

APPENDIX E
INDIRECT AND CUMULATIVE EFFECTS

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Indirect and Cumulative Effects Analysis

WIS 23 Supplemental EIS

Prepared by Vandewalle & Associates February 24, 2014
Revised by Strand Associates Inc. May 2018

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1.0 INTRODUCTION

A. Definition

The Council on Environmental Quality (CEQ) states that “indirect” effects are “caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. Indirect effects may include growth-inducing effects or other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems,” (CFR 1508.8). Cumulative effects are defined as “impact[s] on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time

B. Methodology

The methodology used in this report is based on the Wisconsin Department of Transportation’s Guidance for *Conducting an Indirect Effects Analysis (November 2014)* and *Guidance for Conducting a Cumulative Effects Analysis (November 2007)*. The guidance for indirect effects was based on a variety of resources and references including *NCHRP Report 466, 2002* and *Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process, FHWA, January 2003*. The cumulative effects guidance was based on the CEQ “Eleven Step” process that is described in *Considering Cumulative Effects Under the National Environmental Policy Act (NEPA), Council on Environmental Quality, January 1997*.

The study team collected data regarding natural, cultural and historic resources, key demographic and development trends, and local comprehensive plans and development regulations in the Indirect and Cumulative Effects (ICE) study area through compiling the ICE Study Background Report. To obtain local knowledge, the study team engaged the participation of two expert panels comprised of planning, development and conservation officials active in the ICE study area. Two separate panels were conducted, one in 2012 and another in 2017. The expert panel members were asked to complete a questionnaire about potential indirect and cumulative effects of the WIS 23 No-Build and Build Alternatives, including mapping the locations of identified impacts. Following the compilation of questionnaire and mapping results, the study team held two 3-hour workshops with expert panel members to discuss and confirm potential indirect and cumulative effects.

In addition to compiling the ICE Study Background Report and reviewing the results of the Expert Panel Questionnaire and Workshop, the ICE study team also drew on professional planning, zoning and development expertise. The initial report team included Michael Slavney, FAICP, with 30 years of professional experience for over 30 local governments and Tom Lynch, PE and PTP, with 30 years of professional transportation planning experience. The 2018 ICE study update was prepared by Tom Lynch.

Indirect Effects Methodology

The project team followed the six-step analysis method described in WisDOT’s Guidance for Conducting an Indirect Effects Analysis. The indirect effects analysis in this document is organized around these steps.

1. Scope, Select Tools/Activities, and Determine the Study Area
2. Inventory the Study Area for Notable Features
3. Identify Impact Causing Activities of the Proposed Project Alternatives
4. Identify the Potentially Significant Indirect Effects
5. Analyze Indirect Effects, describe their Significance for Project Alternatives, and Evaluate Assumptions
6. Assess Consequences and Identify Mitigation Strategies.

The following paragraphs summarize the findings of these six steps

1. Scope, Select Tools/Activities, and Determine Study Area

a. Scope

To understand the scope of probable indirect impacts of highway expansion and corridor preservation measures, the project team compiled all available land use plans, zoning ordinances, and zoning maps for each municipality within the ICE study area (the study area boundaries are depicted on Figure 1.0-1). Based upon an analysis of these documents, the project team identified the areas where impacts are likely to occur. The following criteria were used to identify such locations:

- Existing land use and development patterns.
- Population projections.
- Areas planned for development through local land use plans.
- Currently established land use controls.
- Locations of future WIS 23 interchanges and other access changes.
- Locations of significant natural resource features.

b. Select the tools/activities and determine the study area.

In selecting tools, the study team referenced Appendix B in WisDOT's Guidance for Conducting an Indirect Effects Analysis. As mentioned, of the various methods referred to in this document, trend analysis, expert panels, and the Delphi method¹ were most appropriate because these methods leveraged the use of existing information and knowledge.

This analysis builds on and supplements the indirect effects analysis performed for the 2014 LS SFEIS. Both efforts enlisted the input of an expert panel. The expert panel members were selected based on their professional areas of expertise and their local knowledge of the project study area. The panel members included local and regional land use and transportation planners, other local officials, economic development professionals, and agricultural, natural, and cultural resource experts.

An inventory report was provided to panel members to provide an overview of the project and proposed alternatives as well as existing conditions and policies of state and local government. Panel members were asked to review the inventory report, respond to an online survey, and complete a mapping exercise identifying potential indirect and cumulative effects for each of the WIS 23 alternatives. Once these exercises were completed, the panel members participated in a facilitated workshop to review and discuss resources, land use controls, impact causing activities, potential indirect effects, and the potential significance of the indirect effect. The study team then took this information and used it in its analysis of potential indirect effects caused by the corridor alternatives.

The following timeline summarizes the indirect effects analysis process for the 2014 LS SFEIS and this LS SEIS.

December 2011	Expert Panel reviews inventory report and completes survey and mapping exercise.
January 2012	Indirect effects workshop reviews resources, impact causing activities, and potential indirect effects.
Spring 2012	Draft indirect effects report submitted.
July 2013	Indirect effects analysis incorporated in LS SDEIS.
March 2014	Indirect effects analysis incorporated in LS SFEIS.
September 2017	New Expert Panel completes new and updated survey and mapping exercise.

¹ ibid

October 2017 Indirect effects workshop reviews resources, re-evaluates impact causing activities, and re-evaluates potential indirect effects.

Spring 2018 Indirect effects analysis incorporated in Draft LS SEIS.

The initial expert panel activities associated with the 2014 LS SFEIS only reviewed the No-Build Alternative and the Preferred Alternative at that time, the 4-lane On-alignment Alternative. The expert panel activities associated with this LS SEIS evaluated the No-Build Alternative, the Passing Lane Alternative, and the 4-lane On-alignment Alternative. Questions were also presented to the panel regarding improvements associated with the Corridor Preservation. The Hybrid Alternative was not specifically discussed because the study team felt that indirect effects of the Hybrid Alternative could be reasonably inferred from the responses to the Passing Lane and 4-lane On-alignment Alternatives. The No-Build Alternative, Passing Lane Alternative, and 4-lane On-alignment Alternative represents a full spectrum of highway alternatives that can be reasonably implemented and that address the project Purpose and Need.

c. Determine Study Area

The study team interacted with staff planners and resource experts from Fond du Lac County, Sheboygan County, and East Central Wisconsin Planning Commission to determine the likely range of influence of the WIS 23 corridor. These land use and resource experts had the opportunity to comment on the study area boundaries in the Expert Panel Survey and on accompanying maps depicting the boundary. Additionally, expert panelists had the opportunity to discuss study area boundaries with the study team in the first Expert Panel workshop held January 2012 where it was confirmed that the study area boundary was appropriate. The same study area boundaries were used with the 2017 indirect effects analysis.

The indirect effects study area is depicted on Figure 1.0-1 and extends roughly 3.5 miles north of the corridor and roughly 4.5 miles south of the corridor. The ICE study area is defined by commutershed and civil boundaries. It includes all or part of the following jurisdictions: city of Fond du Lac, village of Mt. Calvary, village of St. Cloud, town of Empire, town of Forest, town of Taycheedah, and town of Marshfield in Fond du Lac County and the city of Plymouth, village of Glenbeulah, town of Greenbush, and town of Plymouth in Sheboygan County.

Beyond the study area, the influence of WIS 23 diminishes as other arterial corridors provide access. Delineation of the Indirect Effects Study area boundary was influenced by the location of other available parallel corridors that provide logical alternate routes for WIS 23. On the south side of WIS 23, the presence of US 45, which runs to the southeast from the western end of the WIS 23 corridor, and WIS 67, which runs east and west at the eastern end of the WIS 23 corridor, and County B, which connects US 45 and WIS 67 just south of town boundaries, are the next southerly route options. There are also a series of east/west county highways that provide additional parallel route options. Proximity of these routes and town boundaries contributed to the determination of the southerly study area boundary.

On the north side of WIS 23, the presence of WIS 149 running east in the town of Taycheedah provides an appropriate alternate route and a logical northern boundary at the west end of the study area. At the point where WIS 149 heads to the northeast in the town of Marshfield, town boundaries connected by County A provide a logical continuation of the study area boundary to the east.

In addition to these alternate parallel routes, the selection of the study area was also influenced by the location of municipal boundaries. The census collects socioeconomic and housing data by census blocks and tracts, which commonly follow municipal boundaries. Therefore, municipal boundaries were also used to delineate the WIS 23 study area for the ease of analysis of the socioeconomic impacts of the project alternatives.



Figure 1.0-1 Indirect Effects Study Area

2. Inventory the study area and notable features.

See Section 2 of this Report, Inventory of the Study Area.

3. Identify the impact causing activities of the proposed project alternatives.

The expert panel discussed impact-causing activities of the three alternatives under discussion, the No-Build, Passing Lane, and 4-lane On-alignment. These represent a broad spectrum of alternatives and aided effective discussion on the differences between the alternatives. The study team then assembled the responses from these alternatives to understand potential indirect effects for the Hybrid Alternative, which is a combination of the 4-lane On-alignment Alternative (County UU to County G) and Passing Lane Alternative (County G to County P).

The following paragraphs describe impact-causing activities identified by the study team and the expert panel.

a) No-Build Alternative

- Access to and across WIS 23 difficult from side roads.
- Continued aggressive passing maneuvers from pent up passing demand; particularly affects agricultural equipment traveling on WIS 23.
- Continued avoidance of WIS 23 in favor of local roads that are perceived as less congested and or safer.

b) Passing Lane Alternative

- Access to and across WIS 23 easier at County K. Depending on the suboption selected, intersections could have refuge to ease side road turning maneuvers.
- Access modified/restricted on 4 of the 42 intersections.
- Some passing demand addressed through passing lanes.
- Provision of the Old Plank Road Trail extension.
- Compared to the No-Build Alternative, projected 2040 WIS 23 traffic volumes on the west end of the corridor are 3 to 7 percent lower. From County UU to County P the projected volumes are 2 to 3 percent greater.
- Direct impacts of 79 acres of right of way acquisition (most of which has been purchased).
- 18 residential, business, and farm relocations, all of which have already occurred.

c) Hybrid Alternative (inferred from panel responses)

- Access to and across WIS 23 easier at County K, County UU, and County G jughandles/interchanges. Intersections west of County G have median refuge to ease side road turning maneuvers. Intersections east of County G could have median refuges depending on the suboption selected.
- Access modified by installing RCUTs at Tower Road, 7 Hills Road, and County W.
- Most passing demand satisfied by 4-lane expansion and additional passing lanes.
- Provision of the Old Plank Road Trail extension.
- Projected 2040 WIS 23 traffic volumes are 9 to 37 percent greater than the No-Build Alternative.
- Direct impacts of 321 acres of right of way acquisition (some of which has been purchased).
- 45 residential, business, and farm relocations, of which 43 have already occurred.

- d) 4-lane On-alignment Alternative
 - Access to and across WIS 23 easier at County K, County UU, and County G jughandles/interchanges. Intersections throughout have median refuge to ease side road turning maneuvers.
 - Access modified to improve safety by installing RCUTs at Tower Road, 7 Hills Road, County W, County U, County T, Sugarbush Road, County A, and County S.
 - All passing demand satisfied by 4-lane expansion.
 - Provision of the Old Plank Road Trail extension.
 - Projected 2040 WIS 23 traffic volumes are 21 to 48 percent greater than the No-Build Alternative.
 - Direct impacts of 410 acres of right of way acquisition (some of which has been purchased.)
 - 52 residential, business, and farm relocations, of which 50 have already occurred.
- e) Improvements Associated with Corridor Preservation Measures
 - Corridor Preservation would not result in impact-causing activities besides potentially limiting property owner’s rights to make improvements within the corridor preservation limits. When future transportation options are needed, a range of alternatives will be evaluated at that time within the NEPA process. If corridor preservation improvements are implemented, potential impact-causing activities might include:
 - Access to and across WIS 23 easier at the County W and County A interchanges.
 - Access to WIS 23 would be removed at the grade separations (overpasses) at Tower Road, 7 Hills Road, Scenic View Drive, Sugarbush Road.
 - Access to WIS 23 would be removed through cul-de-sacs at Poplar Road, Hinn Road, and Plank Road.

The improved travel times, mobility, and safety would also increase daily travel volumes in the corridor. Figure 1.0-2 illustrates the difference in 2040 traffic volumes the corridor would experience between the No-Build, Passing Lane, Hybrid, and 4-lane On-alignment Alternatives. The build alternatives, particularly those that add lanes, attract more traffic to the WIS 23 corridor from other local routes.

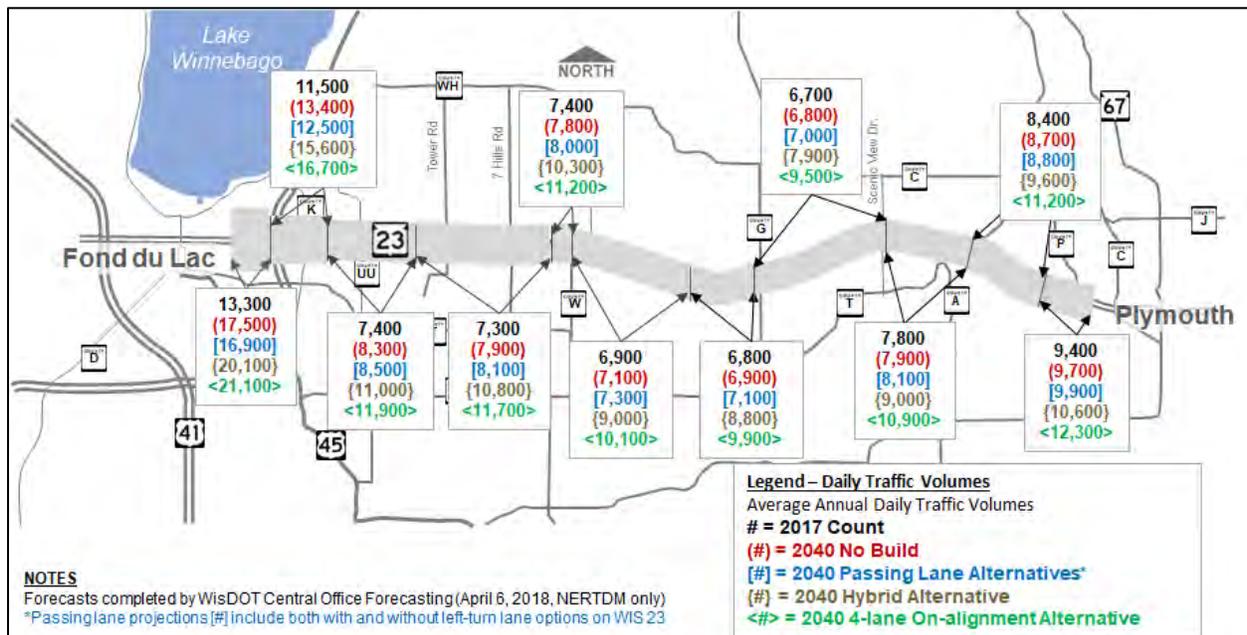


Figure 1.0-2 Projected 2040 Traffic Volume Forecasts

4. Identify the potentially significant indirect effects.
See Section 3: Indirect Effects Analysis.
5. Analyze the indirect effects and evaluate assumptions.
See Section 3: Indirect Effects Analysis.
6. Assess consequences and identify mitigation activities.
See Section 5: Activities to Avoid, Minimize, or Mitigate Effects.

Cumulative Effects Methodology

Cumulative effects are defined as “impact[s] on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.” Figure 1.0-3 illustrates how project effects combine with other actions unrelated to the highway project to produce a cumulative effect.

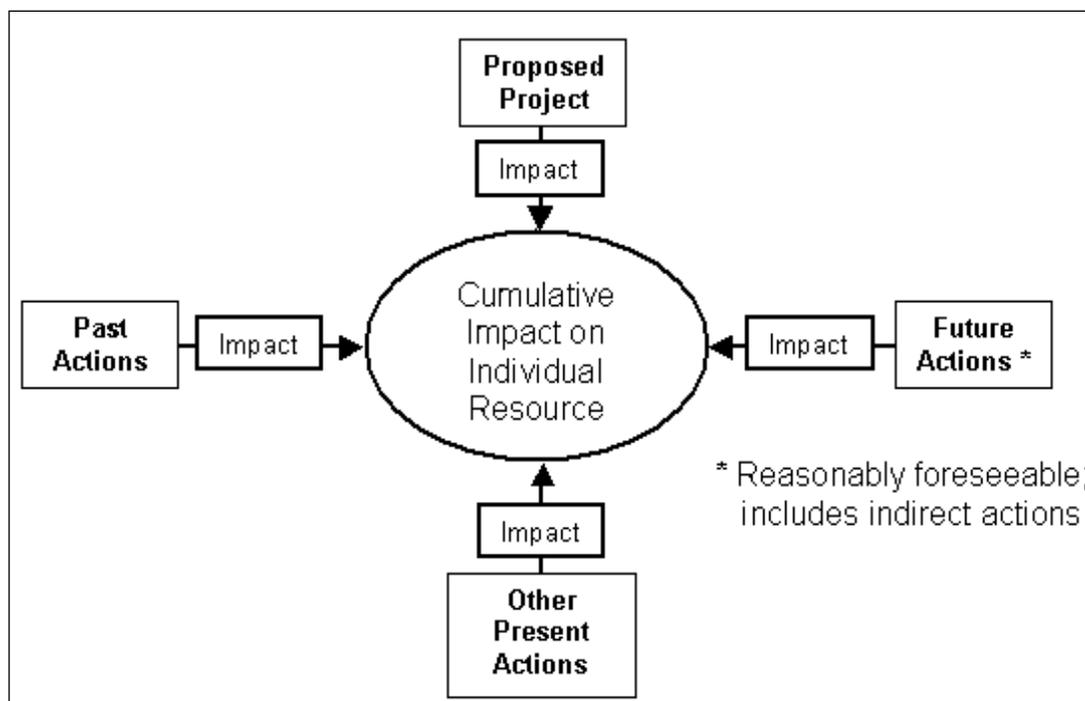


Figure 1.0-3 Cumulative Impacts (FHWA Environmental Review Toolkit)

The project team assessed the potential cumulative effects associated with the Passing Lane, Corridor Preservation for Passing Lane, Hybrid, Corridor Preservation for Hybrid, 4-lane On-alignment, and Corridor Preservation for 4-lane On-alignment Alternatives. The analysis considered the effects of these alternatives when combined with activities that have occurred upon a resource in the study area in the recent past, those that are presently underway, and those that may be reasonably foreseen. The cumulative effect analysis was updated from the one presented in the 2014 LS FEIS. More recently available information was included, updated direct impacts were referenced, opinions of the 2017 expert panel were incorporated, and trends were referenced to suggest the significance of the impact.

The CEQ’s “Eleven-Step” Process was used to conduct the WIS 23 cumulative effects analysis. The steps are outlined in the following listing:

SCOPING FOR THE CUMULATIVE EFFECTS ANALYSIS

1. Identify the significant issues associated with the proposed action and define the assessment.

See Section 2: Inventory of the Study Area.

2. Establish geographic scope for the analysis.

See Project Location and Study Area section discussed on page E-6.

3. Establish timeframe for analysis (into future).

The timeframe for this cumulative effects analysis is 20 years which corresponds with the planning horizon of the majority of local comprehensive plans; however, it can be assumed that the effects identified in this analysis would continue to be valid after 20 years if local policies and regulations remain the same.

4. Identify other actions affecting the natural, historic, cultural resources, ecosystems and human communities of concern.

See Section 4: Cumulative Effects Analysis.

DESCRIBING THE AFFECTED ENVIRONMENT

5. Characterize resources identified in scoping in terms of their response to change and capacity to withstand stress.

See Section 4: Cumulative Effects Analysis.

6. Characterize the stresses affecting these resources and their relation to regulatory thresholds.

See Section 4: Cumulative Effects Analysis.

7. Define a baseline condition for the resources.

See Section 2 Inventory of the Study Area.

DETERMINING THE ENVIRONMENTAL CONSEQUENCES

8. Identify the important cause and effect relationships between human activities including the proposed project and resources.

See Section 4: Cumulative Effects Analysis.

9. Determine the magnitude and significance of cumulative effects to those resources identified in the analysis.

See Section 4: Cumulative Effects Analysis.

10. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative effects.

See Section 5: Activities to Avoid, Minimize or Mitigate Effects.

11. Monitor the cumulative effects of the selected alternative and adapt management.

See Section 5: Activities to Avoid, Minimize or Mitigate Effects.

As mentioned, the study team solicited opinions on potential indirect and cumulative impacts of project alternatives from local experts using the Delphi method on two separate occasions, once in 2012 and again in 2017. Experts were selected based on their professional areas of expertise and their local knowledge of the project study area. The expert panel members included local and regional land use and transportation planners, economic development professionals, and agricultural, natural, and cultural resource experts. The inventory report was provided to panel members to provide an overview of the project and proposed alternatives as well as existing conditions and policies of state and local government. Panel members were asked to review the inventory report, respond to an online survey, and

complete a mapping exercise identifying potential indirect and cumulative effects for each of the WIS 23 alternatives. Panelists were also asked to attend a facilitated panel discussion where panelists shared their survey and map responses. The discussion format enabled the identification of points of consensus and disagreement on possible impacts.

Representatives from agencies and communities that participated in the October 2017 survey and/or panel include:

- Town of Greenbush
- Town of Forest
- Town of Marshfield
- Town of Empire
- Village of Glenbeulah
- Elkhart Lake Chamber of Commerce
- City of Plymouth
- City of Fond du Lac
- Sheboygan County Planning Department
- Fond du Lac County Planning Department
- Fond du Lac Metropolitan Planning Organization
- Envision Greater Fond du Lac
- East Central Wisconsin Regional Planning Commission
- Bay-Lake Wisconsin Regional Planning Commission
- WDNR Wildlife Management, Eastern Fond du Lac and Sheboygan counties
- Ice Age Trail (National Park Service)
- Wisconsin Department of Agriculture, Trade, and Consumer Protection
- University of Wisconsin-Extension, Sheboygan County
- University of Wisconsin-Extension, Fond du Lac County

Expert panel responses to the online survey and mapping exercise were tabulated and summarized; the findings of which were used to inform the indirect and cumulative effects analysis sections of this document. Attachment A includes a summary of all survey responses.

2.0 INVENTORY OF THE STUDY AREA

A. Local and Regional Trend Data

1. Population

Table 2.0-1 displays population trends and forecasts for study area communities as well as for Fond du Lac and Sheboygan counties. As indicated below, population changes have varied greatly. As a whole, the study area grew by 4.2 percent from 2000 to 2010. The Towns of Taycheedah and Fond du Lac showed the greatest growth of 15 and 49 percent respectively. The Village of Mt Calvary showed negative growth of 21 percent.

Table 2.0-1 also displays Wisconsin Department of Administration population forecasts for the study area communities through 2040. In general, communities throughout the study area are projected to grow. The towns of Fond du Lac and Taycheedah are projected to have the largest percent increases in population, while the villages of Mount Calvary and Saint Cloud are expected to lose population.

Table 2.0-1 Population Trends and Forecasts for the Indirect Effects Study Area, 2010-2030, 2040

	Population Trends				Population Forecast	
	County	1990	2000	2010	Forecast 2030	Forecast 2040
Town of Taycheedah	FDL	3,383	3,666	4,205	5,085	5,305
Town of Plymouth	Sheb	2,911	3,115	3,195	3,555	3,560
Town of Empire	FDL	2,485	2,620	2,797	3,105	3,130
Town of Greenbush	Sheb	1,943	2,773	2,565	2,705	2,630
Town of Fond du Lac	FDL	2,308	2,027	3,015	4,185	4,455
Town of Forest	FDL	1,094	1,108	1,080	1,020	950
Town of Marshfield	FDL	1,130	1,118	1,138	1,175	1,140
Village of Mt. Calvary	FDL	558	956	762	540	495
Village of St. Cloud	FDL	594	497	477	445	410
Village of Glenbeulah	Sheb	386	378	463	540	560
City of Fond du Lac	FDL	37,757	42,203	43,021	46,300	45,920
City of Plymouth	Sheb	6,769	7,781	8,445	9,630	9,785
Study Area Total		61,318	68,242	71,163	78,285	78,340
Fond du Lac County		90,083	97,296	101,633	110,590	110,250
Sheboygan County		103,877	112,646	115,507	126,160	125,160

Source: U.S. Census Bureau, 2010; Wisconsin Department of Administration 2013 Estimates, <http://www.doa.wi.gov/Divisions/Intergovernmental-Relations/Demographic-Services-Center/Wisconsin-Population-Projections/>

Table 2.0-2 shows household projections for study area communities and counties. As indicated below, the study area is expected to see increases in the number of households, primarily in the city of Fond du Lac. The villages of Mt. Calvary and St. Cloud and the towns of Marshfield, Greenbush, and Forest are projected to have a decrease in the number of households by 2040.

Table 2.0-2 Household Projections

	Occupied Housing Units 2010	Household Projection 2030	Household Projection 2040
Town of Taycheedah	1,602	2,077	2,215
Town of Plymouth	1,152	1,361	1,387
Town of Empire	957	1,260	1,299
Town of Greenbush	568	618	558
Town of Fond du Lac	1,167	1,737	1,890
Town of Forest	404	409	390
Town of Marshfield	422	465	456
Village of Mt. Calvary	183	149	130
Village of St. Cloud	208	208	196
Village of Glenbeulah	194	241	256
City of Fond du Lac	17,942	20,645	20,773
City of Plymouth	3,710	4,499	4,683
Study Area	40,484	33,669	34,233
Fond du Lac County	40,484	47,419	48,076
Sheboygan County	46,390	53,857	54,620
<i>Source: Wisconsin Department of Administration, 2015-2030 Housing Projections, 2008 (extrapolated to 2040).</i>			
<i>Source: Wisconsin Department of Administration, 2010-2040 Housing Projections, September 2017. U.S. Census 2010</i>			

2. Housing

Table 2.0-3 lists 2010 housing characteristics in the study area including average household size, number of housing units and vacancy rates for the year, and median home value estimates. In terms of home values, housing is more affordable in the city of Fond du Lac and villages of St. Cloud, Mt Calvary, and Glenbeulah compared to other communities in the study area. Home values in the towns of Taycheedah, Plymouth, Empire, and Fond du Lac are substantially higher than Sheboygan and Fond du Lac Counties and neighboring cities and villages.

Table 2.0-3 Housing Characteristics 2010

	Average Household Size	Total Housing Units	Occupied Housing Units	Home Owner Vacancy Rate	Median Value Owner Occupied Housing
Town of Taycheedah	2.62	1,755	1,602	1.6%	\$228,800
Town of Plymouth	2.64	1,229	1,152	1.4%	\$211,600
Town of Empire	2.64	991	957	0.0%	\$227,600
Town of Greenbush	2.70	594	568	1.5%	\$196,000
Town of Fond du Lac	2.58	1,239	1,167	2.5%	\$218,200
Town of Forest	2.67	436	404	1.6%	\$174,000
Town of Marshfield	2.51	497	422	1.1%	\$176,500
Village of Mt. Calvary	2.59	197	183	0.0%	\$136,400
Village of St. Cloud	2.29	216	208	2.7%	\$129,500
Village of Glenbeulah	2.39	204	194	3.0%	\$131,300
City of Fond du Lac	2.28	19,181	17,942	2.4%	\$122,900
City of Plymouth	2.26	4,039	3,710	2.3%	\$149,700

	Average Household Size	Total Housing Units	Occupied Housing Units	Home Owner Vacancy Rate	Median Value Owner Occupied Housing
Fond du Lac County	2.41	43,451	40,484	1.1%	\$143,000
Sheboygan County	2.42	50,766	46,390	2.2%	\$151,100

Source: U.S. Census 2010.

3. Income and Employment Characteristics

Table 2.0-4 shows income and employment information in the study area. The 2015 median household income ranged from approximately \$46,499 to over \$93,750. The town of Empire had the highest median household income compared to other study area communities. Alternatively, the median household income for the cities of Fond du Lac and Plymouth was about \$7,000 less than Fond du Lac and Sheboygan counties. The percentage of families below the poverty level was highest in the cities of Fond du Lac and Plymouth. Communities with low percentages of families in poverty include the towns of Empire, and Fond du Lac, and the village of Glenbeulah. The percentage of the population in the labor force for each community is also depicted in Table 2.0-4. Study area communities were generally comparable to or above the overall percentage for Fond du Lac and Sheboygan counties, with the town of Empire and village of Glenbeulah having the highest percentage of population in the labor force compared to other study area communities. The town of Marshfield and the town of Greenbush had the lowest percentage of population in the labor force at 60.6 percent and 35.2 percent respectively.

Table 2.0-4 Income and Employment

	2015 Median Household Income	2015 Percent of Families below Poverty Level	2015 Percent of Population in Labor Force
Town of Taycheedah	\$74,583	3.1%	66.0%
Town of Plymouth	\$79,398	5.4%	67.7%
Town of Empire	\$93,750	1.3%	70.6%
Town of Greenbush	\$77,031	2.5%	35.2%
Town of Fond du Lac	\$78,442	2.3%	70.7%
Town of Forest	\$68,750	2.7%	74.3%
Town of Marshfield	\$70,714	4.0%	60.6%
Village of Mt. Calvary	\$63,750	1.5%	72.9%
Village of St. Cloud	\$60,500	5.3%	68.3%
Village of Glenbeulah	\$58,068	0.7%	73.3%
City of Fond du Lac	\$46,499	10.2%	66.1%
City of Plymouth	\$49,769	11.7%	69.4%
Fond du Lac County	\$55,473	6.5%	68.3%
Sheboygan County	\$53,713	6.8%	68.4%

Source: 2011-2015 American Community Survey United States Census Data, Table DP-03, Selected Economic Characteristics (County Subdivision and Place within State).

4. Commuting Patterns

U.S. Census “place of work” data provides an indication of how the WIS 23 corridor is used for worker commuting. Tables 2.0-5 through 2.0-8 list the volume of commuters between counties based on the 2000 Census and from the 2009 to 2013 American Community Survey (which at the time of analysis was

the most current information available in county format). In 2013, 36,365 workers (65 percent) remained in Fond du Lac County to work. In 2013, 48,746 workers (78 percent) remained in Sheboygan County to work. These percentages are about 3 to 6 percent lower than the 2000 percentages for workers remaining in their respective counties. Dodge County was the top workplace destination for Fond du Lac County workers who work outside of their county of residence. Ozaukee County was the top workplace destination for Sheboygan County workers who work outside of their county of residence.

Table 2.0-5 Workplace Destinations for Fond du Lac County Residents

County	2000 Workers	2009-2013 Workers
Fond du Lac County	36,585	36,365
Dodge County	4,401	4,465
Winnebago County	2,721	3,599
Washington County	2,057	2,042
Sheboygan County	980	1,274
Green Lake County	755	638
<i>Source: US Census, 2000.</i>		
<i>Source: US Census, American Community Survey 2009-2013, Table 1. Residence County to Workplace County Commuting Flows.</i>		

Table 2.0-6 Top Counties of Residence for Fond du Lac County Workers

County	2000 Workers	2009-2013 Workers
Fond du Lac County	36,585	36,365
Winnebago County	2,544	2,839
Dodge County	1,852	1,957
Green Lake County	1,803	1,682
Washington County	541	836
Sheboygan County	530	628
<i>Source: US Census, 2000</i>		
<i>Source: US Census, American Community Survey 2009-2013, Table 1. Residence County to Workplace County Commuting Flows.</i>		

Table 2.0-7 Top Workplace Destinations for Sheboygan County Residents

County	2000 Workers	2009-2013 Workers
Sheboygan County	51,484	48,746
Ozaukee County	1,931	2,517
Manitowoc County	1,199	1,507
Milwaukee County	1,198	1,542
Washington County	705	832
Fond du Lac County	530	628
<i>Source: US Census, 2000</i>		
<i>Source: US Census, American Community Survey 2009-2013, Table 1. Residence County to Workplace County Commuting Flows.</i>		

Table 2.0-8 Top Counties of Residence for Sheboygan County Workers

County	2000 Workers	2009-2013 Workers
Sheboygan County	51,484	48,746
Manitowoc County	3,676	3,769
Fond du Lac County	980	1,274
Ozaukee County	896	1,257
Calumet County	632	770
Milwaukee County	365	680
<i>Source: US Census, 2000</i>		
<i>Source: US Census, American Community Survey 2009-2013, Table 1. Residence County to Workplace County Commuting Flows.</i>		

5. Environmental Justice and Title VI

Executive Order 12898 (EO 12898), commonly called the Executive Order on Environmental Justice, focuses on low income and minority populations. EO 12898 states that “each federal agency shall make achieving environmental justice (EJ) part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.” EO 12898 emphasizes that Federal agencies should use existing laws and programs to achieve EJ, including Title VI of the Civil Rights Act of 1964 (Title VI).

The Executive Order on Environmental Justice addresses disproportionately high and adverse effects on minority and low-income populations.

- A minority population is defined as any readily identifiable group of minority persons who live in geographic proximity to the project area.
- Low income population means any readily identifiable group of low income persons (having a household income at or below the United States Department of Health and Human Services poverty guidelines) who live in geographic proximity to the project area.

It is FHWA’s policy to also consider the elderly and disabled along with minority populations.

A disproportionately high and adverse effect means:

- An adverse effect that is largely borne by a minority population and/or low income population.
- An adverse effect that will be suffered appreciably more severely or in greater magnitude by a minority and/or low-income population than by a nonminority and/or non-low-income populations.
- Note that US census data does not classify Hispanic or Latino as a race, but as a culture or origin. Therefore, when using US Census data there is an overlap between Hispanic or Latino and the racial minorities of Black or African American, American Indian, Asian, and Pacific Islander. An individual can be African American and have a Hispanic origin. Also, an individual can be white and have a Hispanic or Latino origin. Figure 2.0-1 illustrates Federal Highway Administration’s (FHWA) definition of minority for the purposes of Environmental Justice (EJ) with respect to race and Hispanic or Latino origin.

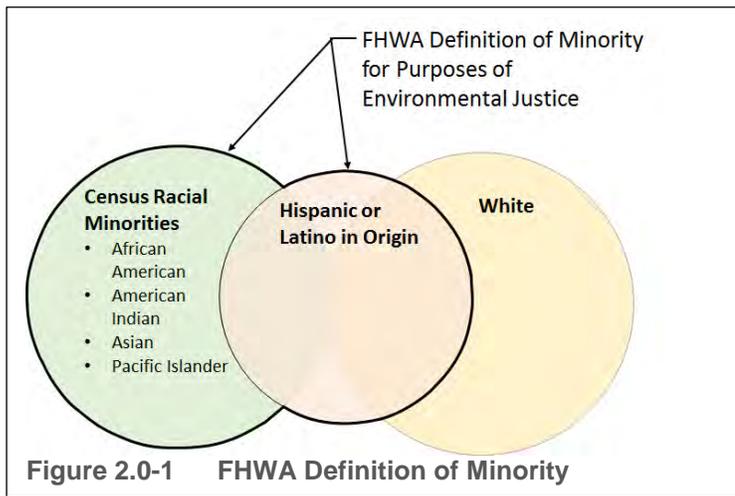
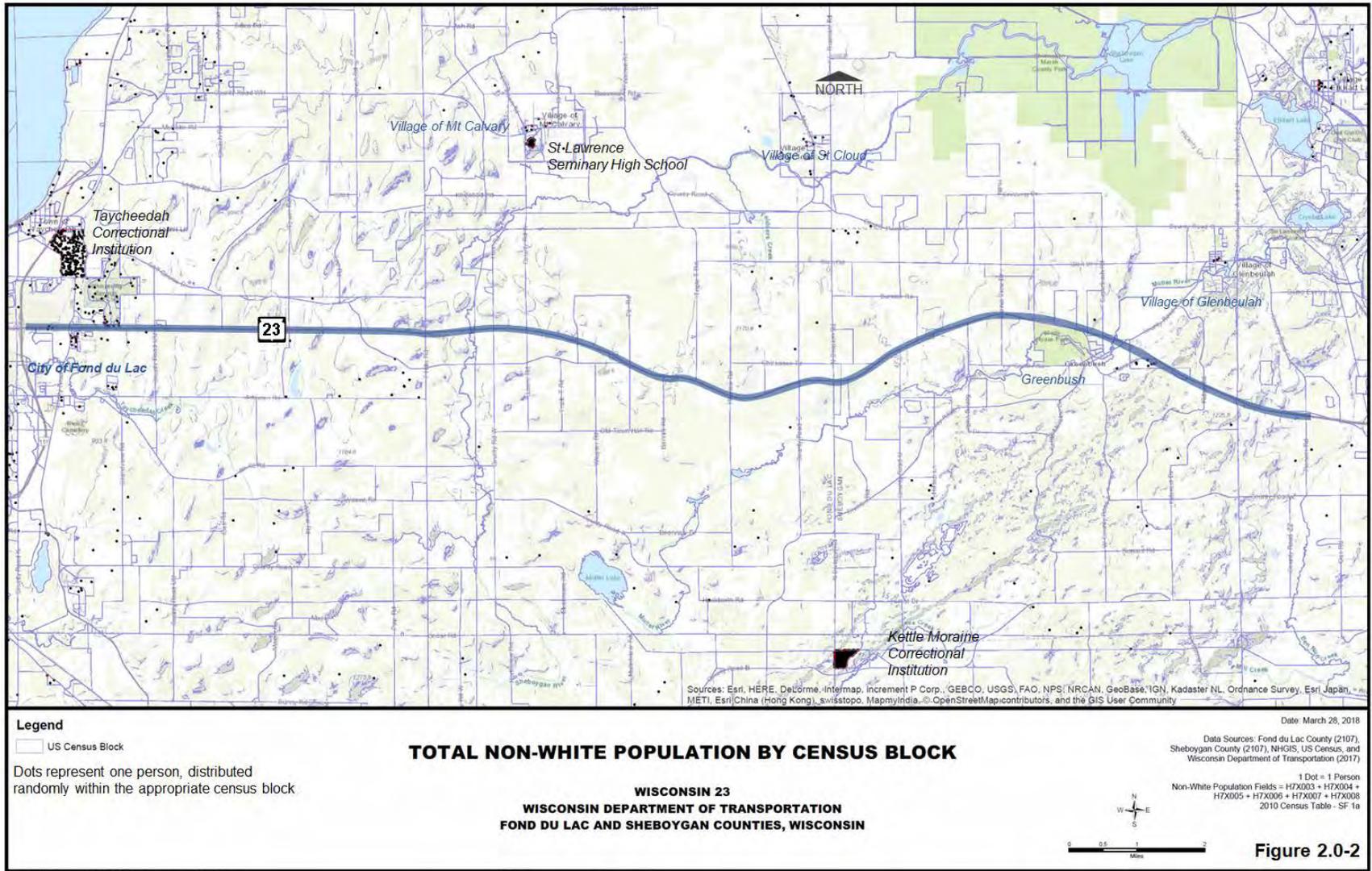


Table 2.0-9 lists the 2010 Census statistics for race and ethnicity in ICE study area communities. As indicated below, the majority of the population is white in all study area communities. Figure 2.0-2 depicts census tracts in ICE study area communities with dots depicting minorities (non-white) residents randomly dispersed by census block. The figure illustrates that the corridor does not have large groupings of minority residents. Groupings of minorities tend to be located at the urban end points of the study corridor. Larger concentrations also reside at:

- The Taycheedah Correctional Institution
- The Kettle Moraine Correctional Institution
- St Lawrence Seminary High School

Figure 2.0-3 depicts census tracts in the ICE study area communities with dots depicting elderly (over 65 years old) residents randomly dispersed by census block. The figure illustrates that there are not large numbers of elderly residents along the corridor, although elderly residents do reside in the Villages of Mt Calvary, St Cloud, and the city of Fond du Lac.



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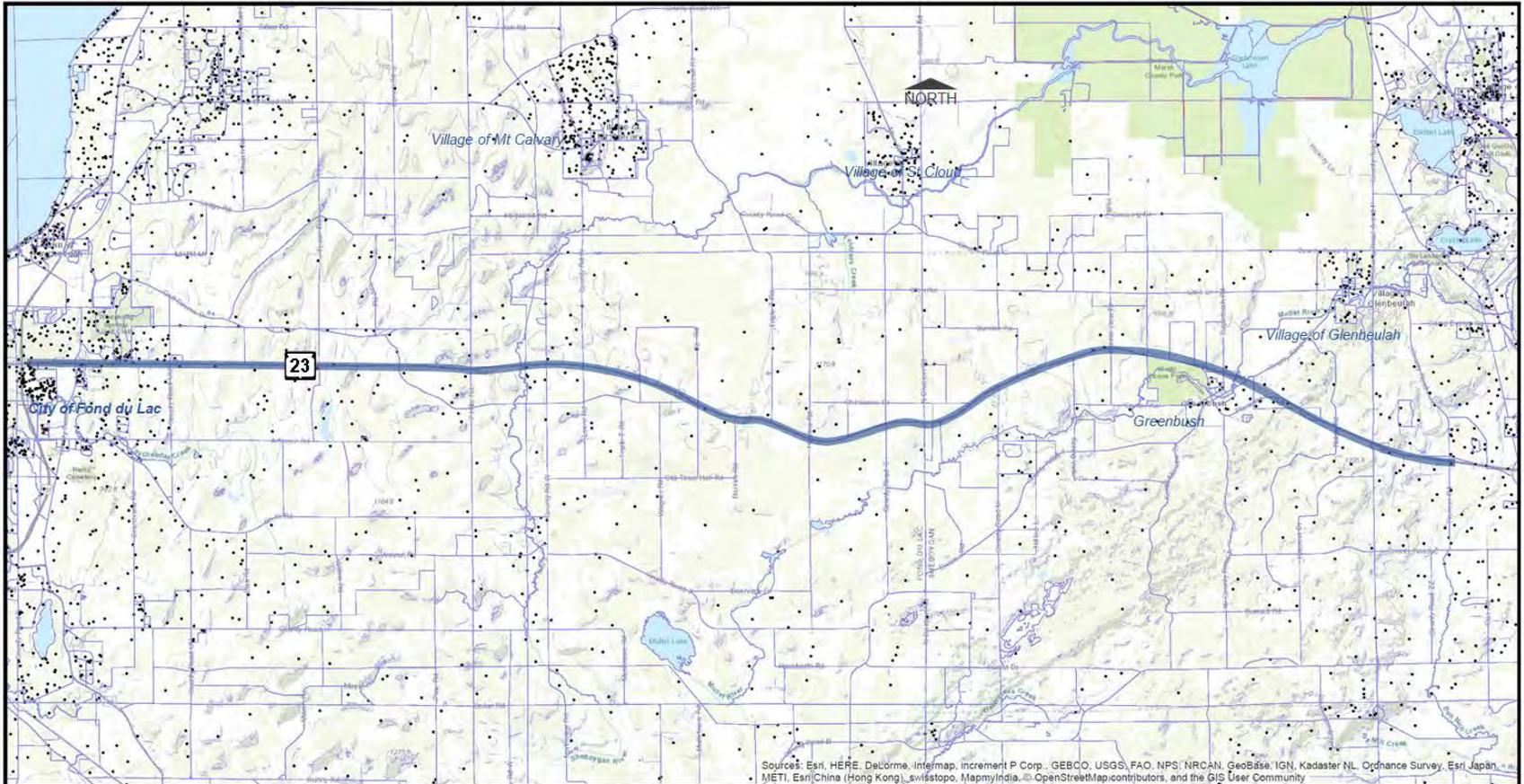
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapnyIndia, © OpenStreetMap contributors, and the GIS User Community

Date: March 28, 2018

Data Sources: Fond du Lac County (2107), Sheboygan County (2107), NHGIS, US Census, and Wisconsin Department of Transportation (2017)

TOTAL NON-WHITE POPULATION BY CENSUS BLOCK

WISCONSIN 23
WISCONSIN DEPARTMENT OF TRANSPORTATION
FOND DU LAC AND SHEBOYGAN COUNTIES, WISCONSIN



Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBasis, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Legend

□ US Census Block
 Dots represent one person, distributed randomly within the appropriate census block

TOTAL ELDERLY POPULATION BY CENSUS BLOCK

WISCONSIN 23
WISCONSIN DEPARTMENT OF TRANSPORTATION
FOND DU LAC AND SHEBOYGAN COUNTIES, WISCONSIN

Date: March 28, 2018
 Data Sources: Fond du Lac County (2107), Sheboygan County (2107), NHGIS, US Census, and Wisconsin Department of Transportation (2017)

1 Dot = 1 Person 65 or Older
 Elderly Population Field = H76020 + H76021 + H76022 + H76023 + H76024 + H76025 + H76044 + H76045 + H76046 + H76047 + H76048 + H76049
 2010 Census Table - SF 1a

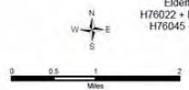


Figure 2.0-3

Table 2.0-9 Race and Ethnicity of Study Area Communities

	Race						Ethnicity
	% White	% Black or African American	% American Indian or Alaskan Native	% Asian	% Native Hawaiian or Other Pacific Islander	% Some Other Race	% Hispanic/Latino
Town of Fond du Lac	97.2	0.3	0.1	1.0	0.0	0.7	2.7
Town of Empire	97.8	0.6	0.1	0.6	0.1	0.2	1.5%
Town of Taycheedah	97.9	0.2	0.2	0.7	0.0	0.2	1.7
Town of Forest	98.4	0.1	0.2	0.2	0.5	0.2	0.9%
Town of Marshfield	98.3	0.2	0.0	0.0	0.0	1.0	1.0
Village of Mt. Calvary	83.6	1.3	1.0	8.3	0.0	5.2	10.9
Village of St. Cloud	96.9	0.0	0.6	0.4	0.0	1.5	2.7
City of Fond du Lac	90.6	2.5	0.7	1.8	0.0	2.5	6.4%
Fond du Lac County	94.1	1.3	0.5	1.1	0.0	1.7	4.3%
Town of Greenbush	97.7	0.0	0.6	0.7	0.0	0.4	1.4%
Town of Plymouth	98.4	0.1	0.1	0.4	0.0	0.3	0.8
Village of Glenbeulah	98.7	0.0	0.2	0.0	0.0	0.4	1.1
City of Plymouth	96.2	0.4	0.4	0.7	0.0	0.9	2.4
Sheboygan County	89.9	1.5	0.4	4.6	0.0	1.6	5.5%

Source: U.S. Census Bureau, 2010.

6. Poverty

FHWA defines a low-income person as a person whose median household income is at or below the United States Department of Health and Human Services (HHS) poverty guideline. This is different, and more simplified, than US Census Bureau poverty thresholds. Table 2.0-10 illustrates the difference between the poverty guidelines issued by HHS and the poverty thresholds issued by the Census Bureau. While FHWA defines low income using the HHS poverty guidelines, there is limited HHS poverty guideline data on a census tract or block level. The US Census Bureau provides poverty threshold data at the census block level. Therefore, this analysis uses census poverty threshold data as an alternate for HHS poverty guidelines data to identify the presence of low-income populations within the project corridor.

Table 2.0-10 Comparison of HHS Poverty Guidelines with Census Poverty Thresholds

Persons in family/household	HHS 2016 Poverty guideline	Census 2015 Weighted Ave Poverty Threshold*
1	\$11,880	\$12,082
2	\$16,020	\$15,391
3	\$20,160	\$19,078
4	\$24,300	\$24,036
5	\$28,440	\$28,286
6	\$32,580	\$31,670
7	\$36,730	\$35,473
8	\$40,890	\$38,999

* Householder under 65 years of age, assumes household members 3 to 8 are under 18 years old.

Source: US Health and Human Services <https://aspe.hhs.gov/poverty-guidelines>

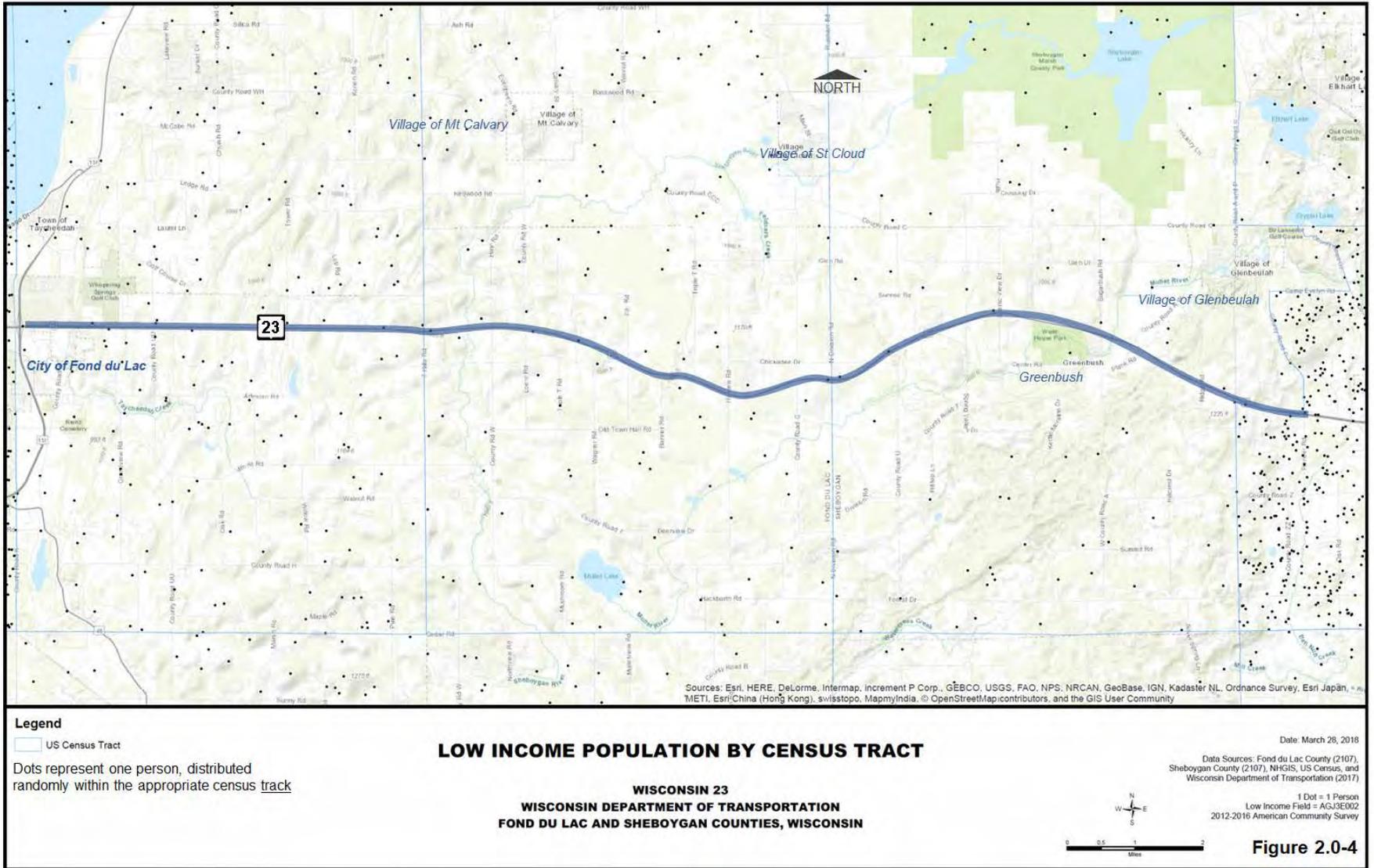
US Census <http://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html>

Table 2.0-11 lists the percentage of individuals living below the poverty level in study area communities according to the census. Concentrations of populations individuals living below the poverty level are located near the cities of Fond du Lac and Plymouth where two tracts in both cities have a percentage of individuals living below the poverty level that is higher than their respective county. Mt. Calvary also has a higher number of individuals living below the poverty level.

Table 2.0-11 Poverty Rate in Study Area Communities

	% Individuals Living Below the Poverty Level
Town of Fond du Lac	0.9
Town of Empire	4.1
Town of Taycheedah	5.4
Town of Forest	3.1
Town of Marshfield	4.1
Village of Mt. Calvary	13.1
Village of St. Cloud	6.0
City of Fond du Lac	13.1
Fond du Lac County	9.5
Town of Greenbush	6.0
Town of Plymouth	1.2
Village of Glenbeulah	0.0
City of Plymouth	13.6
Sheboygan County	8.2

Source: U.S. Census Bureau, 2007-2011 American Community Survey.



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Figure 2.0-4

7. Study Area County Age Statistics

Table 2.0-12 lists the median age of residents in study area communities as well as the percentages of the population in each county under age 5, under age 18, and over age 65. Most census tracts in the study area have a large elderly population with the exceptions of the town of Greenbush and the village of Glenbeulah. The village of Mt. Calvary has a low median age and high percentage of population under age 18 due to the presence of St. Lawrence Seminary High School in addition to the public schools.

Table 2.0-12 Age in Study Area Counties

	Median Age	% Pop. Under Age 18	% Pop. Age 65 and Over
Town of Fond du Lac	43.6	22.8	15.2
Town of Empire	46.7	22.2	13.6
Town of Taycheedah	45.1	22.6	15.0
Town of Forest	43.4	22.8	13.5
Town of Marshfield	47.5	19.2	21.8
Village of Mt. Calvary	26.8	39.6	16.1
Village of St. Cloud	43.3	20.3	16.4
City of Fond du Lac	36.9	22.6	14.7
Fond du Lac County	40.2	22.7	15.0
T. Greenbush	43.2	25.7	11.5
Town of Plymouth	47.7	22.8	16.1
Village of Glenbeulah	41.4	22.0	12.1
City of Plymouth	43.2	25.7	11.5
Sheboygan County	40.3	23.9	14.6

Source: U.S. Census 2010

8. Study Area Disabled Populations

The study team did not analyze disabled populations in the study area due to lack of available data on such populations. However, these populations tend to be located in the same areas as other EJ populations.

9. Agricultural Resources

Agricultural activities dominate land use along the rural parts of the study area. This contributes significantly to the study area’s economy and character. Farm commodities produced in the study area counties include dairy, winter wheat, corn silage, sweet corn, green peas, soybeans, alfalfa, mushrooms, mink, and beef. Table 2.0-13 lists economic impacts of the agricultural economies of Fond du Lac and Sheboygan Counties.

Table 2.0-13 Impacts of the Agricultural Economy

	Jobs	Income	Percent of County Economic Activity	Dairy Production State Ranking
Fond du Lac County	2,218	\$412 million	17 percent	2nd
Sheboygan County	1,574	\$242 million	21 percent	14th

Figure 2.0-5 depicts soil classifications within the study area. The Natural Resources Conservation Service groups soils into classes based on their capability to produce common cultivated crops and pasture plants. These capability classifications are based on numerous criteria that include, but are not

limited to, the soil's salinity; capacity to hold moisture; potential for erosion; depth, texture, and structure; and local climatic limitations (e.g., temperature and rainfall). Under this system of classification, soils are separated into eight classes. Generally, Class I and II soils are the best suited for the cultivation of crops. Approximately 53 percent of the lands within the study area are classified as Class I and II soils, the most productive agricultural soil categories.

Fond du Lac and Sheboygan counties have 262,142 acres and 155,878 acres of cropland, respectively. According to the USDA 2012 Census of Agriculture² and UW Extension, agriculture accounts for \$412 million in sales in Fond du Lac County. The 2006 Agricultural Impact Statement (AIS) and 2010 update for the project published by the Department of Agriculture, Trade, and Consumer Protection stated that an estimated 17 percent of all economic activity in the county is related to agriculture. Rated on a number of farmland preservation indicators, Fond du Lac County, though classified as an urban county, continues to have a very strong agricultural industry. It ranked 17th among Wisconsin counties in 2012 in acres of corn for grain, 4th in acres of corn for silage, 13th in soybean for bean acres, and 1st in wheat for grain acres. Dairy is the largest sector within county agriculture. For Sheboygan County, the USDA 2012 Census of Agriculture and UW Extension estimates that agriculture accounts for \$242 million in sales. The 2006 AIS for the project states that Sheboygan County is more urbanized than Fond du Lac County, but it still remains a very important agricultural county. The report estimated that 21 percent of all economic activity in Sheboygan County is agriculturally related. Sheboygan County ranked 18th among Wisconsin counties in acres of corn for silage, 23rd in soybeans, and 4th in wheat for grain. Dairy is the largest sector within county agriculture, with a large portion being postprocessing such as cheese products.

Table 2.0-14 lists the agricultural trends taken from subsequent Census of Agriculture reports. The table shows the following trends:

- The number of farms is decreasing in both Fond du Lac and Sheboygan counties.
- The amount of land in farms and total cropland is decreasing for both counties.
- The average size of farms is increasing for both counties.

Table 2.0-14 Census of Agriculture Data

	2002 Fond du Lac County	2007 Fond du Lac County	2012 Fond du Lac County	2002 Sheboygan County	2007 Sheboygan County	2012 Sheboygan County
Number of Farms	1,634	1,643	1,399	1,116	1,059	986
Land in Farms (acres)	344,286	335,745	315,553	195,248	191,719	190,155
Average Farm Size (acres)	211	204	226	175	181	193
Total Cropland (acres)	292,255	279,922	262,142	166,592	157,607	155,878

10. Natural Resources

Consideration of natural resources and environmentally sensitive areas is essential in local land use decision making. Long-term preservation of natural features is identified as a goal in the comprehensive plans of each of the study area communities as well as preserving the appearance of the landscape. Natural resources in the study area are depicted Figures 2.0-6 and -7 and described in more detail in Sections 11 through 20 as follows.

² Census of Agriculture is performed at 5-year intervals. Results for the 2017 Census of Agriculture were not available for the writing of this document.

11. Environmental Corridors

Environmental corridors are depicted in Figures 2.0-6 and-7. These areas include generally continuous open space systems based on lands that have sensitive natural resources and limitations for development, including WDNR identified wetlands, subject to existing State-mandated zoning, and FEMA designated floodplains. Environmental corridors have environmental, ecological, passive recreational, stormwater management, groundwater protection and recharge, erosion control, wildlife, timber, and scenic value. Since environmental corridors have severe limitations for development, minimizing development in these areas also protects private property.



WIS 23 Supplemental EIS
Map 6: Agricultural Resources
 Sources: Fond du Lac County, Sheboygan County, USDA, US Census Bureau, Strand Associates, Vandewalle & Associates

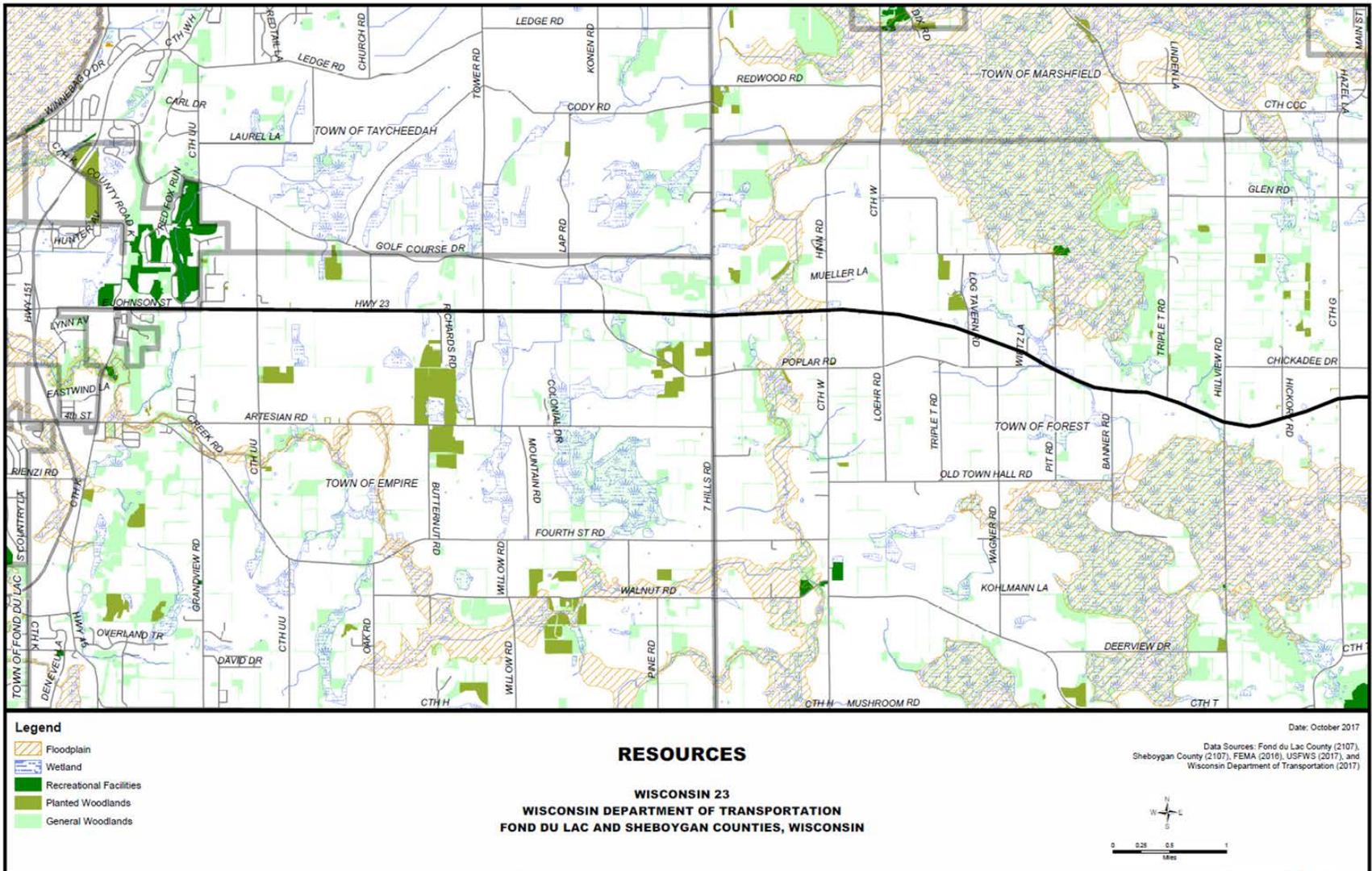
— Major Road
 — Local Road
 — WIS 23 Build Alternative
 - - - WIS 23 ICE Study Area

□ County Boundary
 □ Municipal or Town Boundary
 □ Surface Water

Soil Capability Class
 ■ Class I
 ■ Class II
 ■ Class III - VIII

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Figure 2.0-5



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Figure 2.0-6

12. Wetlands

Most wetlands within the study area are located along the rivers, creeks, and public natural areas in the study area such as the Sheboygan Marsh and the Mullet Marsh. There are also isolated wetlands in the north part of the town of Empire and the southern part of the town of Taycheedah. Wetlands have been identified and mapped by the Army Corps of Engineers and the Wisconsin Department of Natural Resources. These areas are important for aquifer recharge, groundwater and surface water quality improvement, and wildlife habitat. Generally, wetlands are restricted to no development by state statute-authorized local zoning. The Sheboygan Marshes are identified as a Land Legacy Place described in the plans and initiatives section of this document.

According to WDNR aerial photography (1978 to 1979), Fond du Lac County has 69,128 acres of wetlands that account for 14.9 percent of the land cover in the county. Sheboygan County (1987 aerial photography) has 40,447 acres of wetlands that account for 12.3 percent of the county. There are several notable wetland complexes near the WIS 23 corridor. Mullet Marsh (339 acres) is located about 1 mile south of WIS 23. The Sheboygan Marsh area (over 14,000 acres of land and surface water publically owned) is located about 2 miles north of WIS 23 in the project area.

13. Glacial Features

More than 10,000 years ago, glaciers, sheets of ice over a mile thick, covered much of the northern United States, including most of Wisconsin and the entire study area. As they were forming, the slow-moving glaciers ground bedrock into fine powder and transformed a rough terrain into rolling plains. In the Kettle Moraine area, these features are found in unusual abundance. The Kettle Moraine is also unusual in that it is an interlobate moraine, formed where two lobes of the continental glacier are flowing close to and roughly parallel to one another. The Kettle Moraine, formed between the Lake Michigan lobe and the Green Bay lobe, is one of the best examples of an interlobate moraine in the world. The following geological formations are the result of the glacier.

- Drumlin: Oval teardrop-shaped hills formed under the glacial ice near the advancing front of a glacier.
- Erratic: Boulders and large rocks carried by glaciers and deposited on the surface of the land after the ice melted.
- Esker: A long, narrow ridge of coarse gravel deposited by a stream flowing in an ice-walled valley or tunnel in a melting glacier.
- Kame: A conical-shaped hill of sand and gravel that was formed by glacial meltwater swirling into a vertical shaft in the glacier.
- Kettle: A depression formed by the melting of a large block of glacial ice that was partially or completely buried. Some kettles hold water to form kettle lakes.
- Moraine: Jumbled hills of unsorted, unstratified glacial debris found at the sides or front of a glacier.

14. Niagara Escarpment

The Niagara Escarpment is the steep face of a 650-mile bedrock ridge that runs from Rochester, New York, across portions of southeastern Canada, and then southward north and west of Lake Michigan to southeastern Wisconsin. In Wisconsin, the escarpment extends for over 230 miles from Door Peninsula to northern Waukesha and Milwaukee counties. In the study area, the Escarpment runs north to south through the center of Fond du Lac County and is a prominent feature near the southeastern shore of Lake Winnebago. It crosses WIS 23 on the west end of the study corridor.

15. Conservation Easements

Conservation easements protect land from future development. Fond du Lac County administers the Conservation Reserve Enhancement Program (CREP), which is a voluntary land retirement program that helps protect environmentally sensitive land, decrease erosion, restore wildlife habitat, and safeguard ground and surface water. As of 2009, approximately 1,100 acres of land in Sheboygan County have been protected through acquisition by WDNR or through private donations to the Glacial Lakes Conservancy.

16. Basins and Watersheds

The Sheboygan River Basin covers the eastern $\frac{3}{4}$ of the study area. The western portion of the study area is located in the Upper Fox River Basin. Watersheds within these basins covering the study area include Lake Winnebago-East, Sheboygan River, Mullet River, and the Onion River watersheds.

- The Sheboygan River basin has been identified by the International Joint Commission as a Great Lakes Area of Concern. The lower portion of the basin, east of the study area, is characterized by poor water quality. Identified pollutants are suspended solids, fecal coliform bacteria, phosphorus, nitrogen, PCBs, PAHs, and heavy metals. Contamination is the result of both point and nonpoint sources of pollution, including industrial and municipal wastewater discharge and runoff from agricultural lands, roadways, parking lots, construction sites, and other urban and suburban areas.
- The westernmost portion of the study area is located in the Upper Fox River Basin. Groundwater quality varies throughout the basin. Some natural threats to groundwater quality are hardness, iron, manganese, radium/radon, and arsenic. WDNR identified the following threats in the Fond du Lac County portion of the basin: nutrient (i.e., phosphorus and nitrogen) and sediment loading to surface waters from agricultural and urban sources; groundwater contamination; use of fertilizers and pesticides in urban communities; and wildlife habitat destruction and fragmentation.
- The Lake Winnebago-East watershed is located along the east and south shores of Lake Winnebago in Calumet and Fond du Lac counties. This watershed generally flows east to west and drains into Lake Winnebago and contains Taycheedah Creek. This watershed is dominated by agriculture but does include more than a third of the city of Fond du Lac as well as the rapidly developing area east of Fond du Lac on the west slope of the Niagara Escarpment. This watershed is ranked high for nonpoint source issues affecting streams and groundwater. Agricultural nutrient and soil erosion runoff have been dominant pollutants, but nonpoint urban runoff is an increasing concern.
- The Sheboygan River watershed is the largest and possibly the most diverse watershed in the Sheboygan River basin. The Sheboygan River originates in east-central Fond du Lac County and flows generally southeastward into the city of Sheboygan where it enters Lake Michigan. Water quality is good in the headwaters and fair to poor in the lower reaches.
- The Mullet River watershed covers the majority of the study area and connects with the Sheboygan River watershed. Crop farming and public and private forestry comprise the majority of the land uses in the watershed. Water quality ranges from good to fair in the watershed and is affected by agricultural and urban runoff, point source discharges in the urban areas, stream channelization, and dams. Over the years, a number of conservation practices have been employed on farms within the watershed including contour plowing, crop rotation, nutrient management planning, designed manure storage installations, grassed waterways, filter strips, stream buffers, and barnyard runoff measures. Use of these farm practices has a beneficial impact on water quality. However, runoff from agricultural lands continues to impact water quality

in the watershed and there is a need to further reduce sediment and nutrient impacts to waterways in the Mullet River watershed.

- Water quality in the Onion River watershed ranges from excellent to good in the headwater areas to fair to poor in the lower sections. Agricultural and urban runoff is the primary source of pollution as well as point source discharges. Excessive sedimentation and channelization limit stream habitat quality. The Onion River watershed was one of the very first watersheds targeted under the Nonpoint Source Water Pollution Abatement (Priority Watershed) Program. A follow-up report found that the watershed continues to be affected by nonpoint pollution sources.

17. Surface Waters

Significant surface water resources located within the study area include the following:

- Lake Winnebago is the largest lake entirely within the state and has two primary tributaries, the Wolf River and the Fox River. It is drained by the Fox River, which flows north toward Green Bay. Lake Winnebago is classified as an impaired water by the state under the Clean Water Act (Section 303(d)). Water quality concerns range from urban stormwater discharge to agricultural runoff.
- Taycheedah Creek is classified as a warm water sport fish community. Evaluations of water quality in the Taycheedah Creek show that it is in a degraded state. After rainfall or snowmelt, the stream is very turbid and water clarity is very poor. Agriculture and increased urbanization are the suspected sources of pollution.
- Feldner's Creek, located southwest of the village of St. Cloud in Fond du Lac County, is classified as a Class II trout stream. The headwater of Feldner's Creek is also considered an Exceptional Resource Waterway by WDNR, which are characterized by excellent water quality, high recreational value, and high quality fisheries.
- The Sheboygan River originates in east-central Fond du Lac County and flows generally southeastward to the city of Sheboygan where it enters Lake Michigan. The US EPA declared 14 miles of the Sheboygan River east of the study area a superfund site, jeopardizing the integrity and quality of Lake Michigan. Environmental cleanup of the upper portion of the Sheboygan River has been completed. Cleanup efforts for the lower river and inner harbor in the city of Sheboygan will likely be completed by the end of 2012.
- De Neveu Lake is an 80-acre lake in the town of Empire. It has a maximum depth of 67 feet and moderate water clarity. Fish include panfish, largemouth bass, northern pike, and walleye.
- De Neveu Creek is the longest stream in the Lake Winnebago East Watershed. De Neveu Creek is classified as an impaired water by the state under the Clean Water Act (Section 303(d)). The majority of the city of Fond du Lac's stormwater is discharged into De Neveu Creek. Water quality impacts are water turbidity, loss of habitat, hydrologic modifications, sediment, and nutrient loading from urban and rural sources. After snowmelt or rainfall, this stream can become extremely turbid. This stream is also classified as supporting a warm water forage fish community.
- The Mullet River originates at the outlet of Mullet Lake in Fond du Lac County and runs generally east before joining the Sheboygan River in the city of Sheboygan Falls.
- Mullet Lake and Marsh is a 200-acre hard-water seepage lake surrounded by a wetland complex of tamarack, shrub carr, sedge meadow, and swamp forest. The lake and swamp complex is the headwaters of the Mullet River in the priority watershed of the Sheboygan River. This undeveloped inland lake with intact wetland vegetation provides important breeding, nesting, and migratory habitat for numerous bird, reptile, and amphibian species.

- The Onion River flows southerly for about half its length before turning northward, entering the Sheboygan River in Rochester Park in Sheboygan Falls. The headwater of the Onion River, known as Ben Nutt Creek, is a trout stream downstream to the top of the pool formed by the Waldo dam.
- The Plymouth Mill Pond is a 41-acre impoundment of the Mullet River located in the city of Plymouth. The water body is maintained by a dam at the southern end of the pond and it extends north WIS 23. The pond is utilized for boating, fishing, and public ice skating. In recent years, degraded water quality has led to algal blooms and aquatic plant growth, which have caused odor problems, impeded recreational use of the pond, and negatively impacted the aesthetics of the Mill Pond area. A Comprehensive Management Plan was adopted for the pond in 2008.

Other nearby water bodies include the Fond du Lac River, Sheboygan River, Supple Marsh, Wolf Lake, and Long Lake.

18. Groundwater

Groundwater is an important source of potable water and groundwater contamination has been a significant issue along the Niagara Escarpment for some years. In areas of karst (a geologic formation shaped by the dissolution of layers of soluble bedrock) in the study area, pathways develop for water movement through the rock leading directly to the groundwater with little or no filtration. Surface activities such as agriculture (both crops and grazing), road salting, and non-point source pollution can contaminate water moving directly into the groundwater. The thin soils in the area can create other difficulties including the adverse effects of leaking underground storage tanks or deteriorating septic tanks.

19. Parks and State Natural and Wildlife Areas

The WIS 23 corridor traverses the northern unit of the Kettle Moraine State Forest in the town of Greenbush. This and other significant parks and state natural and wildlife areas within the study area are described below.

- Kettle Moraine State Forest - Northern Unit is a 27,725-acre forest stretching across Sheboygan, Fond du Lac, and Washington counties. Made up of geological formations caused by retreating glaciers, the forest is managed for forestry and outdoor recreation. Textbook examples of glacial landforms are scattered throughout the forest, such as drumlins, kames, eskers, and kettles. Botanically, the forest is quite diversified with nearly 60 species of trees present, together with numerous shrubs, wild flowers, ferns, and other plant life. This state park is comprised mostly of forests and lakes and provides habitat for a diversity of species, including whitetail deer, hawks, turkeys, raccoons, squirrels, and possums. The Kettle Moraine State Forest – Northern Unit is part of the Ice Age National Scientific Reserve established in 1964 to protect glacial landforms and landscapes in Wisconsin. The Wade House State Historic Site, situated in Greenbush at the entrance of the Kettle Moraine State Forest, once served as an inn and stopping point for stage coaches traveling on the Fond du Lac-Sheboygan Plank Road.
- The Ice Age Trail is a 1,000-mile footpath highlighting Wisconsin's ice age heritage. The Ice Age Trail is one of only eleven National Scenic Trails in the country. Within the study area, the trail passes through the towns of Greenbush and Plymouth in Sheboygan County.
- Sheboygan Marsh Park and Wildlife Area is located in northwestern Sheboygan County and contains the largest restored wetland in the Wisconsin watersheds of Lakes Michigan and Superior. It encompasses over half of the towns of Russell and Greenbush and includes about 14,000 acres of land and surface water; 8,166 acres are publicly owned, of which 7,414 acres are owned by Sheboygan County (including the County's Broughton Park) and 752 acres by the state. The remainder is privately owned, some of which is publicly accessible. The marsh adjoins

the Ice Age National Scientific Reserve. Archaeological investigations have classified Sheboygan Marsh as an “archaeological treasure” of national significance; it remains a candidate for nomination to the National Register of Historic Places. The Sheboygan River flows easterly through the marsh.

- The Calvary Marsh public hunting ground is a 280-acre Fond du Lac County-owned property. It is mainly marsh and provides an excellent habitat for wildlife. The property is landlocked and only accessible to the public via the Sheboygan River. Overland access to the public is only available if neighboring landowners grant permission to cross their land. According to the county’s Outdoor Recreation and Open Space Plan, the county would like to acquire land to provide direct public access in the future.
- Mullet Creek Wildlife Area is a 2,217-acre WDNR property in the town of Forest that consists of a rich array of wetland, forest, grassland, and farmland. Mullet Creek flows through the entire property eventually joining the Sheboygan River. The central portion of this property consists of shallow open water with submergent vegetation and cattail wetland totaling over 700 acres. Sedge, reed canary grass, willow, dogwood, swamp conifers, and swamp hardwoods occur in the lowland areas. Oak, aspen, and grass fields occur on the upland sites.
- Mullet Lake State Natural Area is a 495-acre WDNR property located about one-half mile southwest of Mullet Creek Wildlife Area. A 200-acre hard-water seepage lake is surrounded by a wetland complex of tamarack, shrub carr, sedge meadow, and swamp forest. The lake and swamp complex is the headwaters of the Mullet River in the priority watershed of the Sheboygan River. This undeveloped inland lake with intact wetland vegetation provides important breeding, nesting, and migratory habitat for numerous bird, reptile, and amphibian species.
- Old Plank Road Trail is a popular 17-mile trail accommodating bicyclists, runners, walkers, in-line skaters, horseback riders, moped users, skiers, and snowmobiles. The trail parallels WIS 23 from Sheboygan, past Kohler, Sheboygan Falls, Plymouth, and on to historic Greenbush, linking with the Ice Age Trail in the northern unit of the Kettle Moraine State Forest.
- There are numerous snowmobile trails in the study area maintained by area clubs. Private land owners provide the majority of the land used for the public trail system.

20. Threatened and Endangered Species

Within the WIS 23 corridor area, there are four plant and animal species federally listed as either threatened or an experimental population and 19 plant and animal species state listed as either threatened, endangered, or special concern within the approximately 19.1 miles between Fond du Lac and Sheboygan counties. Two state threatened species and one state endangered species are considered potentially affected based on WDNR project coordination. The state endangered species includes the rainbow shell mussel. State threatened species include the slippershell mussel and ellipse mussel.

The project team worked with WDNR and USFWS to obtain rare species data for the ICE study area, which is larger than the corridor study area. WIS 23 crosses through Empire and Forest townships in Fond du Lac County and Greenbush and Plymouth townships in Sheboygan County.

Table 2.0-14 shows the number of rare species occurrences by township, in the broader study area. This information is provided to summarize the general density of threatened and endangered species in both Fond du Lac and Sheboygan counties in comparison to the project alignment and occurrences within the four townships that the project traverses.

The Sheboygan county towns of Greenbush and Plymouth contain more threatened and endangered species than towns adjacent to WIS 23 in Fond du Lac County. This is partially based on the presence of

the Kettle Moraine Forest in Sheboygan County. Fond du Lac County has 25 reported threatened and endangered species occurrences and Sheboygan County has reported 31 occurrences. Cumulatively both counties have 47 rare species.

Table 2.0-15 Rare Species Occurrences in Towns and Counties within ICE Study Area

Town	Town	Range	Rare Plants	Rare Terrestrial Animals (including birds)	Aquatic Animals	Total Rare Species per Town (or County)	Total Rare Habitats
Empire (Fond du Lac County)	15N	18E	1	--	--	1	1
Forest (Fond du Lac County)	15N	19E	--	1	1	2	1
Taycheedah (Fond du Lac County)	16N	18E	--	1	--	1	1
Marshfield (Fond du Lac County)	16N	19E	--	--	1	1	--
Greenbush (Sheboygan County)	15N	20E	--	5	3	8	1
Plymouth (Sheboygan County)	15N	21E	3	3	2	8	--
Total Occurrence Summary for all WIS 23 Towns (not including duplicates)	2	4	3	7	4	14	1
Occurrences Summary for Fond du Lac County	T13N to T17N	R14E to R19E	5	14	6	25	3
Occurrences Summary for Sheboygan County	T13N to T16N	R20E to R22E	16	11	4	31	2
Occurrence Summary for both WIS 23 Project Counties (Fond du Lac and Sheboygan) (not including duplicates)	5	9	20	20	7	47	3

Threatened and Endangered Species Data obtained from WDNR on-line Natural Heritage Inventory (NHI 10/31/17) and from WDNR correspondence March 2013. Note: Only threatened and endangered species are included in table. State Special Concern Species were not included in tallies.

21. Air Quality

The proposed WIS 23 project is located in the Lake Michigan Intrastate Air Quality Control Region. These air quality regions monitor National Ambient Air Quality Standards established by the US EPA under the authority of the Clean Air Act. Primary standards are designed to protect human health with an adequate margin of safety. Secondary standards are designed to protect public welfare from any known or anticipated adverse effect. Table C.2-14 lists the standards for the different air pollutants and whether they are a primary or secondary standard.

Table 2.0-16 National Ambient Air Quality Standards

Pollutant	Type	Standard	Averaging Time ^a	Regulatory Citation
SO ₂	Primary	0.14 ppm (365 µg/m ³)	24-hour	40 CFR 50.4(b)
SO ₂	Primary	0.030 ppm (80 µg/m ³)	Annual	40 CFR 50.4(a)
SO ₂	Secondary	0.5 ppm (1,300 µg/m ³)	3-hour	40 CFR 50.5(a)
PM ₁₀	Primary and Secondary	150 µg/m ³	24-hour	40 CFR 50.6(a)
PM _{2.5}	Primary and Secondary	35 µg/m ³	24-hour	40 CFR 50.7(a)

Table 2.0-16 National Ambient Air Quality Standards

Pollutant	Type	Standard	Averaging Time ^a	Regulatory Citation
PM _{2.5}	Primary and Secondary	15 µg/m ³	Annual	40 CFR 50.7(a)
CO	Primary	35 ppm (40 mg/m ³)	1-hour	40 CFR 50.8(a)(2)
CO	Primary	9 ppm (10 mg/m ³)	8-hour	40 CFR 50.8(a)(1)
O ₃	Primary and Secondary	0.12 ppm (235 µg/m ³)	1-hour b	40 CFR 50.9(a)
O ₃	Primary and Secondary	0.075 ppm (150 µg/m ³)	8-hour	40 CFR 50.10(a)
NO ₂	Primary and Secondary	0.053 ppm (100 µg/m ³)	Annual	40 CFR 50.11(a) and (b)
Pb	Primary and Secondary	0.15 µg/m ³	Rolling 3 months	40 CFR 50.1

^a Each standard has its own criteria for how many times it may be exceeded, in some cases using a three year average.

^b As of June 15, 2005, the 1-hour ozone standard no longer applies to areas designated with respect to the 8-hour ozone standard (which includes most of the United States, except for portions of 10 states).

The 4-lane On-alignment Alternative (the Preferred Alternative from the 2014 LS SFEIS) was discussed in the approved Regional Transportation Plan (RTP) and was included in the assessment of conformity of the Year 2045 Sheboygan Area Transportation Plan (SATP). The project is outside the Sheboygan Metropolitan Planning Area, so it is not included in the MPO Transportation Improvement Program (TIP).

The proposed WIS 23 project is in the Lake Michigan Intrastate Air Quality Control Region. Fond du Lac County is presently in attainment of all National Ambient Air Quality Standards (NAAQS).

Sheboygan County currently demonstrates transportation conformity using the “Motor Vehicle Emissions Budget (MVEB) Test” (40 CFR 93.119). WDNR submitted an early progress State Implementation Plan with updated MVEBs for the Sheboygan county nonattainment area on January 16, 2015. On April 1, 2015, USEPA found the MVEBs for Wisconsin’s 8-hour ozone nonattainment area were adequate for use in transportation conformity determinations (80 FR 17428).

On May 21, 2012, USEPA designated Sheboygan County a marginal nonattainment area for ground level ozone under the 2008 eight-hour standard for that pollutant. The USEPA has determined that the Sheboygan, Wisconsin area (Sheboygan County) failed to attain the 2008 ozone NAAQS by the applicable attainment date of July 20, 2016, and that this area is not eligible for an extension of the attainment date. USEPA reclassified this area as “moderate” nonattainment for the 2008 ozone NAAQS.

Per the Clean Air Act, states recommend designations to the USEPA following promulgation of a new NAAQS. In September 2016, Governor Walker recommended that the entire state of Wisconsin be designated as attainment of the 2015 ozone standard. On November 6, 2017 USEPA finalized “round 1” of its initial area designations for the 2015 standard. In April 2017, Wisconsin’s Department of Natural Resources provided supplemental information to USEPA in support of the governor’s recommendation. In February 2018, DNR submitted additional comments to USEPA in response to USEPA’s intended nonattainment area designations.

On May 1, 2018 USEPA notified the state of its final designations for nonattainment of the 2015 ozone NAAQS. For Sheboygan County, the final moderate nonattainment area, (effective 60 days after rule publication in the Federal Register) is:

Inclusive and east of the following roadways going from the northern county boundary to the southern county boundary: Highway 43, Wilson Lima Road, Minderhaud Road,

County Road KK/Town Line Road, N 10th Street, County Road A S/Center Avenue, Gibbons Road, Hoftiezer Road, Highway 32, Palmer Road/Smies Road/Palmer Road, Amsterdam Road/County Road RR, Termaat Road.

The portion of proposed WIS 23 in Sheboygan county is not located in the 2015 Ozone NAAQS nonattainment area.

22. Wind Energy

The development of wind energy generators and transmission has emerged in the study area in recent years. The Cedar Ridge Wind Farm, located in the towns of Empire and Eden (just south of the study area), has been in operation since December 2008. Cedar Ridge is situated on the Niagara Escarpment, a ridgeline that peaks at 1,200 feet, and offers an exceptional wind resource. Cedar Ridge is spread out over 12.2 square miles on 7,800 acres. Its 41 turbines produce approximately 68 megawatts of energy, enough to power about 17,000 homes a year. Seventeen of the 41 turbines are located in the town of Empire.

The Blue Sky Green Field Wind Energy Center is also situated on the Niagara Escarpment. Blue Sky is located in the towns of Marshfield and Calumet (just north of the study area) and consists of 88 turbines producing 145 megawatts of energy, enough to power 36,000 homes per year. Forty-four of the 88 turbines are in the Town of Marshfield. Blue Sky has been in operation since May 2008.

23. Historic and Archeological Resources

Within the broader ICE study area, there are numerous historic resources. Wisconsin's Architecture and Historic Inventory (AHI) is a search engine that provides historical and architectural information for about 120,000 properties within Wisconsin. Listing on the AHI is not an indication of whether the property is eligible for the National Register of Historic Places (NRHP). The AHI resource indicates there are 4,135 listings for Fond du Lac County and 2,708 listings for Sheboygan County.

The Wade House Historic Site is under state ownership and is being managed by the State Historical Society for preservation. The St. Mary's Springs Academy is eligible for the NRHP and is a functioning school. Facility changes by the owner over the past decade have altered the contributing characteristics and the historic significance of this resource. Future management decisions could change the historic integrity of the site. The Sippel archaeological site directly on the corridor is a small Yankee homestead/farm in the town of Greenbush. It was occupied between 1848 and 1875. Data collection by WisDOT on this site was performed in 2014 in areas that could be affected by a WIS 23 improvement in accordance with the Section 106 Memorandum of Agreement for this project.

24. Existing Land Uses

Existing land uses in the study area are depicted on Figures 2.0-8 and -9. The WIS 23 study area passes through rural and urban landscapes. The largest urban areas in the study area are the cities of Fond du Lac and Plymouth. Agriculture is the predominant land use in the unincorporated towns, with scattered, low density housing either associated with farm operations or located in rural subdivisions served by septic and private well systems. Small areas of non-urban commercial development are also scattered throughout the study area. The majority of large woodlands and environmental corridors within the study area are located within the Kettle Moraine State Forest, Sheboygan Marsh Park and Wildlife Area, and other state and/or county owned natural areas.

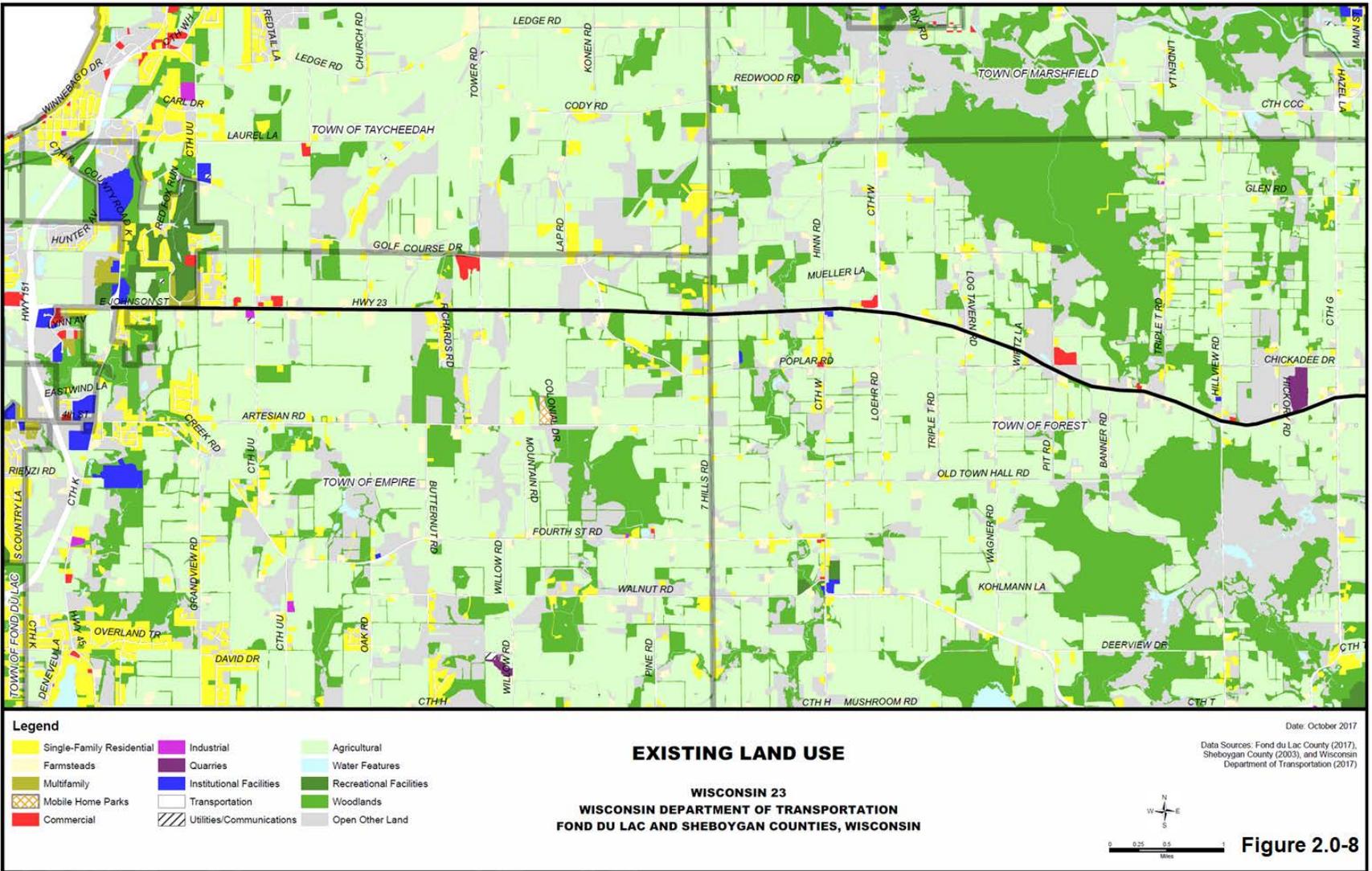
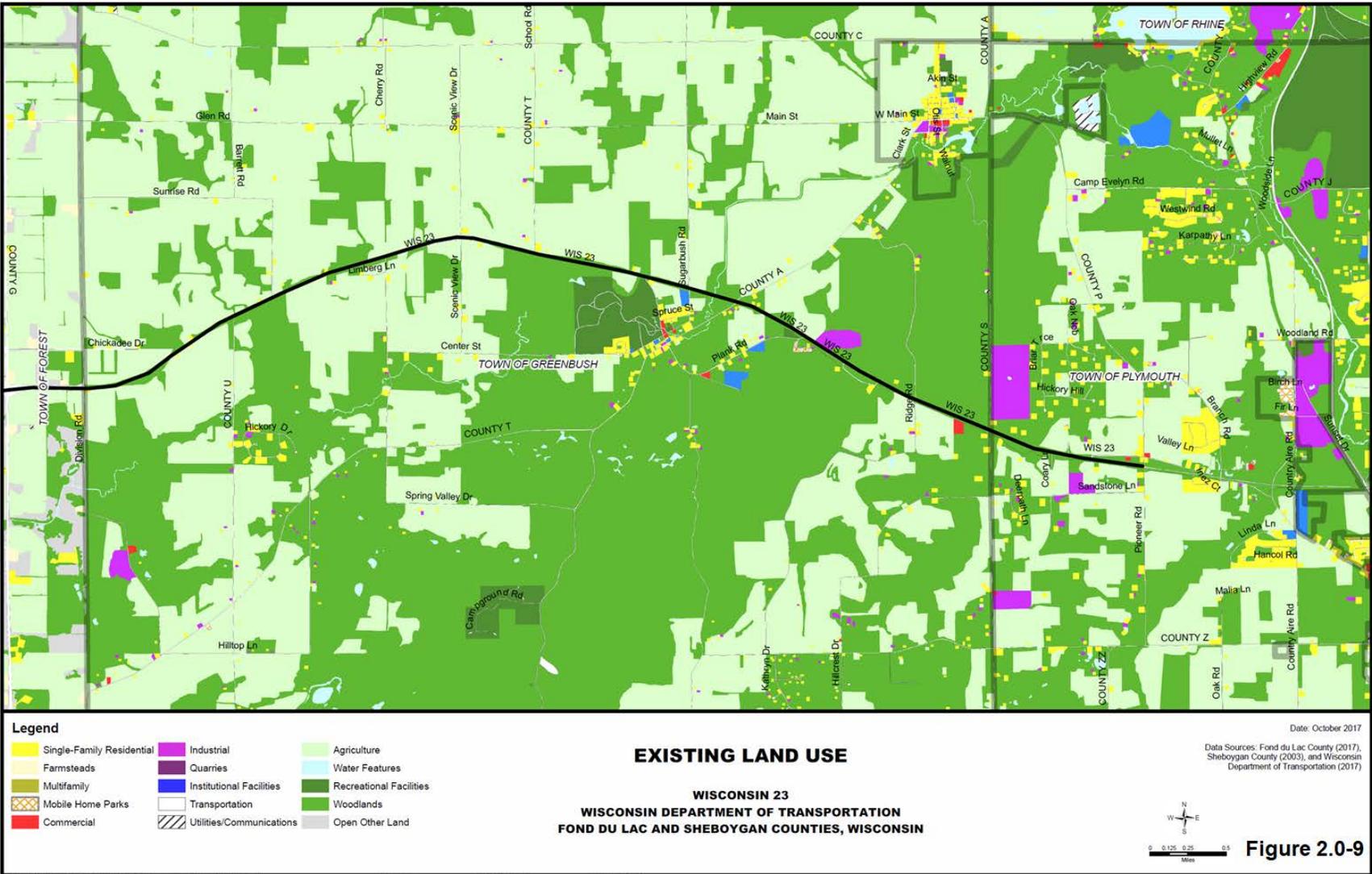


Figure 2.0-8



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Figure 2.0-9

B. Review of Federal, State, County, Regional and Local Plans and Initiatives

The study team collected and reviewed land use, transportation, and other planning documents pertinent to the study area to understand the future of land use, transportation, natural resources, and economic development as well as potential impacts that may result from the proposed project alternatives. These documents are summarized below. Plans current as of August of 2017 were used in this analysis.

Federal and State Plans and Initiatives

1. Ice Age National Scientific Reserve

The Ice Age National Scientific Reserve was established in 1964 to protect the glacial landforms and landscapes in Wisconsin. The reserve is an affiliated area of the National Park System and consists of nine units across Wisconsin, including the Kettle Moraine State Forest – Northern Unit in the study area. Most of these units are connected by the Ice Age Trail. The units protect different areas of scenic and scientific value and provide all kinds of opportunities, from studying Wisconsin's natural history at one of the interpretive centers, to hiking, camping, sightseeing and wildlife viewing.

2. WisDOT Connections 2030 Plan (2009)

Connections 2030 is the long-range transportation plan for the state that addresses all transportation modes and identifies policies and implementation priorities to aid transportation decision makers when evaluating program and project priorities. The plan identifies system-level priority corridors that serve critical sectors of the economy or major population centers, carry significant passenger and freight traffic, show significant growth in travel or economic development, and serve an important role for other transportation modes.

The Connections 2030 Plan includes the Corridors 2030 State Highway Plan that identifies a network of "Backbone" and "Connector" highways. The Backbone System includes the highest value multi-lane (or planned multi-lane) divided highways, which connect all regions and major economic centers in the state and are tied to the national transportation network. The Connector System includes high-quality two- and four-lane highways that connect all other significant economic and tourism centers to the Backbone System. WIS 23 is identified as one of these system-level priority corridors and categorized as a "Connector," referred to in the plan as the Kettle Country Corridor. Key transportation recommendations for the corridor include: improve user efficiency, mobility, and traffic movement along WIS 23 including expanding to four lanes; increase direct air service and infrastructure projects to support business airplane-capable airports; increase regional coordination and continued service, including bus connections between Madison and Green Bay and Madison and Sheboygan with stops in Fond du Lac; and enhance bicycle and pedestrian linkages and accessibility along and across facilities.

3. Wisconsin Working Lands Initiative (2009) - Currently Known as The Farmland Preservation Program

The Wisconsin Working Lands is more commonly known as the Farmland Preservation Program. The program is comprised of the following programs, all of which are administered by the Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP).

- Wisconsin Farmland Preservation Tax Credits Program provides land owners with an opportunity to claim farmland preservation tax credits which are applied against tax liability. To be eligible, acres claimed for the tax credit must be located in a farmland preservation area that is identified in a certified county farmland preservation plan.
- An Agricultural Enterprise Area (AEA) is defined as a contiguous land area devoted primarily to agricultural use and locally targeted for agricultural preservation and agricultural development. Over the two-year pilot period of this program, the state is authorized to designate up to 15 AEAs and up to 200,000 acres of farmland. Land eligible for AEA designation must be a contiguous land area, primarily in agricultural use, and located in a farmland preservation area as identified in a certified county farmland preservation plan.

4. Wisconsin Land Legacy Report (2007)

This report identifies 229 legacy places, which are those places considered to be the most important to meet the state's conservation and recreation needs over the next 50 years. One of these 229 legacy places is the Sheboygan River Marshes area, which is located within the study area. The Sheboygan River provides the common thread for linking three major wetland areas together. At the headwaters of the river is the St. Cloud Marsh, almost entirely in private ownership. A few miles downstream is the Sheboygan Marsh County Park and State Wildlife Area, which together provide over 8,000 acres of publicly owned land. Further downstream is the Kiel Marsh State Wildlife Area, which is about 800 acres in size. The uplands bordering the wetlands are primarily devoted to agriculture. Protecting the open space around and between these three wetlands would buffer them from conflicting land uses and would link them together in an ecologically valuable corridor.

5. Wisconsin Wildlife Action Plan (WWAP) (2005)

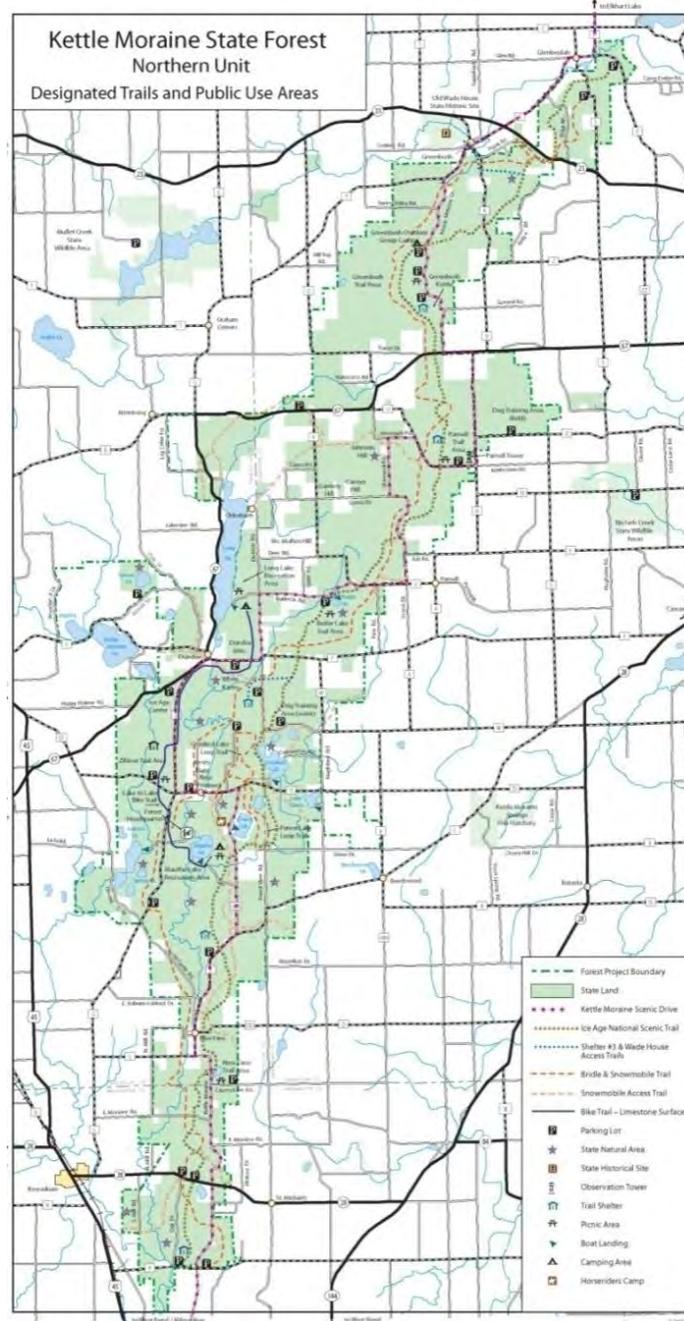
WDNR prepared the WWAP report, which discusses management opportunities to maintain and protect Wisconsin's natural landscapes and species of the greatest concern. The WIS 23 study area lies within the Southeast Glacial Plains ecological landscape. The pre-settlement vegetation of this landscape has been significantly altered by agricultural and urban development. Most of the rare natural communities that remain are associated with large moraines or in areas where the Niagara Escarpment occurs close to the surface. The plan identifies the following management opportunities to protect and restore these important features:

- Protection of the Niagara Escarpment, glacial eskers, and drumlin fields that are unique and in some cases world-renowned features.
- Restoration of large-scale oak forests and savannas, as well as to manage for forest interior species and rare fen plants in the Kettle Moraine.
- Linking scattered woodlots and controlling non-indigenous invasive species throughout the Ecological Landscape.

6. Kettle Moraine – Northern Unit Master Plan (2001)

The master plan serves as a guide for the management of the Kettle Moraine State Forest. Goals identified in the master plan include acquisition of approximately 7,000 acres of new land (see **Figure 2.0-10**), restoration activities, construction of new facilities such as shelters and overlooks, and improvements to land and resource management practices to protect wildlife and enhance recreation.

Figure 2.0-10 Kettle Moraine State Forest – Northern Unit



7. The Niagara Escarpment Inventory of Findings 1999-2001 and Considerations for Management (2002)

This report was prepared by the Natural Heritage Inventory program of the Wisconsin Department of Natural Resources' Bureau of Endangered Resources. The Niagara Escarpment is a statewide critical natural resources area because of its unique geology, the number of rare plants and animals that rely on the escarpment's distinct microclimate, and the land's sensitivity to groundwater contamination. The report is intended as a tool to evaluate the ecological significance of the escarpment and provide background for conservation efforts and management considerations. The report identified the following threats to the Escarpment: land use conflicts, development, road construction, mining, quarrying, tower placement, recreation, invasive/exotic species, hydrologic disruption, groundwater contamination, and

administrative inconsistency. The report also listed a range of management considerations that would contribute to conservation of the Niagara Escarpment's biodiversity including monitoring and management, protection and planning, communication and landowner education, and inventory needs.

Local Plans and Initiatives

8. City of Fond du Lac Comprehensive Plan (2009) and as Amended

The city of Fond du Lac future land use plan shows residential and commercial development on the east side of the city, occurring over the next 20 years. Residential development is planned to extend from the current developments on the east side of Fond du Lac to County UU, on both the north and south sides of WIS 23. Commercial and institutional development is planned for all four quadrants of the US 151/WIS 23 interchange.

Through a formal intergovernmental boundary/service agreement developed under Wisconsin State Statutes 66.30, the city of Fond du Lac and the neighboring towns of Fond du Lac, Empire and Taycheedah have identified future urban growth areas. This agreement spells out the specific areas in which urban growth will be allowed within the city and towns and how annexations to the city will be dealt with. This agreement will be a major determinant of future growth patterns within the urbanized area.

9. Long-Range Transportation and Land Use Plan for the Fond du Lac Metropolitan Planning Organization (2015)

This plan was prepared to meet the requirements of Moving Ahead for Progress in the 21st Century (MAP-21) for long-range transportation and land use in metropolitan areas. Regarding land use, this plan recommends implementing local land use plans, such comprehensive plans.

The plan identifies WIS 23 as the third most important route serving the Fond du Lac area and recommends that the metropolitan planning organization (MPO) continue to work with WisDOT to identify additional safety improvements. As an example, preferred plans for the expansion of WIS 23 include a grade separated jug-handle interchange with County K, which is part of the Passing Lane Alternative and 4-Lane On-Alignment Alternative. The plan supports expansion of WIS 23 to a 4-lane facility from Rolling Meadows Drive to Town Line Road. The expansion of WIS 23 west will accommodate projected future traffic as well as create economic development opportunities.

10. Fond du Lac Land and Water Resource Management Draft Plan (2013-2017)

The Land and Water Resource Management Plan is required by §92.10, Wis. Stats. to evaluate resource conditions and issues in Fond du Lac County and present a plan to address those issues. Key plan goals include:

- Maintaining soil productivity and reduce soil erosion and sedimentation.
- Minimizing runoff, leaching, and drift of nutrients and pesticides to surface and ground water.
- Protecting and conserving ground water quality and quantity.
- Minimizing the impacts of land disturbing and land development activities within the county.
- Reducing the impacts from runoff and storage of animal waste and feed.
- Minimizing impacts of runoff from urban areas.
- Supporting the development and coordination of lake management planning.
- Restoring and preserving critical fish and wildlife habitats.
- Minimizing the threat and spread of exotic and invasive species.
- Using less energy and improving air quality.

11. Fond du Lac Sewer Service Area Plan (2001)

Sewer service area plans serve as a basis for WDNR approval of state and federal grants for the planning and construction of wastewater collection and treatment facilities. They also serve as a basis for WDNR approval of locally proposed sanitary sewer extensions and private sewer laterals. The Fond du Lac

Sewer Service Area is forecast to have a moderate level of growth in the planning period; this plan allocates future growth area acreages within each sewer service area which are not location specific.

12. City of Plymouth Comprehensive Plan (2001) (Amended 2011)

The city of Plymouth's comprehensive plan was prepared in 2001, with an update in 2011. The land use plan identifies future residential development adjacent to WIS 23 east of County C. The city plans for future office development west of County E toward WIS 57. Agricultural preservation is planned for lands north of WIS 23 lying west of County E and lands north and south of WIS 23 west of WIS 57.

13. Village of Mt. Calvary Comprehensive Plan (2009)

The village of Mt. Calvary is located about three miles north of WIS 23. The village's plan indicates that any land considered farmland in the village is not intended to remain in that classification in the long term. The planned land use map identifies the continuation of agriculture in the near term on the village's east side. Residential and public/government uses are planned adjacent to County W.

14. Village of St. Cloud Comprehensive Plan (2009)

The village of St. Cloud is a small village located approximately three miles north of WIS 23. The village's land use plan does not anticipate additional development. Agriculture and open space are the predominant land uses identified for the majority of the undeveloped portions of the village. Existing nonresidential and residential development are anticipated to remain.

15. Village of Glenbeulah Comprehensive Plan (2008)

The village of Glenbeulah is located approximately two miles north of WIS 23. The village's 10- and 20-year land use plan indicates additional future residential development in the north and northeast portions of the village, with some additional commercial development located towards the center of the village just off County A. The village's plan also indicates that the WIS 23 expansion project could impact the village; businesses may be encouraged to locate to future interchange areas and new residents may be attracted by moderate home prices and a shorter commute to neighboring cities.

16. Town of Taycheedah Comprehensive Plan (2009)

The town of Taycheedah's plan shows the majority of town lands remaining in agricultural use, with growth concentrated along the Lake Winnebago shoreline, north of the city of Fond du Lac.

17. Town of Plymouth Comprehensive Plan (2009)

The town of Plymouth's plan shows the majority of town lands remaining in agricultural or open space use. However, the town plan identifies lands adjacent to WIS 23, north of the city of Plymouth, as future commercial development. In addition to adopting a comprehensive plan, the town and city of Plymouth entered into an agreement, similar to a boundary agreement, to establish a modified extraterritorial zoning area.

18. Town of Empire Comprehensive Plan (2007)

The town of Empire's future land use plans do not show any development along the WIS 23 corridor, except for at the intersection of County UU and WIS 23, which is planned for highway business. The remainder of town land along the WIS 23 corridor is planned for long-term agricultural, environmental corridor, and preservation.

19. Town of Greenbush Comprehensive Plan (Draft 2018 Addendum Plan Adopted in 2008)

The town of Greenbush's plan indicates a desire to preserve the majority of town lands for agricultural use, with some commercial and/or residential development planned for the County A and WIS 23 interchange and additional residential development in the village of Glenbeulah where it can be served by municipal sewer and water. The town's plan indicates that the WIS expansion project could impact the town; indicating that it is important to maintain highway access to unincorporated Greenbush, the Wade House, and the Kettle Moraine State Forest.

20. Town of Fond du Lac Comprehensive Plan (2017)

The town of Fond du Lac's land use plan anticipates that the remaining northeastern town lands will be annexed by the city of Fond du Lac over the course of the planning period. On the west end, the town plans for continued growth of commercial areas along the WIS 23 corridor.

21. Town of Forest Comprehensive Plan

The town of Forest was named after the splendid forests of hard timber that originally covered much the larger portion of its surface. In the southeast of the town is the Mullet River, Mullet Lake, and thousands of acres of natural wildlife area. Minimal development is anticipated for this township.

22. Town of Marshfield Comprehensive Plan (2009)

The town of Marshfield land use plan anticipates few land use changes from existing uses; however, the plan indicates some additional development may occur around the village of Mt. Calvary. In addition, the town of Marshfield, along with neighboring town of Calumet, is the site of the Blue Sky Green Field Wind Farm, which includes 88 Vestas Wind Systems. The existence of these turbines is somewhat controversial; the town therefore established a Wind Turbine Committee to 'monitor' or 'mediate' issues that residents have concerning the turbines, such as noise.

23. Fond du Lac County Comprehensive Plan

Fond du Lac County's comprehensive plan dates from the 1960s. Because all towns in the county administer their own zoning ordinances, there is little need for a county-wide plan. The county does not intend to update the plan in the near term.

24. Fond du Lac County Outdoor Recreation and Open Space Plan (2013)

This plan is intended to guide the county recreation and park development and enable it to participate in state and federal recreation grant programs. Within the study area, the plan has four goals:

1. Establish and maintain a countywide system of parks and trails that will meet the need of Fond du Lac County residents.
2. Establish and maintain a system of parks and recreational facilities that help to conserve the natural resources and environment of Fond du Lac County and make them available for recreational use and/or conservation purposes.
3. Operate and improve the County Parks System, and other county recreational facilities, in an efficient and organized manner.
4. Promote Fond du Lac County parks, open spaces and recreation trails to gain maximum utilization and appreciation of these facilities.

25. Fond du Lac County Farmland Preservation Plan (2012)

Fond du Lac County updated its Farmland Preservation Plan in 2012. Agricultural land is the top land use type in all of the 21 Fond du Lac County towns. Agricultural land comprises 60.2 percent of all land in the county.

There are various natural and human activities affecting the rural areas of the county. Many of these activities are responsible for emerging land use trends. These emerging land use trends and the changing demographics can have an effect on the county's farmland preservation and agricultural development activities. All these land use activities have an effect on farmland preservation and agricultural development. Of all these land use issues, nonfarm residential development in rural areas is the largest issue. Nonfarm residential development in agricultural areas will make farmland preservation more difficult creating obstacles for agricultural expansion. Residential development slowed significantly between 2008 and 2013 but will likely rebound in the years ahead.

26. Sheboygan County Comprehensive Plan (2009) Amended (2014)

This plan seeks to generate goals for attaining a desirable development patterns and devise strategies and recommendations the county can follow to achieve its desired development pattern. Because all local communities in Sheboygan County administer their own local ordinances (zoning, building permits, etc.) the county's future land use map is composed of each local community's future land use map.

27. Sheboygan County Comprehensive Outdoor Recreation and Open Space Plan (2015)

This plan is intended to guide local communities and Sheboygan County in the maintenance and development of outdoor recreation facilities. In addition, this plan provides five-year eligibility for participation in the state of Wisconsin stewardship programs. High priority future land acquisitions within the study area include:

- Riparian areas along the North Branch of the Milwaukee River, Silver Creek, and Nichols Creek.
- Tracts of forest contiguous to the Kettle Moraine State Forest–Northern Unit.
- Riparian areas along Mink Creek.
- Riparian areas and wetlands along the Onion River and Ben Nut Creek.
- Tracts of forest adjacent to the Broughton Sheboygan Marsh Park and Wildlife Area.
- Land adjacent to the La Budde Creek State Wildlife Area.
- Land adjacent to Gerber Lakes Public Fish and Wildlife Area.
- Land adjacent to the Kiel Marsh Wildlife Area.
- Land adjacent to the Schuett Creek State Fishery Area and the Rhine Center Bog Natural Area.
- Riparian areas along the Sheboygan River

28. Sheboygan County Farmland Preservation Plan (2013)

This plan was developed to aid in the preservation of productive agricultural lands for continued agricultural use and the protection of farm operations from conflict with incompatible uses, sustaining agriculture as a viable part of the county's economy. The plan identifies agricultural preservation areas and agricultural transition areas. Within the study area, approximately half of the town of Greenbush and about two-thirds of the town of Plymouth have been identified for agricultural preservation.

29. Sheboygan County Natural Areas and Critical Resources Plan (2004)

This plan provides an inventory of the agricultural, natural, and cultural resource features in Sheboygan County that may affect local planning processes. The proposed policies and programs outlined in the plan are intended to preserve, enhance, and further protect the coastal resources of Lake Michigan.

30. Sheboygan County Land and Water Resources Management Plan (2015)

Sheboygan County encompasses 331,000 acres. The county is bordered on the east by Lake Michigan and on the west by the Kettle Moraine State Forest and the northwest by the Sheboygan Marsh. In between lays fertile farmland with 57 percent of the county's land used for cropland and pastures. The ultimate goal of this plan is to significantly remove sediment and phosphorous delivery to the waters of Sheboygan County. The new state standards and prohibitions provide the framework to address these goals.

C. Local Regulations and Tax Incremental Financing Districts

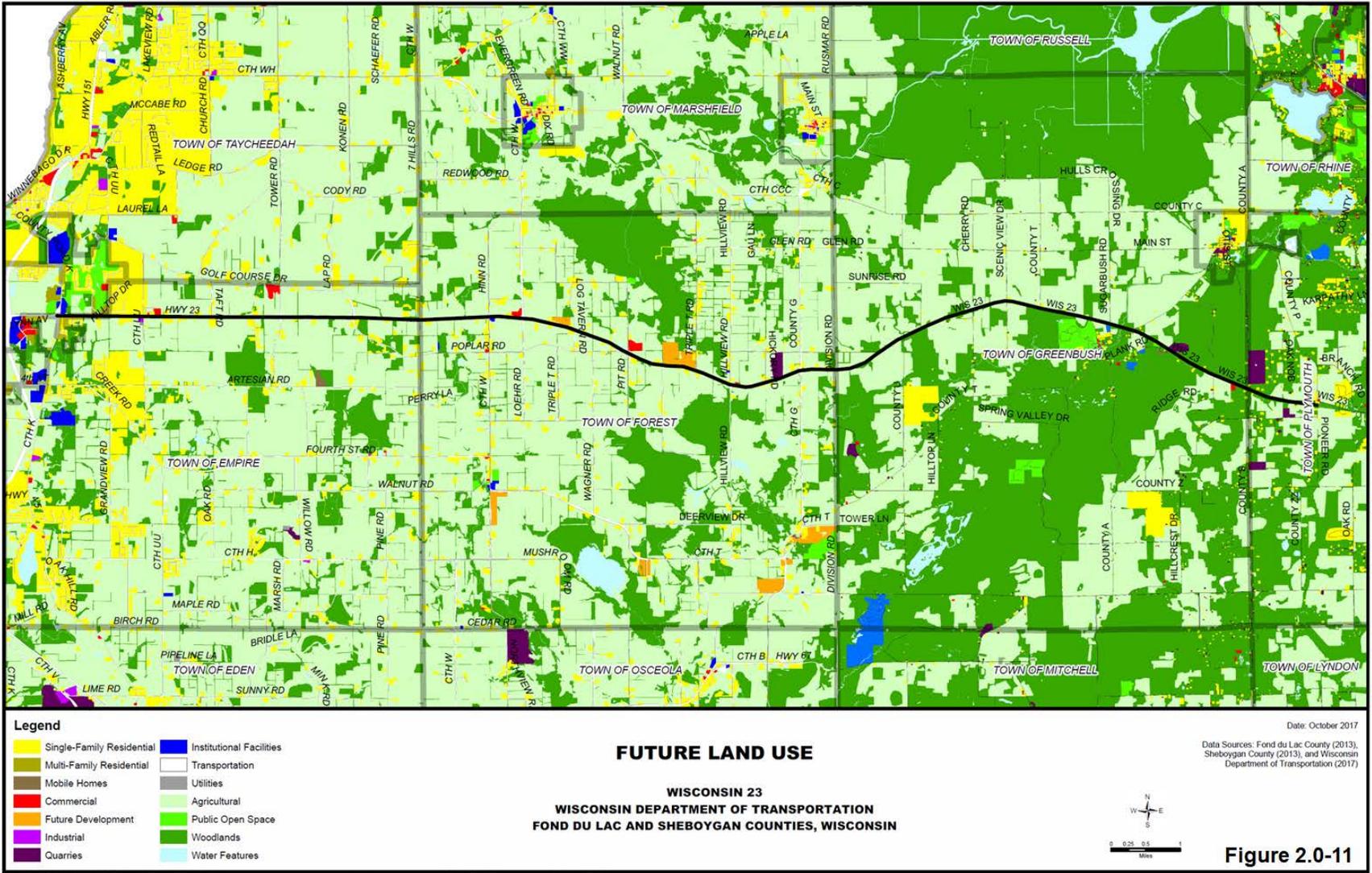
Table 2.0-17 identifies local land use regulations and the number of designated tax incremental finance districts applicable within the study area. Understanding how land is regulated in each study community is important to gain insight into how land is planned to develop and where. It is also important to identify the location of tax incremental districts as these areas are slated for near term development.

Neither Fond du Lac nor Sheboygan County administers countywide zoning, but both counties administer other countywide ordinances including subdivision, shoreland zoning, floodplain zoning, and erosion control and stormwater management.

Table 2.0-17 Land Regulations and Tax Incremental Financing (TIF) Districts

	Zoning Ordinance ¹	Land Division Ordinance ¹	Shoreland, Stormwater and Floodplain Ordinances ^{1,3}	Adopted Official Map ¹	Number of Active TIF Districts ²
City of Fond du Lac	City Zoning	Yes	Shoreland/wetland Zoning	Yes	10
City of Plymouth	City Zoning	Yes	Shoreland-Wetland Zoning	Yes	3
Town of Taycheedah	Town Zoning	Yes	Erosion Control and Stormwater Management	No	None
Town of Plymouth	Town Zoning	Yes	No	No	None
Town of Empire	Town Zoning	Yes	No	No	None
Town of Greenbush	Town Zoning	No	No	No	None
Town of Fond du Lac	Town Zoning	Yes	No	Yes	None
Town of Forest	Town Zoning	No	No	Yes	None
Town of Marshfield	Town Zoning	No	No	No	None
Village of Mt. Calvary	Village Zoning	Yes	No	No	None
Village of St. Cloud	Village Zoning	Yes	No	Yes	None
Village of Glenbeulah	Village Zoning	No	Shoreland Zoning	Yes	1
Fond du Lac County	None	Yes	<ul style="list-style-type: none"> • Shoreland Zoning • Floodplain Zoning • Erosion Control and Stormwater Management 	No	N/A
Sheboygan County	None	Yes	<ul style="list-style-type: none"> • Shoreland Zoning • Floodplain Zoning • Erosion Control and Stormwater Management 	No	N/A
<p>Sources: ¹Wisconsin Department of Administration, 2017 ²Wisconsin Department of Revenue, 2017 ³Town websites, October, 2017</p>					

Figure 2.0-11 illustrates the future land use as depicted by current local land use plans.



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3.0 INDIRECT EFFECTS ANALYSIS

The Council on Environmental Quality (CEQ) defines indirect effects as project impacts that are “caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable.” Indirect effects may include growth inducing or other effects related to changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems.

This indirect and effects analysis considers the No Build Alternative, the Passing Lane Alternative, the Hybrid Alternative, and the 4-lane Alternative. It also reviews possible effects with the improvements associated with corridor preservation.

The alternatives under consideration will have a variety of indirect effects. Indirect effects most likely to occur and enabled by these alternatives include:

- Changes in residential and commercial development patterns due to capacity and access changes.
- Changes in traffic routing and volumes on roadways in the study corridor.
- Changes in farming management practices.

The following sections summarize the indirect effects likely to be incurred by the alternatives under consideration. They include the responses gathered at both the 2012 and 2017 expert panel workshops.

A. No-Build Alternative

1. Development

a. General Development Pattern

Expert panelists stated that under the No-Build Alternative, future land development within the WIS 23 study area will most likely occur in the locations planned for in adopted comprehensive plans. Panelists further indicated that the amount of available land planned for development in comprehensive plans is adequate to accommodate future development. Adopted comprehensive plans indicate that future development will primarily occur in undeveloped areas at the periphery of cities and villages. While the majority of outlying town lands are planned to remain as agriculture, open space, or natural areas, the following areas are planned for future development in the vicinity of WIS 23:

- Residential and commercial development south of the town of Taycheedah, near County UU.
- Residential development in the town of Forest on the north side of WIS 23, east of Triple T.
- Scattered and dispersed residential development east of County G, proximate to the KMSF-NU.
- Residential development in Greenbush at the intersection of County A and WIS 23, east of the Wade House Historic Site.
- Commercial development along the WIS 23 frontage in the town of Plymouth, west of the city of Plymouth.

Areas where panelists identified potential development that may occur under the No-Build Alternative beyond that designated in adopted comprehensive plans are depicted on Figures 3.0-1 and 3.0-2. As is required under state statutes, local zoning supports development and preservation as indicated in adopted comprehensive plans. While certain areas have been planned and zoned for development in the study area, access to urban services and the real estate market will ultimately drive the pace, location, and intensity of future development.

b. Residential Development

Expert panelists stated that the location of future residential development will generally occur in locations planned by study area communities. As indicated in adopted comprehensive plans, new residential development in the study area is planned primarily in city and village growth

areas, such as the east side of the city of Fond du Lac, the east and west sides of the city of Plymouth, and the north side of the village of Glenbeulah. Small areas of residential development are planned in the towns of Greenbush and Empire. Sheboygan County indicated possible scattered residential development proximate to the KMSF-NU. County farmland preservation zoning limits minimum lot sizes to between 10 to 35 acres.

Expert panelists identified areas where residential development may occur under the No-Build Alternative in Figures 3.0-1 and -2. Panelists indicated that scattered, nonfarm residential construction has occurred over the past couple of decades, and reduced the amount of woodlands, natural areas, and farmland in the study area. Panelists suggested that low land prices and inadequate land use controls may have encouraged this trend. More recently adopted farmland preservation plans and zoning regulations will likely slow this trend. However, areas not protected by conservation or farmland preservation zoning may be at risk for future residential development.

c. Commercial Development

Expert panelists indicated that the location of future commercial development will generally occur in locations planned by study area communities. The city of Plymouth plans for substantial commercial growth outside of the study area on its east side to the south of WIS 23 and adjacent to WIS 57. The city of Fond du Lac plans for future mixed-use development at the northeast quadrant of the WIS 23/US 151 interchange. The town of Forest anticipates a small area of commercial development at the juncture of County G/County T, and the town of Plymouth anticipates commercial development along WIS 23 corridor to the northeast of the city of Plymouth.

Some panelists identified a few areas of potential future small scale highway-oriented commercial development that are *not* planned by local communities. These are located primarily at county highway intersections with WIS 23, as well as an area of possible future commercial development on the southeast side of Fond du Lac where future residential development is now planned by the city.

d. Industrial Development

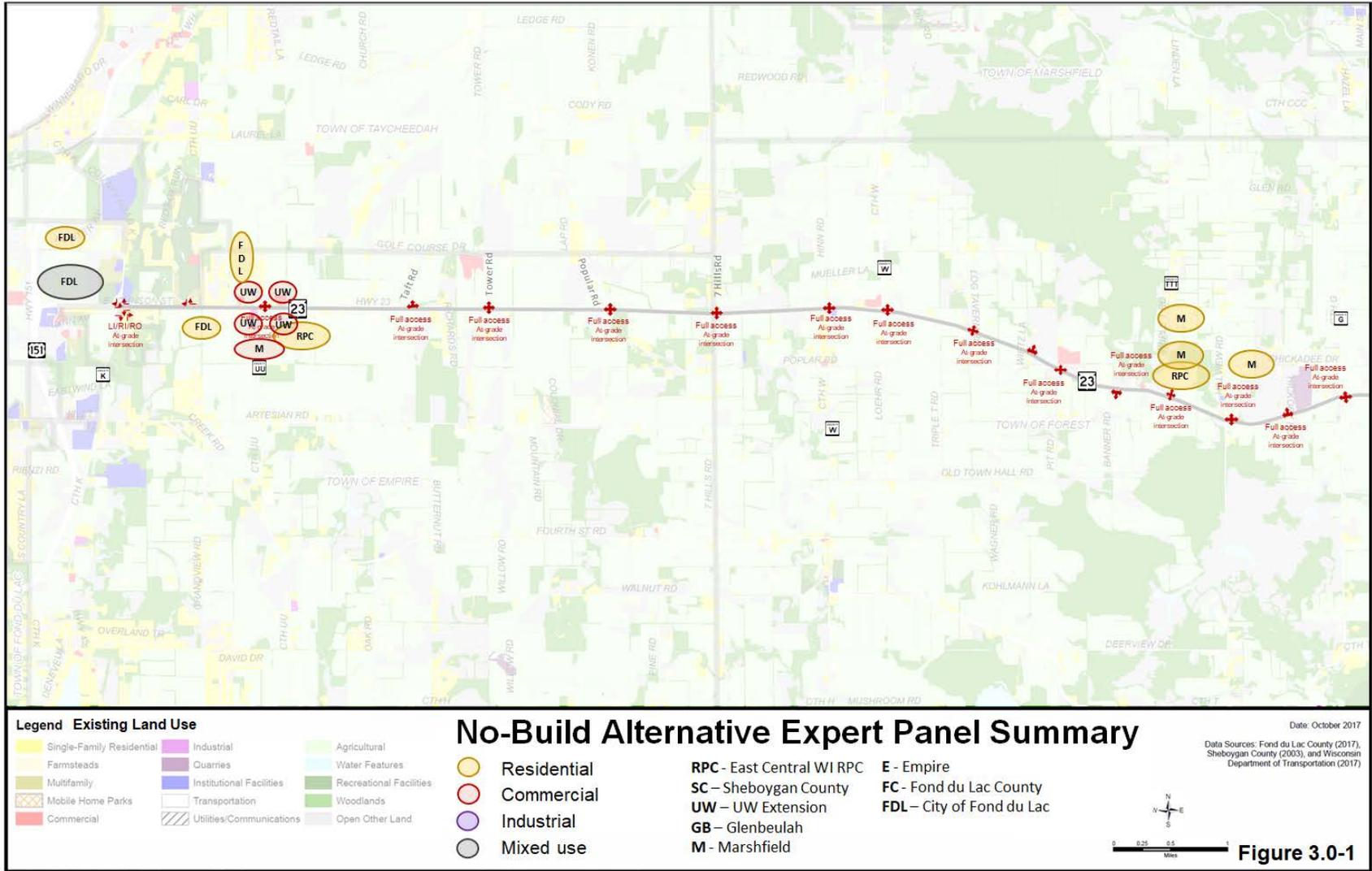
Very little industrial development is planned to occur near the WIS 23 corridor. The city of Plymouth has identified industrial growth areas on the south side of the city in the study area and additional areas outside (east of) the study area. Members of the expert panel associated with economic growth organizations indicated that because WIS 23 is a 2-lane corridor, marketing efforts with industry tend to focus industry to planned and existing business parks with more direct access to 4-lane highways. Expert panelists indicated that industrial development will likely occur in areas planned for industrial development under the No-Build Alternative, which is currently away from the WIS 23 corridor.

a. Institutional Development

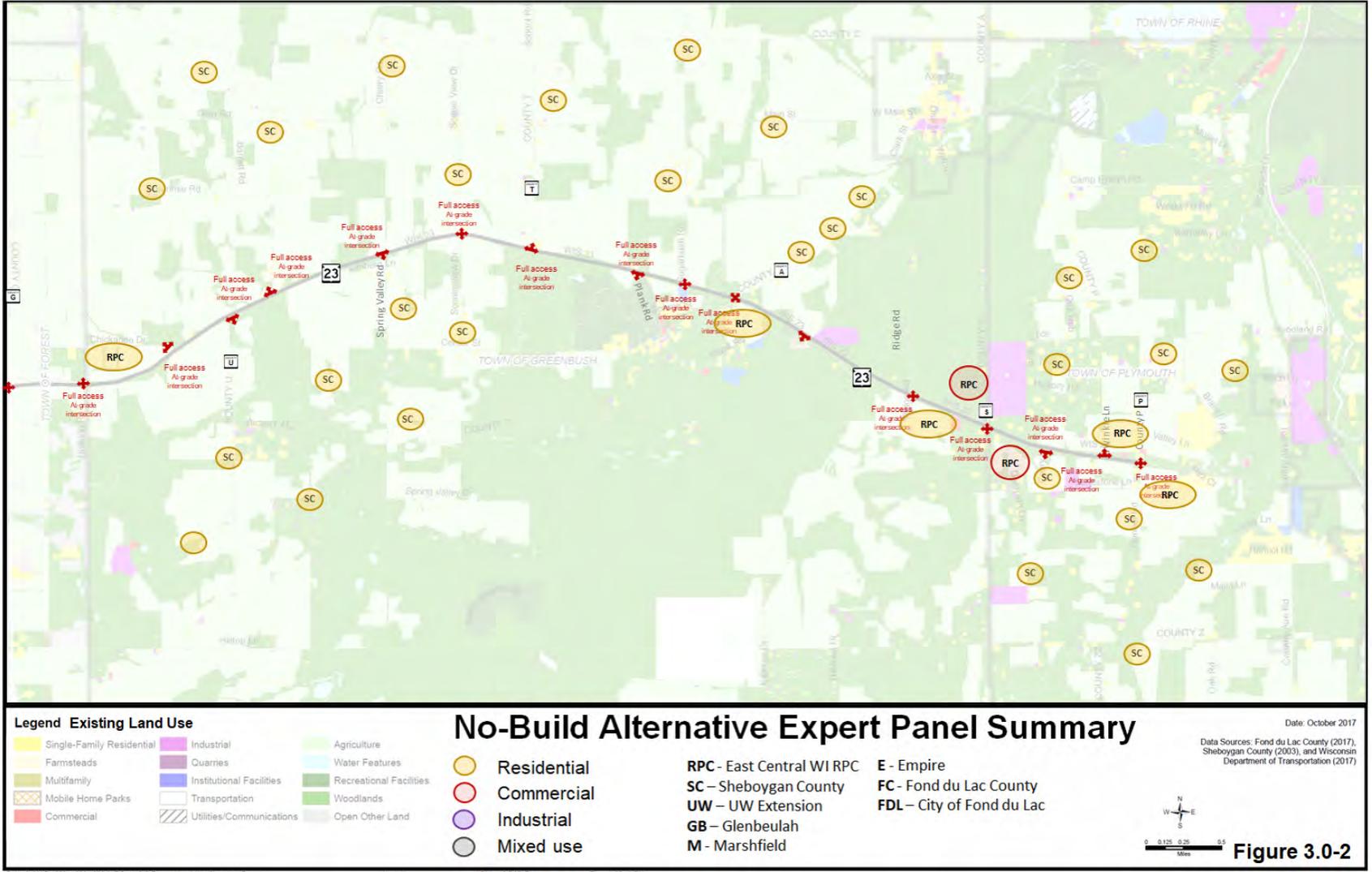
Small scale institutional development to serve local needs under the No-Build Alternative is anticipated to occur as needed, generally based on the pace of new residential development.

2. Community Character

The No-Build Alternative is not expected to significantly alter the existing character of study area communities, as development trends are likely to generally continue. These trends are likely to continue if study area communities follow their adopted long range comprehensive plans which account for and are designed to accommodate modest growth trends. Small scale highway-oriented commercial development may have a slight impact on rural character as local zoning ordinances do not contain provisions that protect community character.



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3. Agriculture

Current agricultural trends are likely to continue with the No-Build Alternative. These include:

- The consolidation and expansion of farm operations, and the demand for tillable land by these operations.
- The continued decrease in the number of farm operations.
- The continued decrease of cropland under production.

Farmland preservation plans prepared by Fond du Lac and Sheboygan counties aid in the preservation of productive farmland and protect farm operations from conflict with incompatible uses. However, the degree to which these plans are followed will vary depending on evolving growth policies and other land use regulations. The rate at which farmland is converted to nonagricultural uses will largely be a factor of economic conditions and each community's desire to preserve agriculture.

Panelists indicated that farmland could likely be lost in the towns adjacent to urban areas (i.e., Taycheedah, Plymouth, and Empire), which may experience development pressure.

The expert panel indicated that the decision to sell farmland is often more related to personal circumstances in the farmer's life. Who the land is sold to and how it is used is difficult to predict. As noted previously, panelists indicated that sometimes the acreage is used to support larger farm operations, while the residence and outbuildings become part of a hobby farm.

4. Wetlands

Expert panelists indicated there would be no impact to wetland areas under the No-Build Alternative. Minimal amounts of wetlands could be degraded or lost to future development. The quality of wetlands in or adjacent to planned development areas may be minimally impacted by stormwater runoff from impervious surfaces associated with new development. Wetlands have strong protections under federal and state law.

5. Water Quality

The study area is located almost entirely within the Sheboygan River basin, which has been identified by the USEPA as an Area of Concern. Areas of Concern are geographic areas that are severely degraded, often resulting from water contamination from chemicals such as PCBs and heavy metals or excessive nutrient contributions. The main land uses and practices within the Sheboygan River basin that have contributed to adverse environmental conditions include agricultural and urban runoff, municipal and industrial discharges, wetland removal, and shoreline modification. In addition, as stated in the Niagara Escarpment Inventory of Findings Report, the Escarpment area is sensitive to groundwater contamination because of the limited soil cover over bedrock.

Panelists indicated that under the No-Build Alternative, impacts to surface water quality and groundwater recharge areas are not anticipated beyond that associated with planned development in city and village growth areas and current trends in rural residential land development.

6. Upland Habitat

a. Woodlands and Ecologic Resources

Much of the woodlands in the study area are located within the KMSF-NU. The forest has been identified as an area of scenic and scientific value and is protected as a unit of the Ice Age National Scientific Reserve. Numerous areas with geographic features of scientific value are located within the study area but are not yet within or protected as part of the Ice Age National Scientific Reserve, including the interlobate moraine. These areas contain woodlands, wetlands, streams, grasslands, kettles, kames, and lakes.

A portion of the Niagara Escarpment is also located in the study area. Because of the distinctive geology of this natural feature, a number of unique plant and animal species rely on the integrity of the escarpment. As indicated in the Niagara Escarpment Inventory of Findings report, the escarpment's ecosystems have been threatened by development in Wisconsin, and in the upper peninsula of Michigan, New York, and Canada. The escarpment ridge is located just east of the city of Fond du Lac in an area planned by the city of Fond du Lac for future residential development. The town of Empire is currently purchasing conservation easements in the escarpment area. In the future, there could be residential development pressure that may impact woodlands and ecological resources in the vicinity of the Niagara Escarpment.

Panel members indicated that there will be minimal impact to woodlands under the No-Build Alternative because of new development. Such development, particularly limited rural residential, could occur in woodlands or alter woodland and wildlife habitat areas. The impact will mainly be because rural residential development occurs in areas planned and zoned for rural residential development. Impacts include habitat fragmentation and reduction of the natural aesthetic caused by residences and woodland clearing on the face or top of the escarpment.

b. Glacial Features

There are numerous glacial features throughout the study area. There will likely be minimal impact to important glacial features under the No-Build Alternative because there will be a limited amount of new development in areas where prominent glacial features are present. These impacts would be reduced if the WDNR implements its plans to acquire 7,000 acres of new land around the KMSF-NU.

7. Threatened and Endangered Species

As mentioned, within the 19.1-mile WIS 23 corridor area there are four federally listed plant and animal species listed as either threatened or experimental population and 19 plant and animal species state listed as either threatened, endangered, or special concern in the area between Fond du Lac and Sheboygan counties. The majority are located in the towns of Plymouth and Greenbush. The No-Build Alternative is not expected to substantially impact these populations because of absence of land-disturbing development activity indirectly related to the No-Build Alternative.

8. Historic and Archaeological Resources

Panelists indicated access to the St. Mary's Springs Academy has become more problematic under the No-Build Alternative because of the recently installed left-in/right-in/right-out access restrictions at the County K intersection. Existing access to the Wade House Historic Site via WIS 23 currently poses traffic safety issues. It was anticipated by the expert panel that the Wade House Historic Site, functioning as a living historic site, could be negatively impacted by growing traffic congestion and safety issues under the No-Build Alternative because of the difficulty accessing the site. Because the historic structures on the NRHP within the site are distant from the roadway, there would be no direct effect to the historic resources in the historic site.

The No-Build Alternative would not require the area occupied by the Sippel archaeological site, therefore, there would be no direct impact to the site. Known archaeological resources are protected from disturbance by state and federal regulations.

9. Air Quality

Motor vehicles contribute several pollutants listed in the NAAQS. These include the following:

- a. Nitrogen oxides react with ammonia, moisture, and other compounds to form nitric acid vapor and related particles. These compounds can affect lung tissue.
- b. Volatile Organic Compounds (VOC) combine with oxides of nitrogen, react and create ozone. While beneficial in the upper atmosphere, ozone irritates the respiratory system at ground level. According to a 2005 USEPA report, about 26 percent of VOCs come from on-road motor vehicles.

- c. Carbon monoxide reduces the blood's ability to deliver oxygen to the body. Motor vehicle travel is the major contributor of carbon monoxide in the United States.

Other pollutants are also discussed in this LS SEIS. With the No-Build Alternative, average daily traffic volumes on WIS 23 will increase from 1 to 32 percent by the year 2040. Corresponding to the increased WIS 23 traffic volumes will be increased side road volumes that both feed WIS 23 and lead to destinations from WIS 23. Motor vehicle technology and cleaner fuels have been leading to a reduction in motor vehicle exhaust pollution. However, increased vehicle volumes may result in additional emissions.

As mentioned, USEPA designated Sheboygan County a marginal nonattainment area for ground level ozone under the 2008 eight-hour standard for that pollutant. Such emissions could affect Sheboygan County's nonattainment status. The conformity analysis indicates the Sheboygan Area Transportation Plan is consistent with the approved motor vehicle emissions budgets for air quality.

10. Trails

The Old Plank Road Trail is a 17-mile multiuse trail that parallels WIS 23 from Sheboygan to Greenbush, linking with the IAT in the KMSF-NU. Other trails in the study area include the IAT, the State Equestrian Trail, and a snowmobile trail crossing WIS 23 between Plank Road and County S.

Panelists indicated that the No-Build Alternative would have no impact on area trails. The study team counters that the No-Build Alternative maintains the existing at-grade IAT/State Equestrian Trail crossing of WIS 23, and that crossing is difficult.

Also, the proposed extension of the Old Plank Road Trail west to Fond du Lac would not occur with the No-Build Alternative, decreasing trail connectivity.

11. EJ Populations

Minority and low-income populations are located at the ends of the indirect effects study area in the cities of Plymouth and Fond du Lac. Several census tracts in the study area also have a greater proportion of elderly individuals (i.e., age 65 and over) when compared to county averages. an EJ population, but it is FHWA's policy to also consider the elderly and disabled along with EJ populations.

The study team determined that minority and low-income populations will not be disproportionately adversely impacted by the No-Build Alternative because generally employment and social services are available in Fond du Lac and Plymouth where such population concentrations occur and therefore travel on WIS 23 is generally not required. Conversely, elderly populations may be more adversely affected by increased congestion and decreased safety because they are concentrated in the central portion of the indirect effects study area and need to travel to the urban areas at the ends of the study area for services.

B. Passing Lane Alternative

1. Development

a. General Development Pattern

Expert panelists indicated that under the Passing Lane Alternative, future land development within the WIS 23 study area will most likely occur in the locations planned for in adopted comprehensive plans. Panelists further indicated that the amount of land planned for development in comprehensive plans is adequate to accommodate future growth needs.

Adopted comprehensive plans indicate that future development will primarily occur in undeveloped lands at the periphery of cities and villages. While the majority of outlying town lands are planned to remain as agriculture, open space, or natural areas, the following areas are planned for future development in the vicinity of WIS 23:

- Residential and commercial development at the south end of the town of Taycheedah, near County UU.
- Highway commercial development at the intersection of County UU and WIS 23 in the town of Empire.
- Residential development in the town of Forest on the north side of WIS 23, east of Triple T.
- Scattered and dispersed residential development east of County G, proximate to the KMSF-NU.
- Residential development in Greenbush at the intersection of County A and WIS 23, east of the Wade House Historic Site.
- Commercial development along the WIS 23 frontage in the town of Plymouth, west of the city of Plymouth.

Areas where panelists identified potential development that may occur under the Passing Lane Alternative beyond that designated in adopted comprehensive plans are depicted on Figures 3.0-3 and-4. As is required under state statutes, local zoning supports development and preservation as indicated in adopted comprehensive plans. While certain areas have been planned and zoned for development in the study area, access to urban services and the real estate market will ultimately drive the pace, location, and intensity of future development.

b. Residential Development

Expert panelists indicated that the pace of residential development will generally occur at the same pace as with the No-Build Alternative. Individual comments indicated that other factors, such as the economy and buyer preferences are more likely to influence the pace of residential development.

Expert panelist indicated that residential development with the Passing Lane Alternative is likely to occur at the same dispersion/concentration as with the No-Build Alternative. The panelists further indicated that residential development with the Passing Lane Alternative is likely to occur at a similar density as with the No-Build Alternative. Expert panelists identified areas where residential development may occur under the Passing Lane Alternative in Figures 3.0-3 and-4.

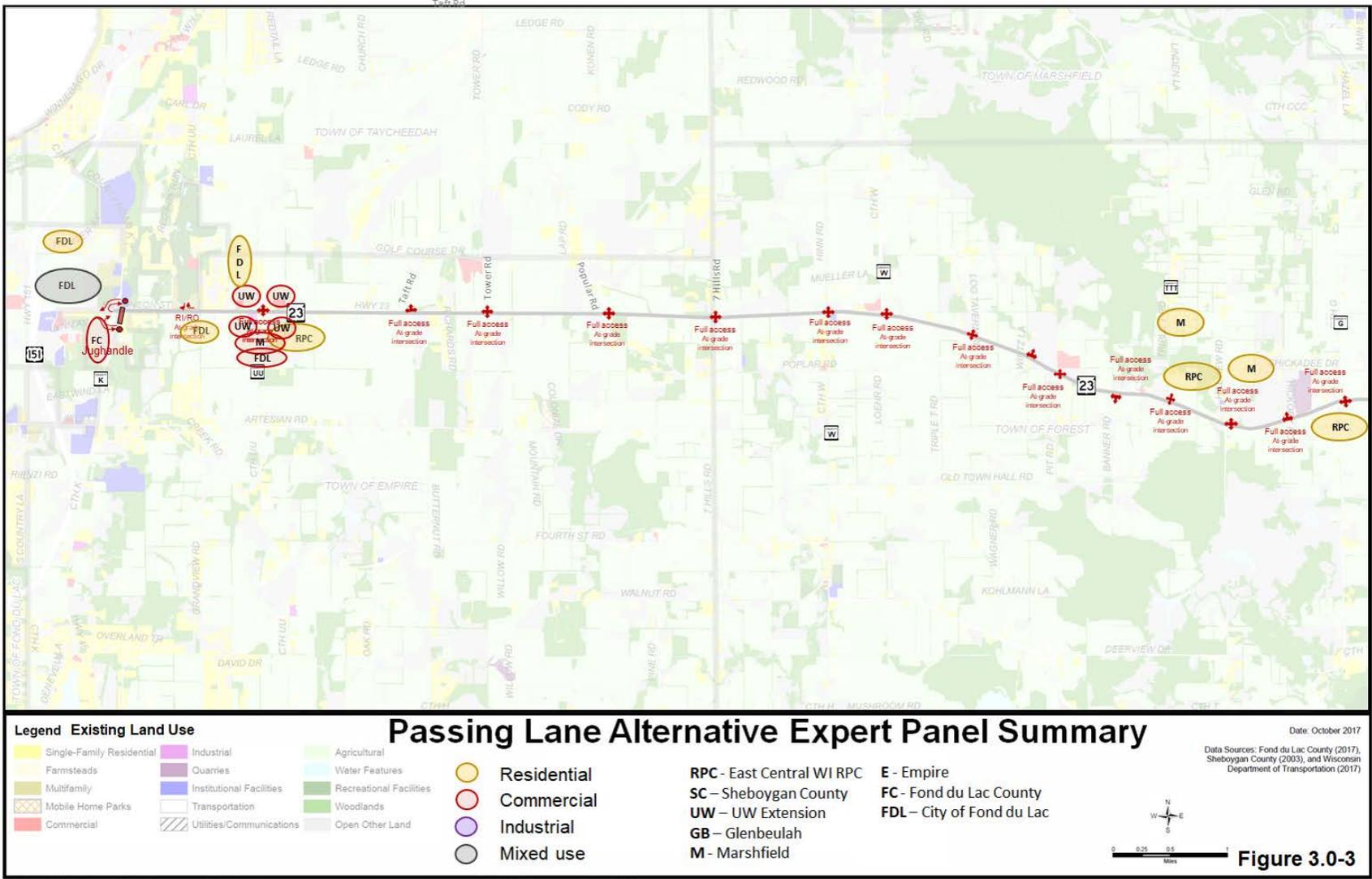
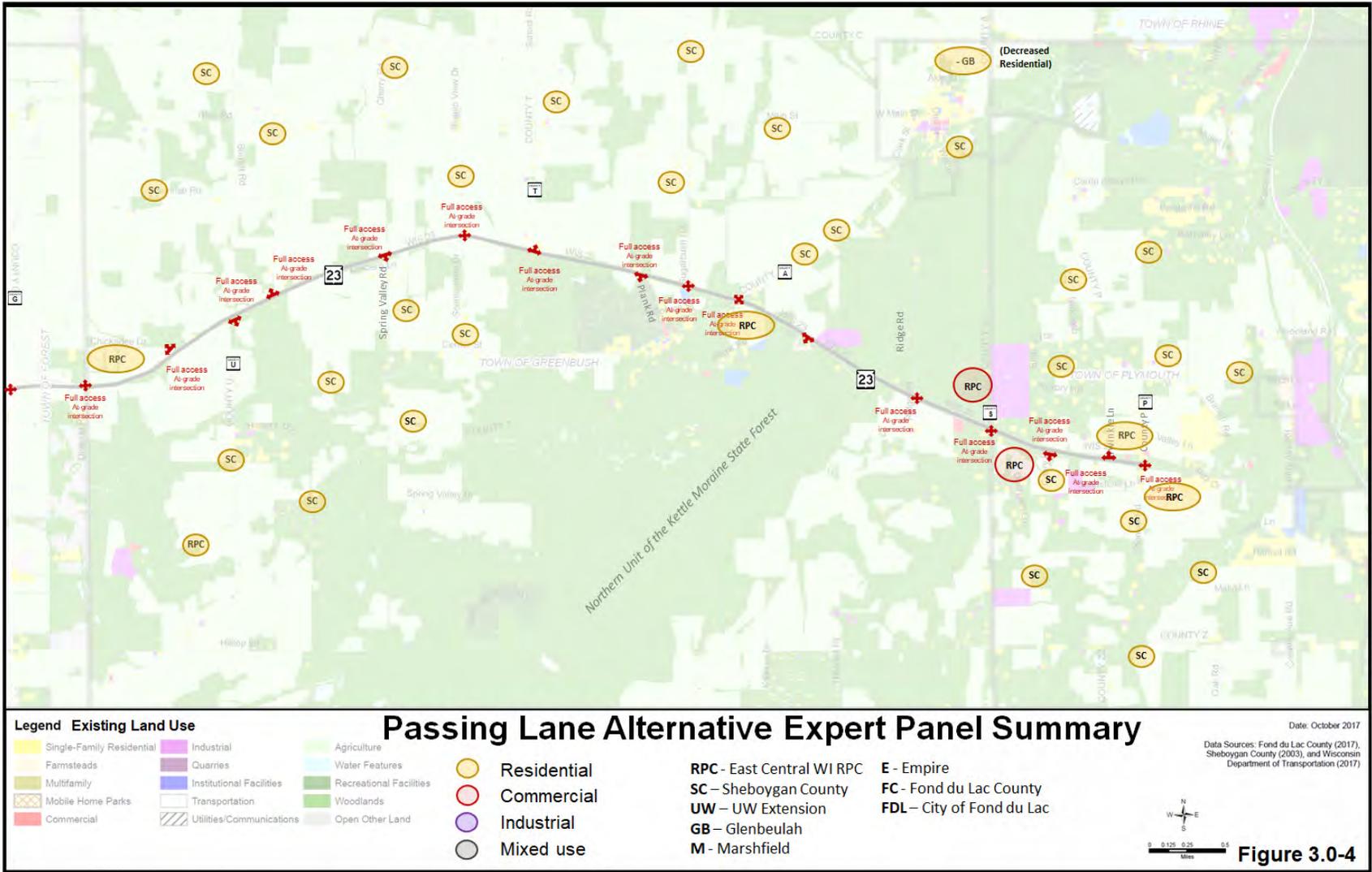


Figure 3.0-3

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c. Commercial Development

Expert panelists indicated that the location of future commercial development will generally occur in locations planned by study area communities. This includes future mixed-use development at the northeast quadrant of the WIS 23/US 151 interchange, a small area of commercial at the juncture of County G/County T, and commercial development along WIS 23 corridor northeast of the city of Plymouth. Some panelists identified a few areas of potential future small-scale highway-oriented commercial development that are *not* planned by local communities, primarily at county highway intersections with WIS 23.

d. Industrial Development

Very little industrial development is planned to occur near the WIS 23 corridor. Panelists indicated that the pace and scale of industrial development with the Passing Lane Alternative is likely to be similar to the pace and scale of industrial development with the No-Build Alternative.

e. Institutional Development

Small scale institutional development to serve local needs under the Passing Lane Alternative is anticipated to occur as needed, generally based on the pace of new residential development.

f. Rural Character

The Passing Lane Alternative is not expected to significantly alter the existing character of study area communities, as existing development trends are likely to generally continue. The majority of expert panelists indicated there would be no change in the rural character of the corridor when compared with the No-Build Alternative. Some indicated that shortened commute times could influence development, which could degrade the rural character.

2. Agriculture

Current agricultural trends are likely to continue with the Passing Lane Alternative. These include:

- The consolidation and expansion of farm operations, and the demand for tillable land by these operations.
- The continued decrease in the number of farm operations.
- The continued decrease of cropland under production.

Farmland preservation plans prepared by Fond du Lac and Sheboygan counties aid in the preservation of productive farmland and protect farm operations from conflict with incompatible uses.

Expert panelists were divided about how much farmland would be under production with the Passing Lane Alternative. About half said there would be less land under production, and the other half said that there would be about the same amount of land under production as with the No-Build Alternative. Some panelists indicated that some farms have already stopped producing because of the land purchased by the state in association with the 2014 LS SFEIS. (Note that 17 of the 18 farm relocations associated with the 2014 decision have already occurred.) About half of the panelists felt the Passing Lane Alternative would have a negative impact on farmland, with the other half indicating no or positive impacts.

3. Wetlands

With the Passing Lane Alternative, half the expert panelists indicated that there would be no impact to wetland areas while the other half indicated there would be a negative impact to wetland areas. Direct impact would amount to about 5 acres of wetland losses. The quality of wetlands in or adjacent to planned development areas may be minimally impacted by stormwater runoff from impervious surfaces associated with new development. Wetlands have strong protections under federal and state law.

4. Water Quality

Panelists indicated that with the Passing Lane Alternative, no impacts to surface water and groundwater recharge areas are anticipated beyond that associated with planned development in city and village growth areas.

5. Upland Habitat

a. Woodlands and Ecologic Resources

As mentioned, much of the woodlands in the study area are located near or within the KMSF-NU and along the Niagara Escarpment.

Most expert panel members indicated that there will be no additional impact to woodlands with the Passing Lane Alternative when compared to the No-Build Alternative. Some indicated that there would be a negative impact. Impact patterns would be similar to those discussed under the No-Build Alternative. Impacts would mainly result from additional rural residential development in areas planned and zoned for rural residential development.

b. Glacial Features

There are numerous glacial features throughout the study area. There will likely be minimal impact to glacial features under the Passing Lane Alternative because there will be a limited amount of new development in areas where prominent glacial features are present. These impacts would be reduced if the WDNR implements its plans to acquire 7,000 acres of new land around the KMSF-NU.

6. Threatened and Endangered Species

As mentioned, within the 19.1-mile WIS 23 corridor area there are four federally listed plant and animal species listed as either threatened or experimental population and 19 plant and animal species state listed as either threatened, endangered, or special concern in the area between Fond du Lac and Sheboygan counties. Panelists indicated that the Passing Lane Alternative is not expected to substantially impact these populations when compared to the No-Build Alternative.

7. Historic and Archaeological Resources

Historic resources in the area include St. Mary's Springs Academy, the Wade House Historic Site, and the Sippel archaeological site. Expert panelists indicated that the Passing Lane Alternative's impact to these resources would be the same as with the No-Build. The study team disagrees with some of this opinion in that access to St. Mary's Springs Academy will be improved and fully restored with the proposed jughandle intersection associated with the Passing Lane Alternative.

8. Air Quality

With the Passing Lane Alternative, average daily traffic volumes on WIS 23 will increase from 4 to 27 percent by the year 2040. Corresponding to the increased WIS 23 traffic volumes will be increased side road volumes that both feed WIS 23 and lead to destinations from WIS 23. Motor vehicle technology and cleaner fuels have been leading to a reduction in motor vehicle exhaust pollution. However, increased vehicle volumes may result in additional emissions.

As mentioned, USEPA designated Sheboygan County a marginal nonattainment area for ground level ozone under the 2008 8-hour standard for that pollutant. Most expert panel members indicated there would be no difference in air quality with the Passing Lane Alternative when compared to the No-Build alternative. A few respondents indicated that the anticipated small reduction in congestion could modestly improve emissions.

9. Trails

The Old Plank Road Trail is a 17-mile multiuse trail that parallels WIS 23 from Sheboygan to Greenbush, linking with the IAT in the KMSF-NU. Other trails in the study area include IAT, the State Equestrian Trail, and a snowmobile trail crossing WIS 23 between Plank Road and County S. The Passing Lane Alternative would construct the Old Plank Road Trail extension and provide a grade separated crossing of WIS 23 for the IAT and State Equestrian Trail.

All expert panelists indicated that the Passing Lane Alternative would have no impact to a very positive impact on trails. Positive impacts include the grade separated IAT/State Equestrian Trail crossing on WIS 23. Also, the proposed extension of the Old Plank Road Trail west to Fond du Lac would be constructed, which panelists representing local governments indicated was something their constituents desired.

10. Environmental Justice Populations

Minority and low-income populations are located at the ends of the indirect effects study area in the cities of Plymouth and Fond du Lac. Several census tracts in the study area also have a greater proportion of elderly individuals (i.e., age 65 and over) when compared to county averages. The elderly is not an EJ population, but it is FHWA's policy to also consider the elderly and disabled along with EJ populations.

The study team determined that minority and low-income populations will not be disproportionately adversely impacted by the Passing Lane Alternative because generally employment and social services are available in Fond du Lac and Plymouth where such population concentrations occur and therefore travel on WIS 23 is generally not required. Conversely, elderly populations may be more adversely affected by limited gaps and lack of refuges on the Passing Lane Alternative because they are concentrated in the central portion of the indirect effects study area and need to travel to the urban areas at the ends of the study area for services.

C. 4-lane On-alignment Alternative

1. Development

a. General Development Pattern

Expert panelists indicated that future land development within the study area will generally follow adopted comprehensive plans. Figures 3.0-5 and -6 illustrate development locations as indicated by the mapping exercise the expert panel performed.

In general, development at the western and eastern ends of the corridor will be less affected by the 4-lane On-alignment Alternative because development in the cities of Fond du Lac and Plymouth respond to the provision of urban utilities and services.

With the mapping exercise, panelists indicated the following development patterns could occur with the 4-lane On-alignment Alternative:

- Higher levels of residential, commercial, and mixed-use development at the east end of Fond du Lac, near County UU.
- Residential, commercial, and mixed-use development near the County G interchange.
- Scattered and dispersed residential development east of County G, proximate to the KMSF-NU.
- Commercial and residential development in Greenbush at the intersection of County A and WIS 23.
- Residential development west of the city of Plymouth.
- Commercial development along the WIS 23 frontage in the town of Plymouth, west of the city of Plymouth.

Development will likely concentrate at future interchanges including County UU, County W (north),

and County G and be reduced where new access restrictions occur including Tower Road and 7 Hills Road. In the vicinity of Greenbush hamlet, future interchange improvements at County T and A could be offset by access reductions at Sugarbush Road.

Panelists generally felt that development would occur at a faster pace with the 4-lane On-alignment Alternative than with the No-Build or Passing Lane Alternatives. The panelists also generally felt that development with the 4-lane On-alignment Alternative would be more concentrated and at higher densities. This alternative also reduces the number of access points which has the strong tendency to focus additional development near remaining access points.

Regional growth trends have been and are likely to continue to be modest. The 4-lane On-alignment Alternative is not a new highway facility but rather a modification of a long-existing highway.

b. Residential Development

Expert panelists indicated that residential development would occur at the same or faster pace when compared with the No-Build Alternative. Some panel members stated that outside factors, such as the economy and buyer preferences, will have a greater effect on the pace of residential development than a 4-lane highway. A couple of panelists indicated that a 4-lane WIS 23 could make the corridor more attractive to reside near for people commuting to the Milwaukee metropolitan area. According to the most recent place of work survey, about 2.7 percent of Sheboygan County workers commute to Milwaukee County. An even smaller percentage of Fond du Lac County workers make that commute. Shortened travel time of about 4.5 minutes for Fond du Lac commuters to I-43 and traveler comfort related to capacity and safety improvements may lead to slight increases in the amount of residential development compared to the No-Build Alternative. Smaller communities within the study area may experience modest increases in the pace and amount of residential growth as a result of improved access to major employment centers beyond the study area. Areas identified by panelists for possible residential development beyond areas identified in comprehensive plans are shown in Figures 3.0-5 and -6.

Panelists indicated that residential development would either be at the same dispersion/concentration as the No-Build alternative, or more concentrated than the No-Build Alternative. Similar responses were given by the panel regarding density, with the 4-lane On-alignment alternative having the same or denser development patterns. Reasoning panelists cited for the projected dispersion/concentration pattern included the 4-lane On-alignment's focusing of access to interchanges along with the modifying or reduction of other side road access.

c. Commercial Development

Expert panel members indicated that commercial development will occur at the same or at a faster pace with the 4-lane On-alignment Alternative than with the No-Build Alternative. They indicated that commercial development is likely to continue to be focused in planned commercial areas with the 4-lane On-alignment Alternative, but unplanned highway-oriented commercial development may also occur at proposed interchange locations because of increased capacity and a focusing of access at proposed interchanges. This is illustrated in the mapping exercise, summarized in Figures 3.0-5 and -6, where panelist show commercial development locating near the County UU and County G interchanges, as well as the County A and County S RCUT intersections. Perceived ease of access was one factor cited in the location of commercial development at these nodes.

Most panelists felt that commercial development will occur on a larger scale with the 4-lane On-alignment Alternative than with the No-Build Alternative.

Panelists associated with groups that foster economic development indicated that it has been difficult to attract business and industry to the east side of Fond du Lac because it is not served by a 4-lane corridor. There are other area business parks that have more direct access to a 4-lane roadway. These panelists felt that expanding WIS 23 to a 4-lane highway might prompt changes in zoning and land use plans that would favor larger business and industry. Some panelists also indicated that with

a 4-lane facility, new economic development initiatives, such as marketing campaigns, creation of tax incremental financing districts, and new business parks and shopping centers could emerge.

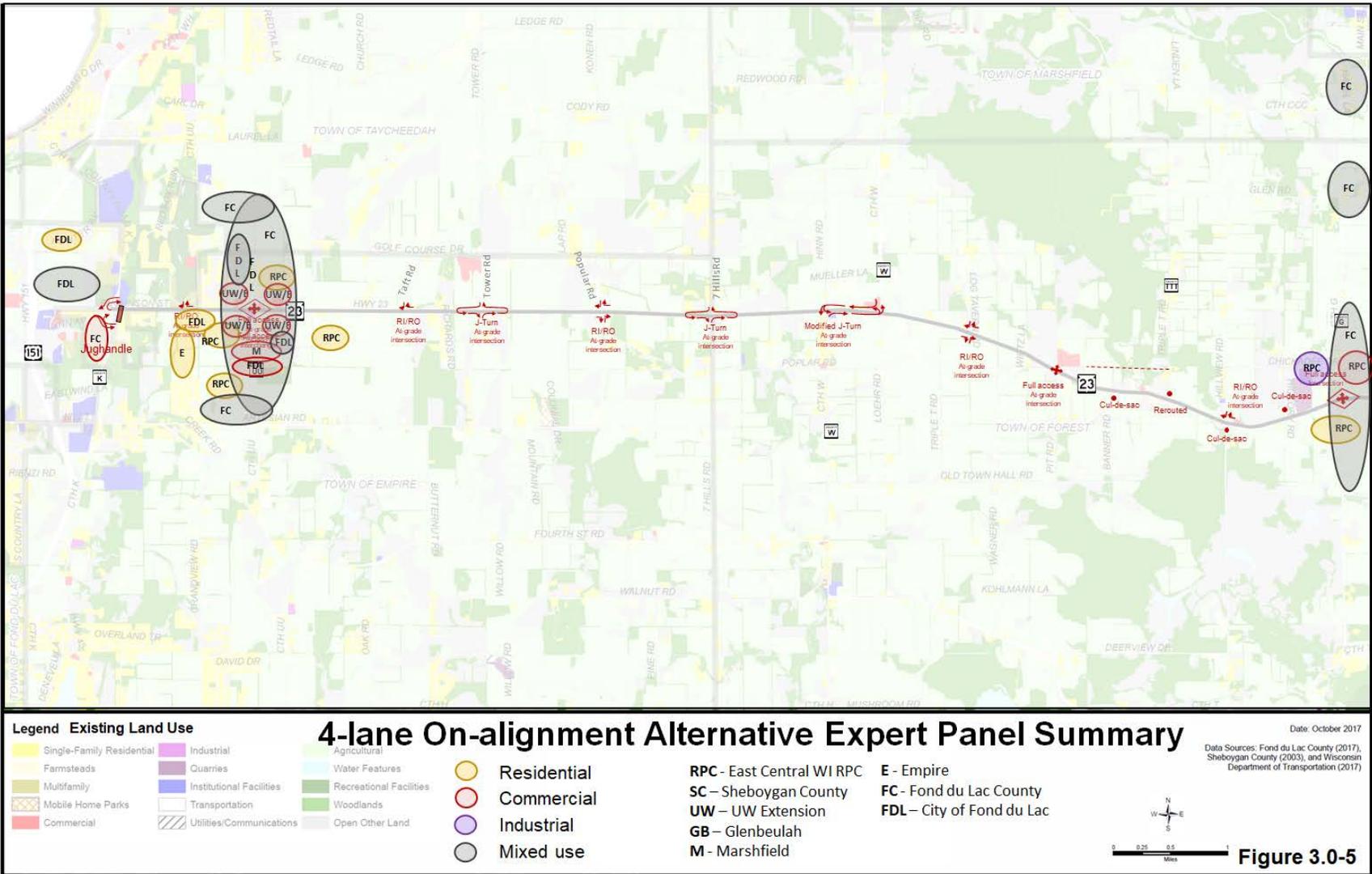
d. Industrial Development

Expert panelist responses to industrial development with the 4-lane On-alignment Alternative were similar to those for commercial development. Most panelists felt that the pace of industrial development would either be the same as, or faster than the pace of industrial development that would occur with the No-Build Alternative. The panelist from Fond du Lac noted that the area just east of Fond du Lac is not planned for industrial development within their comprehensive plans. Panelist also indicated that the scale of industry with the 4-lane On-alignment is likely to be the same, or larger than what would occur with the No-Build Alternative.

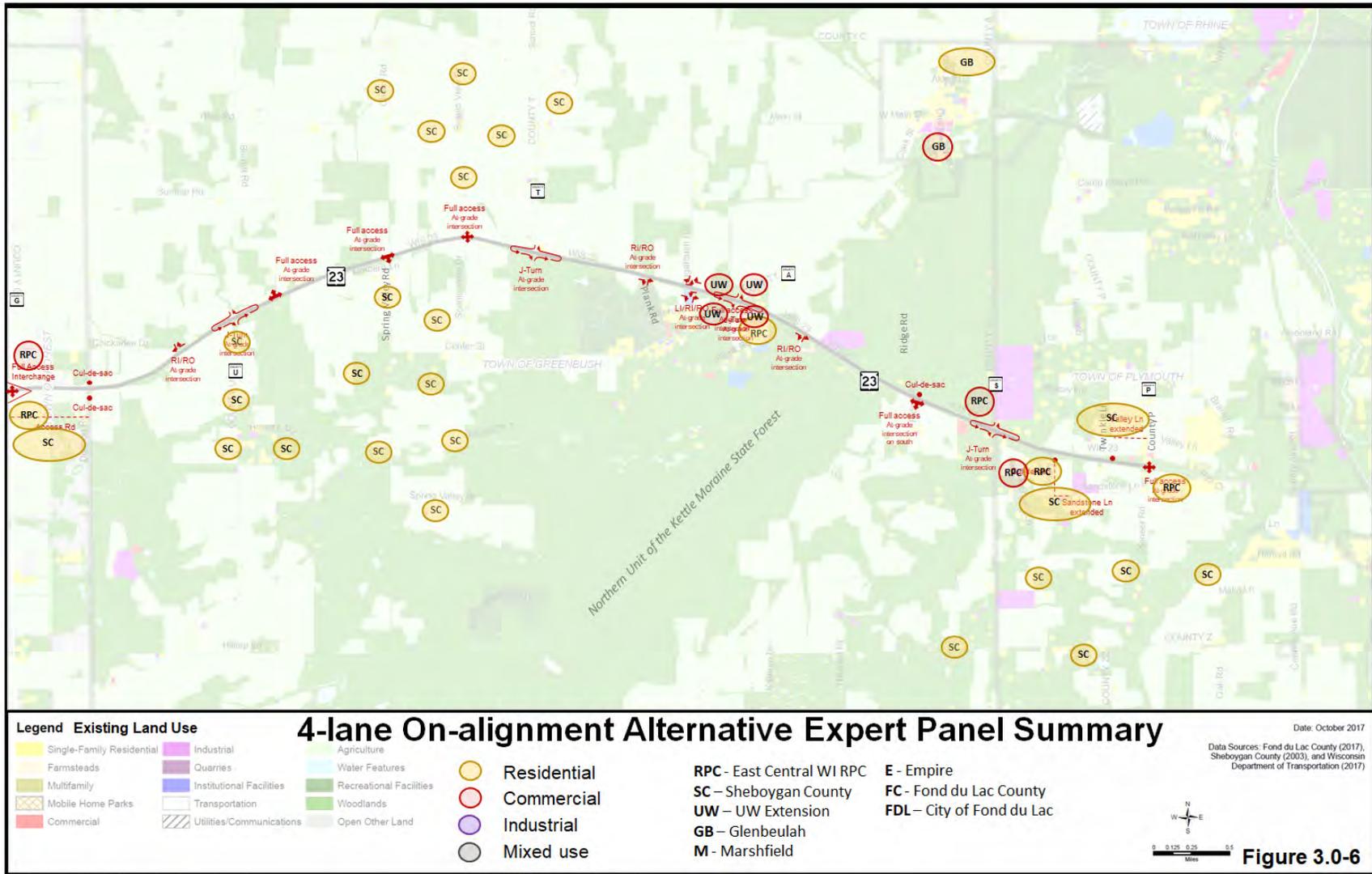
As mentioned under commercial development, panelists associated with groups that foster economic development indicated that it has been difficult to attract business and industry to the east side of Fond du Lac because it is not served by a 4-lane corridor. These panelists felt that expanding WIS 23 to a 4-lane highway might prompt changes in zoning and land use plans that would favor larger business and industry. Some panelists also indicated that with a 4-lane facility, new economic development initiatives, such as marketing campaigns, creation of tax incremental financing districts, and new business parks and shopping centers could emerge.

e. Institutional Development

As mentioned with the other alternatives, additional new locally serving institutional development in the study area is anticipated to occur as needed generally based on the pace of new residential development.



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2. Rural Character

Most expert panelists indicated that the 4-lane On-alignment is likely to have no impact on the rural character of the corridor. About one third of the panelists stated that it would have a negative impact, Individual responses cited the potential for more residential construction, creating a more suburban feel. Some panelists suggested that easier access/decreased commute times provided by a 4-lane WIS 23 may increase demand for “country-living.” The increased development could negatively affect rural character in such areas.

Another individual response cited there would be more exposure and ability to attract business, also diminishing the rural character of the corridor. Near future rural interchanges, small scale highway-oriented commercial development may also have a slight impact on rural character, as local zoning ordinances do not contain provisions which protect community character.

Rural character will ultimately be dependent upon local government regulation and the quality of development and siting decisions. Previous workshop panelists indicated that a 4-lane WIS 23 would not increase the number of billboards in the study area because of lack of demand for off-site advertising. Adopting regulations that prevent billboards would be a more certain way of avoiding this adverse impact on rural character.

3. Agricultural

The majority of towns in the study area are planned for agriculture, except in small areas planned for development. County farmland preservation plans in combination with exclusive agricultural zoning further protect land that is planned to remain in agricultural uses and enables continuation of farming.

Most expert panelists indicated that the 4-lane On-alignment Alternative would have a negative effect on farmland. They further indicated that there would be less farmland under production with the 4-lane On-alignment Alternative than with the No-Build Alternative. Direct effects of the alternative approved with the 2014 LS SFEIS have already led to the relocation 17 farm operations, decreasing the amount of farmland under production. One panel member indicated that most of the farm impacts have already occurred.

Panelists felt that the size of the operations would continue at the same scale with the 4-lane On-alignment as with the No-Build Alternative. They also felt that there probably would be limited influence on crop type.

Some active farmers on the expert panel stated that travel will be difficult for farm equipment associated with the left turns and RCUTs which are part of the 4-lane On-alignment Alternative. Under existing conditions, slow moving agricultural equipment travels on the shoulder, and then takes a full lane before turning left or right onto a side road. With the 4-lane On-alignment, this equipment must take a lane, then move to the left lane, then move to the left-turn lane before making a U-turn. So, while the 4-lane On-alignment provides room for passenger vehicles to pass slow moving farm equipment, it also makes it more difficult for slow moving farm vehicles to access side roads. When asked if they thought the increased difficulty would stop or discourage farmers from working land on or just off WIS 23, panel members indicated it would not. Panelist further stated that the demand for acreage is very high, and available acreage would be farmed by someone. Increased difficulty in accessing farmland will influence individual decisions on what farm parcels to rent or buy. Over time, farmers may consolidate the acreages they farm to one side of WIS 23 or the other.

One panelist from the Department of Agriculture, Trade, and Consumer Protection (DATCP) indicated that increased development pressure may change expectation of area farmers about the long-term viability of farming, leading to lower investments on farm improvements. Farmers may anticipate difficulty in obtaining land for expansion due to urban development and increasing land values. Farm operators may shift more from owners to renters who have less stake in the long-term integrity of the farmland. The same panelist indicated that development pressure can affect crop types. Over decades, dairy and cash grains may shift more to vegetable and specialty crops in urbanizing areas.

4. Wetlands

As noted previously, several wetland areas of regional importance are located in the study area, the protection of which is a priority for WDNR and local land conservancies. Expert panelists indicated that the loss of wetlands will occur with the 4-lane On-alignment. There are anticipated to be about 26 acres of direct wetland impact with this Alternative. Where wetland areas will be lost by this alternative, mitigation and/or replacement is required.

Most expert panelists indicated that the 4-lane On-alignment Alternative would have a negative effect on area wetlands. The amount of wetland areas lost to future development would be modestly greater under the 4-lane On-alignment Alternative compared to the No-Build Alternative because of slight increases in the amount of new development. Increased pace of development could be attracted to open areas that contain wetland, yet wetlands are protected from development by state and federal regulations. Panelists also suggested that the quality of wetlands in or adjacent to planned development areas may be minimally impacted by stormwater runoff from impervious surfaces associated with new development. Ultimately, the level of impact will vary based on development type, local regulations, mitigation activities, and future conservation efforts.

5. Water Quality

As previously indicated, the study area is located almost entirely within the Sheboygan River Basin, which has been identified by the USEPA as a Great Lakes Area of Concern. Highway improvements associated with the 4-lane On-alignment Alternative will increase the impervious surface area in the study area and the number of vehicles using the corridor. These factors may contribute to increases in the peak rate and volume of stormwater runoff and pollutants, including chloride, salt, and other deicing chemicals.

Expert panelists indicated that there would be minimal difference in surface and subsurface water quality impacts with the 4-lane On-alignment Alternative compared to the No-Build Alternative. Increased stormwater runoff from the highway and land development may reduce the area available for groundwater recharge which may alter surface water levels, and further reduce water quality through increased sedimentation and increased temperature. The degree of these impacts would likely be slightly higher compared to the No-Build Alternative.

6. Upland Habitat

a. Woodland and Ecologic Resources

The majority of large tracts of woodlands in the study area are located in or near the KMSF-NU and along the Niagara Escarpment.

Most expert panel members felt that the 4-lane On-alignment would have no impact to woodlands. About one third of the panel member said that this alternative would have a negative impact. Most of the individual comments from the panel members cited direct impacts of right of way acquisition as one reason for the negative effect. The extent to which the 4-lane On-alignment Alternative encourages a faster pace of development also could have a negative effect on woodlands. This could further impact the Escarpment, unique glacial features, and other resources areas of ecological importance.

b. Glacial Features

There are numerous glacial features throughout the study area, and these features are not currently protected through local regulation. There could be slightly increased impacts to prominent glacial features under the 4-lane On-alignment Alternative because of lack of protection (e.g., overlay zoning) and slightly increased amounts of new development compared to the No-Build Alternative. These impacts would be reduced if the WDNR implements its plans to acquire 7,000 acres of new land around the KMSF-NU.

7. Threatened and Endangered Species

There are four federally listed rare species and 19 state listed rare species in the project corridor study area. In the broader ICE study area, there are 25 occurrences of rare species in Fond du Lac County and 31 occurrences of rare species in Sheboygan County.

Most panelists indicated that the 4-lane On-alignment Alternative would have no impact to threatened and endangered species when compared to the No-Build Alternative. This Alternative could reduce habitat as a result of slightly increased pace and amount of development. More discussion on adverse effects to threatened and endangered species is presented in the cumulative effects section.

8. Historic and Archaeological Resources

All panelists felt that the 4-lane On-alignment Alternative would have no more impact to historic and archeological resources than the No-Build Alternative. This is an exception to the direct effects described in Section 4.7 and Section 5.

It is difficult to determine the 4-lane On-alignment's indirect effect on historic structures outside of the WIS 23 corridor. There are no laws preventing private entities from altering these structures, and it is not clear that a slightly increased pace of development would affect the razing or restoration of existing structures.

9. Air Quality

As mentioned previously, motor vehicles contribute several pollutants listed in the NAAQS that affect human health. These pollutants include nitrogen oxides and volatile organic compounds that lead to ozone, carbon monoxide, and minor amounts of particulate matter.

The expert panel felt that the 4-lane On-alignment Alternative would have no more impact on air quality than the No-Build Alternative. Panel members representing metropolitan planning organizations indicated that this alternative would improve air quality due to reduced congestion and higher travel speeds.

The 4-lane On-alignment Alternative will have higher traffic volumes and higher travel speeds. The projected 2040 daily traffic volumes are 45 and 34 percent higher (weighted average) in Fond du Lac and Sheboygan Counties respectively, than what would occur with the No-Build Alternative. In 2016 WIS 23 daily traffic made up about 1.7 percent of the vehicle miles traveled (VMT) in Fond du Lac County and 2.0 percent of the VMT in Sheboygan County³. The 4-Lane On-alignment has more VMT than the No-Build Alternative in the year 2040. This could cause WIS 23's contribution of VMT to grow to 3.2 percent in Fond du Lac County, and 2.8 percent in Sheboygan County. The emissions associated with these higher traffic volumes combined with other human activities such as manufacturing, off-road vehicles, and other sources emit VOCs and NOx that contribute to ground-level ozone levels. WDNR and USEPA have regulations that are designed to decrease emissions from motor vehicles, areas sources and industrial sources over time. Programs and regulations are in place at the federal and state level to control vehicle emissions including regulations in the early 2000s and 2007 further controlling emissions from vehicles and fuels. These are projected to reduce vehicle pollutant emissions over the next 25 years.

As mentioned, USEPA designated Sheboygan County a marginal nonattainment area for ground level ozone under the 2008 eight-hour standard for that pollutant. Additional ozone resulting from emissions associated with the 4-lane On-alignment Alternative could affect Sheboygan County's nonattainment status. The conformity analysis indicates the Sheboygan Area Transportation Plan is consistent with the approved motor vehicle emissions budgets for air quality.

³ 2016 VMT Data from <http://wisconsin.gov/Pages/projects/data-plan/veh-miles/default.aspx>

10. Trails

The IAT, the State Equestrian Trail, and a snowmobile trail currently cross WIS 23 at grade between Plank Road and County S. As part of the 4-lane On-alignment Alternative an underpass will be constructed to provide a safer crossing of WIS 23 and to ensure these important recreational corridors are not interrupted.

Expert panelists indicated that the extension of the Old Plank Road Trail from Plymouth to Fond du Lac will also be a positive impact of the 4-lane On-alignment Alternative. As proposed under this alternative, the Old Plank Road Trail will connect with the 7-mile Prairie Trail in Fond du Lac which is part of a larger system of trails to link the Peebles Trail and the Wild Goose Trail in Dodge County.

11. EJ Populations

Minority and low-income populations are located at the ends of the study area in the cities of Plymouth and Fond du Lac. Several census tracts throughout the study area also have a greater proportion of elderly individuals (i.e., age 65 and over) when compared to county averages. The elderly is not an EJ population, but it is FHWA's policy to also consider the elderly and disabled along with EJ populations.

The study team determined that EJ populations will not be disproportionately adversely impacted by the 4-lane On-alignment Alternative. A variety of access restrictions are included in this Alternative that may make access somewhat less convenient and trips slightly longer for the concentrations of elderly population in the central part of the study area in the towns of Marshfield and Forest and the villages of Mt. Calvary and St. Cloud. The access restriction impacts may be offset by reduced highway congestion and safer conditions under this Alternative.

D. Hybrid Alternative

In order to focus responses and leverage the time available to interact with the expert panel, the Hybrid Alternative was not presented to the panel for review. The study team believes that appropriately applying the responses from the Passing Lane Alternative and the 4-lane On-alignment Alternative, a reasonable estimation of indirect effects for the Hybrid Alternative can be assembled. It is likely that the indirect effects from the Hybrid Alternative will lie between the levels of effect of the Passing Lane Alternative and the 4-lane On-alignment Alternative.

The following paragraphs briefly describe these effects.

1. Development

a. General Development Pattern

Future land development within the study area will generally follow adopted comprehensive plans. Planned development locations at the western and eastern ends of the corridor will be less impacted with the Hybrid Alternative because development in the cities of Fond du Lac and Plymouth respond to the provision of urban utilities and services.

Because the Hybrid Alternative constructs a 4-lane highway on the western Fond du Lac County portion of the corridor, it is likely that this part of the corridor may experience similar development effects as the 4-lane On-alignment Alternative, while the Sheboygan County portion may experience development effects similar to the Passing Lane Alternative. These include:

- Higher levels of residential, commercial, and mixed-use development at the east end of Fond du Lac, near County UU.
- Residential, commercial, and mixed-use development near the County G interchange.
- Scattered and dispersed residential development east of County G, proximate to the KMSF-NU.
- Residential development west of the city of Plymouth.

- More limited commercial development along the WIS 23 frontage in the town of Plymouth, west of the city of Plymouth.

b. Residential Development

Residential development is likely to occur at the same or faster pace when compared with the No-Build Alternative. Smaller communities within the study area, particularly in Fond du Lac County, may experience modest increases in the pace and amount of residential growth as a result of improved access to major employment centers.

Residential development is likely to be at a similar dispersion/concentration as the No-Build alternative. Similar responses were given by the panel regarding density, with the 4-lane On-alignment alternative having the same or denser development patterns.

c. Commercial Development

With the Hybrid Alternative, commercial development may occur at the same or at a faster pace in the Fond du Lac portion of the corridor than it would with the No-Build Alternative. Unplanned highway-oriented commercial development may also occur at the County UU and County G interchanges.

Panelists associated with groups that foster economic development indicated that it has been difficult to attract business and industry to the east side of Fond du Lac because it is not served by a 4-lane corridor. The Hybrid Alternative may not fully address this concern because it does not provide a 4-lane facility to I-43. Therefore, the Hybrid Alternative may not provide as much of an economic attraction for larger business or industry.

d. Industrial Development

With the Hybrid Alternative, the pace of industrial development would either be the same as, or faster than the pace of industrial development with the No-Build Alternative. Panelist from the city of Fond du Lac noted that the WIS 23 corridor is not planned for industrial development within their comprehensive plans.

As mentioned, panelists associated with groups that foster economic development indicated that it has been difficult to attract business and industry to the east side of Fond du Lac because it is not served by a 4-lane corridor. The Hybrid Alternative may not fully address this concern because it does not provide a 4-lane facility to I-43. Therefore, compared to the 4-lane On-alignment Alternative, the Hybrid Alternative may not provide as much of an economic attraction for larger business or industry.

e. Institutional Development

As mentioned with the other alternatives, additional new locally serving institutional development in the study area is anticipated to occur as needed generally based on the pace of new residential development.

2. Rural Character

The Hybrid Alternative may diminish the rural character of the corridor in the Fond du Lac County segment, in that it expands the highway and may attract highway oriented commercial development to the County UU and County G interchanges. The Sheboygan County portion of the corridor is likely to remain unchanged. Rural character will ultimately be dependent upon local government regulation and the quality of development and siting decisions.

3. Agricultural

The majority of towns in the study area are planned for agriculture, except in small areas planned for residential development. County farmland preservation plans in combination with exclusive

agricultural zoning further protect land that is planned to remain in agricultural use and enables continuation of farming.

With the Hybrid Alternative there would be less farmland under production than with the No-Build Alternative. Direct effects of the alternative approved with the 2014 LS SFEIS have already led to the relocation 17 farm operations, which will decrease the amount of farmland under production. Most of the farm impacts have already occurred.

One concern voiced by active farmers on the expert panel regarded difficulty for farm equipment negotiating the left turns at RCUTs. (See discussion under 4-lane On-alignment). This same difficulty will exist with the Hybrid Alternative in Fond du Lac County, where two RCUTs will be installed. The increased difficulty reportedly will not stop farmers from working land on or just off WIS 23 because the demand for acreage is high. Over time, Fond du Lac County farmers may consolidate the acreages they farm to one side of WIS 23 or the other.

4. Wetlands

As noted previously, several wetland areas of regional importance are located in the study area, the protection of which is a priority for WDNR and local land conservancies. The loss of wetlands will occur with the Hybrid Alternative, which will require 21 acres of wetlands. Where wetland areas will be lost by this alternative, mitigation and/or replacement is required.

The amount of wetland areas lost to future development would be modestly higher under the Hybrid Alternative compared to the No-Build Alternative because of slight increases in the amount of new development. The quality of wetlands in or adjacent to planned development areas may be minimally impacted by stormwater runoff from impervious surfaces associated with new development. Ultimately, the level of impact will vary based on development type, local regulations, mitigation activities, and future conservation efforts.

5. Water Quality

There would be minimal difference in surface and subsurface water quality with the Hybrid Alternative when compared with the No-Build Alternative. Increased stormwater runoff from the highway and land development may reduce the area available for groundwater recharge which may alter surface water levels and further reduce water quality through increased sedimentation and increased temperature. The degree of these impacts with the Hybrid Alternative would likely be slightly higher compared to the No-Build Alternative.

Upland Habitat

a. Woodland and Ecologic Resources

The majority of large tracts of woodlands in the study area are located in and near the KMSF-NU and along the Niagara Escarpment.

The greatest effect of the Hybrid Alternative to woodland tracts would be the direct acquisition of 9 acres. The extent to which the Hybrid Alternative encourages a faster pace of development on County K and County UU, also could have a negative effect on Escarpment area woodlands. This could further impact the Escarpment, unique glacial features, and other resources areas of ecological importance.

b. Glacial Features

There could be slightly increased impacts to prominent glacial features under the Hybrid Alternative because of lack of protection (e.g., overlay zoning) and slightly increased amounts of new development compared to the No-Build Alternative. These impacts would be reduced if the WDNR implements its plans to acquire 7,000 acres of new land around the KMSF-NU.

6. Threatened and Endangered Species

The Hybrid Alternative would have limited impact to threatened and endangered species when compared to the No-Build Alternative this alternative could reduce habitat as a result of slightly increased pace and amount of development. More discussion on adverse effects to threatened and endangered species is presented in the cumulative effects section.

7. Historic and Archaeological Resources

Similar to the other alternatives, the Hybrid Alternative would have no impact to historic and archeological resources when compared to the No-Build Alternative. This is an exception to the direct effects described in the LS SEIS.

8. Air Quality

The Hybrid Alternative will have higher traffic volumes and higher travel speeds. The projected 2040 daily traffic volumes are 32 and 13 percent higher (weighted average) in Fond du Lac and Sheboygan counties respectively, than with the No-Build Alternative. In 2016 WIS 23 daily traffic made up about 1.7 percent of the VMT in Fond du Lac County and 2.0 percent of the VMT in Sheboygan county⁴. The Hybrid Alternative would have more VMT than the No-Build Alternative in the year 2040. This could cause WIS 23's contribution of VMT to grow to 2.9 percent in Fond du Lac County, and 2.3 percent in Sheboygan county. The emissions associated with these higher traffic volumes combined with other human activities such as manufacturing, off-road vehicles, and other sources emit VOCs and NOx that contribute to ground-level ozone levels in Sheboygan County.

As mentioned, USEPA designated Sheboygan County a marginal nonattainment area for ground level ozone under the 2008 eight-hour standard for that pollutant. Additional emissions could affect Sheboygan County's nonattainment status. The conformity analysis indicates the Sheboygan Area Transportation Plan is consistent with the approved motor vehicle emissions budgets for air quality

9. Trails

The IAT, the State Equestrian Trail, and a snowmobile trail currently cross WIS 23 between Plank Road and County S. As part of the Hybrid Alternative an underpass will be constructed to provide a safer crossing of WIS 23 and to ensure these important recreational corridors are not interrupted.

Expert panelists indicated that the extension of the Old Plank Road Trail from Plymouth to Fond du Lac will be a positive impact of the Hybrid Alternative. As proposed under this alternative, the Old Plank Road Trail will connect with the 7-mile Prairie Trail in Fond du Lac which is part of a larger system of trails to link the Peebles Trail and the Wild Goose Trail in Dodge County.

10. Environmental Justice Populations

Minority and low-income populations are located at the ends of the study area in the cities of Plymouth and Fond du Lac. Several census tracts throughout the study area also have a greater proportion of elderly individuals (i.e., age 65 and over) when compared to county averages. The elderly is not an EJ population, but it is FHWA's policy to also consider the elderly and disabled along with EJ populations.

Environmental justice populations will not be disproportionately adversely impacted by the Hybrid Alternative. Some access restrictions are included in this Alternative that may make access somewhat less convenient and trips slightly longer for Fond du Lac County residents. The access restrictions may be offset by reduced highway congestion and safer conditions under this Alternative.

⁴Data from <http://wisconsin.gov/Pages/projects/data-plan/veh-miles/default.aspx> October 2017

E. Corridor Preservation

Expert panel members were asked how improvements associated with Corridor Preservation would influence development rates and area resources. The improvements considered include:

- Grade separation (overpass) at Tower Road.
- Cul-de-sacs at Poplar Road.
- Grade separation (overpass) at 7 Hills Road.
- Cul-de-sac at County W south and Hinn Road.
- Rerouting of County W south to County W north.
- Diamond interchange at County W north intersection.
- Grade separation (overpass) at Scenic View Drive.
- Cul-de-sac at Plank Road.
- Grade separation (overpass) at Sugarbush Road.
- Diamond interchange at County A.

Expert panelists were evenly split in their opinion on how these improvements would affect the amount of development, with about one third saying less development, one third saying the same amount of development, and one third saying more development. About one half the panelists stated the amount of farmland under production would be less if the improvements associated with Corridor Preservation were implemented, while the other panelists felt there would be the same amount of farmland under production.

4.0 CUMULATIVE EFFECTS ANALYSIS

The Council on Environmental Quality (CEQ) defines a cumulative impact as “the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”

A. Issues Associated with the Alternatives and Corridor Preservation Under Consideration

The study team collected and compiled an inventory of local and regional trend data including population and housing trends and projections; income, labor force, industries, and commuting patterns; agricultural resources; natural resources; land use and development patterns; archaeological and historical resources; and local, county, regional, and state plans and regulations. These notable features were selected based on guidance from WisDOT’s Guidance for Conducting a Cumulative Effects Analysis (2007) as well as a determination by the study team that they were relevant to the analysis. Information from the inventory was considered in the preparation of the cumulative effects analysis. This analysis will address the following resources, which have been identified as being directly and/or indirectly impacted.

1. Development Patterns
2. Agricultural Land
3. Wetlands
4. Water Quality
5. Upland Habitat
6. Threatened and Endangered Species
7. Historic and Archeological Resources
8. Air Quality
9. Trails
10. Environmental Justice Populations

B. Geographic Scope

The study area for this cumulative effects analysis encompasses the same area used for the indirect effects analysis. The study team interacted with staff planners from Fond du Lac County, Sheboygan County, and East Central Wisconsin Regional Planning Commission to determine the likely range of influence from the WIS 23 corridor. Beyond the study area, the influence of WIS 23 diminishes as other arterial corridors provide access to adjacent lands. In some instances, in the cumulative effects discussion, countywide impact trends are used for both Fond du Lac and Sheboygan counties. Countywide information was referenced because it is readily available (as opposed to town-based information) and because it provided useful information on regional trends as well as the magnitude of effects.

C. Time Frame for Analysis

The time frame for this cumulative effects analysis spans from 15 years prior to the preparation of this analysis to 20 years beyond the preparation of this analysis. This future horizon year corresponds with many of the local community plans that are used to help identify reasonably foreseeable actions in the study area. However, it can be reasonably assumed that the effects identified in this analysis would continue to be valid after 20 years if local policies and regulations remained generally the same. The prior year horizon also acknowledges the completion of proximate transportation projects, such as the Fond du Lac bypass.

D. Other Actions Affecting the Resources, Ecosystems, and Human Communities of Concern

1. Past Actions

a. Land Use and Agriculture

The WIS 23 corridor has experienced little change in land use patterns in the past two decades. There are two major roadway projects that were completed in the last 15 years. The US 151 bypass of Fond du Lac located at the west end of the corridor (construction from 2005 to 2008) and WIS 23 Coary Lane to County O/OJ (construction from 2003 to 2005) located on the east end of the corridor. The Fond du Lac bypass project east of I-41 and the WIS 23 project east of Coary Lane lies within the study area. The US 151 Fond du Lac bypass project constructed a 4-lane divided expressway around the south and east sides of the city of Fond du Lac. The WIS 23 project expanded 3 miles of WIS 23 from 2 to 4 lanes near Plymouth, WI.

The activities of other entities have affected the study area. Local land use policies and decisions have led to the conversion of farmland and woodlands to scattered residential and nonresidential development over the past decades. While the majority of the study area remains in agricultural use, over the years, unsewered residential development has occurred in the towns mostly along the WIS 23 corridor. Most concentrated development has occurred within and around cities and villages located in the study area including primarily the cities of Fond du Lac and Plymouth and, to a much lesser extent, the villages of Mount Calvary, Glenbeulah, and St. Cloud. Some industrial development has occurred in the cities of Fond du Lac and Plymouth and some commercial development is sparsely scattered at intersections along the WIS 23 corridor. Table 4.0-1 compares farm data from the 2002, 2007, and 2012 Census of Agriculture.

Table 4.0-1 Census of Agriculture Data

	2002 Fond du Lac County	2007 Fond du Lac County	2012 Fond du Lac County	2002 Sheboygan County	2007 Sheboygan County	2012 Sheboygan County
Number of Farms	1,634	1,643	1,399	1,116	1,059	986
Land in Farms (acres)	344,286	335,745	315,553	195,248	191,719	190,155
Average Farm Size (acres)	211	204	226	175	181	193
Total Cropland (acres)	292,255	279,922	262,142	166,592	157,607	155,878

Source: USDA 2002, 2007 and 2012 Census of Agriculture - County Data, Table 8. (accessed website on 10/26/2017 at https://www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1,_Chapter_2_County_Level/Wisconsin/)

Incremental development in the study area has also impacted natural resources, particularly the Niagara Escarpment, which is located in the study area (the escarpment brow extends north/south along the eastern periphery of the city of Fond du Lac), and the KMSF-NU,⁵ which intersects with WIS 23 in the town of Greenbush.

In 2008 the Blue Sky Green Field Wind Energy Center was constructed in Fond du Lac County, Wisconsin. The 10,600-acre wind farm is located in the towns of Calumet and Marshfield in northeast Fond du Lac County and is the second largest operating wind farm in Wisconsin behind the Glacier Hills Wind Energy Center in Columbia County.⁶

b. Road Projects

There have been several highway projects in or near the project corridor in the last 15 years. The following list summarizes them.

1) WIS 23 Expansion—Coary Lane to County O/OJ—2004-2005

This project expanded 3.3 miles of WIS 23 on the north side of the city of Plymouth from a 2 to 4-lane expressway in 2004-05.

2) Fond du Lac Bypass—County D to County K—2005-2008

This project constructed a 9-mile 4-lane expressway around the city of Fond du Lac.

3) US 151 Fond du Lac Bypass Improvements—County T, County V, DuCharme Parkway—2017

This project constructed an interchange on US 151 at County V, a County T overpass over US 151, and intersection improvements at DuCharme Parkway.

4) US 41 Interstate Conversion Study

WisDOT recently completed the conversion of US 41 to interstate designation from Milwaukee to Green Bay. The conversion has been completed with no additional right of way required.

⁵KMSF-NU is a 27,725-acre forest stretching across Sheboygan, Fond du Lac, and Washington counties. Made up of geological formations caused by retreating glaciers, the forest is managed for forestry and outdoor recreation. Textbook examples of glacial landforms are scattered throughout the forest, such as drumlins, kames, eskers, and kettles. Botanically, the forest is quite diversified with nearly 60 species of trees present, together with numerous shrubs, wild flowers, ferns, and other plant life. This state park is comprised mostly of forests and lakes and provides habitat for a diversity of species, including whitetail deer, hawks, turkeys, raccoons, squirrels, and possums. The KMSF-NU is part of the Ice Age National Scientific Reserve established in 1964 to protect glacial landforms and landscapes in Wisconsin. The Wade House State Historic Site, situated in Greenbush at the entrance of the KMSF-NU, once served as an inn and stopping point for stage coaches traveling on the Fond du Lac-Sheboygan Plank Road. Source: Kettle Moraine State Forest (Northern Unit) (accessed website on 10/27/2017 at <http://www.fdlco.wi.gov/departments/departments-n-z/parks-trails/state-federal-recreational-areas/kettle-moraine-state-forest-northern-unit>)

⁶Source: Wisconsin Wind Farms—Blue Sky Green Field Wind Energy Center (accessed website on 10/26/17 at <http://www.renewwisconsin.org/wiwindinfoOLD.net/projects/blueskygrfield.html>)

2. Present and Future Actions

a. Highways

As of August 2017, the following WisDOT studies were being conducted or were near completion in the vicinity of the project study area:

1) US 151 Fond du Lac Bypass Corridor Preservation

This study was completed in 2013 and preserved right of way needed to convert the US 151 bypass from an expressway to a freeway facility (a future action). The improvements included access modification on the bypass as well as new service and system interchanges on I-41.

2) WIS 23 Corridor Preservation Study (County P to WIS 32)

This study considered alternatives to preserve right of way for future freeway conversion a 10-mile section of the WIS 23 corridor between County P and WIS 32. It includes frontage roads, overpasses, and interchanges necessary for freeway conversion. WisDOT has recently decided not to officially map improvements considered with the study.

Table 4.0-2 lists the cumulative direct impacts of past, presently planned, and planned future transportation WisDOT projects within the study area.

Table 4.0-2 Past, Present, and Future Project Impacts

Project (Actual or Planned Construction)	WIS 23 Expansion Coary Lane to County O/OJ (2004-05)	Fond du Lac Bypass (2005-08)	US 151 Fond du Lac Bypass (County T, V, DuCharme Improv) (2017)	Fond du Lac Bypass Corridor Preservation (2035?)	WIS 23 Fond du Lac to Plymouth† (2019-21)	WIS 23 Corridor Preservation† US 151 to County P (2040)	WIS 23 Corridor Preservation County P to WIS 32 (2040)	Total
Agricultural Area to Right of Way (acres)	15	178	55.8	98.9	24-218	244-50	0	615.7
Wetlands Filled (acres)	4	4.2	2.5	27.4	30.2-51.8	24.1-2.2	0	92.4
Upland Habitat Affected (acres)	1	~ 15*	11.6	0.0	5-38	40-7	0	72.6
Total Area Converted to Right of Way (acres)	18	323	148.4	68.6	79-410	407-76	0	1044.0
Residential Relocations	2	2	1	3 to 5	12-30	21-3	0	41 to 43
Commercial Relocations	0	1	0	0	0-4	6-2	0	7
Farm Relocations	0	0	0	1	6-18	16-4	0	23
Agricultural Severances	0	19	0	0	1-5	6-2	0	26

*Area affected estimated by using aerial mapping

†Left value is for the Passing Lane Alternative and the right value is for the 4-lane On-alignment Alternative. Value for the Hybrid Alternative falls between the two values provided.

b. Other Actions in the Area

To counter undesired rural development trends, local regulations have changed. These changes have affected farmland preservation planning, zoning, and acquisition of conservation easements to protect natural areas from future development. Other past activities, such as agricultural

practices, urbanization, and stream channelization, have negatively impacted the quality of waterways in the study area. Modern agricultural practices, wetland mitigation banking, and environmental cleanup of impaired waters, such as the Sheboygan River, have helped to improve conditions in the study area.

Agencies have planned for future land conservation through acquisition in the study area and beyond, in particular expansion of the KMSF-NU. Land prices affect agencies' ability to acquire additional land for conservation purposes. High commodity prices tend to raise the value of agricultural land. Agricultural commodity prices are currently lower than they have been in the last 5 years, leading to the first decrease in agricultural land values in 2015. In the WIS 23 corridor, the demand for tillable land is high to service dairy operations. Dairy operations are the predominant agricultural practice in the area. This demand for tillable land can raise land values or keep them steady. An increase in commodity prices, or demand for tillable land to support dairy, may also drive some farmers to convert wooded areas to tillable land causing additional negative impacts on natural resources through runoff and habitat loss. These trends are not influenced by the WIS 23 project.

The pace and amount of residential and nonresidential development that may occur as a result of the WIS 23 alternatives are tied to market demand resulting from a combination of demographic factors and economic conditions. The country is emerging from an economic recession, which had slowed residential market demand until 2011. Since 2011-12 residential market demand has slowly increased. This is illustrated by residential building permits issued in Fond du Lac and Sheboygan counties (see Table 4.0-3).

County	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Sheboygan	318	237	135	89	67	56	62	96	92	106	181
Fond du Lac	334	255	172	128	125	101	96	131	124	146	165

Source: US Census Building Permits Survey, Permits by County or Place, (accessed website on 10/23/2017 at <https://www.census.gov/construction/bps/>)

The number of residential building permits in Sheboygan and Fond du Lac counties is considerably lower in 2016 than in 2006, however, market demand is increasing. Based on its demographic, land use, and economic development expertise, the study team believes the market demand for new development is likely to continue to increase, but not fully return to pre-recession trends as the economy continues to rebound.

E. Characterization of the Resources, Ecosystems, and Human Communities Identified During Scoping in Terms of Their Response to Change and Capacity to Withstand Stress

Much of the characterization of resources in the study area has already been described in Section 3 of this report. The following paragraphs summarize these resources and ecosystems while providing some supplemental information.

1. Agricultural Land

Agriculture is a major industry in Fond du Lac and Sheboygan counties, providing 2,218 and 1,574 jobs,⁷ respectively. Fond du Lac County is a leading dairy producer ranking 2nd out of 72 counties in the state and 20th out of 3,079 counties in the nation in milk from cows dairy production. Sheboygan

⁷Source: 2012 Census of Agriculture—County Data, Table 7. Hired Farm Labor—Works and Payroll: 2012 (accessed website on 10/26/17 at https://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_2_County_Level/Wisconsin/st55_2_007_007.pdf)

County ranks 14th out of 72 counties in the state and 67th out of 3,079 counties in the nation in milk from cows dairy production.⁸

Market forces affect how much land is in agriculture and which crops are grown, which is a function of population growth, local plans, and zoning controls. Once converted to development, agricultural land will likely never return to agricultural use. The result is a consistent long-term trend in the reduction of agricultural lands.

Population growth and development have led to the incremental loss of farmland in the study area. Data from the United States Department of Agriculture (USDA) Census of Agriculture, 2012 and 2007 censuses (see Table 4-5.1) reveal that Fond du Lac and Sheboygan counties lost 6 percent and 1 percent of their farmland, respectively. Based on local land use plans, this trend is likely to continue. Population growth in the study area has historically been comparable to the state average. Local land use plans indicate a desire by all communities to preserve agricultural lands by directing development to areas adjacent to existing cities and villages where it can be served by sewer and water and generally developed at greater densities. This would reduce the residential development acreage and reduce the conversion of agricultural land.

2. Wetlands

Wetlands are scattered throughout the study area, with large concentrations located primarily in the towns of Forest, Marshfield, and Greenbush. The incremental filling of wetlands has occurred over time as a result of development and the conversion of land to agricultural uses. Many of the larger concentrations of remaining wetlands in the study area are located on state-managed lands. Two wetland mitigation banks exist directly adjacent to improvements being considered. They include the Pit Road wetland mitigation site and the Wade House wetland mitigation site. Mullet Marsh is located about 1 mile south of the WIS 23 corridor and the Sheboygan Marsh State Wildlife Area is located about 2 miles north of WIS 23 corridor. A comparison of pre-European settlement land cover data (source: WDNR GIS dataset, Original Vegetation Cover of Wisconsin, 1990) and recent land cover (source: United States Geological Survey, National Land Cover dataset, 2001) indicates that approximately 98 percent of presettlement wetlands remain in the study area.

The majority of historic and ongoing wetland losses in the study area have resulted mostly from farming and conversion of small wetlands which are not protected under local, state, or federal regulations. Wetland ecosystems are very sensitive to change from disruption of native ground cover as a result of farming or development activity. Ongoing significant adverse impacts result from chemical application from farming or lawn care and increased impervious surfaces within their watershed.

3. Water Quality

Water quality in the study area is generally good; however, some waterways have been negatively affected by urban and agricultural runoff, stream channelization, and point source discharges.

The Sheboygan River Basin, of which most of the study area is a part, has been identified by the USEPA as a Great Lakes Area of Concern⁹. Portions of the Sheboygan River are on the Wisconsin's impaired waters list. The section of the river within the WIS 23 corridor is not on the impaired waters list.¹⁰

Several trout streams are located in the study area, including Feldner's Creek and the Mullet River. Feldner's Creek and Ben Nutt Creek are also considered Exceptional Resource Waterways.

⁸Source: 2012 Census of Agriculture County Profile—Sheboygan County—Wisconsin (accessed website on 10/27/17 at https://www.agcensus.usda.gov/Publications/2012/Online_Resources/County_Profiles/Wisconsin/cp55117.pdf) and https://www.agcensus.usda.gov/Publications/2012/Online_Resources/County_Profiles/Wisconsin/cp55039.pdf

⁹<http://dnr.wi.gov/topic/greatlakes/sheboygan.html>

¹⁰Source: Sheboygan River Area of Concern (accessed website on 10/30/17 at <http://dnr.wi.gov/topic/greatlakes/sheboygan.html>)

Exceptional Resource Waters are characterized by excellent water quality, high recreational value, and high-quality fisheries. These may receive treated wastewater discharges or may receive future discharges necessary to correct environmental or public health problems.¹¹

The western portion of the study area (west of Taft Road) is located in the Lake Winnebago East Watershed, which generally flows from east to northwest into Lake Winnebago. This watershed includes Taycheedah Creek and is part of the Upper Wolf River drainage basin. It extends along the east shore of Lake Winnebago in Calumet and Fond du Lac counties. It is predominantly an agricultural watershed, but it does include more than one-third of the city of Fond du Lac as well as the developing area east of Fond du Lac on the west slope of the Niagara Escarpment.¹²

The city of Fond du Lac suffers stormwater peak-flow problems. This is primarily because of its location in a topographical depression next to a lake. The flatness of the terrain does not allow water to drain quickly. This problem is magnified by continued development along the eastern and southern fringe of the city in the watershed (Source: *State of the Upper Fox River Basin*, Wisconsin Department of Natural Resources, 2001).

The quality of groundwater has also been impacted over the years by urban and agricultural land use practices and pollutants associated with chemical storage, road salt use, accidental spills, leaking underground storage tanks, leaking underground pipes and sewers, animal feedlots, fertilizers, septic tanks, sewage lagoons, sumps and dry wells, and improperly abandoned wells.

4. Upland Habitat

Undeveloped lands in the study area are predominantly in agricultural use. Much of the upland habitats are located in the KMSF-NU in Sheboygan County and along the Niagara Escarpment. Nearby natural areas include Mullet Marsh and Sheboygan Marsh.

- a. The KMSF-NU is located within the study area. This state park comprises mostly forests and lakes and provides habitat for a diversity of species including whitetail deer, hawks, turkeys, raccoons, squirrels, and possums. Figure 4.0-1 illustrates the boundaries of the state forest at the time of this writing as they relate to the WIS 23 corridor and also shows the state's plan for the projected forest boundary, which will require purchase of private lands.

¹¹ Source: Outstanding and Exceptional Resource Waters (accessed website on 10/30/17 at <http://dnr.wi.gov/topic/SurfaceWater/orwerw.html>)

¹² Source: Lake Winnebago East Priority Watershed Project Plan (accessed website on 10/30/17 at <http://dnr.wi.gov/topic/nonpoint/documents/9kep/expired/LakeWinnebagoEast.pdf>)

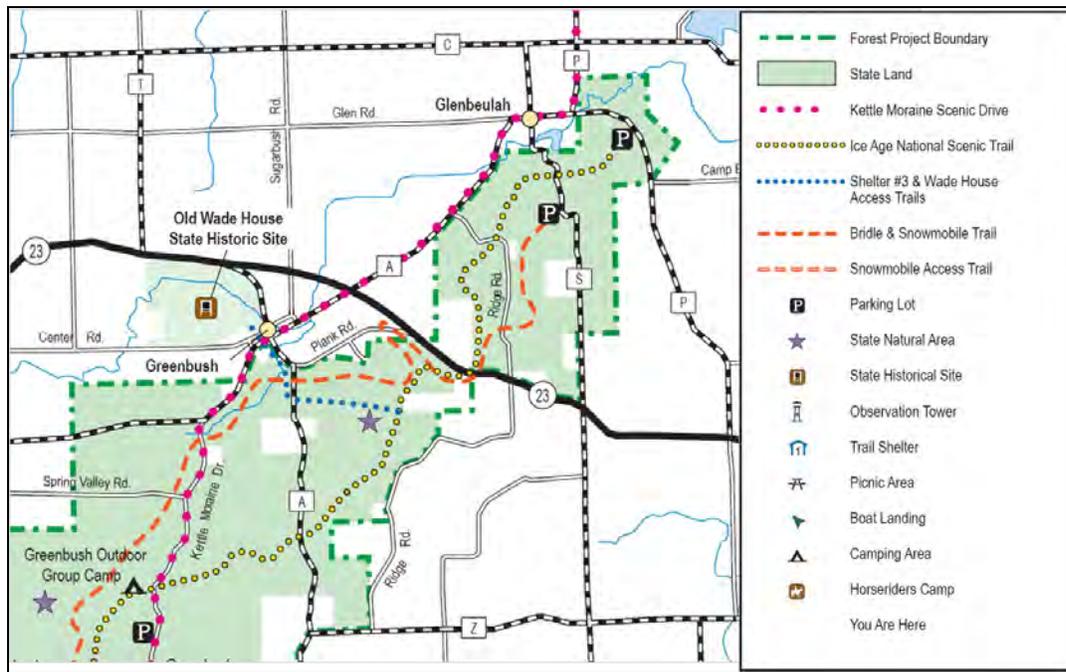


Figure 4.0-1 Northern Unit of the Kettle Moraine State Forest Boundaries

- b. The Niagara Escarpment (which is a long ridge, see Figure 4.0-2) which is located within the study area, is a statewide resource area because of its unique geology, the number of rare plants and animals that rely on the escarpment’s distinct ecosystem and microclimate, and the land’s sensitivity to groundwater contamination. The Escarpment extends for over 1,000 miles from New York through Canada, Michigan, and into Wisconsin. Many areas of the Escarpment have been compromised over the years by development. The Niagara Escarpment Report (1999-2001), prepared by the WDNR, documents the biodiversity associated with the Escarpment and lists recommended management strategies to ensure the long-term integrity of this significant natural feature.



Figure 4.0-2 The Niagara Escarpment (shown in dark line)

- c. Sheboygan Marsh County Park and Sheboygan Marsh State Wildlife Area are located 2 miles north of the WIS 23 corridor. Expansive coniferous swamps of northern white cedar and tamarack, more commonly found in northern Wisconsin, occupy over 4,000 acres of the marsh. The Sheboygan River flows through the marsh and its waters are held back by a dam at the northeast corner of the marsh. The open waters and adjoining wetlands of this restored flowage total over 1,700 acres in size. The Sheboygan Marsh is in a 133-square-mile watershed and receives surface and groundwater drainage from farmlands, small urban communities, and part of the Northern Unit of the Kettle Moraine State Forest.¹³
- d. Mullet Marsh is located 1 mile south of the project corridor. Mullet Creek Wildlife Area is located in the southeastern part of the marsh and consists of wetland, forest, grassland and farmland. The 495-acre Mullet Lake State Natural Area is located about 0.5 miles southwest of Mullet Creek Wildlife Area. The 200-acre hard-water seepage lake is surrounded by a wetland complex of tamarack, shrub carr, sedge meadow, and swamp forest. The lake and swamp complex is the headwaters of the Mullet River in the priority watershed of the Sheboygan River.¹⁴

As mentioned, there also is a variety of privately owned upland areas that lie adjacent to the corridor. Market forces affect how much land is in development and where it is located, which is function of population growth, local plans, and zoning controls. Local plans and zoning rarely protect these areas. Once converted to development, upland habitat will likely never return to undeveloped natural area.

5. Threatened and Endangered Species

There are 47 total plant and animal species state listed as either threatened or endangered within Fond du Lac and Sheboygan counties. Within the WIS 23 corridor area, there are four plant and animal species federally listed as either threatened or an experimental population and 19 plant and animal species state listed as either threatened, endangered, or special concern within the approximately 19.1 miles between Fond du Lac and Sheboygan counties. Two state threatened species and one state endangered species are considered potentially affected based on WDNR project coordination. The potentially affected state endangered species includes the rainbow shell mussel. The potentially affected state threatened species include the slippershell mussel and ellipse mussel. Within the larger study area, residential and commercial development also has the opportunity to adversely affect rare species. Habitat loss, habitat disruption or degradation, loss of travel corridors, fragmentation, roadway and other sources of mortality, and depredation from development (whether agricultural or municipal expansion) are some of the primary reasons why these species are state threatened or endangered species.

The three freshwater mussels that may be potentially directly affected by WIS 23 Build Alternatives are likely the most susceptible rare species on the project corridor. Their response to change is poor as related to draining, encroachment of habitat, loss of water quality buffers, and water pollution. Fifty-four percent of all mussels in Wisconsin are listed as rare species. Siltation from all mechanisms, including agriculture and roadway runoff, causes loss of aquatic bed habitat for these species. Water chemistry through increased fertilizer and agricultural use, stormwater runoff, and residential development has also affected these species.¹⁵

¹³Source: Sheboygan Marsh Wildlife Area (accessed website on 10/30/17 at <http://dnr.wi.gov/topic/lands/wildlifeareas/sheboygan.html>)

¹⁴Source: Mullet Creek Wildlife Area (accessed website on 10/30/17 at <http://dnr.wi.gov/topic/lands/wildlifeareas/mullet.html>)

¹⁵Source: Mussels (accessed website on 10/30/17 at <http://dnr.wi.gov/news/features/feature.asp?id=2&article=9>)

The federally listed species are the Whooping Crane (*Grus americana*), Pitcher's Thistle (*Cirsium pitcheri*), the Eastern Prairie Fringed Orchid (*Plantanthera leucophaea*), and the Northern Long-eared Bat (*Myotis septentrionalis*).

The Whooping Crane depends on large, open wetland ecosystems to eat, roost, and make their nests. No known nesting or migration sites were identified near the corridor. Since this species distribution is not restricted to Wisconsin and because of the extent of the mid-western experimental population expansion project of the USFWS, the species is not extensively tracked by the WDNR within the NHI.

The Pitcher's Thistle is found in open sand dunes and low open beach ridges of the Great Lakes' shores. There is no habitat (sand dunes) in the project proximity. The Eastern Prairie Fringed Orchid is found in a wide variety of habitats, from mesic prairie to wetlands such as sedge meadows, marsh edges, even bogs. There is no known habitat identified in project proximity.

The Northern Long-eared Bat is found in caves and mines, swarming in surrounding wooded areas in autumn. During late spring and summer, the Northern Long-eared Bat roosts and forages in upland forests. Continued suburban development, rural habitat loss and fragmentation from woodland home sites, invasive shrubs and herbaceous plants, and loss or harvest of large, mature trees diminish the habitat for Northern Long-eared Bat. WDNR determined that there are no known Northern Long Eared Bat maternity roost trees within 150 feet and no known hibernacula within 0.25 miles of the proposed project.

6. Historic and Archaeological Resources

As mentioned previously in the indirect effects analysis, there are numerous historic resources within the broader study area. Wisconsin's Architecture and Historic Inventory (AHI) indicates that there are 4135 historic listings for Fond du Lac County and 2708 historic listings for Sheboygan County. Wisconsin also keeps an Archaeological Site Inventory that includes known archaeological sites, cemeteries, and cultural sites. Determinations of Eligibility for the NRHP have not been performed for most of the resources listed within these databases. Directly within the WIS 23 corridor there are 19 potential historic sites. Effects to all these resources were avoided or determined to have no adverse effect.

The Wade House Historic Site is under state ownership and is being managed by the State Historical Society for preservation. The St. Mary's Springs Academy is eligible for the NRHP and is a functioning school. Facility changes by the owner over the past decade have altered the contributing characteristics and the historic significance of this resource. Future management decisions could change the historic integrity of the site. The Sippel archaeological site directly on the corridor is a small Yankee homestead/farm in the town of Greenbush. It was occupied between 1848 and 1875. Data collection by WisDOT on this site was performed in 2014 in areas that could be affected by a WIS 23 improvement in accordance with the Section 106 Memorandum of Agreement for this project.

7. Air Quality

Section 3.0 briefly describes the NAAQS and the conformity of Fond du Lac County and Sheboygan County with those standards. Fond du Lac County is presently in attainment of all NAAQS. On May 21, 2012, USEPA designated Sheboygan County a marginal nonattainment area for ground level ozone under the 2008 eight-hour standard for that pollutant. USEPA has determined that the Sheboygan, Wisconsin area (Sheboygan County) failed to attain the 2008 NAAQS by the applicable attainment date of July 20, 2016, and that this area is not eligible for an extension of the attainment date. USEPA reclassified this area as "moderate" nonattainment for the 2008 ozone NAAQS.

Per the Clean Air Act, states recommend designations to the USEPA following promulgation of a new NAAQS. In September 2016, Governor Walker recommended that the entire state of Wisconsin be designated as attainment of the 2015 ozone standard. On November 6, 2017 USEPA finalized

“round 1” of its initial area designations for the 2015 standard. In April 2017, Wisconsin’s Department of Natural Resources provided supplemental information to USEPA in support of the governor’s recommendation. In February 2018, DNR submitted additional comments to USEPA in response to USEPA’s intended nonattainment area designations.

On May 1, 2018 USEPA notified the state of its final designations for nonattainment of the 2015 ozone NAAQS. For Sheboygan County, the final moderate nonattainment area, (effective 60 days after rule publication in the Federal Register) is:

Inclusive and east of the following roadways going from the northern county boundary to the southern county boundary: Highway 43, Wilson Lima Road, Minderhaud Road, County Road KK/Town Line Road, N 10th Street, County Road A S/Center Avenue, Gibbons Road, Hoftiezer Road, Highway 32, Palmer Road/Smies Road/Palmer Road, Amsterdam Road/County Road RR, Termaat Road.

The portion of proposed WIS 23 in Sheboygan county is not located in the 2015 Ozone NAAQS nonattainment area.

8. Trails

The three trails in the study area vary in their purpose and character. The IAT is intended to provide access to the kettle moraine formations in a manner that highlights glacial land forms. To best meet this objective the natural landscape should be as free from development as possible. Therefore, increasing development diminishes the experience of the resource. The Old Plank Road Trail is intended to provide a recreational experience along the route historically linking Sheboygan to Fond du Lac. For this reason, the trail corridor is close to WIS 23 and adjacent developed areas. Future development will likely occur near the WIS 23 corridor; however, the study team notes that such development is not inconsistent with the recreation purpose and character of this trail.

State, county, and local governments in the study area plan for the acquisition and development of new trails. Other agencies, such as the Niagara Escarpment Network, also work toward these goals. The IAT and State Equestrian Trail have an established at-grade crossing of WIS 23 that would likely continue in absence of other influences. The build alternatives evaluated in this document include a grade separation for this IAT/State Equestrian Trail crossing. The Old Plank Road Trail extends from Sheboygan to the KMSF-NU. The build alternatives evaluated in this document include an extension of the Old Plank Road Trail west to the Prairie Trail in Fond du Lac. In absence of a WIS 23 project, it is undetermined when this trail would be extended west.

State, county, and club-maintained snowmobile trails run along WIS 23 from approximately County W North to Plymouth with additional crossings of WIS 23 near Whispering Springs Boulevard and County W South. The trails are intended for recreational use during the winter months.¹⁶ Snowmobilers use both county and state trails and private snowmobile club trails on private land. Snowmobiling is allowed on the Old Plank Road Trail. Figure 4.0-3 shows their general location.

¹⁶ Sources: Fond Du lac County Snowmobile Association and Visiting Sheboygan County (accessed websites on 11/01/17 at <http://www.fdlsnowmobileassn.com/> and <http://www.visitsheboygancounty.com/wp-content/uploads/2012/04/Snowmobile-Area2pdf.pdf>)

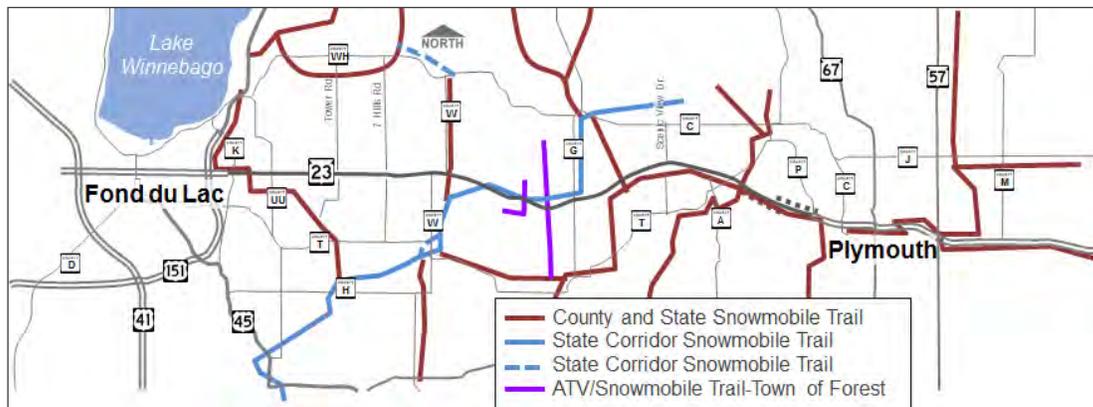


Figure 4.0-3 Snowmobile Trails in the Project Corridor

All-terrain vehicle (ATV) trails cross WIS 23 near Triple T and at Hillview Road. Trail use is allowed between December 15 and March 15. The trails are intended for recreational use.¹⁷

9. EJ Populations

Minority and low-income populations are located at the ends of the ICE study in the cities of Plymouth and Fond du Lac. Some census tracts in the study area also have a greater proportion of elderly individuals (age 65 and over) when compared to county averages. These concentrations are likely to remain because they are closer to urban areas and the associated services, housing, and employment opportunities associated with urban areas. The elderly is not an EJ population, but it is FHWA’s policy to also consider the elderly and disabled along with EJ populations. EJ populations and the elderly have a lower ability to respond to change and capacity to withstand stress related to age, income, education, general health, and access to health care.

F. Characterize Stresses Affecting these Resources, Ecosystems, and Human Communities and their Relation to Regulatory Thresholds

Table 4.0-4 summarizes stresses and factors that are affecting resources.

Table 4.0-4 Stresses Affecting Resources

Resource	Stresses and Factors Affecting Resource
Agricultural Land	Development and urbanization. Commodity prices. Demand for land to support larger dairy operations.
Wetlands	Urban and agricultural runoff. Point-source discharges. Runoff from roads.
Water Quality	Urban and agricultural runoff. Stream channelization and erosion. Point-source discharges. Runoff from roads.
Upland Habitat	Development and urbanization. Demand for land to support dairy encourages land clearing for agriculture.
KMSF-NU	High land prices decrease ability to acquire remaining tracts of land. Built environment, including road and agricultural runoff, diminish resources within State Forest.
Niagara Escarpment	Development and urbanization within the escarpment fragment natural communities. Development of wind farms increase fragmentation of natural resources.
Threatened and Endangered Species	Diminished water quality in streams and wetlands. Reduction in upland habitat caused by urbanization and agriculture

¹⁷ Source: Kettle Moraine ATV Association (accessed website on 11/01/17 at <http://kmatva.com/trailinfo/detailedtrailmap.html>)

Table 4.0-4 Stresses Affecting Resources

Resource	Stresses and Factors Affecting Resource
Historic and Archaeological Resources	Property modifications and changes in the surrounding area can diminish historic value. Construction activities can disturb unrecorded archaeological sites.
Trails	Funding constraints may prevent trail extensions and enhancements.
Environmental Justice Populations	Gentrification can increase housing costs. Economic conditions affect employment opportunities.
Air Quality	NOx and VOCs from industry and mobile sources create ozone

1. Baseline Condition for the Resources, Ecosystems, and Human Communities

The baseline conditions for the purposes of this cumulative effects analysis are predicted based on information provided by local land use plans, county plans, United State Geological Survey (USGS) data, WDNR data, and Wisconsin Department of Administration population reports and are generally described in this cumulative effects analysis.

2. Important Cause and Effect Relationships Between Human Activities and Resource, Ecosystems, and Human Communities

The WIS 23 alternatives evaluated in this document will directly affect land uses and resources. Land that will be purchased for right of way will decrease the amount of cropland, upland habitat, and housing. (Note that much of the land needed for a 4-lane expansion has already been purchased based on the decision from the 2014 LS SFEIS). The WIS 23 build alternatives will also indirectly affect land uses and resources by promoting more efficient and safe travel between the Fond du Lac metropolitan area and the Sheboygan metropolitan area. As described in the indirect effect analysis, this project has the potential to accelerate the timing of future development in the study area. Where access has been restricted and focused by the construction of new interchanges (Hybrid and 4-lane On-alignment Alternatives), the project will also focus the location of development. Additional development in the study area may lead to a loss in agricultural land and further encroachment on and fragmentation of natural habitats such as wetlands and woodlands. Habitat loss may also threaten rare or sensitive species. Development will also generate additional stormwater runoff, which will impact water quality in the region and the previously identified rare species. Figure 4.0-4 schematically illustrates how the WIS 23 alternatives that add capacity along with other unrelated actions cumulatively affect resources.

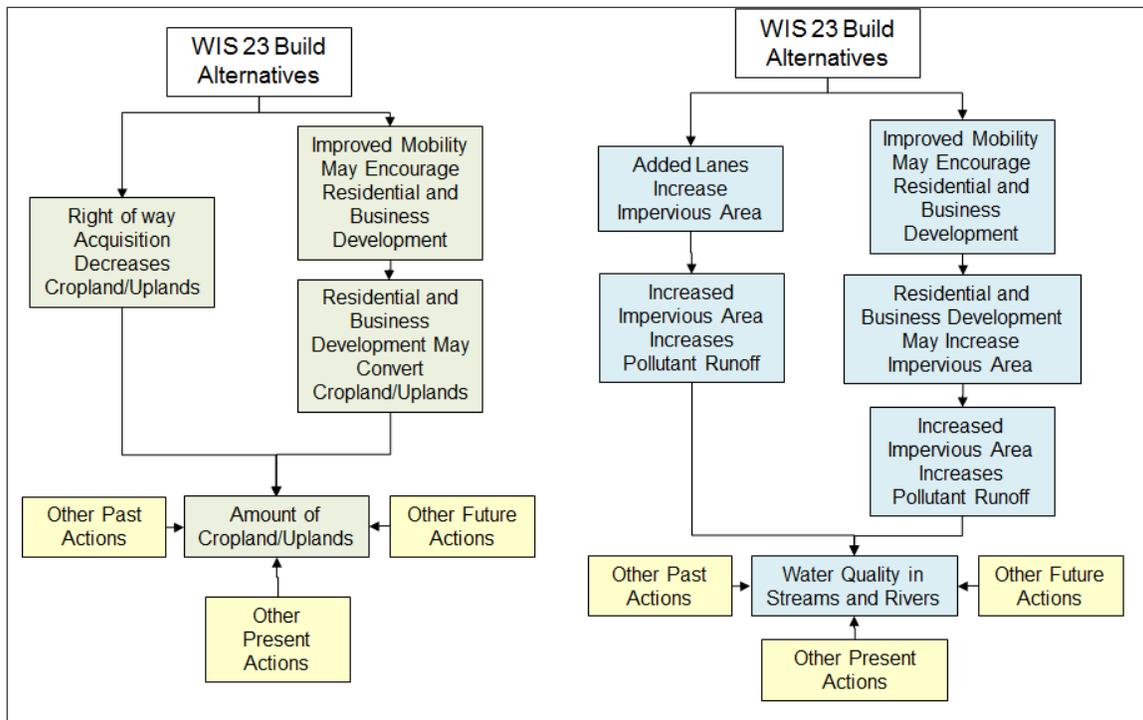


Figure 4.0-4 Examples of Cumulative Effects on Resources

Table 4.0-5 illustrates some cause and effect relationships between resources and the WIS 23 project and how combined they can cause a cumulative impact. The table is meant for illustration purposes only and is not exhaustive.

Table 4.0-5 Example Cause and Effect Relationships

Resource	Other Activities Causing Impacts	Potential WIS 23 Impacts
Water Quality	Agricultural runoff.	Increase pavement and resulting pollutants. Development indirectly enabled by the project have pavements and resulting pollutants.
Farmland	Exurban residential development. Commodity prices.	Direct acquisition of farmland for right of way. Indirect residential development on agricultural lands.
Uplands	Exurban residential development fragmenting uplands.	Direct acquisition of uplands for right of way. Indirect residential development on uplands.
Threatened and Endangered Species	Exurban development reducing habitat. Agricultural runoff diminishing water quality and habitat.	Right of way acquisition reducing habitat. Severing habitat corridors. Pavement runoff diminishes water quality.
Archaeological Resources	Development alters landscapes, potentially adversely affecting unknown resources.	Road constructing affecting known archaeological resources. Indirect development alters landscapes potentially affecting unknown resources.
Air Quality	Aging vehicle fleet remains in operation, keeping VOC and NOx levels high. Improving standards on newer vehicles reducing VOC and NOx emissions, leading to lower ground level ozone levels. Air quality of Chicago Metro area which migrates to the region.	Increased vehicle miles traveled on WIS 23 may increase vehicle emissions of VOCs and NOx, which are precursors to ground level ozone. Decreased congestion and higher travel speeds may decrease vehicle emissions.

Local governments have the ability to influence direct, indirect, and cumulative effects to land use and resources through the administration of land use controls that determine where development occurs, what types of development occur, and the density to which the development occurs.

G. Estimated Magnitude and Significance of Cumulative Effects

The following paragraphs describe the estimated magnitude of the cumulative effects based on input from the expert panel and the study team's expertise.

1. General Development Patterns

The study area has experienced modest change in land use patterns in the past two decades. The majority of the study area is rural and much of it remains in agricultural use. Over the years, some unsewered residential development has occurred in most of the towns in the study area. Most concentrated development has occurred within and around cities and villages located in the study area, primarily in the cities of Fond du Lac and Plymouth, and to a much lesser extent the village of Mount Calvary, Glenbeulah, and St. Cloud. Some industrial development has occurred in the cities of Fond du Lac and Plymouth and some highway-oriented commercial development is very sparsely scattered along the WIS 23 corridor. The construction and opening of the US 151 Fond du Lac bypass has enabled development on the east side of Fond du Lac. This development has included a residential subdivision, a church and school complex, and an office park oriented to medical services.

Under the No-Build Alternative, future land development within the study area will most likely occur in the locations planned for development in adopted comprehensive plans. The continuation of steady long-term trends for modest development, lack of major regional transportation improvements and other large-scale development projects, and the continued long-term economic viability of agricultural activities will reduce the likelihood of land conversion for other development.

The Passing Lane Alternative, would have the effect of having development patterns similar to the No-Build Alternative. Full access will remain for the majority of intersections. Cumulative effects are difficult to discern for access modifications.

The Corridor Preservation for Passing Lane Alternative would have the indirect effect of focusing development. It is likely that long term commercial investments would not occur at roadways where the access would be removed from WIS 23, this includes Tower Road, 7 Hills Road, Scenic View Road, and Sugarbush Road which will receive overpasses. It will probably also guide commercial development to intersections that will maintain full access to WIS 23, such as County UU, County W, County G and County A, which all would receive interchanges, and County W, which would receive a RCUT. A cumulative effect of focusing access to certain side roads could increase travel and emergency response times.

The Hybrid Alternative, has the indirect effect potential to concentrate development at intersections with access to WIS 23 and mildly accelerate the pace of future development in the Fond du Lac county portion of the corridor. County K, County UU, and County G would receive interchanges with the Hybrid Alternative, and County W, which would receive a RCUT. The potential to concentrate development and increase the pace of future development for the Hybrid Alternative is anticipated to be modest, and between the Passing Lane Alternative and the 4-lane On-alignment Alternative. A cumulative effect of focusing access to certain side roads could be increased travel and emergency response times.

The Corridor Preservation for Hybrid Alternative would not provide additional impacts to what is explained previously. It would likely have the indirect focusing effect on commercial development investment to intersections that will maintain access to WIS 23, such as County A. Again, a cumulative

effect of focusing access to certain side roads could be increased travel times and emergency response times.

The 4-lane On-alignment Alternative has the potential indirect effect of concentrating development at access points and increasing the pace of future development in the study area. County K, County UU, County G, would have jughandels and/or diamond interchanges. An additional seven intersections would have RCUTs.

The Corridor Preservation for 4-lane On-alignment Alternative would not provide additional impacts to what is explained previously for the 4-Lane On-Alignment Alternative. It is likely that the corridor preservation would have the indirect effect of discouraging commercial development and investment at intersections that will lose their access to WIS 23. This would include Tower Road, 7 Hills Road, Scenic View Drive, and Sugar Bush Road which are all slated for overpasses. It would probably have the indirect effect of focusing commercial development towards intersections that will eventually become interchanges, such as County W and County A. A cumulative effect of focusing access to certain side roads could increase travel times and emergency response times.

Long-term economic conditions and local government planning and zoning policies, combined with the varying access control elements of the different WIS 23 alternatives, would influence the location of development, which has a cumulative impact on changing development patterns. The panelists also stated other factors that cumulatively affect development patterns include long-term economic conditions and local policies and could be more influential than the Build Alternatives.

Projects associated with the US 151 Fond du Lac bypass corridor preservation plan, when and if implemented, may orient commercial and industrial development to roadways that maintain access to US 41 and US 151. This includes a possible future US 41 service interchange located south of Fond du Lac.

2. Agricultural Land

Under the No-Build Alternative there are no direct impacts or acquisition of agricultural land. The cumulative effect of WIS 23 on agricultural land would be minimal based on development trends and current economic conditions.

Population growth and past development decisions have led to the incremental loss of farmland in the study area.

The construction of the Passing Lane, Corridor Preservation for Passing Lane, Hybrid, Corridor Preservation for Hybrid, 4-lane On-alignment, and Corridor Preservation for 4-lane On-alignment Alternatives would directly require the acquisition of farmland, with acreages shown in Table 4.5-6. Also, expert panelists agreed that the 4-Lane On-Alignment Alternative could increase the pace of farmland conversion to other uses in areas planned for future development (an indirect effect). Other factors that will contribute to the cumulative loss of farmland include exurban residential development, commodity prices, and agricultural workforce. According to the 2012 US Agricultural Census, Fond du Lac and Sheboygan counties lost 21,756 acres of farmland between 2007 and 2012. Table 4.0-6 shows the amount of agricultural land required for the WIS 23 alternatives as a percentage of this loss for comparison purposes. The WIS 23 alternatives reduction in farmland make up a very small percentage of the total farmland losses occurring from other reasons.

Table 4.0-6 Farmland Losses - WIS 23 Alternatives

	No-Build	Passing Ln Alternative	Corridor Preservation Associated with Passing Ln Alt	Hybrid Alternative	Corridor Preservation Associated with Hybrid Alternative	4 lane On alignment	Corridor Preservation Associated with 4 lane On alignment
Acres of farmland needed (acres)	0	16	343	259	135	329	65
WIS 23 farmland needed as a percentage of ag land lost from 2007-2012 in Fond du Lac and Sheboygan Counties	0%	0.1%	1.7%	1.2%	0.6%	1.5%	0.3%
2012 US Agricultural Census							

The farmland impacts associated with the constructed US 151 Fond du Lac Bypass, the constructed WIS 23 project near Plymouth, the construction of US 151/County V and T improvements, and future US 151 corridor preservation improvements amount to 348 acres. If they are included with the impacts of acquiring 394 acres for any build alternative (and associated corridor preservation), the total farmland acreage converted to highway right of way since the construction of the US 151 Fond du Lac Bypass to the construction of any build alternative (and associated corridor preservation) could amount to 742 acres. Local government planning and zoning decisions and general economic conditions will also influence the impacts.

3. Wetlands

Wetlands are scattered throughout the area with large concentrations primarily located in the towns of Forest, Marshfield, and Greenbush, which are mostly permanently protected through public ownership. The incremental filling and draining of wetlands elsewhere has occurred over time as a result of development and conversion to farmland. The conversion of wetlands to agricultural uses has also occurred over time. A comparison of pre-European settlement and current land cover data indicates that approximately 98 percent of historic wetlands remain in the study area because of public acquisition of large wetlands in the Sheboygan Marsh and the Mullet Marsh areas. The cumulative effects on wetlands under the No-Build Alternative will be minimal since there are no direct impacts, and because many of the larger concentrations of remaining study area wetlands are located on state-managed lands or are otherwise subject to state and federal wetland regulations and are therefore protected from development.

There may be cumulative impacts on wetland losses with WIS 23 impacts considered in this LS SEIS. According to WDNR records using aerial photography, there are about 109,600 acres of wetlands in Fond du Lac and Sheboygan Counties. Table 4.0-7 illustrates the wetland losses associated with each WIS 23 alternative, and their percentage of the total wetlands in Fond du Lac and Sheboygan counties.

Table 4.0-7 Wetland Losses–WIS 23 Alternatives

	No-Build	Passing Ln Alternative	Corridor Preservation Associated with Passing Ln Alt	Hybrid Alternative	Corridor Preservation Associated with Hybrid Alternative	4 lane On alignment	Corridor Preservation Associated with 4 lane On alignment
Wetland impacts (acres)	0	29.9	24.1	45.9	8.1	51.8	2.2
WIS 23 wetland impacts as a percentage of wetlands in Fond du Lac and Sheboygan counties	0%	0.03%	0.02%	0.04%	<0.01%	0.05%	<0.01%

Wetland impacts associated with the constructed US 151 Fond du Lac Bypass, the constructed WIS 23 project near Plymouth, the constructed US 151/County V and T improvements, and possible future improvements within the preserved US 151 corridor amount to about 38 acres. The 54 acres of wetland losses associated with any WIS 23 build alternative (and associated corridor preservation), when combined with previous and potential future losses, could be up to 92 acres over an approximate 30-year period. Wetlands filled by the WIS 23 alternatives, as well as all other past, present, and future highway projects, have been and will be mitigated at wetland mitigation sites near the corridor. WisDOT will pursue debiting at an existing wetland bank site if changes occur that prevent the implementation at sites near the corridor. With the wetland mitigation, the WIS 23 Build Alternatives would not have a cumulative effect on wetland acreage lost.

Expert panelists indicated that additional impervious surfaces associated with the roadway expansion and new development will increase stormwater runoff and reduce the quality and ecological integrity of wetland areas, including wetlands of regional significance. The cumulative effect to wetlands from the WIS 23 alternatives would consist mainly of continued water quality effects created by salt and debris from the existing roadway and slightly increased impervious surfaces. Other factors that contribute to the cumulative impact on wetlands include exurban development and associated pavements, pollutant loadings from agriculture, as well as exotics (see water quality).

4. Water Quality

The quality of surface water and groundwater in the study area has been impacted over the years by urban and agricultural land use practices and pollutants associated with chemical storage, road salt, accidental spills, leaking underground storage tanks, leaking underground pipes and sewers, animal feed lots, fertilizers, septic tanks, sewage lagoons, sumps and dry wells, and improperly abandoned wells.

Past, present, and future transportation projects other than WIS 23 in the region and increased development may affect water quality and will likely contribute to incremental increases in the amount of urban runoff that enters and is distributed throughout the basin because of increased impervious surfaces. The Fond du Lac Bypass provided up to 87 additional acres¹⁸ of impervious surface within the study area. The WIS 23 expansion near Plymouth added up to 16 additional acres¹⁹ of impervious surface within the study area. Future public acquisition or private preservation of natural areas in the study area may help improve water quality by keeping lands undeveloped.

The cumulative effect contribution to surface water and groundwater degradation by the No-Build Alternative will be minimal and limited to what is occurring with pavement runoff. Table 4.0-8 list the

¹⁸9 miles x 2 directions x 40 feet
¹⁹3.3 miles x 1 direction x 40 feet

increase in impervious surface for the WIS 23 alternatives, with an increase of 183 impervious acres with any build alternative combined with associated corridor preservation.

Table 4.0-8 Increase in Impervious Surface–WIS 23 Alternatives

	No-Build	Passing Ln Alternative	Corridor Preservation Associated with Passing Ln Alt	Hybrid Alternative	Corridor Preservation Associated with Hybrid Alternative	4 lane On alignment	Corridor Preservation Associated with 4 lane On alignment
Acres of added impervious surface	0	70	113	142	41	178	5

Increased stormwater runoff and land development under the WIS 23 Build Alternatives may reduce the ability for groundwater recharge and may alter surface water levels, particularly after periods of heavy rain and/or snow melt. Over time, the increased development under the WIS 23 Build Alternatives may contribute to incremental increases in the amount of urban runoff that enters and is distributed throughout the Sheboygan River basin. As indicated previously, Lake Winnebago is designated as a Section 303(d) water resource; it is located in the same watershed as the western portion of the WIS 23 corridor and may be at a higher risk for impacts.

One expert panel member indicated the marshes in the study area receive much of the runoff in this corridor. There will be an increased impact to the marshes in the study area under the WIS 23 Build Alternatives because of increased impervious surface area and new development.

Other contributors to the cumulative effect on surface water and groundwater quality in the study area include urban and agricultural land use practices and pollutant discharges associated with those uses summarized previously. The increased pace of residential development could also have a cumulative effect on surface and ground water quality.

5. Upland Habitat

a. Woodlands and Ecologic Resources

A comparison of pre-European settlement and current land cover data indicates that approximately 55 percent of historic forested lands remain in the study area; a significant portion of this is the KMSF-NU. WDNR plans include acquiring approximately 7,000 additional acres of land, conducting restoration activities, and improving management practices to protect wildlife and enhance recreation. In addition, WDNR recently partnered with the Hardwood Forestry Fund, a 501(c)(3) foundation that establishes sustainable forests for future generations. The foundation received a grant in 2011 from the American Forest’s Global ReLeaf program and planted about 20,000 trees on 20 acres of the KMSF-NU near Plymouth. The planting efforts will aid in reduction of the forest fragmentation, allowing for more contiguous native hardwood forests. Additional benefits include production of woody biomass, carbon sequestration, the improvement of habitat for forest interior wildlife species, and the increased opportunity for forest-based recreational opportunities.

The No-Build Alternative’s contribution to the cumulative impacts on woodlands is negligible because there would be no direct impacts to woodlands and ecological resources. Other factors, such as long-term development resulting from modest population growth will lead to minimal conversion of woodlands over time. The decisions and actions of state agencies and other environmental organizations, such as those described above, may help counteract the negative cumulative impacts to woodlands over the next 20 years through purchase and permanent protection of lands with woodlands as called for in plans for the Escarpment and KMSF-NU.

The Niagara Escarpment Report documents the biodiversity associated with the escarpment and lists recommended strategies to ensure long-term integrity of this natural feature. However, many areas of the escarpment continue to see steady population growth and increases in development pressure, including most recently by the development of wind farms along the ridge. In 2011, the Bay-Lake Regional Planning Commission prepared a Niagara Escarpment Overlay Zoning Guide to help Wisconsin communities delineate, develop, implement, and enforce overlay zoning to protect the escarpment. The contribution of the No-Build Alternative to this cumulative degradation of the escarpment is negligible because it has no direct acquisition requirements in the escarpment and does not improve mobility or accessibility to the escarpment.

Table 4.0-9 lists the amount of woodlands/uplands needed with the WIS 23 alternatives, a direct impact. According to their respective regional planning commissions, Fond du Lac County has 58,700 acres of woodlands and Sheboygan County has 103,500 acres of woodlands, which is a subset of upland habitat. The table also shows the percentage of woodlands of Fond du Lac and Sheboygan County woodlands each alternative would impact.

Table 4.0-9 Woodland/Upland Losses–WIS 23 Alternatives

	No-Build	Passing Ln Alternative	Corridor Preservation Associated with Passing Ln Alt	Hybrid Alternative	Corridor Preservation Associated with Hybrid Alternative	4 lane On alignment	Corridor Preservation Associated with 4 lane On alignment
Acres of woodland needed (acres)	0	5	40	9	36	38	7
WIS 23 woodland needed as a percentage of woodland in Fond du Lac and Sheboygan counties	0%	<0.01%	0.02%	0.01%	0.02%	0.02%	<0.01%

Impacts associated with the constructed US 151 Fond du Lac Bypass, the constructed WIS 23 project near Plymouth, the constructed US 151/County V and T improvements, WIS 23 and future US 151 corridor preservation improvements amount to about 28 acres. If the acres from any build alternative and associated corridor preservation are included, the total woodland and upland acreage converted to highway right of way since the construction of the US 151 Fond du Lac Bypass to the construction of any build alternative (and associated corridor preservation) will be about 73 acres.

Indirect development effects of WIS 23 Build Alternatives, which contribute to the cumulative impact on uplands, could occur in woodlands or alter woodland and wildlife habitat areas. Table 4.5-3 illustrates recent residential building permits issued for Fond du Lac and Sheboygan counties. This provides a gauge of development pressures on upland habitat. In addition, other factors contributing to the cumulative impact on uplands include increasing commodity prices that may lead some farmers to clear woodlands for farm fields. Panelists also indicated that invasive species, such as phragmites, can impact upland habitat and spread rapidly along highway corridors, which is another possible impact of the WIS 23 Build Alternatives.

b. Glacial Features

There are numerous glacial features throughout the study area. One panel member noted these features are not currently protected through local regulation. There will be no direct

effects and minimal indirect impacts to glacial features resulting from the No-Build Alternative due to modest amounts of new development. Therefore, the No-Build Alternative’s contribution to the cumulative negative effects to glacial features will be minimal.

The WIS 23 Build Alternatives will increase the footprint of the WIS 23 corridor, which will add to the cumulative detrimental effect on glacial features, particularly near the KMSF-NU. The WIS 23 Build Alternatives’ potential to increase the pace of development, an indirect effect, could also contribute to the cumulative negative effect on glacial features.

6. Threatened and Endangered Species

It is difficult to estimate the presettlement populations of threatened and endangered species except by gauging changes in their habitat. The current amount of Wisconsin waters acreages and stream threads is comparable to the amount that existed in presettlement conditions; however, the water quality has diminished which has likely resulted in decreased mussel populations. The current forested acres and wetland acres in the state and the study area have also declined since presettlement conditions which may contribute to fragmentation and reduced quality of wildlife habitat, including that of the garter snake and turtles. Similarly, wooded species and the introduction of exotic/invasive species into open canopy wetlands and grasslands has decreased suitable habitat for wildlife.

The No-Build Alternative will have no direct impacts and likely minimal indirect impacts to habitat areas and environments that support threatened and endangered species. Therefore, the No-Build Alternative’s contribution to cumulative adverse effects to threatened and endangered species is likely to be minimal.

The WIS 23 Build Alternatives could adversely affect threatened and endangered species through habitat reduction associated with right of way acquisition and other development pressures. Increases in impervious area will degrade water quality that could affect rare mussel populations within the corridor. Increased runoff can result in wetland sedimentation that can alter and degrade native plant communities, favoring monotypic stands of nuisance or exotic species. Table 4.0-10 lists the direct right of way needed for each WIS 23 alternative. This will result in the direct loss of habitat.

Table 4.0-10 Right of Way Acquisition–WIS 23 Alternatives

	No-Build	Passing Ln Alternative	Corridor Preservation Associated with Passing Ln Alt	Hybrid Alternative	Corridor Preservation Associated with Hybrid Alternative	4 lane On alignment	Corridor Preservation Associated with 4 lane On alignment
Acres of right of way acquisition needed (acres)	0	79	407	321	165	410	76

The purchase of new right of way for the WIS 23 Build Alternatives will alter habitats that support rare birds within the area. Because the right of way purchase follows the existing corridor, limited fragmentation will occur. Right of way acquisition in wetlands and uplands may affect reptilian habitat. The increased roadway corridor width for the WIS 23 Build Alternatives may also increase mortality rates.

7. Historic and Archaeological Resources

The No-Build Alternative will have no direct effects on archaeological or historical resources eligible for inclusion on the NRHP. Therefore, the No-Build Alternative will have limited contribution to cumulative adverse effects on cultural resources.

As for direct effects of the WIS 23 Build Alternatives, the Alternatives will not affect St. Mary’s Springs Academy (eligible for the NRHP) nor will it adversely affect the Wade House Historic Site. Data

recovery has been performed at the Sippel archaeological site, which could be affected by some WIS 23 alternatives, in accordance with the Section 106 Memorandum of Agreement.

Other actions that could affect historic and archaeological sites include the redevelopment and/or razing of existing buildings with historic significance. Also, residential and commercial development activities that alter the landscape could adversely affect unknown archaeological resources. The number of historic resources within Fond du Lac and Sheboygan counties is briefly discussed under the indirect effects section and includes 4,135 historic listings for Fond du Lac County and 2,708 historic listings for Sheboygan County on Wisconsin's Architecture and Historic Inventory. The direct effects of WIS 23 Build Alternatives, combined with possible redevelopment and development impacts could create a cumulative impact to historic resources. This impact is anticipated to be modest when compared to the direct effects of WIS 23 Build Alternatives. This characterization is based on a comparison of potential ground disturbing activities. The WIS 23 4-lane On-alignment Alternative will disturb approximately 410 acres of new right of way. If increased residential development occurring as an indirect effect of the 4-lane On-alignment Alternative amounted to an additional 0 to 125 homes, it could cause the disturbance of 0 to 25 or more acres, which is a small fraction of the ground disturbance activities that are a direct result of the 4-lane On-alignment Alternative.

8. Air Quality

As mentioned previously, NOx and VOC emissions are precursors to the formation of ozone, and Sheboygan County is in nonattainment for the 8-hour standard for ground-level ozone (Fond du Lac County is in attainment.) The impact-causing effects of the WIS 23 Build Alternatives on these emissions is complicated. Figure 4.0-5 shows generic emission graphs for VOCs, NOx, and CO emissions versus speed using the older Mobile 6.2 emissions model. The newer MOVES (Motor Vehicle Emission Simulator) model produces similar results/trends. These curves do not represent the full range of effects associated with travel at different speeds. Emissions rates are higher during stop-and-go, congested traffic conditions than free-flow conditions operating at the same average speed. Emission rates vary based on the speed a vehicle is traveling. VOC and CO emissions rates typically drop as speed increases (See Figure 4.0-5)²⁰. NOx emission rates increase at higher speeds. Emissions rates at all speeds have been falling over time as newer, more efficient vehicles enter the fleet.²¹

The US 151 Fond du Lac bypass is a past highway project that provided a new 4-lane expressway on a new alignment. Traffic volumes on the bypass now range from 11,000 to 18,100 vehicles per day (vpd) at relatively high speeds.²² Some of these trips represent travel that once occurred on US 151 as it traveled through central Fond du Lac at slower speeds. Some of this bypass traffic volume are new trips that would not have occurred without the bypass. The increase in VMT produced by the US 151 bypass would increase emissions in Fond du Lac County. The higher speeds on the bypass would lower emissions. As mentioned, Fond du Lac County is currently in attainment for NAAQS (see discussion later in this section).

The WIS 23 alternatives will have varying traffic volumes on the highway, and consequently higher VMT. Table 4.0-11 lists the weighted average 2040 average daily traffic associated with each build alternative

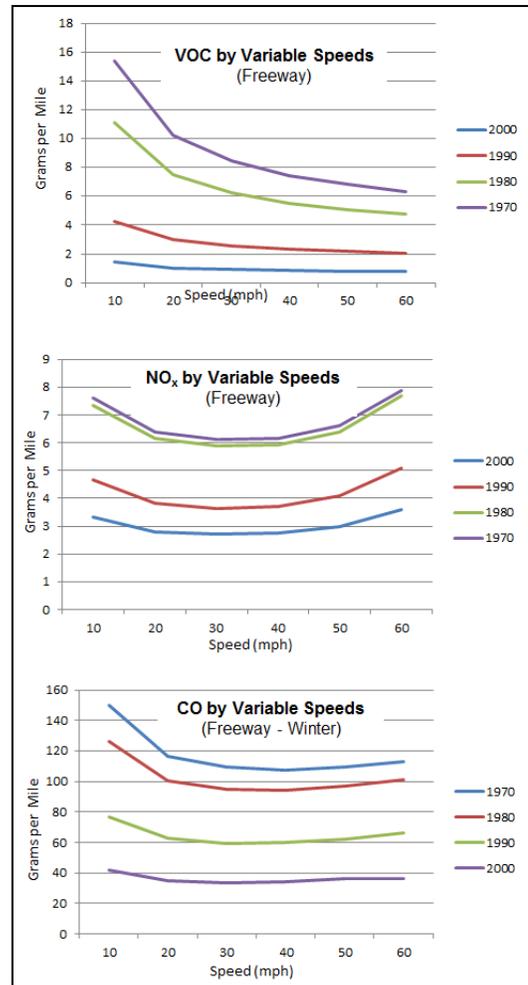


Figure 4.0-5 Generic Emission vs Speed
Source :US EPA. MOBILE 6.2 Model run 24 September 2003

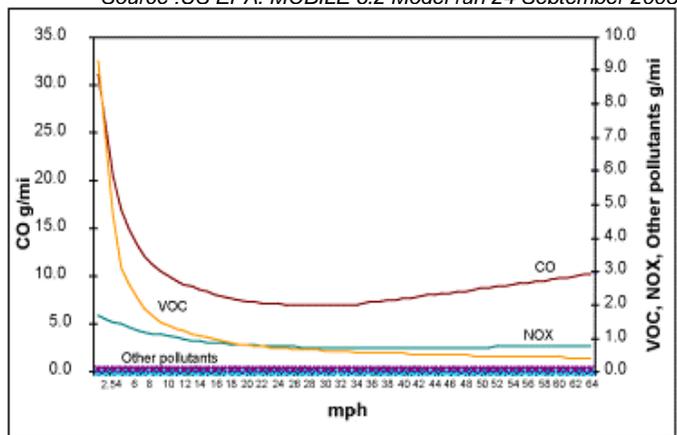


Figure 4.0-6 Emissions Factors by Speed for Light-Duty Vehicles and Trucks, 2006 (arterials)

²⁰Source https://www.fhwa.dot.gov/Environment/air_quality/conformity/research/mpe_benefits/mpe02.cfm accessed website on 11/17/2017)

²¹Source: Transportation Air Quality Selected Facts and Figures - Vehicle Emissions (accessed website on 11/6/17 at https://www.fhwa.dot.gov/environment/air_quality/publications/fact_book/page17.cfm)

²²Source: Wisconsin Department of Transportation (website accessed on 11/03/17 at <https://trust.dot.state.wi.us/roadrunner/>)

compared to the 2040 average annual daily traffic volume for the No-Build Alternative.

Table 4.0-11 Projected 2040 Average Weighted Daily Traffic Volumes 2-lane Portion

	2017 Traffic Volume	2040 No-Build	2040 Passing Ln Alternative	2040 Hybrid Alternative	2040 4 lane On alignment
Fond du Lac County Daily Traffic Volume	7,140	7,610	7,810	10,010	11,000
Sheboygan County Daily Traffic Volume	7,640	7,810	7,990	8,840	10,500
Total Weighted Daily Traffic Volume	7,360	7,700	7,890	9,480	10,780
Percentage weighted volume greater than 2040 No-Build Traffic Volume	NA	0%	2.5%	23.1%	40.0%

From 2017 to 2040, traffic volumes are projected to increase 5 percent (weighted average) with the No-Build Alternative. The No-Build Alternative’s VMT increase, combined with increases in vehicle miles traveled throughout Fond du Lac and Sheboygan counties may lead to increases in exhaust pollutants. Some of these increases could be partially offset by technology advances. The projected 2040 daily summer traffic on the Sheboygan County portion of WIS 23 represents about 1.88 percent of the total estimated 2040 VMT in Sheboygan County²³ for a summer day²⁴.

The Passing Lane Alternative projected 2040 daily traffic volumes are 2.5 percent higher (weighted average) than what would occur with the No-Build Alternative. The projected 2040 daily summer traffic on the Sheboygan County portion of WIS 23 represents about 1.92 percent of the total vehicle miles traveled in Sheboygan County for a summer day. With the Passing Lane Alternative, WIS 23 has 0.04 percent more VMT contribution to the total county VMT than the No-Build Alternative. The emissions associated with these higher traffic volumes combine with other human activities such as manufacturing, off-road vehicles, and other sources that emit VOCs and NOx and contribute to ground-level ozone levels in Sheboygan County.

The Hybrid Alternative projected 2040 daily traffic volumes are 23 percent higher (weighted average) than what would occur with the No-Build Alternative. The projected 2040 daily summer traffic on the Sheboygan County portion of WIS 23 represents about 2.12 percent of the total vehicle miles traveled in Sheboygan County for a summer day. With the Hybrid Alternative, WIS 23 has 0.25 percent more VMT contribution to the total county VMT. The emissions associated with these higher traffic volumes combine with other human activities such as manufacturing, off-road vehicles, and other sources that emit VOCs and NOx contribute to ground-level ozone levels in Sheboygan County.

The 4-lane On-alignment Alternative projected 2040 daily traffic volumes are 45 and 34 percent higher (weighted average) in Fond du Lac and Sheboygan Counties respectively, than what would occur with the No-Build Alternative. The projected 2040 daily summer traffic on the Sheboygan County portion of WIS 23 represents about 2.52 percent of the total vehicle miles traveled in

²³ 2040 County-wide VMT value for Sheboygan was interpolated. The 2016 VMT value is from WisDOT sources (<http://wisconsindot.gov/Documents/projects/data-plan/veh-miles/vmt2016-c.pdf>. Accessed April 18, 2018) and the 2045 VMT value is from Table 7.10 of the Sheboygan Area Transportation Plan, updated May 2015, referencing the “With Plan” value. The daily VMT for Sheboygan County in 2016 was 3,032,072 vehicles per day (vpd) and the projected 2045 “With Plan” value is 3,378,898 vpd. The 2040 VMT value for Sheboygan County is interpolated between 2016 and 2045 and equals 3,329,612 vpd.

The comparisons made in this section are between the estimated 2040 VMT value developed from the traffic forecasts and the distance between County G and County P in Sheboygan County. The equation for the estimated 2040 VMT value for each alternative is: = Estimated 2040 VMT_{Alternative} = 2040 weighted AADT_{Alternative} x Distance_{County G to County P}. The estimated 2040 VMT is then divided by the 2040 Sheboygan County VMT to provide an indication of how the estimated 2040 VMT for each alternative relates to the Sheboygan County 2040 VMT. The Build Alternative proportions are then compared to the No-Build proportion to determine the additional VMT added by each Build Alternative (e.g. the No-Build proportion is 1.88 percent and the Hybrid Alternative proportion is 2.13 percent, therefore the Hybrid has 0.25 percent more VMT contribution to the county-wide VMT). Fond du Lac County is in attainment and is therefore not included in these calculations.

Sheboygan County for a summer day. With the 4-lane On-alignment Alternative, WIS 23 has 0.65 percent more VMT contribution to the total county VMT.

The emissions associated with these higher traffic volumes combined with other human activities such as manufacturing, off-road vehicles, and other sources emit VOCs and NOx that contribute to ground-level ozone levels.

WDNR and USEPA have in place a set of regulations that are designed to decrease emissions from motor vehicles, areas sources and industrial sources over time. Programs and regulations are in place at the federal and state level to control vehicle emission including regulations in the early 2000s and 2007 further controlling emissions from vehicles and fuels. These are projected to reduce vehicle pollutant emissions over the next 25 years.

As mentioned, Sheboygan County is nonattainment for the 8-hour standard for ground-level ozone NAAQS. The Clean Air Act requires that states prepare state implementation plans (SIP) for air quality to identify how the NAAQS in the nonattainment area will ultimately be met. In Wisconsin, this is the responsibility of the WDNR. The attainment demonstration included in the SIP takes into account many emission sources and details regulations to reduce emissions from those sources. The mobile source sector is responsible for reducing its emissions as well. The SIP provides emissions budgets that act as emissions ceilings for the mobile sector. The Clean Air Act requires that in nonattainment areas the planning agencies demonstrate that mobile source emissions resulting from the modeling for changes to the transportation system “conform” to the budgets included in Wisconsin’s SIP. In Sheboygan County, Bay Lake Regional Planning Commission prepares a conformity analysis for ozone as part of its long-range transportation plan as well as its transportation improvement program. The most recent conformity analysis is contained in Appendix C of the Year 2045 Sheboygan Area Transportation Plan. The expansion of WIS 23 to 4 lanes is included in the conformity analysis. As for VOC emissions, the conformity plan states the following:

*The transportation system volatile organic compound emissions under the transportation system plan and transportation improvement program, when analyzed for all of Sheboygan County, are less than the motor vehicle emissions budgets for volatile organic compounds ...thus meeting this criterion for consistency.*²⁵

Table C.5: Forecast Volatile Organic Compound Emissions from the Transportation System in Sheboygan County Under the Year 2045 SATP/2015 – 2018 TIP and the State Implementation Plan for Air Quality: 2015, 2025, 2035 and 2045 (On a Hot Summer Weekday) Using MOVES 2014

Year	Sheboygan County	
	State Implementation Plan (tons)*	Year 2045 SATP (tons)
2015	1.9720	1.6770
2025	1.9720	0.7423
2035	1.9720	0.4501
2045	1.9720	0.4337

*The State Implementation Plan budget for volatile organic compounds is 1.9720 tons for 2015. Source: Wisconsin Department of Natural Resources, 2015; and Bay-Lake Regional Planning Commission, 2015.

As for NOx emissions, the conformity plan states the following:

The transportation system nitrogen oxide emissions under the transportation system plan and transportation improvement program, when analyzed for all

²⁵ The motor vehicle emission budgets used for conformity purposes are contained in the “8-Hour Ozone Redesignation. Request and Maintenance Plan for the Sheboygan County Subpart 2 Moderate Nonattainment Area.”

of Sheboygan County, are less than the motor vehicle emissions budgets for nitrogen oxides ...thus meeting this criterion for consistency. ²⁶

Table C.6: Forecast Nitrogen Oxide Emissions from the Transportation System in Sheboygan County Under the Year 2045 SATP/2015 – 2018 TIP and the State Implementation Plan for Air Quality: 2015, 2025, 2035 and 2045 (On a Hot Summer Weekday) Using MOVES 2014

Year	Sheboygan County	
	State Implementation Plan (tons)*	Year 2045 SATP (tons)
2015	4.4350	3.6967
2025	4.4350	1.3222
2035	4.4350	0.8568
2045	4.4350	0.9038

*The State Implementation Plan budget for nitrogen oxides is 4.4350 tons for 2015.

Source: Wisconsin Department of Natural Resources, 2015; and Bay-Lake Regional Planning Commission, 2015.

Therefore, while the WIS 23 Build Alternatives are projected to produce more VMT, it represents a small proportion of the overall VMT for Sheboygan County (1.88 percent for the No-Build, 1.92 percent for the Passing Lane, 2.12 percent for the Hybrid, and 2.52 percent for the 4-lane On-alignment Alternatives). The conformity analysis indicates the Sheboygan Area Transportation Plan is consistent with the approved motor vehicle emissions budgets for Air Quality even with the expansion of WIS 23 to 4 lanes.

9. Trails

State, county, and local governments and other organizations in the study area continually plan for the acquisition and development of new trails. The US 151 Fond du Lac bypass, constructed in 2005 through 2008, created the Prairie Trail, a multiuse path that travels around the east and south sides of Fond du Lac. For the WIS 23 corridor, the potential indirect impacts to trails of the No-Build Alternative include delaying the extension of the Old Plank Road Trail west to Fond du Lac and delaying the construction of an underpass for safe passage across WIS 23 for the IAT, State Equestrian Trail, and snowmobiles. There would be no cumulative impact from the No-Build Alternative to trails. The current WIS 23 at-grade crossing of WIS 23 at the IAT and State Equestrian Trail on WIS 23 would remain. This alternative also would not extend the Old Plank Road Trail from the KMSF-NU to Fond du Lac.

The WIS 23 Build Alternatives contribution to cumulative impact to trails and nonmotorized travel is beneficial through the extension of the Old Plank Road Trail and the provision of a grade separated crossing of WIS 23 for the IAT/State Equestrian Trail. This, combined with other actions, such as local trail improvements which include the Wild Goose-Prairie Connector, the Mascoutin Valley Trail Extension, and Union Pacific Trail Conversion, will make nonmotorized travel easier.

10. EJ Populations

There are no direct impacts to environmental justice populations under the No-Build Alternative. In terms of indirect impacts, the study team determined that concentrations of minority and low-income populations will not be greatly affected because generally employment and social services are available in Fond du Lac and Plymouth where such population concentrations occur. Concentrations of elderly populations will be more affected where they are concentrated in the central portion of the study area and need to travel to the urban areas at the ends of the study area for services. The elderly is not an EJ population, but it is FHWA’s policy to also consider the elderly and disabled along with EJ populations.

²⁶The motor vehicle emission budgets used for conformity purposes are contained in the “8-Hour Ozone Redesignation Request and Maintenance Plan for the Sheboygan County Subpart 2 Moderate Nonattainment Area.”

In terms of cumulative impacts, the percentage of elderly populations is projected to increase in the coming decades based on data from the WDOA Demographic Services, State Population Projections 2010 to 2040, produced in 2013, based from 2010 US Census. The lack of improvements under the No-Build Alternative will not address safety problems currently found in the corridor. This safety issue may contribute to the cumulative adverse safety impact on elderly residents and drivers who are more at risk where safety problems exist. As a result, these safety problems that are not addressed with the No-Build Alternative are likely to adversely impact a slightly larger percentage of the population within the study area.

There are no direct impacts to environmental justice populations under the WIS 23 Build Alternatives. Indirect impacts under the WIS 23 Build Alternatives may include access restrictions which are proposed along points in the corridor that may make access somewhat less convenient and trips slightly longer for the concentrations of elderly population in the central part of the study area. However, such access restrictions are likely to be offset by reduced highway congestion and safer conditions under the WIS 23 Build Alternatives.

In terms of cumulative impacts, the percentage of elderly populations is projected to increase in the coming decades based on data from the WDOA Demographic Services, State Population Projections 2010 to 2040, produced in 2013, based from 2010 US Census. The improvements under the WIS 23 Build Alternatives will address safety problems currently found in the corridor and thus help correct a problem which disproportionately impacts elderly residents and drivers who are more at risk where safety problems exist. Other cumulative effects of the WIS Build Alternatives will be modest and may include:

- Need for additional public and nonmotorized vehicle transportation. The availability of public and nonmotorized vehicle transportation options (i.e., sidewalks, bike lanes, paths, and trails) varies throughout the study area, with metro areas having a greater amount of these accommodations. As new development occurs, additional transportation options may be needed to provide multiple transportation options beyond the single occupancy vehicle. Transportation options will be helpful for all individuals in the study area to reach new employment destinations.
- Need for safe, affordable housing in the vicinity of employment destinations. Similarly, as modest new employment-related growth occurs as a result of the WIS 23 Build Alternatives, the need for new, safe, affordable housing will likely occur. In Fond du Lac and Plymouth, higher density housing is planned near locations planned for employment. Future development of these areas may fill the need to provide affordable housing in the study area.

Summary

In addition to the cumulative effects described in 1. through 10. above, cumulative adverse effects resulting from the WIS 23 Build Alternatives include the slight increase in the pace of development, which could affect farmlands and woodlands, particularly those in the Niagara Escarpment.

The combination of access controls, intersection improvements, and interchanges associated with the WIS 23 Build Alternatives will likely have the result of focusing development near the interchanges and reducing scattered development throughout the remainder of the study area (an indirect effect). By reducing the indirect effect of scattered development, the cumulative effect to agricultural lands and uplands will be reduced.

The cumulative effect of the WIS 23 project when combined with other actions analyzed above will be the incremental loss of agricultural land and other natural areas in the study area, particularly surrounding the cities of Fond du Lac and Plymouth where development is planned.

5.0 ACTIVITIES TO AVOID, MINIMIZE, OR MITIGATE EFFECTS

A. Indirect Effects Minimization and Mitigation Measures.

The indirect effects analysis indicates the predominant consequence of indirect effects from any of the build alternatives is the potentially increased pace of development that could occur outside the urban centers as a result of improved safety and increased mobility on WIS 23. This varies from limited increases with the Passing Lane Alternative to greater increases with 4-lane On-alignment Alternative. Since most of the sensitive resources in the study area are located in nonurban areas, the consequence of the indirect effect of rural development includes adverse impacts on agricultural land, water quality, and upland habitat, which are not protected to the same extent as wetlands.

NEPA does not specifically require substantive mitigation for project impacts: direct, indirect, or cumulative. The CEQ regulations require that the environmental impact statement include consideration and discussion of possible mitigation for project impacts (40 CFR §§ 1502.14(f), 1502.16(e-h), 1505.2(c), 1508.25(b)(3)).²⁷

Questions 19a. and 19b. of the *CEQ 40 Questions and Answers* provide additional guidance on mitigation to be addressed and documented in a NEPA document.

“The mitigation measures discussed in an EIS must cover the range of impacts of the proposal. The measures must include such things as design alternatives that would decrease pollution emissions, construction impacts, esthetic intrusion, as well as relocation assistance, possible land use controls that could be enacted, and other possible efforts.”

“All relevant, reasonable mitigation measures that could improve the project are to be identified, even if they are outside the jurisdiction of the lead agency or the cooperating agencies, and thus would not be committed to as part of the RODs of these agencies. This will serve to alert agencies or officials who can implement these extra measures and will encourage them to do so. To ensure that environmental effects of a proposed action are fairly assessed, the probability of the mitigation measures being implemented must also be discussed. Thus the EIS and the Record of Decision should indicate the likelihood that such measures will be adopted or enforced by the responsible agencies.”

Provisions regarding FHWA’s legal responsibility and authority for mitigating project impacts are found in FHWA’s Environmental regulations, 23 CFR Section 771.105(d):

“Measures necessary to mitigate adverse impacts will be incorporated into the action and are eligible for Federal funding when the Administration determines that:

- 1. The impacts for which the mitigation is proposed actually result from the Administration action; and*
- 2. The proposed mitigation represents a reasonable public expenditure after considering the impacts of the action and the benefits of the proposed mitigation measures. In making this determination, the Administration will consider, among other factors, the extent to which the proposed measures would assist in complying with a Federal statute, Executive Order, or Administration regulation or policy.”*

It is important that we understand how mitigation is defined in the NEPA process. Replacement or compensation is the last of a sequence of considerations that constitute the overall mitigation expectation of the CEQ regulations (40 CFR Section 1508.20). Mitigation includes avoidance and minimization of project impacts first. This hierarchy is often referred to as “sequencing” and means that impact avoidance and minimization measures should be considered early and as an integral component of the alternatives development and analysis

²⁷ <http://www.environment.fhwa.dot.gov/projdev/qaimpact.asp> accessed on June 2013

process. Replacement or compensation for impacts are intended primarily to deal with residual impacts that cannot be avoided or minimized.

The following paragraphs summarize project sequencing as it pertains to all impacts, direct, indirect, and cumulative.

1. Avoidance Measures

a. Corridor Selection

In the development, evaluation, and screening of alternative corridors, WisDOT considered both the direct environmental impacts of the corridor alternatives as well as the indirect effects. The consideration of direct, indirect, and cumulative effects led to the selection of the on-alignment alternatives be brought forward for detailed evaluation. The selection of on-alignment alternatives had the following effects:

- It reduced the quantity of direct impacts to farmland, wetlands, and uplands.
- It reduced the number of severed farm parcels and the amount of farmland required. Farm severances make agriculture less sustainable and can lead to a reduction in farming activities and the conversion of severed parcels to other land uses (an indirect effect). On-alignment alternatives have the least amount of farm severances and cropland required.
- It reduced the amount of roadway lane mileage associated with WIS 23 improvements. Selection of an off-alignment corridor would have increased lane mileage because new bypass lanes would be constructed in addition to the existing WIS 23 lanes. Even with a 4-lane facility, an on-alignment alternative would have about one third less pavement than some off-alignment alternatives. Additional lane mileage has direct environmental effects, such as degraded water quality, induced traffic, the corresponding air quality impacts, and severance of natural communities. Selection of on-alignment alternatives avoided the impacts that would have occurred with additional lane mileage of the off-alignment alternatives.
- It avoided potential residential and commercial development from occurring along an off-alignment corridor (an indirect effect). This included avoiding the corresponding environmental impacts that would have been associated with this development.

b. Features Incorporated into Alternatives to Offset Negative Effects

WisDOT seeks to incorporate design components and features into the analyzed alternatives that minimize the adverse effects of the potential project. Many of these components address direct effects, but they also have regional influence. All build alternatives being evaluated include a 16-mile extension of the Old Plank Road Trail. This extension enhances the ability of WIS 23 to serve nonmotorized modes of transportation and offsets potential negative project effects to nonmotorized modes.

2. Minimization Measures

WisDOT implements access management on roadways and access points along state highways. The implementation of access management can affect the development potential of properties served by that project (an indirect effect). In implementing access management, WisDOT seeks not to restrict or impede existing land uses but seeks to prevent traffic from potential future development from negatively impacting highway operations. By implementing access restrictions, new development, particularly commercial development, is less likely to occur near the access restriction. Similarly, by permitting access, development is able to occur in planned locations and at higher

densities. Several of the alternatives being considered in this document incorporate access management, which is detailed in Section 2.

3. Mitigation Measures

Mitigation for direct effects includes wetland mitigation, the provision of a grade-separated crossing for the IAT/State Equestrian Trail, the replacement of forest land to the KMSF-NU, and data recovery for the Sippel Archaeological site. Other than access management, no direct mitigation measures are proposed that specifically target indirect effects.

4. Avoidance, Minimization, and Mitigation Measures Outside of WisDOT's and FHWA's Jurisdiction.

Although neither WisDOT nor FHWA has jurisdiction over local land use policy and/or decisions, the project team has identified several avoidance, minimization, and mitigation measures that may further reduce indirect and cumulative impacts if implemented by other entities. They are identified here for consideration by the appropriate outside entities. Policy choices by local governments regarding planning and existing and future land use regulations can play a large role in either facilitating or minimizing potential indirect effects of the WIS 23 project. Local jurisdictions through land use policies and decisions have a greater influence on other actions that contribute to indirect effects. Land use tools available to local jurisdictions commonly used to avoid and reduce impacts to resources include the following:

- a. **Comprehensive Planning**—Wisconsin law requires communities that wish to regulate land adopt a comprehensive plan to guide local land use decisions. These decisions—for example, the location, type, quantity and character of development, protection of agricultural lands and natural resources, local utilities and community facilities, and economic development initiatives—are closely related to impacts analyzed in this report. Comprehensive plans may be amended from time to time and are required to be updated every ten years.
- b. **Zoning**—A zoning ordinance and map can be used to determine appropriate locations and other regulations for specific land uses. For example, zoning land for exclusive agricultural use can help ensure that it will not be developed for nonagricultural uses until zoning policies have changed or a rezoning has occurred. Overlay zoning above and beyond state and federal regulations for natural resource features, such as isolated wetlands, uplands, woodlands, shorelands, steep slopes, drainageways, habitat areas, and historic sites, may also be adopted by local jurisdictions. According to state law, zoning ordinances and maps are required to be consistent with the local comprehensive plan.
- c. **Land Division**—Land division ordinances must also be consistent with the local comprehensive plan under state law. These ordinances determine the manner in which land may be divided, design standards, types of public improvements needed to serve development, access control at time of land division, and, in conjunction with the zoning ordinance, the development density.
- d. **Extraterritorial Jurisdiction**—Wisconsin Statutes specifically allow cities and villages to prepare plans for and to regulate land divisions within their extraterritorial jurisdictions in unincorporated (township) areas. Such extraterritorial powers can help reduce development in agricultural areas and can help ensure that when development does occur, it can be developed in a manner consistent with local zoning and the comprehensive plan.
- e. **Official Mapping**—Official mapping is a plan implementation tool authorized under Wisconsin Statutes for adoption as an ordinance by cities, villages, and towns. These maps may be used to show alignments of future roads, expanded right of way for existing roads, and other planned public facilities, such as parks and trails. When land development is proposed in an

area with a planned facility as depicted on the official map, the municipality may obtain or reserve land for that future facility through public dedication, public purchase, or reservation for future purchase.

- f. Conservation Easements—Purchase of agricultural or conservation easements to prohibit development are voluntary and allow the landowner to be compensated for limiting the development potential of the land. Conservation easements are permanent and are carried over to subsequent landowners when the property is sold.
- g. Urban Service Area—In Wisconsin, urban service area boundaries around municipalities may be legally extended (e.g., public sewer and water). Urban service areas are useful in managing the location and timing of urban and suburban growth.
- h. Tax Increment Financing (TIF)—Communities may utilize TIF to fund public improvements that would otherwise not occur without the use of TIF. Local governments may adopt TIF districts to direct development and redevelopment to specific locations in a community. Typically, these are compact areas served by public utilities.
- i. Stormwater Best Management Practices (BMP)—Traditional stormwater management practices attempt to carry water away from a developed site as quickly as possible after a storm or are designed to hold water on-site in constructed ponds. Alternatively, BMPs aim to control runoff by managing precipitation as close to where it hits the ground as possible, thereby facilitating infiltration of precipitation into groundwater and evaporation of water back into the atmosphere. This approach decreases peak stormwater quantities and improves the overall quality of the stormwater that does enter streams and lakes. The severity of water quality impacts is dependent on the magnitude and duration of upstream hydrologic events including sediment inputs, flooding, and land use change. However, these impacts may be minimized through local and county stormwater ordinances and BMPs. BMPs will be administered both in the design of the roadway and during construction. WisDOT through Trans 401, Wisconsin Administrative Code and the WisDOT/WDNR Cooperative Agreement will comply with the substantive requirements of Chapter 147, Wisconsin Statutes, Wisconsin Pollutant Discharge Elimination System (WPDES).

5. Monitoring and Evaluation of Indirect Effects

The LS SEIS contains the commitments to mitigation and monitoring regarding effects of the Preferred Alternative. It includes continued coordination with WDNR regarding threatened and endangered species, commitments regarding archaeological and historic sites, wetland monitoring, as well as measures to offset impacts to Section 4(f) properties. WisDOT and FHWA will work within their jurisdictional limitations to minimize adverse indirect effects. These efforts will be primarily associated with the roadway project corridor and are primarily limited to the duration of the construction project. Local communities and state agencies with jurisdiction in the study area will have the ability to monitor and evaluate impacts on land and resources on a long-term basis. Communities have the ability to approve or not approve development proposals and can influence the pace of development for years after WIS 23 improvements are completed. Other agencies with federal authority, such as the USEPA and USACE, also have the authority to monitor impacts to natural resources such as floodplains, wetlands, and water quality.

B. Cumulative Impact Minimization Measures

1. Alternatives to Avoid, Minimize, or Mitigate Significant Cumulative Effects

The WIS 23 Build Alternatives will contribute to the cumulative effect on resources, with other contributors being past, present, and future actions by other entities. The predominant contribution to cumulative

effects from the WIS 23 Build Alternatives includes loss of farmland, loss of uplands, degradation of water quality, and a small degradation of air quality.

FHWA's environmental toolkit describes FHWA's responsibility in the mitigation of indirect and cumulative effects.²⁸ NEPA does not specifically require substantive mitigation for project impacts; direct, indirect, or cumulative. The CEQ regulations require that the environmental impacts statement include consideration and discussion of possible mitigation for project impacts (40 CFR §§ 1502.14((f), 1502.16(e-h), 1505.2(c), 1508.25(b)(3)).

While this section specifically addresses cumulative effects, direct and indirect effects represent WIS 23's contribution toward the cumulative effect on a resource and are therefore discussed.

1. Avoidance Measures

a. Corridor Selection

As mentioned, WisDOT considered both the direct environmental impacts of the corridor alternatives and the indirect and cumulative effects. The consideration of direct, indirect, and cumulative effects led to the selection of the current range of on-alignment alternatives. The selection of on-alignment alternatives had the following effects:

- (1) It reduced the quantity of direct impacts to farmland, wetlands, and uplands. The range of on-alignment alternatives requires at least 23 percent less right of way and 42 percent fewer wetland impacts than the off-alignment alternatives.)²⁹ In doing so, it reduced the highway improvement's contribution to cumulative effects.
- (2) It reduced the number of severed farm parcels and the amount of farmland required. The range of on-alignment alternatives requires at least 57 percent less farmland than the off-alignment alternatives. Farm severances make agriculture less sustainable and can lead to a reduction in farming activities and the conversion of severed parcels to other land uses (an indirect effect that leads to a cumulative effect on resources). The range of on-alignment alternatives had the least amount of farm severances and cropland required.
- (3) It reduced the amount of roadway lane mileage associated with WIS 23 improvements. Selection of an off-alignment corridor would have increased lane mileage because new bypass lanes would be constructed in addition to the existing WIS 23 lanes. The range of on-alignment alternatives would have about one third less pavement than off-alignment alternatives. Additional lane mileage has direct environmental effects, such as degraded water quality, induced traffic, the corresponding air quality impacts, and severance of natural communities. Selection of the range of on-alignment alternatives avoided the impacts that would have occurred with additional lane mileage of the off-alignment alternatives.
- (4) It avoided potential residential and commercial development from occurring along an off-alignment corridor (an indirect effect that leads to a cumulative effect on resources). This included avoiding the corresponding indirect environmental impacts that would have been associated with this development.

b. Alignment Refinements

The Passing Lane Alternatives has limited alignment refinements because it is reconstructing the roadway in-place. Several alignment modifications were made for the Hybrid and 4-lane On-alignment Alternatives to avoid direct impacts, which then decrease the cumulative impact of the project on area resources. These alignment refinements included shifting the roadway

²⁸ Source: <http://www.environment.fhwa.dot.gov/projdev/qaimpact.asp> accessed June 2013

²⁹ Based on the impacts presented in table 4.5-1 of the 2014 LS SFEIS- the same for farmland comparison.

alignment north of the Wade House Historic Site and south of the Pit Road wetland mitigation sites. Both alignment shifts decreased wetland impacts, decreasing the cumulative effect of the alternative on area wetlands.

c. WIS 23 Build Alternative Features

WisDOT seeks to incorporate design components and features into the WIS 23 Build Alternatives that minimize the adverse effects of the potential project. Many of these components address direct effects, but they also have regional influence and a cumulative effect. The WIS 23 Build Alternatives incorporate a 16-mile extension of the Old Plank Road Trail. This extension enhances the ability of WIS 23 to serve nonmotorized modes of transportation and offsets potential negative project effects to nonmotorized modes.

2. Minimization Measures

a. Impact Minimization

Through the project design process, WisDOT seeks to minimize impacts to adjacent properties and resources. This minimization reduces the direct impacts of the alternatives, which contribute to the overall cumulative impacts on particular resources. Design refinements to the 4-lane On-alignment Alternative have reduced the amount of impact on some resources. Some impact categories have risen since the publishing of the 2014 LS SFEIS—mostly because of revised boundaries (wetlands) or property owner requests (residential relocations and/or acquiring uneconomic remnants).

b. Construction Impact Minimization

WisDOT will seek to minimize construction impacts through the implementation of various measures that are described in the LS SEIS. These measures reduce direct construction impacts, which consequently reduce the project's contribution on the cumulative impact on these resources. Measures to minimize construction impacts include the following:

- A transportation management plan (TMP) will provide reasonably convenient access to residences, businesses, farm parcels, community services, and local roads during construction.
- Special provisions to reduce the short-term impacts of construction noise will require that motorized equipment be operated in compliance with all applicable local, state, and federal laws and regulations on noise levels permissible within and adjacent to the project construction site.
- The special provisions and plan set will include measures to reduce water quality and quantity impacts occurring through construction. WisDOT will implement typical stormwater management techniques to minimize adverse effects and enhance beneficial effects are outlined in TRANS 401.106 and the pending Wisconsin Pollution Discharge Elimination System (WPDES) Transportation Construction General Permit (TCGP) for stormwater. The strategy includes preparation of a written plan that outlines the BMPs to be implemented to reduce water quality and hydrology impacts. Precautions will be taken at the Sheboygan River and Mullet River Creek crossings to preclude erosion and stream siltation.
- To reduce impacts to wildlife, construction work will be scheduled during nonbreeding seasons. The LS SEIS details commitments being made to reduce impacts to rare species as coordinated with the WDNR.
- During construction, impacts to wetlands from erosion and sediment transport will be minimized or prevented by implementing erosion control BMPs as specified in the construction contract
- For agriculture, reasonable access will be provided to farms. Existing drainage systems (ditches and tiles) will be kept operational during construction.

c. Access Management

WisDOT implements access management on roadways and access points along state highways. Access management reduces the indirect effects of a project. The WIS 23 alternatives have varying levels of access management, which will affect their overall contribution to a cumulative effect on a resource. Access management and its effect on development were described in the indirect effects section. Of the current 42 full-access intersections,

- The Passing Lane Alternative incorporates four access changes which include a jughandle interchange and a right-in/right-out access.
- The Hybrid Alternative incorporates 19 access changes which include 5 cul-de-sacs, 4 right-in/right-out access restrictions, 3 RCUT intersections, and 3 interchanges/jughandle.
- The 4-lane On-alignment Alternative incorporates 33 access changes which include 7 cul-de-sacs, 14 right-in/ right-out access restrictions, 11 RCUT intersections and 3 interchanges/jughandle.
- Future improvements associated with the Corridor Preservation for 4-lane On-alignment Alternative, if implemented, would incorporate 12 cul-de-sac access restrictions 12 right-in/right-out access restrictions, 5 interchanges/jughandle/overpasses, and 3 RCUT intersections.

While providing sufficient local access, the alternatives with greater access restriction will tend to direct development away from rural intersections with less access. At the same time, access will be directed toward intersections with improved access.

3. Mitigation Measures

a. Direct Impact Mitigation and Corresponding Contribution to Cumulative Impacts

Mitigation was provided for the US 151 Bypass, a past project, in the creation of the Taycheedah Wetland Mitigation Bank. The construction of the Prairie Trail with this project also augmented nonmotorized travel in the study area.

For WIS 23, WisDOT is providing mitigation for several types of direct impacts. Mitigating direct impacts reduces or eliminates the WIS 23 project's contribution to cumulative impacts of specific resources. Direct impact mitigation includes:

- The mitigation of up to 51.8 acres of wetland impacts is being fulfilled through the establishment of two permittee-responsible wetland mitigation sites.
- The provision of a grade-separated crossing of WIS 23 for the Ice Age Trail and State Equestrian Trail for the Passing Lane, Hybrid, and 4-Lane On-Alignment Alternatives.
- The replacement of 2.21 acres of land required from the KMSF-NU with 4.275 acres of land transferred to State Forest ownership (already accomplished).
- The Phase III data recovery at the Sippel Archaeological Site to document the information from this archaeological resource. (Accomplished - report submitted).

Mitigation will occur for other present and future highway projects. At a minimum the mitigation will include wetland mitigation and acquiring right of way in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act, as well as other measures. Details of the mitigation associated with each project will be described in each project's NEPA documentation.

b. Avoidance, Minimization, and Mitigation Measures Outside of WisDOT's and FHWA's Jurisdiction.

As mentioned in the indirect effects section, neither WisDOT nor FHWA has jurisdiction over local land use policy or decisions. The project team has identified several avoidance, minimization, and

mitigation measures that may further reduce indirect and cumulative effects if implemented by other entities. They are identified here for consideration by the appropriate outside entities. Policy choices by local governments regarding planning and existing and future land use regulations can play a large role in either facilitating or minimizing potential indirect effects of the WIS 23 project and their resulting contribution to cumulative effects on resources. WisDOT can control WIS 23's direct effects that contribute to the cumulative effect of other past, present, and future actions on resources. Land use tools available to local jurisdictions commonly used to avoid and reduce impacts to resources were described in the indirect effects section and include the following:

- Comprehensive Planning
- Farmland Preservation Planning
- Zoning Ordinance
- Subdivision/Land Division Ordinance
- Extraterritorial Jurisdiction
- Official Mapping
- Conservation Easements
- Urban Service Area
- Tax Increment Financing (TIF).

Use of these tools can decrease the negative consequences of indirect development on resources.

4. Monitor and Evaluate the Cumulative Effects of the Selected Alternative and Adapt Management

This LS SEIS contains the commitments to mitigation and monitoring regarding effects of WIS 23 alternatives. It includes continued coordination with WDNR regarding threatened and endangered species, commitments regarding archaeological and historic sites, wetland monitoring, and measures to offset impacts to Section 4(f) properties. WisDOT and FHWA will work within their jurisdictional limitations to minimize adverse indirect and cumulative effects. These efforts will be primarily associated with the roadway project corridor and are primarily limited to the duration of the construction project. Local communities and state agencies with jurisdiction in the study area will have the ability to monitor and evaluate impacts on land and resources on a long-term basis. Communities have the ability to approve or not approve development decisions and can influence the pace of development for years after WIS 23 improvements are completed. Other agencies with federal authority, such as the USEPA and USACE, also have the authority to monitor impacts to natural resources such as floodplains, wetlands, and water quality.

Attachment A

Thank you for helping us identify the indirect effects that could be caused by pursuing different alternatives on the WIS 23 corridor from Fond du Lac to Sheboygan. Indirect effects are project impacts “caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable.” Indirect effects may include population growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air, water, and other natural systems, including ecosystems.

The WIS 23 project has not finalized the range of reasonable alternatives. However, for this indirect effects analysis exercise three alternatives will be evaluated: No-Build, Passing Lane Alternative, and a 4-Lane On-alignment alternative. The questionnaire will also include questions regarding potential future freeway conversion. While this listing will not encompass all the alternatives that will be discussed in the new SEIS, these alternatives provide a range of examples that cover the full spectrum of alternatives. The following paragraphs summarize each alternative.

A. No-Build Alternative

The No-Build Alternative involves the continued use of the existing WIS 23 without reconstruction or enhancements of the existing roadway. The No-Build alternative may include minor restoration types of activities that maintain the same typical section and alignment of the highway. WIS 23 would remain a 4-lane roadway for the western 1.3 miles from US 151 to 0.4 miles east of County K. It would be a 2-lane roadway for the remaining 18 miles to the eastern end of the study limits.

B. Passing Lane Alternative

The Passing Lane Alternative would add 4 passing lanes, 2 for eastbound travel and 2 for westbound travel in addition to the existing two climbing lanes west of County P in Sheboygan County. The Passing Lane Alternative would upgrade side-road intersections with the appropriate intersection type. All intersections would have access to WIS 23. A new jug-handle intersection would be provided at County K to address the higher crash frequency and traffic volumes at this intersection. The jug-handle has a grade separation with bridges to carry WIS 23 over County K. West of County K, traffic would have on and off access to WIS 23 using dedicated lanes. The Passing Lane Alternative would include the provision of a multi-use trail (Old Plank Road trail extension) that spans from Fond du Lac to Plymouth.

C. 4-Lane On-Alignment Alternative

The 4-Lane On-Alignment Alternative would provide a 4-lane divided highway on the existing alignment for the full length of the project. For the 2-mile section from US 151 to County UU, WIS 23 would have a high-speed urban cross section. From County UU east to County P in Sheboygan County, WIS 23 would have a typical expressway cross section with a design speed of 60 mph or higher and a posted speed of 55 mph. A jug-handle intersection would be provided at County K; diamond interchanges would be provided at County UU, County G, and County P. Other intersections would be upgraded, some with access restrictions. The 4-Lane On-alignment Alternative would include the provision of a multi-use trail (Old Plank Road trail extension) that spans from Fond du Lac to Plymouth.

Both the Passing Lane Alternative and the 4-Lane On-alignment Alternative have a corridor preservation option that would preserve right of way needed for future freeway conversion.

1. Please enter your name and jurisdiction/agency you are representing.

15 people/groups participated in the survey representing the following entities:

- *Bay-Lake Regional Planning Commission*
- *East Central Wisconsin Regional Planning Commission*
- *Elkhart Lake Chamber of Commerce*
- *Empire, Town of*
- *Envision Greater Fond du Lac, Inc.*
- *Fond du Lac, City of*
- *Fond du Lac County*

- *Greenbush, Town of*
- *Marshfield, Town of*
- *Plymouth, City of*
- *Sheboygan County Planning and Conservation*
- *University of Wisconsin-Extension Fond du Lac County*
- *University of Wisconsin-Extension Sheboygan County*
- *Wisconsin Department of Agriculture, Trade, and Consumer Protection*
- *Wisconsin Department of Natural Resources*

2. Was the improvement of WIS 23 from Fond du Lac to Plymouth considered in the long-range planning documents prepared by the jurisdiction/agency that you represent?

- *Yes: 8 responses*
- *No: 6 responses*

If you answered yes, what type of WIS 23 improvements were considered? How did the WIS 23 improvements influence the plan?

- *Bay-Lake Regional Planning Commission*
 - *Yes.*
 - *While this project is not in the Sheboygan metropolitan planning (MPO) area, we do transportation/air quality conformity for all of Sheboygan County. For the conformity analysis on the Year 2045 Sheboygan Area Transportation Plan (SATP) adopted in 2015 and its various implementing transportation improvement programs (TIPs) adopted in 2015 and after, we assumed that this project would be built as a 4-lane facility by 2025; it is coded accordingly in the WisDOT Northeast Region travel demand forecast model (at least for Sheboygan County).*
- *East Central Wisconsin Regional Planning Commission*
 - *Yes.*
 - *It has been in the plan for the 4-lane expansion the last two Long Range Plans.*
- *Elkhart Lake Chamber of Commerce*
 - *Yes.*
 - *Both the passing lane option and the original 4-lane project were considered as solutions for population growth/increased number of drivers and road safety/safer driving.*
- *Empire, Town of*
 - *Yes.*
 - *The development of the Intergovernmental boundary/service agreement between City of Fond du Lac and the Towns of Fond du Lac, Empire and Taycheedah considered land use along US highway 23.*
- *Envision Greater Fond du Lac, Inc.*
 - *No.*
- *Fond du Lac, City of*
 - *Yes.*
 - *The City's Comprehensive Plan did not detail potential improvements. It only referenced "modernization" of STH 23 and improvements to the STH 23 and 151 area. Access and capacity are important components of looking at land uses along STH 23 corridor.*
- *Fond du Lac County*
 - *Yes.*
 - *"major renovations" FdL County Farmland Preservation Plan 2012. <http://www.fdlco.wi.gov/home/showdocument?id=4748>*
- *Greenbush, Town of*
 - *No.*
- *Marshfield, Town of*
 - *No.*
- *Plymouth, City of*
 - *Yes.*
 - *The project limits stop short of the corporate limits of the City of Plymouth as it relates to the proposed improvements to HWY 23 at this time. However, the City planned for a*

future conversion of HWY 23 to a freeway and includes an interchange at County E in the transportation plan as well as a full frontage road south of HWY 23. This area is east of the current HWY 23 project area.

- Sheboygan County Planning and Conservation
 - No.
- University of Wisconsin-Extension Fond du Lac County
 - No.
- University of Wisconsin-Extension Sheboygan County
 - No.
- Wisconsin Department of Agriculture, Trade, and Consumer Protection
 - N/A.
- Wisconsin Department of Natural Resources
 - Yes.
 - Installing a box culvert large enough for pedestrians and equine users to use as an alternative to crossing the proposed 4 lane highway across the surface itself.

3. Will the pace of residential development occur at a different rate with the following two alternatives than it would with the No-Build Alternative? (Please put a check mark in the appropriate box for each alternative)		
	Passing Lane Alternative	4-Lane On-alignment Alternative
Residential development will occur at a slower pace than with the No-Build Alternative	2	2
Residential development will occur at about the same pace as the No-Build Alternative	9	5
Residential development will occur at a faster pace than with the No-Build Alternative	1	4
No opinion	4	4

Comments:

- Bay-Lake Regional Planning Commission
 - In our modeling process, we allocate growth before evaluating the network and its congested links.
- East Central Wisconsin Regional Planning Commission
 - The area between Fond du Lac and Plymouth will likely remain rural for many years into the future.
- Fond du Lac, City of
 - At this point in time, there are other outside factors (the economy, market demand, lending practices etc.) that have a greater impact on the speed of residential development in this area than the transportation improvements.
- Fond du Lac County
 - Work commute times should drop with road improvements making it possible to live further from job centers and commute from rural areas.
- University of Wisconsin-Extension Sheboygan County
 - I haven't seen much, if any, residential development along STH 57 since it became four lanes. I don't see how STH 23 would be much different. Most of the younger demographic groups are gravitating toward already built up areas. In general, they seem to prefer living within Fond du Lac or Sheboygan rather than in isolated rural areas.

4. Will the dispersion or concentration of residential development associated with the following two alternatives be different than it would with the No-Build Alternative? (Will development occur in random dispersed patterns, or concentrate in nodes?). (Please put a check mark in the appropriate box for each alternative)		
	Passing Lane Alternative	4-Lane On-alignment Alternative
Residential development will be more dispersed than with the No-Build Alternative	1	2

Residential development will be at about the same dispersion/concentration as the No-Build Alternative	10	5
Residential development will be more concentrated than with the No-Build Alternative	1	5
No opinion	3	3
Comments: <ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission</i> <ul style="list-style-type: none"> ○ <i>Eventual access restrictions may lead to more concentrated residential growth near interchanges.</i> • <i>East Central Wisconsin Regional Planning Commission</i> <ul style="list-style-type: none"> ○ <i>It is likely that some development would occur closer to the interchanges with the build.</i> • <i>Fond du Lac, City of</i> <ul style="list-style-type: none"> ○ <i>The dispersion and concentration of residential development will vary based upon the access to STH 23.</i> • <i>University of Wisconsin-Extension Sheboygan County</i> <ul style="list-style-type: none"> ○ <i>Very hard to say.</i> 		

5. Will the density of residential development associated with the following two alternatives be different than it would with the No-Build Alternative? (Please put a check mark in the appropriate box for each alternative)		
	Passing Lane Alternative	4-Lane On-alignment Alternative
Residential development will occur at a lower density than with the No-Build Alternative	2	2
Residential development will occur at about the same density as the No-Build Alternative	9	6
Residential development will occur at a higher density than with the No-Build Alternative	0	3
No opinion	3	3
Comments: <ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission</i> <ul style="list-style-type: none"> ○ <i>As stated with Question 4, eventual access restrictions may lead to more concentrated development near interchanges.</i> • <i>Fond du Lac, City of</i> <ul style="list-style-type: none"> ○ <i>The density of residential development will vary based upon the access to STH 23.</i> • <i>Sheboygan County Planning and Conservation</i> <ul style="list-style-type: none"> ○ <i>In any scenario, I would expect any residential development to be of the large-lot nature.</i> 		

6. Will the pace of commercial development occur at a different rate with the following two alternatives than it would with the No-Build Alternative? (Please put a check mark in the appropriate box for each alternative)		
	Passing Lane Alternative	4-Lane On-alignment Alternative
Commercial development will occur at a slower pace than with the No-Build Alternative	1	1
Commercial development will occur at about the same pace as the No-Build Alternative	9	5
Commercial development will occur at a faster pace than with the No-Build Alternative	2	7
No opinion	2	2
Comments: <ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission</i> 		

- *In our modeling process, we allocate growth before evaluating the network and its congested links.*
- *East Central Wisconsin Regional Planning Commission*
 - *Significant commercial development will likely not occur away from established communities with urban services.*
- *Fond du Lac, City of*
 - *First, the pace of commercial development is impacted by other factors beyond transportation. However, the ease of access and capacity are important factors for commercial development. If the market supports commercial development (e.g. no downward change in economic conditions), then improvements to the corridor will be perceived as more favorable to commercial development and may occur at a faster pace.*

7. Will the **scale of commercial** development change with the following two alternatives than it would with the No-Build Alternative? (Please put a check mark in the appropriate box for each alternative)

	Passing Lane Alternative	4-Lane On-alignment Alternative
Commercial development will occur at a smaller scale than with the No-Build Alternative	2	1
Commercial development will occur at about the same scale as the No-Build Alternative	9	3
Commercial development will occur at a larger scale than with the No-Build Alternative	1	8
No opinion	3	3

Comments:

- *Bay-Lake Regional Planning Commission*
 - *Might have more highway commercial near eventual interchanges.*
- *Fond du Lac, City of*
 - *First, the pace of commercial development is impacted by other factors beyond transportation. However, the ease of access and capacity are important factors for commercial development. If the market supports commercial development (e.g. no downward change in economic conditions), then improvements to the corridor will be perceived as more favorable to commercial development and may occur at a faster pace.*
- *Marshfield, Town of*
 - *I think there will be much development of commercial property on this stretch of highway except from Cty UU in Fond du Lac to Highway 151*

8. Will the **pace of industrial** development occur at a different rate with the following two alternatives than it would with the No-Build Alternative? (Please put a check mark in the appropriate box for each alternative)

	Passing Lane Alternative	4-Lane On-alignment Alternative
Industrial development will occur at a slower pace than with the No-Build Alternative	2	1
Industrial development will occur at about the same pace as the No-Build Alternative	9	6
Industrial development will occur at a faster pace than with the No-Build Alternative	0	3
No opinion	5	5

Comments:

- *Bay-Lake Regional Planning Commission*
 - *In our modeling process, we allocate growth before evaluating the network and its congested links.*
- *East Central Wisconsin Regional Planning Commission*

- Significant industrial development is not likely in the rural area.
- Fond du Lac, City of
 - The City has not designated this area for industrial use within the City boundaries.
- Marshfield, Town of
 - I don't think there will be any industrial development off this stretch of proposed highway

9. Will the **scale of industrial** development change with the following two alternatives compared to the No-Build Alternative? (Please put a check mark in the appropriate box for each alternative)

	Passing Lane Alternative	4-Lane On-alignment Alternative
Industrial development will occur at a smaller scale than with the No-Build Alternative.	2	1
Industrial development will occur at about the same scale as the No-Build Alternative	8	4
Industrial development will occur at a larger scale than with the No-Build Alternative	1	5
No opinion	5	5

Comments:

- Bay-Lake Regional Planning Commission
 - Improved travel speeds could lead to making areas like Plymouth and the Sheboygan area communities more attractive for industry. This attractiveness will be higher for the 4-lane alternative, but there will likely be some growth under both alternatives. Industry should be allocated to areas where it already exists, and not to remote portions of towns.
- Fond du Lac, City of
 - The City has not designated this area for industrial use within the City boundaries.

10. Will the **amount of farmland** under production change with the following two alternatives from what would occur with the No-Build Alternative? (Please put a check mark in the appropriate box for each alternative)

	Passing Lane Alternative	4-Lane On-alignment Alternative
There will be less farmland under production than with the No-Build Alternative.	6	8
There will be about the same amount of farmland under production as with the No-Build Alternative.	7	3
There will be more farmland under production than with the No-Build Alternative	0	2
No opinion	3	2

Comments:

- Bay-Lake Regional Planning Commission
 - There will be farmland taken under either alternative, but the amount taken can hopefully be minimized.
- Empire, Town of
 - The passing lane alternative will have a smaller impact on the farmland under production.
- Sheboygan County Planning and Conservation
 - One could argue that with limited access of the 4-lane alternative, that there will be less scattered style residential pressure put on the ag production areas of this corridor.
- University of Wisconsin-Extension Fond du Lac County
 - We have already seen farms exiting the industry with the already state-purchased land for the 4-lane highway.

- *Wisconsin Department of Agriculture, Trade, and Consumer Protection*
 - *Mainly, increased development pressures surrounding intersections may lead to farmers being more willing to sell their farmland. As the value of farmland rises due to development pressure, the value of the land for farm use goes down.*

11. Will the **character and scale of farmland** change with the following two alternatives from what would occur with the No-Build Alternative? (e.g. smaller scale farms vs. larger scale farms) (Please put a check mark in the appropriate box for each alternative)

	Passing Lane Alternative	4-Lane On-alignment Alternative
There will be smaller scale farms than what would occur with the No-Build Alternative.	3	2
There will be about the same scale farms as what would occur with the No-Build Alternative.	9	6
There will be larger scale farms under production than what would occur with the No-Build Alternative	0	2
No opinion	4	5

Comments:

- *Bay-Lake Regional Planning Commission*
 - *The move to larger scale farms will likely continue regardless of what is done with this project.*
- *University of Wisconsin-Extension Fond du Lac County*
 - *Passing lane or 4-lane alignment would not have a bearing if a farm is large or small.*
- *Wisconsin Department of Agriculture, Trade, and Consumer Protection*
 - *Increased pressure may change expectations of area farmers about the long-term viability of farming, leading to lower investments in farm improvements. Farmers may anticipate increasing difficulty in obtaining land for expansion due to expected urban growth/development. Farm operators may shift more from owners to renters who have less stake in the long-term integrity of the farmland. Increased rental of land adds uncertainty for farm operators. Increased farm fragmentation can also negatively affect ag productivity.*

12. Please indicate how the Passing Lane and 4-Lane On-alignment Alternatives might **influence crop types** when compared to the No-Build alternative.

Change in crop type (yes/no)	Passing Lane Alternative		4-Lane On-alignment Alternative	
	Yes	No	Yes	No
	1	8	2	7
No opinion	5		6	

Comments:

- *Bay-Lake Regional Planning Commission*
 - *Not informed enough to have an opinion.*
- *Sheboygan County Planning and Conservation*
 - *This question depends on whether the landowner has fields on both sides (north or south) of the 4-lane alternative. If they do, that might affect what they plant. If they don't, we don't see it affecting what they plant.*
- *Wisconsin Department of Agriculture, Trade, and Consumer Protection*
 - *Development pressures have been shown to affect types of farming. Over a period of decades, dairy and cash grains may shift more to vegetable and specialty crop groups in urbanizing regions.*

13. Will **new economic development initiatives** (e.g. creation of new TIF district, creation of new business parks, or marketing campaigns) be developed under the following alternatives? (Please put a check mark in the appropriate box for each alternative)

	No-Build Alternative	Passing Lane Alternative	4-Lane On-alignment Alternative
No	7	6	3
Yes	0	1	5
No opinion	7	7	7
Comments: <ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission</i> <ul style="list-style-type: none"> ○ <i>Improvements to STH 23 are likely to spur additional economic growth.</i> • <i>Fond du Lac, City of</i> <ul style="list-style-type: none"> ○ <i>Economic development initiatives are based upon the merits of the project itself. The alternatives are only a factor in as much as they may or may not impact future development projects.</i> • <i>Marshfield, Town of</i> <ul style="list-style-type: none"> ○ <i>I believe the majority of the land is zoned along the highway is agriculture</i> • <i>Plymouth, City of</i> <ul style="list-style-type: none"> ○ <i>I do not represent economic development efforts in the project areas.</i> • <i>University of Wisconsin-Extension Sheboygan County</i> <ul style="list-style-type: none"> ○ <i>4-Lane On-Alignment Alternative: Marketing campaigns</i> 			

14. Indicate the level of impact the **No-Build Alternative** may have on the following resources. (Please put a check mark in the appropriate box for each impact category)

	Very Negative	Negative	No Impact	Positive	Very Positive	No Opinion
Farmland	1	1	11	1	0	1
Wetlands	1	0	11	1	0	1
Surface Water	1	0	11	1	0	1
Ground Water	1	0	11	1	0	1
Air Quality	1	1	10	0	0	2
Woodlands	1	0	12	1	0	0
Endangered Species	1	0	12	0	0	1
Historic or Archeological Sites	1	0	12	0	0	1
Parkland/State Forests	1	0	12	1	0	0
Trails	2	1	10	1	0	0
Rural Character	1	0	12	1	0	0

15. If you identified potential impacts to resources in the question above, please indicate how they might be impacted under the **No-Build Alternative**. (Please describe under each impact category.)

Farmland	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: No taking of farmland</i> • <i>Sheboygan County Planning and Conservation: See previous comment. No-build with the same access as currently available might increase scattered development pressure.</i>
Wetlands	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: No taking of wetlands</i>
Surface Water	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: No impacts anticipated</i>
Ground Water	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: No impacts anticipated</i>

Air Quality	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Not completing the project will lead to lower speeds, more congestion caused by crashes, and consequently more ozone precursor pollutants</i>
Woodlands	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: No taking of woodlands</i>
Endangered Species	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: No impacts anticipated</i>
Historic or Archeological Sites	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: No impacts anticipated</i>
Parkland/State Forests	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: No taking of parkland or state forests is anticipated</i>
Trails	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Extension of the Old Plank Road Trail is a plus. This may lead to more connector trails to communities in western Sheboygan County.</i> • <i>Elkhart Lake Chamber of Commerce: Lack of additional trails</i> • <i>Fond du Lac County: No build also means no Plank Trail extension in FdL County.</i>
Rural Character	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: No impacts anticipated</i>

16. Indicate the level of impact the **Passing Lane Alternative** may have on the following resources. (Please put a check mark in the appropriate box for each impact category.)

	Very Negative	Negative	No Impact	Positive	Very Positive	No Opinion
Farmland	0	7	4	2	0	2
Wetlands	0	5	5	1	0	3
Surface Water	0	1	7	1	0	5
Ground Water	0	0	8	1	0	5
Air Quality	0	1	8	2	0	3
Woodlands	0	3	8	1	0	2
Endangered Species	0	1	9	0	0	4
Historic or Archeological Sites	0	0	9	0	0	5
Parkland/State Forests	0	2	9	0	0	3
Trails	0	1	6	3	3	1
Rural Character	0	4	10	0	0	0

17. If you identified potential impacts to resources in the question above, please indicate how they might be impacted under the **Passing Lane Alternative** (Please describe under each impact category.)

Farmland	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Some taking of farmland, but not like the 4-lane alternative</i> • <i>East Central Wisconsin Regional Planning Commission: Some farmland would likely be taken.</i> • <i>Fond du Lac County: Conversion of farmland to highway use.</i> • <i>Greenbush, Town of: Use of more land</i> • <i>Marshfield, Town of: taking away additional farmland</i> • <i>Sheboygan County Planning and Conservation: Same as previous.</i>
Wetlands	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Some taking of wetlands, but not like the 4-lane alternative</i>

17. If you identified potential impacts to resources in the question above, please indicate how they might be impacted under the Passing Lane Alternative (Please describe under each impact category.)	
	<ul style="list-style-type: none"> • <i>East Central Wisconsin Regional Planning Commission: Some would likely be impacted.</i> • <i>Fond du Lac County: Conversion of wetlands to highway use.</i> • <i>Greenbush, Town of: Use of more land</i> • <i>Sheboygan County Planning and Conservation: Not sure if wetlands will be affected or not by the passing lane alternative. Depends where the widening will happen for those particular areas.</i>
Surface Water	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Do not know enough to assess impacts</i> • <i>East Central Wisconsin Regional Planning Commission: Some would likely be impacted.</i>
Ground Water	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Do not know enough to assess impacts</i>
Air Quality	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Increasing speeds in the corridor and decreasing congestion resulting from fewer crashes should lead to fewer ozone precursor emissions. However, these may be harder to quantify than in the 4-lane alternative</i> • <i>East Central Wisconsin Regional Planning Commission: Should improve it a bit</i>
Woodlands	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Some taking of woodlands, especially in the Kettle Moraine State Forest, but not to the same extent as the 4-lane alternative</i> • <i>East Central Wisconsin Regional Planning Commission: Some would likely be impacted.</i> • <i>Marshfield, Town of: eliminate woodlands however I don't believe there are large woodlands along the proposed highway</i>
Endangered Species	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Do not know enough to assess impacts</i> • <i>East Central Wisconsin Regional Planning Commission: Some would likely be impacted.</i>
Historic or Archeological Sites	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Do not know enough to assess impacts, although with the proximity of the Wade House and suspicion that pre-settlement activities are often found in wooded areas, there will likely be some impacts</i>
Parkland/State Forests	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Some taking of the Kettle Moraine State Forest is likely, but not to the extent of the 4-lane alternative</i> • <i>East Central Wisconsin Regional Planning Commission: Some would likely be impacted.</i>
Trails	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Extension of the Old Plank Road Trail is a plus. This may lead to more connector trails to communities in western Sheboygan County.</i> • <i>East Central Wisconsin Regional Planning Commission: Improvement for the trail system.</i>

17. If you identified potential impacts to resources in the question above, please indicate how they might be impacted under the Passing Lane Alternative (Please describe under each impact category.)	
	<ul style="list-style-type: none"> • <i>Elkhardt Lake Chamber of Commerce: Additional trails could be added</i> • <i>Fond du Lac County: Alternative includes construction of Plank Trail extension in FdL County.</i> • <i>Greenbush, Town of: make trail crossing more difficult</i> • <i>Plymouth, City of: Completed multi-use trail is a big positive.</i>
Rural Character	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: There will be a small negative impact, but not overly so, and nor like the 4-lane alternative</i> • <i>Greenbush, Town of: will change the look of the land</i> • <i>Fond du Lac County: Shortened commute times allows for more home construction for people commuting to employment centers.</i> • <i>Marshfield, Town of: will have a negative impact however most the buildings have been already eliminated</i>

18. Indicate the level of impact the 4-Lane On-alignment Alternative may have on the following resources. (Please put a check mark in the appropriate box for each impact category.)						
	Very Negative	Negative	No Impact	Positive	Very Positive	No Opinion
Farmland	1	7	3	1	0	3
Wetlands	0	6	4	0	0	4
Surface Water	0	2	6	0	0	6
Ground Water	0	1	8	0	0	5
Air Quality	0	1	7	2	0	4
Woodlands	0	4	8	0	0	2
Endangered Species	0	2	6	0	0	6
Historic or Archeological Sites	0	0	7	0	0	7
Parkland/State Forests	0	2	6	2	1	3
Trails	0	1	1	3	8	1
Rural Character	0	5	8	1	0	0

19. If you identified potential impacts to resources in the question above, please indicate how they might be impacted under the 4-Lane On-alignment Alternative (Please describe under each impact category.)	
Farmland	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Some taking of farmland</i> • <i>East Central Wisconsin Regional Planning Commission: It may improve the sustainability of agriculture.</i> • <i>Empire, Town of: Some farmland taken out of production</i> • <i>Fond du Lac County: Conversion of farmland to highway use.</i> • <i>Greenbush, Town of: use more land and make farm equipment travel difficult</i> • <i>Sheboygan County Planning and Conservation: See previous.</i> • <i>University of Wisconsin-Extension Sheboygan County: Loss of acreage; access to fields may become more difficult</i>
Wetlands	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Some taking of wetlands</i>

	<ul style="list-style-type: none"> • <i>East Central Wisconsin Regional Planning Commission: Some would likely be impacted.</i> • <i>Fond du Lac County: Conversion of wetlands to highway use.</i> • <i>Greenbush, Town of: use more farm land</i> • <i>Sheboygan County Planning and Conservation: It is my understanding existing wetlands will be affected by the 4-lane alternative.</i> • <i>University of Wisconsin-Extension Sheboygan County: Loss of acreage of buffers</i>
Surface Water	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Do not know enough to assess impacts.</i> • <i>University of Wisconsin-Extension Sheboygan County: More impervious surfaces, more runoff into surface waters</i>
Ground Water	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Do not know enough to assess impacts.</i> • <i>University of Wisconsin-Extension Sheboygan County: Less recharge acreage</i>
Air Quality	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Increasing speeds in the corridor and decreasing congestion resulting from fewer crashes should lead to fewer ozone precursor emissions</i> • <i>East Central Wisconsin Regional Planning Commission: Should improve air quality</i> • <i>University of Wisconsin-Extension Sheboygan County: More vehicle exhaust due to higher speeds and additional traffic</i>
Woodlands	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Some taking of woodlands, especially in the Kettle Moraine State Forest</i> • <i>East Central Wisconsin Regional Planning Commission: Some would likely be impacted.</i> • <i>University of Wisconsin-Extension Sheboygan County: Loss of acreage; more damage to trees from vehicle exhaust</i>
Endangered Species	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Do not know enough to assess impacts.</i> • <i>East Central Wisconsin Regional Planning Commission: Some would likely be impacted.</i> • <i>University of Wisconsin-Extension Sheboygan County: Loss of habitat acreage</i>
Historic or Archeological Sites	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Do not know enough to assess impacts, although with the proximity of the Wade House and suspicion that pre-settlement activities are often found in wooded areas, there will likely be some impacts.</i>
Parkland/State Forests	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Some taking of the Kettle Moraine State Forest is likely.</i> • <i>East Central Wisconsin Regional Planning Commission: Some would likely be impacted.</i> • <i>Envision Greater Fond du Lac, Inc.: More access</i> • <i>University of Wisconsin-Extension Sheboygan County: Loss of acreage; more damage to trees from exhaust</i>

Trails	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Extension of the Old Plank Road Trail is a plus. This may lead to more connector trails to communities in western Sheboygan County.</i> • <i>East Central Wisconsin Regional Planning Commission: Improvement</i> • <i>Elkhart Lake Chamber of Commerce: Additional trails available</i> • <i>Envision Greater Fond du Lac, Inc.: More connectivity, more access</i> • <i>Fond du Lac County: Alternative includes construction of Plank Trail extension in FdL County.</i> • <i>Greenbush, Town of: make it difficult to cross with 4 lanes</i> • <i>Plymouth, City of: Multi-use trail is a big positive.</i> • <i>Sheboygan County Planning and Conservation: The Old Plank Road Trail will be extended due to the 4-lane alternative.</i> • <i>University of Wisconsin-Extension Sheboygan County: OPRT will be extended</i>
Rural Character	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: There will be a small negative impact, but not overly so.</i> • <i>East Central Wisconsin Regional Planning Commission: No Change</i> • <i>Envision Greater Fond du Lac, Inc.: More access, more appreciation and exposure</i> • <i>Fond du Lac County: Shortened commute times allows for more home construction for people commuting to employment centers.</i> • <i>Greenbush, Town of: will make the rural character look more like urban or city areas</i> • <i>University of Wisconsin-Extension Sheboygan County: 4-lane roads have a more urban character to them</i>

20. Are there resource(s), such as farmland, that are currently under pressure from activities other than the WIS 23 project ? If so, please comment on them below. What is causing the pressure?	
	What is causing the pressure?
Farmland	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Increased size of farms can lead to pressures.</i> • <i>East Central Wisconsin Regional Planning Commission: Fewer family farms, larger operations, agribusiness</i> • <i>Empire, Town of: Commercial development</i>
Wetlands	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Aware of none</i> • <i>East Central Wisconsin Regional Planning Commission: Has always been impacted by agriculture.</i>
Surface Water	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Aware of none</i> • <i>East Central Wisconsin Regional Planning Commission: Under pressure from farming/chemicals.</i> • <i>University of Wisconsin-Extension Sheboygan County: Levels are lower, probably due to increased groundwater withdrawal</i>
Ground Water	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Possible increased well water use</i> • <i>East Central Wisconsin Regional Planning Commission: Under pressure from farming/chemicals.</i> • <i>University of Wisconsin-Extension Sheboygan County: Levels are lower due to increased withdrawals</i>

Air Quality	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: impacts of non-transportation sectors on air quality.</i> • <i>East Central Wisconsin Regional Planning Commission: Has always been impacted by agriculture.</i>
Woodlands	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Increased development leading to taking of woodlands.</i> • <i>East Central Wisconsin Regional Planning Commission: Has always been impacted by agriculture.</i> • <i>University of Wisconsin-Extension Sheboygan County: Health being impacted by invasives, climate changes</i>
Endangered Species	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Aware of none</i> • <i>East Central Wisconsin Regional Planning Commission: Has always been impacted by agriculture.</i>
Historic or Archeological Sites	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Aware of none</i>
Parkland/State Forests	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Aware of none</i>
Trails	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Aware of none</i>
Rural Character	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: Aware of none</i>
Other	<ul style="list-style-type: none"> • <i>Bay-Lake Regional Planning Commission: NA</i>

21. If you answered “yes” to the previous question (Question 20) regarding resources under pressure, how might the **No-Build Alternative** affect those resources?

Comments:

- *Bay-Lake Regional Planning Commission*
 - *Not much effect*
- *East Central Wisconsin Regional Planning Commission*
 - *The pressures I indicated are from agriculture, I wouldn't expect the highway to matter.*
- *Empire, Town of*
 - *Less development*
- *University of Wisconsin-Extension Sheboygan County:*
 - *Not at all*

22. If you answered “yes” to Question 20 regarding resources under pressure, how might the **Passing Lane Alternative** affect those resources?

Comments:

- *Bay-Lake Regional Planning Commission*
 - *Not much effect, although increases in emissions from other sectors could be offset with decreases in transportation emissions if this alternative is implemented.*
- *East Central Wisconsin Regional Planning Commission*
 - *The pressures I indicated are from agriculture, I wouldn't expect the highway to matter.*
- *Empire, Town of*
 - *No impact*
- *University of Wisconsin-Extension Sheboygan County:*
 - *Not much*

23. If you answered “yes” to Question 20 regarding resources under pressure, how might the **4-Lane On-alignment Alternative** affect those resources?

Comments:

- *Bay-Lake Regional Planning Commission*
 - *Not much effect, although increases in emissions from other sectors could be offset with decreases in transportation emissions if this alternative is implemented (more so than with the passing lane alternative).*
- *East Central Wisconsin Regional Planning Commission*
 - *The pressures I indicated are from agriculture, I wouldn't expect the highway to matter.*
- *Empire, Town of*
 - *More commercial development*
- *University of Wisconsin-Extension Sheboygan County:*
 - *Not much*

24. With both the Passing Lane Alternative and the 4-Lane On-alignment Alternative, WisDOT may consider corridor preservation measures for improvements that would convert WIS 23 to a freeway where all access to WIS 23 occurs through interchanges, and local roads are converted to overpasses/underpasses or cul-de-sacs. In addition to the interchanges at County UU and County G, freeway conversion measures being considered include:

- Interchange at County W
- Interchange at County A
- Overpasses/underpasses at Tower Road, 7 Hills Road, Scenic View Drive, and Sugarbush Road

If these freeway conversion measures associated with corridor preservation were implemented, please indicate the effect they might have on the following development patterns.

	Less Development	Same Amount of Development	More Development	More Dispersed	Same amount of dispersion/ concentration	More Concentrated
Residential Development	4	3	2	0	1	5
Commercial Development	3	1	4	0	1	6
Industrial Development	2	3	3	0	2	4

Comments:

- *East Central Wisconsin Regional Planning Commission*
 - *I would expect residential and especially commercial and industrial development to occur near the urban areas in any alternative. A freeway would likely make development more attractive near the interchanges and access to WIS 23.*

25. If the freeway conversion measures associated with the corridor preservation were implemented, please indicate the effect they might have on farmland.

	Freeway Conversion Alternative (Corridor Preservation)		
	Less/Smaller	Same	More/Larger
Amount of farmland in production	5	4	0
Scale/size of farm	1	2	2
Change in crop type (yes/no)	Yes		No
	0		4

Comments:

- *East Central Wisconsin Regional Planning Commission*
 - *Agriculture has been changing dramatically over the past couple decades. I don't believe there would be a discernible difference in production.*
- *Empire, Town of*

- Same Amount in Production
- Greenbush, Town of: No Change in Crop Types, Same Amount in Production

26. Are there any other projects or activities occurring now or within the next 20 years other than the WIS 23 project that might impact the study area?

No	8
Yes	1
No opinion	3

If you selected yes, what are they?

- East Central Wisconsin Regional Planning Commission
 - Not aware of anything specific.
- Plymouth, City of
 - Economic development and growth east of project area.
- Sheboygan County Planning and Conservation
 - Not aware of any.

27. Are there other impacts that are not discussed in this questionnaire that may affect any of the following alternatives?

	No-Build Alternative	Passing Lane Alternative	4-Lane On-alignment Alternative
No	2	0	4
Yes	0	0	3
No opinion	0	0	3

If you answered yes to any of the alternatives, please describe the impacts.

- Bay-Lake Regional Planning Commission
 - No on all three (the buttons would not let me register this response).
- East Central Wisconsin Regional Planning Commission
 - The greatest impact or the one that matters most is safety. It doesn't show up in the questionnaire, but safety should trump everything else. What about safety? A 4-lane divided highway is the safest facility. Another bad crash on WIS 23 on October 22nd (yesterday). It is ridiculous that this is still dragging on.
- Plymouth, City of
 - No opinion due to the fact that I am not associated with jurisdictions along this part of the project corridor.
- Sheboygan County Planning and Conservation
 - Yes, No Build Alternative.
 - The safety impact of the no-build was not mentioned in the questionnaire.
- University of Wisconsin-Extension Sheboygan County:
 - Yes, 4-Lane Build On-alignment Alternative.
 - 4-lane would decrease the current level of route options for farm vehicles, school buses, and emergency vehicles.
- Wisconsin Department of Agriculture, Trade, and Consumer Protection
 - Yes, 4-Lane Build On-alignment Alternative.
 - Access restrictions would be a significant concern for some farmers, especially where farmers work land on both sides of the highway. The expanded highway may act as a barrier to movement of farm equipment. Farmers would have to travel longer distances and may expose themselves to greater risk of being involved in traffic accidents.