U.S. Department
of Transportation
**Federal Highway
Administration**

Office of the Administrator

1200 New Jersey Ave., SE
Washington, D.C. 20590

April 7, 2015

In Reply Refer To:
HEPH-20

Mr. Mark Gottlieb, P.E.
Secretary
Wisconsin Department of Transportation
P.O. Box 7910
Madison, WI 53707-7910

Through: Mr. George R. Poirier, P.E.
Division Administrator
Madison, WI

Dear Mr. Gottlieb:

Thank you for your collaborated request with the Illinois Department of Transportation that U.S. 41 from the U.S. 41 and I-94 Interchange in Illinois to I-43 in Green Bay, Wisconsin, be added to the Interstate System and co-numbered with I-94/894 as I-41. This segment is part of High Priority Corridor #57 that is designated as a future part of the Interstate System by Section 1105(e)(5) of the Intermodal Surface Transportation Efficiency Act of 1991, as amended.

Our Wisconsin Division Office has confirmed there are design exceptions to the American Association of State Highway and Transportation Officials (AASHTO) Interstate Design Standards noted in your request. We find the design exceptions acceptable. The requested segment also meets a statutory requirement by connecting to existing I-43. Based on our reviews and AASHTO's conditional approval of the numbering, the addition of this segment to the Interstate System and co-numbering of I-94 and I-894 as I-41 is approved as requested.

Sincerely,

Gregory G. Nadeau
Deputy Administrator

cc: Marty Vitale (AASHTO)

U.S. Department of Transportation
Federal Highway Administration

Office of the Administrator

1200 New Jersey Ave., SE
Washington, D.C. 20590

April 7, 2015

In Reply Refer To:
HEPH-20

Mr. Randall S. Blankenhorn
Acting Secretary
Illinois Department of Transportation
2300 South Dirksen Parkway
Springfield, IL 62764

Through: Ms. Catherine Batey
Division Administrator
Springfield, IL

Dear Mr. Blankenhorn:

Thank you for your collaborated request with the Wisconsin Department of Transportation that U.S. 41 from the U.S. 41 and I-94 Interchange in Illinois to I-43 in Green Bay, Wisconsin, be added to the Interstate System and co-numbered with I-94/894 as I-41. This segment is part of High Priority Corridor #57 that is designated as a future part of the Interstate System by Section 1105(e)(5) of the Intermodal Surface Transportation Efficiency Act of 1991, as amended.

Our Wisconsin Division Office has confirmed there are design exceptions to the American Association of State Highway and Transportation Officials (AASHTO) Interstate Design Standards noted in your request. We find the design exceptions acceptable. The requested segment also meets a statutory requirement by connecting to existing I-43. Based on our reviews and AASHTO's conditional approval of the numbering, the addition of this segment to the Interstate System and co-numbering of I-94 and I-894 as I-41 is approved as requested.

Sincerely,

Gregory G. Nadeau
Deputy Administrator

cc: Marty Vitale (AASHTO)

U.S. Department of Transportation
Federal Highway Administration

Memorandum

Subject: **ACTION:** Designation of U.S. 41 to Interstate 41, from I 94/US 41 Interchange to I 43 Various Counties, IL and WI

Date: February 27, 2015

From: George R. Poirier, P.E.
Division Administrator
Wisconsin Division

In Reply Refer To:
HDA-WI

To: Shari Schaftlein,
Director, Office of Human Environment
(HEPH-20)
Federal Highway Administration
Attn: Kevin Adderly

We are writing to request formal approval to designate a section of US Highway 41 as Interstate 41. A complete conversion request package is attached. Included in the package are letters from the Wisconsin Department of Transportation (WisDOT) dated February 25, 2015 and the Illinois Department of Transportation (IDOT) dated February 4, 2015, requesting FHWA to formally designate a segment of US 41 as Interstate 41. The segment requested for designation extends from the US 41/I-94 interchange approximately one mile south of the Wisconsin/Illinois state line, continuing north concurrently with I-94 to the I-94/I-894/I-43 interchange (Mitchell Interchange), then northwesterly concurrent with I-894 to the I-94/I-894/US 45 (Zoo Interchange). From the Zoo Interchange, the route extends north along US 45 and US 41 through Fond du Lac, the Fox Valley, and Green Bay, and ends at the US 41/I-43 interchange.

The section of this facility from the Mitchell Interchange north to the US 41/I-43 Interchange in Green Bay was designated as a future Interstate under Section 1304(b)(5)(57) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) (amending Section 1105(e)(5) of the Intermodal Surface Transportation Efficiency Act (ISTEA)). The section of this facility from the Mitchell Interchange south to the US 41/I-94 Interchange in Illinois is an existing Interstate facility (I-94) and will be signed concurrently. The WisDOT has worked very closely with our office to ensure all requirements for conversion have been met. The Division Office strongly endorses this request and recommends final approval for designation as Interstate 41. A summary of the study process, and how all requirements have been met, is included in the conversion request package.

We have confirmed that this 175 mile segment of US 41 meets AASHTO Interstate Design Standards approved under Section 109(b) of Title 23, United States Code, with

appropriate exceptions. The attached Design Exception Report identifies and justifies existing design exceptions that will remain following Interstate designation. WisDOT has committed funding to mitigate and correct deficiencies related to safety issues and the Division Office is confident that future improvements will be completed in accordance with WisDOT's plan. The National Environmental Policy Act (NEPA) process for conversion and signing has been completed, with final environmental approval provided on February 25, 2015. The NEPA process included several Public Information Meetings, formal public hearings, and a full Indirect and Cumulative Effects (ICE) analysis.

AASHTO conditionally approved the I-41 designation pending FHWA approval at their Special Committee on U.S. Route Numbering Annual Meeting held on November 16, 2012.

As such, WisDOT has now fulfilled all of the necessary steps for formal designation. Accordingly, the Wisconsin Division recommends that this 175 mile segment be designated I-41.

If you have any questions, or require any additional information, please contact me at 608-829-7505 or Tracey Blankenship, Major Projects Program Manager at 608-829-7510.

Attachment

Wisconsin Department of Transportation
www.dot.wisconsin.gov

Scott Walker
Governor

Mark Gottlieb, P.E.
Secretary

Office of the Secretary
4802 Sheboygan Avenue, Room 120B
PO Box 7910
Madison, WI 53707-7910

Telephone: 608-266-1113
FAX: 608-266-9912
E-mail: sec.exec@dot.wi.gov

February 25, 2015

George R. Poirier, P.E.
Division Administrator
Federal Highway Administration
525 Junction Road, Suite 8000
Madison, WI 53717

Re: U.S. Route 41 Interstate Conversion

Dear Mr. Poirier:

In accordance with 23 Code of Federal Regulations (CFR) 470, Appendix B, the Wisconsin Department of Transportation (WisDOT) requests that the referenced 175 mile segment of U.S. Route 41 from the U.S. Route 41/I-94 interchange in Illinois to I-43 in Green Bay, Wisconsin be added to the Interstate System. This segment of U.S. Route 41 is congressionally designated High Priority Corridor #57 and designated as a future Interstate route by Section 1105(e)(5) of ISTEA, as amended.

A Formal Conversion Request Memo has been submitted which details information confirming that the referenced segment of U.S. Route 41 addresses the current Interstate System design standards established in *A Policy on Design Standards - Interstate System, 5th Edition* (2005). Also, a Design Exception Report that identifies and justifies design exceptions has been approved. The US 41 corridor is one of the state's highest priorities. WisDOT is committed to meeting Interstate standards for this corridor. Multiple projects are currently programmed to mitigate or improve deficiencies. Any deficiencies remaining after currently programmed resurfacing projects are completed will be monitored and mitigation measures will be implemented if safety issues arise.

AASHTO conditionally approved the I-41 designation pending FHWA approval at their Special Committee on U.S. Route Numbering Annual Meeting held on November 16, 2012.

The proposed action has been documented in the approved Categorical Exclusion meeting the requirements of the National Environmental Policy Act (NEPA).

WisDOT has coordinated and received concurrence from the Illinois Department of Transportation (IDOT) regarding the proposed addition to the Interstate System for the section of US 41 within the state of Illinois. IDOT will also be sending a letter of request for this Interstate System addition.

WisDOT requests that you process the I-41 designation request in accordance with 23 CFR 470, Appendix B and looks forward to working with you on implementing this important corridor. If you have any questions regarding this matter, please contact me at your convenience.

Sincerely,

Mark Gottlieb, P.E.
Secretary

cc: Will Dorsey, NE Region Director
Brett Wallace, P.E., SE Region Director

Illinois Department of Transportation
Office of the Secretary
2300 South Dirksen Parkway / Springfield, Illinois / 62764
Telephone 217/782-5597

February 4, 2015

Ms. Catherine Batey
Division Administrator
Federal Highway Administration
3250 Executive Park Drive
Springfield, Illinois 62703

Dear Ms. Batey:

In accordance with the Code of Federal Regulations (CFR), the Illinois Department of Transportation (IDOT) in conjunction with the Wisconsin Department of Transportation (WisDOT) requests the 175 mile segment of US 41 from the US 41/I-94 interchange in Illinois to I-43 in Green Bay, Wisconsin be added to the Interstate System. This segment of US 41 is congressionally designated High Priority Corridor #57 and designated as a future Interstate route by Section 1105(e)(5) of ISTEA, as amended.

IDOT has coordinated and is in concurrence with WisDOT regarding the one mile section of US 41 proposed for addition to the Interstate System that is located within the state of Illinois from the US 41/I-94 interchange to the Illinois-Wisconsin state line.

AASHTO conditionally approved the I-41 designation pending approval at their Special Committee on U.S. Route Numbering Annual Meeting held on November 16, 2012.

The department requests that you process the I-41 designation request in accordance with 23 CFR 470, Appendix B and looks forward to working with you on implementing this important corridor. WisDOT will also be sending a letter of request with additional documentation and information regarding the proposed conversion. If you have any questions regarding this matter, please contact Amy Eller, Acting Engineer of Operations at (217) 782-7231.

Sincerely,

Randall S. Blankenhorn
Acting Secretary

cc: Mark Gottlieb, WisDOT Secretary
Will Dorsey, WisDOT NE Region Director
George Poirier, FHWA Wisconsin Division Administrator

bcc: Omer M. Osman; Aaron A. Weatherholt; Amy Eller
HST-54604

FORMAL CONVERSION REQUEST MEMO

US 41 Conversion to I-41
Project I.D. 1113-00-00
US 41 Interstate Conversion Study
I-94 – I-43
Various Counties

February 26, 2015

Contents

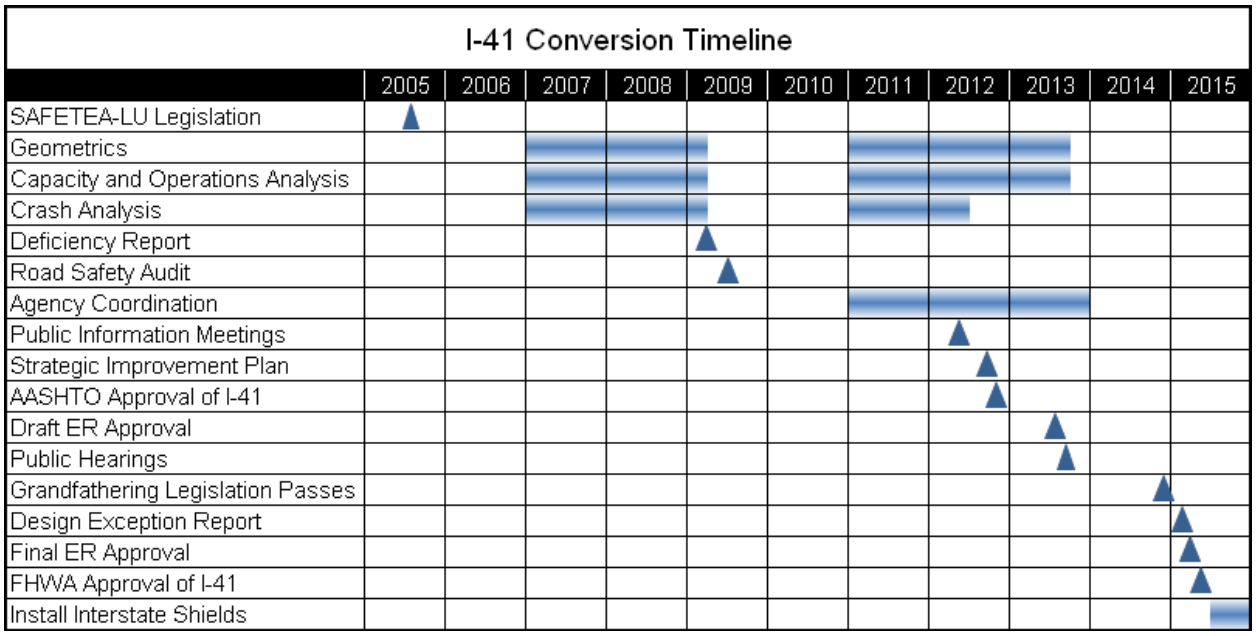
APPENDICES

Appendix A – Project Location Map
Appendix B – AASHTO SCOH 11/16/12 meeting minutes/report
Appendix C – Signed Environmental Report cover sheet
Appendix D – Concurrence/status from HIPA on Design Exception Report
Appendix E – Design Exception Report
    Attachment A – Project Location/Overview Map
    Attachment B – Proposed Design Criteria
    Attachment C – Deficiency Mitigation and Improvements Table
    Attachment D – Project Status
    Attachment E – Listing of Deficiencies
Appendix F – Strategic Improvement Plan
Appendix G – Road Safety Audit Recommendation Response Table

1. EXECUTIVE SUMMARY

The Wisconsin Department of Transportation (WisDOT), in consultation with the Federal Highway Administration (FHWA), has conducted a study to convert United States Highway 41 (US 41) from a non-Interstate freeway on the National Highway System (NHS) to an Interstate Highway between the Zoo Interchange on Interstate 94 (I-94/I-894) in Milwaukee, and the US 41/I-43 interchange in Green Bay. The overall study area extends from the US 41/I-94 interchange just south of the Wisconsin/Illinois state line to Green Bay; however, between the study area's south terminus and the Zoo Interchange, the study corridor is already an Interstate highway: I-94 / I-894 / I-43. See Appendix A for the project location map. This study evaluated the existing design features and operational conditions of the segment of US 41 from the Zoo Interchange north to the US 41/I-43 interchange to determine if the segment meets the criteria established in Section 1105 (e), of Intermodal Surface Transportation Efficiency Act (ISTEA), as amended. The purpose of this report is to summarize the process that WisDOT and Federal Highway Administration (FHWA) underwent.

Congress made the high priority corridor designation based on the importance of the route in serving regional, national, and international freight and vehicle movements. After the legislation was enacted in 2005 identifying US 41 as a future Interstate, WisDOT began a study in 2007 to understand the needs and impacts of Interstate conversion. The study initially investigated existing deficiencies in geometrics and safety issues. In 2011, direction from WisDOT management renewed the study and a Conversion Delivery Team was formed. Ten task teams were created to manage and investigate a range of study topics from geometrics to crash analysis to economics. WisDOT worked closely with FHWA, and most task teams had a representative from FHWA on the team. Below is an overview of the timeline.



The results of the study confirm that this segment of US 41 connects to the existing Interstate System, and addresses the current Interstate System design standards as established in *A Policy on Design Standards-Interstate System. 5th Edition* (2005). The Design Exception Report (DER) (See Appendix E) details each of the 23 criteria evaluated as part of the study and identifies and justifies design exceptions that are requested at the time of conversion. WisDOT has programmed several projects that will mitigate and improve existing deficiencies. FHWA Office of Infrastructure concurred with the DER on February 23, 2015. (See Appendix D) The deficiencies that have been deferred to later years were determined not to be fiscally prudent at this time. The US 41 corridor is one of the state's highest priorities and WisDOT is committed to meeting Interstate standards for this corridor. Following concurrence on the action to convert with these exceptions in place, WisDOT plans to let two Interstate signing contracts in April 2015.

2. SAFETEA-LU LEGISLATION

The following enacted Congressional legislation has shaped the framework for authorizing the establishment of US 41 as an Interstate in the United States:

Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy For Users (SAFETEA-LU)(P.L. 109-59)

Section 1304 of the Act amended the Intermodal Surface Transportation Efficiency Act (ISTEA) to establish the High Priority Corridor 57 System as part of the National Highway System (NHS).

The US 41 corridor was designated a future Interstate corridor by Congressional action under the provisions of section 1105(e)(5) of ISTEA, as amended. According to Section 1105 (e), as amended, segments of this section of US 41 may be designated as Interstate at such time it is determined that a segment meets the Interstate design standards approved under Section 109(b) of Title 23, United States Code and connects to an existing Interstate System segment.

3. LOGICAL TERMINII

The south terminus for the proposed I-41 route is identified as the I-94/US 41 interchange located approximately one mile south of the Wisconsin/Illinois border. SAFETEA-LU legislation initially identified the south terminus as the Mitchell Interchange (I-94/I-894) in Milwaukee; however, the Interstate Conversion study team elected to extend the I-41 corridor concurrent with I-94 south approximately 33 miles to the I-94/US 41 interchange for the following reasons:

- This is the location where US 41 begins to follow an Interstate route.

- The addition of I-41 to the I-94 corridor will allow the signing for cardinal direction to be north/south rather than the current east/west signing. A long-term goal of reducing driver confusion when driving north on a roadway signed as "west" can be realized for the northern Illinois and southern Wisconsin areas.

- The purpose of the Interstate Conversion is to enhance economic development by converting US 41 to an Interstate Highway. Business interests in the Oshkosh, Neenah, and Appleton area (the Fox Valley) voiced support for converting US 41 to an Interstate Highway to their congressional representatives because they believed an Interstate would better support and enhance economic development than a US highway. As a result of this support, US 41 was included in SAFETEA-LU as a candidate for Interstate

conversion. The extension along I-94 links these Wisconsin metropolitan areas and markets to the greater Chicago metropolitan area. Chicago is the economic epicenter of the entire Midwest and a key hub near the end of the I-41 corridor. Milwaukee, the Fox Valley, and Green Bay are closely linked satellite communities within the context of the greater Chicago "mega-region." As "supplier" communities that produce and ship goods and services connected to Chicago markets, the Wisconsin communities will certainly benefit from extending I-41 to directly link them to Chicago, as will the Chicago area itself as the Midwest's control center for business, finance, commodities markets, and logistics.

- With the extension into Illinois, the I-41 route becomes a true Interstate route.

- Extends the length of the proposed Interstate route from 142 miles to 175 miles.

4. ROUTE DESIGNATION

a) Route Designation - Alternatives

The study team investigated alternative route designation numbers as part of the US 41 Interstate Conversion Study. The AASHTO HO1 and HO2 purpose and policy statements from the "AASHTO Transportation Policy Book" were used to identify potential alternatives. Using the guidelines, seven potential route designation numbers were investigated including I-41, I-43, I-47, I-55, I-57, I-594 and I-643. WisDOT attempted to work with Illinois on the I-55/57 potential route designations; however, no agreement could be reached.

WisDOT selected I-41 as the preferred route designation number for the following reasons:

- I-41 follows the AASHTO guidelines of increasing route numbers west to east with its location between I-39 and I-43.
- I-41 is the route designation number anticipated and preferred by the general public.
- I-41 allows for future Interstate loop or spur routes to be designated. Potential loop or spur routes could include converting existing WIS 441 in the Appleton area or WIS 172 in the Green Bay area to Interstate routes.

b) WIS 175

As part of AASHTO's conditional approval of the I-41 designation, the segment of US 41 between I-94 near Miller Park (Stadium Interchange) and US 45, known locally as Lisbon Avenue and Appleton Avenue, will be designated WIS 175, and US 41 will be rerouted to become concurrent with the proposed I-41. With the WIS 175 designation, WisDOT has committed to keeping the new WIS 175 segment as a connecting highway.

Project team members met with the City of Milwaukee and Milwaukee County in October 2012 to discuss changing the route number of this segment of US 41 to WIS 175. The US 41/US 45/WIS 175 interchange is the current southern terminus of WIS 175. Changing the route number to WIS 175 would extend this highway from the west side of the US 41/US 45/WIS 175 interchange and allow for a connection to I-94 at the Stadium interchange. The city and county support the WIS 175 designation and the Milwaukee County Board passed a resolution supporting this on June 20, 2013.

Between the Mitchell Interchange and Stadium Interchange, the US 41 designation would be removed from the I-94 corridor. US 41 has been signed concurrently with I-94 between the two interchanges since 2000.

c) AASHTO approval

AASHTO conditionally approved the I-41 designation on November 16, 2012 (See Appendix B). The conditional approval included the rerouted US 41 in the Milwaukee area.

5. ENVIRONMENTAL DOCUMENT

An Environmental Report (ER) was prepared for the study following the National Environmental Policy Act (NEPA) process. The draft ER was approved on August 8, 2013. The Final ER was approved on February 25, 2015 (See Appendix C), completing the NEPA process.

Initially WisDOT and FHWA determined a tiered environmental impact statement (EIS) was the appropriate document type because of uncertainty about the project's potential impacts and the level of controversy. WisDOT and FHWA determined that three impact categories associated with Interstate conversion could result in significant impacts. The three impact categories evaluated included:

- Potentially significant direct human impacts caused by:
  - the Interstate's more restrictive oversize/ overweight (OSOW) regulations
  - the Interstate's more restrictive off-property outdoor advertising regulations
  - the change in route number and potential changes to exit numbers
- Potentially significant indirect and cumulative impacts
- Future improvement projects required to bring US 41 up to Interstate standards

The original intent was that the Tier 1 document would focus on broad issues (convert to Interstate or not), and the Tier 2 documents would focus on the direct impacts of improving US 41 features that do not meet Interstate standards, associated cost, and mitigation measures.

During the course of the study, WisDOT developed a clearer understanding about the range and significance of the project's potential impacts noted above, and the reactions of the business community, the trucking industry, the outdoor advertising industry, and the public to the project. After the project team evaluated the range of the project's potential impacts, WisDOT concluded that the project would not have significant impact and that, in general, the outreach completed had shown that the public supported the project and there was little controversy.

Because conversion of US 41 to an Interstate would not have significant impacts, WisDOT and FHWA agreed to change the environmental document type from a tiered EIS to an ER. An ER is appropriate for projects that have minor environmental impacts rather than significant impacts. A memorandum that described in greater detail the reasons that the environmental document type changed was prepared and presented to FHWA, cooperating agencies, and participating agencies. FHWA concurred with the document type change on May 29, 2013.

Key topics discussed in the ER include the following:

a) Purpose of and Need for the Project

The purpose of the proposed action is to enhance and accelerate economic development by converting US 41 to an Interstate Highway and signing it as an Interstate. The need for the proposed action is based in part on economics, and in part on meeting the intent of the previous federal surface transportation law, which identified the US 41 corridor a high priority corridor on the National Highway System (NHS) and designated it a future Interstate route. Congress made the high priority corridor designation based on the importance of the route in serving regional, national, and international freight and vehicle movements.

b) Economics

The purpose of the proposed Interstate conversion is to enhance and accelerate economic development by converting the US 41 corridor to an Interstate highway. The impetus for including US 41 as a candidate for inclusion on the Interstate System has economic underpinnings. Business interests in the Oshkosh, Neenah, and Appleton area (the Fox Valley) voiced support for converting US 41 to an Interstate Highway to their congressional representatives because they believed an Interstate would better support and enhance economic development than a US Highway. As a result of this support, US 41 was included in the previous federal transportation law as a candidate for Interstate conversion.

To understand the potential differences between a US Highway and an Interstate Highway on industrial and commercial development along the US 41 corridor, WisDOT surveyed economic and community development experts in the US 41 corridor in fall 2011. The key findings and themes from the survey responses of these experts were enhanced business recruitment, job creation, business retention and expansion, increased tourism and property value improvement with potential economic impacts of Interstate conversion extending 10 miles beyond the US 41 interchanges.

c) Oversize / Overweight Vehicles

The maximum gross vehicle weight allowed on Interstates is 80,000 pounds, except where lower gross vehicle weight is dictated by the bridge formula. Currently on US 41, trucks hauling certain commodities are authorized by Wisconsin law to haul at over 80,000 pounds. This is authorized by permit or statutory exception for divisible loads (i.e. the load could be divided into smaller loads) as established in Wisconsin Statute 348, and by chapters of Wisconsin Administrative Code. Some common divisible loads that are currently allowed by permit or statute include shipments such as milk, timber, fresh vegetables, livestock, garbage, and scrap metal.

Federal legislation was passed in December 2014 that allows trucks currently authorized by existing Wisconsin statute or permit to haul over federal weight limits on US 41 to continue operating on I-41.

d) Outdoor Advertising

With Interstate conversion, the permitting process for off-property signs will follow stricter federal regulations. It is expected that most of the existing legally permitted off-property signs will become non-conforming, which means they will be able to remain in place for their useful life, but they will not be able to be improved beyond 50 percent of their replacement value, reconstructed, or replaced. Because non-conforming off-property signs will be allowed to remain following Interstate conversion, the project would not create significant impacts to the outdoor advertising industry.

e) Indirect and Cumulative Effects

The project's indirect and cumulative effects analysis is based on the six-step process outlined in WisDOT's Guidance for Conducting an Indirect Effects Analysis, and the eleven-step process outlined in WisDOT's Guidance for Conducting a Cumulative Effects Analysis.

The Indirect and Cumulative Effects (ICE) report concluded that the Interstate Designation Alternative is not expected to stimulate substantial indirect environmental effects and the project's contribution to cumulative effects is minor. New development caused by the "Interstate brand" is expected to occur in areas already planned for such by local governments. The study team and expert panel agreed that Interstate conversion may lead to a slight increase in the pace of nonresidential development and redevelopment, particularly at interchanges and other visible locations. Panelists also agreed that higher quality development may occur, and that the pace of land development may increase to prerecession levels. The complete ICE report was included on a compact disc with the ER.

f) Public Involvement

The study team engaged the general public and stakeholders representing the following areas: local government agencies, the trucking/transportation industry, outdoor advertising industry, general business, manufacturing, and tourism. A website was created (www.41conversion.wi.gov) to provide study information, meeting displays and handout materials, and contact information. Additionally, print materials (brochures and posters printed in English and Spanish) were produced to share information with the public.

From May 16-31, 2012 the department conducted six public meetings for the Interstate conversion project in Green Bay, Appleton, Oshkosh, Fond du Lac, Germantown, and Wauwatosa. At the meetings a formal presentation was given that provided an overview of the study background, the study tasks, and study schedule. The NEPA process and opportunities for public input were explained. Display boards were available for viewing that described potential route numbers, traffic volumes, potential economic benefits of Interstate conversion, Interstate safety benefits, the NEPA process and opportunities for public input, and the EIS alternatives. Attendance at the meetings varied, but demonstrated that there was minimal concern from the public.

Three public hearings were conducted on September 10, 11, and 12, 2013 in Appleton, Fond du Lac, and Milwaukee. Notices of the public hearing and availability of the environmental document were published in 10 area newspapers and sent to cooperating and participating agencies, elected officials, and over 800 properties along Lisbon Avenue and Appleton Avenue. Copies of the environmental report were made available at all of the county highway offices within the

study corridor and at the WisDOT offices in Green Bay, Waukesha, and Madison. News releases were provided to media outlets throughout the study corridor further announcing the public hearings.

Public support for the project has been overwhelming, despite the varied attendance at the public meetings and hearings. Those in attendance at the meetings were generally in favor of the conversion to an Interstate. In addition to the public information meetings, the study team participated in several meetings to inform interested persons about the Interstate Conversion Study. Meetings attended included the Kiwanis Club, Chambers of Commerce, ITE Midwest Conference, Governor's Conference on Tourism, and New North Summit. Meeting participants were interested in the study and asked about the advantages of Interstate conversion and the schedule to complete the conversion. The study team has also participated in interviews with several local radio and television stations to provide information about the project to a larger audience.

g) Agency Coordination

In late August and early September 2011, FHWA and WisDOT sent letters to federal and state regulatory agencies, local officials, and Native American tribes inviting them to be cooperating or participating agencies as applicable. An agency scoping meeting was held in May 2012 to provide background information on the study, obtain agency input on the Agency Coordination Plan and Impact Analysis Methodology, obtain agency input on issues that will be considered in the study, discuss the elements of project purpose and need and to preview the exhibits to be presented at the May 15 to 31, 2012 public information meetings. An agency update meeting was held in February 2013 to update the agencies on the proposal to change the project's environmental document type from an EIS to an ER, review the project's Agency Coordination Plan and Impact Analysis Methodology, which were revised to remove references to the EIS and EIS tasks in the study process and provide a general update on other aspects of the study.

The cooperating and participating agencies have responded with minor or no comments regarding the conversion of US 41 to an Interstate, providing generalized support for the conversion. Several participating agencies, including the East Central Wisconsin Regional Planning Commission, have sent letters in support of the Interstate conversion. Early in the study several communities passed resolutions supporting Interstate conversion and specific Interstate route numbers.

6. GEOMETRICS

US 41 is classified as a freeway on the National Highway System and therefore WisDOT uses design standards from the WisDOT Facilities Development Manual (FDM) meeting 70 mph freeway standards. As part of the Interstate Conversion Study, WisDOT in conjunction with FHWA prepared a table of roadway design criteria that references AASHTO's *A Policy on Design Standards - Interstate System*, AASHTO's *A Policy on Geometric Design of Highways and Streets*, and the WisDOT Facilities Development Manual (FDM). The table of roadway design criteria establishing Interstate design standards mirrors the FDM 70 MPH freeway standards except in one area – shoulder widths. However, because US 41 has more than 250 trucks in the design hourly volume (DHV), the shoulder widths in the FDM standards for 70 mph freeways also match the Interstate standards in the AASHTO *A Policy on Design Standards – Interstate System*.

The geometric investigation involved collecting extensive data on existing conditions, comparing the data to standards, and then identifying deficient elements. Data collection included performing field surveys, cataloging as-built plans, researching WisDOT databases for structure information and pavement conditions, reviewing crash reports, and collecting traffic information. Collected data was compared against design standards prepared by WisDOT and other accepted engineering documents including the FDM, A Policy on Geometric Design of Highways and Streets 2004 (GDHS 2004), and A Policy on Design Standards – Interstate System, 2005.

WisDOT, FHWA and the Interstate conversion team reviewed the Geometric Deficiencies Report, *USH 41 Interstate Conversion – Road Safety Audit* (RSA) report, and the MV4000 crash reports, segment by segment. The team identified all deficiencies, prioritized improving and mitigating deficiencies that had correlations to safety issues, committed funding to address higher priority deficiencies, and developed a plan to address all deficiencies. The recommended mitigation and improvements for the study were summarized in the Strategic Improvement Plan (SIP) (see Appendix F) and the Deficiency Mitigation & Improvement Table (see Appendix E, Attachment C) which were used by WisDOT to commit to funding the improvements.

7. CAPACITY AND OPERATIONS ANALYSIS

Traffic projections for the years 2010, 2020, and 2035 and level of service (LOS) calculations for base year 2010 and horizon year 2035 were included as part of the *USH 41 Interstate Conversion – Geometric Deficiencies* report. While there are failing segments today in Milwaukee County, any improvements that could be made would likely be higher impact requiring environmental study. Mitigation strategies such as adding auxiliary lanes, extending acceleration and deceleration lanes or constructing parallel entrance and exit ramps are recommended if safety issues develop due to declining levels of service. Overall, five US 41 mainline projects to improve capacity were identified by the traffic analysis for long-term study and improvement.

8. CRASH ANALYSIS

The US 41 corridor was divided into one-mile-analysis segments and crash rates were calculated for each segment using 2006-2010 crash data. Crash rates for total crashes, fatal and incapacitating crashes, and total fatal crashes were calculated and then compared to statewide annual crash rates. Crash rates greater than 1.5 times the statewide average rate are identified as a deficiency, and labeled as poor. Crash rates between 1.5 times the statewide average rate and the statewide average rate are identified as a potential deficiency, and labeled as fair. Crash rates less than the statewide average rate are not considered a deficient item and are labeled as good. These crash rates and labels were included as part of the *USH 41 Interstate Conversion – Geometric Deficiencies* report.

The Geometrics Task Team reviewed the MV4000 crash reports within each crash hot spot to identify trends and crash correlations with the geometric deficiencies within each mile section. This crash information was used when prioritizing improvements and creating the SIP table and Deficiency Mitigation & Improvement Table.

9. DEFICIENCY REPORT

The *USH 41 Interstate Conversion – Geometric Deficiencies* report involved collecting extensive data on existing conditions, comparing the data to standards, and then identifying deficient elements. Deficient elements are presented in the report and within the appendices. The appendices document the location and relative level of deficiency by use of an aerial plan view over a bar chart system. The appendices were used to pictorially show potential correlation between deficiencies and the crash rate.

The draft report was completed in February 2009. Projects that were programmed in 2009 and 2010 were considered existing. When the study was renewed in 2011, a decision was made to leave the deficiency report in draft form and not update to include additional or future improvements.

10. ROAD SAFETY AUDIT

The *USH 41 Interstate Conversion – Road Safety Audit* (RSA) was completed independently of the Geometric Deficiency Report. Geometric, traffic and crash characteristics were evaluated to identify safety issues and develop improvement options. The study objectives of the USH 41 Interstate Conversion Safety Assessment included:

- Reviewing the safety and operational performance of the corridor;
- Identifying safety issues and causes of concern along the corridor;
- Determining the collision causes and developing improvement strategies at interchanges with high crash risks;
- Conducting an economic evaluation to determine the cost effectiveness and the level of potential investment towards the implementation of corridor safety improvements.

The Geometrics Task Team reviewed the recommended mitigation and corrective improvements. The team recommended which improvements would be implemented, and also looked at other mitigation strategies. The Roadway Safety Audit (RSA) recommendation response table (See Appendix G) summarizes the recommended mitigation strategies, other mitigation strategies that were investigated, and whether each will be implemented.

11. DESIGN EXCEPTION REPORT

In accordance with 23 CFR 470 Appendix B, US 41 is constructed to Interstate design standards with design exceptions that are included in the Design Exception Report (DER) (See Appendix E). FHWA Office of Infrastructure concurred with the DER on February 23, 2015. (See Appendix D) The DER details each of the 23 design criteria, identifies and justifies design exceptions and documents when deficiencies will be mitigated or corrected. The Deficiency Mitigation and Improvements Table (See Attachment C of the DER) and the Strategic Improvement Plan (SIP) (See Appendix F) show existing and proposed mitigation as well as programmed and future improvements.

Any deficiencies remaining after the currently programmed resurfacing projects are completed

will be monitored. If any safety issues arise, mitigation strategies will be implemented as part of WisDOT's Highway Safety Improvement Program (HSIP). As level of service issues arise along the corridor, sections will be evaluated for capacity expansion. As each section's existing pavement reaches the end of its useful life, it will be evaluated for a full reconstruction.

Of the 175 miles that will be I-41, 43 miles are currently an Interstate highway. A Project Status Map is included in the DER. (See Appendix E, Attachment D.) There are 27 miles of major reconstruction projects that are designed/constructed using Interstate standards. There are 11 miles that were resurfaced and shoulders, clear zone and vertical clearance was improved to meet Interstate standards. There are 41 miles of resurfacing projects scheduled in WisDOT's current 6 year program. Twenty four miles have had median cable guard installed to mitigate substandard median width. Only 29 miles have no projects in the 6 year program to improve deficiencies. Based on existing pavement conditions, resurfacing projects are anticipated to be programmed for this remaining 29 miles between the years 2020 and 2025. These will correct deficiencies in shoulder width, clear zone, and unprotected steep slopes.

12. STRATEGIC IMPROVEMENT PLAN

The Strategic Improvement Plan (SIP) table (See Appendix F) shows crash hot spot segments, operations, crash rate, deficiencies and short term, midterm, and long term improvements. Technical experts from WisDOT central office, WisDOT regions, FHWA and the Interstate conversion team reviewed the Geometric Deficiency Report, USH 41 Interstate Conversion – Road Safety Audit (RSA) report, and the MV4000 crash reports, segment by segment to recommend mitigation and improvements. Meetings were held with WisDOT technical experts to create the SIP table and improvements.

All of the recommended improvements discussed in the Geometrics Task Team technical memorandums were compiled into the SIP table. The SIP table breaks US 41 into large segments according to past project limits. The WisDOT Backbone Program team and the Management Oversight Team finalized the SIP table and committed to funding the recommended improvements.

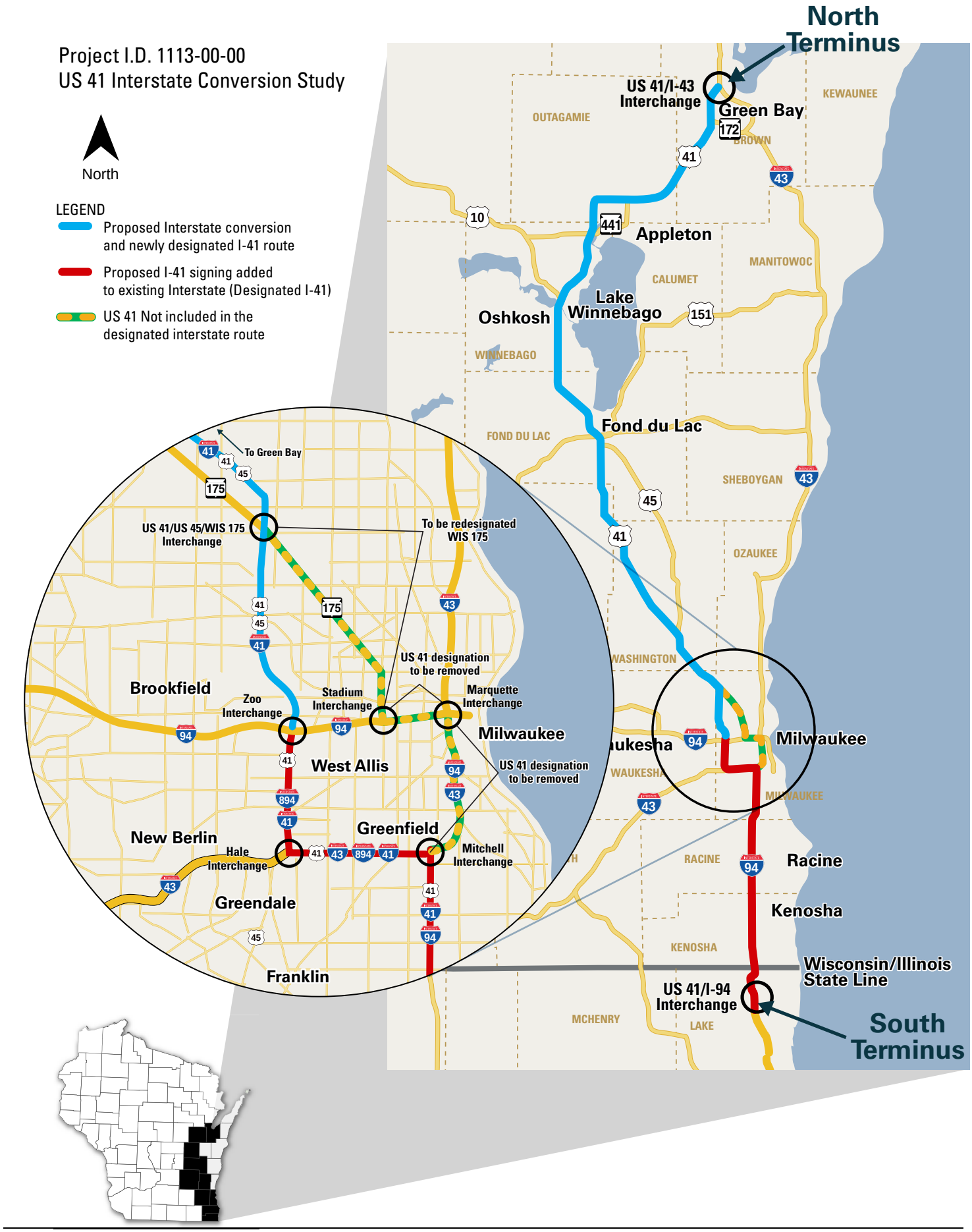
13. CONCLUSION

Converting US 41 to an Interstate Highway will enhance and accelerate economic development within areas already planned for development. Public support for the project has been overwhelming. WisDOT in conjunction with FHWA has completed an extensive study that analyzed geometrics, capacity and operations, and their correlation to crashes. Many reports and technical memos were created discussing specific topics and are available at WisDOT NE region. WisDOT identified all deficiencies, prioritized improving and mitigating deficiencies that had correlations to safety issues, committed funding to address higher priority deficiencies, and developed a plan to address all deficiencies. The US 41 corridor is one of the state's highest priorities. WisDOT is committed to meeting Interstate standards for this corridor. The results of the study confirm that this segment of US 41 connects to the existing Interstate System at logical termini, addresses the current Interstate System design standards and should be converted to I-41.

Appendix A

Project Location Map

Project Location



Appendix B

AASHTO SCOH 11/16/12 meeting minutes/report

SCOH Report

From

Special Committee on U.S. Route Numbering Annual Meeting

Friday, November 16, 2012

Meeting Minutes

The Special Committee on U.S. Route Numbering and U.S. Bicycle Route Systems (USRN) convened at 6:32 PM at the David L. Lawrence Convention Center, Pittsburgh, PA. Present were Ken Sweeney, ME (Chair), Greg Johnson, MI, Mark McConnell, MS, Cathy Nelson, OR and Marty Vitale, AASHTO (Secretary). Also present were members of AASHTO from Wisconsin.

The committee discussed the enclosed letter received on November 15 at 4:00PM from FHWA's Shari Schaftlein, Director, Office of Human Environment that addressed 11 interstate route applications from several member departments. It was unanimously decided by the committee to send a letter to each member department (Alabama, Illinois, Indiana, Maryland, Minnesota, Texas, and Wisconsin) informing them that although, AASHTO USRN conditionally approves their applications they must first satisfy the FHWA conditions described in the letter and that FHWA makes the ultimate decisions on all interstate routes.

This report contains the results to the ballot titled *RN-12-02 Special Committee on U.S. Route Numbering Annual Meeting Ballot*. The USRN reviewed all applications prior to meeting on November 15 to discuss and reconcile their decisions. The committee received 23 applications from 12 states.

One application was disapproved, 12 approved, and 10 approved with conditions.

TEXAS	Establishment of Interstate Route (#TBD)	Route will begin at 0.5 mile west of the U.S. 83/Showers Road junction in Palmview, TX. Route will extend 46.8 miles to the east. Existing facility is a four-lane to six-lane divided, controlled access route. Route will travel west to east. Mission, McAllen, Pharr, and Harlingen are four focal point cities. Route will extend 46.8 miles. Route will end at the junction of U.S. 77 in Harlingen, TX.	Disapproved Application incomplete without an interstate number and Texas needs to provide a map showing that interstate routes are interconnected.

DOT	Route	Description	Decision
ALABAMA	Establishment Interstate I-22	Route begins at intersection of I-65 at mile marker 96.22 in Birmingham, AL westerly to the Mississippi State Line over an existing Future I-22/US 78 west to Jasper, AL for a total of 96.22 miles and ending at MI State Line at mile marker 0.00.A letter is included from John R. Cooper, AL Transportation Director to Mark D. Bartlett FHWA Montgomery, AL dated September 5, 2012. A letter is being sent to FHWA headquarters from AASHTO informing FHWA of the application. This is in accordance with MAP-21: Section 1104 - NHS.	Conditional Approval **Mississippi** needs to submit an application. Pending FHWA approval from Victor Mendez, FHWA Administrator
ARIZONA	Establishment US Truck Routed 95 (category added by Arizona)	A new US 95 Truck Route [sic] is proposed to be established in San Luis, Arizona, extending from an intersection with US 95 south and east along existing streets 0.5 mile to the Port of Entry at the international boundary. AASHTO's policy does not include U.S. truck routes. See AASHTO Policy Statements: Purpose & Policy Statement HO1 and Purpose & Policy Statement HO2 (Retention of HO1). The FHWA contact on the subject of truck and freight is Ed Strocko 202-366-2997 Ed.Strocko@dot.gov and for AASHTO Leo Penne 202-624-5800 lpenne@aashto.org.	Approved
ARIZONA	Relocation of U.S. 93	US 93 is requested to be relocated over a new alignment, from the north side of Wickenburg, AZ 1.2 miles to the south to a new junction and terminus with US 60 on the east side of Wickenburg, AZ.	Approved
ARIZONA	Relocation of U.S. 93	US 93 will be relocated from its old alignment through the City of Kingman onto existing Interstate 40 4.2 miles from Exit 48 on the west sid3e of Kingman north and east to Exit 53 on the east side of Kingman.	Approved
ARIZONA	Relocation of US 180	US 180 will be relocated from its old alignment down I-40 onto County Club Rd heading north and then west on old route 66 to the intersection of Santa Fe Ave. and Humphrey's St.	Approved
ARIZONA	Elimination of US 89	The portion of US 89 to be eliminated begins at the Country Club Dr. and I-40 interchange in Flagstaff and ends 0.5 miles to the north at the intersection of County Club Dr. and Route 66. The intersection of County Club Dr. and Route 66 (I-40 Business, US 180) will be the new terminus of US 89.	Approved

DOT	Route	Description	Decision
ILLINOIS	Establishment of I-41	Begins at the Wisconsin/Illinois state border following USH 41/IH-94 to the USH 41/IH-94 interchange south of Russell Road/County Highway 19. Travels over an existing Interstate and US Highways Southerly covering 0.9 and ends at the USH 41/IH-94 interchange. IH-41 is proposed to follow USH 41/IH-94 from the Wisconsin/Illinois state border south to the USH 41/IH-94 interchange. No letter included showing the member department has contacted FHWA. AASHTO to prepare information letter to FHWA headquarters and copying Illinois. South of Russell Road/County Highway 19.	Conditional Approval Pending FHWA approval from Victor Mendez, FHWA Administrator
INDIANA	Extension of I-69	(Intersection or Mile Marker) Currently, the I-69 route begins at the I-64/ I-164 interchange (Mile Marker 21) in Gibson County, Indiana. The new alignment of Interstate 69 Section 4 begins at the end of I-69 Section 3 near the U.S. 231 interchange (Mile Marker 87) in Greene County. Describe where it is going? From the City of Evansville the road travels northerly through the State of Indiana to the City of Indianapolis and providing access to Bloomington. From U.S. 231 north of the Crane Naval Surface Warfare Center to S.R. 37 southwest of Bloomington, Indiana. I-69 Section 4 will be traveling over a new alignment. Give the direction of travel: Beginning at the U.S. 231 interchange (Mile Marker 87), the existing segment of I-69 would be routed over a new alignment traveling northerly and easterly past the intersection of State Road 45 (Mile Marker 98) to the Greene/Monroe County Line interchange (Mile Marker 104). Then I-69 Section 4 travels north and east to the new interchange at State Road 37 (Mile Marker 114) southwest of Bloomington, Indiana. Name the focal point city or cities: The City of Bloomington, Indiana is the focal point city for the section in reference of this request. Length of route in miles: This segment of I-69 Section 4 that is proposed to be routed over a new alignment is approximately 26.7 miles long. The total corridor length at the completion of I-69 Section 4 will be approximately 93.77 miles. For this request, new road construction for I-69 terminates at the juncture of S.R. 37 (mile marker 114) on the southwest side of the City of Bloomington. No letter provided from the member department that FHWA has been contacted about this change. AASHTO will send a letter of information to FHWA and copy Indiana.	Conditional Approval Pending FHWA approval from Victor Mendez, FHWA Administrator
IOWA	Relocation of U.S. 20	Route begins at Junction with existing U.S. 20, approximately 1 mile west of US71. From its junction with existing U.S. 20, traversing east through Sac County, continuing east through Calhoun County to its junction with Iowa 4. This is a New Alignment traveling East covering Approximately 26.1 miles. The route ends at Junction with existing U.S. 20 and Iowa 4.	Approved

DOT	Route	Description	Decision
MARYLAND	Relocation of I-370	Interstate Route 370 begins at the point where Sam Eig Highway (a Montgomery County-maintained route) ends, and travels easterly to a point where Maryland Route 200, the Intercounty Connector begins. It is a two-way divided highway. The total distance of this interstate highway is 2.54 miles. The focal point city is Rockville, Maryland.	Conditional Approval Pending FHWA approval from Victor Mendez, FHWA Administrator
MICHIGAN	Recognition of a Business Route on U.S. 131	The MDOT Control Section 78012 begins at mile 0.0 at the US-131/US-12 intersection in Saint Joseph County, Michigan. The beginning of US-131BR (South Tie In, CS 78012 MP 1.47) will begin approximately 0.63 miles north of Dickinson Road. From the beginning north of Dickinson Road the road travels northerly through the village of Constantine, Michigan until it rejoins existing US-131 south of Garber Road in Saint Joseph, County. The road will be primarily traveling over the existing US-131 alignment. The north and south tie in intersections with US-131 will be new construction. US-131 travels from south to north beginning north of Dickinson Road and ending south of Garber Road. The Village of Constantine is the focal point for the section in reference of this request. The total length of this segment of re-designated existing alignment is 4.04 miles. The end of US-131BR (North Tie In, CS 78012 MP 5.51) will end approximately 0.74 miles south of Garber Road.	Approved
MICHIGAN	Relocation of U.S. 131	The new alignment of US-131 begins at mile 0.0 approximately 0.63 miles north of Dickinson Road in Saint Joseph County, Michigan. From the beginning north of Dickinson Road the road travels northerly to the west of the village of Constantine, Michigan until it rejoins existing US-131 south of Garber Road in Saint Joseph, County. The road will be traveling over a new alignment. US-131 travels from north to south beginning north of Dickinson Road and ending south of Garber Road. The Village of Constantine is the focal point for the section in reference of this request. The total length of this segment of new alignment is 4.201 miles. The new alignment of US-131 ends at mile 4.201 approximately 0.73 miles south of Garber Road in Saint Joseph County, Michigan.	Approved

DOT	Route	Description	Decision
MINNESOTA	Recognition of Business Route I-35	The route will begin at the intersection of I-35 and County State Aid Highway 7 to the intersection with County State Aid Highway 61 and thence northerly along County State Aid Highway 61, parallel to I-35, to the intersection with County State Aid Highway 11. Thence the business route extends westerly along County State Aid Highway 11 and terminates at the intersection of I-35 and County State Aid Highway 11 (Exit 171). The route will travel south to north through the business district of Pine City, a distance of approximately 3 miles	Approved New I-35 “business loop” meets MUTCD Section 2D.11 and needs to be a M1-2 green sign as a business loop off the Interstate.
MINNESOTA	Establishment of USBRS 45 (aka Mississippi River Trail)	The route begins at the E Entrance Road at the southeast entrance of Itasca State Park to Cass Lake: 60.2 miles Cass Lake to Brainerd via Heartland and Paul Bunyan State Trails: 83.5 miles Cass Lake to Brainerd East Route: 177.2 miles Brainerd to Sauk Rapids: 66.7 miles West Side of Mississippi River: 3.7 miles East Side of Mississippi River: 5 miles St. Cloud to Elk River: 40.9 miles	Approved
NORTH CAROLINA	Extension of U.S. 311	The route begins at the intersection of NC 14 south of Eden in Rockingham County in North Carolina. The North Carolina portion of the route is going north and east along portions of existing North Carolina routes (NC 14, NC 700, and NC 770) south, in, and northeast of Eden in Rockingham County. The North Carolina portion of the route is traveling along an arterial on an existing alignment, which is primarily a five-lane undivided cross-section with a two-way left turn lane in Eden, and primarily a two-lane undivided cross-section in the northeastern part of Eden to the Virginia state line. The route is going north and east. The focal point city along the North Carolina portion is Eden. The route will cover approximately 9.78 miles in North Carolina. The North Carolina portion of the route ends at the Virginia state line in Rockingham County	Approved
TEXAS	Extension of I-69	Route will begin at IH 610 West in Houston. Route will extend 28.4 miles to the south. Existing facility is a four-lane to twelve-lane divided, controlled access route. Route will travel north to south. Houston, Sugarland, and Rosenberg are the three focal points. Route will extend 28.4 miles. Route will end 0.16 mile north of the intersection of US 59 and SS 529	Conditional Approval Pending FHWA approval from Victor Mendez, FHWA Administrator
TEXAS	Extension of I-69	Route will begin at 0.6 mile north of the U.S. 77 / CR 3690 junction north of Raymondville, TX. Route will extend 53.3 miles to the south. Existing facility is a four-lane divided, controlled access route. Route will travel south to north. Raymondville, Harlingen, and Brownsville are the three focal points. Route will extend 53.3 miles. Route will end 0.1 mile north of the U.S. 77 / University Boulevard intersection in Brownsville, TX.	Conditional Approval Pending FHWA approval from Victor Mendez, FHWA Administrator

DOT	Route	Description	Decision
TEXAS	Establishment of I-69C	Route will begin at 0.5 mile north of the U.S. 281/FM 2812 junction. Route will extend 13.5 miles to the south. Existing facility is a four-lane divided, controlled access route. Route will travel south to north. Edinburg and Pharr are the two focal points. Route will extend 13.5 miles. Route will end at the junction of U.S. 83.	Conditional Approval Pending FHWA approval from Victor Mendez, FHWA Administrator
TEXAS	Establishment of I-369	Route will begin at IH 30 in Texarkana. Route will extend 3.5 miles to the south. Existing facility is a four-lane divided, controlled access route. Route will travel south to north. Texarkana is the focal point city. Route will extend 3.5 miles. Route will end at the junction of U.S. 59 and SL 151.	Conditional Approval Pending FHWA approval from Victor Mendez, FHWA Administrator
TEXAS	Establishment of Interstate Route (#TBD)	Route will begin at 0.5 mile west of the U.S. 83/Showers Road junction in Palmview, TX. Route will extend 46.8 miles to the east. Existing facility is a four-lane to six-lane divided, controlled access route. Route will travel west to east. Mission, McAllen, Pharr, and Harlingen are four focal point cities. Route will extend 46.8 miles. Route will end at the junction of U.S. 77 in Harlingen, TX.	Disapproved Application incomplete without an interstate number and Texas needs to provide a map showing that interstate routes are interconnected.
VIRGINIA	Extension of U.S. 311	The route begins at the North Carolina state line in Pittsylvania County. The Virginia portion of the route is going north and east along the extent of existing Route 863 in Virginia in Pittsylvania County. The Virginia portion of the route is traveling along an existing alignment which is primarily a two lane undivided cross section from the NC state line to U.S. 58 Business just west of Danville, VA. The route is going north and east. The focal point city is Danville, VA. The route will cover approximately 7.63 miles in Virginia. The VA portion ends at the intersection of U.S. 58 Business just west of Danville, VA.	Approved
WISCONSIN	Establishment of I-41	The route beings at US 41/I-43 Interchange in Green Bay. It follows US 41 south to the US 41/US 45 split in the northwest part of Milwaukee, and then following US 45, I-894, and I-94/US-41 to the Wisconsin/Illinois state border. It travels over an existing Interstate and US Highways southerly to Green Bay, Appleton, Oshkosh, Fon du Lac, and Milwaukee a total of 171.5 miles and ends at the Wisconsin/Illinois state border.IH-41 is proposed to follow US 41 from the US 41/I-43 Interchange in Green Bay south to the US 41/US 45 split near Richfield then follow US 45to the Zoon Interchange (I-94/I-894, then follow I-894 to the Mitchell Interchange (I-94/I-894) and then follow US 41/I-94 south to the Wisconsin/Illinois state border.	Conditional Approval Pending FHWA approval from Victor Mendez, FHWA Administrator

DOT	Route	Description	Decision
WISCONSIN	Relocation of US 41	The route begins at US 41/US 45 Interchange and follows US 45 and IH-894 from the USH 41/USH 45 interchange to the IH-94/IH-894 interchange (Mitchell Interchange) over an existing interstate and US highways southerly and easterly at Milwaukee for 17.6 miles and ends at IH-94/IH-894 interchange (Mitchell Interchange).USH 41 is proposed to be relocated to follow USH 45 from the USH 41/USH 45 interchange between Milwaukee and Menominee Falls to the Zoo Interchange (IH-94/IH-894), then follow IH-894 from the Zoon Interchange (IH-94/IH-894) to the IH 94/IH-894 interchange (Mitchell Interchange).	Conditional Approval Contingent upon the Approval of I-41 or pending FHWA approval of I-41 (entry 23)

Appendix C

Signed Environmental Report cover sheet

ENVIRONMENTAL EVALUATION OF FACILITIES DEVELOPMENT ACTIONS

Wisconsin Department of Transportation

Basic Sheet 1

Project ID 1113-00-00	**Project Termini** From: US 41/I-94 Interchange (1.0 mile south of the Wisconsin/Illinois state line) To: US 41/I-43 Interchange (Green Bay)	**Funding Sources - Check all that apply** ☒ Federal ☒ State ☐ Local
Route Designation (if applicable) National Highway System (NHS) Route ☒ Yes ☐ No	**Nearest Community** Kenosha, Racine, Milwaukee, Fond du Lac, Oshkosh, Neenah, Appleton, Green Bay	**Estimated Project Cost** $5.3 million (2015 dollars) Real Estate Acquisition Portion of Estimated Cost $0
Project Name US 41 Interstate Conversion Study		
County Kenosha, Racine, Milwaukee, Waukesha, Washington, Dodge, Fond du Lac, Winnebago, Outagamie, and Brown	**Section-Township-Range**	**Right of Way Acquisition**
Bridge Number(s), if applicable	**Scheduled start date (Operational Planning Meeting (OPM), or specify other)** June 15, 2007 (contract approval) 2015 (install Interstate signs)	

	Acres
Fee	0
TLE	0
PLE	0

Functional Classification of Existing Route	Urban	Rural
Freeway/Expressway	☒	☒
Principal Arterial	☐	☐
Minor Arterial	☐	☐
Major Collector		☐
Minor Collector		☐
Collector	☐	
Local	☐	☐
No Functional Class	☐	☐

WisDOT Project Classification	
Resurfacing	☐
Pavement Replacement	☐
Reconditioning	☐
Expansion	☐
Bridge Rehabilitation	☐
Bridge Replacement	☐
A "Majors" Project	☐
SHRM	☐
Preventive Maintenance	☐
Safety	☐
Other, Describe: Interstate Conversion	☒

X FHWA Draft Categorical Exclusion, Draft Type 2c, No significant impacts indicated by initial assessment
☐ FHWA Final Categorical Exclusion, Type 2c, No significant impacts will occur
☐ FHWA Environmental Assessment, Type 3, No significant impacts indicated by initial assessment

Preparer: Stan Wojcie / CH2M HILL 8/8/13

(Signature) (Company/Org.) (Date) (Title)

Rebecca Burkel 8/8/2013

(Signature) (Date) (Title)
(Director, Bureau of Technical Services)

Tammy R Rabe 8/8/13

[signature] 8/8/13

(Signature) (Date) (Title)

☒ Region ☐ Aeronautics ☐ Rails & Harbors)

Andrew Brinkerhoff 8/8/2013 NER FOE

(Signature) (Date) (Title)

(☒ FHWA ☐ FAA ☐ FTA ☐ FRA)

After reviewing and addressing substantive public comments, updating the Preliminary Categorical Exclusion or Environmental Assessment (EA), and coordinating with other agencies, it is determined that this action:
☒ Will not significantly affect the quality of the human environment. This document is a Final Categorical Exclusion (Type 2c).
☐ Will not significantly affect the quality of the human environment. This document is a Finding of No Significant Impact (FONSI).
☐ Has potential to significantly affect the quality of the human environment. Environmental Impact Statement (EIS) required.

Preparer: CH2M HILL

B. Goldberg 2/24/15

(Signature) (Company/Org.) (Date) (Title)

Rebecca Burkel 2/25/15

(Signature) (Date) (Title)
(Director, Bureau of Technical Services)

Tammy A Rabe 2/24/15

[signature] 2-24-15

(Signature) (Date) (Title)

(☒ Region ☐ Aeronautics ☐ Rails & Harbors)

Tracey Blankenship 2/25/2015 Maj. Proj. Prog. Mgr.

(Signature) (Date) (Title)

(☒ FHWA ☐ FAA ☐ FTA ☐ FRA)

Appendix D

Concurrence/status from HIPA on Design Exception Report

From: Hilton, Elizabeth (FHWA)
Sent: Monday, February 23, 2015 8:15 AM
To: Blankenship, Tracey (FHWA); Brinkerhoff, Andrew (FHWA)
Cc: Mooney, Robert (FHWA); Holt, Daniel (FHWA)
Subject: RE: Wisconsin Division: US 41 Interstate Conversion

Good morning all – Thanks to the Division for your efforts to work with the state to address our comments on the draft design exception report. We concur that our comments have been adequately addressed. We'll be looking for the official transmittal of the conversion package through HEP.

Thanks,
Elizabeth

Elizabeth Hilton, P.E. | Geometric Design Engineer | FHWA - HIPA-20 | 512-536-5970 |
Elizabeth.Hilton@dot.gov
300 East 8th Street, Suite 826, Austin, Texas 78701 | http://www.fhwa.dot.gov/design/

From: Blankenship, Tracey (FHWA)
Sent: Friday, February 20, 2015 7:09 AM
To: Hilton, Elizabeth (FHWA); Brinkerhoff, Andrew (FHWA)
Cc: Mooney, Robert (FHWA); Holt, Daniel (FHWA)
Subject: RE: Wisconsin Division: US 41 Interstate Conversion

Hi Elizabeth –

I've attached a response from WisDOT that addresses the additional issues that we discussed on the phone and that you formally transmitted via e-mail on February 6. I've also attached a revised Design Exception Report that adds additional information referenced in the response. Our office feels that the additional issues have been adequately addressed. We are hoping to submit the formal conversion package to HQ sometime next week. I will follow up with you to see if you, Robert, or anyone else in your office have any further concerns that we should ensure are addressed before we submit the formal request to HEP. We appreciate all of your timely feedback and assistance.

Tracey

Tracey Blankenship, P.E.
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tracey.blankenship@dot.gov

From: Hilton, Elizabeth (FHWA)
Sent: Friday, February 06, 2015 7:12 AM

To: Brinkerhoff, Andrew (FHWA); Blankenship, Tracey (FHWA)
Cc: Mooney, Robert (FHWA); Holt, Daniel (FHWA)
Subject: RE: Wisconsin Division: US 41 Interstate Conversion

Tracey – I've reviewed the information Andy submitted regarding the US 41 Interstate conversion. For the most part, the analysis appears well documented and most of my prior questions have been adequately addressed. We do have a few outstanding concerns regarding the Design Exception report, outlined below:

1. Bridge Shoulder Widths (Section 1.6 and App E, p.11): I've coordinated our review with the Office of Bridges and Structures and we're concerned about the narrow bridge shoulders. We note that the fatal/injury crash rate is more than 1.5 times the statewide average. Narrow shoulders on bridges may result in water ponding on the main travel lanes during heavy rainfall. The six bridges with shoulder deficiencies should be evaluated with regard to drainage, to see if ponding extends to the travel lanes. We'd also like to see an evaluation of the crash history to know if there's a connection to the narrow shoulders..
2. Vertical clearance (1.8): Is it possible to add (or provide supplemental information) regarding any history of the structures with deficient vertical clearance ever being hit? We're particularly concerned about the pedestrian bridge, since the standard vertical clearance is 17'.
3. Structural capacity: Page 10 indicates that 9 structures will be rehabilitated in 2020 and that those projects "**may potentially** raise the inventory load ratings to Interstate standards." (emphasis added) It's unclear what is meant by 'may potentially'…. Shouldn't it be '**will** raise the inventory load ratings to Interstate standards'?
4. Clear Zone: It appears that most deficiencies will be addressed in the next few years, but App. E, p. 17 shows that from MM 135.50 to MM 148.72 there are untreated fixed objects and a fatal and incapacitating crash rate more than 1.5 times the statewide average. Could a project be programmed in the next few years to address this section, in addition to the other projects shown?

Also, the programmed projects span the next decade with a commitment to monitor other areas indefinitely. I'm wondering… what sort of mechanism does the Division use to ensure that these commitments are met over the coming years, despite turnover in division personnel? I can see how that would be difficult to manage.

Thanks,
Elizabeth

Elizabeth Hilton, P.E. | Geometric Design Engineer | FHWA - HIPA-20 | 512-536-5970 | Elizabeth.Hilton@dot.gov
300 East 8th Street, Suite 826, Austin, Texas 78701 | http://www.fhwa.dot.gov/design/

From: Brinkerhoff, Andrew (FHWA)
Sent: Wednesday, January 21, 2015 12:59 PM
To: Hilton, Elizabeth (FHWA)
Cc: Mooney, Robert (FHWA); Blankenship, Tracey (FHWA); Holt, Daniel (FHWA)
Subject: RE: Wisconsin Division: US 41 Interstate Conversion

Hi Elizabeth,

You and I spoke approximately a month ago over the phone regarding the US 41 Interstate Conversion. I placed a phone call to you today, but unfortunately I was unable to reach you. I left a rather long voicemail attempting to explain what I was going to be sending you this afternoon.

As a refresher, approximately one year ago, you provided our office with comments regarding the Design Exception Report for the US 41 Interstate Conversion here in the state of Wisconsin. After that time, we were in somewhat of a holding pattern waiting for Congress to act on the requested grandfathering of OSOW vehicles along this corridor. If the state of Wisconsin did not receive the grandfathering legislation, they were not going to convert to Interstate. During the course of the past year, there were several times we thought the grandfathering might occur, but it simply didn't ever happen until late December. As a result, nearly a year passed before WisDOT continued to pursue the process with our office. Tracey provided you with a brief update last May stating that she was hopeful we would be getting this response to you within a month. Obviously, that didn't happen and we missed that date due to WisDOT holding out for the grandfathering legislation. So, I apologize for the delay in our response and I hope that you find the updated information provided to be adequate.

Moving on, I have attached three documents to this email. The attachments are as follows:

1. **Response to FHWA Questions** – This document contains direct responses to your comments from last year. It provides more information and explains how the Project Team addressed your comments.
2. **USH 41 Design Exception Report** – This document is the updated version of what you reviewed last time. The responses to your comments discussed in the first document have been incorporated into the Design Exception Report.
3. **Formal Conversion Request Memo** – This document simply provides some background information on the project as a whole. It explains what has taken place up to this point and may be useful to help familiarize yourself with the project. However, it is not necessary that you read it; more of just an FYI. So, please disregard it if you don't find it useful or you do not have the time to read it. Also, one other note of interest is that this document is still in the draft form, so it hasn't been finalized yet.

I know our office has already submitted another document for your review and requested a quick turnaround, so I apologize for giving you another submittal! I will actually be out of the office soon for an extended amount of time due to the birth of my child. However, at this time, please feel free to give me a call if you would like. Once I am gone, if you have any questions/concerns, please make certain to contact Tracey Blankenship. We look forward to hearing back from you.

Thanks,

Andrew Brinkerhoff, P.E.
Field Operations Engineer

US 41, WIS 441 Tri-County Freeway Project Oversight Manager
WI Division, Federal Highway Administration, 525 Junction Road, Suite 8000, Madison, WI 53717
phone: 608-829-7523 | fax: 608-662-2121 | email: andrew.brinkerhoff@dot.gov

From: Brinkerhoff, Andrew (FHWA)
Sent: Thursday, January 23, 2014 4:39 PM
To: Hilton, Elizabeth (FHWA)
Cc: Mooney, Robert (FHWA); Blankenship, Tracey (FHWA); Jolicoeur, David (FHWA)
Subject: RE: Wisconsin Division: US 41 Interstate Conversion

Hi Elizabeth,

I have been out of the office the last couple of days for a conference.

Thank you for providing your comments. The Division will take the comments and discuss them internally and then share them with the Project Team. Once we have had the opportunity to thoroughly digest your comments, the Division will provide responses back to you.

Thanks,
Andy

From: Hilton, Elizabeth (FHWA)
Sent: Tuesday, January 21, 2014 1:38 PM
To: Brinkerhoff, Andrew (FHWA); Blankenship, Tracey (FHWA)
Cc: Mooney, Robert (FHWA)
Subject: Wisconsin Division: US 41 Interstate Conversion

After review of the Design Exception Report, Geometric Deficiencies Report, Roadway Safety Audit and other materials provided by your office, we offer the following comments with regard to the potential addition of the US 41/US 45 corridor between Milwaukee and Green Bay to the Interstate Highway system.

1. For each geometric element, the Design Exception Report should clearly describe which needed improvements will be completed prior to Interstate designation and which would not. Attachment C, Strategic Improvement Table, is a start at this but it's difficult to tell what specific deficiencies will be addressed by each project. In addition, many of the 'short term' projects were scheduled in 2012 or 2013. We recommend updating the report to remove any deficiencies that have already been corrected, and show what remains to be accomplished prior to designation.

2. For corrective action planned after Interstate designation:
    a. Prioritize and include timeframes for when improvements will be made,
    b. Describe mitigation strategies that will be implemented, and when, until the geometric condition is brought into compliance with the appropriate design criteria. Numerous mitigation recommendations are found in the Phase 3 Roadway Safety Audit report but it's unclear which, if any, will be implemented and when. Also, the July 2007 document *Mitigation Strategies for Design Exceptions* is a helpful reference, available at http://safety.fhwa.dot.gov/geometric/pubs/mitigationstrategies/.

3. The following deficiencies are critical and should be addressed prior to designation:
    a. Direct access to the proposed Interstate needs to be removed (2 locations described in Section 1.14 of the Design Exception Report)

4. The following deficiencies need mitigation and a commitment to corrective action:
    a. Narrow shoulders (median and outside), including on bridges due to the frequency of run-off-the-road crashes
    b. Profile grade >3% due to the impact on operations in this corridor with heavy truck usage
    c. Vertical clearance at the 14 structures over US 41 with deficient clearance due to the heavy truck usage of this corridor
    d. Clear Zone – unprotected fixed objects and slopes ≥3:1 due to the history of run-off-the-road crashes
    e. Superelevation at locations combined with a history of crashes during inclement weather, or when combined with locations with minimal longitudinal grade
    f. Stopping Sight Distance on crest vertical curves

5. We also have some questions and/or comments about the following interchanges:
    a. US 45 @ W. North Ave – The northbound US 45 to Eastbound W. North Ave movement is made via a ramp to N. Mayfair Rd, rather than at W. North Ave with the rest of the ramp movements. This may be confusing to unfamiliar drivers. How well is this routing communicated to drivers via signage?

    b. US 45 @ US 41/W. Appleton Ave – The northbound and southbound ramps from US 45 only allow for left turn movements onto W. Appleton Ave (i.e. SB to SB and NB to NB). While it appears possible to continue through a series of ramps and re-enter US 45, how well are these movements signed for unfamiliar drivers?

    c. US 41/45 @ W Good Hope Rd – Westbound traffic on W Good Hope Rd can either turn left just west of US 41/45, or they can turn right and use the cloverleaf. Both movements lead to southbound US 41/45. Why are both movements needed at this interchange and how are they signed to avoid confusion?

    d. US 41/45 @ N 124th St/Fond Du Lac Fwy – it's not intuitive how a southbound driver exiting by mistake would find a way to get back on southbound US 41/45. Does signage provide the necessary guidance?

    e. US 41/45 @ Pilgrim Rd – The cloverleaf in the NE corner, from northbound US 41/45 to southbound Pilgrim Rd appears to have a very sharp radius where it connects to Pilgrim Rd. What is this radius? What is the crash history associated with this curve and connection to Pilgrim Rd? Can the curve be reconstructed prior to designation?

    f. US 41 @ Main St in Neenah – This is a partial interchange. Are there plans to construct the remaining movements or is it functioning well as is?

    g. US 41 @ US 10 – The EB-NB and NB-WB movements are not provided for at this interchange. It looks like an Access Request that will add these movements (as well as other changes) was recently approved at this interchange. When are those improvements scheduled to occur?

h. US 41 @ Main Ave. in S. Green Bay – The interchange doesn't accommodate the EB to SB movement. Are there any plans to construct this movement in the future?

Once agreement is reached regarding actions needed after Interstate delegation, we recommend the Division and State develop a Memorandum of Understanding to outline needed actions so these may be monitored more easily.

On an editorial note, the map contained in Appendix A, *Project Location/Overview Map*, suggests the US 41 designation proposal extends south of Milwaukee to the Illinois state line, rather than ending at the Zoo Interchange as described in the text. As you update the report, please also update this map, and the cover of the report, to be consistent with the limits described in the report.

Please let me know if you have further questions.

Thanks,
Elizabeth

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Appendix E

Design Exception Report

US 41 INTERSTATE CONVERSION DESIGN EXCEPTION REPORT
Project I.D. 1113-00-00
US 41 Interstate Conversion Study
I-94 – I-43
Various Counties
February 13, 2015

Executive Summary

The Wisconsin Department of Transportation (WisDOT) is proposing to convert United States Highway 41 (US 41), from a non-Interstate freeway on the National Highway System to an Interstate highway, from the Zoo Interchange in Milwaukee to the US 41/I-43 interchange in Green Bay. The overall study area extends from the US 41/I-94 interchange just south of the Wisconsin/Illinois state line to Green Bay.See Attachment A for a project location map. AASHTO conditionally approved the I-41 designation on November 16, 2012 pending approval by FHWA. The Environmental Report (ER) has been approved.

Because the section from the south project terminus to the Zoo Interchange is already an existing Interstate, there is no plan to evaluate this section of the corridor as part of Interstate Conversion. From the south state line to Milwaukee the corridor is being improved from a 6 lane to an 8 lane section and is currently approximately 50% complete with all work programmed for completion in 2021. Three additional sections of the corridor were not evaluated as part of Interstate Conversion. The section from the Zoo Interchange to the Burleigh Street interchange in Milwaukee County is currently being reconstructed, the section from the WIS 26 interchange to the Breezewood Lane interchange in Winnebago County was recently reconstructed and the section from the Scheuring Road interchange to the north project terminus in Brown County is currently being reconstructed. These projects were all designed to meet current Interstate standards.

The existing facility is generally a four lane divided freeway, with wider six lane sections in the urban portions of Milwaukee, Waukesha, Winnebago, Outagamie and Brown counties. The corridor has relatively flat terrain and includes urban, suburban, and rural sections. The posted speed is 65 miles per hour (mph) except for the urban section around Milwaukee, which is posted 55 mph. The design standards are based on Interstate design standards established in *A Policy on Design Standards-Interstate System. 5th Edition* (2005). See Attachment B for the roadway design criteria summary.

Two reports were written as part of our study documenting the existing conditions of the US 41 corridor between the Zoo Interchange and Green Bay. Field reviews and existing as-built plans were used to gather data along the route.

The *USH 41 Interstate Conversion – Geometric Deficiencies*[1] report summarizes deficiencies in the study corridor including horizontal and vertical geometrics, vertical clearance, structural capacity and rating, cross section elements including lane and shoulder widths, median widths, and lane arrangements. The report includes a detailed listing of geometric deficiencies, and a map book exhibit spatially locating the deficiency.

The *USH 41 Interstate Conversion – Road Safety Audit*[2] (RSA) report documents the detailed safety assessment. Geometric, traffic and crash characteristics were evaluated to identify safety issues and develop improvement options.

Highway Capacity Software (HCS) was used to determine the freeway density and corresponding Level of Service (LOS) for the study corridor. The LOS was evaluated for design years 2010 and 2035 using a K200 design hour in Milwaukee County and a K30 design hour in the remaining counties.

The study team compiled crash data in several ways, including looking at the RSA data, 2006-2010 crash rates, run-off-road (ROR) crash data, and Wisconsin State Patrol interviews. The team then conservatively determined 43 hot spots along the corridor. These crash hot spot locations were further studied by reviewing each crash report within the limits of the hot spots. Particularly, the crash report narrative and crash diagram were reviewed to identify potential geometric deficiencies related to a crash. In analyzing the crash reports, little correlation was found to directly tie the majority of the hot spot areas to a geometric deficiency.

[1] USH 41 Interstate Conversion – Geometric Deficiencies, February 2009
[2] USH 41 Interstate Conversion – Road Safety Audit, Phases 1-3

The improvements recommended to address geometric deficiencies along the corridor are compiled into the Deficiency Mitigation and Improvement Table, see Attachment C. The Deficiency Mitigation and Improvement Table breaks the US 41 corridor into large segments according to past project limits. The table shows each type of deficiency in the section along with existing mitigation, improvements and mitigation that WisDOT has programmed, future mitigation that will be implemented if safety issues arise and deficiencies that will be addressed when the section's pavement has reached the end of its useful life and reconstruction is necessary.

The majority of the US 41 study corridor is either already classified as an Interstate, is being reconstructed as part of a major reconstruction project, had recent construction, or has a resurfacing project scheduled, see Attachment D. Some of the upcoming improvements on resurfacing projects include: installing median barrier/cable guard and widening shoulders, regrading steep side slopes, and providing proper clear zone. Although the existing median is greater than 36 feet, which meets AASHTO standards, WisDOT standard is 60' median width. WisDOT is committed to installing median cable guard as mitigation for the less than 60' median width and will have it installed along the entire corridor when resurfacing projects are completed in 2022.

The US 41 corridor is one of the state's highest priorities. WisDOT is committed to meeting Interstate standards for this corridor. Any deficiencies remaining after the currently programmed resurfacing projects are completed will be monitored. WisDOT's scoping process tracks geometric deficiencies along the corridor and addresses them as each improvement project is scoped. As part of our safety program, WisDOT meets monthly with each county along the corridor and discusses any crash trends that may be developing. If any safety issues arise, mitigation strategies will be implemented as part of our Highway Safety Improvement Program (HSIP). As level of service issues arise along the corridor, sections will be evaluated as part of our majors project for capacity expansion. As each section's existing pavement reaches the end of its useful life, it will be evaluated for a full reconstruction. WisDOT has a strong history of bringing facilities up to standard during our reconstruction process as has been demonstrated with the US 41 Winnebago and Brown County majors projects.

This design exception report details each of the 23 criteria evaluated as part of the study. Technical experts from WisDOT central office, WisDOT regions, FHWA and the Interstate conversion team reviewed the USH 41 Interstate Conversion – Geometric Deficiencies report, the USH 41 Interstate Conversion – Road Safety Audit (RSA) report, and the MV4000 crash reports, segment by segment to recommend mitigation and improvements. A Strategic Improvement Plan was developed and WisDOT committed funding the upcoming improvement projects based on the decisions these teams made. This report documents the decision making process used to determine when the geometric deficiency will be improved, or whether WisDOT will address the deficiency at the time of the next reconstruction project. Any costs included in this report are in 2014 dollars. The costs typically address single deficiencies which are not reflective of the larger project costs that would likely be associated if a reconstruction project were programmed.

1.0 Design Exceptions

The following 23 criteria were evaluated in the *USH 41 Interstate Conversion – Geometric Deficiencies Report*:

Design Speed * - No deficiencies
Lane Width * - No deficiencies
Pavement Cross Slope * - No deficiencies
Curbs – No deficiencies
Horizontal Alignment *
    PI Point
Superelevation *
Vertical Curvature *
    Stopping Sight Distance *
    Decision Sight Distance
Profile Grade *
Inside and Outside Shoulder Width *
Bridge Shoulder Width *
Horizontal/Lateral Clearance *
Vertical/Structure Clearance *
Structural Capacity/Inventory Load Rating *
Clear Zone
    Unshielded Objects
    Unshielded Slopes
    Median Cross Over Slopes
Median Width
Interchange Spacing
Interchange Ramps
Level of service
Access

* Controlling Criteria

The following sections summarize the existing deficiencies. Each section discusses when WisDOT has a programmed improvement to fix the deficiency or when an improvement would be considered. Also discussed is existing mitigation and future mitigation that will be implemented if safety issues arise. Each of the following 23 criteria below is evaluated against minimum to remain in place Interstate design values. Attachment E contains a complete listing of the mainline deficiencies, including locations, actual values and when there is a programmed improvement.

1.1 Horizontal Alignment/PI Point

Location	Design Value	Range of Actual Values	Number of Locations Below Design Value
Winnebago County	2,050 feet	1,763 to 22,918	1
Fond du Lac County	0º45’	0º to 2º41’	2

There is one horizontal curve that currently does not meet Interstate design standards. The curve is in Winnebago County with a radius of 1763 feet. The minimum radius is 2050 feet. There are also two Points of Intersection (PI’s) without a horizontal curve that have a deflection angle greater than the allowable 0º45’ PI without a horizontal curve. Both PI’s are located in Fond du Lac County. The first PI is located under STH 23 within the interchange, and the second is located north of Lincoln Road.

Horizontal Curve - Winnebago County

This horizontal curve deficiency was included in the approved Exception to Standards Report for the US 10/WIS 441 project. The existing northbound horizontal curve radius of 1762.95' and southbound radius of 1812.95' do not meet the 70 mph design standard of 2050'. They do meet a 65 mph design speed standard of 1660', the same as the posted freeway speed. In order to reconstruct the USH 41 SB curve, the corresponding USH 41 NB curve would also need to be reconstructed. This would require full reconstruction for a 1400' segment of USH 41 SB and NB, including new concrete pavement, replacement of the existing B-70-131 & B-70-132 structures over Green Bay Road and the Wisconsin Central Limited RR, and new retaining walls. The construction cost to reconstruct USH 41 NB and SB at this curve is $8.1 million.

Although the existing horizontal curve is not being reconstructed, safety improvements are proposed for this section of USH 41.The merge area for the CTH II northbound entrance ramp has moved to the north, reducing the need to merge in the curve. Auxiliary/option lanes have been added on USH 41 northbound between CTH II and the off ramps at the system interchange, providing lane balance and improved acceleration/deceleration lengths. Auxiliary/option lanes have also been added on USH 41 southbound between the on ramps from the system interchange and CTH II, providing lane balance and improved acceleration/deceleration lengths. The merge area for the CTH II southbound exit ramp has moved to the north, reducing the need to merge in the curve. This exit ramp will also have a designated exit only lane, as well as an either/or exit/through lane.

The horizontal curve in Winnebago County will also be mitigated by placing a friction-enhancing epoxy overlay and installing delineation tape on the median barrier. These improvements will be installed in 2015 as part of Project ID's 1120-29-71, 1120-54-61 and 1133-03-76.

PI's – Fond du Lac County

None of the crash reports relate the PI's to the cause of the crash. WisDOT will evaluate mitigation strategies (enhanced pavement marking, signing, lighting, etc.) if safety issues develop.

Improving the deflection in Fond du Lac County by creating a curve with the desirable radius would require reconstruction. The PI located within the STH 23 interchange would require reconstruction of the interchange. Reconstruction costs are approximately $11 million per mile for US 41 urban reconstruction and new structures are approximately $100 per square foot. Assuming 2,500 LF of reconstruction of mainline and 18,000 square feet of new structure, the approximate cost is $7.0 million. The PI north of Lincoln Road is located between interchanges. Reconstruction costs are approximately $10 million per mile for US 41 reconstruction. Assuming 1,500 LF of reconstruction of mainline per location for required superelevation, the approximate cost is $3.0 million plus real estate costs.

It is not fiscally prudent to address the deficient horizontal curve and PI locations before the roadway reaches the end of its useful life. When the existing asphalt overlay reaches the end of its useful life, around 2045, the segment will be evaluated for reconstruction which will improve the horizontal curves to Interstate standards.

1.2 Superelevation

Location	Design Super	Actual Super	Difference	Correct with Project ID	Construction Year
Milwaukee County	5.5%	4.2%	1.3%	1100-20/21-70	2022
Washington County	4.2%	3.0%	1.2%	1100-38-70	2016
Dodge County	4.6%	3.0%	1.6%	1107-00-74	2015

There are three horizontal curves with deficient superelevation (SE) rates greater than a one percent difference from the Interstate design standard. There are 31 locations where the superelevation is less than a 0.8% difference

The department has programmed resurfacing projects in Milwaukee, Washington and Dodge Counties that will correct the deficient superelevation rates that are greater than one percent. As resurfacing projects occur at the locations of deficient SE rates, the SE will be brought to the required SE rates.

1.3 Vertical Curvature/Stopping Sight Distance/Decision Sight Distance

Location	Design Value	Range of Actual Values	Number of Locations Below Design Value (Crest Curve)	Number of Locations of Below Design Value (Sag Curve)
Stopping Sight Distance				
Milwaukee County	570 feet	364 to 3,888	4	4
Other Counties	730 feet	538 to 29,105	1	3
Vertical Curve K Values				
Milwaukee County–Crest Curve	151 (Crest) 136 (Sag)	85 to 216 (Crest) 79 to 267 (Sag)	6	8
Other Counties–Crest Curve	247 (Crest) 181 (Sag)	52 to 8,000 (Crest) 127 to 4,138 (Sag)	5	4

There are 12 locations with deficient stopping sight distance (SDD), with eight of those deficient SDD's being located in Milwaukee County. There are 23 locations with deficient vertical curve K values that do not meet Interstate standards.

None of the 2006 – 2010 crash reports related the cause of the crash to these deficiencies.

The areas with deficient stopping sight distances are directly related to vertical curves. Improving stopping sight distances requires improving K values of vertical curves. These improvements require reconstruction of the roadway. Reconstruction costs are approximately $11 million per mile for urban areas and $10 million per mile for rural areas. Assuming 2,000 lineal feet (LF) of reconstruction for each location below design value, the approximate cost is $52 million plus real estate costs.

There are 5 crest curves with deficient stopping sight distances. Four of the curves are in Milwaukee County and would require structure replacements at Burleigh Street interchange, C&NW railroad structure, Capitol Drive interchange and Silver Spring Drive interchange. The crest curve in Washington County would require replacement of a railroad structure. The 5 crest curves will be mitigated with enhanced pavement marking and safety edge in resurfacing projects Project ID's 1100-20/21-70 programmed for 2020/2022 in Milwaukee County and Project ID 1100-38-70 programmed for 2016 in Washington County.

There are 7 sag curves with deficient stopping sight distances. Four of the curves are in Milwaukee County and are mitigated with existing lighting. Six of the sag curves will be mitigated with enhanced pavement marking and safety edge in resurfacing projects Project ID's 1100-20/21-70 programmed for 2020/2022 in Milwaukee County, Project ID 1107-00-71 programmed for 2022 in Washington County, and Project ID 1130-44-00 programmed for 2017 in Brown County. The sag curve in Fond du Lac County will be mitigated with enhanced pavement marking and safety edge when it is resurfaced after 2024.

There are three locations with poor decision sight distance (DSD), one each in Washington, Fond du Lac, and Outagamie Counties. These areas with deficient DSD have crash rates below the statewide average. WisDOT will evaluate mitigation strategies (enhanced pavement marking, signing, lighting, etc.) if safety issues develop.

Because reconstruction is the only way to remove these deficiencies, it is not fiscally prudent to address the deficient stopping sight distance, decision sight distance and vertical curve locations before the roadway reaches the end of its useful life. At the time of reconstruction, after 2030, future improvement projects will address the deficient stopping sight distances, decision sight distances and vertical curves for improvement to Interstate standards.

1.4 Profile Grade

Location	Minimum Design Value	Maximum Design Value	Range of Actual Values	Miles of Locations Below 0.3% Design Value	Miles of Locations Above 3.0% Design Value
All Counties	0.3% to 0.5%	3.0%	0.0% to 3.66%	17.59	0.25

There are 72 locations with vertical grades that currently do not meet Interstate design standards. These 72 locations account for 18 miles of roadway. Only 4 locations (0.25 miles) have grades greater than 3.0 percent; the remaining profile grades are less than 0.3 percent. The majority of the deficient vertical grades are located in Washington County (5.1 miles), Outagamie County (4.6 miles), and Dodge County (3.5 miles).

None of the 2006 – 2010 crash reports reviewed relate the gradient to the cause of the crash. If a safety problem develops in the future, climbing lanes could be constructed as mitigation.

Generally, gradients less than 0.3 percent are acceptable on rural sections if sufficient median width and right-of-way on the outside are available to create special ditching, and are not located across a structure.

There are 4 locations with grades greater than 3%, one in Milwaukee County and three in Washington County.

- The one profile grade deficiency in Milwaukee County is positioned just south of the bridge over N 124th street. The profile grade of +3.16% has a length of 460 feet.
- The first location in Washington County is south of WIS 144 near the Lovers Lane cul-de-sacs. This deficiency consists of a +3.66% profile grade for a length of 200 feet. The existing topography in the area of the deficient profile grade is a large hill with steep grades approaching and exceeding 3.0% extending for a distance of nearly 3,500 feet from the bottom to the top of the hill. The section of existing US 41 profile grade at +3.66% closely matches the existing topography to avoid excessive impacts.
- The second location in Washington County is just south of the County D interchange. The roadway profile currently consists of a 200-foot long deficient segment with a grade of +3.54% that is connected via a short crest curve to a 750-foot segment with a +3.00% grade.
- The final location in Washington County lies one mile north of the County D interchange. This location has a 500-foot long, +3.14% deficient profile grade. The existing topography in the area of the deficient profile grade is a large hill with steep grades approaching and exceeding 3.0% extending for a distance of nearly 3,000 feet from the bottom to the top of the hill.

Reducing the profile grades would require major reconstruction in the 4 locations. Reconstruction would also create drainage issues that would need to be addressed and would require real estate acquisition due to 2-to-5-foot cut and fill conditions for all profile changes. The profile grade will be evaluated when the existing pavement reaches the end of its useful life and reconstruction becomes necessary, likely after the year 2040.

Reconstruction costs are approximately $10 million per mile. Assuming 18 miles of reconstruction of mainline to correct grades less than 0.3 percent, the approximate cost is $180 million plus real estate costs.

It is not fiscally prudent to address these deficient profiles before the roadway reaches the end of its useful life. At the time of reconstruction after 2040, the future improvement project will correct the deficient profile grade to Interstate design standards unless costs and impacts determine that to be impractical.

1.5 Inside and Outside Shoulder Width

Location	Minimum Design Value (Paved)	Range of Actual Values (Paved)	Total Miles of Locations Less Than Minimum (Paved)
6-Lane, Outside Shoulder	10 feet (10 feet)	10 to 12 feet (7 to 12 feet)	0.0 (25.8)
6-Lane, Median Shoulder	10 feet (10 feet)	5 to 15 feet (5 to 15 feet)	1.4 (1.4)
4-Lane, Outside Shoulder	10 feet (10 feet)	8 to 12 feet (2 to 10 feet)	0.3 (77.8)
4-Lane, Median Shoulder	6 feet (4 feet)	5 to 22 feet (3 to 22 feet)	5.0 (72.8)

Safety issues have been tied to deficient shoulder widths. There are rumble strips on the entire length of the US 41 shoulders that serve as mitigation for narrow shoulders. The narrow paved outside shoulders will be paved 10’ wide with the next resurfacing projects. The narrow paved median shoulders will be paved to at least 4’ wide with the next resurfacing projects. See the Deficiency Mitigation and Improvement Table, Attachment C, for specific projects and years.

Minimum Interstate design standards are not met for the following:

- total inside shoulder width of 6.4 miles of roadway
- paved inside shoulder width of 74.2 miles of roadway
- total outside shoulder width of 0.3 miles of roadway
- paved outside shoulder width of 103.6 miles of roadway

There are 3.5 miles with deficient northbound and southbound total shoulder width. The 0.7 miles in Milwaukee County are adjacent to Capitol Drive in the median. The narrow median has a single dual-face concrete barrier wall that eliminates the ability to widen the existing shoulder as part of a resurfacing project. The 2.8 miles of median and outside total shoulder widths that are deficient in Dodge County, will be brought up to Interstate standards with the resurfacing project scheduled for 2015.

The department has programmed resurfacing projects in Waukesha, Washington, Dodge and Brown Counties that will widen the majority of the deficient paved shoulder widths within the next six years. As the remaining sections of US 41 are resurfaced, as indicated in the Deficiency Mitigation and Improvement Table, Attachment C, the paved shoulder widths will be paved wider to meet minimum to remain in place Interstate design standards.

1.6 Bridge Shoulder Width

Location	Minimum Design Value	Range of Actual Values	Miles of Locations Less Than Minimum
6-Lane, Outside Shoulder	10 feet	3 to 15 feet	0.2 (2 locations)
6-Lane, Median Shoulder	3.5 feet	6 to 11 feet	0.0
4-Lane, Outside Shoulder	10 feet	3 to 22 feet	0.4 (4 locations)
4-Lane, Median Shoulder	3.5 feet	3 to 22 feet	0.4 (4 locations)

There are six bridges with deficient shoulder widths. Four of the bridges are located in Outagamie County and have both deficient inside and outside shoulder widths. The deficient shoulder width on the 6 bridges is being mitigated with object marker signs (chevron signs), which warn the motorist to the narrowing bridge they are approaching. These object marker signs (chevron signs) and delineators are placed on the approach guardrail and bridge railings.

The one-mile crash evaluation sections that include the southbound and northbound bridges over Capitol Drive in Milwaukee County have a total crash rate that is slightly above the statewide average; however, the fatal and incapacitating crash rates are below the statewide average. The one-mile crash evaluation sections that include the four deficient bridges in Outagamie County have a total crash rate below the statewide average; however, they have a fatal and incapacitating crash rate above 1.5 times the statewide average. None of the crash diagrams show or detail the bridges in the Outagamie County sections indicating the crashes were not in the vicinity of the narrow bridge shoulders.

Reconstruction costs for new bridges are approximately $100 per square foot, and roadway approach work is approximately $1,000 per LF. Assuming 25,000 square feet of new bridge structure for a bridge in one direction, and allowing for 100 feet of roadway work for each approach to the structure, the cost is approximately $3 million per location, and approximately $18 million total for the six locations plus real estate costs.

The 6 bridges with deficient shoulder width were originally constructed between 1960 and 1967 (listed in Attachment E). WisDOT inspects all structures on a regular schedule and will replace the bridges with shoulder widths to meet Interstate design standards when they are reconstructed at the end of their useful life.

1.7 Horizontal/Lateral Clearance

County	Location	Horizontal/Lateral Clearance Location
Milwaukee	NB Capitol Drive Bridge	Outside
Milwaukee	SB Capitol Drive Bridge	Outside
Outagamie	NB RR Bridge	Outside
Outagamie	SB RR Bridge	Outside
Outagamie	NB Gillett Street Bridge	Outside
Outagamie	SB Gillett Street Bridge	Outside

There are 6 locations with deficient lateral clearance that does not meet Interstate design standards of finished shoulder width with roadside barrier. All 6 of the deficient locations are due to narrow shoulders with concrete barrier wall. The bridges have object marker signs and enhanced pavement marking that serve as mitigation.

The Gillett Street bridge is in a crash hot spot; however, none of the crash reports reviewed relate the cause of the crash to the deficient lateral clearance width.
Improvements to deficient lateral clearance widths require reconstruction of the structures. Reconstruction costs for new bridges are approximately $100 per square foot, and roadway approach work is approximately $1,000 per LF. Assuming 25,000 square feet of new bridge structure for a bridge in one direction, and allowing for 100 feet of roadway work for each approach to the structure, the cost is approximately $3 million per location, and approximately $18 million total for the six locations plus real estate costs.

It is not fiscally prudent to address the deficient lateral clearance width locations before the structures reach the end of their useful life. The 6 structures were originally constructed between 1960 and 1967 as shown in Attachment E. WisDOT inspects all structures on a regular schedule. At the time a bridge replacement becomes necessary, the new structures will be constructed to meet Interstate design standards.

1.8 Vertical/Structure Clearance

County	Structure Number	Location Over US 41	Vertical Clearance (Feet) NB	SB
Milwaukee	B-40-0360	W. Hampton Ave.	14.64	15.20
Milwaukee	B-40-0369	W. Florist Ave.	14.67	14.80
Milwaukee	B-40-0248	EB Good Hope Rd.	15.03	14.59
Milwaukee	B-40-0249	WB Good Hope Rd.	15.13	14.83
Waukesha	B-67-0035	SB Pilgrim Rd.	14.93	15.32
Waukesha	B-67-0198	NB Pilgrim Rd.	14.93	16.67
Waukesha	B-67-0137	Pedestrian bridge	16.33	14.96
Washington	B-66-0031	Maple Rd.	16.00	15.26
Washington	B-66-0034	Mequon Rd.	15.92	15.68
Fond Du Lac	B-20-0058	CTH OOO	15.85	16.07
Fond Du Lac	B-20-0059	CTH OO	15.95	16.18

There are 11 structures over USH 41 with vertical clearance that does not meet Interstate design standards.

Improvements to deficient vertical clearance involve reconstructing or raising the structures. Costs to reconstruct existing bridges with deficient vertical clearance along with roadway approaches are approximately $1.5 million per structure. Assuming reconstruction of 7 structures, the approximate cost is $10.5 million plus real estate costs. Costs to raise existing bridges with deficient vertical clearance along with roadway approaches are approximately $1 million per structure. Assuming raising 4 structures, the approximate cost is $4 million plus real estate costs.

Bridges B-67-0035 and B-67-0198 are scheduled to be replaced in 2015 and will be brought to desirable Interstate standards. Bridges B-66-0031 and B-66-0034 will be raised in 2020. There is no history of these bridges being hit in crash reports from 2000 to 2011.

Bridges (B-20-0058 and B-20-0059) in Fond du Lac County were designed with 16' vertical clearance as shown in the 2009 resurfacing plan. However the asphalt pavement was placed too thick leaving B-20-0058 and B-20-0059 with vertical clearances of just under 16'. WisDOT NE Region is evaluating an interim pavement maintenance project to mill and overlay under the structures to achieve the 16' clearance. There is no history of these bridges being hit in crash reports from 2000 to 2011.
The pedestrian bridge (B-67-0137) was recently painted and cannot be raised because it's a cable stayed girder bridge with approach slopes of 8.3% that do not meet ADA requirements. It will be re-evaluated at the end of its useful life. There was one bridge hit in 2000.

The remaining four Milwaukee County bridges (B-40-0360, B-40-0369, B-40-0248, and B-40-0249) were originally constructed between 1964 and 1967. The bridges at Hampton Avenue and the two at Good Hope Road eastbound and westbound are located at interchanges and would require major reconstruction. The other bridge at West Florist Avenue has an intersection, a church, an apartment and subdivisions in close proximity to the overpass. The structure would need to be reconstructed over 2 feet higher, which would require the reconstruction of a significant amount of Florist Ave, and also portions of North 115th and 117th streets. Crash reports from 2000 to 2011 were reviewed and of the four bridges, the West Florist Avenue bridge was hit twice and the Hampton Avenue bridge was hit once. At the end of the structure's useful life or when the roadway will be expanded or reconstructed, the future improvement projects will increase the vertical clearances to Interstate standards.

1.9 Structural Capacity/Inventory Load Rating

County	Structure Number	Location Under US 41	Inventory Load Rating
Milwaukee	B-40-0333	Capitol Drive	HS18
Milwaukee	B-40-0334	Capitol Drive	HS18
Milwaukee	B-40-0365	Railroad	HS19
Milwaukee	B-40-0366	Railroad	HS19
Milwaukee	B-40-0346	Appleton Avenue	HS18
Milwaukee	B-40-0347	Appleton Avenue	HS18
Milwaukee	B-40-0350	STH 175 NB	HS18
Washington	B-66-0002	Railroad	HS15
Washington	B-66-0001	Railroad	HS16
Washington	B-66-0022	Limestone Creek	HS15
Washington	B-66-0023	Limestone Creek	HS18
Washington	B-66-0016	Kohlsville River	HS18
Washington	B-66-0017	Kohlsville River	HS19
Outagamie	B-44-0042	Maloney Road	HS16
Outagamie	B-44-0043	Maloney Road	HS16
Brown	B-05-0080	Apple Creek	HS18

There are 16 structures on USH 41 that have inventory load ratings less than the Interstate design standards, but do not pose a public safety issue. All the structures have a sufficiency rating above the desirable value of 70.

Structures B-66-0016/0017 over Kohlsville River in Washington County are scheduled to be replaced as part of Project ID 1100-03-73 in 2016 and will be brought to desirable Interstate standards.

Structures B-66-0022/0023 over Limestone Creek in Washington County are scheduled to be replaced as part of Project ID 1100-41-70 in 2019 and will be brought to desirable Interstate standards.

The 7 structures in Milwaukee County will be rehabilitated as part of Project ID 1100-01-07 in 2020.

Structures B-66-0001 and B-66-0002 over the railroad in Washington County will be rehabilitated as part of Project ID 1100-39-70 in 2020.

WisDOT inspects all structures on a regular schedule. At the time the bridges need replacement, the new structures will be constructed to meet Interstate design standards.

1.10 Clear Zone

Unshielded Objects/Unshielded Slopes/Median Cross Over Slopes

Clear Zone Hazard Type	Number of Hazard Spots
Unprotected 3:1 Slopes	132
Unprotected 2.5:1 Slopes	26
Unprotected 2:1 Slopes	9
Unprotected 1.5:1 Slopes	1
Median Crossover Slope Steeper than 10:1	20
Drop Off Due to Eroded Ditch	4
Bridge Slope Paving	10
Exposed Bridge Piers	2
Retaining Wall	2
Culvert Pipes>36” & Box Culverts	70
Pole & Pole Bases	28
Tree	4
Exposed Manhole	2

The Interstate design standard for clear zone is 30 feet. Locations that have clear zone hazards inside of 30 feet are spread throughout the study corridor. All together there are 310 clear zone hazards that are inside the required clear zone.

A total of 168 of the 310 hazards are due to unprotected foreslopes or backslopes, that are steeper than a 4:1, and add up to a total of 21.21 miles throughout the corridor. There are 1.41 miles of deficient steep side slopes with a total crash rate that exceeds 1.5 times the statewide average, and 14.3 miles of deficient steep side slopes have a fatal and incapacitating crash rate above 1.5 times the statewide average. None of the 2006 – 2010 crash reports related the cause of the fatality or incapacitating crash to the steep side slopes.

There are 20 locations where the median cross over slopes are steeper than 10:1, and add up to a total of 2.0 miles. None of the 2006 – 2010 crash reports related the cause of the fatality or incapacitating crash to the steep median slopes.

There are also 122 locations that have hazards such as trees, poles, culvert pipes, box culverts, retaining walls, and exposed manholes within the clear zone. Some safety issues have been tied to the clear zone objects in Washington County.

The department has programmed resurfacing projects in Milwaukee, Waukesha, Washington, Dodge, and Brown Counties, and will remove or protect the deficient clear zone hazards in those sections within the next 6 years. As the remaining sections of US 41 are resurfaced between 2027 and 2038, the deficient clear zone hazards will be addressed according to minimum to remain in place Interstate design standards.

1.11 Median Width

Location	Min. To Remain Design Value	Range of Actual Values	Miles of Locations Less Than Min. To Remain Design Value
Without concrete barrier	36 feet or greater	48 to 60 feet	0.0
With concrete barrier	26 feet or greater	20 to 48 feet	5.1 (3 locations)

There are 3 locations where the median width is below Interstate standards. These 3 locations account for 5.1 miles.

None of the crash reports reviewed in the 5.1 miles of deficient median width relate the cause of the crash to the deficient width.

Improvements to deficient median widths require reconstruction to provide a minimum 26-foot-wide median with concrete barrier wall. Improvements in the deficient section near Capitol Drive (WIS 190) would also require reconstruction of the tri-level interchange at Capitol Drive. Reconstruction costs are estimated at approximately $20 million for the reconstruction of the Capitol Drive (STH 190) urban interchange plus real estate costs.

Improvements to the section from Good Hope Road to WIS 100 would involve reconstruction of the ramps from the braided urban interchanges with Good Hope Road, WIS 145, and North 124th Street. Reconstruction costs are approximately $11 million per mile for US 41 reconstruction in urban areas and new structures are approximately $100 per square foot. Assuming 3.2 miles of reconstruction of mainline and 44,200 square feet of new bridge structure to improve the section from Good Hope Road to Main Street (WIS 174), the approximate cost is $40 million plus real estate costs.

Improvements to the section at the WIS 33 interchange would involve reconstructing the interchange and extending a retaining wall to avoid an elevated water tank. Reconstruction costs are approximately $10 million per mile for US 41 reconstruction in rural areas and new concrete retaining walls are approximately $125 per square foot. Assuming 1.3 miles of reconstruction of mainline and 1,250 square feet of new concrete retaining wall structure to improve the section at the WIS 33 interchange, the approximate cost is $13 million plus real estate costs.

It is not fiscally prudent to address these deficient median widths before the roadway reaches the end of its useful life. At the time of reconstruction after 2039, future improvement projects will address the median widths for improvement to Interstate standards. There are areas where the existing median is greater than 36’ and meets AASHTO standards but does not meet WisDOT’s standard of 60’ median width. WisDOT is committed to installing median cable guard as mitigation for the less than 60’ median width and will have it installed along the entire corridor when resurfacing projects are completed in 2022.

1.12 Interchange Spacing

Location	Min. To Remain Design Value	Number of Locations Less Than Min. Design Value
Milwaukee County	1 mile between Interchanges	2
All Other Counties	3 miles between interchanges	24

There are 26 locations where the spacing between interchanges is less than the minimum to remain design standards.

All 26 locations with interchange spacing less than the minimum design value have a total crash rate below the statewide average. None of the crash reports reviewed relate interchange spacing to the cause of the crash.

For the purposes of the Interstate Conversion Study, Milwaukee County was the only area that used urban design standards. The rest of the corridor was evaluated using rural standards, even though the areas around Fond du Lac, Neenah, Menasha and Appleton function as urban areas. There are 4 deficient interchange spacing locations within the 6 miles around the urbanized area of Fond Du Lac. In northern Winnebago and in Outagamie Counties there are 13 deficient interchange spacing locations in the 20 miles surrounding the urbanized areas of Neenah, Menasha and Appleton. If these locations were evaluated using the urban design standards, most of these deficiencies would be eliminated.

There are 3 interchanges in Milwaukee and Waukesha Counties that have ramps that are metered that serve as mitigation.

Improvements to correct the deficient interchange spacing require removal of an existing interchange. Costs to remove an existing interchange are approximately $500,000 per interchange. Assuming removing 21 interchanges to create desirable interchange spacing throughout the study corridor, the approximate cost is $10.5 million plus real estate costs. Removing any interchanges would also face public opposition.

When segments that include deficient interchange spacing are studied for reconstruction, NEPA documents will evaluate the impacts of removing or moving interchanges. WisDOT will mitigate deficient interchange spacing by adding auxiliary lanes if safety issues develop. WisDOT has in recent history reconstructed highways like I 94 and US 41 with the use of auxiliary lanes or collector distributor roadways to mitigate the closely spaced interchanges. WisDOT also has removed access between two closely spaced interchanges (Velp Avenue and I 43) along US 41 in Brown County.

1.13 Interchange Ramps

There are 39 out of 61 interchanges where the ramp geometrics are less than the minimum to remain design standards. The ramp geometrics that were evaluated and have some deficiencies are lane width, curbs, horizontal alignment, vertical curvature, profile grade, and inside and outside shoulder width. The interchange deficiencies range from one ramp being deficient by having a curb to multiple ramps having multiple deficiencies.

Interchange ramps that have experienced a high crash history will be evaluated for safety improvements as part of the Highway Safety Improvement Program (HSIP) or as part of future programmed improvement projects.

It is not fiscally prudent to address these deficient interchange ramp geometrics before the roadway reaches the end of its useful life. At the time of reconstruction of these interchanges, future improvement projects will address the deficient ramp geometrics for improvement to Interstate standards.

1.14 Level of Service (LOS)

Year and Direction	Miles at LOS D (Fair)	Miles at LOS E (Fair)	Miles at LOS F (Poor)	Total Miles with LOS < C	Percent of Study Length
2010 SB	8.94	0.94	0.79	10.67	8.2%
2010 NB	9.19	0.88	0.52	10.59	8.1%
2035 SB	29.33	14.53	6.83	50.69	39.0%
2035 NB	29.34	13.82	7.45	50.61	38.9%

In 2010 there were 21.3 miles of roadway with level of service below LOS C. In 2035 there are 101.3 miles of roadway modeled to have level of service below LOS C. In general, the locations with LOS F are located in Milwaukee County and Outagamie County.

Crashes related to congestion were identified in five of the crash hot spots. Four of the locations were in Milwaukee and Waukesha County. The fifth location was in Winnebago County approaching the US 10/STH 441 interchange, which is currently being reconstructed.

Improvement options for areas with poor LOS include reconstructing the roadway to add capacity. Reconstruction costs are approximately $11 million per mile for urban areas and $10 million per mile for rural areas. Assuming reconstruction of all areas with LOS less than C in the year 2035 and 6.6 miles of urban and 44.1 miles of rural, the approximate cost is $515 million plus real estate costs.

It is not fiscally prudent to address these locations with deficient level of service before the roadway reaches the end of its useful life. Auxilary lanes may be constructed as interim improvements to LOS to address any safety needs that arise. At the time of reconstruction at these locations, future improvement projects will be designed to bring the level of service up to Interstate standards.

1.15 Access

There are two existing access points located in Washington County. Removal of these access points is included in Project ID 1120-11-86 which is scheduled to be let on 4/11/2015.

2.0 Attachments

A-Project Location/Overview Map
B-Proposed Design Criteria
C-Deficiency Mitigation and Improvement Table
D-Project Status
E-Listing of Deficiencies

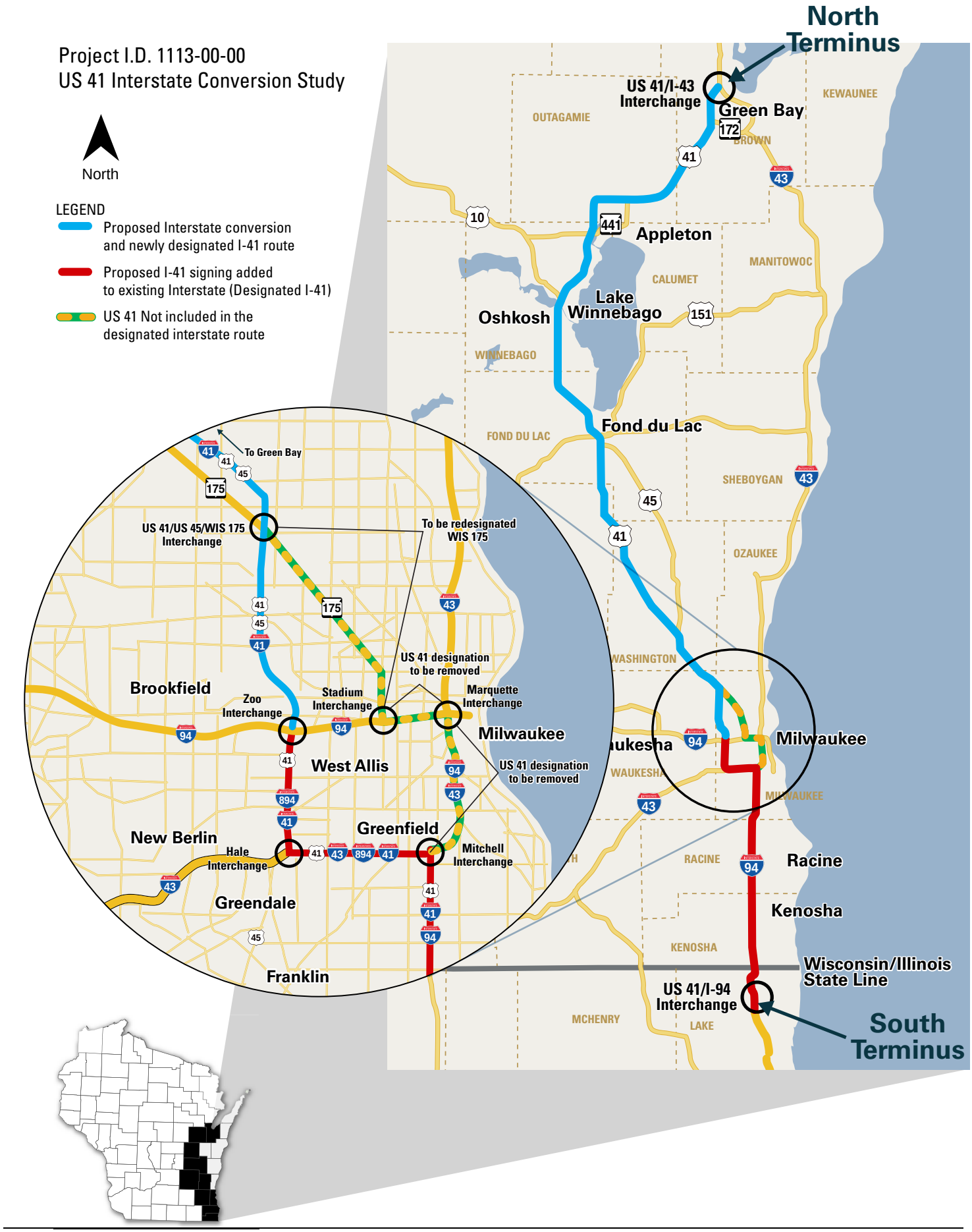
Appendix E

Design Exception Report

Attachment A

Project Location/Overview Map

Project Location



Appendix E

Design Exception Report

Attachment B

Proposed Design Criteria

USH 41 Corridor Conversion To Interstate Highway
Milwaukee - Green Bay, Wisconsin

TABLE 1
ROADWAY DESIGN CRITERIA

Final Approved by FHWA

2/11/13

Item	Reference	Freeway Mainline		System Interchanges & Ramps		Service Interchanges & Ramps	
		Existing, Min to Remain in Place	**Reconst Reqd to Meet IH Criteria (ie Pvmt Replace, Add lanes)**	**Existing, Min to Remain in Place**	**Reconst. Reqd to Meet IH Criteria (I.e. Pvmt Replace, Add Lanes)**	**Existing, Min to Remain in Place**	**Reconst. Reqd to Meet IH Criteria (I.e. Pvmt Replace, Add Lanes)**
DESIGN SPEED - V (MPH)	AASHTO IH Policy & FDM 11-10-1, 11-15-1, 11-30-1 & 11-44-1	70 mph rural; 50 mph urban	70 mph rural; 60 mph urban	**Directional ramps**: 60 mph rural; 40 mph urban. **Loop ramps**: 30 mph **(See Notes 1 & 2)**	**Directional ramps**: 60 mph rural; 50 mph urban. **Loop ramps**: 30 mph **(See Notes 1 & 2)**	**Diamond ramps**: 55 mph rural; 40 mph urban. **Loop ramps**: 25 mph **(See Note 1)**	**Diamond ramps**: 55 mph rural; 40 mph urban. **Loop ramps**: 25 mph **(See Note 1)**
DESIGN VEHICLE	WisDOT policy	WB-65	WB-65	WB-65	WB-65	WB-65	WB-65
EXISTING POSTED SPEED	FDM 11-10-1	65 mph rural; 50 mph urban	65 mph rural; 55 mph urban	Varies	Varies	Varies	Varies
DESIGN HOURLY VOLUME FACTOR (K) **(See Note 3)**	FDM 11-5-3; GDHS, pp. 59-62; Appendix B	K30 (Rural); K200 (Urban)	K30 (Rural); K200 (Urban)	Weekday a.m. & p.m. peak hours	Weekday a.m. & p.m. peak hours	Weekday a.m. & p.m. peak hours	Weekday a.m. & p.m. peak hours
LEVEL OF SERVICE **(see Note 4)**	AASHTO IH Policy; FDM 11-5-3; Appendix B	LOS C min (at time of conversion)--**Rural**; LOS D minimum--**Urban**	LOS C min for 20 Yrs--**Rural;** LOS D min for 20 Yrs--**Urban**	Same as Mainline	Same as Mainline	Same as Mainline	Same as Mainline
MIN. STOPPING SIGHT DISTANCE--based on design speeds noted above **(see Note 5)**	FDM 11-10-5, Figures 1, 3 & 4; Appendix A	730 feet 70 mph; 425 feet 50 mph	730 feet 70 mph; 570 feet 60 mph	570 feet 60 mph; 305 feet 40 mph; 200 feet 30 mph	570 feet 60 mph; 425 feet 50 mph; 200 feet 30 mph	See FDM, 2001 GDHS values	See FDM, 2001 GDHS values
MIN. DECISION SIGHT DISTANCE **(see Note 5)**	Appendix A (Prop Rev FDM 11-10-5, Fig 1)	## --- 1105 feet 70 mph; 750 feet 50 mph	1105 feet 70 mph; 990 feet 60 mph	## --- **Directional ramps**: 990 feet 60 mph; 600 feet 40 mph. **Loop ramps**: 450 feet	**Directional ramps:** 990 feet 60 mph; 750 feet 50 mph. **Loop ramps**: 450 feet	## --- **Directional ramps**: 865 feet 55 mph; 600 feet 40 mph. **Loop ramps**: 375 feet	**Directional ramps:** 865 feet 55 mph; 600 feet 40 mph. **Loop ramps:** 375 feet
HORIZONTAL ALIGNMENT							
MIN. RADII OF CURVE--based on design speeds noted above **(see Note 6)**	FDM 11-10-5 Exhibit 5.1; 11=30-1 Attachment 1.2	2050 feet 70 mph; 835 feet 50 mph	2050 feet 70 mph; 1340 feet 60 mph	See FDM	See FDM	See FDM	See FDM
COMPOUND CURVATURE - Ratio of Radii for Increasing Curvature (flatter radius to sharper radius)--**see Note 7**	GDHS, pp. 205	1.5:1 desirable max for open highways; 1.75:1 absolute max	1.5:1 max for open highways	##--1.5:1 desirable max for open highways; 1.75:1 absolute max	1.5:1 desirable max for open highways; 1.75:1 absolute max	##--1.75:1 desirable max; 2:1 absolute max	1.75:1 desirable max; 2:1 absolute max
MAX. SUPERELEVATION RATE **(see Note 8)**	FDM 11-10-5 page 19	6% Superelevation table	6% Superelevation table	6% Superelevation table	6% Superelevation table	6% Superelevation table	6% Superelevation table
SUPERELEVATION TRANSITION **(see Note 9)**	FDM 11-10-5 Exhibit 5.1	## --- See FDM	See FDM	## --- See FDM	See FDM	## --- See FDM	See FDM
VERTICAL ALIGNMENT							
MAX. GRADE	FDM 11-10-5, Attachment 5.3	3%	3%	## --- 5%	5%	## --- 5%	5%
MIN. CONTINUOUS GRADE **(see Note 10)**	FDM 11-10-5, p.22	## --- 0.50% desirable; 0.30% minimum	0.50% desirable; 0.30% minimum	## --- 0.50% desirable; 0.30% minimum	0.50% desirable; 0.30% minimum	## --- 0.50% desirable; 0.30% minimum	0.50% desirable; 0.30% minimum
MIN. K VALUE FOR CREST VERTICAL CURVES--based on design speeds above **(see Note 11)**	FDM 11-10-5, Attachment 3 & GDHS, p. 274	247 for 70 mph; 84 for 50 mph	247 for 70 mph; 84 for 50 mph	**Directional ramps:** 151 for 60 mph; 44 for 40 mph; **Loop ramps:** 19	**Directional ramps:** 151 for 60 mph; 84 for 50 mph; **Loop ramps:** 19	**Diamond ramps:** 114 for 55 mph; 44 for 40 mph; **Loop ramps**: 12	Diamond ramps: 114 for 55 mph; 44 for 40 mph; Loop ramps: 12
MIN. K VALUE FOR SAG VERTICAL CURVES--based on design speeds above **(see Note 11)**	FDM 11-10-5, Attachment 4 & GDHS, p. 280	181 for 70 mph; 96 for 50 mph	181 for 70 mph; 96 for 50 mph	**Directional ramps:** 136 for 60 mph; 64 for 40 mph; **Loop ramps:** 37	**Directional ramps:** 136 for 60 mph; 96 for 50 mph; **Loop ramps:** 37	**Diamond ramps:** 115 for 55 mph; 64 for 40 mph; **Loop ramps:** 26	Diamond ramps: 115 for 55 mph; 64 for 40 mph; Loop ramps: 26
MINIMUM VERTICAL CLEARANCE (Desirable / Minimum)							
* CLEAR OVER FREEWAY, EXPRESSWAY OR STH ARTERIAL	FDM 11-35-1, Attachment 1.8 & 1.9	16'-0"	16'-9" / 16'-4"	16'-0"	16'-9" / 16'-4"	16'-0"	16'-9" / 16'-4"
* CLEAR OVER ARTERIAL CTH OR LOCAL RD w/ Interchange **(see Note 13)**	FDM 11-35-1, Attachment 1.8 & 1.9	15'-3"	16'-9" / 16'-3"	15'-3"	16'-9" / 16'-3"	15'-3"	16'-9" / 16'-3"
* CLEAR OVER ARTERIAL CTH OR LOCAL RD without Interchange **(see Note 14)**	FDM 11-35-1, Attachment 1.8 & 1.9	14'-0"	15'-3" / 14'-9"	14'-0"	15'-3" / 14'-9"	14'-0"	15'-3" / 14'-9"
* CLEAR OVER RAILROAD **(see Note 15)**	FDM 11-35-1, Attachment 1.8 & 1.9	23'-0"	23'-0"	23'-0"	23'-0"	23'-0"	23'-0"
* CLEAR UNDER PEDESTRIAN BRIDGE--ARTERIAL CTH, EXPRESSWAYS & FREEWAYS **(see Notes 16 & 17)**	FDM 11-35-1, Attachment 1.8 & 1.9; AASHTO IH Policy, p. 5	17'-0"	17'-9" / 17'-4"	17'-0"	17'-9" / 17'-4"	17'-0"	17'-9" / 17'-4"
* CLEAR UNDER SIGN BRIDGE--FREEWAY, EXPRESSWAY OR ARTERIAL STH **(see Note 18)**	FDM 11-35-1, Attachment 1.8 & 1.9; AASHTO IH Policy, p. 5	17'-0"	18'-4" / 18'-0"	17'-0"	18'-4" / 18'-0"	17'-0"	18'-4" / 18'-0"
STRUCTURAL CAPACITY							
STRUCTURAL CAPACITY	FDM 11-44-1, Bridge Manual Ch 3, Sec 3.1; New AASHTO Load and Resistance Factor Design Specification (LRFD), Chapter 17	HS-20 / Rated Oper Cap Safely Serv Sys for 20yr / in or added to 6-year Imp Prog	HL-93	HS-20 / Rated Oper Cap Safely Serv Sys for 20yr / in or added to 6-year Imp Prog	HL-93	HS-20 / Rated Oper Cap Safely Serv Sys for 20yr / in or added to 6-year Imp Prog	HL-93
CROSS SECTION ELEMENTS							
LANE WIDTH **(see Note 19)**	FDM 11-15-1, Attachment 1.1; AASHTO IH Policy, p. 3	12'	12'	———	———	———	———
* 1-LANE RAMP	FDM 11-30-5, p. 1	___	___	15'	15'	15'	15'
* 2-LANE RAMP	FDM 11-30-5, p. 1	___	___	24'	24'	24'	24'
TOTAL SHOULDER WIDTH **(RIGHT / LEFT**)--Also **see Note 19**	FDM 11-15-1, Attachment 1.1; FDM 11-44-1, page 3; AASHTO IH Policy, p. 3	**4-lane:** 10' / 6'; **6-lane:** 10' / 10'	**4-lane:** 12' / 6'; **6-lane:** 12' / 12'	———	———	———	———
* 1-LANE RAMP **(see Note 20)**	FDM 11-30-1, Attachments 1.1, 1.2, 1.3; GDHS, pp. 838-840	———	____	## --- 8' / 4'	8' / 4'	8' / 4'	8' / 4'
* 2-LANE RAMP **(see Note 21)**	FDM 11-30-1, Attachments 1.1, 1.2, 1.3; GDHS, pp. 838-840	———	———	## --- 10' / 6'	10' / 6'	8' / 4'	8' / 4'
* 3-LANE RAMP **(see Note 22)**	FDM 11-30-1, Attachments 1.1, 1.2, 1.3; GDHS, pp. 838-841	———	———	## --- 10' / 10'	10' / 10'	8' / 4'	8' / 4'

= If existing values are less than minimums to remain in place, then perform operational safety analysis to determine if deficiency should be allowed to remain in place. Deficiency report documentation required.

USH 41 Corridor Conversion To Interstate Highway
Milwaukee - Green Bay, Wisconsin

TABLE 1
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PAVED SHOULDER WIDTH **(RIGHT / LEFT)--see Note 23**	FDM 11-15-1, Attachments 1.1 & 1.5; AASHTO IH Policy, p. 3	**4-lane:** 10' / 4'; **6-lane:** 10' / 10'	**4-lane:** 12' / 4'; **6-lane:** 12' / 12' **(see Note 24)**	____	____	____	____
* 1-LANE RAMP **(see Note 20)**	FDM 11-15-1, Attachment 1.5; FDM 11-30-1, Attachments 1.1, 1.2, 1.3	____	____	## --- 8' / 4'	8' / 4'	5' / 3'	5' / 3'
* 2-LANE RAMP **(see Note 21)**	FDM 11-30-1, Attachments 1.1, 1.2, 1.3	____	____	## --- 10' / 6'	10' / 6'	5' / 3'	5' / 3'
* 3-LANE RAMP **(see Note 22)**	FDM 11-30-1, Attachments 1.1, 1.2, 1.4	____	____	## --- 10' / 10'	10' / 10'	5' / 3'	5' / 3'
BRIDGE SHOULDER WIDTHS	____	____	____	____	____	____	____
* NORMAL BRIDGES **(RIGHT / LEFT)**	FDM 11-44-1, p. 4; FDM 11-35-1; AASHTO IH Policy, p. 5; GDHS, Exhibit 10-67, p. 839	10' / 3.5'	See total shoulder widths from previous page. Also **see Note 25**.	See total shoulder widths from previous page	See total shoulder widths from previous page. Also **see Note 25.**	See total shoulder widths from previous page	See total shoulder widths from previous page. Also **see Note 24.**
* MAJOR LONG BRIDGES **(RIGHT/LEFT)--See Note 26**	FDM 11-44-1, p. 4; FDM 11-35-1; AASHTO IH Policy, p. 5; GDHS, Exhibit 10-67, p. 839	3.5' / 3.5'	See total shoulder widths from previous page. Also **see Note 26.**	3.5' / 3.5'	See total shoulder widths from previous page. Also **see Note 26.**	3.5' / 3.5'	See total shoulder widths from previous page. Also **see Note 25.**
BRIDGE CURBS & PARAPETS on MAINLINE	FDM 11-44-1; Bridge Manual	No curbs more than 9" wide, Parapet meets NCHRP 350 TL-3 Criteria	Current Design Criteria	No curbs more than 9" wide, Parapet meets NCHRP 350 TL-3 Criteria	Current Design Criteria	No curbs more than 9" wide, Parapet meets NCHRP 350 TL-3 Criteria	Current Design Criteria
BRIDGE CURBS & PARAPETS AT SIDEROAD OVER MAINLINE **(see Note 27)**	FDM 11-44-1; Bridge Manual	No curbs more than 9" wide. Parapet meets appropriate NCHRP 350 TL-3 criteria based on posted speed.	Current Design Criteria	No curbs more than 9" wide. Parapet meets appropriate NCHRP 350 TL-3 criteria based on posted speed.	Current Design Criteria	No curbs more than 9" wide. Parapet meets appropriate NCHRP 350 TL-3 criteria based on posted speed.	Current Design Criteria
MEDIAN WIDTH (For mainline locations not on structure)	FDM (Offset plus barrier width); A Policy on Design Standards--Interstate System, p. 4	36' min. without barrier; 26' with single-faced concrete barrier (both sides)	New FDM requirements	____	____	____	____
CURBS	FDM 11-20-1, p. 5; 11-44-1	4" sloped mountable at outside edge of shoulder	No curbs	4" sloped mountable at outside edge of shoulder	No curbs	4" sloped mountable at outside edge of shoulder	No curbs
LATERAL CLEARANCE -- **See Note 28 for definition**	____	____	____	____	____	____	____
*ALONG ROADWAY	FDM 11-15-1, pp 5-6 & Attachment 1.15; AASHTO IH Policy, p. 4; AASHTO Roadside Design Guide	Finished shoulder width (w/ roadside barrier); finished shoulder width + 2' (w/o roadside barrier).	Finished shoulder width (w/ roadside barrier); finished shoulder width + 2' (w/o roadside barrier).	Finished shoulder width (w/ roadside barrier); finished shoulder width + 2' (w/o roadside barrier).	Finished shoulder width (w/ roadside barrier); finished shoulder width + 2' (w/o roadside barrier).	Finished shoulder width (w/ roadside barrier); finished shoulder width + 2' (w/o roadside barrier).	Finished shoulder width (w/ roadside barrier); finished shoulder width + 2' (w/o roadside barrier).
*UNDER STRUCTURES	FDM 11-35-1, Attachments 1.1, 1.2, 1.3, 1.5 and 1.7; AASHTO IH Policy, p. 5; AASHTO Roadside Design Guide	For lateral distance to fixed object of 2.5' or less, provide vertical wall concrete barrier. For lateral distance to fixed object between 2.5' and 4', provide safety shape concrete barrier. **See note 29.**	For lateral distance to fixed object of 2.5' or less, provide vertical wall concrete barrier. For lateral distance to fixed object between 2.5' and 4', provide safety shape concrete barrier. **See note 29.**	For lateral distance to fixed object of 2.5' or less, provide vertical wall concrete barrier. For lateral distance to fixed object between 2.5' and 4', provide safety shape concrete barrier. **See note 29.**	For lateral distance to fixed object of 2.5' or less, provide vertical wall concrete barrier. For lateral distance to fixed object between 2.5' and 4', provide safety shape concrete barrier. **See note 29.**	For lateral distance to fixed object of 2.5' or less, provide vertical wall concrete barrier. For lateral distance to fixed object between 2.5' and 4', provide safety shape concrete barrier. **See note 29.**	For lateral distance to fixed object of 2.5' or less, provide vertical wall concrete barrier. For lateral distance to fixed object between 2.5' and 4', provide safety shape concrete barrier. **See note 29.**
NORMAL PAVEMENT CROSS SLOPE	FDM 11-20-1, p. 1, FDM 11-15-1, p. 2 & FDM 11-44-1	1.5%	2%	1.5%	2%	1.5%	2%
NORMAL SHOULDER CROSS SLOPE **(See Note 30)**	FDM 11-15-1, p. 2 & 11-44-1	2%	4%	2%	4%	2%	4%
SUPERELEVATED SHOULDER CROSS SLOPE	____	____	____	____	____	____	____
* LOW SIDE	FDM 11-15-1, pp. 2-3	## --- Match pavement superelevation, 4% min.	Match pavement superelevation, 4% min.	## --- Match pavement superelevation, 4% min.	Match pavement superelevation, 4% min.	## --- Match pavement superelevation, 4% min.	Match pavement superelevation, 4% min.
* HIGH SIDE	FDM 11-15-1, pp. 2-3	## --- **See Note 31**	**See Note 31**	## --- **See Note 31**	**See Note 31**	## --- **See Note 31**	**See Note 31**
CROSS SECTION ELEMENTS- Continued							
MAX. CROSS SLOPE BREAK - Pavement to Pavement **(See Note 32)**	FDM 11-10-5, p. 21, GDHS, pp. 309-310	## --- 4%	4%	## --- 4%	4%	## --- 4%	4%
MAX. CROSS SLOPE BREAK - Pavement to Shoulder	FDM 11-10-5, p. 21,	## --- 8%	8%	## --- 8%	8%	## --- 8%	8%
FORESLOPES WITHOUT TRAFFIC BARRIER **(see Note 33)**	FDM 11-15-1, Attachment 1.9; AASHTO Roadside Design Guide	4:1 max, or 3:1 max w/ adequate recovery area to meet clear zone requirements	6:1 to clear zone, 3:1 max. beyond	4:1 max, or 3:1 max w/ adequate recovery area to meet clear zone requirements	6:1 to clear zone, 3:1 max. beyond	4:1 max, or 3:1 max w/ adequate recovery area to meet clear zone requirements	6:1 to clear zone, 3:1 max. beyond
CLEAR ZONE DISTANCES	FDM 11-15-1, Attachment 1.9; FDM 11-44-1; AASHTO Roadside Design Guide; AASHTO IH Policy, p. 4	30 ft.	Refer to FDM	## --- Refer to FDM	Refer to FDM	## --- Refer to FDM	Refer to FDM
ENTRANCE RAMP DESIGN							
ENTRANCE RAMP TERMINAL DESIGN	Use FDM 11-30-1, Attachments 1.1, 1.2	____	____	## --- **See Note 34**	**See Note 34**	## --- **See Note 34**	**See Note 34**
ENTRANCE RAMP - LANE DROP TAPER - (Parallel type Only)	Use FDM 11-30-1, Attachment 1.2	____	____	## --- **See Note 35**	**See Note 35**	## --- **See Note 35**	**See Note 35**

= If existing values are less than minimums to remain in place, then perform operational safety analysis to determine if deficiency should be allowed to remain in place. Deficiency report documentation required.

USH 41 Corridor Conversion To Interstate Highway
Milwaukee - Green Bay, Wisconsin

TABLE 1
ROADWAY DESIGN CRITERIA

Final Approved by FHWA

2/11/13

Item	Reference	Freeway Mainline		System Interchanges & Ramps		Service Interchanges & Ramps	
		Existing, Min to Remain in Place	Reconst Reqd to Meet IH Criteria (ie Pvmt Replace, Add lanes)	Existing, Min to Remain in Place	Reconst. Reqd to Meet IH Criteria (I.e. Pvmt Replace, Add Lanes)	Existing, Min to Remain in Place	Reconst. Reqd to Meet IH Criteria (I.e. Pvmt Replace, Add Lanes)
ENTRANCE RAMP - LANE DROP TAPER - Taper Style Design Only (Desirable Value / Minimum Value)	FDM 11-30-1 Attachment 1.1; GDHS pg. 845-847	___	___	## --- Typical 70:1 / 50:1	70:1 / 50:1	## --- Typical 70:1 / 50:1	70:1 / 50:1
ENTRANCE RAMP - AUXILIARY LANE LENGTH (parallel type only)	GDHS pp. 814-816; ITE Freeway and Interchange Geometric Design Handbook, p. 127 (Figure 4-12)	___	___	## --- 2500 feet typical **(See Note 36)**	2500 feet --- **See Note 36**	## --- 2500 feet typical **(See Note 36)**	2500 feet --- **See Note 36**
EXIT RAMP DESIGN							
EXIT RAMP - TERMINAL DESIGN	FDM 11-30-1, Attachments 1.3, 1.4; GDHS pp. 849-852	___	___	## **--- See Note 37**	**See Note 37**	## **--- See Note 37**	**See Note 37**
EXIT RAMP - DIVERGENCE TAPER RATE	FDM 11-30-1, Attachment 1.3; GDHS pp. 849-852	___	___	## **--- See Note 38**	**See Note 38**	## **--- See Note 38**	**See Note 38**
EXIT RAMP - AUXILIARY LANE LENGTH (parallel type only)	GDHS pp. 814-816; ITE Freeway and Interchange Geometric Design Handbook, p. 127 (Figure 4-12)	___	___	## --- 2500 feet typical **(See Note 36)**	2500 feet --- **See Note 36**	## --- 2500 feet typical **(See Note 36)**	2500 feet --- **See Note 36**
EXIT RAMP - LENGTH IN ADVANCE OF STOP CONDITION	GDHS, Exhibits 10-71 and 10-73	___	_____	____	_____	## --- Deceleration length in advance of queue.	Deceleration length in advance of queue.
DESIGN AT RAMP CROSS STREET TERMINALS	FDM 11-30-1, Attachments 1.4, 1.5 and 1.6	___	___	_____	_____	## --- Refer to FDM	Refer to FDM
LANE ARRANGEMENTS							
BASIC NUMBER OF LANES	GDHS, pp 814	**See Note 39**	**See Note 39**	**See Note 39**	**See Note 39**	**See Note 39**	**See Note 39**
LANE BALANCE--**see Note 40**	GDHS pg. 811-817; ITE Freeway and Interchange Geometric Design Handbook, pp. 126, 260-262	## --- Applies to design of all ramp terminals	Applies to design of all ramp terminals	## --- Applies to design of all ramp terminals	Applies to design of all ramp terminals	## --- Applies to design of all ramp terminals	Applies to design of all ramp terminals
ROUTE CONTINUITY	GDHS Exhibit 10-46	**See Note 41**	**See Note 41**	___	_____	___	_____
AUXILIARY LANES	GDHS, pp. 818 - 821	## --- Add and drop on the right. Terminate properly.	Add and drop on the right. Terminate properly.	___	_____	___	_____
RAMP TERMINAL SPACING	ITE Freeway and Interchange Geometric Design Handbook, p. 127 (Figure 4-12); AASHTO IH Policy, p. 4	____	____	## --- Variable--see reference; also **see Note 42** for minimum interchange spacing	Variable--see reference; also **see Note 42** for minimum interchange spacing	## --- Variable--see reference; also **see Note 42** for minimum interchange spacing	Variable--see reference; also **see Note 42** for minimum interchange spacing
LANE DROP TAPER (Desirable/Minimum)	GDHS, p. 818	## --- Typical 70:1 / 50:1	Typical 70:1 / 50:1	___	_____	___	_____
LANE ADD TAPER	GDHS, Exhibit 10-52, p. 820	## --- 300 feet typical (@25:1 for 12 feet)	300 feet typical (@25:1 for 12 feet)	____	_____	____	_____
ACCESS CONTROL							
ACCESS CONTROL	FDM 11-5-5 & 11-44-1	Full Access Control	Full Access Control	Full Access Control	Full Access Control	Full Access Control	Full Access Control
INTERCHANGES	AASHTO IH Policy, p. 4	_____	_____	Full System **(See Note 43)**	Full System	Full Service **(See Note 43)**	Full Service
LOCKED GATES	FHWA Policy	**See Note 44**	**See Note 44**	_____	_____	**See Note 44**	**See Note 44**

References:
GDHS '04: A Policy on Geometric Design of Highways and Streets (a.k.a. AASHTO Green Book)
FDM: Facilities Development Manual (WisDOT)
Intelligent Transportation Systems Design Manual (WisDOT)
A Policy on Design Standards - Interstate System, 2005 (a.k.a. AASHTO IH Policy)
MUTCD: Manual on Uniform Traffic Control Devices, 2003 Edition
State of Wisconsin Bridge Manual
AASHTO Roadside Design Guide, 2006
Highway Capacity Manual, 2000
ITE Freeway and Interchange Geometric Design Handbook, 2005 edition

Notes:
1. The selected design speed at the point where the ramp taper is 12 feet from the edge of mainline will be at least 80% of the adjacent mainline speed. Design speeds on ramps may require proration of speeds in 10 mph increments.
2. Wherever prudent and reasonable, maintain mainline design speed between major merge and diverge areas (i.e. system split, forks) of two freeways.
3. For "K" value analysis, urban is defined within Milwaukee County. Rural is outside Milwaukee County. K200 closely depicts SEWRPC (Southeast Wisconsin Regional Planning Commission) traffic forecasts from its demand model, thus WisDOT will be adopting K200 for all future interstate project traffic analysis within Milwaukee County. See Appendix B for further discussion and documentation.
4. For level of service (LOS) analysis, use same definitions of urban and rural as "K" value analysis (see Note 3). Highway Capacity Manual (HCM) methodologies required. K100 may be used for rural conditions to evaluate sensitivity. Higher design hourly volumes (DHV) may be justified when the level of service (LOS) using K30 cannot be achieved because of social, environmental or financial constraints. For rural locations that cannot achieve minimum LOS C and urban locations that cannot achieve minimum LOS D, written justification will be required. Peak hour factor (PHF) = 1.0 will be used for mainline LOS analysis per WisDOT/FHWA draft policy agreement. Additional traffic modeling studies to validate HCM results are desirable. See Appendix B for further discussion and documentation.
5. WisDOT will use FDM standards established during plan development of various freeway majors' projects. Some elements of the 2001 GDHS standards have been adopted in these standards. See separate attachment (Appendix A) for standards on stopping sight and decision sight distances.
6. Based on e max = 6% superelevation tables.
7. Compound curves are not preferred and should be avoided. If used, compound curve guidelines based on travel in direction of sharper curve. For the acceleration condition (I.e. travel in direction of sharper to flatter curve), the absolute max ratio is not as critical and may be exceeded. For exit ramps, first compound curve should be flatter curve, and adequate deceleration length should be accommodated. For entrance ramps, second compound curve should be flatter due to acceleration needs. Avoid compound curves that require transition from normal crown to reverse crown or greater superelevation.
8. WisDOT policy is 6% maximum superelevation rate. FHWA would allow superelevation rates exceeding 6%, up to 8% max. Due to complexity of interchange designs and limited ROW availability, 8% maximum superelevation

= If existing values are less than minimums to remain in place, then perform operational safety analysis to determine if deficiency should be allowed to remain in place. Deficiency report documentation required.

USH 41 Corridor Conversion To Interstate Highway
Milwaukee - Green Bay, Wisconsin

TABLE 1
ROADWAY DESIGN CRITERIA

Final Approved by FHWA

2/11/13

Item	Reference	Freeway Mainline		System Interchanges & Ramps		Service Interchanges & Ramps	
		Existing, Min to Remain in Place	Reconst Reqd to Meet IH Criteria (ie Pvmt Replace, Add lanes)	Existing, Min to Remain in Place	Reconst. Reqd to Meet IH Criteria (I.e. Pvmt Replace, Add Lanes)	Existing, Min to Remain in Place	Reconst. Reqd to Meet IH Criteria (I.e. Pvmt Replace, Add Lanes)

may be used for ramps and will be documented as a design exception.
9. Superelevation transition lengths may be lengthened to provide smoother, less-abrupt transition or meet existing superelevation transition conditions.
10. Applicable to bridges with parapets or other curbed sections. Flatter longitudinal gradient may be acceptable on rural, normal cross slope roadway sections. Superelevation transitions should be evaluated along flat longitudinal gradients.
11. The ramp vertical alignment, or K-value, shall meet or exceed the selected design speed utilized for the horizontal alignment and superelevation.
12. None
13. For non-arterial vertical clearance, desirable/minimum clearance for new construction may be reduced to 15'-9" and 15'-3" respectively
14. Vertical clearances also apply to non-arterial CTH, STH or local roads without interchanges.
15. Consult with the region railroad coordinator if the overpassing or underpassing facility is either a railroad or a "rails-to-trails" trail; or if a structure is owned by a railroad company. Discuss with Bureau of Rail & Harbors if < 23' vertical clearance is acceptable for existing conditions.
16. Clearance under pedestrian structures may be reduced to 17'-3" minimum for arterials and CTHs.
17. Vertical clearance under pedestrian bridge for non-arterials does not apply for this interstate conversion study.
18. Vertical clearance under sign bridge for arterial CTH and local roads & non-arterials do not apply for this interstate conversion study.
19. Wider lanes may be necessary on sharp curves. See GDHS, Exhibit 10-67 p. 839. Shoulder widths may need to be increased on structures to accommodate horizontal sight distance or request exception to standards.
20. Consideration should be given to widening the ramp shoulder(s) if additional width is needed for future rehabilitation staging needs, frequency of maintenance vehicles (including maintenance for lighting), distressed vehicles alongside long barrier (i.e. bridge) sections, increased sight distance, etc… Wider pullout embankment sections for additional shoulder width may be desirable for added safety and comfort adjacent to the ends of long ramp bridges. If wider shoulder widths are selected, the shoulder dimensions and reasons for the wider shoulders shall be documented in the DSR. As-built plans may indicate variable shoulder widths. Variable total and paved shoulder widths: 2' to 10' right; 2' to 8' left.
21. Use 12-foot right shoulder (12 feet paved) if truck DHV > 250 along ramp. As-built plans may indicate variable shoulder widths. Variable total shoulder widths: 6' to 12' right; 2' to 10' left. Variable paved shoulder widths: 3' to 12' right; 2' to 8' left.
22. Use 12-foot left and right shoulders (12 feet paved) if truck DHV > 250 along ramp. Three-lane ramps usually associated with major forks. As-built plans may indicate variable shoulder widths. Variable total shoulder widths: 6' to 12' right; 2' to 12' left. Variable paved shoulder widths: 3' to 12' right; 2' to 10' left.
23. Offset of 12' is to be provided to face of barrier or curb. Consider constructing total shoulder width one foot wider than paved shoulder width for added stability. Where roadside barriers, walls or other vertical elements are present, it is desirable to provide a graded shoulder wide enough that the vertical elements will be offset a minimum of 2 feet from the outer edge of the usable shoulder. This applies to outside shoulders as well as median shoulders, and this also applies to beamguard and cable guard as well as concrete barrier. See GDHS, Exhibit 10-67, p. 839 if barriers placed along edge of paved shoulder.
24. Use a 12-foot paved shoulder (right) on 4-lane freeways if truck traffic >250 DHV. Use 12-foot paved shoulders (left & right) on 6-lane freeways if truck traffic > 250 DHV. All bridges having three or more travel lanes in the same direction, including long bridges, should have 12-foot shoulders.
25. Full-width shoulders are preferred for safety and operations when constructing/replacing structures.
26. Long bridge defined as 200' length or greater. Long bridges may have a lesser width and need to be analyzed individually. Adequate sight distance may be dependent on shoulder width for structures located on curves. Minimum 4-foot shoulders required for new long bridges.
27. Side road overpasses/underpasses need to be evaluated for adequacy. Parapet meeting NCHRP 350 TL-2 criteria may be acceptable for posted speeds 40 mph and under. Concrete parapet preferred on structures.
28. Lateral clearance (a.k.a. operational offset distance) defined as an obstruction free area beginning at the edge of driving lane and extending a distance not to interfere with the operation of the roadway.
29. To the extent practicable, the piers and abutments of overcrossing structures should be designed to provide a horizontal clearance equal to the clear recovery area. On 4R projects, it is most important to provide full shoulder width. May need fillet concrete barrier between bridge columns so column is flush with face of concrete barrier.
30. AASHTO allows 2% shoulder cross slope. Construction techniques typically create a 2% monolithic paved shoulder. Use 2% on all structures.
31. WisDOT policy allows high-side shoulder to slope in direction of superelevated roadway. Shoulder cross slope typically matches roadway slope. Shoulder cross slope could be 2% at high side for flatter curves.
32. Cross slope break may be increased to 5% to address drainage issues where needed.
33. A recoverable slope is one on which most motorists can generally stop their vehicles or slow them enough to return to the roadway safely. Foreslopes of 6:1 or flatter are considered recoverable. Slopes as steep as 4:1 are considered recoverable if they are also relatively smooth. Foreslopes of 3:1 are not considered recoverable, but are usually traversable if they are relatively smooth. Barrier railing is usually warranted for foreslopes steeper than 3:1.
34. The parallel type of entrance ramp terminal is preferred.
35. A 50:1 taper is required within the length of the parallel entrance ramp. Provide a downstream merge taper of 360 feet (@ 30:1 taper).
36. Existing auxiliary lanes could be shorter and still provide adequate functionality and operational efficiency if traffic demands do not create weaving and other safety issues. Traffic capacity modeling may be required to justify shorter auxiliary lanes. Weaving segment lengths are measured from where ramps are 12' from the edge of the mainline.
37. The taper type of exit ramp terminal is preferred. WisDOT current design practices uses the tangent tapered exit ramp design versus the curvilinear tapered design. Parallel exit ramp designs are suitable for high-queuing ramps as well as other geometric considerations. Dual-lane system ramps will be designed on a case by case basis considering the speed and traffic volume to be accommodated.
38. Tangential tapered design divergence angles typically ranges between 2 and 5 degrees. WisDOT current practice is 12.5:1 exit taper (= 4 degrees, 34 minutes).
39. Based on level-of-service, operational and safety analyses. Does not include auxiliary lanes.
40. See ITE Freeway and Interchange Handbook for lane balance formulas.
41. US 41, when converted to interstate, will be considered the mainline and will control route continuity.
42. From *A Policy on Design Standards Interstate System,* a general rule of thumb for minimum interchange spacing is 1 mile in urban areas and 3 miles in rural areas.
43. Partial interchanges must be justified to remain.
44. Locked gate access points are primarily used to emergency, maintenance or land access needs. Locked gate locations must be approved based on the interstate access justification criteria and the IAJR process.

= If existing values are less than minimums to remain in place, then perform operational safety analysis to determine if deficiency should be allowed to remain in place. Deficiency report documentation required.

Appendix E

Design Exception Report

Attachment C

Deficiency Mitigation and Improvements Table

Deficiency Mitigation and Improvements

US 41 Interstate Conversion Study

WisDOT Project ID 1113-00-00

Project Termini [1]	Stats	[2]	Segment		Operations [3]			Crash Rate			Deficiencies [6]		Mitigation		Improvements [7]	
					2010 LOS	2035 LOS	Failing Year	Flags [4]	Total [5]	K+A [5]	Type	Number of Locations	Existing Mitigation in Place	Future Mitigation	Programmed Improvements	Future Improvements (8)
Milwaukee County From MM 43.2 to MM 49.4 **Zoo Freeway (Burleigh Street - STH 145)**	Length (miles)	Urban	43	NB	F	F	2010	05-07 RSA 03-07 RSA ROR State Patrol Coord.	119.9	0.8	SE Rate	1	---	---	Year 2022 ID 1100-20/21-70 Resurfacing - Correct SE to the required rate	---
				SB	F	F	2010		103.2	0.8	Vertical Curvature - (6 crest; 8 sag)	14	Lighting (sag vertical curves)	Year 2022 ID 1100-20/21-70 Resurfacing - Place preformed wet reflective contrast tape for lane lines; Place safety edge; Widen outside paved shoulder to 10 ft	---	Expansion/reconstruction to address vertical curvature and SSD at end of resurface pavement life or when expansion becomes necessary (Year 2040 or later)
	6.2		44	NB	E	E	---	05-07 RSA 03-07 RSA ROR	61.6	0.8	Stopping Sight Distance - (4 crest; 4 sag)	8				
	Number of crash hot spots			SB	F	F	2010		134.0	1.7	Profile Grade > 3% - (3.16%)	1	---	WisDOT commits to evaluating adding climbing lanes if safety issues develop	---	Expansion/reconstruction to address profile grade at end of resurface pavement life or when expansion becomes necessary (Year 2040 or later)
			45	NB	E	E	---	---	72.9	1.3	Inside Shoulder Width - (width < 10 ft)	4	Shoulder rumble strip, partially paved shoulder	Year 2022 ID 1100-20/21-70 Resurfacing - Place preformed wet reflective contrast tape for lane lines	---	Expansion/reconstruction to address widening inside shoulder at end of resurface pavement life or when expansion becomes necessary (Year 2040 or later)
	3			SB	E	F	2034				Outside Shoulder Width - (paved shoulder < 10 ft)	2	Shoulder rumble strip	---	Year 2022 ID 1100-20/21-70 Resurfacing - Widen paved shoulder to 10 ft	---
	2035 LOS F Freeway Locations [8]		46	NB	D	F	2021	03-07 RSA ROR	53.9	1.0	Bridge Shoulder Width - (outside shoulder < 10 ft)	2	Object Marker Signs	Year 2022 ID 1100-20/21-70 Resurfacing - Place preformed wet reflective contrast tape for lane lines. WisDOT will evaluate additional strategies including skid-resistant pavement and lighting if safety issues develop.	---	Replace structures constructed in 1967 at end of the structure life or when expansion becomes necessary (Year 2040 or later)
				SB	D	F	2021		68.6	2.0	Horizontal/Lateral Clearance	2				
			47	NB	D	E	---	---	48.2	0.5	Vertical/Structure Clearance - (clearance < 16 ft)	4	---	WisDOT commits to evaluating adding vertical clearance signing if safety issues develop.	---	Replace structures constructed between 1964 and 1967 at end of the structure life or when expansion becomes necessary (Year 2040 or later)
	17			SB	D	E	---				Structure Inventory Load Rating - (< HS20)	7	---	---	Year 2020 ID 1100-01-07 Rehabilitation - PMA Overlay may raise the inventory load ratings	Replace structures constructed in 1967 at end of the structure life or when expansion becomes necessary (Year 2040 or later)
	Crash Memo #		48	NB	C	C	---	---	78.3	1.8	Clear Zone/ Unshielded Objects within 30 ft	8	---	---	Year 2022 ID 1100-20/21-70 Resurfacing - Remove, adjust or shield objects	---
				SB	E	F	2033				Clear Zone/ Unshielded Slopes (steeper than 4:1)	23	---	---	Year 2022 ID 1100-20/21-70 Resurfacing - Flatten slopes if possible or shield with barrier	---

Project Termini [1]			Stats	[2]	Segment		Operations [3]			Crash Rate			Deficiencies [6]		Mitigation		Improvements [7]	
							2010 LOS	2035 LOS	Failing Year	Flags [4]	Total [5]	K+A [5]	Type	Number of Locations	Existing Mitigation in Place	Future Mitigation	Programmed Improvements	Future Improvements (8)
Milwaukeee County	From MM 43.2 to MM 49.4 (cont.)	**Zoo Freeway (Burleigh Street - STH 145)**	3	Urban									Median Width - (<26 ft with barrier)	2 miles	---	---	---	Expansion/reconstruction to address widening inside shoulder and median width at end of resurface pavement life or when expansion becomes necessary (Year 2040 or later)
													Interchange Spacing	2	Ramp metering	WisDOT commits to evaluating adding auxiliary lanes if safety issues develop	---	---
													Interchange Ramps	6	---	WisDOT commits to evaluating mitigation strategies (signing, pavement marking, delineators, lighting, etc) if safety issues develop	---	Expansion/reconstruction to address interchange ramp deficiencies at end of resurface pavement life or when expansion becomes necessary (Year 2040 or later)
Waukesha County	From MM 49.4 to MM 53.1	**STH 145 to North Waukesha County Line**	Length (miles)	Urban	50	NB	C	D	---	03-07 RSA ROR	42.9	1.3	Vertical Curvature - (1 crest; 1 sag)	2	Lighting (sag vertical curve)	Year 2019 ID 1100-36-70/71 Resurfacing - Place preformed wet reflective contrast tape for lane lines; Place safety edge; Widen outside paved shoulder to 10 ft	---	Expansion/reconstruction to address vertical curvature at end of resurface pavement life or when expansion becomes necessary (Year 2040 or later)
			4										Outside Shoulder Width - (paved shoulder < 10 ft)	4	Shoulder rumble strip	---	Year 2019 ID 1100-36-70/71 Resurfacing - Widen paved shoulder to 10 ft	---
			Number of crash hot spots			SB	C	D	---		42.9	0.0	Vertical/Structure Clearance - (clearance < 16 ft; 1 ped. br. w/ clearance < 17 ft)	3	---	WisDOT commits to evaluating adding vertical clearance signing if safety issues develop at ped bridge location.	---	Year 2015 ID 2782-12-70 Reconstruction - Pilgrim Road Interchange (2 structures) to required vertical clearance. Replace ped bridge constructed in 1970 at end of the structure life or when expansion becomes necessary (Year 2040 or later)
			3		51	NB	C	D	---	05-07 RSA 03-07 RSA ROR	65.2	0.0	Clear Zone/ Unshielded Objects within 30 ft	11	---	---	Year 2019 ID 1100-36-70/71 Resurfacing - Remove, adjust or shield objects	---
			2035 LOS F Freeway Locations [8]			SB	C	D	---		87.8	1.3	Clear Zone/ Unshielded Slopes (steeper than 4:1)	13	---	---	Year 2019 ID 1100-36-70/71 Resurfacing - Flatten slopes if possible or shield with barrier	---
			0		52	NB	C	D	---	03-07 RSA ROR	38.3	0.0	Median Width - (<26 ft with barrier)	1.8 miles	---	---	---	Expansion/reconstruction to address median width at end of resurface pavement life or when expansion becomes necessary (Year 2040 or later)
			Crash Memo #										Interchange Spacing	1	Ramp metering	WisDOT commits to evaluating adding auxiliary lanes if safety issues develop	---	---
			3			SB	C	D	---		53.0	0.0	Interchange Ramps	4	---	WisDOT commits to evaluating mitigation strategies (signing, pavement marking, delineators, lighting, etc) if safety issues develop	---	Expansion/reconstruction to address interchange ramp deficiencies at end of resurface pavement life or when expansion becomes necessary (Year 2040 or later)

Project Termini [1]			Stats	[2]	Segment		Operations [3]			Crash Rate			Deficiencies [6]		Mitigation		Improvements [7]	
							2010 LOS	2035 LOS	Failing Year	Flags [4]	Total [5]	K+A [5]	Type	Number of Locations	Existing Mitigation in Place	Future Mitigation	Programmed Improvements	Future Improvements (8)
Washington County	From MM 53.1 to MM 59.8	South Washington County Line to US 45/41 Split	Length (miles)	Urban	55	NB	C	D	---	06-10 K+A	41.7	4.8	SE Rate	1	---	---	Year 2016 ID 1100-38-70 Resurfacing - SE will be corrected to the required SE rate	---
			8			SB	C	D	---		44.9	1.6	Vertical Curvature - (1 crest)	1	---	Year 2016 ID 1100-38-70 Resurfacing - Place preformed wet reflective contrast tape for lane lines; Place safety edge; Widen paved shoulder to 10 ft	---	Expansion/reconstruction to address vertical curvature and SSD at end of resurface pavement life or when expansion becomes necessary (Year 2035 or later)
			Number of crash hot spots		57	NB	C	D	---	03-07 RSA ROR	44.9	0.0	Stopping Sight Distance - (1 crest)	1	---			
						SB	C	D	---		81.7	0.0	Outside Shoulder Width - (paved shoulder < 10 ft)	2	Shoulder rumble strip	---	Year 2016 ID 1100-38-70 Resurfacing - Widen paved shoulder to 10 ft	---
			5	Rural	58	NB	C	D	---	06-10 Total 03-07 RSA ROR	63.3	3.2	Vertical/Structure Clearance - (clearance < 16 ft)	2	---	---	Year 2020 ID 1100-39-70 Bridge Rehab - Improve clearance to 16 ft	---
			2035 LOS F Freeway Locations [8]			SB	C	D	---		93.3	1.6	Structure Inventory Load Rating - (< HS20)	2	---	---	Year 2020 ID 1100-39-70 Bridge Rehab - Improve inventory load rating	Replace structures constructed in 1952 at end of the structure life or when expansion becomes necessary (Year 2035 or later)
					59	NB	C	D	---	06-10 Total 05-07 RSA 03-07 RSA ROR	38.8	0.0	Clear Zone/ Unshielded Objects within 30 ft	10	---	---	Year 2016 ID 1100-38-70 Resurfacing - Remove, adjust or shield objects	---
			0			SB	C	D	---		93.9	2.0	Clear Zone/ Unshielded Slopes (steeper than 4:1)	7	---	---	Year 2016 ID 1100-38-70 Resurfacing - Flatten slopes if possible or shield with barrier	---
			Crash Memo #		60	NB	B	C	---	06-10 Total	43.7	0.0	Clear Zone/Median Cross Over Slopes	1	---	---	Year 2016 ID 1100-38-70 Resurfacing - Flatten slopes	---
			1			SB	C	D	---		82.0	0.0						

Project Termini [1]			Stats	[2]	Segment		Operations [3]			Crash Rate			Deficiencies [6]		Mitigation		Improvements [7]	
							2010 LOS	2035 LOS	Failing Year	Flags [4]	Total [5]	K+A [5]	Type	Number of Locations	Existing Mitigation in Place	Future Mitigation	Programmed Improvements	Future Improvements (8)
Washington County	MM 59.8 to MM 81.5	**US 41/45 Split to North Washington County Line**	Length (miles)	Rural	68	NB	B	C	---	State Patrol Coord.	48.1	0.0	Vertical Curvature (1 sag)	1	---	Year 2022 ID 1107-00-71 Resurfacing - Place preformed wet reflective contrast tape for lane lines; Place safety edge; Widen paved shoulders	---	Expansion/reconstruction to address vertical curvature and SSD at end of resurface pavement life or when expansion becomes necessary (Year 2040 or later)
													Stopping Sight Distance - (1 sag)	1	---			
													Decision Sight Distance	1	---	WisDOT commits to evaluating mitigation strategies (signing, lighting, etc.) if safety issues develop	---	Expansion/reconstruction to address decision sight distance at end of resurface pavement life or when expansion becomes necessary (Year 2040 or later)
			20			SB	B	C	---		44.7	0.0	Profile Grade > 3% - (3.14%-3.66%)	3	---	WisDOT commits to evaluating adding climbing lanes if safety issues develop	---	Expansion/reconstruction to address profile grade at end of resurface pavement life or when expansion becomes necessary (Year 2040 or later)
			Number of crash hot spots										Inside Shoulder Width - (paved width < 4 ft)	4	Shoulder rumble strip	---	Year 2022 ID 1107-00-71 Resurfacing - Widen paved shoulder to 4 ft	---
			3		72	NB	B	C	---	06-10 K+A	29.6	0.0	Outside Shoulder Width - (paved shoulder < 10ft)	6	Shoulder rumble strip	---	Year 2022 ID 1107-00-71 Resurfacing - Widen paved shoulder to 10 ft	---
			2035 LOS F Freeway Locations [8]										Structural Capacity/ Inventory Load Rating - (IRL < HS20; SR < 50)	4	---	---	Year 2016 and 2018, IDs 1100-41-73 & 1100-00-70 Bridge Replacement - Replace bridges	---
						SB	B	B	---		66.7	7.4	Clear Zone/ Unshielded Objects within 30 ft	31	---	---	Year 2022 ID 1107-00-71 Resurfacing - Remove, adjust or shield objects	---
													Clear Zone/ Unshielded Slopes (steeper than 4:1)	56	---	---	Year 2022 ID 1107-00-71 Resurfacing - Flatten slopes if possible or shield with barrier	---
			0		73	NB	B	B	---	06-10 K+A	14.8	0.0	Clear Zone/Median Cross Over Slopes	5	---	---	Year 2022 ID 1107-00-71 Resurfacing - Flatten slopes	---
			Crash Memo #										Median Width (<26 ft with barrier)	1	---	---	---	Expansion/reconstruction to address median width at end of resurface pavement life or when expansion becomes necessary (Year 2040 or later)
			3			SB	B	C	---		44.3	7.4						

Project Termini [1]			Stats	[2]	Segment		Operations [3]			Crash Rate			Deficiencies [6]		Mitigation		Improvements [7]	
							2010 LOS	2035 LOS	Failing Year	Flags [4]	Total [5]	K+A [5]	Type	Number of Locations	Existing Mitigation in Place	Future Mitigation	Programmed Improvements	Future Improvements (8)
Dodge County	From MM 81.5 to MM 88.8	**South Dodge County Line to North Dodge County Line**	Length (miles)	Rural	81	NB	C	C	---	06-10 K+A 05-07 RSA	55.4	7.4	SE Rate	1	---	---	Year 2015 ID 1107-00-04/74 Resurfacing - SE will be corrected to the required SE rate	---
			8			SB	C	D	---		51.7	0.0	Inside Shoulder Width - (paved width < 4 ft)	8	Shoulder rumble strip, partially paved shoulder	---	Year 2015 ID 1107-00-04/74 Resurfacing - Widen paved shoulder to 4 ft	---
			Number of crash hot spots		82	NB	B	C	---	06-10 K+A 05-07 RSA	33.3	7.4	Outside Shoulder Width - (paved shoulder < 10ft)	7	Shoulder rumble strip, partially paved shoulder	---	Year 2015 ID 1107-00-04/74 Resurfacing - Widen paved shoulder to 10 ft	---
						SB	B	C	---		37.0	11.1	Clear Zone/ Unshielded Objects within 30 ft	9	---	---	Year 2015 ID 1107-00-04/74 Resurfacing - Remove, adjust or shield objects	---
			5		83	NB	B	C	---	06-10 K+A 05-07 RSA	51.8	7.4	Clear Zone/ Unshielded Slopes (steeper than 4:1)	18	---	---	Year 2015 ID 1107-00-04/74 Resurfacing - Flatten slopes if possible or shield with barrier	---
			2035 LOS F Freeway Locations [8]			SB	C	D	---		33.3	0.0	Clear Zone/Median Cross Over Slopes	2	---	---	Year 2015 ID 1107-00-04/74 Resurfacing - Flatten slopes	---
			0		85	NB	C	D	---	06-10 Total 06-10 K+A	77.6	3.5						
						SB	C	D	---		52.9	3.5						
			Crash Memo #		88	NB	C	D	---	06-10 K+A	20.5	3.4						
			1			SB	C	D	---		41.0	3.4						
Fond Du Lac County	From MM 88.8 to MM 96.0	**South Fond Du Lac County Line to USH 151**	Length (miles)	Rural	89	NB	C	C	---	06-10 Total 06-10 K+A 05-07 RSA	47.8	3.4	Vertical Curvature - (1 sag)	1	---	Year 2024 Future Resurfacing - Place preformed wet reflective contrast tape for lane lines; Place safety edge; Widen paved shoulders	---	Reconstruction to address vertical curvature and SSD at end of resurface pavement life or when expansion becomes necessary (Year 2045 or later)
			8										Stopping Sight Distance - (1 sag)	1	---			
			Number of crash hot spots										Inside Shoulder Width - (paved shoulder < 4 ft)	2	Shoulder rumble strip	---	Year 2024 Future Resurfacing - Widen paved shoulder to 4 ft	---
			1										Outside Shoulder Width - (paved Shoulder < 10 ft)	2	Shoulder rumble strip	---	Year 2024 Future Resurfacing - Widen paved shoulder to 10 ft	---
			2035 LOS F Freeway Locations [8]			SB	C	C	---		78.5	6.8	Clear Zone/ Unshielded Objects within 30 ft	4	---	---	Year 2024 Future Resurfacing - Remove, adjust or shield objects	---
			0										Clear Zone/ Unshielded Slopes (steeper than 4:1)	17	---	---	Year 2024 Future Resurfacing - Flatten slopes if possible or shield with barrier	---
			Crash Memo #										Clear Zone/Median Cross Over Slopes	2	---	---	Year 2024 Future Resurfacing - Flatten slopes	---
			1															

Project Termini [1]			Stats	[2]	Segment		Operations [3]			Crash Rate			Deficiencies [6]		Mitigation		Improvements [7]	
							2010 LOS	2035 LOS	Failing Year	Flags [4]	Total [5]	K+A [5]	Type	Number of Locations	Existing Mitigation in Place	Future Mitigation	Programmed Improvements	Future Improvements (8)
Fond Du Lac County	From MM 96.0 to MM 100.0	**USH 151 to STH 23**	Length (miles)	Urban	100	NB	C	E	---	State Patrol Coord.	58.1	0.0	Horizontal Alignment - Deflection Angle	1	---	WisDOT commits to evaluating mitigation strategies (enhanced pavement marking, signing, lighting, etc.) if safety issues develop	---	Reconstruction to address deflection angle at end of resurface pavement life or when expansion becomes necessary (Year 2055 or later)
			4										Decision Sight Distance	1	---	WisDOT commits to evaluating mitigation strategies (signing, lighting, etc.) if safety issues develop	---	Reconstruction to address decision sight distance at end of resurface pavement life or when expansion becomes necessary (Year 2055 or later)
			Number of crash hot spots										Inside Shoulder Width - (paved shoulder < 4 ft)	2	Shoulder rumble strip	---	Year 2035 Future Pavement Repair and Overlay - Widen paved shoulder to 4 ft	---
			1										Outside Shoulder Width - (paved shoulder < 10 ft)	2	Shoulder rumble strip	---	Year 2035 Future Pavement Repair and Overlay - Widen paved shoulder to 10 ft	---
			2035 LOS F Freeway Locations [8]			SB	C	E	---		99.5	0.0						
			0															
			Crash Memo #															
			4															

Project Termini [1]			Stats	[2]	Segment		Operations [3]			Crash Rate			Deficiencies [6]		Mitigation		Improvements [7]	
							2010 LOS	2035 LOS	Failing Year	Flags [4]	Total [5]	K+A [5]	Type	Number of Locations	Existing Mitigation in Place	Future Mitigation	Programmed Improvements	Future Improvements (8)
Fond du Lac and Winnebago Counties	From MM 100.0 to MM 113.6	**STH 23 to STH 26**	Length (miles)	Urban	101	NB	C	E	---	06-10 K+A	26.3	8.8	Horizontal Alignment - Deflection Angle	1	---	WisDOT commits to evaluating mitigation strategies (enhanced pavement marking, signing, lighting, etc.) if safety issues develop	---	Reconstruction to address deflection angle at end of resurface pavement life or when expansion becomes necessary (Year 2045 or later)
						SB	C	E	---		43.9	0.0	Inside Shoulder Width - (paved shoulder < 4 ft)	2	Shoulder rumble strip	---	Year 2027 Future Resurfacing - Widen paved shoulder to 4 ft	---
			12	Rural	105	NB	D	E	---	06-10 ROR	28.7	0.0	Outside Shoulder Width - (paved shoulder < 10 ft)	2	Shoulder rumble strip	---	Year 2027 Future Resurfacing - Widen paved shoulder to 10 ft	---
			Number of crash hot spots			SB	C	E	---		12.3	0.0	Vertical/Structure Clearance - (clearance < 16 ft)	2	---	WisDOT commits to evaluating adding vertical clearance signing if safety issues develop.	---	Replace structures constructed in 1973 at end of the structure life or when expansion becomes necessary (Year 2045 or later)
					106	NB	D	E	---	06-10 Total 05-07 RSA 06-10 ROR	100.5	4.0	Clear Zone/ Unshielded Objects within 30 ft	23	---	---	Year 2027 Future Resurfacing - Remove, adjust or shield objects	---
			6			SB	C	E	---		84.4	0.0	Clear Zone/ Unshielded Slopes (steeper than 4:1)	19	---	---	Year 2027 Future Resurfacing - Flatten slopes if possible or shield with barrier	---
			2035 LOS F Freeway Locations [8]		107	NB	B	C	---	05-07 RSA 06-10 ROR	23.9	4.0	Clear Zone/Median Cross Over Slopes	2	---	---	Year 2027 Future resurfacing - Flatten slopes	---
						SB	C	D	---		15.9	0.0						
			0		108	NB	B	C	---	05-07 RSA	27.8	0.0						
			Crash Memo #			SB	B	C	---		39.8	4.0						
					112	NB	B	C	---	06-10 ROR	38.2	0.0						
			4			SB	B	C	---		15.9	0.0						
Winnebago and Outagamie Counties	From MM 129.9 to MM 138.9	**Breezewood to STH 15**	Length (miles)	Urban	131	NB	D	F	2034	06-10 ROR State Patrol Coord.	63.0	0.0	Horizontal Alignment - Curve Radius	1	---	Year 2015 ID 1120-29-71 - Place friction-enhancing epoxy overlay and place delineation tape on median barrier	---	Reconstruction to address horizontal curve radius at end of resurface pavement life or when expansion becomes necessary (Year 2045 or later)
			9			SB	D	E	---		58.7	2.9	Clear Zone/Unshielded Objects within 30 ft	2	---	---	Year 2024 Future resurfacing - Remove, adjust or shield objects	---
			Number of crash hot spots		132	NB	D	F	2034	05-07 RSA 06-10 ROR 03-07 RSA ROR	109.5	0.0	Clear Zone/ Unshielded Slopes (steeper than 4:1)	5	---	---	Year 2024 Future resurfacing - Flatten slopes if possible or shield with barrier	---
						SB	C	E	---		112.1	3.9	Clear Zone/Median Cross Over Slopes	1	---	---	Year 2024 Future resurfacing - Flatten slopes	---
			6		133	NB	D	F	2033	06-10 ROR State Patrol	56.1	3.8						
						SB	E	F	2035		40.8	0.0						
			2035 LOS F Freeway Locations [8]		135	NB	C	D	---	06-10 K+A 05-07 RSA 06-10 ROR 03-07 RSA ROR	62.8	2.9						
						SB	C	D	---		75.7	5.7						
			4		136	NB	D	E	---	06-10 ROR	48.0	0.0						
						SB	D	E	---		50.9	1.5						
			Crash Memo		138	NB	C	D	---	05-07 RSA	51.8	0.0						
			2			SB	C	D	---		38.8	3.2						

Project Termini [1]			Stats	[2]	Segment		Operations [3]			Crash Rate			Deficiencies [6]		Mitigation		Improvements [7]	
							2010 LOS	2035 LOS	Failing Year	Flags [4]	Total [5]	K+A [5]	Type	Number of Locations	Existing Mitigation in Place	Future Mitigation	Programmed Improvements	Future Improvements (8)
Outagamie County	From MM 138.9 to MM 150.8	**STH 15 to CTH J**	Length (miles)	Urban	139	NB	D	F	2029	---	39.5	1.6	Vertical Curvature - (1 crest)	1	---	Year 2028 Future resurfacing - Place preformed wet reflective contrast tape for lane lines; Place safety edge	---	Expansion/reconstruction to address vertical curvature at end of useful life of resurface pavement or when expansion becomes necessary (Year 2030 or later)
						SB	D	F	2029	---			Decision Sight Distance	1	---	WisDOT commits to evaluating mitigation strategies (signing, lighting, etc.) if safety issues develop	---	Expansion/reconstruction to address decision sight distance at end of useful life of resurface pavement or when expansion becomes necessary (Year 2030 or later)
			12		140	NB	D	F	2029	06-10 K+A State Patrol Coord.	31.6	9.5	Bridge Shoulder Width- (4 bridge crossings w/ outside shoulder < 10 ft ; inside shoulder < 3.5 ft)	8	Object marker signs, delineators on approach guardrail and bridge railing	WisDOT commits to evaluating additional mitigation strategies (lighting, skid-resistant pavement) if safety issues develop	---	Replace structures constructed in 1960 and 1961 at end of the structure life or when expansion becomes necessary (Year 2030 or later)
						SB	D	F	2029		22.1	0.0						
			Number of crash hot spots		141	NB	D	F	2029	06-10 K+A State Patrol Coord.	47.3	0.0	Horizontal/Lateral Clearance	4	Object marker signs, Enhanced pavement marking	WisDOT commits to evaluating additional mitigation strategies (lighting, skid-resistant pavement) if safety issues develop	---	Replace structures constructed in 1960 and 1961 at end of the structure life or when expansion becomes necessary (Year 2030 or later)
						SB	D	F	2029		82.1	6.3						
					142	NB	D	F	2030	05-07 RSA	31.6	0.0						
						SB	D	F	2030		28.8	0.0	Structure Inventory Load Rating - (<HS20)	2	---	---	---	Replace structures constructed in 1961 at end of the structure life or when expansion becomes necessary (Year 2030 or later)
			7		144	NB	C	E	---	06-10 K+A	53.7	6.3						
						SB	D	E	---		56.8	3.2	Clear Zone/ Unshielded Objects	16	---	---	Year 2028 Future resurfacing - Remove, adjust or shield objects	---
			2035 LOS F Freeway Locations [8]		146	NB	D	E	---	06-10 K+A	26.0	10.4						
						SB	D	E	---		62.4	5.2						
			12		147	NB	C	E	---	06-10 K+A	25.8	3.7						
						SB	D	E	---		33.1	3.7						
			Crash Memo #		148	NB	C	E	---	06-10 K+A	11.8	0.0						
						SB	C	D	---		39.2	11.8						
			2		149	NB	C	E	---	---	33.4	2.0						
						SB	C	E	---	---								

Project Termini [1]			Stats	[2]	Segment		Operations [3]			Crash Rate			Deficiencies [6]		Mitigation		Improvements [7]	
							2010 LOS	2035 LOS	Failing Year	Flags [4]	Total [5]	K+A [5]	Type	Number of Locations	Existing Mitigation in Place	Future Mitigation	Programmed Improvements	Future Improvements (8)
Brown County	From MM 150.8 to MM 161.5	**CTH J to CTH F**	Length (miles)	Urban	154	NB	C	E	---	06-10 K+A	30.7	2.4	Vertical Curvature - (1 crest; 1 sag)	2	---	Year 2017 ID 1130-44-00 Resurfacing - Place preformed wet reflective contrast tape for lane lines; Place safety edge; Widen paved shoulders	---	Reconstruction to address vertical curvature and SSD at end of resurface pavement life or when expansion becomes necessary (Year 2035 or later)
			11										Stopping Sight Distance - (1 sag)	1	---			
			Number of crash hot spots	Rural		SB	C	E	---		54.3	11.8	Inside Shoulder Width - (paved shoulder < 4 ft)	2	Shoulder rumble strip	---	Year 2017 ID 1130-44-00 Resurfacing - Widen paved shoulder to 4 ft	---
			3		157	NB	C	E	---	06-10 K+A 05-07 RSA	30.7	7.1	Outside Shoulder Width - (paved shoulder < 10 ft)	2	Shoulder rumble strip	---	Year 2017 ID 1130-44-00 Resurfacing - Widen paved shoulder to 10 ft	---
			2035 LOS F Freeway Locations [8]			SB	C	D	---		30.7	4.7	Structure Inventory Load Rating - (<HS20)	1	---	---	---	Replace structure constructed in 1997 at end of the structure life or when expansion becomes necessary (Year 2035 or later)
			0		158	NB	C	C	---	06-10 K+A	48.5	4.2	Clear Zone/ Unshielded Objects	8	---	---	Year 2017 ID 1130-44-00 Resurfacing - Remove, adjust or shield objects	---
			Crash Memo #			SB	C	C	---		29.5	4.2	Clear Zone/ Unshielded Slopes	6	---	---	Year 2017 ID 1130-44-00 Resurfacing - Flatten slopes if possible or shield with barrier	---
			4										Clear Zone/Median Cross Over Slopes	7	---	---	Year 2017 ID 1130-44-00 Resurfacing - Flatten slopes	---

Crash Rate Coloring

Crash Rate is between 1.0 and 1.5 times the SWA

Crash Rate is greater than 1.5 times the SWA

Notes

[1] US

[2] According to Meta Manager safety data

[3] Worst freeway segment shown within each MM

[4] K: Fatal
A: Incapacitating Injury
ROR: Run-off-the-Road

[5] Statewide Average Crash Rates (SWA)

	Total	K+A
Urban (7)	78	2.0
Rural (1)	39	2.1

[6] For Milwaukee County, the deficiencies are shown for a design speed of 60 mph, for all other counties deficiencies are based on a design speed of 70 mph

[7] For all resurfacing projects, clear zone, slope, and shoulder width deficiencies will be brought to Remain in Place design standards for appropriate design speed

[8] Earliest year for expansion/reconstruction was determined by adding 18 years to the last resurface date and then rounding to the nearest 5 year increment

Appendix E

Design Exception Report

Attachment D

Project Status

Path: S:\MAD\1000--10991\10891\92\Data\GIS\CH2MHill\I44emplateMapDocs\Project Status 11x17.mxd

User: danc

Date: 10/31/2013

Time: 4:11:30 PM

Legend

I-41 Project Location (175 Miles)

Status

- Currently Interstate (43 Miles)
- Major Reconstruction Projects Underway Designed/Constructed using Interstate Standards (27 Miles)
- Completed Resurfacing (Shoulders, Clear Zone and Vertical Clearance meets Interstate Standards) (11 Miles)
- Resurfacing Projects scheduled in WisDOT's Current 6 year Program (Shoulders, Clear Zone, and Vertical Clearance will Meet Interstate Standards) (41 Miles)
- Completed Projects (Median Cable Guard Installed to Mitigate Substandard Median Width) (24 miles)
- Resurfacing Projects Anticipated for 2020 to 2025 Due to Existing Pavement Conditions (Shoulders, Clear Zone, and Vertical Clearance will Meet Interstate Standards) (29 Miles)

Shawano
Oconto
Door
Kewaunee
Green Bay
Brown
Outagamie
Appleton
Neenah
Oshkosh
Winnebago
Lake Winnebago
Calumet
Manitowoc
Marquette
Green Lake
Fond du Lac
Sheboygan
Columbia
Dodge
West Bend
Washington
Ozaukee
Lake Michigan
Dane
Jefferson
Waukesha
Milwaukee
Oak Creek
Racine
Kenosha
Green
Rock
Walworth
STEPHENSON
WINNEBAGO
BOONE
MCHENRY
LAKE

54 41 10 21 45 33 151 51 26 19 94 43 90 12 11

N W E S

0 2.5 5 10 Miles

PROJECT STATUS

US 41 INTERSTATE CONVERSION
WISCONSIN DEPARTMENT OF TRANSPORTATION
NORTHEAST, SOUTHWEST, AND SOUTHEAST REGIONS

Interstate 41 US 41 Conversion

U.S. Department of Transportation Federal Highway Administration

Appendix E

Design Exception Report

Attachment E

Listing of Deficiencies

ID 1113-00-00
I-94 to I-43
US 41 Interstate Conversion Study
Horizontal Alignment

County	Start Mile Marker	End Mile Marker	Curve Direction	Radius (feet)	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB	Programmed Improvement	Remarks
Fond du Lac	100	100	Left	0	Yellow	Green	C	D		Deflection Angle 2º41'
Fond du Lac	109	109	Right	0	Green	Green	C	C		Deflection Angle 0º57'
Winnebago	132.9	133.15	Right	1762.95	Yellow	Green	E	F	Delineation Tape on Median Barrier (1120-11-86 Interstate Signing 2015)	

Design Standard

Milwaukee County (60 MPH Design Speed)

Desirable Radius = 1,340 feet
Minimum Radius = 835 feet

All Other Counties (70 MPH Design Speed)

Minimum/Desirable Radius = 2,050 feet
Maximum/Desirable Deflection Angle = 0º45'

Crash Rate

Crash Rate is at or below the Statewide Average (SWA)
Crash Rate is between 1.0 and 1.5 times the SWA
Crash Rate is greater than 1.5 times the SWA

LOS

A, B and C (Below Capacity)
D and E (Approaching Capacity)
F (Exceeds Capacity)

ID 1113-00-00
I-94 to I-43
US 41 Interstate Conversion Study
Vertical Curvature

County	Start Mile Marker	End Mile Marker	Travel Direction	Curve Type	Curve Length (feet)	K Value	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB
Milwaukee	43.30	43.40	North	Crest	300	93	Yellow	Green	F	F
Milwaukee	43.60	43.70	North	Sag	350	79	Yellow	Green	F	F
Milwaukee	43.80	43.90	North	Crest	600	106	Yellow	Green	F	F
Milwaukee	44.10	44.20	North	Sag	400	86	Yellow	Green	E	E
Milwaukee	44.30	44.40	North	Crest	350	85	Yellow	Green	E	E
Milwaukee	44.90	45.00	North	Sag	200	108	Yellow	Green	F	E
Milwaukee	45.00	45.10	North	Crest	150	102	Green	Green	F	E
Milwaukee	45.40	45.50	North	Sag	150	117	Green	Green	E	E
Milwaukee	46.00	46.10	North	Sag	250	117	Green	Green	D	E
Milwaukee	46.20	46.30	North	Crest	300	89	Green	Green	D	D
Milwaukee	46.30	46.40	North	Sag	200	82	Green	Green	D	D
Milwaukee	46.50	46.60	North	Crest	350	134	Green	Green	F	D
Milwaukee	46.80	46.90	North	Sag	350	113	Green	Green	F	F
Milwaukee	48.80	48.90	North	Sag	300	125	Green	Green	F	C
Waukesha	49.40	49.50	North	Crest	530	230	Green	Green	D	C
Waukesha	51.70	51.80	South	Sag	400	180	Green	Green	C	C
Washington	58.00	58.10	North	Crest	900	150	Red	Yellow	C	C
Washington	59.80	59.90	South	Sag	200	127	Red	Green	C	C
Fond du Lac	92.70	92.80	North	Sag	800	169	Yellow	Green	C	C
Outagamie	149.40	149.50	South	Crest	200	198	Green	Green	E	D
Brown	156.00	156.10	North	Crest	30	52	Green	Green	D	D
Brown	156.10	156.20	North	Sag	840	174	Green	Green	D	D

8150 Total feet of substandard curve
1.5 Total miles of substandard curve

Design Standard

Milwaukee County (60 MPH Design Speed)
Crest Curves
Desirable K Value = 245
Minimum K Value = 151
Sag Curves
Minimum/Desirable K Value = 136

All Other Counties (70 MPH Design Speed)
Crest Curves
Desirable K Value = 401
Minimum K Value = 247
Sag Curves
Minimum/Desirable K Value = 181

Crash Rate

Crash Rate is at or below the Statewide Average (SWA)
Crash Rate is between 1.0 and 1.5 times the SWA
Crash Rate is greater than 1.5 times the SWA

LOS

A, B and C (Below Capacity)
D and E (Approaching Capacity)
F (Exceeds Capacity)

ID 1113-00-00
I-94 to I-43
US 41 Interstate Conversion Study
Stopping Sight Distance

County	Start Mile Marker	End Mile Marker	Travel Direction	Stopping Sight Distance	Curve Type	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB
Milwaukee	43.30	43.40	North	484	Crest	Yellow	Green	F	F
Milwaukee	43.60	43.70	North	364	Sag	Yellow	Green	F	F
Milwaukee	43.80	43.90	North	478	Crest	Yellow	Green	F	F
Milwaukee	44.10	44.20	North	389	Sag	Yellow	Green	E	E
Milwaukee	44.30	44.40	North	438	Crest	Yellow	Green	E	E
Milwaukee	45.40	45.50	North	503	Sag	Green	Green	E	E
Milwaukee	46.20	46.30	North	472	Crest	Green	Green	D	D
Milwaukee	46.80	46.90	North	553	Sag	Green	Green	F	F
Washington	58.00	58.10	North	569	Crest	Red	Yellow	C	C
Washington	59.80	59.90	South	538	Sag	Red	Green	C	C
Fond du Lac	92.70	92.80	North	691	Sag	Yellow	Green	C	C
Brown	156.10	156.20	North	707	Sag	Green	Green	D	D

Design Standard

Milwaukee County (60 MPH Design Speed)

Minimum/Desirable SSD = 570 ft

All Other Counties (70 MPH Design Speed)

Minimum/Desirable SSD = 730 ft

Crash Rate

Crash Rate is at or below the Statewide Average (SWA)
Crash Rate is between 1.0 and 1.5 times the SWA
Crash Rate is greater than 1.5 times the SWA

LOS

A, B and C (Below Capacity)
D and E (Approaching Capacity)
F (Exceeds Capacity)

ID 1113-00-00
I-94 to I-43
US 41 Interstate Conversion Study
Decision Sight Distance

County	Start Mile Marker	End Mile Marker	Travel Direction	Decision Sight Distance	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB
Washington	73.10	73.30	South	Poor	Green	Red	C	B
Fond du Lac	96.50	96.70	South	Poor	Green	Green	E	D
Outagamie	149.30	149.50	South	Poor	Green	Green	E	D

Design Standard

Milwaukee County (60 MPH Design Speed)

Minimum/Desirable DSD = 990 ft

All Other Counties (70 MPH Design Speed)

Minimum/Desirable DSD = 1,105 ft

Crash Rate

Crash Rate is at or below the Statewide Average (SWA)
Crash Rate is between 1.0 and 1.5 times the SWA
Crash Rate is greater than 1.5 times the SWA

LOS

A, B and C (Below Capacity)
D and E (Approaching Capacity)
F (Exceeds Capacity)

ID 1113-00-00
I-94 to I-43
US 41 Interstate Conversion Study
Profile Grades Greater than 3.0%

County	Start Mile Marker	End Mile Marker	Length	Travel Direction	Profile Grade	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB
Milwaukee	49.31	49.40	0.09	North	3.16	Green	Green	D	C
Washington	65.16	65.20	0.04	South	3.66	Green	Green	C	D
Washington	76.02	76.05	0.03	South	3.54	Yellow	Green	C	C
Washington	77.82	77.91	0.09	South	3.14	Yellow	Green	B	B

0.25 Total miles of substandard profile

Design Standard

Desirable Profile Grade = 0.5%-3.0%
Maximum Profile Grade = 3.0%

Crash Rate

Crash Rate is at or below the Statewide Average (SWA)
Crash Rate is between 1.0 and 1.5 times the SWA
Crash Rate is greater than 1.5 times the SWA

LOS

A, B and C (Below Capacity)
D and E (Approaching Capacity)
F (Exceeds Capacity)

ID 1113-00-00
I-94 to I-43
US 41 Interstate Conversion Study
Profile Grades Less than 0.3%

County	Start Mile Marker	End Mile Marker	Length	Travel Direction	Profile Grade	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB
Waukesha	52.79	53.21	0.42	North	-0.08	Red	Yellow	C	C
Washington	53.69	53.95	0.26	North	0.10	Red	Yellow	D	D
Washington	54.10	54.54	0.44	North	-0.10	Green	Yellow	D	D
Washington	54.67	54.88	0.21	North	0.06	Green	Yellow	C	D
Washington	59.10	59.60	0.50	North	0.10	Red	Green	D	D
Washington	61.20	61.30	0.10	North	0.20	Green	Green	C	C
Washington	62.30	62.40	0.10	North	0.01	Green	Yellow	C	C
Washington	62.90	63.00	0.10	North	0.00	Green	Yellow	C	C
Washington	67.91	68.16	0.25	South	-0.29	Yellow	Green	B	C
Washington	71.96	72.34	0.38	North	0.00	Yellow	Red	B	B
Washington	74.18	74.41	0.23	North	0.00	Green	Green	B	B
Washington	74.49	75.14	0.65	North	0.18	Green	Green	B	B
Washington	75.33	75.68	0.35	North	-0.20	Green	Green	B	B
Washington	75.75	75.84	0.09	North	0.20	Green	Green	B	B
Washington	77.12	77.27	0.15	North	0.00	Yellow	Green	C	C
Washington	78.87	79.22	0.35	South	0.26	Green	Green	B	B
Washington	79.91	80.75	0.84	North	0.10	Green	Green	B	B
Washington	80.77	80.85	0.08	South	-0.20	Green	Green	B	B
Dodge	81.50	82.09	0.59	South	0.00	Yellow	Red	C	B
Dodge	82.56	82.64	0.08	South	0.00	Green	Red	C	C
Dodge	83.50	83.70	0.20	South	0.25	Yellow	Red	C	C
Dodge	83.78	84.18	0.40	South	0.00	Yellow	Red	C	C
Dodge	85.43	86.26	0.83	South	0.00	Red	Red	C	D
Dodge	86.34	86.45	0.11	North	0.27	Green	Green	C	C
Dodge	86.53	87.17	0.64	North	0.18	Green	Green	C	C
Dodge	87.25	87.32	0.07	North	0.29	Green	Green	D	D
Dodge	87.93	88.40	0.47	North	0.23	Green	Red	C	C
Dodge	88.48	88.55	0.07	North	0.00	Green	Red	C	C
Fond du Lac	91.32	91.45	0.13	North	-0.28	Yellow	Green	C	C
Fond du Lac	91.53	91.64	0.11	North	0.12	Yellow	Green	C	C
Fond du Lac	93.74	93.94	0.20	North	-0.24	Green	Green	D	D
Fond du Lac	95.16	95.41	0.25	North	-0.12	Yellow	Green	D	D

ID 1113-00-00
I-94 to I-43
US 41 Interstate Conversion Study
Profile Grades Less than 0.3%

County	Start Mile Marker	End Mile Marker	Length	Travel Direction	Profile Grade	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB
Fond du Lac	103.38	103.61	0.23	North	0.00	Yellow	Green	E	E
Fond du Lac	104.18	104.23	0.05	North	-0.26	Yellow	Green	E	E
Fond du Lac	104.31	104.51	0.20	North	0.22	Yellow	Green	E	E
Fond du Lac	105.11	105.38	0.27	North	0.00	Green	Green	E	E
Fond du Lac	105.47	105.48	0.01	North	0.27	Green	Green	E	E
Fond du Lac	105.86	105.88	0.02	North	0.28	Green	Green	E	E
Winnebago	111.06	111.19	0.13	North	-0.15	Yellow	Green	C	C
Winnebago	111.19	111.38	0.19	North	-0.10	Yellow	Green	C	C
Winnebago	111.42	111.78	0.36	North	-0.25	Yellow	Green	C	C
Winnebago	111.85	112.46	0.61	North	0.10	Yellow	Green	C	C
Winnebago	134.12	134.12	0.00	South	-0.10	Green	Green	C	D
Winnebago	135.09	135.12	0.03	North	0.05	Green	Red	D	D
Outagamie	136.38	136.77	0.39	North	0.19	Green	Green	D	D
Outagamie	138.78	138.96	0.18	North	0.21	Green	Green	D	D
Outagamie	139.15	139.39	0.24	North	0.20	Green	Green	D	D
Outagamie	140.47	140.62	0.15	North	0.28	Green	Red	F	F
Outagamie	143.57	143.71	0.14	North	-0.10	Green	Green	F	F
Outagamie	143.99	144.24	0.25	North	-0.10	Green	Red	D	D
Outagamie	144.83	145.01	0.18	North	-0.25	Green	Red	E	D
Outagamie	145.09	145.30	0.21	North	0.10	Green	Green	E	D
Outagamie	145.30	145.68	0.38	North	-0.10	Green	Green	E	E
Outagamie	146.09	146.26	0.17	North	0.10	Green	Red	E	E
Outagamie	146.26	146.64	0.38	North	-0.15	Green	Red	E	E
Outagamie	147.10	147.30	0.20	North	0.10	Green	Red	D	D
Outagamie	147.30	147.91	0.61	North	-0.15	Green	Red	D	D
Outagamie	147.99	148.39	0.40	North	0.13	Green	Red	D	D
Outagamie	149.14	149.33	0.19	North	-0.11	Green	Green	D	D
Outagamie	150.15	150.32	0.17	North	-0.24	Yellow	Green	D	D
Outagamie	151.28	151.42	0.14	North	-0.18	Yellow	Yellow	D	D
Outagamie	151.73	151.97	0.24	North	-0.09	Yellow	Yellow	D	D
Brown	154.88	155.20	0.32	North	-0.24	Yellow	Red	E	E
Brown	156.55	156.60	0.05	North	-0.12	Green	Green	D	D

ID 1113-00-00
I-94 to I-43
US 41 Interstate Conversion Study
Profile Grades Less than 0.3%

County	Start Mile Marker	End Mile Marker	Length	Travel Direction	Profile Grade	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB
Brown	158.94	159.11	0.17	South	0.16	Green	Red	C	C
Brown	159.24	159.47	0.23	South	-0.14	Green	Green	C	C
Brown	159.79	160.11	0.32	North	0.11	Green	Green	C	C
Brown	160.53	160.66	0.13	North	0.15	Green	Green	C	C

17.59 Total miles of substandard profile

Design Standard

Desirable Profile Grade = 0.50%-3.0%
Minimum Profile Grade = 0.30%

Crash Rate

Crash Rate is at or below the Statewide Average (SWA)
Crash Rate is between 1.0 and 1.5 times the SWA
Crash Rate is greater than 1.5 times the SWA

LOS

A, B and C (Below Capacity)
D and E (Approaching Capacity)
F (Exceeds Capacity)

ID 1113-00-00
I-94 to I-43
US 41 Interstate Conversion Study
Inside Shoulder Widths

County	Start Mile Marker	End Mile Marker	Length	Travel Direction	Number of Lanes	Total Shoulder Width	Paved Shoulder Width	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB	Programmed Improvement
Milwaukee	44.00	44.60	0.60	North	6	5	5	Yellow	Green	D	F	
Milwaukee	44.00	44.60	0.60	South	6	5	5	Yellow	Green	D	F	
Milwaukee	44.60	44.70	0.10	North	6	5 to 13	5 to 13	Yellow	Green	D	E	
Milwaukee	44.60	44.70	0.10	South	6	5 to 13	5 to 13	Yellow	Green	D	E	
Washington	63.40	79.50	16.10	North	4	6	3	Yellow	Red	D	C	1107-00-71 Resurfacing, 2022
Washington	63.40	79.50	16.10	South	4	6	3	Yellow	Red	D	C	1107-00-71 Resurfacing, 2022
Washington	79.50	82.00	2.50	North	4	6	3	Yellow	Red	D	B	1107-00-71 Resurfacing, 2022
Washington	79.50	82.00	2.50	South	4	6	3	Yellow	Red	D	B	1107-00-71 Resurfacing, 2022
Dodge	82.00	83.80	1.80	North	4	10	3	Yellow	Red	D	C	1107-00-04/07 Resurfacing, 2015
Dodge	82.00	83.80	1.80	South	4	10	3	Yellow	Red	D	C	1107-00-04/07 Resurfacing, 2015
Dodge	83.80	86.30	2.50	North	4	5	3	Red	Red	D	C	1107-00-04/07 Resurfacing, 2015
Dodge	83.80	86.30	2.50	South	4	5	3	Red	Red	D	C	1107-00-04/07 Resurfacing, 2015
Dodge	86.30	88.50	2.20	North	4	6	3	Green	Red	D	C	1107-00-04/07 Resurfacing, 2015
Dodge	86.30	88.50	2.20	South	4	6	3	Green	Red	D	C	1107-00-04/07 Resurfacing, 2015
Dodge	88.50	88.80	0.30	North	4	10	3	Green	Red	D	C	1107-00-04/07 Resurfacing, 2015
Dodge	88.50	88.80	0.30	South	4	10	3	Green	Red	D	C	1107-00-04/07 Resurfacing, 2015
Fond du Lac	95.50	96.95	1.45	North	4	6	3	Yellow	Green	D	D	
Fond du Lac	95.50	96.95	1.45	South	4	6	3	Yellow	Green	D	D	
Fond du Lac	96.95	98.00	1.05	North	4	6	3	Yellow	Red	D	E	
Fond du Lac	96.95	98.00	1.05	South	4	6	3	Yellow	Red	D	E	
Winnebago	110.00	113.00	3.00	North	4	6	3	Yellow	Green	D	C	
Winnebago	110.00	113.00	3.00	South	4	6	3	Yellow	Green	D	C	
Outagamie	151.90	157.60	5.70	South	4	6	3	Yellow	Red	D	D	1130-44-00 Resurfacing, 2017
Outagamie	152.80	158.10	5.30	North	4	6	3	Yellow	Red	D	D	1130-44-00 Resurfacing, 2017

Design Standard

Six Lane Facility
- Median Total and Paved Shoulder
  - Desirable shoulder width = 12 ft
  - Minimum shoulder width = 10 ft

Four Lane Facility
- Median Total Shoulder
  - Minimum/Desirable shoulder width = 6 ft
- Median Paved Shoulder
  - Minimum/Desirable shoulder width = 4 ft

Crash Rate

Crash Rate is at or below the Statewide Average (SWA)
Crash Rate is between 1.0 and 1.5 times the SWA
Crash Rate is greater than 1.5 times the SWA

LOS

A, B and C (Below Capacity)
D and E (Approaching Capacity)
F (Exceeds Capacity)

ID 1113-00-00
I-94 to I-43
US 41 Interstate Conversion Study
Outside Shoulder Widths

County	Start Mile Marker	End Mile Marker	Length	Travel Direction	Location of Shoulder	Total Shoulder Width	Paved Shoulder Width	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB	Programmed Improvement
Milwaukee	48.00	51.20	3.20	North	Outside	10	8	Green	Green	F	E	1100-20/21-70 Resurfacing, 2020/2022
Milwaukee	48.00	51.20	3.20	South	Outside	10	8	Green	Green	F	E	1100-20/21-70 Resurfacing, 2020/2022
Waukesha	51.20	52.70	1.50	North	Outside	10	7	Green	Green	D	D	1100-36-70/71 Resurfacing, 2018/2019
Waukesha	51.20	52.70	1.50	South	Outside	10	7	Green	Green	D	D	1100-36-70/71 Resurfacing, 2018/2019
Waukesha	52.70	60.90	8.20	North	Outside	10	7	Red	Red	D	D	1100-38-70 Resurfacing, 2016
Waukesha	52.70	60.90	8.20	South	Outside	10	7	Red	Red	D	D	1100-38-70 Resurfacing, 2016
Washington	60.90	63.40	2.50	North	Outside	10	7	Red	Yellow	D	C	1107-00-71 Resurfacing, 2022
Washington	60.90	63.40	2.50	South	Outside	10	7	Red	Yellow	D	C	1107-00-71 Resurfacing, 2022
Washington	63.40	79.50	16.10	North	Outside	10	8	Yellow	Red	D	D	1107-00-71 Resurfacing, 2022
Washington	63.40	79.50	16.10	South	Outside	10	8	Yellow	Red	D	D	1107-00-71 Resurfacing, 2022
Washington	79.50	82.00	2.50	North	Outside	10	8	Yellow	Red	C	C	1107-00-71 Resurfacing, 2022
Washington	79.50	82.00	2.50	South	Outside	10	8	Yellow	Red	C	C	1107-00-71 Resurfacing, 2022
Dodge	82.00	83.80	1.80	North	Outside	10	3	Yellow	Red	D	C	1107-00-04/74 Resurfacing, 2015
Dodge	82.00	83.80	1.80	South	Outside	10	3	Yellow	Red	D	C	1107-00-04/74 Resurfacing, 2015
Dodge	83.80	86.30	2.50	North	Outside	10	2 to 7	Red	Red	D	D	1107-00-04/74 Resurfacing, 2015
Dodge	83.80	86.30	2.50	South	Outside	10	2 to 7	Red	Red	D	D	1107-00-04/74 Resurfacing, 2015
Dodge	86.30	88.80	2.50	North	Outside	10	8	Green	Red	D	D	1107-00-04/74 Resurfacing, 2015
Dodge	86.30	88.50	2.20	South	Outside	10	8	Green	Red	D	D	1107-00-04/74 Resurfacing, 2015
Dodge	88.50	88.80	0.30	South	Outside	8	8	Green	Red	C	C	1107-00-04/74 Resurfacing, 2015
Fond du Lac	95.50	96.95	1.45	North	Outside	10	8	Yellow	Green	E	D	
Fond du Lac	95.50	96.95	1.45	South	Outside	10	8	Yellow	Green	E	D	
Fond du Lac	96.95	98.00	1.05	North	Outside	10	8	Yellow	Red	D	E	
Fond du Lac	96.95	98.00	1.05	South	Outside	10	8	Yellow	Red	D	E	
Winnebago	110.00	113.00	3.00	North	Outside	10	8	Yellow	Green	C	C	
Winnebago	110.00	113.00	3.00	South	Outside	10	8	Yellow	Green	C	C	
Outagamie	151.90	157.60	5.70	South	Outside	10	8	Yellow	Red	E	E	1130-44-00 Resurfacing, 2017
Outagamie	152.80	158.10	5.30	North	Outside	10	8	Yellow	Red	E	E	1130-44-00 Resurfacing, 2017

Design Standard

Six Lane Facility
Outside Total and Paved Shoulder
Desirable shoulder width = 12 ft
Minimum shoulder width = 10 ft

Four Lane Facility
Outside Total and Paved Shoulder
Desirable shoulder width = 12 ft
Minimum shoulder width = 10 ft

Crash Rate

Crash Rate is at or below the Statewide Average (SWA)
Crash Rate is between 1.0 and 1.5 times the SWA
Crash Rate is greater than 1.5 times the SWA

LOS

A, B and C (Below Capacity)
D and E (Approaching Capacity)
F (Exceeds Capacity)

ID 1113-00-00
I-94 to I-43
US 41 Interstate Conversion Study
Bridge Shoulder Widths

County	Start Mile Marker	End Mile Marker	Structure Number	Travel Direction	Median Or Outside	Feature Crossed	Bridge Shoulder Width	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB	Year Constructed
Milwaukee	44.25	44.35	B400333	Southbound	Outside	STH 190 Capitol Dr	6	Yellow	Green	E	E	1967
Milwaukee	44.25	44.35	B400334	Northbound	Outside	STH 190 Capitol Dr	6	Yellow	Green	E	E	1967
Outagamie	140.95	141.05	B440020	Southbound	Median	Railroad	3	Green	Red	F	F	1960
Outagamie	140.95	141.05	B440020	Southbound	Outside	Railroad	3	Green	Red	F	F	1960
Outagamie	140.95	141.05	B440021	Northbound	Median	Railroad	3	Green	Red	F	F	1960
Outagamie	140.95	141.05	B440021	Northbound	Outside	Railroad	3	Green	Red	F	F	1960
Outagamie	141.20	141.30	B440028	Southbound	Median	Gillett Street	3	Green	Red	F	F	1961
Outagamie	141.20	141.30	B440028	Southbound	Outside	Gillett Street	3	Green	Red	F	F	1961
Outagamie	141.20	141.30	B440029	Northbound	Median	Gillett Street	3	Green	Red	F	F	1961
Outagamie	141.20	141.30	B440029	Northbound	Outside	Gillett Street	3	Green	Red	F	F	1961

Design Standard

Six Lane Facility
- Outside Shoulder
  - Desirable shoulder width = 12 ft
  - Minimum shoulder width = 10 ft
- Median Shoulder
  - Desirable shoulder width = 12 ft
  - Minimum shoulder width = 3.5 ft

Four Lane Facility
- Outside Shoulder
  - Desirable shoulder width = 12 ft
  - Minimum shoulder width = 10 ft
- Median Shoulder
  - Desirable shoulder width = 6 ft
  - Minimum shoulder width = 3.5 ft

Crash Rate

Crash Rate is at or below the Statewide Average (SWA)
Crash Rate is between 1.0 and 1.5 times the SWA
Crash Rate is greater than 1.5 times the SWA

LOS

A, B and C (Below Capacity)
D and E (Approaching Capacity)
F (Exceeds Capacity)

ID 1113-00-00
I-94 to I-43
US 41 Interstate Conversion Study
Horizontal / Lateral Clearance

County	Start Mile Marker	End Mile Marker	Length	Travel Direction	Shoulder Location	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB	Year Constructed	Remarks
Milwaukee	44.13	44.39	0.26	South Bound	Outside	Yellow	Green	E	E	1967	Capitol Drive Bridge
Milwaukee	44.16	44.51	0.35	North Bound	Outside	Yellow	Green	E	E	1967	Capitol Drive Bridge
Outagamie	140.95	141.05	0.10	North Bound	Outside	Green	Red	F	F	1960	RR Bridge
Outagamie	140.95	141.05	0.10	South Bound	Outside	Green	Red	F	F	1960	RR Bridge
Outagamie	141.20	141.30	0.10	North Bound	Outside	Green	Red	F	F	1961	Gillett Street Bridge
Outagamie	141.20	141.30	0.10	South Bound	Outside	Green	Red	F	F	1961	Gillett Street Bridge

Design Standard

Minimum/Desirable lateral clearance = finished shoulder width with roadside barrier or finished shoulder width + 2 ft

Crash Rate

Crash Rate is at or below the Statewide Average (SWA)
Crash Rate is between 1.0 and 1.5 times the SWA
Crash Rate is greater than 1.5 times the SWA

LOS

A, B and C (Below Capacity)
D and E (Approaching Capacity)
F (Exceeds Capacity)

ID 1113-00-00
I-94 to I-43
US 41 Interstate Conversion Study
Vertical / Structure Clearance

County	Start Mile Marker	End Mile Marker	Structure Number	Deficient Travel Direction	Feature	Structure Crossing Type	Critical Vertical Clearance (ft) over US 41 Southbound	Critical Vertical Clearance (ft) over US 41 Northbound	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB	Year Constructed	Programmed Improvement
Milwaukee	45.30	45.40	B-40-0360	Northbound and Southbound	W. Hampton Ave.	US 41 Under	15.20	14.64	Green	Green	E	E	1967	
Milwaukee	46.80	46.90	B-40-0369	Northbound and Southbound	W. Florist Ave.	US 41 Under	14.80	14.67	Green	Green	F	F	1967	
Milwaukee	48.25	48.35	B-40-0248	Northbound and Southbound	Good Hope Rd. Eastbound	US 41 Under	14.59	15.03	Green	Green	E	C	1964	
Milwaukee	48.25	48.35	B-40-0249	Northbound and Southbound	Good Hope Rd. Westbound	US 41 Under	14.83	15.13	Green	Green	E	C	1964	
Waukesha	51.80	51.90	B-67-0035	Northbound and Southbound	Pilgrim Rd. Southbound	US 41 Under	15.32	14.93	Green	Green	C	C	1962	2782-12-70 Bridge Reconstruction: 2015
Waukesha	51.80	51.90	B-67-0198	Northbound	Pilgrim Rd. Northbound	US 41 Under	16.67	14.93	Green	Green	C	C	1980	2782-12-70 Bridge Reconstruction: 2015
Waukesha	52.50	52.60	B-67-0137	Southbound	Pedestrian bridge	US 41 Under	14.96	16.33	Green	Green	C	D	1970	
Washington	54.60	54.70	B-66-0031	Southbound	Maple Rd.	US 41 Under	15.26	16.00	Green	Yellow	D	D	1970	1100-39-70 Bridge Rehab, 2020
Washington	55.70	55.80	B-66-0034	Northbound and Southbound	Mequon Rd.	US 41 Under	15.68	15.92	Yellow	Red	D	D	1969	1100-39-70 Bridge Rehab, 2020
Fond du Lac	100.60	100.70	B-20-0058	Northbound	CTH OOO	US 41 Under	16.07	15.85	Yellow	Green	E	E	1973	
Fond du Lac	101.95	102.05	B-20-0059	Northbound	CTH OO	US 41 Under	16.18	15.95	Green	Red	D	D	1973	

Design Standard

USH 41 Under Roadway
- Desirable clearance = 16 ft 9 in
- Minimum clearance = 16 ft

USH 41 Crossing Over Road with Interchange (Arterial)
- Desirable clearance = 16 ft 9 in
- Minimum clearance = 15 ft 3 in

USH 41 Crossing over Road with interchange (Non-Arterial)
- Desirable clearance = 15 ft 9 in
- Minimum clearance = 15 ft 3 in

USH 41 Crossing over Road w/o interchange (Arterial)
- Desirable clearance = 16 ft 9 in
- Minimum clearance = 14 ft

USH 41 Crossing over Road w/o interchange (Non-Arterial)
- Desirable clearance = 15 ft 3 in
- Minimum clearance = 14 ft

USH 41 Over Railroad
- Minimum/Desirable clearance = 23 ft

USH 41 Under Pedestrian Crossing
- Desirable clearance = 17 ft 9 in
- Minimum clearance = 17 ft

Crash Rate

Crash Rate is at or below the Statewide Average (SWA)
Crash Rate is between 1.0 and 1.5 times the SWA
Crash Rate is greater than 1.5 times the SWA

LOS

A, B and C (Below Capacity)
D and E (Approaching Capacity)
F (Exceeds Capacity)

ID 1113-0-00
I-94 to I-43
US 41 Interstate Conversion Study
Structural Capacity / Inventory Load Rating

County	Start MileMarker	End MileMarker	Structure Number	Travel Direction	Feature Crossed	Inventory Load Rating	Rate Score	Sufficiency Rating	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB	Year Constructed	Programmed Improvement
Milwaukee	44.25	44.35	B400333	South	Capitol Drive	HS18	86.50	81.1	Yellow	Green	E	E	1967	1100-01-07 PMA Overlay: 2020
Milwaukee	44.25	44.35	B400334	North	Capitol Drive	HS18	89.00	92.1	Yellow	Green	E	E	1967	1100-01-07 PMA Overlay: 2020
Milwaukee	46.40	46.50	B400365	South	Railroad	HS19	89.00	96.8	Green	Green	D	D	1967	1100-01-07 PMA Overlay: 2020
Milwaukee	46.40	46.50	B400366	North	Railroad	HS19	89.00	89.5	Green	Green	D	D	1967	1100-01-07 PMA Overlay: 2020
Milwaukee	47.20	47.30	B400346	South	Appleton Avenue South	HS18	83.40	94.1	Green	Green	D	D	1967	1100-01-07 PMA Overlay: 2020
Milwaukee	47.20	47.30	B400347	North	Appleton Avenue	HS18	83.40	94.1	Green	Green	D	D	1967	1100-01-07 PMA Overlay: 2020
Milwaukee	47.50	47.60	B400350	South	STH 175 NB	HS18	89.00	96.1	Green	Green	D	D	1967	1100-01-07 PMA Overlay: 2020
Washington	57.95	58.05	B660002	North	Railroad	HS15	89.00	90.5	Red	Green	C	D	1952	1100-39-70 Bridge Rehab: 2020
Washington	57.95	58.05	B660001	North	Railroad	HS16	89.00	87.3	Red	Green	C	D	1952	1100-39-70 Bridge Rehab: 2020
Washington	73.80	73.90	B660022	South	Limestone Creek	HS15	86.60	90.5	Green	Red	B	B	1957	1100-41-70 Bridge Reconstruction: 2019
Washington	73.80	73.90	B660023	North	Limestone Creek	HS18	85.00	89.7	Green	Red	B	B	1957	1100-41-70 Bridge Reconstruction: 2019
Washington	77.30	77.40	B660016	North	Kohlsville River	HS18	86.50	79.0	Yellow	Green	B	C	1953	1100-00-73 Bridge Reconstruction: 2016
Washington	77.30	77.40	B660017	South	Kohlsville River	HS19	86.50	86.3	Yellow	Green	B	C	1953	1100-00-73 Bridge Reconstruction: 2016
Outagamie	149.30	149.40	B440042	South	Maloney Road	HS16	86.60	90.6	Green	Green	E	D	1961	
Outagamie	149.30	149.40	B440043	North	Maloney Road	HS16	86.60	91.6	Green	Green	E	D	1961	
Brown	155.00	155.10	B050080	South	Apple Creek	HS18	89.00	96.1	Green	Green	E	E	1987	

Design Standard

Desirable sufficiency rating = 70
Minimum sufficiency rating = 50

Minimum inventory load rating = HS20

Crash Rate

Crash Rate is at or below the Statewide Average (SWA)
Crash Rate is between 1.0 and 1.5 times the SWA
Crash Rate is greater than 1.5 times the SWA

LOS

A, B and C (Below Capacity)
D and E (Approaching Capacity)
F (Exceeds Capacity)

ID 1113-00-00
I-94 to I-43
US 41 Interstate Conversion Study
Clear Zone/Unshielded Objects

County	Start Mile Marker	End Mile Marker	Travel Direction	Clear Zone Type	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB	Programmed Improvement	Remarks
Milwaukee	43.42	43.47	South Bound	Pole	Yellow	Green	F	F	1100-20/21-70 Resurfacing, 2020/2022	IT pole-not break away
Milwaukee	44.12	44.17	South Bound	Pole	Yellow	Green	E	E	1100-20/21-70 Resurfacing, 2020/2022	signal pole
Milwaukee	45.03	45.08	North Bound	Tree > 4" Dia.	Green	Green	F	E	1100-20/21-70 Resurfacing, 2020/2022	
Milwaukee	45.31	45.36	South Bound	Other	Green	Green	E	E	1100-20/21-70 Resurfacing, 2020/2022	mh - low side w/ 2' exposed
Milwaukee	46.32	46.37	North Bound	Other	Green	Green	D	D	1100-20/21-70 Resurfacing, 2020/2022	mainline bw within ramp cl zone
Milwaukee	48.12	48.17	South Bound	Other	Green	Green	E	E	1100-20/21-70 Resurfacing, 2020/2022	10 in high concrete light pole base
Milwaukee	48.95	49.00	North Bound	Other	Green	Green	D	E	1100-36-70/71 Resurfacing, 2018/2019	ret wall cont beyond bg exit
Milwaukee	49.02	49.07	North Bound	Other	Green	Green	D	E	1100-36-70/71 Resurfacing, 2018/2019	end ret wall r-40-205-00
Waukesha	49.55	49.60	South Bound	Other	Green	Green	D	C	1100-36-70/71 Resurfacing, 2018/2019	8-10 in high concrete base
Waukesha	49.75	49.80	North Bound	Other	Green	Green	B	C	1100-36-70/71 Resurfacing, 2018/2019	mh on 3:1 slope- low side exposed 12 in
Waukesha	49.83	49.88	South Bound	Other	Green	Green	B	C	1100-36-70/71 Resurfacing, 2018/2019	2 ft drop at eroded ditch
Waukesha	50.25	50.30	South Bound	Other	Green	Green	D	D	1100-36-70/71 Resurfacing, 2018/2019	4-6 ft drop at eroded ditch
Waukesha	50.32	50.37	South Bound	Other	Green	Green	D	D	1100-36-70/71 Resurfacing, 2018/2019	4-6 ft drop at eroded ditch
Waukesha	50.35	50.40	South Bound	Other	Green	Green	D	D	1100-36-70/71 Resurfacing, 2018/2019	4-6 ft drop at eroded ditch
Waukesha	51.09	51.14	North Bound	Culvert > 36"	Green	Green	C	D	1100-36-70/71 Resurfacing, 2018/2019	Twin 48 in pipe w/ endwall - 26 ft to wing
Waukesha	51.70	51.75	North Bound	Pole	Green	Green	C	C	1100-36-70/71 Resurfacing, 2018/2019	15 ft from pole- pole is 21.5 ft to ramp
Waukesha	51.75	51.80	North Bound	Pole	Green	Green	C	C	1100-36-70/71 Resurfacing, 2018/2019	15 ft from pole- pole is 23 ft to ramp
Waukesha	51.80	51.85	North Bound	Pole	Green	Green	C	C	1100-36-70/71 Resurfacing, 2018/2019	15 ft from pole- pole is 22 ft to ramp
Waukesha	52.68	52.73	South Bound	Culvert No Endw	Green	Green	C	D	1100-36-70/71 Resurfacing, 2018/2019	36 in elliptical
Washington	53.73	53.78	South Bound	Culvert > 36"	Red	Yellow	D	D	1100-38-70 Resurfacing, 2016	42 in rccp
Washington	54.72	54.77	South Bound	Culvert > 36"	Green	Yellow	C	D	1100-38-70 Resurfacing, 2016	
Washington	54.83	54.88	North Bound	Culvert No Endw	Green	Yellow	C	D	1100-38-70 Resurfacing, 2016	30 in rccp
Washington	55.15	55.23	North Bound	Culvert > 36"	Yellow	Red	C	B	1100-38-70 Resurfacing, 2016	48 in rccp
Washington	55.71	55.76	South Bound	Other	Yellow	Red	D	D	1100-38-70 Resurfacing, 2016	3 bridge piers - structure 34
Washington	56.30	56.42	South Bound	Culvert > 36"	Green	Green	D	D	1100-38-70 Resurfacing, 2016	36 in rccp
Washington	57.23	57.28	North Bound	Culvert > 36"	Red	Green	D	D	1100-38-70 Resurfacing, 2016	48 in rccp
Washington	59.07	59.12	North Bound	Culvert > 36"	Red	Green	D	D	1100-38-70 Resurfacing, 2016	23 ft x 7 ft box culvert
Washington	59.31	59.36	North Bound	Culvert > 36"	Red	Green	D	D	1100-38-70 Resurfacing, 2016	6.5 ft x 21 ft box culvert median
Washington	59.71	59.76	South Bound	Culvert > 36"	Red	Green	C	C	1100-38-70 Resurfacing, 2016	23 ft x 7 ft box culvert
Washington	59.84	59.89	North Bound	Culvert > 36"	Red	Green	C	C	1107-00-71 Resurfacing, 2022	42 in rccp
Washington	60.84	60.89	South Bound	Culvert > 36"	Red	Green	D	C	1107-00-71 Resurfacing, 2022	72 rcp w/ end wall and fence posts
Washington	61.35	61.40	South Bound	Culvert > 36"	Green	Green	C	C	1107-00-71 Resurfacing, 2022	72 rcp w/ endwall and safety bar
Washington	62.12	62.17	South Bound	Culvert > 36"	Green	Yellow	C	C	1107-00-71 Resurfacing, 2022	72 in rccp
Washington	62.23	62.28	South Bound	Culvert > 36"	Green	Yellow	C	C	1107-00-71 Resurfacing, 2022	48 in rccp
Washington	63.05	63.10	South Bound	Culvert > 36"	Green	Green	C	C	1107-00-71 Resurfacing, 2022	6 ft x 4 ft box culvert
Washington	64.85	64.90	North Bound	Culvert > 36"	Yellow	Yellow	B	B	1100-60-70 Reconstruction 2022	large box culvert
Washington	65.42	65.52	South Bound	Tree > 4" Dia.	Green	Green	C	C	1107-00-71 Resurfacing, 2022	tree clump w/ 2-4 inch trees
Washington	67.55	67.60	North Bound	Culvert > 36"	Green	Green	C	C	1107-00-71 Resurfacing, 2022	large box culvert w/ fence
Washington	69.48	69.53	North Bound	Culvert > 36"	Yellow	Green	B	B	1107-00-71 Resurfacing, 2022	large box culvert str number - c664
Washington	69.68	69.78	North Bound	Culvert > 36"	Yellow	Green	B	B	1107-00-71 Resurfacing, 2022	large box culvert w/ fence
Washington	70.18	70.23	South Bound	Culvert > 36"	Green	Green	B	B	1107-00-71 Resurfacing, 2022	72 in rccp
Washington	70.46	70.51	South Bound	Culvert > 36"	Green	Green	B	B	1107-00-71 Resurfacing, 2022	72 in rccp
Washington	71.24	71.29	South Bound	Culvert > 36"	Green	Green	B	B	1107-00-71 Resurfacing, 2022	42 in cmp
Washington	71.45	71.50	South Bound	Culvert > 36"	Green	Green	B	B	1107-00-71 Resurfacing, 2022	72 in rccp
Washington	71.96	72.01	South Bound	Culvert > 36"	Green	Green	B	B	1107-00-71 Resurfacing, 2022	60 in cmp

ID 1113-00-00
I-94 to I-43
US 41 Interstate Conversion Study
Clear Zone/Unshielded Objects

County	Start Mile Marker	End Mile Marker	Travel Direction	Clear Zone Type	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB	Programmed Improvement	Remarks
Washington	72.04	72.09	South Bound	Culvert > 36"	Yellow	Red	B	B	1107-00-71 Resurfacing, 2022	60 in cmp
Washington	75.48	75.53	South Bound	Culvert > 36"	Green	Green	B	B	1107-00-71 Resurfacing, 2022	66 in rccp
Washington	75.73	75.78	South Bound	Culvert > 36"	Green	Green	B	B	1107-00-71 Resurfacing, 2022	66 in
Washington	76.35	76.40	North Bound	Culvert > 36"	Yellow	Green	B	B	1107-00-71 Resurfacing, 2022	
Washington	76.71	76.80	South Bound	Culvert No Endw	Yellow	Green	B	B	1107-00-71 Resurfacing, 2022	
Washington	77.20	77.25	South Bound	Culvert No Endw	Yellow	Green	C	C	1107-00-71 Resurfacing, 2022	
Washington	77.75	77.83	South Bound	Culvert No Endw	Yellow	Green	B	B	1107-00-71 Resurfacing, 2022	
Washington	78.00	78.05	South Bound	Culvert No Endw	Green	Green	B	B	1107-00-71 Resurfacing, 2022	
Washington	78.18	78.23	South Bound	Culvert No Endw	Green	Green	B	B	1107-00-71 Resurfacing, 2022	
Washington	78.78	78.83	North Bound	Culvert No Endw	Green	Green	B	B	1107-00-71 Resurfacing, 2022	
Washington	78.90	78.95	South Bound	Culvert No Endw	Green	Green	B	B	1107-00-71 Resurfacing, 2022	
Washington	79.05	79.10	South Bound	Culvert No Endw	Green	Green	B	B	1107-00-71 Resurfacing, 2022	
Washington	79.30	79.35	South Bound	Culvert No Endw	Green	Green	B	B	1107-00-71 Resurfacing, 2022	
Washington	79.67	79.90	North Bound	Pole	Green	Green	B	B	1107-00-71 Resurfacing, 2022	oh- electric
Washington	81.40	81.45	North Bound	Culvert > 36"	Yellow	Red	C	B	1107-00-71 Resurfacing, 2022	60 in rccp
Dodge	81.60	81.65	South Bound	Culvert No Endw	Yellow	Red	C	C	1107-00-04/74 Resurfacing, 2015	rccp
Dodge	81.81	81.86	South Bound	Culvert No Endw	Yellow	Red	C	C	1107-00-04/74 Resurfacing, 2015	multiple culverts
Dodge	82.40	82.45	South Bound	Culvert > 36"	Green	Red	C	C	1107-00-04/74 Resurfacing, 2015	large box culvert
Dodge	82.84	82.94	North Bound	Culvert > 36"	Green	Red	C	C	1107-00-04/74 Resurfacing, 2015	36 in rccp
Dodge	83.50	83.55	North Bound	Culvert > 36"	Yellow	Red	C	C	1107-00-04/74 Resurfacing, 2015	36 in rccp
Dodge	83.58	83.63	North Bound	Pole	Yellow	Red	C	C	1107-00-04/74 Resurfacing, 2015	
Dodge	84.00	84.05	South Bound	Culvert > 36"	Green	Green	C	C	1107-00-04/74 Resurfacing, 2015	4 ft x 3 ft box culvert
Dodge	84.70	84.75	South Bound	Culvert > 36"	Green	Green	C	C	1107-00-04/74 Resurfacing, 2015	48 in rccp
Dodge	85.70	85.75	North Bound	Culvert > 36"	Red	Red	C	C	1107-00-04/74 Resurfacing, 2015	48 in rccp
Fond du Lac	93.65	93.70	North Bound	Culvert > 36"	Green	Green	D	D		3 - 36 in rccp
Fond du Lac	94.38	94.55	South Bound	Culvert No Endw	Yellow	Green	D	D		
Fond du Lac	94.91	94.96	North Bound	Culvert > 36"	Yellow	Green	D	D		3 - 48 in rccp
Fond du Lac	95.15	95.20	South Bound	Culvert > 36"	Yellow	Green	D	D		36 in rccp
Fond du Lac	100.26	100.50	North Bound	Pole	Yellow	Green	E	D		utility pole behind fence
Fond du Lac	100.83	100.88	North Bound	Culvert > 36"	Yellow	Green	E	E		Box Culvert
Fond du Lac	102.26	103.30	North Bound	Pole	Yellow	Green	E	E		utility pole behind fence
Winnebago	110.05	110.10	South Bound	Other	Yellow	Green	C	C		5 ft x 3 ft box culvert- 29' to headwall
Winnebago	110.25	110.30	South Bound	Culvert > 36"	Yellow	Green	C	C		48 in rccp - with mortar rubble end wall
Winnebago	110.36	110.41	South Bound	Culvert No Endw	Yellow	Green	C	C		36 in rccp
Winnebago	110.88	110.93	North Bound	Pole	Yellow	Green	C	C		high voltage transmission line-electrical
Winnebago	110.96	111.01	North Bound	Pole	Yellow	Green	C	C		high voltage transmission line-electrical
Winnebago	111.05	111.10	North Bound	Pole	Yellow	Green	C	C		high voltage transmission line-electrical
Winnebago	111.18	111.23	North Bound	Pole	Yellow	Green	C	C		high voltage transmission line-electrical
Winnebago	111.31	111.36	North Bound	Pole	Yellow	Green	C	C		high voltage transmission line-electrical
Winnebago	111.42	111.47	North Bound	Pole	Yellow	Green	C	C		high voltage transmission line-electrical
Winnebago	111.55	111.60	North Bound	Pole	Yellow	Green	C	C		high voltage transmission line-electrical
Winnebago	111.65	111.70	North Bound	Pole	Yellow	Green	C	C		high voltage transmission line-electrical
Winnebago	111.78	111.83	North Bound	Pole	Yellow	Green	C	C		high voltage transmission line-electrical
Winnebago	111.90	111.95	North Bound	Pole	Yellow	Green	C	C		high voltage transmission line-electrical
Winnebago	112.12	112.20	North Bound	Culvert > 36"	Green	Green	C	C		36 in rccp w/end wall

ID 1113-00-00
I-94 to I-43
US 41 Interstate Conversion Study
Clear Zone/Unshielded Objects

County	Start Mile Marker	End Mile Marker	Travel Direction	Clear Zone Type	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB	Programmed Improvement	Remarks
Winnebago	112.25	112.30	North Bound	Pole	Green	Green	C	C		high voltage transmission line-electrical
Winnebago	112.40	112.45	North Bound	Pole	Green	Green	C	C		high voltage transmission line-electrical
Winnebago	112.51	112.56	North Bound	Pole	Green	Green	C	C		high voltage transmission line-electrical
Winnebago	112.63	112.68	North Bound	Pole	Green	Green	C	C		high voltage transmission line-electrical
Winnebago	112.76	112.81	North Bound	Pole	Green	Green	C	C		high voltage transmission line-electrical
Winnebago	112.90	112.95	North Bound	Pole	Green	Green	C	C		high voltage transmission line-electrical
Winnebago	135.50	135.55	South Bound	Other	Green	Red	D	D		pedestal
Outagamie	138.72	138.80	South Bound	Other	Green	Green	D	D		bridge slope 12 ft south end
Outagamie	139.00	139.10	North Bound	Other	Green	Green	D	D		bridge slope 12 ft south end
Outagamie	140.21	140.26	North Bound	Culvert > 36"	Green	Red	F	F		headwall
Outagamie	140.46	140.55	North Bound	Other	Green	Red	F	F		bridge slope 12 ft south end
Outagamie	140.72	140.77	North Bound	Culvert No Endw	Green	Red	F	F		
Outagamie	141.81	141.86	North Bound	Culvert No Endw	Green	Red	D	E		
Outagamie	142.10	142.28	North Bound	Tree > 4" Dia.	Green	Green	D	E		
Outagamie	142.97	143.06	South Bound	Other	Green	Green	F	F		bridge slope 15 ft south end
Outagamie	143.26	143.31	South Bound	Culvert > 36"	Green	Green	F	F		
Outagamie	143.98	144.07	North Bound	Other	Green	Red	D	D		bridge slope 12 ft south end
Outagamie	144.90	145.00	North Bound	Other	Green	Red	E	D		bridge slope 12 ft south end
Outagamie	145.05	145.12	South Bound	Other	Green	Green	E	D		bridge slope 15 ft south end
Outagamie	147.05	147.15	North Bound	Other	Green	Red	D	D		bridge slope 12 ft
Outagamie	147.55	147.60	South Bound	Culvert No Endw	Green	Red	E	E		
Outagamie	147.76	147.81	North Bound	Culvert > 36"	Green	Red	D	D		
Outagamie	148.05	148.10	North Bound	Culvert No Endw	Green	Red	D	D		
Outagamie	148.67	148.72	South Bound	Culvert > 36"	Green	Red	D	D		
Outagamie	150.45	150.50	North Bound	Culvert > 36"	Yellow	Green	D	D	1130-44-00 Resurfacing, 2017	headwall
Outagamie	153.65	153.70	South Bound	Culvert No Endw	Green	Green	D	D	1130-44-00 Resurfacing, 2017	
Outagamie	154.07	154.12	North Bound	Culvert No Endw	Yellow	Red	D	E	1130-44-00 Resurfacing, 2017	
Brown	156.58	156.63	South Bound	Culvert > 36"	Green	Green	D	D	1130-44-00 Resurfacing, 2017	
Brown	157.48	157.53	South Bound	Other	Green	Red	D	D		15 ft from bridge slope
Brown	157.50	157.56	North Bound	Other	Green	Red	D	D		15 ft from bridge slope
Brown	159.65	159.80	North Bound	Tree > 4" Dia.	Green	Green	C	C	1130-44-00 Resurfacing, 2017	
Brown	160.91	160.96	North Bound	Culvert > 36"	Green	Green	D	C	1130-44-00 Resurfacing, 2017	double box culvert

Design Standard

Minimum clear zone distance to unshielded object = 30 ft

Crash Rate

Crash Rate is at or below the Statewide Average (SWA)
Crash Rate is between 1.0 and 1.5 times the SWA
Crash Rate is greater than 1.5 times the SWA

LOS

A, B and C (Below Capacity)
D and E (Approaching Capacity)
F (Exceeds Capacity)

ID 1113-00-00
I-94 to I-43
US 41 Interstate Conversion Study
Clear Zone/Unshielded Slopes

County	Start Mile Marker	End Mile Marker	Length	Travel Direction	Slope Ratio	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB	Programmed Improvement
Milwaukee	43.46	43.50	0.04	South Bound	3:1	Yellow	Green	F	F	1100-20/21-70 Resurfacing, 2020/2022
Milwaukee	43.54	43.61	0.07	South Bound	3:1	Yellow	Green	F	F	1100-20/21-70 Resurfacing, 2020/2022
Milwaukee	43.67	44.03	0.36	South Bound	3:1	Yellow	Green	F	F	1100-20/21-70 Resurfacing, 2020/2022
Milwaukee	43.90	44.08	0.18	North Bound	3:1	Yellow	Green	F	F	1100-20/21-70 Resurfacing, 2020/2022
Milwaukee	44.49	44.55	0.06	North Bound	2:1	Yellow	Green	E	E	1100-20/21-70 Resurfacing, 2020/2022
Milwaukee	44.53	44.87	0.34	South Bound	3:1	Yellow	Green	F	E	1100-20/21-70 Resurfacing, 2020/2022
Milwaukee	44.57	44.65	0.08	North Bound	2.5:1	Yellow	Green	F	E	1100-20/21-70 Resurfacing, 2020/2022
Milwaukee	44.83	44.86	0.03	North Bound	2:1	Yellow	Green	F	E	1100-20/21-70 Resurfacing, 2020/2022
Milwaukee	44.88	45.03	0.15	South Bound	3:1	Yellow	Green	F	E	1100-20/21-70 Resurfacing, 2020/2022
Milwaukee	45.08	45.14	0.06	South Bound	3:1	Green	Green	F	E	1100-20/21-70 Resurfacing, 2020/2022
Milwaukee	45.17	45.24	0.07	North Bound	3:1	Green	Green	E	E	1100-20/21-70 Resurfacing, 2020/2022
Milwaukee	45.51	45.57	0.06	North Bound	3:1	Green	Green	E	E	1100-20/21-70 Resurfacing, 2020/2022
Milwaukee	45.59	45.86	0.27	South Bound	3:1	Green	Green	F	E	1100-20/21-70 Resurfacing, 2020/2022
Milwaukee	45.69	45.79	0.10	North Bound	3:1	Green	Green	F	E	1100-20/21-70 Resurfacing, 2020/2022
Milwaukee	45.80	45.85	0.05	North Bound	3:1	Green	Green	F	E	1100-20/21-70 Resurfacing, 2020/2022
Milwaukee	46.13	46.19	0.06	South Bound	3:1	Green	Green	D	D	1100-20/21-70 Resurfacing, 2020/2022
Milwaukee	46.85	46.88	0.03	North Bound	2.5:1	Green	Green	F	F	1100-20/21-70 Resurfacing, 2020/2022
Milwaukee	46.91	47.03	0.12	South Bound	3:1	Green	Green	F	F	1100-20/21-70 Resurfacing, 2020/2022
Milwaukee	47.14	47.17	0.03	North Bound	3:1	Green	Green	D	D	1100-20/21-70 Resurfacing, 2020/2022
Milwaukee	47.22	47.27	0.05	South Bound	3:1	Green	Green	D	D	1100-20/21-70 Resurfacing, 2020/2022
Milwaukee	47.81	48.01	0.20	South Bound	3:1	Green	Green	E	E	1100-20/21-70 Resurfacing, 2020/2022
Milwaukee	49.01	49.06	0.05	South Bound	3:1	Green	Green	D	E	1100-36-70/71 Resurfacing, 2018/2019
Milwaukee	49.27	49.28	0.01	North Bound	3:1	Green	Green	D	C	1100-36-70/71 Resurfacing, 2018/2019
Waukesha	49.49	49.52	0.03	North Bound	3:1	Green	Green	D	C	1100-36-70/71 Resurfacing, 2018/2019
Waukesha	49.68	49.76	0.08	South Bound	2.5:1	Green	Green	D	C	1100-36-70/71 Resurfacing, 2018/2019
Waukesha	49.74	49.85	0.11	North Bound	3:1	Green	Green	B	C	1100-36-70/71 Resurfacing, 2018/2019
Waukesha	50.72	51.02	0.30	South Bound	3:1	Green	Green	C	D	1100-36-70/71 Resurfacing, 2018/2019
Waukesha	50.82	50.84	0.02	North Bound	3:1	Green	Green	C	D	1100-36-70/71 Resurfacing, 2018/2019
Waukesha	51.11	51.14	0.03	North Bound	3:1	Green	Green	C	D	1100-36-70/71 Resurfacing, 2018/2019
Waukesha	52.33	52.47	0.14	South Bound	2.5:1	Green	Green	D	D	1100-36-70/71 Resurfacing, 2018/2019
Waukesha	52.59	52.70	0.11	South Bound	2.5:1	Green	Green	C	D	1100-36-70/71 Resurfacing, 2018/2019
Waukesha	52.68	52.73	0.05	North Bound	3:1	Green	Green	C	D	1100-36-70/71 Resurfacing, 2018/2019
Waukesha	52.75	52.84	0.09	South Bound	3:1	Green	Green	C	D	1100-36-70/71 Resurfacing, 2018/2019
Waukesha	52.82	52.83	0.01	North Bound	3:1	Green	Green	C	C	1100-36-70/71 Resurfacing, 2018/2019
Waukesha	53.05	53.10	0.05	North Bound	2:1	Red	Yellow	C	C	1100-36-70/71 Resurfacing, 2018/2019
Waukesha	53.09	53.14	0.05	South Bound	3:1	Red	Yellow	C	C	1100-36-70/71 Resurfacing, 2018/2019
Washington	54.64	54.67	0.03	North Bound	2.5:1	Green	Yellow	D	D	1100-38-70 Resurfacing, 2016
Washington	54.90	54.92	0.02	North Bound	3:1	Green	Yellow	C	B	1100-38-70 Resurfacing, 2016

ID 1113-00-00
I-94 to I-43
US 41 Interstate Conversion Study
Clear Zone/Unshielded Slopes

County	Start Mile Marker	End Mile Marker	Length	Travel Direction	Slope Ratio	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB	Programmed Improvement
Washington	55.03	55.07	0.04	North Bound	2:1	Yellow	Red	C	B	1100-38-70 Resurfacing, 2016
Washington	55.16	55.19	0.03	North Bound	3:1	Yellow	Red	C	B	1100-38-70 Resurfacing, 2016
Washington	57.03	57.07	0.04	North Bound	2.5:1	Red	Green	D	D	1100-38-70 Resurfacing, 2016
Washington	57.72	57.89	0.17	South Bound	3:1	Red	Green	C	D	1100-38-70 Resurfacing, 2016
Washington	58.18	58.22	0.04	North Bound	2.5:1	Red	Yellow	C	C	1100-38-70 Resurfacing, 2016
Washington	61.14	61.19	0.05	South Bound	3:1	Green	Green	C	C	1107-00-71 Resurfacing, 2022
Washington	61.18	61.25	0.07	North Bound	3:1	Green	Green	C	C	1107-00-71 Resurfacing, 2022
Washington	61.31	61.64	0.33	North Bound	3:1	Green	Green	C	C	1107-00-71 Resurfacing, 2022
Washington	62.01	62.29	0.28	North Bound	3:1	Green	Yellow	C	C	1107-00-71 Resurfacing, 2022
Washington	63.35	63.44	0.09	North Bound	3:1	Green	Green	C	C	1107-00-71 Resurfacing, 2022
Washington	63.54	63.73	0.19	North Bound	3:1	Green	Green	C	C	1107-00-71 Resurfacing, 2022
Washington	63.73	63.86	0.13	North Bound	3:1	Green	Green	C	C	1107-00-71 Resurfacing, 2022
Washington	64.31	64.37	0.06	South Bound	3:1	Yellow	Yellow	D	D	1107-00-71 Resurfacing, 2022
Washington	64.52	64.55	0.03	South Bound	3:1	Yellow	Yellow	B	D	1107-00-71 Resurfacing, 2022
Washington	64.72	64.92	0.20	South Bound	3:1	Yellow	Yellow	B	B	1107-00-71 Resurfacing, 2022
Washington	65.68	65.78	0.10	North Bound	3:1	Green	Green	C	C	1107-00-71 Resurfacing, 2022
Washington	66.27	66.42	0.15	South Bound	2.5:1	Yellow	Green	C	C	1107-00-71 Resurfacing, 2022
Washington	69.21	69.33	0.12	South Bound	3:1	Yellow	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	70.22	70.28	0.06	South Bound	3:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	70.52	70.69	0.17	South Bound	3:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	71.02	71.18	0.16	North Bound	3:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	71.27	71.47	0.20	North Bound	3:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	71.64	71.72	0.08	South Bound	3:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	71.87	71.93	0.06	South Bound	2.5:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	72.07	72.15	0.08	North Bound	3:1	Yellow	Red	B	B	1107-00-71 Resurfacing, 2022
Washington	73.00	73.16	0.16	North Bound	3:1	Green	Red	C	B	1107-00-71 Resurfacing, 2022
Washington	73.05	73.18	0.13	South Bound	3:1	Green	Red	C	B	1107-00-71 Resurfacing, 2022
Washington	73.28	73.32	0.04	South Bound	3:1	Green	Red	C	B	1107-00-71 Resurfacing, 2022
Washington	73.35	73.46	0.11	South Bound	3:1	Green	Red	B	B	1107-00-71 Resurfacing, 2022
Washington	73.36	73.50	0.14	North Bound	3:1	Green	Red	B	B	1107-00-71 Resurfacing, 2022
Washington	73.64	73.82	0.18	South Bound	3:1	Green	Red	B	B	1107-00-71 Resurfacing, 2022
Washington	74.00	74.24	0.24	South Bound	3:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	74.01	74.22	0.21	North Bound	3:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	74.32	74.58	0.26	North Bound	3:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	74.51	74.64	0.13	South Bound	3:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	74.76	74.83	0.07	North Bound	3:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	75.25	75.35	0.10	South Bound	3:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	75.38	75.55	0.17	North Bound	3:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022

ID 1113-00-00
I-94 to I-43
US 41 Interstate Conversion Study
Clear Zone/Unshielded Slopes

County	Start Mile Marker	End Mile Marker	Length	Travel Direction	Slope Ratio	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB	Programmed Improvement
Washington	75.70	75.80	0.10	South Bound	3:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	75.72	75.86	0.14	North Bound	3:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	75.97	76.05	0.08	North Bound	3:1	Yellow	Green	C	C	1107-00-71 Resurfacing, 2022
Washington	76.28	76.37	0.09	North Bound	3:1	Yellow	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	76.68	76.87	0.19	South Bound	3:1	Yellow	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	77.01	77.31	0.30	South Bound	3:1	Yellow	Green	C	B	1107-00-71 Resurfacing, 2022
Washington	77.20	77.27	0.07	North Bound	3:1	Yellow	Green	C	C	1107-00-71 Resurfacing, 2022
Washington	77.37	77.49	0.12	North Bound	3:1	Yellow	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	77.43	77.51	0.08	South Bound	3:1	Yellow	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	77.73	77.77	0.04	South Bound	3:1	Yellow	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	77.82	77.94	0.12	North Bound	3:1	Yellow	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	78.61	79.03	0.42	North Bound	3:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	78.69	78.87	0.18	South Bound	3:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	78.94	79.35	0.41	South Bound	3:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	79.09	79.30	0.21	North Bound	3:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	79.52	79.62	0.10	North Bound	3:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	79.67	79.86	0.19	North Bound	3:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	79.67	79.70	0.03	South Bound	2.5:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	79.76	80.01	0.25	South Bound	2.5:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	80.30	80.42	0.12	North Bound	3:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	80.48	80.60	0.12	South Bound	3:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	80.88	80.94	0.06	North Bound	3:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	81.23	81.31	0.08	North Bound	3:1	Yellow	Red	C	B	1107-00-71 Resurfacing, 2022
Dodge	81.62	81.66	0.04	South Bound	3:1	Yellow	Red	C	C	1107-00-04/74 Resurfacing, 2015
Dodge	82.08	82.19	0.11	South Bound	3:1	Green	Red	D	C	1107-00-04/74 Resurfacing, 2015
Dodge	82.19	82.40	0.21	South Bound	3:1	Green	Red	D	C	1107-00-04/74 Resurfacing, 2015
Dodge	82.22	82.35	0.13	North Bound	3:1	Green	Red	D	C	1107-00-04/74 Resurfacing, 2015
Dodge	82.58	82.89	0.31	North Bound	3:1	Green	Red	C	C	1107-00-04/74 Resurfacing, 2015
Dodge	82.88	83.05	0.17	South Bound	3:1	Yellow	Red	C	C	1107-00-04/74 Resurfacing, 2015
Dodge	83.22	83.33	0.11	North Bound	3:1	Yellow	Red	C	C	1107-00-04/74 Resurfacing, 2015
Dodge	83.34	83.44	0.10	South Bound	3:1	Yellow	Red	C	C	1107-00-04/74 Resurfacing, 2015
Dodge	83.62	83.64	0.02	South Bound	2:1	Yellow	Red	C	C	1107-00-04/74 Resurfacing, 2015
Dodge	83.69	83.75	0.06	North Bound	3:1	Yellow	Red	C	C	1107-00-04/74 Resurfacing, 2015
Dodge	83.87	84.01	0.14	South Bound	2.5:1	Yellow	Red	C	C	1107-00-04/74 Resurfacing, 2015
Dodge	84.27	84.58	0.31	South Bound	3:1	Green	Green	D	C	1107-00-04/74 Resurfacing, 2015
Dodge	84.46	84.57	0.11	North Bound	3:1	Green	Green	C	C	1107-00-04/74 Resurfacing, 2015
Dodge	84.69	85.12	0.43	South Bound	3:1	Red	Red	C	C	1107-00-04/74 Resurfacing, 2015
Dodge	84.70	84.82	0.12	North Bound	3:1	Green	Green	C	C	1107-00-04/74 Resurfacing, 2015

ID 1113-00-00
I-94 to I-43
US 41 Interstate Conversion Study
Clear Zone/Unshielded Slopes

County	Start Mile Marker	End Mile Marker	Length	Travel Direction	Slope Ratio	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB	Programmed Improvement
Dodge	85.10	85.28	0.18	North Bound	3:1	Red	Red	D	C	1107-00-04/74 Resurfacing, 2015
Dodge	87.72	87.75	0.03	North Bound	3:1	Green	Green	C	C	1107-00-04/74 Resurfacing, 2015
Dodge	88.61	88.82	0.21	North Bound	3:1	Green	Red	C	C	1107-00-04/74 Resurfacing, 2015
Fond du Lac	89.31	89.36	0.05	North Bound	2.5:1	Red	Red	C	C	
Fond du Lac	90.01	90.09	0.08	North Bound	3:1	Green	Green	C	C	
Fond du Lac	90.79	90.87	0.08	North Bound	2.5:1	Green	Green	C	C	
Fond du Lac	91.88	91.93	0.05	North Bound	3:1	Yellow	Green	C	C	
Fond du Lac	92.37	92.48	0.11	North Bound	3:1	Yellow	Green	D	D	
Fond du Lac	92.82	92.86	0.04	North Bound	2:1	Yellow	Green	C	C	
Fond du Lac	92.88	93.07	0.19	North Bound	2:1	Yellow	Green	C	C	
Fond du Lac	93.23	93.28	0.05	South Bound	2.5:1	Green	Green	C	C	
Fond du Lac	93.35	94.01	0.66	North Bound	3:1	Yellow	Green	D	D	
Fond du Lac	93.71	94.09	0.38	South Bound	3:1	Yellow	Green	D	D	
Fond du Lac	94.07	94.17	0.10	North Bound	3:1	Yellow	Green	D	D	
Fond du Lac	94.14	94.27	0.13	South Bound	3:1	Yellow	Green	D	D	
Fond du Lac	94.33	94.37	0.04	North Bound	3:1	Yellow	Green	D	D	
Fond du Lac	94.50	94.59	0.09	South Bound	3:1	Yellow	Green	D	D	
Fond du Lac	95.01	95.08	0.07	South Bound	3:1	Yellow	Green	D	D	
Fond du Lac	95.12	95.29	0.17	South Bound	3:1	Yellow	Green	D	D	
Fond du Lac	95.13	96.11	0.98	North Bound	3:1	Yellow	Green	E	D	
Fond du Lac	105.55	105.59	0.04	North Bound	3:1	Green	Green	E	E	
Fond du Lac	106.99	107.07	0.08	North Bound	2.5:1	Red	Green	D	E	
Fond du Lac	107.47	107.53	0.06	North Bound	3:1	Green	Green	C	C	
Fond du Lac	107.51	107.56	0.05	South Bound	3:1	Green	Green	C	C	
Fond du Lac	108.14	108.25	0.11	North Bound	3:1	Green	Green	C	C	
Fond du Lac	108.41	108.43	0.02	North Bound	2.5:1	Green	Green	C	C	
Fond du Lac	108.51	108.58	0.07	North Bound	3:1	Green	Green	C	C	
Fond du Lac	108.87	108.90	0.03	North Bound	3:1	Green	Green	C	C	
Fond du Lac	108.99	109.03	0.04	North Bound	3:1	Green	Green	C	C	
Fond du Lac	109.16	109.28	0.12	North Bound	3:1	Green	Green	C	C	
Fond du Lac	109.63	109.76	0.13	North Bound	3:1	Green	Green	C	C	
Fond du Lac	109.65	109.79	0.14	South Bound	3:1	Green	Green	C	C	
Winnebago	110.05	110.16	0.11	North Bound	3:1	Yellow	Green	C	C	
Winnebago	110.23	110.31	0.08	North Bound	3:1	Yellow	Green	C	C	
Winnebago	110.74	110.77	0.03	South Bound	3:1	Yellow	Green	C	C	
Winnebago	110.80	110.92	0.12	North Bound	3:1	Yellow	Green	C	C	
Winnebago	110.83	110.85	0.02	South Bound	2.5:1	Yellow	Green	C	C	
Winnebago	110.93	110.95	0.02	North Bound	2.5:1	Yellow	Green	C	C	

ID 1113-00-00
I-94 to I-43
US 41 Interstate Conversion Study
Clear Zone/Unshielded Slopes

County	Start Mile Marker	End Mile Marker	Length	Travel Direction	Slope Ratio	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB	Programmed Improvement
Winnebago	110.93	110.95	0.02	South Bound	3:1	Yellow	Green	C	C	
Winnebago	130.45	130.64	0.19	South Bound	3:1	Green	Green	E	E	
Winnebago	131.16	131.20	0.04	South Bound	3:1	Green	Green	D	D	
Winnebago	131.23	131.26	0.03	South Bound	3:1	Green	Green	D	D	
Winnebago	132.26	132.60	0.34	South Bound	2.5:1	Yellow	Green	E	F	
Winnebago	134.13	134.17	0.04	South Bound	2.5:1	Green	Green	C	D	
Outagamie	152.57	152.65	0.08	South Bound	3:1	Yellow	Green	D	D	1130-44-00 Resurfacing, 2017
Outagamie	153.11	153.21	0.10	North Bound	3:1	Green	Green	D	D	1130-44-00 Resurfacing, 2017
Brown	154.75	154.76	0.01	South Bound	2:1	Yellow	Red	D	E	1130-44-00 Resurfacing, 2017
Brown	154.84	154.86	0.02	North Bound	1.5:1	Yellow	Red	E	E	1130-44-00 Resurfacing, 2017
Brown	157.38	157.46	0.08	South Bound	2.5:1	Green	Red	D	D	1130-44-00 Resurfacing, 2017
Brown	160.86	160.93	0.07	North Bound	3:1	Green	Green	C	C	1130-44-00 Resurfacing, 2017

Crash Rate

Crash Rate is at or below the Statewide Average (SWA)
Crash Rate is between 1.0 and 1.5 times the SWA
Crash Rate is greater than 1.5 times the SWA

LOS

A, B and C (Below Capacity)
D and E (Approaching Capacity)
F (Exceeds Capacity)

ID 1113-0-00
I-94 to I-43
US 41 Interstate Conversion Study
Clear Zone/Median Cross Over Slopes

County	Start MileMarker	End MileMarker	Cross Over Slopes	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB	Programmed Improvement
Washington	57.40	57.50	8:1	Red	Green	D	D	1100-38-70 Resurfacing, 2016
Washington	59.98	60.08	4:1	Red	Green	C	C	1107-00-71 Resurfacing, 2022
Washington	65.39	65.49	8:1	Green	Green	C	C	1107-00-71 Resurfacing, 2022
Washington	69.31	69.41	8:1	Yellow	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	70.64	70.74	4:1	Green	Green	B	B	1107-00-71 Resurfacing, 2022
Washington	73.94	74.04	7:1	Green	Red	B	B	1107-00-71 Resurfacing, 2022
Dodge	84.23	84.33	3:1	Green	Green	D	C	1107-00-04/74 Resurfacing, 2015
Dodge	85.12	85.22	6:1	Red	Red	D	C	1107-00-04/74 Resurfacing, 2015
Fond du Lac	91.78	91.88	4.5:1	Yellow	Green	C	C	
Fond du Lac	95.33	95.43	8:1	Yellow	Green	E	D	
Fond du Lac	108.04	108.14	5:1	Green	Green	C	C	
Winnebago	111.13	111.23	1:1	Yellow	Green	C	C	
Outagamie	138.65	138.75	5:1	Green	Green	D	D	
Outagamie	152.33	152.43	5:1	Yellow	Green	D	D	1130-44-00 Resurfacing, 2017
Outagamie	154.10	154.20	5:1	Yellow	Red	D	E	1130-44-00 Resurfacing, 2017
Brown	155.22	155.32	6:1	Green	Green	D	D	1130-44-00 Resurfacing, 2017
Brown	156.73	156.83	7:1	Green	Green	D	D	1130-44-00 Resurfacing, 2017
Brown	158.15	158.25	5:1	Green	Red	C	C	1130-44-00 Resurfacing, 2017
Brown	159.68	159.78	5:1	Green	Green	C	C	1130-44-00 Resurfacing, 2017
Brown	160.68	160.78	6:1	Green	Green	C	C	1130-44-00 Resurfacing, 2017

Design Standard

Desirable cross over slope = 20(H):1(V) or flatter
Maximum steepness of cross over slope = 10(H):1(V)

Crash Rate

Crash Rate is at or below the Statewide Average (SWA)
Crash Rate is between 1.0 and 1.5 times the SWA
Crash Rate is greater than 1.5 times the SWA

LOS

A, B and C (Below Capacity)
D and E (Approaching Capacity)
F (Exceeds Capacity)

ID 1113-0-00
I-94 to I-43
US 41 Interstate Conversion Study
Median Width

County	Start Mile Marker	End Mile Marker	Length	Median Width	Total Crash Rate	Fatal Incapacitating Crash Rate	2035 LOS SB	2035 LOS NB	Remarks
Milwaukee	44.00	44.60	0.60	20	Yellow	Green	F	F	Existing Barrier Wall
Milwaukee	48.00	51.20	3.20	24	Green	Green	F	E	Existing Barrier Wall
Washington	72.30	73.60	1.30	20	Yellow	Red	C	C	Existing Barrier Wall

5.10 Total miles of substandard median width

Design Standard

Median without Barrier Wall

Minimum/Desirable median width = 36 ft

Median with Barrier Wall

Minimum/Desirable median width = 26 ft

Crash Rate

Crash Rate is at or below the Statewide Average (SWA)
Crash Rate is between 1.0 and 1.5 times the SWA
Crash Rate is greater than 1.5 times the SWA

LOS

A, B and C (Below Capacity)
D and E (Approaching Capacity)
F (Exceeds Capacity)

Appendix F

Strategic Improvement Plan

FHWA Strategic Improvement Plan

US 41 Interstate Conversion Project

WisDOT Project ID 1113-00-00

Project Termini [1]	Stats	[2]	Segment		Operations [3]			Crash Rate			Deficiencies to be brought to "Existing to Remain in Place" Standards [6]	Short Term			Mid Term 2014 - 2027			
					2010 LOS	2035 LOS	Failing Year	Flags [4]	Total [5]	K+A [5]		Improvements [7]	Cost		Improvements [7]	Cost		
													Programmed [11]	Additional [13]		Programmed [11]	Next Scheduled [12]	Additional [13]
Milwaukee County From MM 43 to MM 49 **Zoo Freeway (Burleigh Street - Good Hope Road)**	Length (miles) 6 Number of crash hot spots 3 2035 LOS F Freeway Locations [8] 17 Crash Memo # 3	Urban	43	NB	F	F	2010	05-07 RSA 03-07 RSA ROR 11 State Patrol	119.9	0.8	Inadequate Lateral Clearance Objects within Clear Zone Unprotected Steep Slopes	1. Move Type 2 sign and remove vegetation to improve sight distance at NB Appleton Avenue exit ramp 2. Install median delineation on concrete barrier for horizontal curves 3. Remove concrete barrier between mainline and ramp to improve visibility at SB Capitol Drive and SB Appleton Ave		$1K $0.3M $10K	1100-33-70 Resurfacing, Good Hope Road Interchange, 2014	$0.3M		
				SB	F	F	2010		103.2	0.8								
			44	NB	E	E	---	05-07 RSA 03-07 RSA ROR	61.6	0.8					1100-20/21-70 Resurfacing, Burleigh Street to Good Hope Road, 2020		$27.6M	
				SB	F	F	2010		134.0	1.7								
			45	NB	E	E	---	---	72.9	1.3								
				SB	E	F	2034											
			46	NB	D	F	2021	03-07 RSA ROR	53.9	1.0					1. Add NB and SB auxiliary lanes from Appleton Avenue to Silver Spring Drive			$1.2M
				SB	D	F	2021		68.6	2.0								
			47	NB	D	E	---	---	48.2	0.5								
				SB	D	E	---											
			48	NB	C	C	---	---	78.3	1.8								
				SB	E	F	2033											
Zoo Freeway (Burleigh St. - Good Hope Rd.) Total Costs														$0.3M		$0.3M	$27.6M	$1.2M

Project Termini [1]			Stats	[2]	Segment		Operations [3]			Crash Rate			Deficiencies to be brought to "Existing to Remain in Place" Standards [6]	Short Term			Mid Term 2014 - 2027			
							2010 LOS	2035 LOS	Failing Year	Flags [4]	Total [5]	K+A [5]		Improvements [7]	Cost Programmed [11]	Cost Additional [13]	Improvements [7]	Cost Programmed [11]	Cost Next Scheduled [12]	Cost Additional [13]
Milwaukee and Waukesha Counties	From MM 49 to MM 53	**Good Hope Road to North Waukesha County Line**	Length (miles)	Urban	50	NB	C	D	---	03-07 RSA ROR	42.9	1.3	Objects within Clear Zone Unprotected Steep Slopes	1100-26-60 Bridge Rehab, US 41/45 Pedestrian Bridge, 2012	$0.6M		2782-12-70 Reconstruction, Pilgrim Road Interchange, 2015	$3.9M		
			4			SB	C	D	---		42.9	0.0					1100-37-70 Bridge Rehab, Waukesha County, 2015 (Raise Pilgrim Road bridges to improve vertical clearance)	$2.2M		
			Number of crash hot spots		51	NB	C	D	---	05-07 RSA 03-07 RSA ROR	65.2	0.0								
			3			SB	C	D	---		87.8	1.3					1100-36-70/71 Resurfacing, 2018-2019	$8.0M	$8.0M	
			2035 LOS F Freeway Locations [8]		52	NB	C	D	---	03-07 RSA ROR	38.3	0.0								
			0			SB	C	D	---		53.0	0.0								
			Crash Memo #																	
			3																	
Good Hope Road to North Waukesha County Line Total Costs															$0.6M			$14.1M	$8.0M	
Washington County	From MM 53 to MM 61	**South Washington County Line to US 45/41 Split**	Length (miles)	Urban	55	NB	C	D	---	06-10 K+A	41.7	4.8	Outside Paved Shoulder Width Objects within Clear Zone Unprotected Steep Slopes	1100-40-70 Beam Guard End Treatments, Washington County, 2013	$1.7M		1100-39-70 Bridge Rehab, Washington County Line to US 41/45 Split, 2020		$16.5M	
			8			SB	C	D	---		44.9	1.6								
			Number of crash hot spots		57	NB	C	D	---	03-07 RSA ROR	44.9	0.0					1100-38-70 Resurfacing, Washington County Line to US 41/45 Split, 2016	$18.1M		
						SB	C	D	---		81.7	0.0		1. Install additional signing NB for US 41/45 split		$0.1M				
			5	Rural	58	NB	C	D	---	06-10 Total 03-07 RSA ROR	63.3	3.2					1. Replace low tension median barrier			
			2035 LOS F Freeway Locations [8]			SB	C	D	---		93.3	1.6								
					59	NB	C	D	---	06-10 Total 05-07 RSA	38.8	0.0					1. Install beam guard at outside piers for the Mequon Road bridge			$25K
			0			SB	C	D	---	03-07 RSA ROR	93.9	2.0								
			Crash Memo #		60	NB	B	C	---	06-10 Total	43.7	0.0					2. Install beam guard at outside piers for the US 45 bridge			$26K
			1			SB	C	D	---		82.0	0.0								
South Washington County Line to US 45/41 Split Total Costs															$1.7M	$0.1M		$18.1M	$16.5M	$51K

Project Termini [1]			Stats	[2]	Segment		Operations [3]			Crash Rate			Deficiencies to be brought to "Existing to Remain in Place" Standards [6]	Short Term			Mid Term 2014 - 2027			
							2010 LOS	2035 LOS	Failing Year	Flags [4]	Total [5]	K+A [5]		Improvements [7]	Cost Programmed [11]	Cost Additional [13]	Improvements [7]	Cost Programmed [11]	Cost Next Scheduled [12]	Cost Additional [13]
Washington County	MM 61 to MM 81	**US 41/45 Split to North Washington County Line**	Length (miles)	Rural	68	NB	B	C	---	11 State Patrol	48.1	0.0	Vertical Clearance Median and Outside Paved Shoulder Width Objects within Clear Zone Unprotected Steep Slopes	1100-40-70 Beam Guard End Treatments, Washington County, 2013	$1.7M		1107-02-79 Reconstruction, WIS 144 Interchange, 2014	$7.3M		
			20			SB	B	C	---		44.7	0.0								
			Number of crash hot spots		72	NB	B	C	---	06-10 K+A	29.6	0.0					1100-03-71 Bridge Rehab, Bridge over Kohlsville River (B66-23/16), 2014	$1.5M		
			3			SB	B	B	---		66.7	7.4					1100-16-70 Reconstruction, WIS 60 interchange, 2019		$4.6M	
			2035 LOS F Freeway Locations [8]		73	NB	B	B	---	06-10 K+A	14.8	0.0					1107-00-71 Resurfacing, US 41/45 Split to South Dodge County Line, 2022		$20.2M	
			0			SB	B	C	---		44.3	7.4								
			Crash Memo #																	
			3																	
US 41/45 Split to North Washington County Line Total Costs														$0M (Included Above)				$8.8M	$24.8M	
Dodge County	From MM 81 to MM 89	**South Dodge County Line to North Dodge County Line**	Length (miles)	Rural	81	NB	C	C	---	06-10 K+A 05-07 RSA	55.4	7.4	Median and Outside Paved and Total Shoulder Width Objects within Clear Zone Unprotected Steep Slopes				1107-00-04/74 Resurfacing, South Dodge County Line to North Dodge County Line, 2015 1. Install median barrier	$6.1M		$2.6M $1.2M
			8			SB	C	D	---		51.7	0.0								
			Number of crash hot spots		82	NB	B	C	---	06-10 K+A 05-07 RSA	33.3	7.4								
			5			SB	B	C	---		37.0	11.1								
			2035 LOS F Freeway Locations [8]		83	NB	B	C	---	06-10 K+A 05-07 RSA	51.8	7.4								
			0			SB	C	D	---		33.3	0.0								
			Crash Memo #		85	NB	C	D	---	06-10 Total 06-10 K+A	77.6	3.5								
			1			SB	C	D	---		52.9	3.5								
					88	NB	C	D	---	06-10 K+A	20.5	3.4								
						SB	C	D	---		41.0	3.4								
South Dodge County Line to North Dodge County Line Total Costs																		$6.1M		$3.8M

Project Termini [1]			Stats	[2]	Segment		Operations [3]			Crash Rate			Deficiencies to be brought to "Existing to Remain in Place" Standards [6]	Short Term			Mid Term 2014 - 2027			
							2010 LOS	2035 LOS	Failing Year	Flags [4]	Total [5]	K+A [5]		Improvements [7]	Cost		Improvements [7]	Cost		
															Programmed [11]	Additional [13]		Programmed [11]	Next Scheduled [12]	Additional [13]
Fond Du Lac County	From MM 89 to MM 97	**South Fond Du Lac County Line to US 151**	Length (miles)	Rural	89	NB	C	C	---	06-10 Total 06-10 K+A 05-07 RSA	47.8	3.4	Median and Outside Paved Shoulder Width Objects within Clear Zone Unprotected Steep Slopes	1000-03-32 Guardrail upgrades, 2012	$0.8M		Resurfacing, 2022-2026		$14.6M	
			8																	
			Number of crash hot spots																	
			1																	
			2035 LOS F Freeway Locations [8]			SB	C	C	---		78.5	6.8								
			0																	
			Crash Memo #																	
			1																	
South Fond Du Lac County Line to US 151 Total Costs															$0.8M				$14.6M	
Fond Du Lac County	From MM 97 to MM 101	**US 151 to WIS 23**	Length (miles)	Urban	100	NB	C	E	---	11 State Patrol	58.1	0.0		1000-03-32 Guardrail upgrades, 2012	$0.8M					
			4																	
			Number of crash hot spots																	
			1																	
			2035 LOS F Freeway Locations [8]			SB	C	E	---		99.5	0.0								
			0																	
			Crash Memo #																	
			4																	
US 151 to WIS 23 Total Costs														$0M (Included Above)						

Project Termini [1]			Stats	[2]	Segment		Operations [3]			Crash Rate			Deficiencies to be brought to "Existing to Remain in Place" Standards [6]	Short Term			Mid Term 2014 - 2027			
							2010 LOS	2035 LOS	Failing Year	Flags [4]	Total [5]	K+A [5]		Improvements [7]	Cost: Programmed [11]	Cost: Additional [13]	Improvements [7]	Cost: Programmed [11]	Cost: Next Scheduled [12]	Cost: Additional [13]
Fond du Lac and Winnebago Counties	From MM 101 to MM 113	**WIS 23 to WIS 26**	Length (miles)	Urban	101	NB	C	E	---	06-10 K+A	26.3	8.8	Median and Outside Paved Shoulder Width Objects within Clear Zone Unprotected Steep Slopes	1000-03-32 Guardrail upgrades, 2012	$0.8M		Resurfacing, 2025-2027		$22M	
						SB	C	E	---		43.9	0.0								
			12		105	NB	D	E	---	06-10 ROR	28.7	0.0								
			Number of crash hot spots			SB	C	E	---		12.3	0.0								
					106	NB	D	E	---	06-10 Total 05-07 RSA 06-10 ROR	100.5	4.0								
			6			SB	C	E	---		84.4	0.0								
			2035 LOS F Freeway Locations [8]	Rural	107	NB	B	C	---	05-07 RSA 06-10 ROR	23.9	4.0								
						SB	C	D	---		15.9	0.0								
			0		108	NB	B	C	---	05-07 RSA	27.8	0.0								
			Crash Memo #			SB	B	C	---		39.8	4.0								
					112	NB	B	C	---	06-10 ROR	38.2	0.0								
			4			SB	B	C	---		15.9	0.0								
WIS 23 to WIS 26 Total Costs														$0M (Included Above)					$22M	
Winnebago and Outagamie Counties	From MM 130 to MM 139	**Breezewood to WIS 15**	Length (miles)	Urban	131	NB	D	F	2034	06-10 ROR 11 State Patrol	63.0	0.0	Objects within Clear Zone Unprotected Steep Slopes	1000-03-30 Guardrail upgrades, 2012	$0.8M		Joint Maintenance Repair, 2018		$3.6M	
			9			SB	D	E	---		58.7	2.9					Resurfacing, 2020-2025		$17M	
			Number of crash hot spots		132	NB	D	F	2034	05-07 RSA 06-10 ROR 03-07 RSA ROR	109.5	0.0								
						SB	C	E	---		112.1	3.9		1. Install median delineation on concrete barrier for horizontal curves		$0.4M				
			6		133	NB	D	F	2033	06-10 ROR 11 State Patrol	56.1	3.8								
						SB	E	F	2035		40.8	0.0								
			2035 LOS F Freeway Locations [8]		135	NB	C	D	---	06-10 K+A 05-07 RSA 06-10 ROR 03-07 RSA ROR	62.8	2.9								
						SB	C	D	---		75.7	5.7								
			4		136	NB	D	E	---	06-10 ROR	48.0	0.0								
						SB	D	E	---		50.9	1.5								
			Crash Memo #		138	NB	C	D	---	05-07 RSA	51.8	0.0								
			2			SB	C	D	---		38.8	3.2								
Breezewood to WIS 15 Total Costs														$0M (Included Above)		$0.4M			$20.6M	

Project Termini [1]			Stats	[2]	Segment		Operations [3]			Crash Rate			Deficiencies to be brought to "Existing to Remain in Place" Standards [6]	Short Term			Mid Term 2014 - 2027			
															Cost			Cost		
							2010 LOS	2035 LOS	Failing Year	Flags [4]	Total [5]	K+A [5]		Improvements [7]	Programmed [11]	Additional [13]	Improvements [7]	Programmed [11]	Next Scheduled [12]	Additional [13]
Outagamie County	From MM 139 to MM 151	**WIS 15 to County J**	Length (miles)	Urban	139	NB	D	F	2029	---	39.5	1.6	Vertical Clearance Inadequate Lateral Clearance Objects within Clear Zone	1000-03-32 Guardrail upgrades, 2012	$0.8M		Resurfacing, 2026-2028		$18M	
						SB	D	F	2029	---										
			12		140	NB	D	F	2029	06-10 K+A	31.6	9.5								
						SB	D	F	2029	11 State Patrol	22.1	0.0								
			Number of crash hot spots		141	NB	D	F	2029	06-10 K+A	47.3	0.0					1130-33-71 Reconstruction, WIS 47, 2014	$3.4M		
						SB	D	F	2029	11 State Patrol	82.1	6.3								
			7		142	NB	D	F	2030	05-07 RSA	31.6	0.0								
						SB	D	F	2030		28.8	0.0								
			2035 LOS F Freeway Locations [8]		144	NB	C	E	---	06-10 K+A	53.7	6.3								
						SB	D	E	---		56.8	3.2								
			12		146	NB	D	E	---	06-10 K+A	26.0	10.4								
						SB	D	E	---		62.4	5.2								
			Crash Memo #		147	NB	C	E	---	06-10 K+A	25.8	3.7								
						SB	D	E	---		33.1	3.7								
			2		148	NB	C	E	---	06-10 K+A	11.8	0.0								
						SB	C	D	---		39.2	11.8								
					149	NB	C	E	---	---	33.4	2.0								
						SB	C	E	---	---										
WIS 15 to County J Total Costs														$0M (Included Above)				$3.4M	$18M	
Brown County	From MM 151 to MM 161	**County J to County F**	Length (miles)	Urban	154	NB	C	E	---	06-10 K+A	30.7	2.4	Inadequate Lateral Clearance Median and Outside Paved Shoulder Width Objects within Clear Zone Unprotected Steep Slopes	1000-03-32 Guardrail upgrades, 2012	$0.8M		1120-47-71 Resurfacing, County J to County F, 2017 1. Install median barrier 2. Extend beam guard at County U and County S bridge structures	$16M		$9M
			11			SB	C	E	---		54.3	11.8								
			Number of crash hot spots	Rural	157	NB	C	E	---	06-10 K+A 05-07 RSA	30.7	7.1								
						SB	C	D	---		30.7	4.7								
			3		158	NB	C	C	---	06-10 K+A	48.5	4.2								
			2035 LOS F Freeway Locations [8]			SB	C	C	---		29.5	4.2								
			0																	
			Crash Memo #																	
			4																	
County J to County F Total Costs														$0M (Included Above)				$16.0M		$9.0M

Project Termini [1]	Stats	[2]	Segment	Operations [3]			Crash Rate			Deficiencies to be brought to "Existing to Remain in Place" Standards [6]	Short Term			Mid Term 2014 - 2027			
				2010 LOS	2035 LOS	Failing Year	Flags [4]	Total [5]	K+A [5]		Improvements [7]	Cost		Improvements [7]	Cost		
												Programmed [11]	Additional [13]		Programmed [11]	Next Scheduled [12]	Additional [13]
										Total Costs		**$3.1M**	**$0.8M**		**$66.8M**	**$152.1M**	**$14.1M**

Crash Rate Coloring

Crash Rate is between 1.5 times SWA and 2 times the SWA

Crash Rate is greater than 2 times the SWA

Improvement Coloring

Programmed Improvements

Improvements due to Interstate Conversion

Notes

[1] US 41 project termini exclude Zoo interchange project (MM 39 to 43), Winnebago County Majors project (MM 113 to 130), US 41/US 10/WIS 441 reconstruction (MM 133 to 136), and Brown County Majors project (MM 161 to 171)

[2] According to Meta Manager safety data

[3] Worst freeway segment shown within each MM

[4] K: Fatal
A: Incapacitating Injury
ROR: Run-off-the-Road

[5] Statewide Average Crash Rates (SWA)

	Total	K+A
Urban (7)	78	2.0
Rural (1)	39	2.1

[6] For Milwaukee County, the deficiencies are shown for a design speed of 60 mph, for all other counties deficiencies are based on a design speed of 70 mph

[7] For all resurfacing projects, clear zone, slope, and shoulder width deficiencies will be brought to Remain in Place design standards for appropriate design speed

[8] Freeway locations include merge, basic, diverge, and weave segments as defined by the 2010 Highway Capacity Manual

[11] Currently Programmed Projects: Costs that are already in the 6 year program

[12] Next Scheduled Projects: Costs that are anticipated to be programmed in the future whether US 41 is or is not designated an Interstate highway

[13] Additional Costs: Costs based on recommended improvements

Appendix G

Road Safety Audit Recommendation Response Table

Road Safety Audit Recommendation Response

US 41 Interstate Conversion Project

WisDOT Project ID 1113-00-00

Mitigation	Issue Addressed	RSA Recommended Locations (MM)								Will RSA Solution Option be Implemented	Remark
		Milwaukee	Waukesha	Washington	Dodge	Fond Du Lac	Winnebago	Outagamie	Brown		
Parallel Off Ramps / Auxiliary Lanes	-Tapered off-ramps increase the risk of rear-end and weaving related crashes -Interchange spacing		52-53	81		106	113 129 131 133		157 161	Partially	An auxiliary lane has since been constructed between CTH II and USH 10/STH 441 northbound (MM 133). WisDOT FDM standards use taper-type exit ramps. AASHTO GDHS 6th Edition in Chapter 10.9.6 states for taper type exit ramps "Studies of this type of terminal show that most vehicles leave the through lane at relatively high speeds, thereby reducing the potential for rear-end collisions as a result of deceleration on the through lane."
Replace Low Tension Cable Guard/Median Barrier	-Narrow median width -Vehicle Crossover			59-81	81-89	89-90				Yes	Future resurfacing projects in 2015 and 2022 will install high-tension cable guard in the median as part of the project.
Roadside Barrier	-Overhead cantilever guide signs are located within the clear zone -Steep slopes -Objects located within the clear zone			67	81-83	90 106	131-133	139 145 152-154		Yes	Future projects will investigate if the objects in the clear zone can be removed or if road side barriers are required to protect the hazard.
Overhead Signing	-Ground mounted guide signs in the urban sections of the study corridor -Advance interchange guide signing -Weaving			58		106	133	144-146		Partially	Overhead signs have been modified approaching the USH 41/USH 45 split (MM 58) to clarify lane useage. New overhead signs were added as part of the auxiliary lane constructed between CTH II and USH 10/STH 441 (MP 133). Remaining locations will be investigated for replacement as part of future projects.
Dynamic Advanced Warning Signing	-Horizontal curve limiting sight distance -Crest curve limiting stopping sight distance	42-47		58				149-153		Partially	Funding for ITS infrastructure is prioritized for the US 41 corridor to install fiber optic cable and additional cameras extending north from the Milwaukee area. ITS cameras and changeable message boards were installed in fall 2015 in Winnebago and Outagamie Counties. Future projects may investigate opportunities for installation of Intelligent Transportation Systems (ITS) that have the capability to provide dynamic advance warnings.
Diagrammatic Signing	-Sign message may cause confusion leading to an increased risk of weaving related crashes	47								Yes	The Interstate conversion signing plans will cover the existing diagrammatic sign that may cause confusion.
Enhanced Pavement Marking	-Dark Conditions -Crashes during adverse road conditions -Crest curve limiting stopping sight distance	42-44 49-50	49-50	57-58				149-153		Yes	WisDOT policy for pavement marking on Freeways is to install preformed wet reflective tape or preformed wet reflective contrast tape for lane lines. Future resurfacing and reconstruction projects will install these enhanced pavement marking materials.
Widen Shoulders	-Narrow shoulder increases the risk of rear-end, weaving and fixed object crashes	42-49 49-53	49-53	59-90			110-113 129-135	136-151		Yes	Future resurfacing and reconstruction projects will widen shoulders to meet current Interstate standards..
Rumble Strips	-Narrow Shoulders -The presence of the wind farm increases driver distraction			59-90		90	110-113	136-151		Yes	WisDOT takes a systemic approach to rumble strip installation based on national evidence that rumble strips reduce crashes and increase safety on divided and undivided roadways. The WisDOT standard is milled-in rumbles on concrete and asphaltic divided highway shoulders. Future resurfacing and reconstruction projects will install rumble strips per policy.

Interstate 41 US 41 Conversion

Road Safety Audit Recommendation Response

US 41 Interstate Conversion Project

WisDOT Project ID 1113-00-00

Wisconsin Department of Transportation

U.S. Department of Transportation Federal Highway Administration

Mitigation	Issue Addressed	RSA Recommended Locations (MM)								Will RSA Solution Option be Implemented	Remark
		Milwaukee	Waukesha	Washington	Dodge	Fond Du Lac	Winnebago	Outagamie	Brown		
Enhance Enforcement	-High severity crashes involving motorcycle crashes -Trucks driving too fast for conditions -High Speed Crashes	42-49	50	55-68		89 97-106	110-113 135	141-147 151-152	155-165	Partially	Constrained budgets limit the availability of State Patrol to provide enhanced enforcement. Opportunities for enhanced enforcement will continue to be sought and implemented when feasible.
Lighting	-Dark Conditions -Sight Distance					96-98 106	129-135			Partially	WisDOT takes a conservative approach to the use of lighting, primarily because of the high cost of installation, coupled with the long-term maintenance and energy expenditures involved. Lighting is always installed on the Milwaukee area freeways. Lighting was installed on the Lake Butte des Morts bridge as part of recent reconstruction in 2013. Future reconstruction projects will investigate lighting and potentially install lighting if the installation of lighting is the only remedy.
Delineation Tape on Median Barrier	-Lane Assignment -Roadway alignment confusion	42-46								Yes	The Interstate conversion signing plans will install Linear Delineation System (tape on median barrier wall) at two locations with deficient hoirzontal curve radii (MM 43 and MM 133).
Post Mounted Delineators	-Roadway alignment confusion			58						Yes	WisDOT policy is to use delineators on unlighted freeways with a normal longitudinal spacing of 400 feet. Future resurfacing and reconstruction projects will install delineators per policy.
Increase Median Barrier Height	-Lower median barrier increases the risk of crashes due to the presence of headlight glare	42-46								Yes	WisDOT policy is to use a standard barrier height of 42-inches for freeways (compared to most existing installations that are 32-inches tall). Future projects will install median barrier per policy.
Glare Screens	-Drivers being blinded by vehicle headlights from the opposing direction	42-46								Partially	WisDOT typically does not install glare screens in medians wider than 20 feet or in locations where there is ambient lighting, but may consider if there is counter directional traffic on a frontage road next to a main line. There is concern that glare screens may cause sight distance problems. Future projects will consider the installation of glare screen in accordance with policy.
Variable Speed Limits	-Rear-end Collisions	42-47								No	The MUTCD does allow a changeable message sign that changes the speed limit for traffic and ambient conditions provided that the appropriate speed limit is displayed at the proper times. Because WisDOT traffic engineers think that ITS cameras and changeable message boards are a better mitigation strategy, this mitigation measure was not further considered for installation.
High Friction Pavement	-Crashes during adverse road conditions			57-58	81-82 88-90	88-90				Partially	Resurfacing projects in 2015 and 2022 will provide a new HMA surface that will improve pavement friction. However, specific high friction surface treatments are not currently proposed.
Side Slope Grading	-Steep side slopes			58	81-83			142		Yes	Future projects will investigate if the steep side slopes can be corrected or if road side barriers are required to protect the hazard.
Relocate Utility Poles	-Utility corridor on the east side of NB USH 41 may be within the clear zone					102				Partially	The existing utility poles are typically at or beyond 30 feet from the edge of the travel lane. Future project will investigate if road side barriers are necessary to protect this potential hazard.
Barrier Protection of Fixed Objects	-Objects in clear zone					102				Yes	Future projects will investigate if the objects in the clear zone can be removed or if road side barriers are required to protect the hazard.

Interstate 41 US 41 Conversion

Road Safety Audit Recommendation Response

US 41 Interstate Conversion Project

WisDOT Project ID 1113-00-00

Wisconsin Department of Transportation

U.S. Department of Transportation Federal Highway Administration

Mitigation	Issue Addressed	RSA Recommended Locations (MM)								Will RSA Solution Option be Implemented	Remark
		Milwaukee	Waukesha	Washington	Dodge	Fond Du Lac	Winnebago	Outagamie	Brown		
Ramp Metering	-Interchange spacing -Rear-end collisions						129-131 132-133			Partially	The northbound entrance ramp from Breezewood Lane was reconstructed in 2012 with geometry to allow future ramp metering to be installed. Ramp metering will be investigated at other locations at the time of reconstruction.
Destination Information	-Lack of destination information increases the risk of weaving						133			No	An auxiliary lane has since been constructed between CTH II and USH 10/STH 441 northbound (MM 133. The existing full span sign bridge was replaced with an overhead cantilever sign structure over the auxiliary lane. WisDOT follows the guidance to not include city name (destination) and to use the highway designation or street name on advance guide signs when within the municipality limits. Therefore, the advance guide sign continues to have US 10/STH 441 signs rather than a destination name.
Enhanced Merge Signing	-On ramps merging in superelevated section							139		No	New, but standard merge signing was installed at this location in 2009/2010 as part of the resurface project along with enhanced pavement marking in the gore area.
Relocate Advance Guide Signing	-Location of advance signing encouraging weaving							144		Yes	This sign was relocated with the 2009/2010 resurfacing project that included adding an auxiliary lane between STH 441 and CTH E/Ballard Road.
Double Posted Speed Feedback System	-High Speed Crashes								155-165	No	The WisDOT Traffic Guidelines Manual states that except for work zone areas, dynamic speed display signs shall not be allowed on freeways and expressways, including ramps.
Remove Vegetation	-Vegetation restricts sight distance	46								Yes	The Interstate conversion signing plans include clearing and grubbing at this location to improve the sight distance.
Bridge De-Icing System	-Poor bridge conditions in inclement weather						133			Partially	Based on input from the geometric task team, mitigation could include either a de-icing system or friction treatment at this location. Neither option was carried forward for unknown reasons, but can be investigated as part of future projects at this location.
Bridge Friction Treatment	-Poor bridge friction			58						Yes	Possible bridge friction treatment to be included with bridge rehabilitation project programmed for 2020 (ID 1100-39-70).
Traversible Culvert Endwalls	-Culverts in clear zone									Yes	Future resurfacing and reconstruction projects will investigate culvert endwalls in the clear zone and determine if the culvert pipe can be extended or if road side barriers are necessary to protect this potential hazard.
Remove Concrete Barrier	-Barrier obstructs line of sight between mainline and entering traffic									No	Concrete barrier is necessary to allow for grade differences between mainline and ramp. Sufficient sight distance was determined to be available after further review.