33 from side roads. These locations are identified by black triangles on Exhibit 5 and include obstructions from business signs, landscaping vegetation, parked vehicles, buildings, and retaining walls. Ash Street was identified by local officials as an area of particular concern due to the building and retaining wall located in the northwest quadrant of the intersection. In fact, three of the four quadrants have obstructed views of WIS 33 from Ash Street. Future improvements should consider opportunities to change physical features to enhance the line of sight where it is obstructed.

Offset Intersections

Within the village of West Baraboo and the city of Baraboo, there are several locations where side roads connect to WIS 33 in an offset manner and in close proximity to one another. Offset intersections can provide safety challenges, where opposing left-turns overlap. Barker Street, Tuttle/Wheeler Streets, and Jefferson Street are three of these intersections. They were identified from stakeholders as locations where safety issues may be emerging. Barker Street could be monitored, and if left-turns onto WIS 33 become a safety hazard, a median treatment could be used to eliminate those movements.

Tuttle Street and Wheeler Street are located in close proximity to East Elementary School with school buses using Wheeler Street to enter WIS 33. Because of the geometry of this intersection, and lack of sidewalks along Tuttle Street, pedestrian crossings are encouraged further west at Camp Street. A median could be considered here to allow for a pedestrian refuge and limit the southbound left-turns. The area could also be explored for both pedestrian circulation and bus circulation to enhance the

connectivity between the neighborhoods located north of WIS 33 and East Elementary School located to the south.

This study recommends realigning the south leg of Jefferson Street as part of the Baraboo redevelopment plan or the road diet concept presented in this study. Realignment would correct the offset condition and provide a safer intersection for future development if/when it occurs.

Paved Shoulders

This study recommends providing wider paved shoulders along WIS 33 between the cities of Baraboo and Portage. The wider shoulders prolong the pavement life by reducing shoulder degradation due to snow plow operations. In addition, wider shoulders would allow for the relocation of the fog-line rumble strips outside of the white outside pavement markings where they are currently. This is in line with current standards for the installation of fog-line rumble strips which provides more space for vehicles to operate. Wide paved shoulders would also enhance bike/pedestrian facility and safety in the rural areas.

Transition and Gateway

Numerous comments were received related to vehicle speeds when entering the city of Portage from the west. The current posted speed on WIS 33 is 55 mph from I-39 up to Fairfield Street where it abruptly changes to 25 mph. Drivers typically enter the city well above the posted speed according to local comments.

This study recommends evaluating the current speed and further exploring opportunities to convert this segment of WIS 33 into an area where it is more obvious to drivers that they are entering an urban environment. A complete streets approach could include:

- Conversion to an urban cross section with curb and gutter between Fairfield Road and the Wisconsin River.
- A multi-use paved trail located on the south side of WIS 33 within the right-of-way that would complete a planned bike connection between County U and the city of Portage.
- Installation of a gateway feature at the Fairfield Road intersection which could include a roundabout
- Prominent signage for the public carry-in boat access to the Wisconsin River.
- Prominent signage and crossing markings for the Ice Age National Scenic Trail.

10.2 City of Portage One-Way Pairs

The concept of one-way pairs within the city of Portage has appeared with varying levels of interest over the past few decades. Currently, WIS 33 traffic forecasts do not show a need to address capacity expansion up to 2046. For this reason, this study does not recommend implementation of one-way-pairs in the near-term. However, because the issue had been raised recently, the study examined how one-way pairs could be implemented.

Within the downtown Portage area, numerous historic structures line the corridor, limiting the ability to add additional lanes of traffic to address future capacity needs. A potential solution would create one-

way pairs in the Historic Retail District. Advantages include accommodating additional traffic without impacting the sensitive historic fabric of the downtown area and improving the intersection capacity of the WIS 33/DeWitt Street (US 51) intersection. Challenges include accommodating semi-trucks at intersections that have inadequate turn radii.

One concept for a one-way pair scenario is shown in Figure 52. This concept could be implemented in stages over time and would require a new signal at the West Wisconsin Street (WIS 16)/West Conant Street intersection. Other intersections would be converted to stop controlled. Adjustments to the existing signals at WIS 16/WIS 33 and US 51/WIS 33 would also be required for the concept. Stages for implementation include:

1. Extend DeWitt Street one-way northbound to WIS 33. Currently US 51 is one-way northbound from Pleasant Street to its intersection with MacFarlane Street.
2. Convert West Conant Street to one-way westbound between DeWitt Street and WIS 16. Signalize the WIS 16/West Conant Street intersection. Convert WIS 16 to one-way southbound between West Conant Street and DeWitt Street. Convert DeWitt Street to one-way northbound for its remaining length. This would require minor modifications to the WIS 16/DeWitt Street intersection (yellow area in figure).
3. Complete the one-way pairs by extending West Conant Street one-way westbound to MacFarlane Road, MacFarlane Road as a one-way southbound between West Conant Street and WIS 33, and WIS 33 as a one-way eastbound between MacFarlane Road and DeWitt Street.

Figure 52 Portage one-way pair concept

10.3 Bike and Pedestrian Enhancements

The *WIS 33 Corridor Study* included a review of the existing bike and pedestrian accommodations located along and connecting to WIS 33 within the city of Baraboo and city of Portage. Two technical

memos were prepared identifying opportunities to enhance these features and are included in Appendix E. A summary of the findings of those memoranda are included below:

Village of West Baraboo and City of Baraboo

Within the village of West Baraboo and city of Baraboo pedestrians are generally well accommodated with adequate terraces between WIS 33 and sidewalks and appropriate vehicle speeds that allow for drivers to see and react to pedestrians. Some sidewalk gaps exist along connecting side roads and on some portions of WIS 33 within the village of West Baraboo. In addition, offset intersections pose challenges to safe pedestrian crossings of WIS 33 in some locations. Currently, WIS 33 does not have bicycle facilities within the village and city.

General opportunities to enhance bicycle and pedestrian use along WIS 33 include:

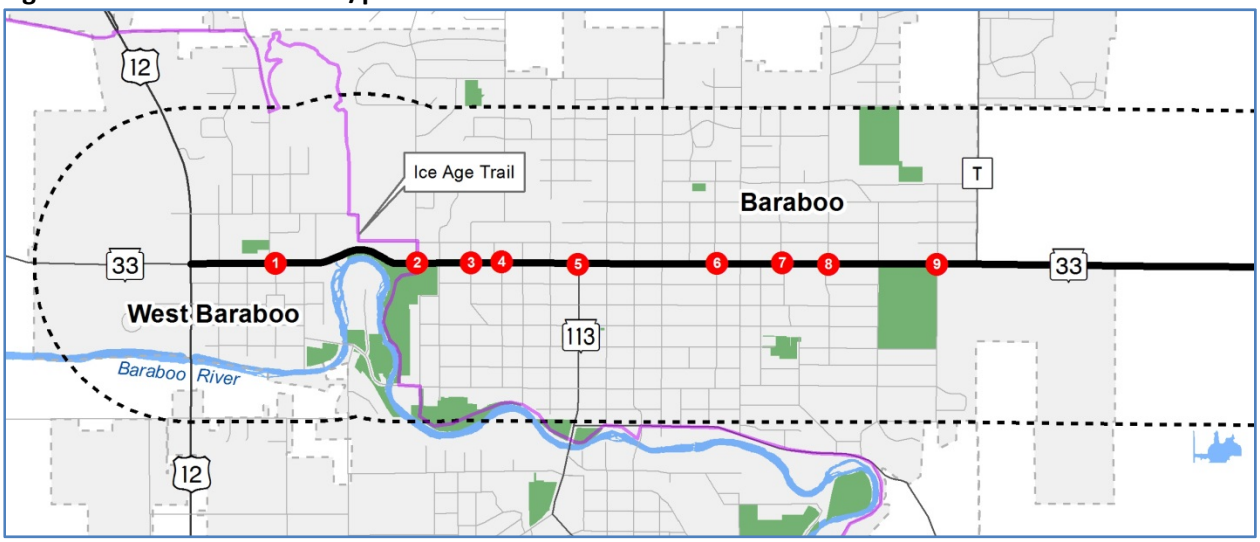
- As part of access management, where driveways are consolidated or reconstructed, ensure a consistent treatment and a level walking surface is provided.
- Prior to reconstruction of WIS 33, provide a local street bike route system to encourage cyclists to use a safer parallel alternative to WIS 33, such as 7th Street or 9th Street.
- Require adequate landscaped street and parking lot terraces between sidewalks and these features to ensure a consistent, well defined, and safe pedestrian surface is available.
- Provide a universal, curb cut and crosswalk design and markings that are consistent for motorists to alert them of the presence of pedestrians.

Specific locations for pedestrian and bicycle enhancements within the village and city include (see Figure 53):

1. Improve pedestrian accommodations at the offset Connie Road/Cedar Street intersection by reducing driveway width and hardscaping and adding a crosswalk east of Cedar Street.
2. Extend the sidewalk along WIS 33 through the Draper Street intersection and alert motorists traveling eastbound around the curve of the potential for pedestrians at Draper Street. Consider an automatic pedestrian phase for the signal. Provide additional sidewalk and crosswalk treatments to the intersection as part of future projects to promote pedestrian connectivity.
3. At Summit Street provide landscaped buffers between the sidewalk and parking lots as well as reduce driveway widths to better define the pedestrian zone.
4. The offset Wood Street/Center Street intersection is confusing to motorists and pedestrians and is an important school crossing of WIS 33. Treatments could include a median with pedestrian refuge opportunities to reduce confusion. Continue the use of pedestrian signs and beacons at this location to improve visibility of pedestrians.
5. The Broadway Street intersection is the gateway to the downtown area from WIS 33 and the addition of wayfinding signage for cyclists and pedestrians would help them navigate the intersection. Splitter island enhancements and a pedestrian signal phase would also improve the intersection.

6. The WIS 33/Barker Street intersection is an offset intersection with retaining walls which makes crossing a challenge for pedestrians at this location due to poor visibility. The intersection should be treated as one large intersection with crosswalks located on both sides. Consider modifying the retaining walls to improve visibility.
7. Wheeler Street/Tuttle Street is positioned in close proximity to the school, but is an offset intersection lacking sidewalks along Tuttle Street. Even though the location of the crossing is convenient, the intersection is not a safe crossing location and crossing is encouraged further to the west. Pedestrian treatments along Tuttle Street, improving the obstructed sightlines, and treating the offset intersection as one large intersection could improve the intersection.
8. Jefferson Street is an offset intersection with high pedestrian crossing activity due to the locations of commercial businesses and the school. Treatments could include flashing beacons and the installation of a median with pedestrian refuge. Long term, the intersection should be realigned as a four-leg intersection to reduce potential safety issues.
9. Between Lincoln Avenue and County T, WIS 33 becomes more rural. Sidewalks should be provided along Lincoln Street and east to County T as part of future commercial development. In addition, a transition for cyclists to rural WIS 33 should be considered. A gateway on the north side of WIS 33 would alert westbound motorists entering the city of the potential for pedestrians.

Figure 53 Baraboo area bike/pedestrian recommnedations



City of Portage

Within the city of Portage pedestrians are well accommodated through a continuous sidewalk along both sides of WIS 33. In addition, pedestrian curb extensions and pedestrian signals at busier downtown intersections improve the crossing conditions. Oblique intersections, presence of trucks with wide turning radii, and varying crosswalk treatments and markings are some of the corridor challenges. WIS 33 does not have bicycle facilities within the city of Portage. A well signed bike route exists on local streets, but there are some gaps. The presence of the Canadian Pacific Railroad on the east side of the

city limits opportunities for pedestrian and bike connectivity to the rural routes and trails to the east as there are only a few locations to cross.

General opportunities to enhance the corridor for pedestrians and cyclists include:

- Future changes to driveways should ensure a consistent and level pedestrian surface and tight radii to minimize high-speed vehicle turns.
- Provide a universal, curb cut and crosswalk design that is consistent to alert motorists of the presence of pedestrians.
- Consider completing the existing bike route systems and closing any remaining gaps. Supplement the system by providing bicycle accommodations parallel to WIS 33 on local streets in the short-term. In the long-term, determine if it is feasible to mark bike lanes along WIS 33.
- Ensure shoulders and bridges are sufficiently wide to accommodate pedestrians and cyclists east of the city of Portage.
- Explore a paved trail connection between the city of Portage and the Historic Fort Winnebago sites as well as signed bicycle routes along County F and County EE.

Specific locations for pedestrian and bicycle enhancements within the city include (see Figure 54):

1. The WIS 33/Pierce Street intersection is a wide intersection located on a curve with a park located on the west side. The intersection experiences pedestrian and bicycle traffic due to other amenities in the vicinity of the intersection such as a signed bike route. The intersection should include signage to alert motorists that pedestrians may be present. Sidewalks should be extended to the park entrance and striping could be used to slow motorists. In the long-term reconstruction and local road connection changes could further enhance the intersection for pedestrians and cyclists.
2. The WIS 16/WIS 33 intersection is constructed at an oblique angle resulting in increased crossing distances and poor visibility for pedestrians. A leading pedestrian interval, elimination of right-turn on red, and relocation of stop bar could improve visibility for pedestrians. This intersection has geometric challenges with inadequate lane widths for turning vehicles. Modifications to the intersection should consider benefits to pedestrians.
3. The DeWitt Street intersection was a concern from public comments noting difficulty in crossing. The intersection has well defined crosswalks and curbs extensions. The addition of a leading pedestrian interval would allow pedestrians to enter the intersection ahead of vehicles which would improve visibility and reduce crashes involving turning vehicles.
4. The Wayside and Surgeons Quarters Historic Site are assets for the city of Portage and the crossing could benefit from enhancements to facilitate crossing between the two locations. Potential options include a raised crossing table to slow motorists, flashing beacons and high visibility markings to alert motorists of the potential for pedestrians, or installation of a median.

Figure 54 City of Portage bike/pedestrian recommendations