APPENDICES

for

Environmental Assessment

ID 5845-06-03
US 51 Corridor Study
Stoughton–McFarland
I-39/90 to US 12/18 (Madison South Beltline)
Dane County

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APPENDIX A
PROGRESSION OF US 51 CORRIDOR STUDY

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A. Progression of Corridor Study and Development of Alternatives

The study progressed from an initial Needs Assessment study to the evaluation of multiple improvement alternatives as part of an EIS to the current evaluation in this EA. The following timeline summarizes the progression of the study and provides an overview of the alternatives developed.

A.1 2002 to 2004: Needs Assessment

WisDOT initiated a transportation needs study of the US 51 corridor from I-39/90 to McFarland. The US 51 Needs Assessment results were presented at a PIM in 2004 and identified the following needs:

- Safety
- Travel Demand and Capacity
- Bicycle and Pedestrian Accommodations
- Roadway Deficiencies
- Long-Term Planning and Corridor Preservation

A.2 2005: Alternatives Workshop and Initial Screening

In 2005, the study team held an "Alternatives Workshop" for the public that solicited input on transportation problems and brainstormed possible solutions. Based on suggestions received from the public, an "Alternatives Screening" process was completed to determine what impact expansion of US 51 and/or adjacent highway corridors would have on traffic patterns within the general study area. This was done using the Madison Area Metropolitan Planning Organization's 2030 Regional Travel Demand Model.

In November 2005, the WisDOT Majors Peer Review Committee gave approval to the study team to include non-US 51 corridor improvements as possible study alternatives to US 51 expansion. WisDOT and FHWA concluded that, based on the wide scope of the study and potential impacts, an EIS would be the appropriate level of environmental documentation for the US 51 corridor study.

A.3 2006 to 2013: EIS Phase

Work on the EIS began in 2006. Early in the alternatives development process, the following two concepts were initially considered and were dismissed:

1. Transportation Demand Management strategies that might reduce the number of single-occupancy vehicles on US 51, such as Park and Ride lots and transit, were recognized as having merit but not able to fully address corridor needs as stand-alone strategies.

2. Expansion of US 51 through downtown Stoughton was considered because of the projected poor traffic operations during future peak commuting hours. Because of the number of businesses abutting the downtown's limited R/W, anticipated removal of all downtown parking, and the existing five historic districts adjacent to US 51, this expansion concept had anticipated unacceptable impacts and was dismissed.

Five build concepts were developed, in addition to a No Build concept. Three of the build concepts considered expansion of corridors besides US 51. The key attributes of the 2006 concepts are as follows:

1. Concept A — A low-build concept with intersection improvements at rural US 51 intersections between Stoughton and McFarland, minor safety improvements in Stoughton and McFarland, and a passing lane east of Stoughton.

2. Concept B — A 4-lane expansion of US 51 between Stoughton and McFarland with a mobility route around the west, north, and east sides of Stoughton, minor safety improvements in Stoughton and McFarland, and a passing lane east of Stoughton.

3. Concept C — A 4-lane expansion of WIS 138 between Stoughton and Oregon with the same mobility route around Stoughton as provided in Concept B, intersection safety improvements on US 51 north of Stoughton, minor safety improvements in Stoughton and McFarland, and a passing lane east of Stoughton.

4. Concept D — A 4-lane expansion of County N from County B to I-39/90, the mobility route around Stoughton as provided in Concept B, intersection safety improvements on US 51 north of Stoughton, minor safety improvements in Stoughton and McFarland, and a passing lane east of Stoughton.

5. Concept E — A 4-lane expansion of both WIS 138 and County N, the mobility route around Stoughton as provided in Concept B, intersection safety improvements on US 51 north of Stoughton, minor safety improvements in Stoughton and McFarland, and a passing lane east of Stoughton.

Concept A (Low Build) and Concepts B, C, D, and E (4-Lane Build) are shown in Figures 1 and 2.

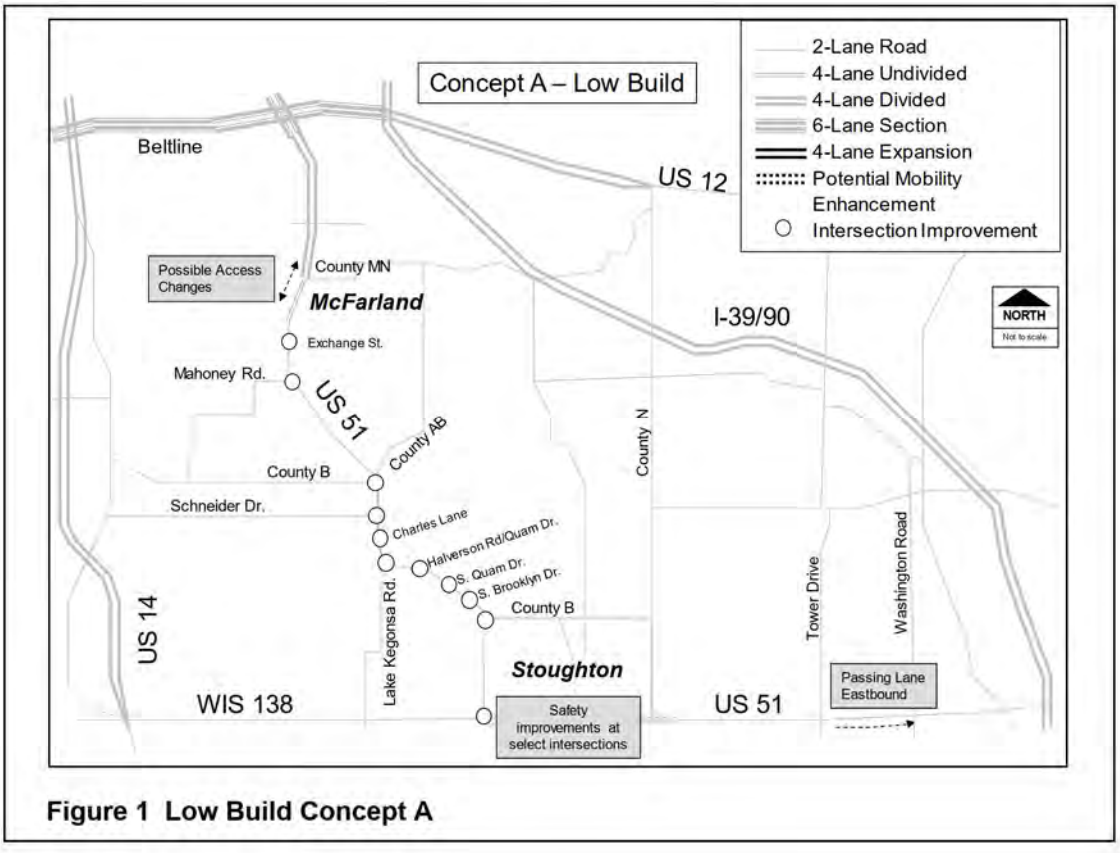

Figure 1 Low Build Concept A

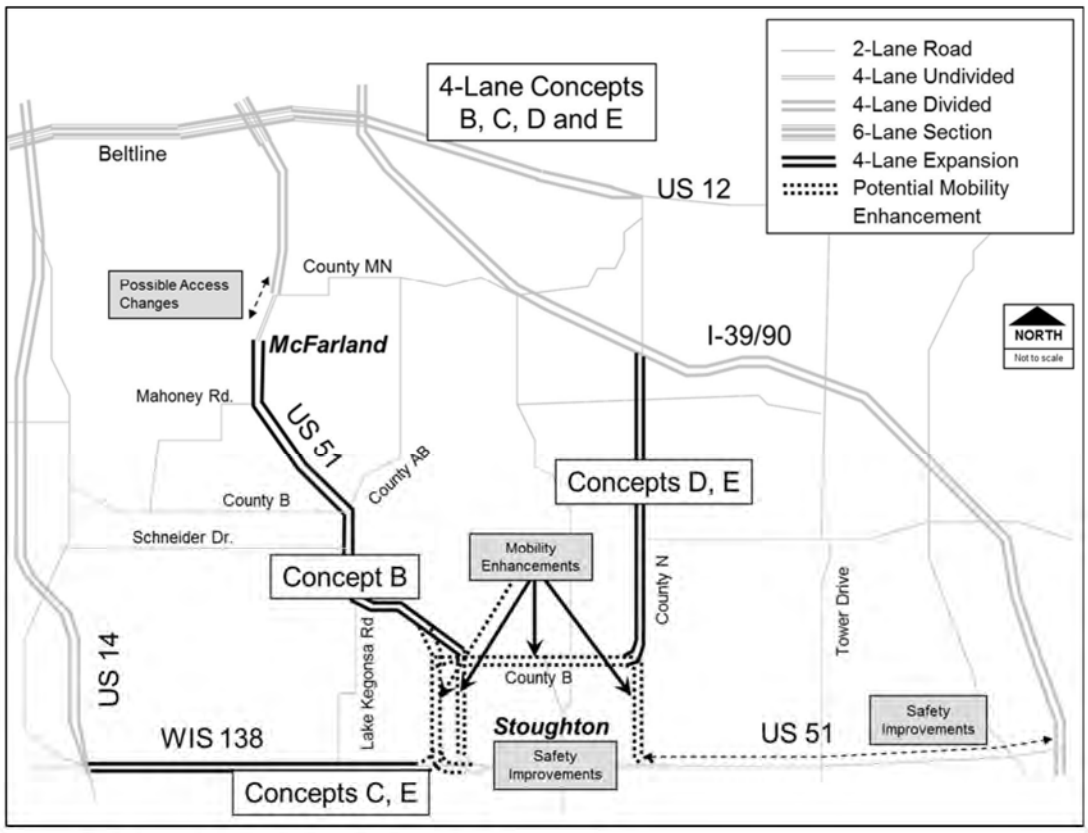

Figure 2 Four-Lane Build Concepts B Through E

A PIM held in 2006 presented the No Build and five build concepts. In 2008, a Value Engineering Study was completed and generated additional alternatives for a total of 17. Many of the alternatives were variations on the original five concepts. These alternatives were screened for meeting the purpose and need, environmental considerations, technical feasibility, and economic feasibility. After the screening, Alternatives A through D remained, with the mobility route around Stoughton associated as part of Alternatives B, C, and D now identified as the Stoughton Bypass.

A PIM held in 2009 presented the updated alternatives A, B, C, and D. The Stoughton Bypass aspect of the expansion alternatives generated the most comments with the majority of commenters opposed to the Stoughton Bypass.

In 2011, after further consideration of the alternatives screening analysis, Alternatives C and D were dismissed and the reasons were as follows:

1. Even if a 4-lane corridor on WIS 138 or County N corridor was constructed (Alternatives C or D), future traffic volumes on the 2-lane US 51 between County B (east) and County B/AB would still approach the 4-lane threshold (approximately 15,000 vpd ADT) based on the traffic modeling results at that time.

2. Alternatives C and D did not draw an appreciable amount of US 51 traffic away from the corridor. The projected volume on US 51 for Alternative C was the same volume for the No Build and Alternative A. The projected volume on US 51 for Alternative D was 500 vpd (4 percent) less than the No Build or Alternative A volumes.

3. Increased use of interstate I-39/90 as a local route was an undesirable attribute of Alternative D.

4. Alternative C increased traffic volumes through Stoughton.

The dismissal of Alternatives C and D was presented at a PIM held in 2011. There was one written comment submitted regarding the dismissal (it noted support of Alternative D).

A PIM held in October 2012 provided information regarding the three remaining corridor alternatives, No Build, Alternative A (Low Build), and Alternative B (4-lane expansion with Stoughton Bypass). Further refinements of the Stoughton Bypass with multiple alignment options were also presented. Public comments were summarized for inclusion in the DEIS, which was anticipated to be published in 2013. The three alternatives included the following:

- **No Build:** Normal roadway maintenance and currently programmed resurfacing projects only.
- **Alternative A** (Low Build): Safety improvements at various intersections and reconstruction of 2-lane US 51 east of Stoughton (Figure 3).
- **Alternative B** (4-Lane Expansion): Four-lane expansion of US 51 between Stoughton and McFarland, 4-lane reconstruction in McFarland, the Stoughton Bypass (with various possible alignment options), safety improvements in Stoughton, and reconstruction of 2-lane US 51 east of Stoughton (Figure 4).

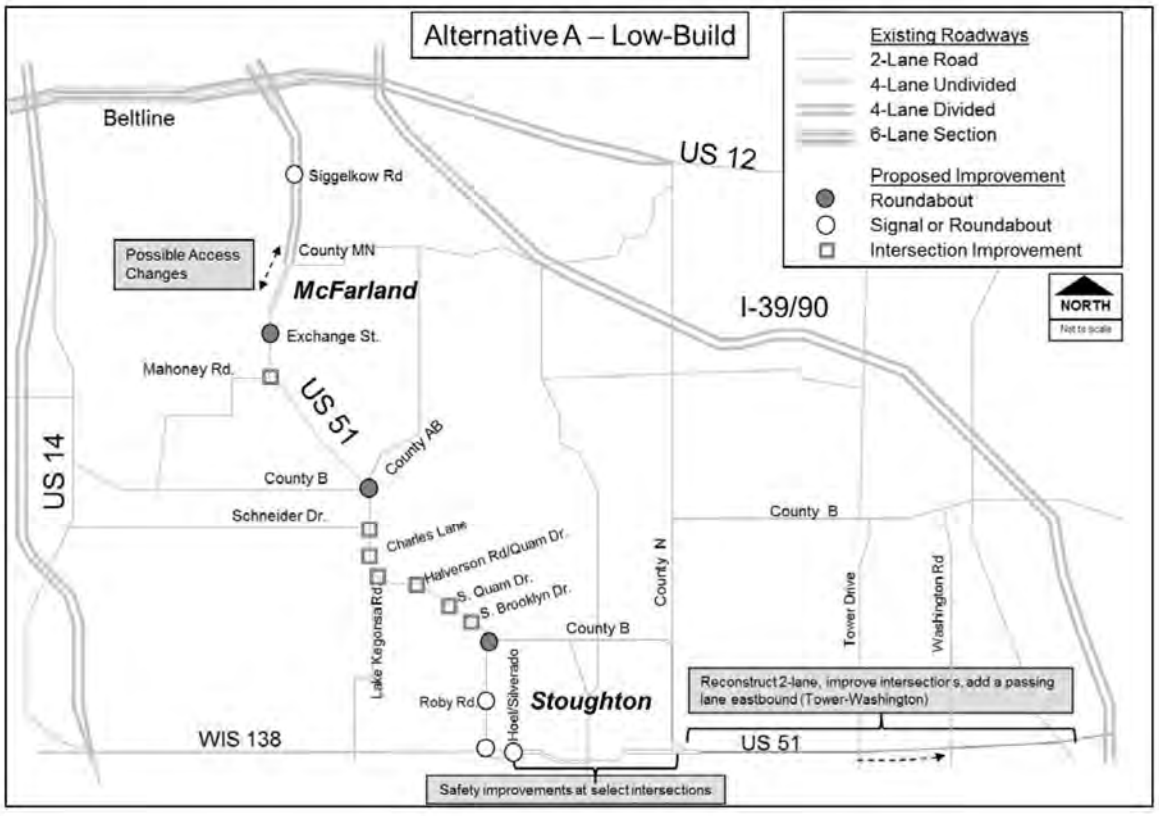

Figure 3 Alternative A (Low Build) (as shown in the October 2012 Newsletter)

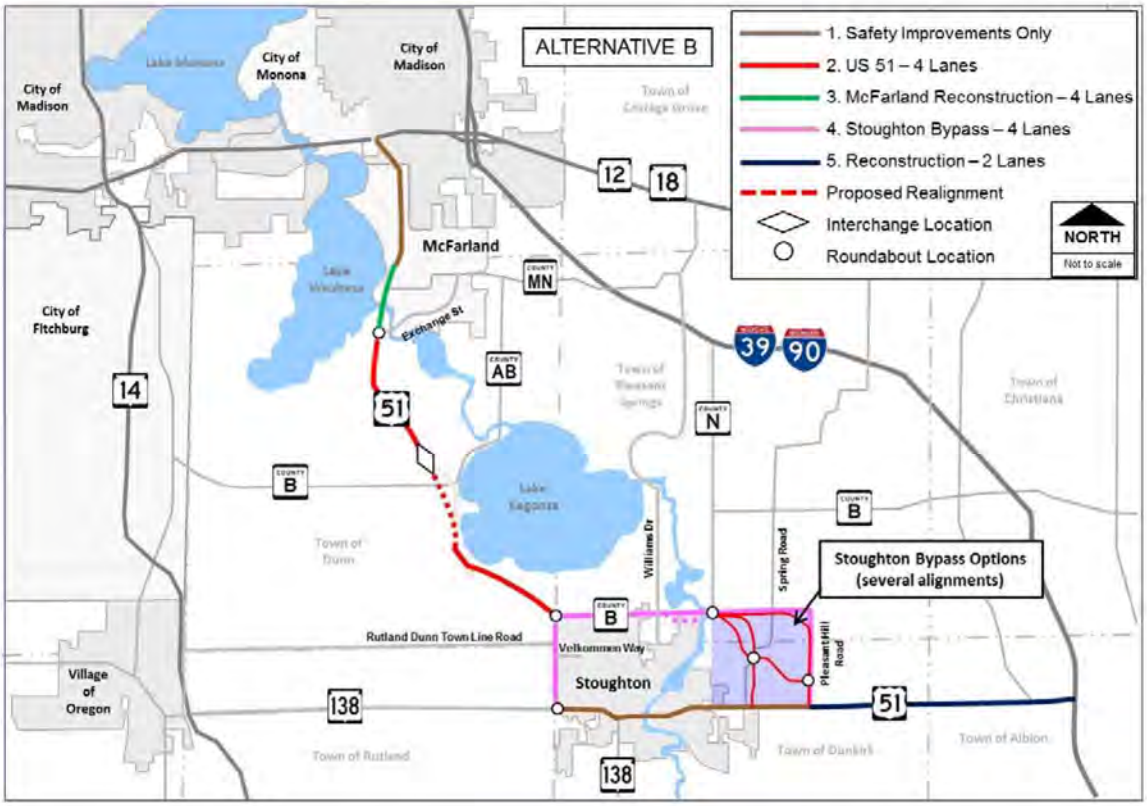

Figure 4 Alternative B (4-Lane Expansion) (as shown in the October 2012 Newsletter)

A.4 2014 to 2016: Transition to EA

The DEIS was completed at the end of 2013, but it was not published. Based on a combination of changes in statewide priorities and federal fiscal constraint policy, other strategies were reviewed to complete the environmental process. The federal fiscal constraint requirements applied to WisDOT environmental studies and require that funding be identified for the next major project action to advance the project to construction within a reasonable timeframe. Based on statewide priorities, it was determined that the US 51 corridor alternatives proposed in the DEIS would not receive funding for the next major action to advance the project. If the EIS had been completed, it is likely Alternative B would have been selected as the preferred alternative because it fully satisfied the project's purpose and need at that time.

Because there are safety, operations, and pavement issues along the corridor that need to be addressed, WisDOT worked with FHWA to examine possible options to fund a fiscally constrained improvement project that would address the existing safety, operations, and pavement issues along the corridor while still addressing the purpose and need of the study. During the transition, each of the project need factors was updated and included a review of the latest available crash data, pavement conditions, and land use planning information. The traffic forecasts and travel demand and operations modeling were also fully updated.

To accommodate the funding limitations, WisDOT and FHWA initially planned to proceed with a two-stage approach that would address near-term improvements with this EA document and long-term improvements would be addressed with a Tiered EIS. WisDOT presented this initial two-stage approach to regulatory agencies in November 2014 and to the public at the August 26, 2015 PIM. In February 2016, WisDOT and FHWA agreed that it was appropriate to downscope the project and continue the US 51 Corridor Study as an EA. Refer to Section A.4.3 for additional details on this decision. The following

subsections provide details on the initial two-stage approach and reasons for the modified approach to environmental documentation for the US 51 Corridor Study.

A.4.1 Initial Approach/Stage One–EA for Near-Term Improvements

Stage One included the preparation of this EA for corridor improvements that are anticipated to receive funding for the next major action to advance the project to construction within a reasonable timeframe. This EA documents the development of alternatives specific to near-term corridor needs. These alternatives include Low Build and 4-lane expansion options for specific sections and include intersection improvements. The EA evaluates the need for the project, compares alternatives, addresses environmental impacts, and summarizes input from regulatory agencies and the public.

A.4.2 Initial Approach/Stage Two–Tiered EIS for Long-Term Improvements

Stage Two would have used a Tiered EIS process for corridor improvements that would not receive funding for the next major action to advance the project for the foreseeable future. The process would begin with a Tier 1 EIS document that analyzes the project on a broad scale to identify a preferred corridor location for potential future improvements. When funding for the next major action to advance one or more projects identified in the Tier 1 EIS would become available, Tier 2 environmental documents would be prepared with a greater degree of engineering detail for specific improvements.

For US 51, WisDOT would have prepared a Tier 1 EIS evaluating a general corridor location for the potential 4-lane expansion of US 51 between Stoughton and McFarland and a possible bypass of Stoughton. These possible improvements are illustrated in Figure 5.

The Tier 1 EIS would have identified:

- *Selected corridor location*: Selection of the corridor location in Tier 1 would consider the range of potential impacts as well as agency and public input.
- *Corridor width*: Selecting a wide corridor in Tier 1 would leave flexibility for specific alignment options to be determined in Tier 2. The Tier 1 corridor could be widened at potential intersection locations and other areas where needed depending on project features, topography, environmental resources, or other factors.
- *Proposed termini for subsequent projects*: WisDOT would identify possible logical sections for implementation of future Tier 2 improvements.

After completion of the Tier 1 EIS, and when funding was available, WisDOT would then develop Tier 2 environmental documents for subsections of the corridor. Each Tier 2 document would include detailed analysis and identify the preferred alternative within the Tier 2 document's specific subsection.

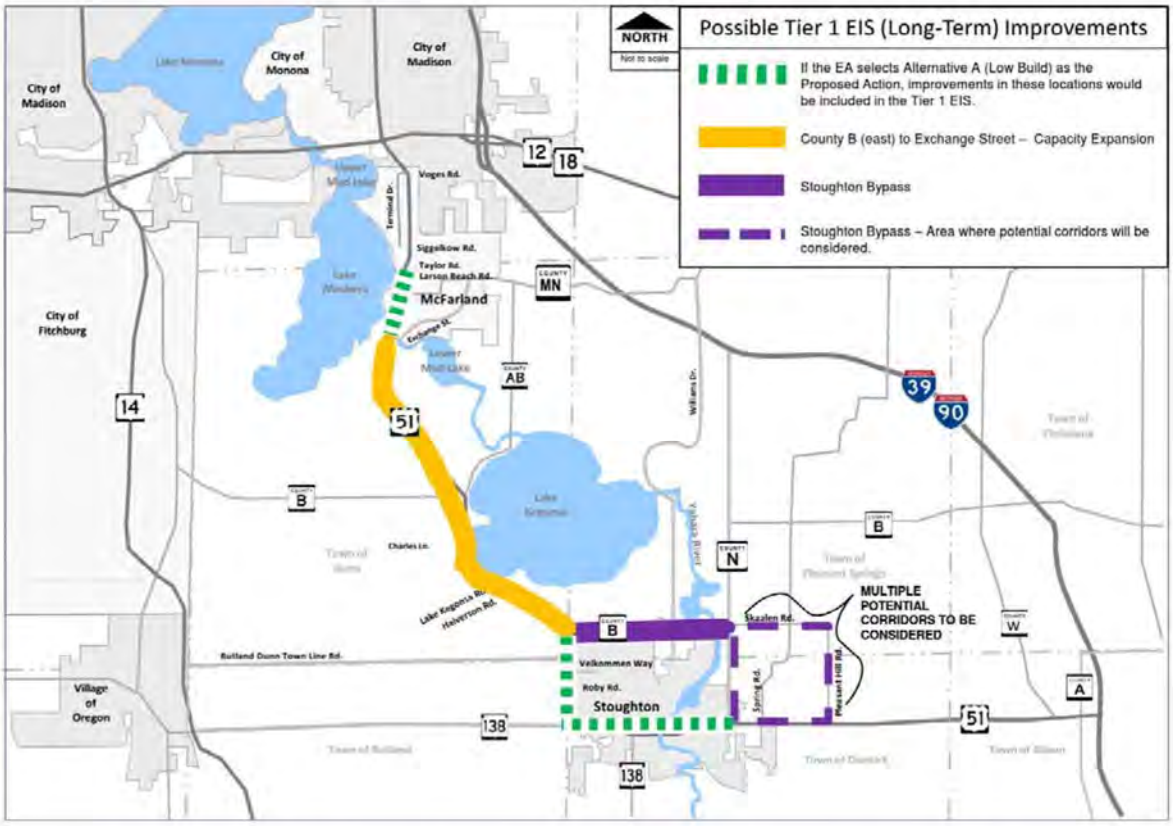

Figure 5 Possible Tier 1 EIS (Long-Term) Improvements (as shown in July 2015 Newsletter)

A.4.3 Modified Approach

In February 2016, WisDOT and FHWA agreed that it was appropriate to downscope the project and continue the US 51 Corridor Study as an EA. Four key reasons support this decision:

1. The Code of Federal Regulations (CFR), 40 CFR 1502.20 states, *"Agencies are encouraged to tier their environmental impact statements to eliminate repetitive discussions of the same issues and to focus on the actual issues ripe for decision at each level of environmental review." (emphasis added)* Issues likely to be covered in a Tier 1 EIS would include eventual capacity expansion to a 4-lane roadway and a possible bypass of Stoughton. Because of current and projected funding constraints, these issues are not ripe for decision and likely will not be for several decades.

2. If EA-proposed improvements are approved, construction would likely take place in the early to mid-2020s and future pavement improvements would not be needed before 2045 or 2050, or beyond the current planning horizon. In the event projected funding constraints would ease, it is highly unlikely that WisDOT would prioritize funding for Tier 1 improvements before EA-constructed pavement conditions would require it (post 2045 to 2050), as long as safety and traffic operations continue to be addressed by EA improvements.

3. It is anticipated more than 30 years might elapse before improvements recommended in a Tier 1 EIS might align with funding. This creates difficulties for potentially affected property owners. A number of property owners have already communicated concerns about the

shadow of uncertainty an extended Tier 1 would cast on their ability to make decisions about their properties.

4. In February 2016, WisDOT's goal for traffic operations on US 51 was LOS D in the design year (2045) from I-39/90 to east of Spring Road and from County B/AB to Tower Road. For US 51 from east of Spring Road to County B/AB and from Tower Road to Terminal Drive, WisDOT's goal for traffic operations on US 51 was mid-LOS E for the 2045 design year. With the exception of the projected operations in a 5.6-mile rural section between Stoughton and McFarland, WisDOT's LOS goals were met for the remainder of the 18.6-mile corridor with EA improvements. EA improvements in the 5.6-mile rural section address safety concerns through the addition of left-turn lanes and intersection improvements. WisDOT evaluated numerous aspects of the projected traffic operations and likely travel speeds during the future peak hours in the 5.6-mile section. Based on the results, WisDOT accepted the lower US 51 mainline operations provided by EA improvements along this specific section of US 51 because they are limited in duration and should not substantially impact travel speeds.

   See Section 1.2.2.4 of the EA document for details on updates to WisDOT guidance related to LOS criteria since February 2016. Details on the operations analysis methodology and results are provided in Section 2.4.4.1 of the EA document.

APPENDIX B
US 51 CRASH ANALYSIS SUMMARY MEMORANDUM

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January 24, 2020

Mr. Jeff Berens, P.E.
Wisconsin Department of Transportation–Southwest Region
2101 Wright Street
Madison, WI 53704

Re: US 51 Corridor Study Crash Analysis Summary Memo

Dear Jeff,

Enclosed is the US 51 Corridor Study Crash Analysis Summary Memo for your records. This document supplements the 2014 to 2018 crash data and analysis presented in the US 51 Environmental Assessment (EA).

Please call me with any questions.

Sincerely,

STRAND ASSOCIATES, INC.®

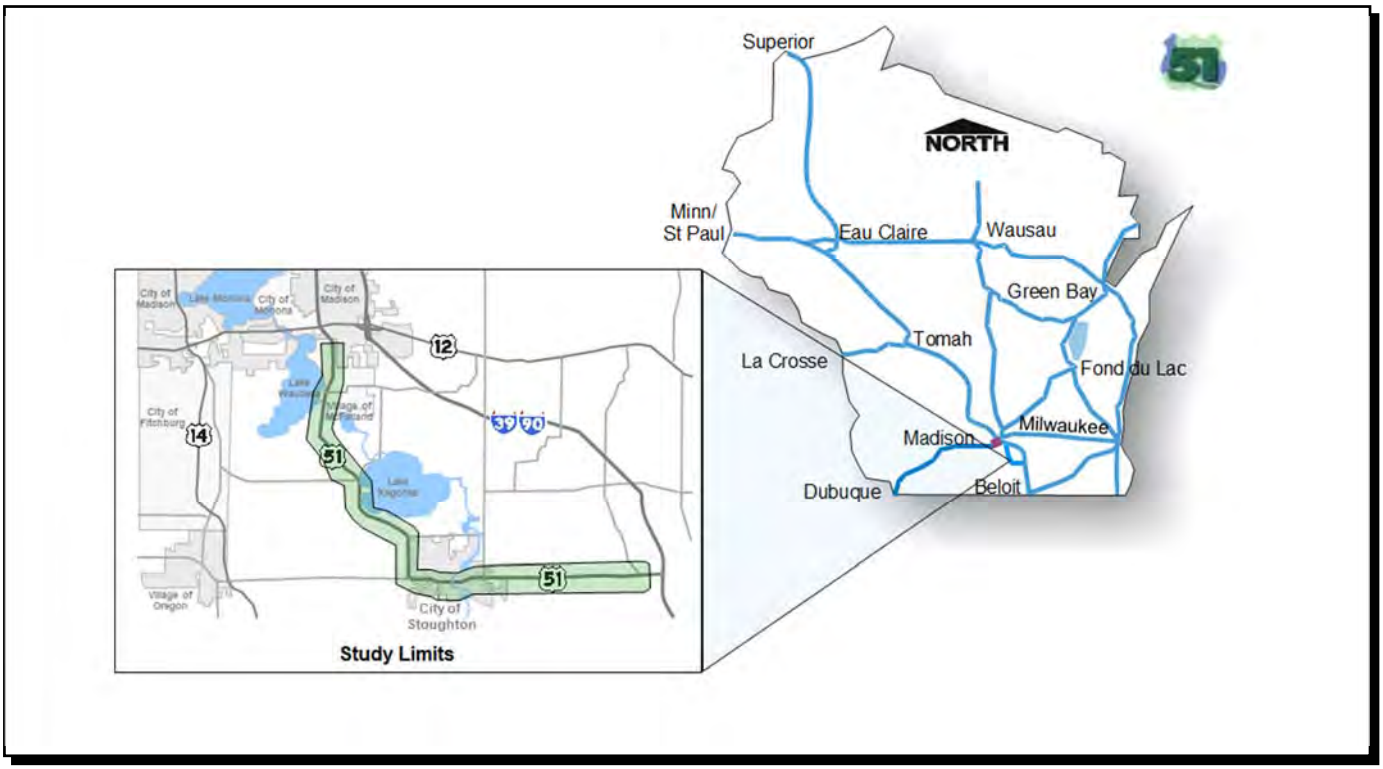
Joseph M. Urban, P.E.

Adam Walter, P.E.

Enclosure: Report

S:\MAD\1000--1099\1089\947\Designs-Studies-Reports\Memos\Crash Analysis Memo\2020-01-24 US 51 Corridor Study Crash Memo_Final.docx\041020

This document describes the crash analysis methodology and results for the US 51 Corridor Study completed by Strand Associates, Inc.® (Strand). Strand performed a crash analysis along a 17.7 mile stretch of US 51, from I-39/90 to south of Terminal Drive, to determine segment and intersection crash rates from 2014 to 2018. Crashes from the portion of US 51 from Terminal Drive/Voges Road (Terminal Drive) to US 12/18 and the I-39/US 51 interchange were not included because they are part of other studies. The project location is shown in Figure 1.



CRASH ANALYSIS METHODOLOGY

WisDOT provided 2014 to 2018 crash data along US 51 from I-39/90 to Terminal Drive/Voges Road. The project team categorized crashes as a segment and/or an intersection crash. The segment crash rates were compared to the 2014 to 2018 statewide average crash rates based on the appropriate Meta-Manager Peer Group of the roadway as defined by the WisDOT Bureau of Traffic Operations (BTO). The Meta-Manager Peer Groups for the US 51 study corridor are as follows based on WisDOT guidance:

- Multilane Divided Highways Posted at 45 mph or higher (Group 310)
- Multilane Divided Highways Posted at 40 mph or lower (Group 320)
- Multilane Undivided and One-Way Highways (Group 330)
- Rural 2-lane Highways with 2,000 to 7,000 vehicles per day (Group 420)
- Rural 2-lane Highways with more than 7,000 vehicles per day (Group 430)
- Rural 2-Lane Highways Posted at 40 mph or lower (Group 440)

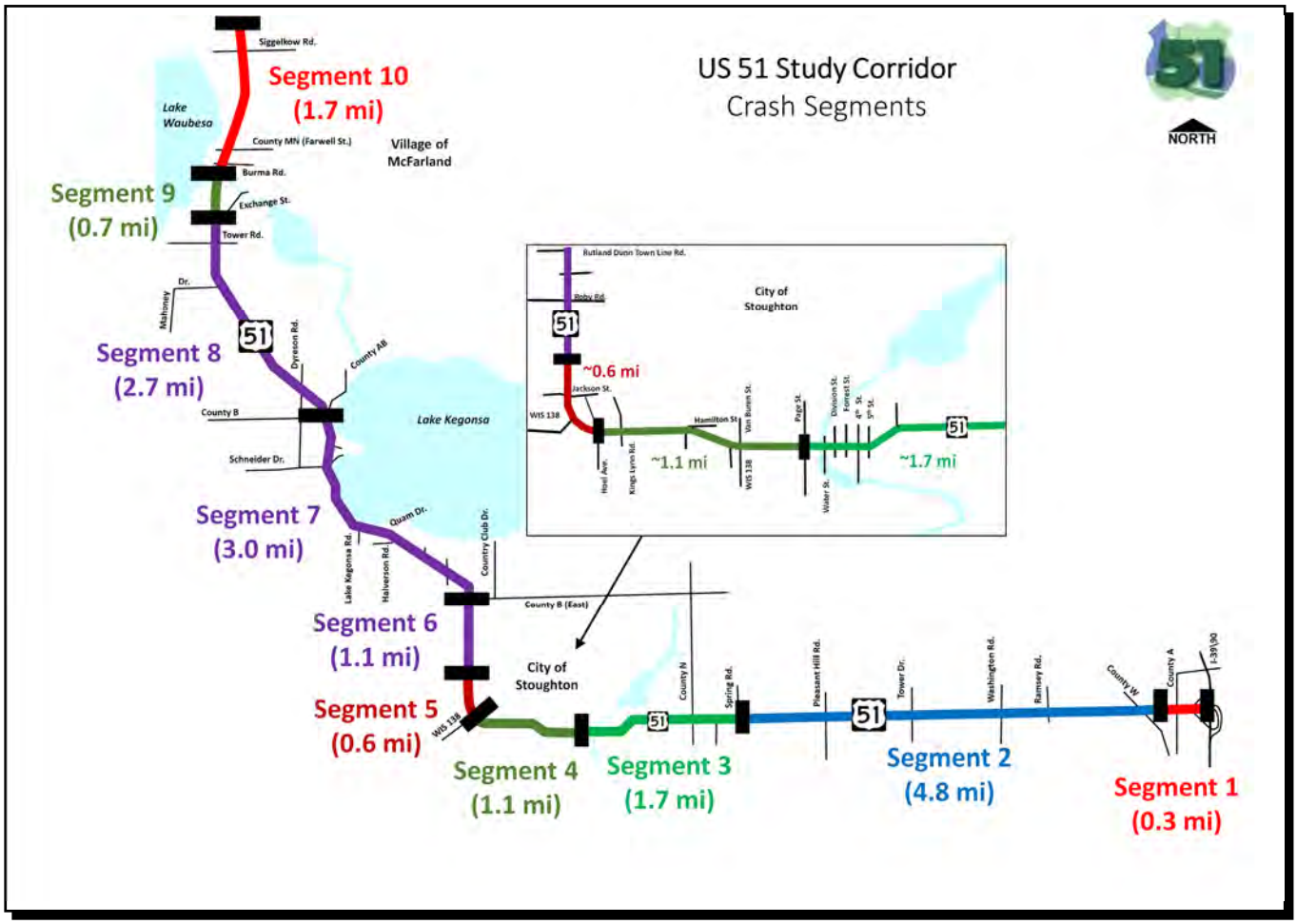
Police reports for the study area crashes were provided by the University of Wisconsin-Madison Traffic Operations and Safety Laboratory. The project team analyzed each police report to confirm the crash as a segment and/or an intersection crash. Animal-related crashes were not included in the crash analysis.

SEGMENT CRASH RATES

To analyze crashes along US 51, the corridor was divided into ten roadway segments based on the changing character of the highway. Beginning at I-39/90 east of Stoughton, the ten segments are:

- Crash Segment 1 is from I-39/90 to west of County A (0.3 miles).
- Crash Segment 2 is from west of County A to Spring Road (4.8 miles).
- Crash Segment 3 is from Spring Road to Page Street (1.7 miles).
- Crash Segment 4 is from Page Street to WIS 138 South (1.1 miles).
- Crash Segment 5 is from WIS 138 South to north of Jackson Street (0.6 miles).
- Crash Segment 6 is from north of Jackson Street to County B (East) (1.1 miles).
- Crash Segment 7 is from County B (East) to County B/AB (3.0 miles).
- Crash Segment 8 is from County B/AB to Exchange Street (2.7 miles).
- Crash Segment 9 is from Exchange Street to south of Burma Road (0.7 miles).
- Crash Segment 10 is from south of Burma Road to south of Terminal Drive (1.7 miles).

Figure 2 shows where the segments are located. Segment crash rates were calculated between intersections based on the borders of different classes of the roadway. The segment crash rates were calculated as the number of crashes per hundred million vehicle miles traveled.



Intersection crashes were included in the segment crash data where the intersection is located within the segment. If a crash occurred in the functional area of County B/AB, which borders Segment 7 to the south and Segment 8 to the north, it was considered to occur in the segment that the at-fault driver was traveling from. For example, if the at fault driver was traveling northbound at the intersection of US 51 and County B/AB, the crash would be included in the Segment 7. If a crash occurred exclusively on the crossroad, it was considered to occur in the segment to the south or east of the intersection. For example, if a rear-end collision crash occurred on County B/AB at the intersection with US 51, the crash would be included in Segment 7. This methodology ensured crashes were not double-counted and maintained a consistent methodology to identify crash locations at the intersection bordering the segments.

A summary of the segment crash analysis is shown in Table 1. For divided roadways, the northbound and southbound crash rates are calculated independently based on WisDOT guidance.

Segment	Meta Group	Termini	Total Segment Crashes	Total KAB Injury Crashes	Crash Rate for Total Crashes	Crash Rate for KAB Crashes
1 (NB)	310	I-39/90 - West of County A	1	0	77.1	0.0
1 (SB)	310	I-39/90 - West of County A	5	2	385.3	154.1
2	420	West of County A - Spring Rd	28	5	60.7	10.8
3	440	Spring Rd - Page St	138	9	462.4	30.2
4	330	Page St - Hoel Ave	106	6	385.1	21.8
5 (NB)	320	Hoel Ave - North of Jackson St	16	2	255.2	31.9
5 (SB)	320	Hoel Ave - North of Jackson St	23	3	366.9	47.9
6	430	North of Jackson St - County B (east)	59	11	277.5	51.7
7	430	County B (east) - County B/AB	110	28	185.0	47.1
8	430	County B/AB - Exchange St	64	14	109.0	23.8
9	330	Exchange St - Burma Rd	11	1	61.5	5.6
10 (NB)	310	Burma Rd - South of Terminal Dr/Voges Rd	55	8	163.4	23.8
10 (SB)	310	Burma Rd - South of Terminal Dr/Voges Rd	63	4	187.2	11.9

Notes:
KAB = sum of K-Level (fatal), A-level (suspected serious injury), and B-level (suspected minor injury) crashes as defined by WisDOT guidance.
*Average Yearly Crash Rate = (# Crashes/# years*100000000)/(AADT*365*Length)*
Meta Group represents the "The Meta-Manager Peer Group" based on WisDOT's 2014-2018 statewide average crash rate guidance.

There were 679 (non-deer-related) crashes from 2014 to 2018 between I-39/90 and south of Terminal Drive/Voges Road. In five of the ten crash segments, the overall crash rate exceeded the statewide average for similar roadways. There were 2 fatal crashes and 14 suspected serious injury crashes during the study period. Injury crash rates for segments 1, 6, 7, 8, and 10 each exceeded the statewide average.[1] In the five years prior to the analysis period, from 2009 to 2013, nine fatal crashes occurred. More detailed information on the US 51 segment crash rates versus the statewide average crash rates is located in Attachment A.

INTERSECTION CRASH RATES

Intersection crashes in the crash analysis include those that occur within the physical and functional areas of an intersection. The intersection crash rates were calculated as the number of crashes per

[1] Injury crash rates are expressed with a KAB severity measure, which includes the sum of all K-Level (fatal), A-Level (suspected serious injury) and B-Level (suspected minor injury) crashes as defined by WisDOT guidance.

million entering vehicles (MEV). Attachment B shows the rankings for intersection total and KAB injury crash rates for the study corridor.

CRASH TRENDS AND RESULTS

Crash types were broken down into seven categories: angle (ANGL), rear end (REAR), sideswipe/same direction (SSS), sideswipe opposite direction (SSOP), head on collision (HEAD), single vehicle (NO), and other (OTHER) crashes. Crashes were also analyzed to see if weather could be a contributing factor to a crash. The three main road conditions that contributed to weather related crashes were ice, snow, and wet roadway conditions. Lighting conditions could also be a contributing factor of a crash. Lighting conditions were broken down into "day" and "dark" categories. Dawn, dusk, or street-lighted conditions were included in the dark category total. Appendices A and B show the breakdown of the crash types, road conditions, and lighting conditions by segment and by intersections, respectively, that had 5 or more crashes occur during the study period.

The results of the crash analysis indicated the following:

- The corridor had 679 crashes from 2014 to 2018.
- 419 crashes (62 percent) were intersection related.
- 402 crashes (59 percent) were either of the angle or rear-end crash types.
- 193 crashes (28 percent) involved Type A, B, or C injuries.
- 192 crashes (28 percent) involved poor weather-related roadway conditions.
- 208 crashes (31 percent) occurred when it was dark.
- 2 crashes involved fatalities over the analysis period.

The total crash rates and injury crash rates are shown in Attachment A for each segment.

CRASH DIAGRAMS

Crash diagrams were completed for the following nine intersections as part of Intersection Control Evaluation (ICE) analysis efforts for the US 51 Corridor Study:

1. US 51 and Silverado Drive/Hoel Avenue
2. US 51 and WIS 138 (west)
3. US 51 and Jackson Street
4. US 51 and Roby Road/Deer Point Drive
5. US 51 and County B (east)
6. US 51 and County B/County AB
7. US 51 and Exchange Street
8. US 51 NB Ramps and Siggelkow Road
9. US 51 SB Ramps and Siggelkow Road

The majority of these crash diagrams (all except Siggelkow Road) were created as part of Phase II: Alternative Selection ICE efforts in 2015 and early 2016. The completed Phase II ICE Reports were each approved by WisDOT Bureau of Traffic Operations (BTO) staff and, therefore, were not updated with the more recently available 5-year crash data (2014 to 2018). A Phase I: Scoping Level ICE evaluation was performed for the Siggelkow Road interchange ramp terminal intersections within the overall study efforts.

The intersection crash diagrams for the ramp terminals were updated to use 2014 to 2018 crash data as part of the Phase I ICE effort. The Phase I ICE Report identifies multiple feasible intersection control alternatives. A Phase II: Alternative Selection ICE Report for the Siggelkow Road ramp terminals is anticipated to be completed during the design phase of the project.

The intersection crash diagrams can be found in Attachment C.

BICYCLE AND PEDESTRIAN CRASHES

There were nine crashes involving a bicyclist or pedestrian during the analysis period. Seven of the bicyclist or pedestrian crashes occurred in the city of Stoughton while two occurred in McFarland. Table 2 summarizes the crashes involving a bicyclist or pedestrian.

Location	Intersection	Date	Crash Type	Crash Severity[1]	Description
City of Stoughton	US 51 / 7th St	5/9/2017	Bike	B	Bicycle struck in crosswalk, struck by creeping vehicle at stop sign
	US 51 / 6th St	11/28/2018	Bike	C	Bicycle struck in crosswalk at stop sign
	US 51 / 5th St	3/8/2018	Bike[2]	PDO	Scooter struck in crosswalk
	US 51 / S Monroe St	5/28/2015	Pedestrian	B	Pedestrian struck in crosswalk
	US 51 / S Prairie St	11/16/2017	Pedestrian	C	Pedestrian struck in crosswalk
	US 51 / W Main St	10/7/2014	Bike	A	Bicycle struck in crosswalk, operator ejected off bike
	US 51 / Kings Lynn Rd	4/27/2017	Pedestrian	A	Pedestrian struck in crosswalk
Village of McFarland	US 51 / Farwell St (County MN)	10/14/2014	Pedestrian	B	Pedestrian struck in crosswalk
		7/24/2017	Bike	A	Bicycle struck in crosswalk, bicycle crossed against the signal

[1] Crash Severity Definitions: Type K = Fatal, Type A = Suspected Serious Injury, Type B = Suspected Minor Injury, Type C = Possible Injury, PDO = Property Damage Only

[2] Scooter assumed to be non-motorized, treated as bike crash

ATTACHMENT A
SEGMENT CRASH ANALYSIS

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Segment	Direction	Termini	Segment Length (miles)	AADT[1] (vehicles per day)	Year	Fatal	A-Level Injury	B-Level Injury	C-Level Injury	PDO	*All Injury*	*KAB Injury*	*Total*	Segment Total Crashes	Segment KAB Crashes	Total Crash Rate	KAB Crash Rate
1	N	Segment 1: I-39/90 to West of County A	0.3	2,155	2014	0	0	0	0	0	*0*	***0***	**0**	1	0	77	0.0
					2015	0	0	0	0	0	*0*	***0***	**0**				
					2016	0	0	0	0	0	*0*	***0***	**0**				
					2017	0	0	0	0	1	*0*	***0***	**1**				
					2018	0	0	0	0	0	*0*	***0***	**0**				
1	S			2,155	2014	0	0	0	1	0	*1*	***0***	**1**	5	2	385	154.1
					2015	0	0	0	0	1	*0*	***0***	**1**				
					2016	0	0	1	0	0	*1*	***1***	**1**				
					2017	0	0	1	0	0	*1*	***1***	**1**				
					2018	0	0	0	0	1	*0*	***0***	**1**				
2	Both	Segment 2: West of County A to Spring Road	4.8	5,270	2014	0	0	0	1	7	*1*	***0***	**8**	28	5	61	10.8
					2015	0	0	2	2	0	*4*	***2***	**4**				
					2016	0	0	0	0	3	*0*	***0***	**3**				
					2017	0	0	2	0	4	*2*	***2***	**6**				
					2018	0	0	1	1	5	*2*	***1***	**7**				
3	Both	Segment 3: Spring Road to Page Street	1.7	9,600	2014	0	0	1	5	23	*6*	***1***	**29**	138	9	462	30.2
					2015	0	1	2	3	25	*6*	***3***	**31**				
					2016	0	0	0	2	23	*2*	***0***	**25**				
					2017	0	0	4	2	24	*6*	***4***	**30**				
					2018	0	1	0	2	20	*3*	***1***	**23**				
4	Both	Segment 4: Page Street to WIS 138 South	1.1	13,710	2014	0	1	1	3	21	*5*	***2***	**26**	106	6	385	21.8
					2015	0	0	1	5	15	*6*	***1***	**21**				
					2016	0	0	0	3	14	*3*	***0***	**17**				
					2017	0	1	2	1	17	*4*	***3***	**21**				
					2018	0	0	0	1	20	*1*	***0***	**21**				
5	N	Segment 5: WIS 138 South to North of Jackson Street	0.6	5,725	2014	0	0	2	0	1	*2*	***2***	**3**	16	2	255	31.9
					2015	0	0	0	0	1	*0*	***0***	**1**				
					2016	0	0	0	0	1	*0*	***0***	**1**				
					2017	0	0	0	1	2	*1*	***0***	**3**				
					2018	0	0	0	0	8	*0*	***0***	**8**				
5	S			5,725	2014	0	0	0	2	3	*2*	***0***	**5**	23	3	367	47.9
					2015	0	0	2	0	1	*2*	***2***	**3**				
					2016	0	0	1	0	6	*1*	***1***	**7**				
					2017	0	0	0	0	3	*0*	***0***	**3**				
					2018	0	0	0	1	4	*1*	***0***	**5**				
6	Both	Segment 6: North of Jackson Street to County B (East)	1.1	10,590	2014	0	1	1	0	8	*2*	***2***	**10**	59	11	278	51.7
					2015	0	0	3	5	4	*8*	***3***	**12**				
					2016	0	0	2	5	13	*7*	***2***	**20**				
					2017	0	0	1	3	3	*4*	***1***	**7**				
					2018	0	0	3	0	7	*3*	***3***	**10**				
7	Both	Segment 7: County B (East) to County B/AB	3.0	10,860	2014	1	0	5	4	11	*10*	***6***	**21**	110	28	185	47.1
					2015	0	1	3	3	8	*7*	***4***	**15**				
					2016	0	0	4	5	14	*9*	***4***	**23**				
					2017	0	1	4	2	14	*7*	***5***	**21**				
					2018	1	2	6	2	19	*11*	***9***	**30**				
8	Both	Segment 8: County B/AB to Exchange Street	2.7	11,920	2014	0	0	1	4	9	*5*	***1***	**14**	64	14	109	23.8
					2015	0	0	3	2	8	*5*	***3***	**13**				
					2016	0	1	0	1	7	*2*	***1***	**9**				
					2017	0	0	3	5	9	*8*	***3***	**17**				
					2018	0	1	5	1	4	*7*	***6***	**11**				
9	Both	Segment 9: Exchange Street to South of Burma Road	0.7	13,990	2014	0	0	0	1	1	*1*	***0***	**2**	11	1	62	5.6
					2015	0	0	0	2	3	*2*	***0***	**5**				
					2016	0	0	0	0	1	*0*	***0***	**1**				
					2017	0	0	1	0	1	*1*	***1***	**2**				
					2018	0	0	0	0	1	*0*	***0***	**1**				
10	N	Segment 10: South of Burma Road to South of Terminal Drive/Voges Road	1.7	10,850	2014	0	0	1	0	6	*1*	***1***	**7**	55	8	163	23.8
					2015	0	0	1	2	8	*3*	***1***	**11**				
					2016	0	0	1	1	5	*2*	***1***	**7**				
					2017	0	1	2	0	14	*3*	***3***	**17**				
					2018	0	0	2	3	8	*5*	***2***	**13**				
10	S			10,850	2014	0	0	0	2	9	*2*	***0***	**11**	63	4	187	11.9
					2015	0	0	0	4	6	*4*	***0***	**10**				
					2016	0	0	1	4	16	*5*	***1***	**21**				
					2017	0	2	0	1	7	*3*	***2***	**10**				
					2018	0	0	1	2	8	*3*	***1***	**11**				
Totals			17.7	---	2014	1	2	12	23	99	*38*	***15***	**137**	679	93	---	---
					2015	0	2	17	28	80	*47*	***19***	**127**				
					2016	0	1	10	21	103	*32*	***11***	**135**				
					2017	0	5	20	15	99	*40*	***25***	**139**				
					2018	1	4	18	13	105	36	**23**	**141**				
					TOTAL	**2**	**14**	**77**	**100**	**486**	**193**	**93**	**679**				

Average Yearly Crash Rate *= (# Crashes/# years*100000000)/(ADT*365*Length)*

Notes:

PDO = Property Damage Only. KAB Injury = sum of K-level, A-level, and B-level crashes.

[1] Source = WisDOT TCMap https://wisconsindot.gov/Pages/projects/data-plan/traf-counts/default.aspx, accessed July/August 2019. Five-year average AADTs (2014 to 2018) were calculated from the volume data provided on the TCMap for this analysis.

S:\MAD\1000--1099\1089\947\Designs-Studies-Reports\EA Data Folders\Crashes\2019-11 US 51 EA Crash Calcs (2014-2018).xlsx

WisDOT Division of Transportation
System Development
Bureau of Traffic Operations
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Governor Tony Evers
Secretary Craig Thompson
wisconsindot.gov

Date: November 15, 2019

To: Region Systems Planning and Operations Sections

From: Brian Porter, PE, PTOE
State Traffic Safety Engineer

Subject: 2018 Statewide Average Crash Rates

Statewide Average Crash Rates and Upper Control Limits

Table 1 shows the Wisconsin statewide average crash rates for the five-year period from January 1, 2014 to December 31, 2018. Crashes involving deer were removed from the dataset before completing the calculations.

Table 1 includes the statewide average crash rates for the State Trunk Highway network broken out by Meta-Manager Peer Group. The Meta-Manager Peer Groups are intended to represent a group of roadway segments throughout the state with similar characteristics (i.e. number of lanes, type of access, presence of median, etc.). These are often referred to as reference populations. Each year, the peer groups are created by combining Meta-Manager roadway segments that have the characteristics which define each group. Other minor modifications are made to the Peer Groups so these crash rates should not be compared to previous statewide average crash rates.

Table 1: 2014-2018 Statewide Average Crash Rates, KAB Crash Rates, and UCLs for State Highways

Meta-Manager Peer Group		Total Crash Rate (crashes per HMVMT)		KAB Crash Rate (crashes per HMVMT)	
		Average	UCL	Average	UCL
110	6-lane Freeways with AADT ≤ 90,300 vpd	70.28	$= 70.28 + 523.42\sqrt{\frac{70.28}{AADT * L * Y}}$	8.18	$= 8.18 + 523.42\sqrt{\frac{8.18}{AADT * L * Y}}$
120	6-lane Freeways with AADT > 90,300 vpd	106.47	$= 106.47 + 523.42\sqrt{\frac{106.47}{AADT * L * Y}}$	8.99	$= 8.99 + 523.42\sqrt{\frac{8.99}{AADT * L * Y}}$
130	4-lane Freeways	50.89	$= 50.89 + 523.42\sqrt{\frac{50.89}{AADT * L * Y}}$	7.06	$= 7.06 + 523.42\sqrt{\frac{7.06}{AADT * L * Y}}$
210	65 mph Expressways*	47.48	$= 47.48 + 523.42\sqrt{\frac{47.48}{AADT * L * Y}}$	9.31	$= 9.31 + 523.42\sqrt{\frac{9.31}{AADT * L * Y}}$
220	55 mph Expressways*	74.33	$= 74.33 + 523.42\sqrt{\frac{74.33}{AADT * L * Y}}$	12.75	$= 12.75 + 523.42\sqrt{\frac{12.75}{AADT * L * Y}}$
310	Multilane Divided Highways Posted at 45 mph or higher	206.87	$= 206.87 + 523.42\sqrt{\frac{206.87}{AADT * L * Y}}$	24.24	$= 24.24 + 523.42\sqrt{\frac{24.24}{AADT * L * Y}}$
320	Multilane Divided Highways Posted at 40 mph or lower	424.99	$= 424.99 + 523.42\sqrt{\frac{424.99}{AADT * L * Y}}$	52.22	$= 52.22 + 523.42\sqrt{\frac{52.22}{AADT * L * Y}}$
330	Multilane Undivided and One-Way Highways	464.01	$= 464.01 + 523.42\sqrt{\frac{464.01}{AADT * L * Y}}$	57.46	$= 57.46 + 523.42\sqrt{\frac{57.46}{AADT * L * Y}}$
410	Rural 2-lane Highways with AADT ≤ 2,000	101.39	$= 101.39 + 523.42\sqrt{\frac{101.39}{AADT * L * Y}}$	24.53	$= 24.53 + 523.42\sqrt{\frac{24.53}{AADT * L * Y}}$
420	Rural 2-lane Highways with 2,000 < AADT < 7,000	79.25	$= 79.25 + 523.42\sqrt{\frac{79.25}{AADT * L * Y}}$	18.51	$= 18.51 + 523.42\sqrt{\frac{18.51}{AADT * L * Y}}$
430	Rural 2-lane Highways with AADT ≥ 7,000	96.34	$= 96.34 + 523.42\sqrt{\frac{96.34}{AADT * L * Y}}$	20.04	$= 20.04 + 523.42\sqrt{\frac{20.04}{AADT * L * Y}}$
440	2-Lane Highways Posted at 40 mph or lower	298.56	$= 298.56 + 523.42\sqrt{\frac{298.56}{AADT * L * Y}}$	35.64	$= 35.64 + 523.42\sqrt{\frac{35.64}{AADT * L * Y}}$

AADT = Average Annual Daily Traffic (vehicles per day) L = Segment Length (miles) Y = Years
HMVMT = 100 million vehicle miles traveled

* "Expressway" means a state trunk highway that, as determined by the department, has 4 or more lanes of traffic physically separated by a median or barrier and that gives preference to through traffic by utilizing interchanges or limiting at-grade access to selected public roads and public driveways. WI State Statutes: 346.57 (1)(ag)

Previous statewide average crash rate summaries can be found here:

http://wisconsindot.gov/Pages/doing-bus/local-gov/traffic-ops/manuals-and-standards/manuals.aspx

Calculating Statewide Average Crash Rates and Upper Control Limits

To assist with screening for potential safety issues, WisDOT provides statewide average crash rates and UCLs for 12 different categories of state roadways and 2 categories of non-state roadways. The following instructions are provided so segment crash rates are calculated and compared using consistent methodologies. In addition, information is provided to assist users in taking the appropriate actions based on the results of the comparisons.

There are six steps involved with calculating and comparing segment crash rates and UCLs:

Step 1: Identify Segments
Step 2: Determine Total Number of Crashes and KAB Crashes
Step 3: Determine AADT
Step 4: Calculate Crash Rates and KAB Crash Rates
Step 5: Calculate Crate Rate UCLs and KAB Crash Rate UCLs
Step 6: Compare Crash Rates and KAB Crash Rates to UCLs and Choose Action

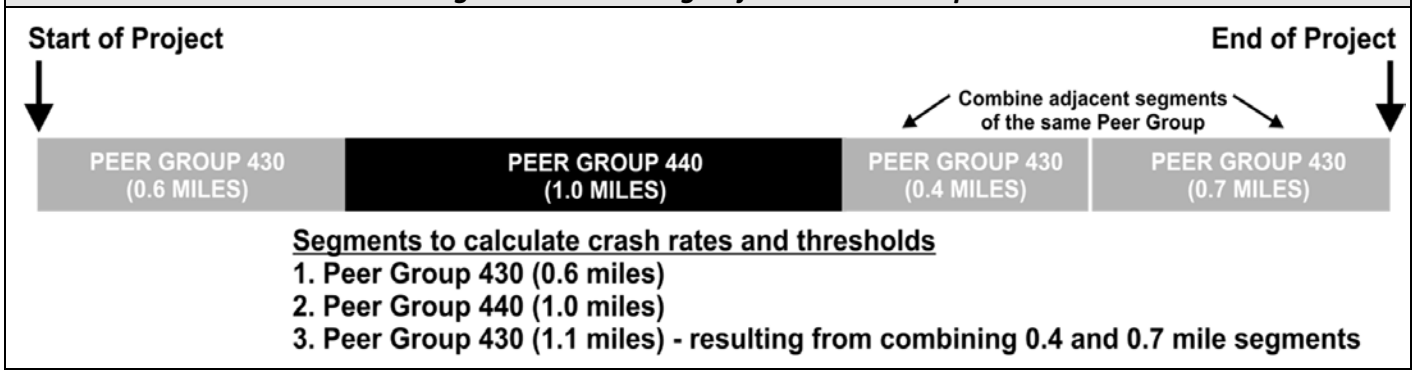
Detailed instructions for each of the six steps are provided below:

Step 1: Identify the roadway segments on your project. If multiple Peer Groups exist on your project, crash rates and UCLs should be calculated for each Peer Group by combining adjacent segments of the same Peer Group per the example in ***Figure 1***.

- ⇨ Segments 0.1 miles or less should be excluded from crash rate comparisons unless combined with other segments.

- ⇨ Segments should not exceed 5 miles in length. If necessary, break a long segment into segments less than 5 miles.

Figure 1: Combining Adjacent Peer Groups



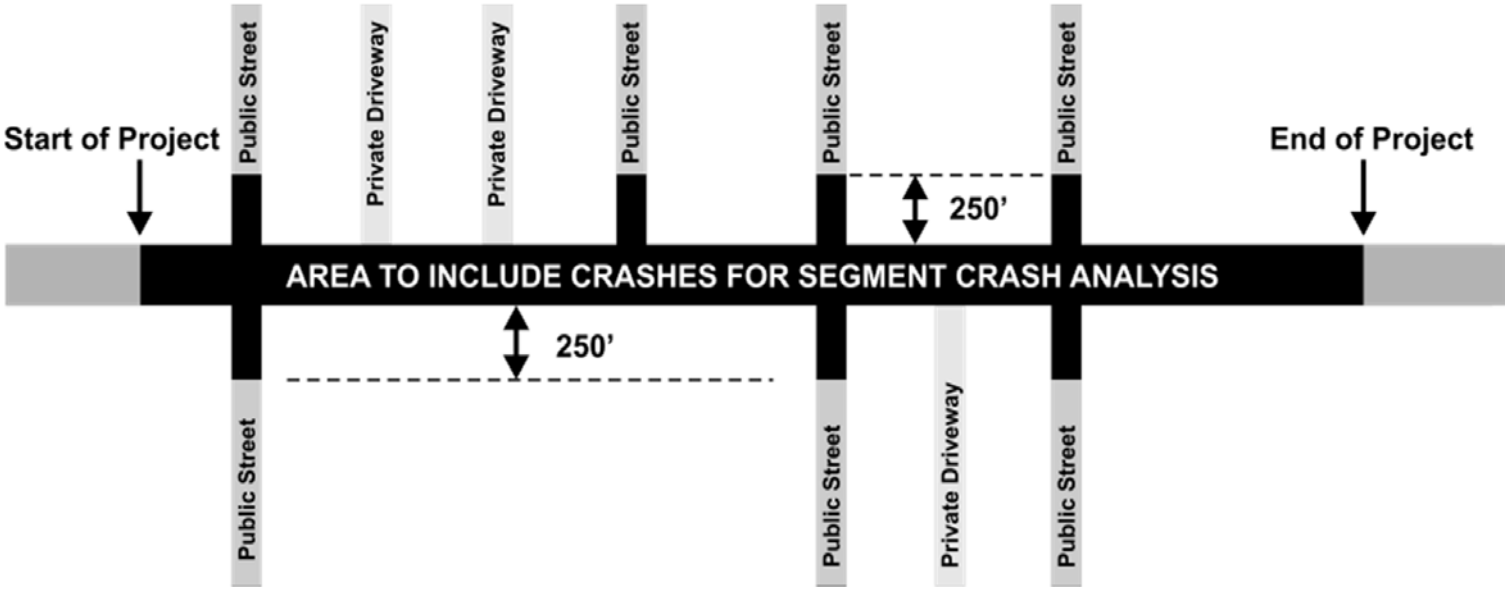
Step 2: Determine the total number of crashes for each segment on your project and the sum of KAB crashes (K-Level, A-Level, and B-Level). Severity definitions are provided on page 6.

The total number of crashes should include all reportable non-deer related crashes occurring on the roadway, including crashes on intersecting public streets within a distance of 250 feet from the roadway (see ***Figure 2*** for an illustration of the areas where crashes should be included). Crashes occurring on private driveways should not be included in crash rate calculations.

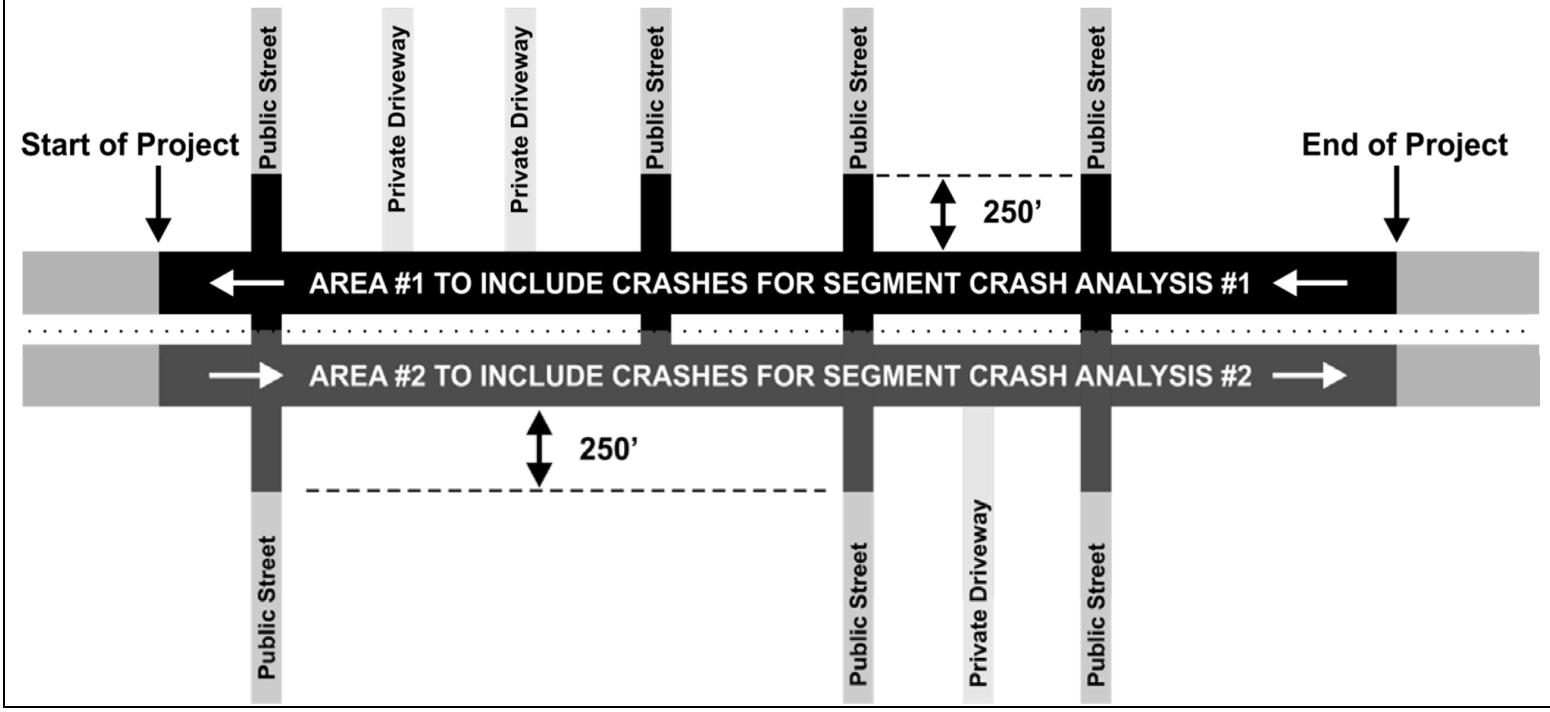
IMPORTANT: Divided roadways (i.e., Peer Groups 110, 120, 130, 210, 220, 310, and 320) should have each direction of travel analyzed separately to be consistent with the methods used to calculate the statewide average crash rates. AADT volumes should be determined for each direction of travel on divided roadways.

Figure 2: Crashes to Include in Segment Crash Rates

Undivided Roadways



Divided Roadways – Separate Analysis for Each Direction of Travel



Crash Severity

The severity of a crash is based on the most severe injury to any person involved in the crash. Crash severity is based on the KABCO injury severity scale according to the following definitions:

Fatal (K) = Any injury from a traffic crash which results in death within 30 days of the crash.

A-level = Suspected Serious Injury – Any injury other than fatal which results in one or more of the following:

- Severe laceration resulting in exposure of underlying tissues/muscle/organs or resulting in significant loss of blood, broken or distorted extremity (arm or leg), crush injuries, suspected skull, chest or abdominal injury other than bruises or minor lacerations, significant burns (second and third degree burns over 10% or more of body), unconsciousness when taken from the crash scene, or paralysis.

B-level = Suspected Minor Injury – Any injury that is evident at the scene of the crash other than fatal or serious injuries.

- Examples include lump on the head, abrasions, bruises, minor lacerations (cuts on the skin surface with minimal bleeding and no exposure of deeper tissue/muscle).

C-level = Possible Injury – Any injury reported or claimed which is not fatal, suspected serious or suspected minor injury.

- Examples include momentary loss of consciousness, claim of injury, limping, or complaint of pain or nausea. Possible injuries are those which are reported by the person or are indicated by his/her behavior, but no wounds or injuries are readily evident.

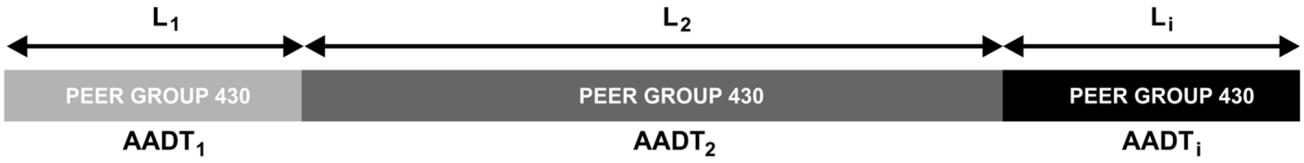
O-level = Property Damage Only / No Apparent Injury - No reason to believe that the person received any bodily harm from the motor vehicle crash. There is no physical evidence of injury and the person does not report any change in normal function.

A reportable crash is any crash that results in an injury or fatality. Additionally, a reportable crash is a crash in which damage to an individual's property totals more than $1,000 or damage to government property (e.g. traffic control devices, guardrail, etc.) totals more than $200.

<u>Step 3</u>: Identify or calculate the AADT for each segment on your project (see Step 1 for instructions about combining adjacent segments with the same Peer Group). If multiple AADTs exist within the same Peer Group, use ***Equation 1*** to calculate a pro-rated AADT. AADT volumes should be determined for each direction of travel on divided roadways.

Equation 1: Pro-Rated AADT

Pro-rate AADTs when combining adjacent segments of the **same Peer Group** that have varying AADTs.



$AADT_{PR} = \frac{L_1 * AADT_1 + L_2 * AADT_2 + L_i * AADT_i}{L_1 + L_2 + L_i}$ = Pro-Rated Annual Average Daily Traffic

L_1 = Length of Segment #1 (miles)
$AADT_1$ = Annual Average Daily Traffic of Segment #1
L_2 = Length of Segment #2 (miles)
$AADT_2$ = Annual Average Daily Traffic of Segment #2
L_i = Length of Segment #i (miles)
$AADT_i$ = Annual Average Daily Traffic of Segment #i

Notes:
1. If multiple AADTs are provided for a particular segment (e.g., Year 2014 $AADT_1$ = 5,000 and Year 2017 $AADT_1$ = 6,500), use engineering judgment to calculate an AADT that best represents the five-year average.

2. Engineering judgment should be used when determining where AADT counts begin and end. Roadway characteristics that affect traffic volumes are typically good places to define AADT limits. For example, major intersections, driveways to traffic generating businesses, and transitions in surrounding land uses (e.g., urban to rural) are commonly used as start/stop points for AADTs.

Step 4: Calculate segment crash rates (see ***Equation 2***) and KAB Crash Rates (see ***Equation 3***) for each segment on your project (see Step 1 for instructions about combining adjacent segments with the same Peer Group).

Equation 2: Segment Crash Rate

Segment Crash Rate = $\frac{C*100{,}000{,}000}{AADT*L*Y*365}$ = Crashes *per* 100 million vehicle miles traveled (HMVMT)

C = Number of crashes in five-year period (years 2014-2018)
AADT = Annual Average Daily Traffic (if AADT varies along the roadway, see ***Equation 1***)
L = Length of segment (miles)
Y = Number of years analyzed (5)

Equation 3: KAB Crash Rate

KAB Crash Rate = $\frac{C_{KAB}*100{,}000{,}000}{AADT*L*Y*365}$ = KAB Crashes *per* HMVMT

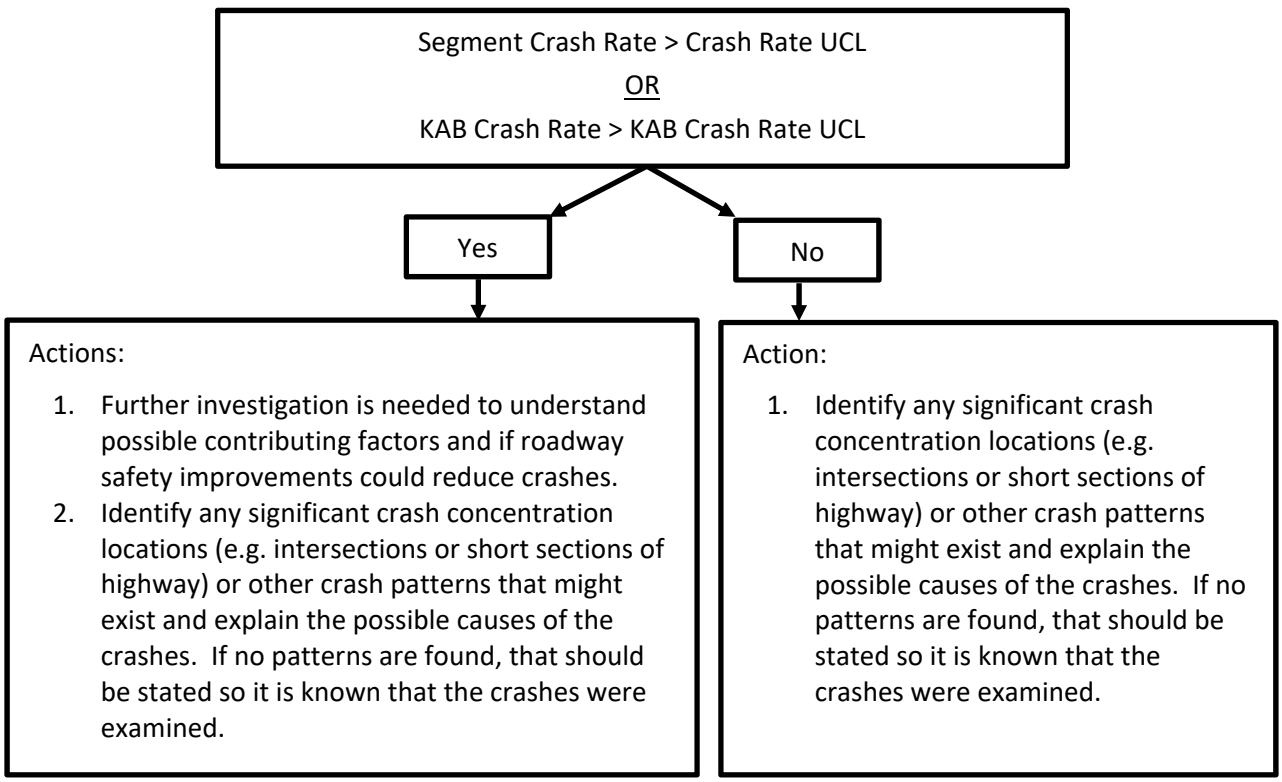
C_{KAB} = Sum of K-level, A-level, and B-level crashes in five-year period (years 2014-2018)
AADT = Annual Average Daily Traffic (if AADT varies along the roadway, see ***Equation 1***)
L = Length of segment (miles)
Y = Number of years analyzed (5)

Step 5: Calculate crash rate and KAB Crash Rate UCLs for each segment on your project per the formulas provided in ***Table 1***. Example calculations are provided below:

Example UCL Calculations
Rural Two-Lane Highway AADT = 4,500 Length = 2.0 Miles Crash Rate = 70 crashes per 100 MVM KAB Crash Rate = 50 KAB crashes per 100 MVM Classification: Peer Group (420) Rural 2-lane Highway with 2,000 < AADT ≤ 7,000 *Example UCL Calculations for Peer Group (420) – See **Table 1** to find equations for UCLs* $$Crash\ Rate\ UCL = 79.25 + 523.42\sqrt{\frac{79.25}{AADT * L * Y}}$$ $$Crash\ Rate\ UCL = 79.25 + 523.42\sqrt{\frac{79.25}{4{,}500 * 2.0 * 5}} = 101.22\ Crashes\ per\ 100\ MVM$$ $$KAB\ Rate\ UCL = 18.51 + 523.42\sqrt{\frac{18.51}{AADT * L * Y}}$$ $$KAB\ Rate\ UCL = 18.51 + 523.42\sqrt{\frac{18.51}{4{,}500 * 2.0 * 5}} = 29.13\ KAB\ Crashes\ per\ 100\ MVM$$ *Results*: The segment's crash rate of 70 crashes per 100 MVM is less than the crash rate UCL of 101.22, but the segment's KAB Crash Rate of 50 crashes per 100 MVM is higher than the KAB Crash Rate UCL of 29.13. See Step 6 for how to interpret these results and what actions are suggested.

Step 6: Compare your segment's crash rate and KAB Crash Rates to the calculated UCLs. Use the flowchart in ***Figure 3*** to determine what action should be taken.

Figure 3: Action Flow Chart



Local Road Crash Rates

Table 2 includes statewide average crash rates for local roads which are broken into Urban Street and Rural County Trunk Highways. The Urban Street category includes urban city streets, rural city streets and urban county trunk highways.

The local road crash rates and KAB segment crash rates have been consolidated to a five-year average for two peer groups. UCLs are provided to help identify where further analysis might be beneficial.

Table 2: 2014-2018 Statewide Average Crash Rates, KAB Crash Rates, and UCLs for Local Roads

	Crash Rate (crashes per HMVMT)		KAB Crash Rate (crashes per HMVMT)	
Local Road Group	**Average**	**UCL**	**Average**	**UCL**
Urban Streets	349.89	$= 349.89 + 523.42\sqrt{\frac{349.89}{AADT * L * Y}}$	39.90	$= 39.90 + 523.42\sqrt{\frac{39.90}{AADT * L * Y}}$
Rural County Trunk Highways	92.87	$= 92.87 + 523.42\sqrt{\frac{92.87}{AADT * L * Y}}$	20.93	$= 20.93 + 523.42\sqrt{\frac{20.93}{AADT * L * Y}}$

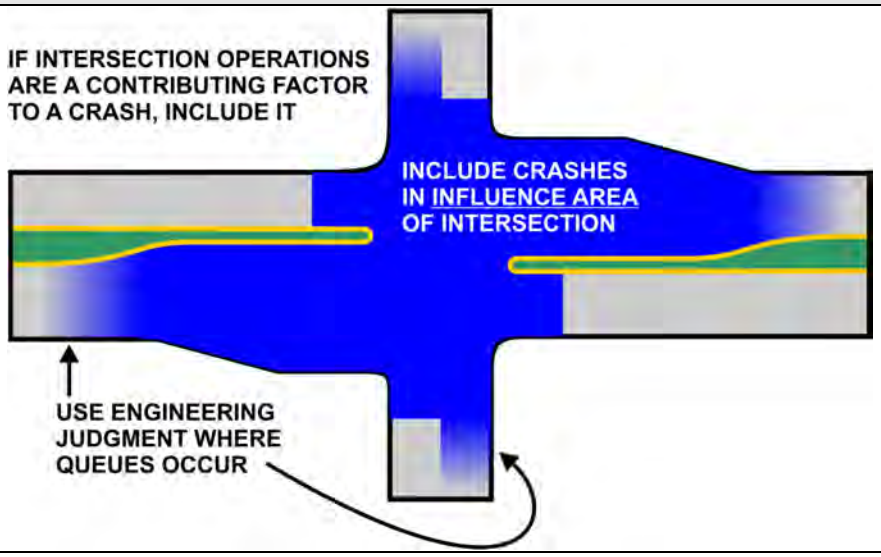
AADT = Average Annual Daily Traffic (vehicles per day) L = Segment Length (miles) Y = Years
HMVMT = 100 million vehicle miles traveled

Intersection Crash Rates

WisDOT does not produce statewide intersection crash rates or utilize a specific threshold crash rate for screening potential intersection safety issues. WisDOT is in the process of developing statewide intersection crash data for use in intersection safety analyses. When this information is ready, it will be included in future publications of this document with guidance regarding its use.

If intersection crash rates are calculated, they should be calculated using the crashes that occurred in the past five years within the influence area of the intersection. See ***Figure 4*** for an illustration of the influence area of an intersection. If operational characteristics of the intersection (such as queueing) appear to be related to the cause of the crash, the crash should be included in the intersection crash rate analysis.

Figure 4: Influence Area of Intersection



Equation 4 shows the calculation for intersection crash rates.

Equation 4: Intersection Crash Rate

Intersection Crash Rate = $\frac{C*1{,}000{,}000}{AADT_{ent}*Y*365}$ = Crashes *per* 1 million entering vehicles (MEV)

C = Number of crashes in the time period analyzed (preferably 5 years) within the influence area of the intersection

$AADT_{ent}$ = Annual Average Daily Traffic entering the intersection

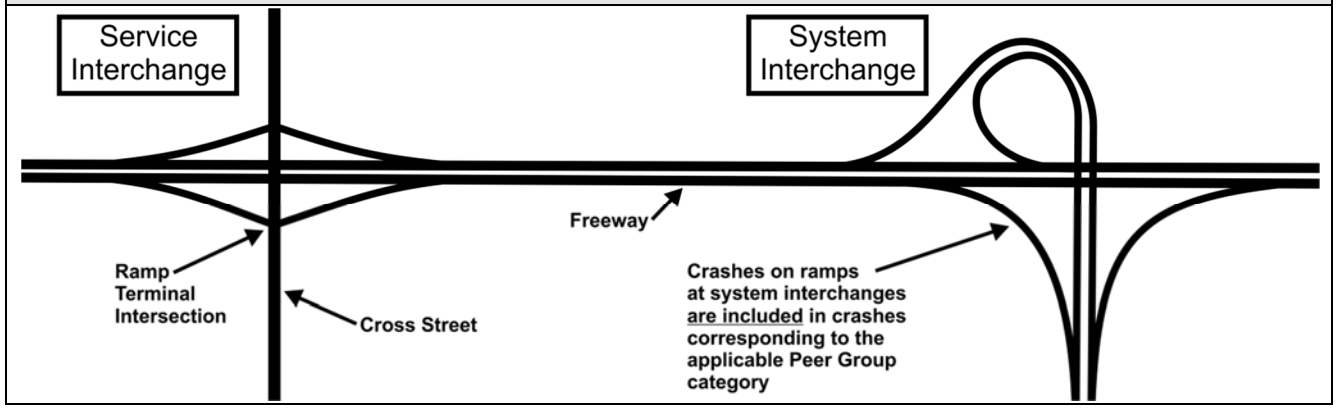
Y = Number of years analyzed (preferably 5)

Ramp Crash Rates

Crashes that occurred on ramps at service interchanges **are not** included in the crashes used to calculate the statewide average crash rates for roadways. WisDOT is in the process of developing statewide ramp crash information for use in comparisons. When this information is ready, it will be included in future publications of this document with guidance regarding its use.

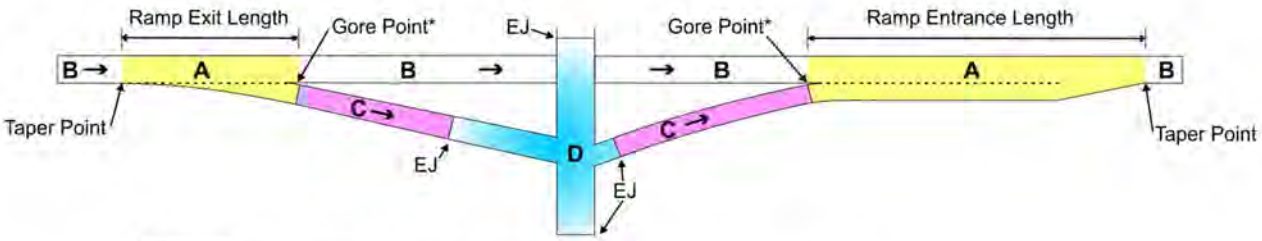
Crashes that occurred on ramps at system interchanges (i.e., freeway to freeway) **are** included in the crashes used to calculate the corresponding freeway Peer Group average crash rates. Please see ***Figure 5a*** for an illustration of service versus system interchanges.

Figure 5a: Service versus System Interchanges



At service interchanges, the variability in ramp designs and interchange configurations present challenges for conducting consistent analysis. If crash analysis is conducted at a service interchange, it is suggested the analysis be conducted using the segmentation shown in ***Figure 5b***.

Figure 5b: Ramp Detail at Service Interchanges



Definitions

A: All crashes that occur within this area are classified as speed-change crashes
B: All crashes that occur within this area are classified as freeway segment crashes
C: All crashes that occur within this area are classified as ramp crashes
D: All crashes that occur within this area are classified as ramp terminal intersection crashes
EJ: Engineering judgment should be use to determine if crashes occur within the influence area of the intersection

* Point where marked gore is 2 ft wide (gore point)

The definitions shown in ***Figure 5b*** for speed-change areas and freeway segments are based on definitions in the Enhanced Interchange Safety Analysis Tool (ISETe): User Manual, published May 31st, 2012 through the National Cooperative Highway Research Program (NCHRP). ***Figure 5b*** also includes guidance about defining ramps and the influence area of intersections, which are definitions specific to WisDOT business practices.

US 51 Environmental Assessment: Corridor Crash Rate Summary

January 2020

Shading Key: Corridor Crash Rate vs. Statewide Data

0.7 to 1.0	1.0 to 1.5	1.5 - 2.0	> 2.0

			US 51 Corridor (2014-2018)		Statewide Averages (2014-2018)		Upper Control Limits (UCL) (2014-2018)	
Segment 1	**I-39/90 to West of County A**	**Severity**	**Total**	**Average Annual Crash Rate**	**Statewide Average Crash Rate**	**Corridor vs Statewide Average**	**UCL**	**Corridor vs UCL**
	Northbound							
	Meta-manager Peer Group 310: Multilane Divided Highways Posted at 45 mph or higher	Total Crashes	1	77.05	206.87	0.37	333.12	0.23
	0.33 miles	KAB Injury	0	0.00	24.24	0.00	67.46	0.00
	2,155 vehicles per day							
	Southbound							
	Meta-manager Peer Group 310: Multilane Divided Highways Posted at 45 mph or higher	Total Crashes	5	385.25	206.87	**1.86**	333.12	**1.16**
	0.33 miles	KAB Injury	2	154.10	24.24	**6.36**	67.46	**2.28**
	2,155 vehicles per day							
Segment 2	**West of County A to Spring Road**	**Severity**	**Total**	**Average Annual Crash Rate**	**Statewide Average Crash Rate**	**Corridor vs Statewide Average**	**UCL**	**Corridor vs UCL**
	Meta-manager Peer Group 420: Rural 2-lane Highways with 2,000 < AADT ≤ 7,000	Total Crashes	28	60.71	79.25	**0.77**	92.36	0.66
	4.80 miles	KAB Injury	5	10.84	18.51	0.59	24.85	0.44
	5,270 vehicles per day							
Segment 3	**Spring Road to Page Street**	**Severity**	**Total**	**Average Annual Crash Rate**	**Statewide Average Crash Rate**	**Corridor vs Statewide Average**	**UCL**	**Corridor vs UCL**
	Meta-manager Peer Group 440: Rural 2-lane Highways at 40mph or lower	Total Crashes	138	462.36	298.56	**1.55**	330.19	**1.40**
	1.70 miles	KAB Injury	9	30.15	35.64	**0.85**	46.57	0.65
	9,600 vehicles per day							
Segment 4	**Page Street to WIS 138 South**	**Severity**	**Total**	**Average Annual Crash Rate**	**Statewide Average Crash Rate**	**Corridor vs Statewide Average**	**UCL**	**Corridor vs UCL**
	Meta-manager Peer Group 330: Multilane Undivided and One-Way Highways	Total Crashes	106	385.13	464.01	**0.83**	505.07	**0.76**
	1.10 miles	KAB Injury	6	21.80	57.46	0.38	71.91	0.30
	13,710 vehicles per day							

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US 51 Environmental Assessment: Corridor Crash Rate Summary

January 2020

Shading Key: Corridor Crash Rate vs. Statewide Data

0.7 to 1.0	1.0 to 1.5	1.5 - 2.0	> 2.0

			US 51 Corridor (2014-2018)		Statewide Averages (2014-2018)		Upper Control Limits (UCL) (2014-2018)	
Segment 5	**WIS 138 South to North of Jackson Street**	**Severity**	**Total**	**Average Annual Crash Rate**	**Statewide Average Crash Rate**	**Corridor vs Statewide Average**	**UCL**	**Corridor vs UCL**
	Northbound							
	Meta-manager Peer Group 320: Multilane Divided Highways Posted at 40 mph or lower	Total Crashes	16	255.23	424.99	0.60	507.33	0.50
	0.60 miles	KAB Injury	2	31.90	52.22	0.61	81.08	0.39
	5,725 vehicles per day							
	Southbound							
	Meta-manager Peer Group 320: Multilane Divided Highways Posted at 40 mph or lower	Total Crashes	23	366.89	424.99	**0.86**	507.33	**0.72**
	0.60 miles	KAB Injury	3	47.86	52.22	**0.92**	81.08	0.59
	5,725 vehicles per day							
Segment 6	**North of Jackson Street to County B (East)**	**Severity**	**Total**	**Average Annual Crash Rate**	**Statewide Average Crash Rate**	**Corridor vs Statewide Average**	**UCL**	**Corridor vs UCL**
	Meta-manager Peer Group 430: Rural 2-lane Highways with ≥ 7,000	Total Crashes	59	277.52	96.34	**2.88**	117.63	**2.36**
	1.10 miles	KAB Injury	11	51.74	20.04	**2.58**	29.75	**1.74**
	10,590 vehicles per day							
Segment 7	**County B (East) to County B/AB**	**Severity**	**Total**	**Average Annual Crash Rate**	**Statewide Average Crash Rate**	**Corridor vs Statewide Average**	**UCL**	**Corridor vs UCL**
	Meta-manager Peer Group 430: Rural 2-lane Highways with ≥ 7,000	Total Crashes	110	185.00	96.34	**1.92**	109.07	**1.70**
	3.00 miles	KAB Injury	28	47.09	20.04	**2.35**	25.85	**1.82**
	10,860 vehicles per day							
Segment 8	**County B/AB to Exchange Street**	**Severity**	**Total**	**Average Annual Crash Rate**	**Statewide Average Crash Rate**	**Corridor vs Statewide Average**	**UCL**	**Corridor vs UCL**
	Meta-manager Peer Group 430: Rural 2-lane Highways with ≥ 7,000	Total Crashes	64	108.96	96.34	**1.13**	109.15	**1.00**
	2.70 miles	KAB Injury	14	23.84	20.04	**1.19**	25.88	**0.92**
	11,920 vehicles per day							

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US 51 Environmental Assessment: Corridor Crash Rate Summary

January 2020

Shading Key: Corridor Crash Rate vs. Statewide Data

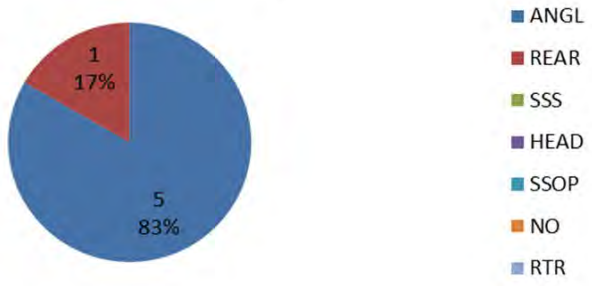
0.7 to 1.0	1.0 to 1.5	1.5 - 2.0	> 2.0

			US 51 Corridor (2014-2018)		Statewide Averages (2014-2018)		Upper Control Limits (UCL) (2014-2018)	
Segment 9	**Exchange Street to South of Burma Road**	**Severity**	**Total**	**Average Annual Crash Rate**	**Statewide Average Crash Rate**	**Corridor vs Statewide Average**	**UCL**	**Corridor vs UCL**
	Meta-manager Peer Group 330: Multilane Undivided and One-Way Highways	Total Crashes	11	61.55	464.01	0.13	514.96	0.12
	0.70 miles 13,990 vehicles per day	KAB Injury	1	5.60	57.46	0.10	75.39	0.07

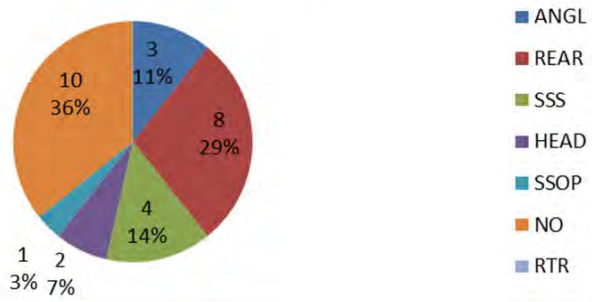
Segment 10	**South of Burma Road to South of Terminal Drive/Voges Road**	**Severity**	**Total**	**Average Annual Crash Rate**	**Statewide Average Crash Rate**	**Corridor vs Statewide Average**	**UCL**	**Corridor vs UCL**
	Northbound							
	Meta-manager Peer Group 310: Multilane Divided Highways Posted at 45 mph or higher	Total Crashes	55	163.39	206.87	**0.79**	231.66	**0.71**
	1.70 miles 10,850 vehicles per day	KAB Injury	8	23.77	24.24	**0.98**	32.73	**0.73**
	Southbound							
	Meta-manager Peer Group 310: Multilane Divided Highways Posted at 45 mph or higher	Total Crashes	63	187.15	206.87	**0.90**	231.66	**0.81**
	1.70 miles 10,850 vehicles per day	KAB Injury	4	11.88	24.24	0.49	32.73	0.36

Segments: Crash Types (2014-2018)

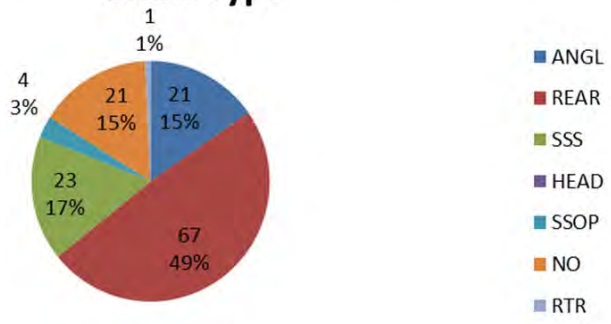
Segment 1: I-39/90 to West of County A - Crash Type



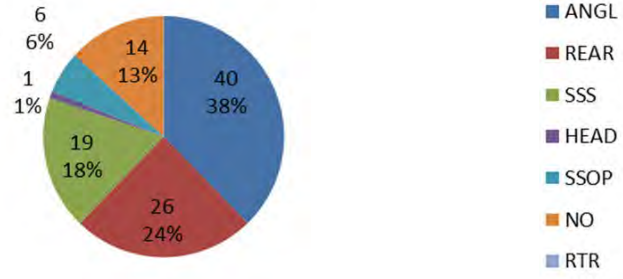
Segment 2: West of County A to Spring Road - Crash Type



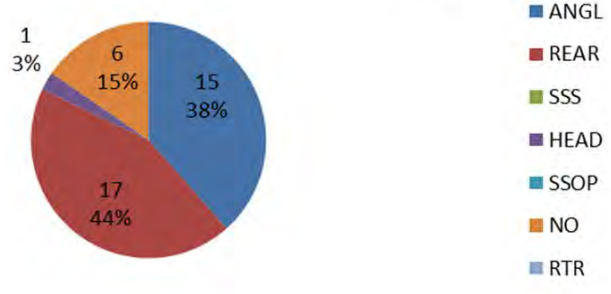
Segment 3: Spring Road to Page Street Crash Type



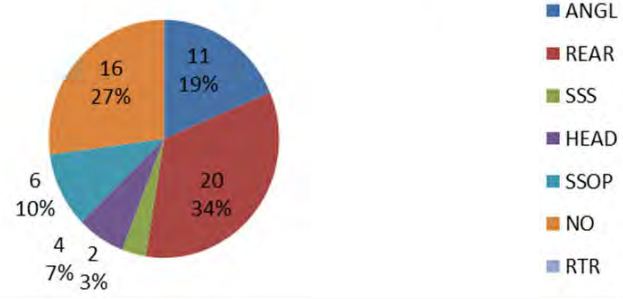
Segment 4: Page Street to WIS-138 Crash Type



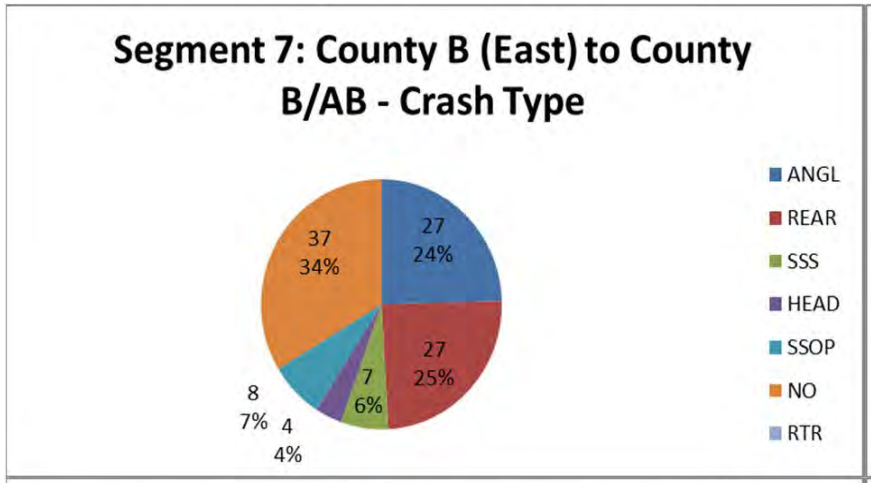
Segment 5: WIS-138 South to North of Jackson Street - Crash Type

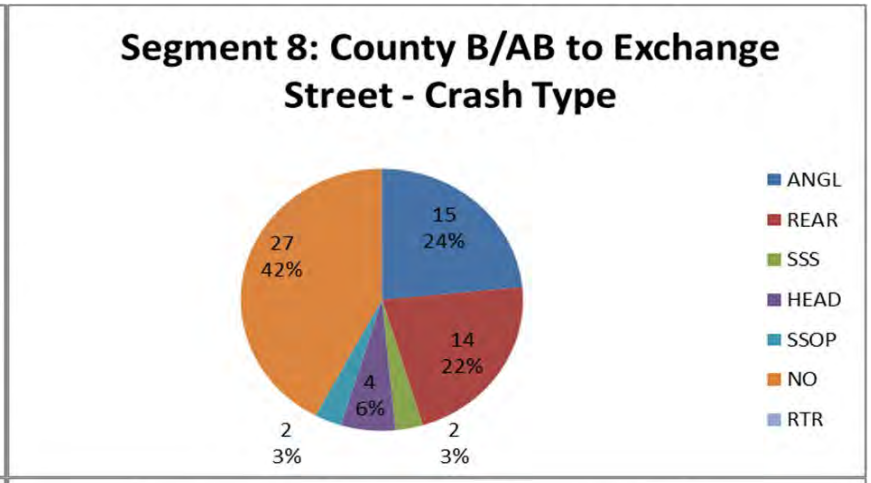


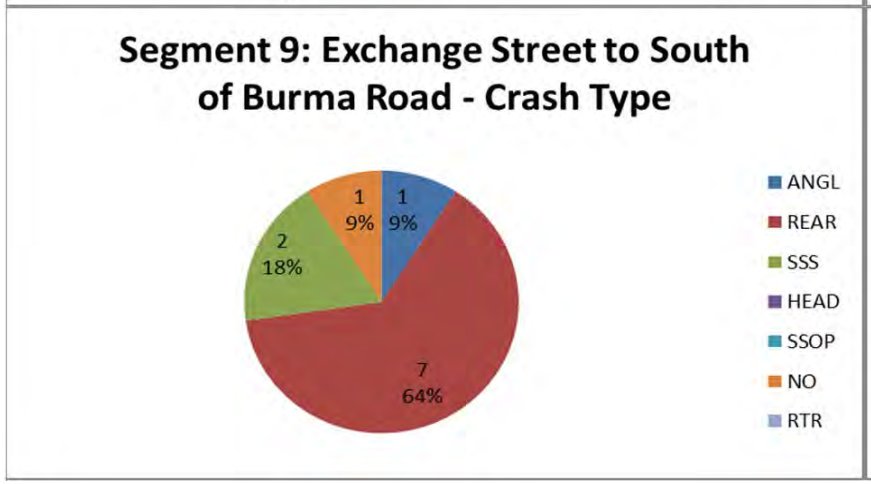
Segment 6: North of Jackson Street to County B (East) - Crash Type

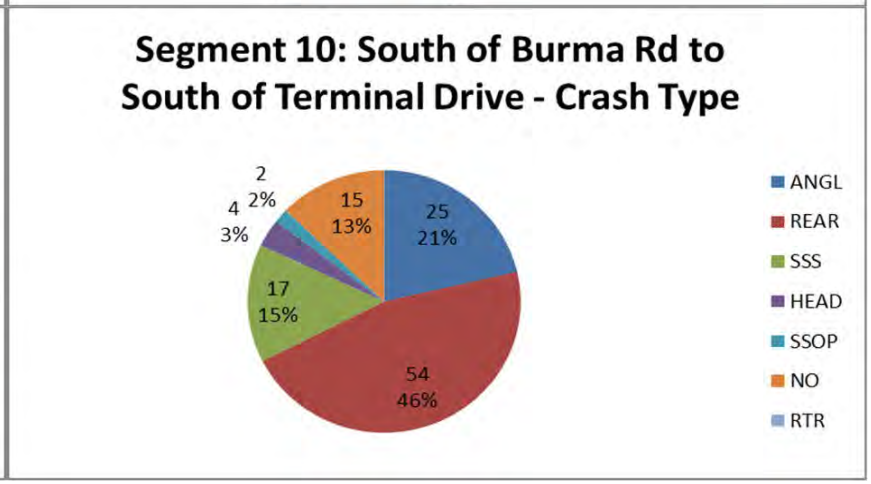


Segments: Crash Types (2014-2018)

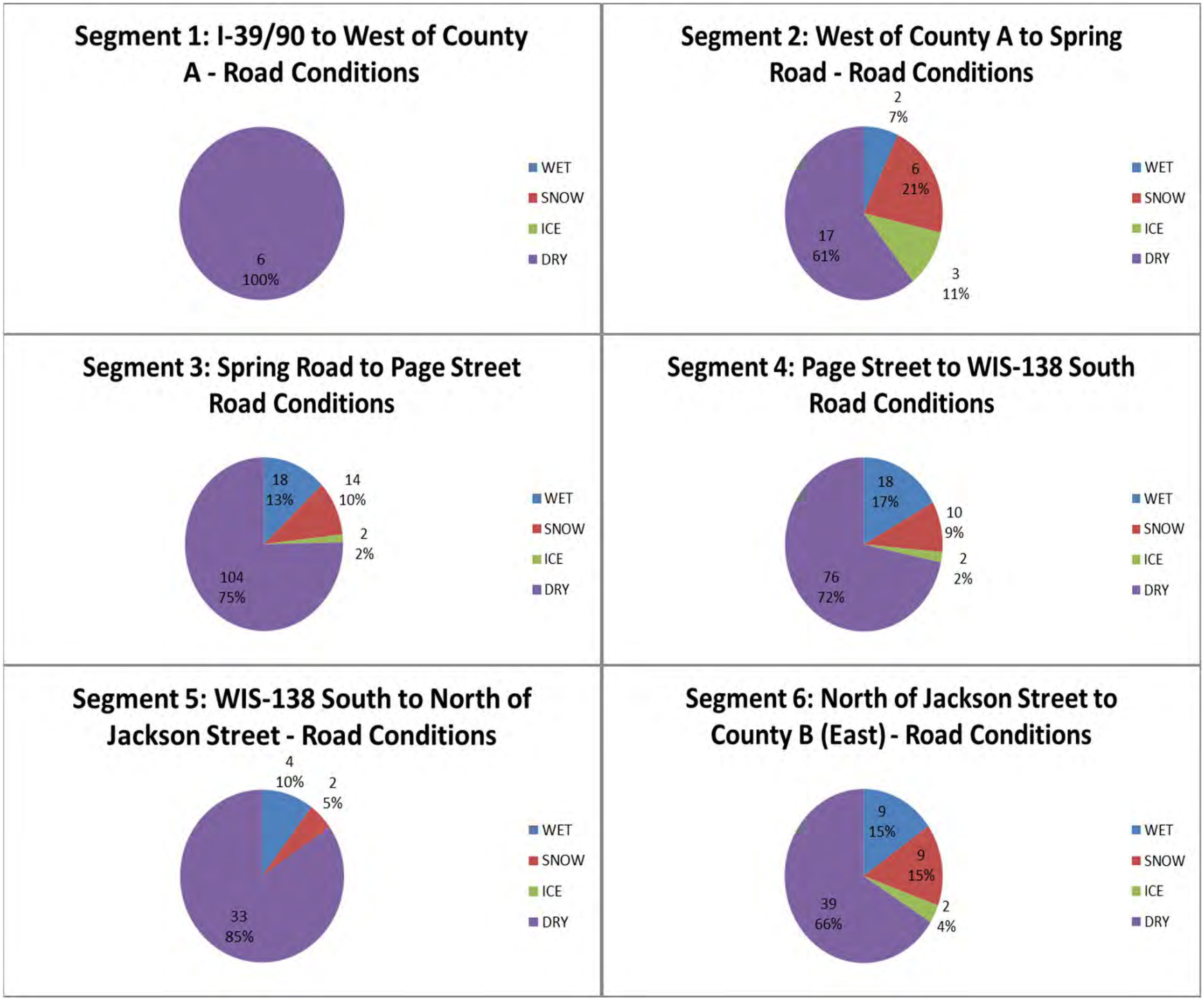




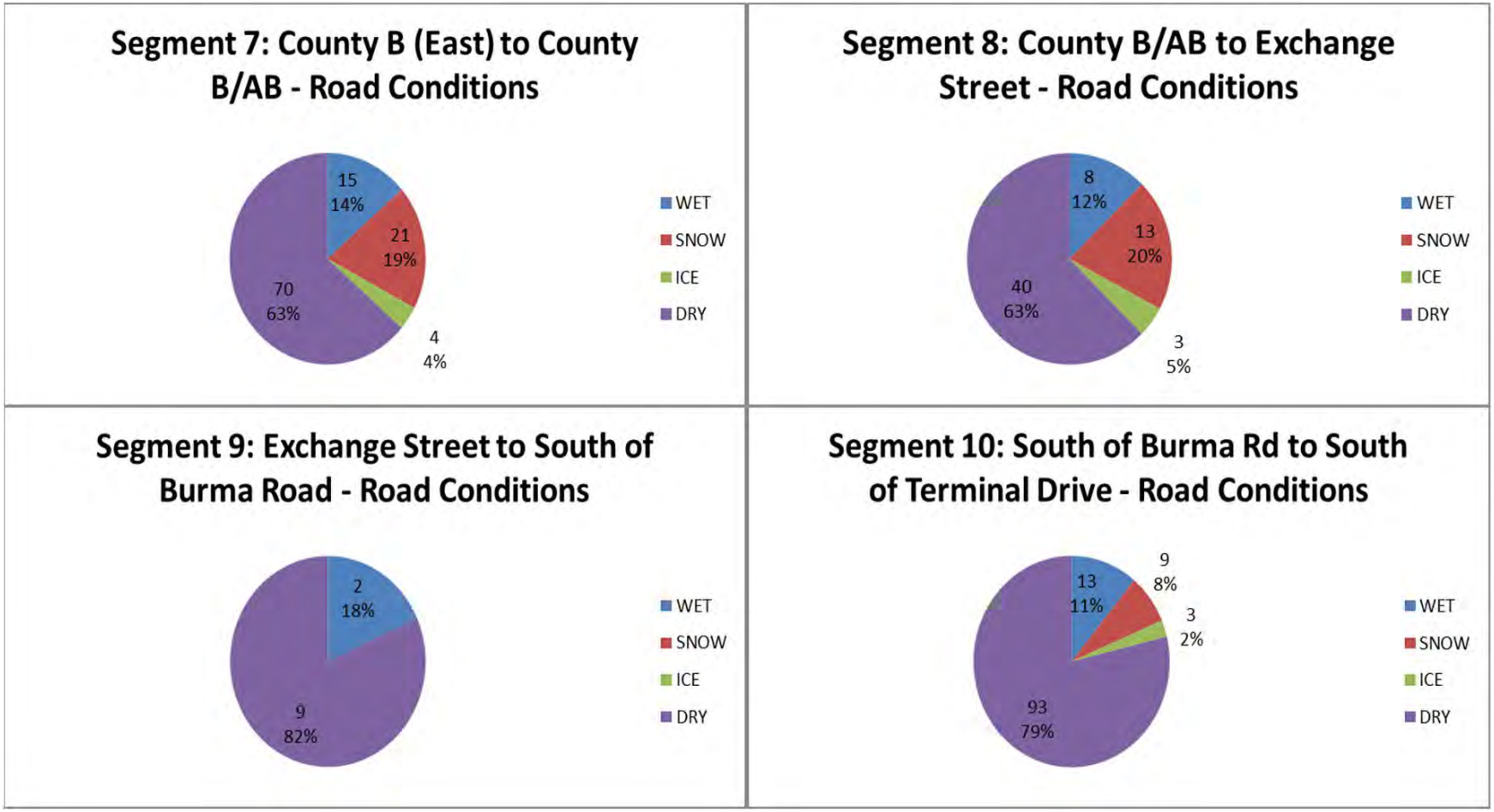




Weather Related Segment Crashes (2014-2018)



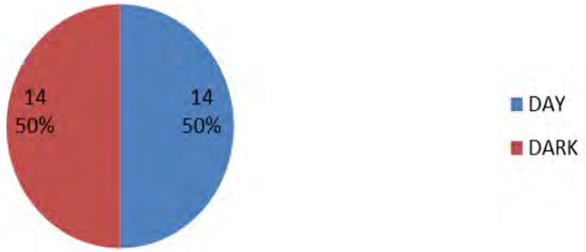
Weather Related Segment Crashes (2014-2018)



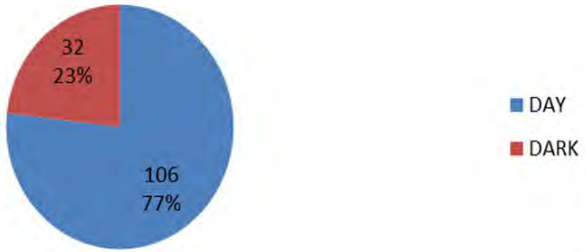
Light Conditions Segment Crashes (2014-2018)

Segment 1: I-39/90 to West of County A Light Conditions

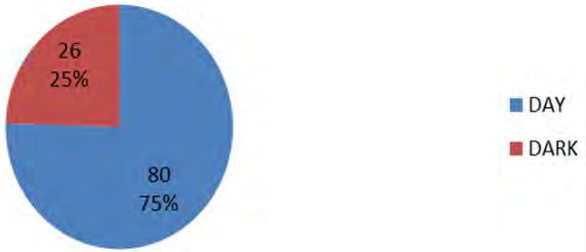
Segment 2: West of County A to Spring Road - Light Conditions



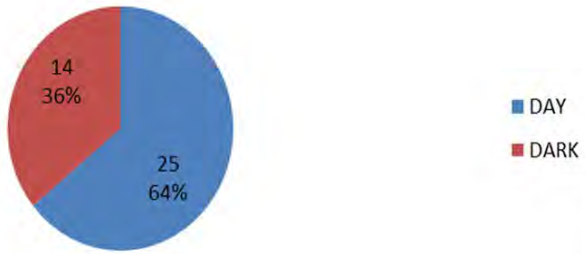
Segment 3: Spring Road to Page Street Light Conditions



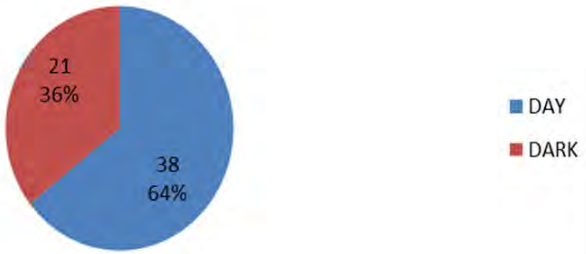
Segment 4: Page Street to WIS-138 South - Light Conditions



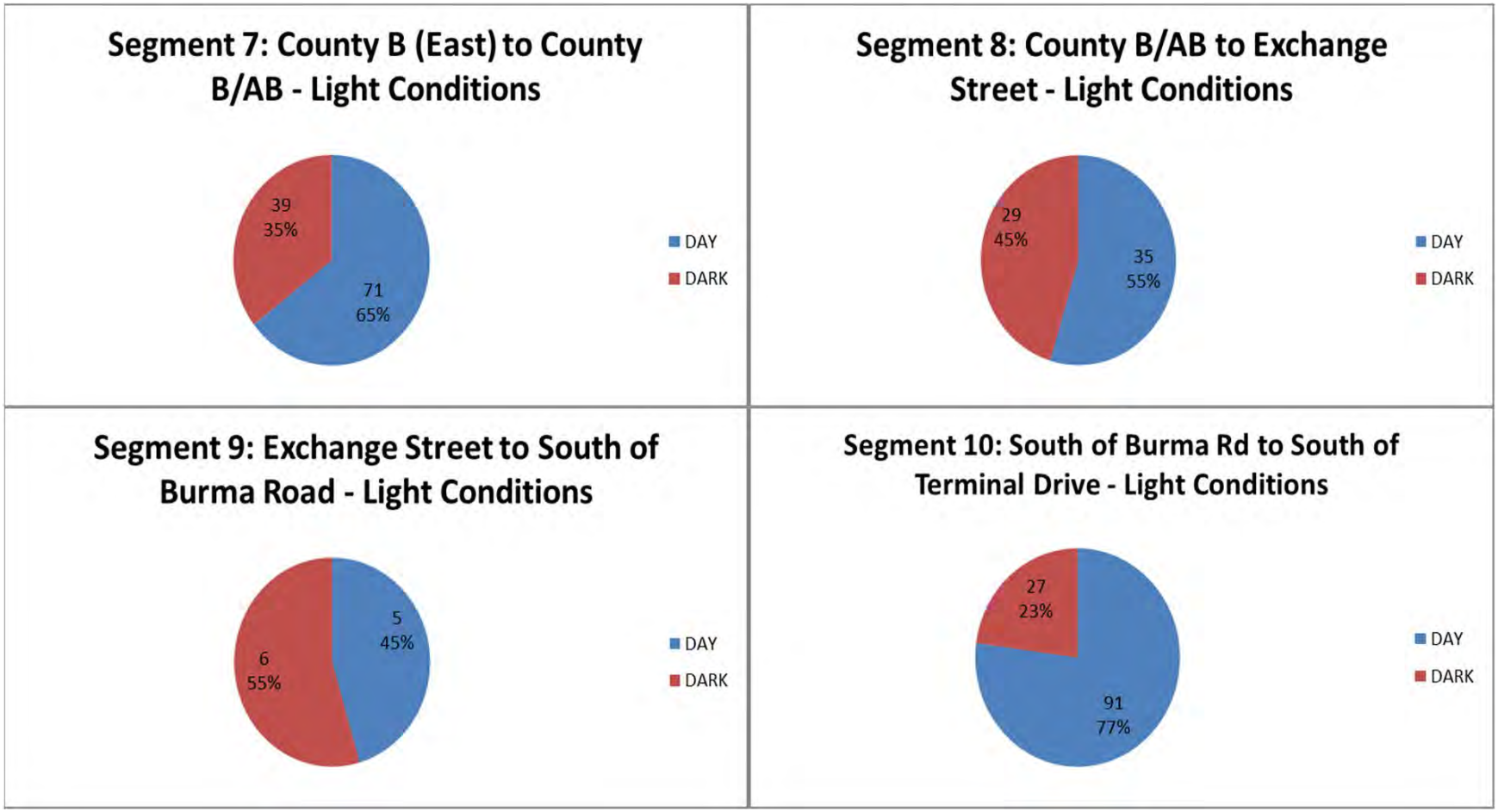
Segment 5: WIS-138 South to North of Jackson Street - Light Conditions



Segment 6: North of Jackson Street to County B (East) - Light Conditions



Light Conditions Segment Crashes (2014-2018)



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ATTACHMENT B
INTERSECTION CRASH ANALYSIS

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US 51 Environmental Assessment - Intersection Crash Summary

August 2019

US 51 Intersection	TOTALS								Entering Vehicle Volume / AADT	Crash Rate	KAB Crash Rate	Total Crash Rate Rank	KAB Crash Rate Rank
	Fatal	A Injury	B Injury	C Injury	*KAB Injury*	*All Injury*	PDO	TOTAL					
County A	0	0	2	1	***2***	*3*	3	**6**	5,110	**0.64**	**0.21**	7	3
County W	0	0	1	0	***1***	*1*	2	**3**	5,000	**0.33**	**0.11**	21	9
Ramsey Road	0	0	0	1	***0***	*1*	0	**1**	5,390	**0.10**	**0.00**	44	36
Washington Road	0	0	2	0	***2***	*2*	1	**3**	5,490	**0.30**	**0.20**	22	4
Pleasant Hill Road	0	0	0	0	***0***	*0*	1	**1**	5,420	**0.10**	**0.00**	45	36
Race Track Road	0	0	1	0	***1***	*1*	1	**2**	7,510	**0.15**	**0.07**	38	15
County N	0	0	0	3	***0***	*3*	9	**12**	13,190	**0.50**	**0.00**	13	36
S 4th St	0	1	1	3	***2***	*5*	12	**17**	15,050	**0.62**	**0.07**	10	16
S Page Street	0	0	1	3	***1***	*4*	10	**14**	16,000	**0.48**	**0.03**	15	34
Van Buren Street/WIS 138 (south)	0	0	1	1	***1***	*2*	11	**13**	17,210	**0.41**	**0.03**	17	35
WIS 138 (west)	0	0	4	3	***4***	*7*	16	**23**	16,180	**0.78**	**0.14**	5	6
Roby Road/Deer Point Drive	0	1	5	3	***6***	*9*	14	**23**	13,730	**0.92**	**0.24**	3	2
Rutland Dunn Townline Road	0	0	0	0	***0***	*0*	7	**7**	10,920	**0.35**	**0.00**	18	36
County B (east)	0	1	1	8	***2***	*10*	9	**19**	13,610	**0.76**	**0.08**	6	13
Brooklyn Drive	0	0	1	2	***1***	*3*	2	**5**	11,060	**0.25**	**0.05**	29	18
Halverson Road/Quam Drive	0	0	1	1	***1***	*2*	3	**5**	11,290	**0.24**	**0.05**	30	21
Lake Kegonsa Road	0	0	0	1	***0***	*1*	8	**9**	11,520	**0.43**	**0.00**	16	36
Charles Lane	0	1	1	0	***2***	*2*	8	**10**	11,160	**0.49**	**0.10**	14	10
Schneider Drive	0	0	1	2	***1***	*3*	4	**7**	11,400	**0.34**	**0.05**	19	22
County B/AB	1	0	9	7	***10***	*17*	19	**36**	11,400	**1.73**	**0.48**	1	1
Dyreson Road	0	0	1	3	***1***	*4*	2	**6**	11,750	**0.28**	**0.05**	26	23
Mahoney Road	0	0	1	2	***1***	*3*	4	**7**	13,900	**0.28**	**0.04**	27	26
Tower Road	0	0	2	0	***2***	*2*	1	**3**	12,600	**0.13**	**0.09**	39	12
Exchange Street	0	0	1	0	***1***	*1*	5	**6**	14,090	**0.23**	**0.04**	31	27
Yahara Drive	0	0	1	2	***1***	*3*	1	**4**	14,240	**0.15**	**0.04**	36	28
Babcock County Park	0	0	0	0	***0***	*0*	1	**1**	14,090	**0.04**	**0.00**	52	36
Burma Road	0	0	0	2	***0***	*2*	1	**3**	14,490	**0.11**	**0.00**	43	36
Farwell Street (County MN)	0	1	1	5	***2***	*7*	14	**21**	19,730	**0.58**	**0.06**	12	17
Dale Curtain Drive	0	0	0	1	***0***	*1*	6	**7**	19,150	**0.20**	**0.00**	32	36
Larson Beach Road	0	0	5	6	***5***	*11*	22	**33**	21,610	**0.84**	**0.13**	4	7
Siggelkow Road NB Ramps	0	0	0	1	***0***	*1*	3	**4**	7,830	**0.28**	**0.00**	25	36
Siggelkow Road SB Ramps	0	0	0	0	***0***	*0*	14	**14**	7,830	**0.98**	**0.00**	2	36
Amundson Parkway	0	0	0	0	***0***	*0*	3	**3**	9,500	**0.17**	**0.00**	35	36
Franklin Street	0	0	0	0	***0***	*0*	2	**2**	9,050	**0.12**	**0.00**	40	36
Church Street	0	0	0	0	***0***	*0*	1	**1**	11,260	**0.05**	**0.00**	50	36
Lynn Street	0	0	0	0	***0***	*0*	2	**2**	11,260	**0.10**	**0.00**	46	36
Hillside Avenue	0	0	0	0	***0***	*0*	1	**1**	11,260	**0.05**	**0.00**	50	36
S 7th Street	0	0	1	0	***1***	*1*	5	**6**	11,260	**0.29**	**0.05**	24	19
S 6th Street	0	0	0	1	***0***	*1*	2	**3**	11,260	**0.15**	**0.05**	37	19
S 5th Street	0	0	0	0	***0***	*0*	2	**2**	11,260	**0.10**	**0.00**	46	36
Forrest Street	0	0	0	1	***0***	*1*	6	**7**	12,900	**0.30**	**0.04**	23	24
Division Street	0	0	1	2	***1***	*3*	13	**16**	13,810	**0.63**	**0.12**	8	8
Water Street	0	0	0	1	***0***	*1*	4	**5**	14,390	**0.19**	**0.04**	33	29
Main Page Court	0	0	0	0	***0***	*0*	1	**1**	14,270	**0.04**	**0.00**	53	36
Prairie Street	0	0	0	2	***0***	*2*	1	**3**	14,390	**0.11**	**0.08**	42	14
Madison Street	0	0	0	0	***0***	*0*	2	**2**	14,390	**0.08**	**0.00**	48	36
Monroe Street	0	0	1	0	***1***	*1*	4	**5**	14,390	**0.19**	**0.04**	33	29
Gjertson Street	0	0	1	0	***1***	*1*	8	**9**	14,800	**0.33**	**0.04**	20	31
Main Street	0	1	0	0	***1***	*1*	0	**1**	14,800	**0.04**	**0.04**	54	31
Rowe Street	0	0	0	0	***0***	*0*	1	**1**	14,800	**0.04**	**0.00**	54	36
Hamilton Street	0	0	0	0	***0***	*0*	2	**2**	14,640	**0.07**	**0.00**	49	36
King Street	0	0	0	1	***0***	*1*	2	**3**	13,780	**0.12**	**0.04**	41	25
Kings Lynn Road	0	0	0	4	***0***	*4*	11	**15**	13,780	**0.60**	**0.16**	11	5
Hoel Avenue/Silverado Drive	0	0	1	0	***1***	*1*	6	**7**	15,050	**0.25**	**0.04**	28	33
Jackson Street	0	0	1	1	***1***	*2*	12	**14**	12,110	**0.63**	**0.09**	9	11
TOTAL	1	6	50	74	***57***	*131*	305	**436**					
TOTAL Along US 51 (no Siggelkow)	1	6	50	73	***57***	*130*	288	**418**					

Notes:

Intersections are organized top down from south to north.

Intersection crashe rates are expressed in crashes per million entering vehicles.

The highlighted blue boxes represent the top ten total crash rates and top ten injury crash rates.

Deer crashes and other animal crashes are not included in the calculations.

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Intersections: Crash Types (2014-2018)

CRASH TYPE

INTERSECTION	TOTAL CRASHES	ANGLE		REAR-END		HEAD-ON		SS-SAME		SS-OPPOSITE		FIXED		NO COLLISION		OVERTURN		OTHER/UNKN	
		NO.	PERCENT	NO.	PERCENT	NO.	PERCENT	NO.	PERCENT	NO.	PERCENT	NO.	PERCENT	NO.	PERCENT	NO.	PERCENT	NO.	PERCENT
138 WB	23	6	26.09%	12	52.17%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	5	21.74%	0	0.00%	0	0.00%
A	6	5	83.33%	1	16.67%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
AB/B	36	19	52.78%	12	33.33%	1	2.78%	1	2.78%	1	2.78%	0	0.00%	2	5.56%	0	0.00%	0	0.00%
AMUNDSON PKWY	3	1	33.33%	1	33.33%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	33.33%	0	0.00%	0	0.00%
B EAST	19	6	31.58%	7	36.84%	3	15.79%	0	0.00%	1	5.26%	0	0.00%	2	10.53%	0	0.00%	0	0.00%
Babcock County Park	1	1	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Brooklyn	5	2	40.00%	0	0.00%	0	0.00%	2	40.00%	1	20.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
BURMA RD	3	1	33.33%	2	66.67%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Charles	10	5	50.00%	4	40.00%	0	0.00%	1	10.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
CHURCH ST	1	1	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
DALE RD	7	6	85.71%	0	0.00%	1	14.29%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
DEER POINT DR/ROBY RD	23	7	30.43%	10	43.48%	1	4.35%	1	4.35%	1	4.35%	0	0.00%	3	13.04%	0	0.00%	0	0.00%
DIVISION ST	16	1	6.25%	13	81.25%	0	0.00%	1	6.25%	0	0.00%	0	0.00%	1	6.25%	0	0.00%	0	0.00%
DYRESON RD	6	3	50.00%	2	33.33%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	16.67%	0	0.00%	0	0.00%
EXCHANGE ST	6	0	0.00%	3	50.00%	1	16.67%	1	16.67%	0	0.00%	0	0.00%	1	16.67%	0	0.00%	0	0.00%
FARWELL ST	21	4	19.05%	11	52.38%	0	0.00%	4	19.05%	0	0.00%	0	0.00%	2	9.52%	0	0.00%	0	0.00%
Fifth St	2	2	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
FORREST ST	7	0	0.00%	7	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
FOURTH ST	17	0	0.00%	11	64.71%	0	0.00%	4	23.53%	0	0.00%	0	0.00%	2	11.76%	0	0.00%	0	0.00%
FRANKLIN ST	2	1	50.00%	1	50.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
GJERTSON ST	9	6	66.67%	2	22.22%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	11.11%	0	0.00%	0	0.00%
Halverson/Quam	5	2	40.00%	0	0.00%	0	0.00%	1	20.00%	0	0.00%	0	0.00%	2	40.00%	0	0.00%	0	0.00%
HAMILTON	2	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	2	100.00%	0	0.00%	0	0.00%
HILLSIDE	1	0	0.00%	1	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
HOEL AVE/SILVERADO DR	7	2	28.57%	3	42.86%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	2	28.57%	0	0.00%	0	0.00%
JACKSON ST	14	9	64.29%	4	28.57%	1	7.14%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
KING ST	3	1	33.33%	1	33.33%	0	0.00%	1	33.33%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
KINGS LYNN RD	15	4	26.67%	4	26.67%	1	6.67%	2	13.33%	2	13.33%	0	0.00%	2	13.33%	0	0.00%	0	0.00%
LAKE KEGONSA	9	2	22.22%	2	22.22%	0	0.00%	3	33.33%	0	0.00%	0	0.00%	2	22.22%	0	0.00%	0	0.00%
LARSON BEACH RD	33	6	18.18%	17	51.52%	2	6.06%	4	12.12%	1	3.03%	0	0.00%	3	9.09%	0	0.00%	0	0.00%
LYNN ST	2	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	2	100.00%	0	0.00%	0	0.00%
MADISON ST	2	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	50.00%	0	0.00%	1	50.00%	0	0.00%	0	0.00%
MAHONEY	7	3	42.86%	3	42.86%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	14.29%	0	0.00%	0	0.00%
MAIN PAGE CT	1	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	100.00%	0	0.00%	0	0.00%
MAIN ST	1	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	100.00%	0	0.00%	0	0.00%
MONROE ST	5	2	40.00%	1	20.00%	0	0.00%	1	20.00%	0	0.00%	0	0.00%	1	20.00%	0	0.00%	0	0.00%
N/VETERANS RD	12	4	33.33%	7	58.33%	0	0.00%	1	8.33%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
PAGE ST	14	4	28.57%	7	50.00%	0	0.00%	2	14.29%	1	7.14%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
PLEASANT HILL	1	0	0.00%	0	0.00%	0	0.00%	1	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
PRAIRIE ST	3	1	33.33%	0	0.00%	0	0.00%	0	0.00%	1	33.33%	0	0.00%	1	33.33%	0	0.00%	0	0.00%
RACE TRACK	2	1	50.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	50.00%	0	0.00%	0	0.00%
RAMSEY	1	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	100.00%	0	0.00%	0	0.00%
ROWE ST	1	1	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
RUTLAND DUNN	7	0	0.00%	3	42.86%	0	0.00%	1	14.29%	0	0.00%	0	0.00%	3	42.86%	0	0.00%	0	0.00%
SCHNEIDER	7	1	14.29%	3	42.86%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	3	42.86%	0	0.00%	0	0.00%
SEVENTH ST	6	2	33.33%	2	33.33%	0	0.00%	0	0.00%	1	16.67%	0	0.00%	1	16.67%	0	0.00%	0	0.00%
Sixth St	3	0	0.00%	1	33.33%	0	0.00%	0	0.00%	1	33.33%	0	0.00%	1	33.33%	0	0.00%	0	0.00%
TOWER RD	3	1	33.33%	1	33.33%	1	33.33%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
VAN BUREN ST/138 SB	13	9	69.23%	1	7.69%	0	0.00%	1	7.69%	1	7.69%	0	0.00%	1	7.69%	0	0.00%	0	0.00%
W	3	1	33.33%	0	0.00%	0	0.00%	1	33.33%	0	0.00%	0	0.00%	1	33.33%	0	0.00%	0	0.00%
WASHINGTON	3	2	66.67%	1	33.33%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
WATER ST	5	0	0.00%	5	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
YAHARA	4	0	0.00%	4	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
TOTAL (INTERSECTIONS):	418	135	32.30%	170	40.67%	12	2.87%	34	8.13%	13	3.11%	0	0.00%	54	12.92%	0	0.00%	0	0.00%

Weather Related Intersection Crashes (2014-2018)

ROAD CONDITIONS

INTERSECTION	TOTAL CRASHES	DRY		WET		SNOW		ICE		MUD		OTHER/UNKN	
		NO.	PERCENT	NO.	PERCENT	NO.	PERCENT	NO.	PERCENT	NO.	PERCENT	NO.	PERCENT
138 WB	23	18	78.26%	3	13.04%	2	8.70%	0	0.00%	0	0.00%	0	0.00%
A	6	6	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
AB/B	36	31	86.11%	4	11.11%	0	0.00%	1	2.78%	0	0.00%	0	0.00%
AMUNDSON PKWY	3	1	33.33%	2	66.67%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
B EAST	19	13	68.42%	2	10.53%	4	21.05%	0	0.00%	0	0.00%	0	0.00%
Babcock County Park	1	1	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Brooklyn	5	5	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
BURMA RD	3	3	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Charles	10	7	70.00%	1	10.00%	1	10.00%	1	10.00%	0	0.00%	0	0.00%
CHURCH ST	1	1	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
DALE RD	7	7	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
DEER POINT DR/ROBY RD	23	19	82.61%	3	13.04%	1	4.35%	0	0.00%	0	0.00%	0	0.00%
DIVISION ST	16	10	62.50%	4	25.00%	2	12.50%	0	0.00%	0	0.00%	0	0.00%
DYRESON RD	6	4	66.67%	0	0.00%	2	33.33%	0	0.00%	0	0.00%	0	0.00%
EXCHANGE ST	6	4	66.67%	1	16.67%	1	16.67%	0	0.00%	0	0.00%	0	0.00%
FARWELL ST	21	20	95.24%	0	0.00%	1	4.76%	0	0.00%	0	0.00%	0	0.00%
Fifth St	2	1	50.00%	1	50.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
FORREST ST	7	7	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
FOURTH ST	17	13	76.47%	3	17.65%	1	5.88%	0	0.00%	0	0.00%	0	0.00%
FRANKLIN ST	2	2	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
GJERTSON ST	9	6	66.67%	3	33.33%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Halverson/Quam	5	2	40.00%	1	20.00%	2	40.00%	0	0.00%	0	0.00%	0	0.00%
HAMILTON	2	0	0.00%	0	0.00%	2	100.00%	0	0.00%	0	0.00%	0	0.00%
HILLSIDE	1	0	0.00%	1	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
HOEL AVE/SILVERADO DR	7	6	85.71%	0	0.00%	1	14.29%	0	0.00%	0	0.00%	0	0.00%
JACKSON ST	14	14	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
KING ST	3	3	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
KINGS LYNN RD	15	11	73.33%	2	13.33%	1	6.67%	1	6.67%	0	0.00%	0	0.00%
LAKE KEGONSA	9	7	77.78%	1	11.11%	1	11.11%	0	0.00%	0	0.00%	0	0.00%
LARSON BEACH RD	33	24	72.73%	5	15.15%	3	9.09%	1	3.03%	0	0.00%	0	0.00%
LYNN ST	2	2	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
MADISON ST	2	1	50.00%	0	0.00%	0	0.00%	1	50.00%	0	0.00%	0	0.00%
MAHONEY	7	5	71.43%	1	14.29%	1	14.29%	0	0.00%	0	0.00%	0	0.00%
MAIN PAGE CT	1	1	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
MAIN ST	1	1	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
MONROE ST	5	3	60.00%	2	40.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
N/VETERANS RD	12	12	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
PAGE ST	14	10	71.43%	4	28.57%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
PLEASANT HILL	1	1	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
PRAIRIE ST	3	2	66.67%	0	0.00%	1	33.33%	0	0.00%	0	0.00%	0	0.00%
RACE TRACK	2	1	50.00%	0	0.00%	1	50.00%	0	0.00%	0	0.00%	0	0.00%
RAMSEY	1	0	0.00%	0	0.00%	1	100.00%	0	0.00%	0	0.00%	0	0.00%
ROWE ST	1	1	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
RUTLAND DUNN	7	3	42.86%	2	28.57%	2	28.57%	0	0.00%	0	0.00%	0	0.00%
SCHNEIDER	7	5	71.43%	0	0.00%	2	28.57%	0	0.00%	0	0.00%	0	0.00%
SEVENTH ST	6	4	66.67%	0	0.00%	0	0.00%	2	33.33%	0	0.00%	0	0.00%
Sixth St	3	1	33.33%	1	33.33%	1	33.33%	0	0.00%	0	0.00%	0	0.00%
TOWER RD	3	2	66.67%	1	33.33%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
VAN BUREN ST/138 SB	13	8	61.54%	3	23.08%	2	15.38%	0	0.00%	0	0.00%	0	0.00%
W	3	3	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
WASHINGTON	3	2	66.67%	1	33.33%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
WATER ST	5	5	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
YAHARA	4	3	75.00%	1	25.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
TOTAL (INTERSECTIONS):	418	322	77.03%	53	12.68%	36	8.61%	7	1.67%	0	0.00%	0	0.00%

Light Conditions Intersection Crashes (2014-2018)

LIGHT CONDITIONS

INTERSECTION	TOTAL CRASHES	LIGHT		DARK	
		NO.	PERCENT	NO.	PERCENT
138 WB	23	15	65.22%	8	34.78%
A	6	6	100.00%	0	0.00%
AB/B	36	28	77.78%	8	22.22%
AMUNDSON PKWY	3	3	100.00%	0	0.00%
B EAST	19	15	78.95%	4	21.05%
Babcock County Park	1	1	100.00%	0	0.00%
Brooklyn	5	4	80.00%	1	20.00%
BURMA RD	3	3	100.00%	0	0.00%
Charles	10	6	60.00%	4	40.00%
CHURCH ST	1	1	100.00%	0	0.00%
DALE RD	7	6	85.71%	1	14.29%
DEER POINT DR/ROBY RD	23	20	86.96%	3	13.04%
DIVISION ST	16	14	87.50%	2	12.50%
DYRESON RD	6	5	83.33%	1	16.67%
EXCHANGE ST	6	3	50.00%	3	50.00%
FARWELL ST	21	20	95.24%	1	4.76%
Fifth St	2	2	100.00%	0	0.00%
FORREST ST	7	6	85.71%	1	14.29%
FOURTH ST	17	15	88.24%	2	11.76%
FRANKLIN ST	2	1	50.00%	1	50.00%
GJERTSON ST	9	9	100.00%	0	0.00%
Halverson/Quam	5	3	60.00%	2	40.00%
HAMILTON	2	0	0.00%	2	100.00%
HILLSIDE	1	1	100.00%	0	0.00%
HOEL AVE/SILVERADO DR	7	7	100.00%	0	0.00%
JACKSON ST	14	14	100.00%	0	0.00%
KING ST	3	2	66.67%	1	33.33%
KINGS LYNN RD	15	13	86.67%	2	13.33%
LAKE KEGONSA	9	8	88.89%	1	11.11%
LARSON BEACH RD	33	30	90.91%	3	9.09%
LYNN ST	2	2	100.00%	0	0.00%
MADISON ST	2	2	100.00%	0	0.00%
MAHONEY	7	6	85.71%	1	14.29%
MAIN PAGE CT	1	1	100.00%	0	0.00%
MAIN ST	1	1	100.00%	0	0.00%
MONROE ST	5	4	80.00%	1	20.00%
N/VETERANS RD	12	11	91.67%	1	8.33%
PAGE ST	14	13	92.86%	1	7.14%
PLEASANT HILL	1	1	100.00%	0	0.00%
PRAIRIE ST	3	1	33.33%	2	66.67%
RACE TRACK	2	2	100.00%	0	0.00%
RAMSEY	1	0	0.00%	1	100.00%
ROWE ST	1	1	100.00%	0	0.00%
RUTLAND DUNN	7	5	71.43%	2	28.57%
SCHNEIDER	7	6	85.71%	1	14.29%
SEVENTH ST	6	6	100.00%	0	0.00%
Sixth St	3	3	100.00%	0	0.00%
TOWER RD	3	2	66.67%	1	33.33%
VAN BUREN ST/138 SB	13	8	61.54%	5	38.46%
W	3	1	33.33%	2	66.67%
WASHINGTON	3	2	66.67%	1	33.33%
WATER ST	5	5	100.00%	0	0.00%
YAHARA	4	3	75.00%	1	25.00%
TOTAL (INTERSECTIONS):	418	347	83.01%	71	16.99%

ATTACHMENT C
INTERSECTION CRASH DIAGRAMS

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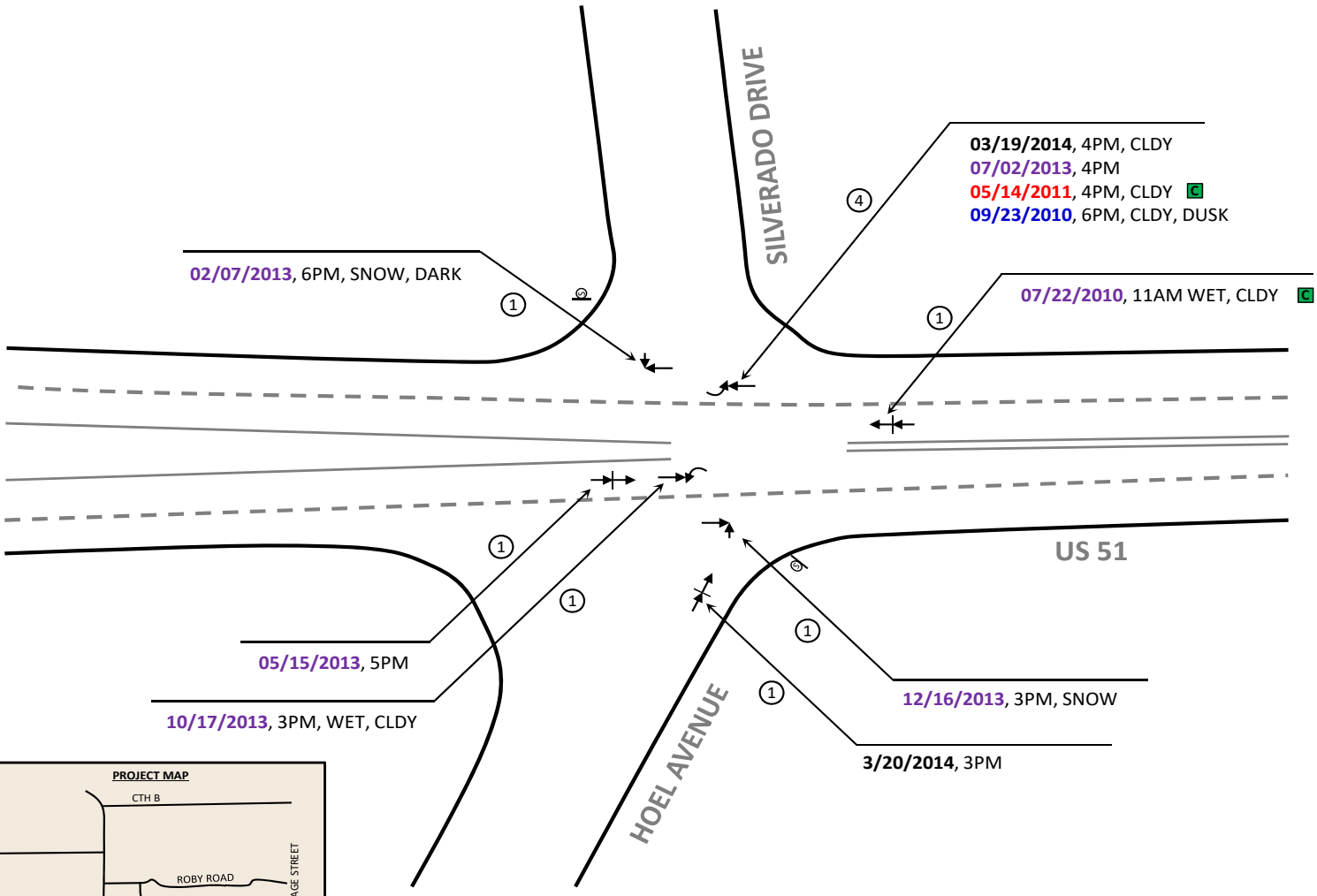
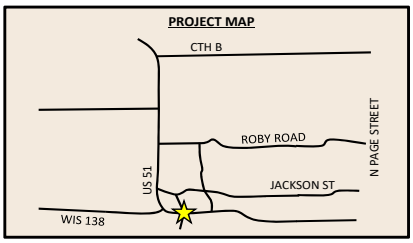
Phase II ICE Approved 2016

NORTH

12-15-15





YEAR

2010 BLUE
2011 RED
2012 GREEN
2013 PURPLE
2014 BLACK

CRASH RATE

0.36 Crashes
Per Million
Entering Vehicles

Entering Vehicles: 15,410/day

CRASH FREQUENCY/SEVERITY

10 Crashes

0	Fatal Crash (K)
0	Incapacitating (A-Level)
0	Non-Incapacitating (B-Level)
2	Possible (C-Level)
8	Property Damage Only

LEGEND

- Moving Vehicle
- Backing Vehicle
- Pedestrian
- Bicyclist
- Parked Vehicle
- Stop/Yield Sign
- (T) Tree
- (U) Utility Pole
- (F) Fixed Object
- (N) Non-Fixed Object
- Angle (Right Angle)
- Angle (Left-Turn)
- Angle (Right-Turn)
- Sideswipe-Same
- Sideswipe-Opposite
- Head-On
- Rear-End
- Out of Control
- Overtake
- Overturn

(#) = CRASH FREQUENCY

"LETTER" = USED FOR REFERENCING CRASHES IN REPORT AS NEEDED
DATE OF CRASH
HOUR
SEVERITY (SEE SEVERITY DEFINITIONS)
ROAD CONDITIONS (DRY IF BLANK)
LIGHT CONDITIONS (DAYTIME IF BLANK)
ALCOHOL/DRUG INVOLVEMENT (AL/DG)

CRASH SEVERITY DEFINITIONS

- K = Fatal Crash
- A = Incapacitating Injury Crash
- B = Non-Incapacitating Injury Crash
- C = Possible Injury Crash
- = Property Damage Only Crash

Note: Intersection crashes without available MV4000 crash reports were not placed on diagram, but included in calculations

EXHIBIT A1
INTERSECTION COLLISION DIAGRAM
US 51 & SILVERADO DRIVE/HOEL AVENUE
DANE COUNTY, WISCONSIN

STRAND ASSOCIATES

Phase II ICE Approved 2016

GENERAL INFORMATION

INTERSECTION: US 51/HOEL/SILVERADO
MUNICIPALITY: STOUGHTON
COUNTY: DANE
STATE: WI
PROJECT ID: 5845-06-02

CRASHES FROM: 1/1/2010
TO: 12/31/2014

DURATION
5 YEARS
0 MONTHS

PREPARED BY: AJW

DATE: 12/14/2015

INTERSECTION CHARACTERISTICS

TRAFFIC CONTROL: STOP CONTROL ON HOEL/SILVERADO
INTERSECTION AADT: Year (2012): 15,410
NUMBER OF LEGS: 4

POSTED SPEED (MAJOR): 25
DEER CRASHES INCLUDED: NO
AREA TYPE: URBAN

CRASH STATISTICS

CRASH FREQUENCY & SEVERITY

YEAR	PD	UNKNOWN	C-LEVEL	B-LEVEL	A-LEVEL	FATAL	TOTAL
2010	1	0	1	0	0	0	2
2011	0	0	1	0	0	0	1
2012	0	0	0	0	0	0	0
2013	5	0	0	0	0	0	5
2014	2	0	0	0	0	0	2
TOTAL	*8*	*0*	*2*	*0*	*0*	*0*	*10*
PERCENT	*80.0%*	*0.0%*	*20.0%*	*0.0%*	*0.0%*	*0.0%*	*100.0%*
YEAR AVG.	*1.6*	*0.0*	*0.4*	*0.0*	*0.0*	*0.0*	*2.0*

ROAD CONDITIONS		PERCENT
DRY	6	60.0%
WET	2	20.0%
SNOW	2	20.0%
ICE	0	0.0%
MUD	0	0.0%
OTHER/UNKN	0	0.0%
TOTAL	*10*	*100.0%*

CRASH TYPE		PERCENT
ANGLE	6	60.0%
REAR-END	3	30.0%
HEAD-ON	1	10.0%
SS-SAME	0	0.0%
SS-OPPOSITE	0	0.0%
PEDESTRIAN	0	0.0%
BICYCLE	0	0.0%
FIXED	0	0.0%
NO COLLISION	0	0.0%
OVERTURN	0	0.0%
OTHER/UNKN	0	0.0%
TOTAL	*10*	*100.0%*

CRASH RATES	per MEV
CRASH RATE	0.36
INJURY CRASH RATE	0.07

LIGHT CONDITIONS		PERCENT
DAY	8	80.0%
DARK	2	20.0%
TOTAL	*10*	*100.0%*

Note: Dawn, dusk or street lighted conditions included in dark total.

VEHICLE TYPES		PERCENT
CAR	18	90.0%
TRUCK	2	10.0%
OTHER/UNKN	0	0.0%
TOTAL	*20*	*100.0%*

DAY AND TIME - BOTH DIRECTIONS

DAY OF WEEK	*EARLY MORNING* 2:00 AM TO 5:59 AM	*AM PEAK* 6:00 AM TO 9:59 AM	*MIDDAY* 10:00 AM TO 1:59 PM	*PM PEAK* 2:00 PM TO 5:59 PM	*EVENING* 6:00 PM TO 9:59 PM	*LATE EVENING* 10:00 PM TO 1:59 AM	*UNKNOWN*	*TOTAL*	
MONDAY	0	0	0	1	0	0	0	1	
TUESDAY	0	0	0	1	0	0	0	1	
WEDNESDAY	0	0	0	2	0	0	0	2	Weekday
THURSDAY	0	0	1	2	2	0	0	5	
FRIDAY	0	0	0	0	0	0	0	0	
SATURDAY	0	0	0	1	0	0	0	1	Weekend
SUNDAY	0	0	0	0	0	0	0	0	
TOTAL	*0*	*0*	*1*	*7*	*2*	*0*	*0*	*10*	

DRIVER AGES		PERCENT
<25	7	35.0%
25-34	3	15.0%
35-44	4	20.0%
45-54	1	5.0%
55-64	4	20.0%
65-74	1	5.0%
75-84	0	0.0%
85+	0	0.0%
UNKNOWN	0	0.0%
TOTAL	*20*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

VEHICLE DAMAGE		PERCENT
OTHER/UNKN	0	0.0%
NONE	0	0.0%
VERY MINOR	1	5.0%
MINOR	3	15.0%
MODERATE	11	55.0%
SEVERE	5	25.0%
VERY SEVERE	0	0.0%
TOTAL	*20*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

AVERAGE NUMBER OF VEHICLES PER CRASH *2.1*

Note: Statistics based on all vehicles in crashes.

BY SEASON		PERCENT
SPRING	7	70.0%
SUMMER	1	10.0%
FALL	0	0.0%
WINTER	2	20.0%
TOTAL	*10*	*100.0%*

Note: Wint=Jan-Mar, Spr=Apr-June, Sum=July-Sept, Fall=Oct-Dec

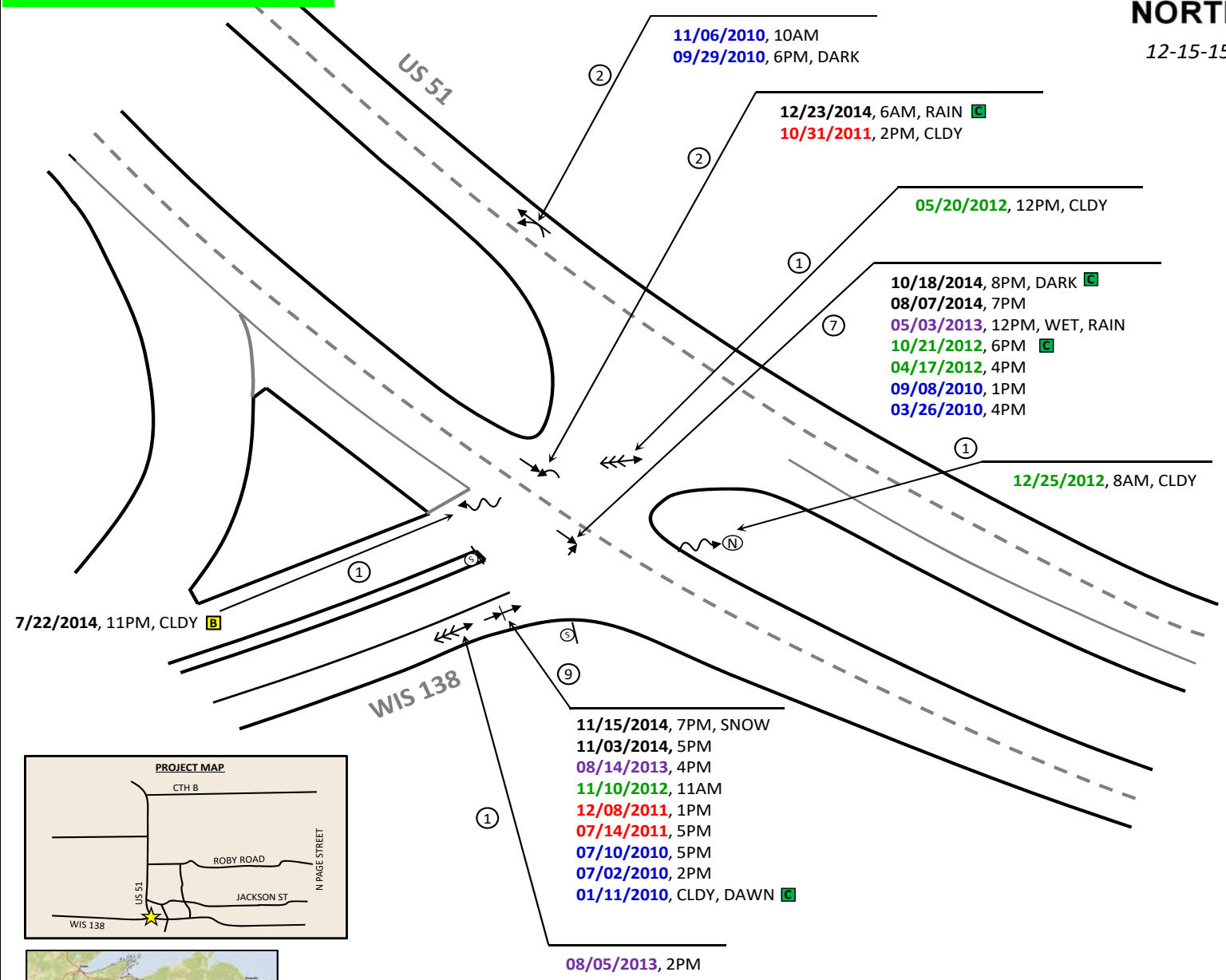
ALCOHOL RELATED CRASHES	
TOTAL	0
PERCENTAGE OF TOTAL	0.00%

EXHIBIT A2
INTERSECTION CRASH STATISTICS
US 51 & SILVERADO DRIVE/HOEL AVENUE
DANE COUNTY, WISCONSIN

Phase II ICE Approved 2016

NORTH

12-15-15



YEAR

2010 BLUE
2011 RED
2012 GREEN
2013 PURPLE
2014 BLACK

CRASH RATE

0.73 Crashes
Per Million
Entering Vehicles

Entering Vehicles: 17,940/day

CRASH FREQUENCY/SEVERITY

24 Crashes

0	Fatal Crash (K)
0	Incapacitating (A-Level)
1	Non-Incapacitating (B-Level)
4	Possible (C-Level)
19	Property Damage Only

LEGEND

- Moving Vehicle
- Backing Vehicle
- Pedestrian
- Bicyclist
- Parked Vehicle
- Stop/Yield Sign
- (T) Tree
- (U) Utility Pole
- (F) Fixed Object
- (N) Non-Fixed Object
- Angle (Right Angle)
- Angle (Left-Turn)
- Angle (Right-Turn)
- Sideswipe-Same
- Sideswipe-Opposite
- Head-On
- Rear-End
- Out of Control
- Overtake
- Overturn

(#) = CRASH FREQUENCY

"LETTER" = USED FOR REFERENCING CRASHES IN REPORT AS NEEDED
DATE OF CRASH
HOUR
SEVERITY (SEE SEVERITY DEFINITIONS)
ROAD CONDITIONS (DRY IF BLANK)
LIGHT CONDITIONS (DAYTIME IF BLANK)
ALCOHOL/DRUG INVOLVEMENT AL/DG

CRASH SEVERITY DEFINITIONS

- K = Fatal Crash
- A = Incapacitating Injury Crash
- B = Non-Incapacitating Injury Crash
- C = Possible Injury Crash
- = Property Damage Only Crash

Note: Intersection crashes without available MV4000 crash reports were not placed on diagram, but included in calculations

EXHIBIT B1
INTERSECTION COLLISION DIAGRAM
US 51 & WIS 138 (WEST)
DANE COUNTY, WISCONSIN

STRAND ASSOCIATES

Phase II ICE Approved 2016

GENERAL INFORMATION

INTERSECTION: US 51/WIS 138
MUNICIPALITY: STOUGHTON
COUNTY: DANE
STATE: WI
PROJECT ID: 5845-06-02

CRASHES FROM: 1/1/2010
TO: 12/31/2014

DURATION
5 YEARS
0 MONTHS

PREPARED BY: AJW

DATE: 12/14/2015

INTERSECTION CHARACTERISTICS

TRAFFIC CONTROL: STOP CONTROL ON WIS 138
INTERSECTION AADT: Year (2012): 17,940
NUMBER OF LEGS: 3

POSTED SPEED (MAJOR): 35
DEER CRASHES INCLUDED: NO
AREA TYPE: URBAN

CRASH STATISTICS

CRASH FREQUENCY & SEVERITY

YEAR	PD	UNKNOWN	C-LEVEL	B-LEVEL	A-LEVEL	FATAL	TOTAL
2010	5	0	2	0	0	0	7
2011	3	0	0	0	0	0	3
2012	5	0	0	0	0	0	5
2013	3	0	0	0	0	0	3
2014	3	0	2	1	0	0	6
TOTAL	*19*	*0*	*4*	*1*	*0*	*0*	*24*
PERCENT	*79.2%*	*0.0%*	*16.7%*	*4.2%*	*0.0%*	*0.0%*	*100.0%*
YEAR AVG.	*3.8*	*0.0*	*0.8*	*0.2*	*0.0*	*0.0*	*4.6*

ROAD CONDITIONS		PERCENT
DRY	21	87.5%
WET	2	8.3%
SNOW	1	4.2%
ICE	0	0.0%
MUD	0	0.0%
OTHER/UNKN	0	0.0%
TOTAL	*24*	*100.0%*

CRASH TYPE		PERCENT
ANGLE	9	37.5%
REAR-END	10	41.7%
HEAD-ON	0	0.0%
SS-SAME	3	12.5%
SS-OPPOSITE	0	0.0%
PEDESTRIAN	0	0.0%
BICYCLE	0	0.0%
FIXED	0	0.0%
NO COLLISION	2	8.3%
OVERTURN	0	0.0%
OTHER/UNKN	0	0.0%
TOTAL	*24*	*100.0%*

CRASH RATES	per MEV
CRASH RATE	0.73
INJURY CRASH RATE	0.15

LIGHT CONDITIONS		PERCENT
DAY	17	70.8%
DARK	7	29.2%
TOTAL	*24*	*100.0%*

Note: Dawn, dusk or street lighted conditions included in dark total.

VEHICLE TYPES		PERCENT
CAR	35	72.9%
TRUCK	10	20.8%
OTHER/UNKN	3	6.3%
TOTAL	*48*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

DAY AND TIME - BOTH DIRECTIONS

DAY OF WEEK	*EARLY MORNING* 2:00 AM TO 5:59 AM	*AM PEAK* 6:00 AM TO 9:59 AM	*MIDDAY* 10:00 AM TO 1:59 PM	*PM PEAK* 2:00 PM TO 5:59 PM	*EVENING* 6:00 PM TO 9:59 PM	*LATE EVENING* 10:00 PM TO 1:59 AM	*UNKNOWN*	*TOTAL*	
MONDAY	0	1	0	3	0	0	0	4	
TUESDAY	0	2	0	1	0	1	0	4	
WEDNESDAY	0	0	1	1	1	0	0	3	Weekday
THURSDAY	0	0	1	1	1	0	0	3	
FRIDAY	0	0	1	2	0	0	0	3	
SATURDAY	0	0	2	1	2	0	0	5	Weekend
SUNDAY	0	0	1	0	1	0	0	2	
TOTAL	*0*	*3*	*6*	*9*	*5*	*1*	*0*	*24*	

DRIVER AGES		PERCENT
<25	9	20.8%
25-34	6	14.0%
35-44	7	14.0%
45-54	11	23.3%
55-64	10	23.3%
65-74	1	2.3%
75-84	0	0.0%
85+	0	0.0%
UNKNOWN	1	2.3%
TOTAL	*45*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

VEHICLE DAMAGE		PERCENT
OTHER/UNKN	1	2.2%
NONE	2	4.3%
VERY MINOR	6	13.0%
MINOR	12	26.1%
MODERATE	15	32.6%
SEVERE	9	19.6%
VERY SEVERE	1	2.2%
TOTAL	*46*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

AVERAGE NUMBER OF VEHICLES PER CRASH	*1.9*

Note: Statistics based on all vehicles in crashes.

BY SEASON		PERCENT
SPRING	9	37.5%
SUMMER	5	20.8%
FALL	0	0.0%
WINTER	10	41.7%
TOTAL	*24*	*100.0%*

Note: Wint=Jan-Mar, Spr=Apr-June, Sum=July-Sept, Fall=Oct-Dec

ALCOHOL RELATED CRASHES	
TOTAL	0
PERCENTAGE OF TOTAL	0.00%

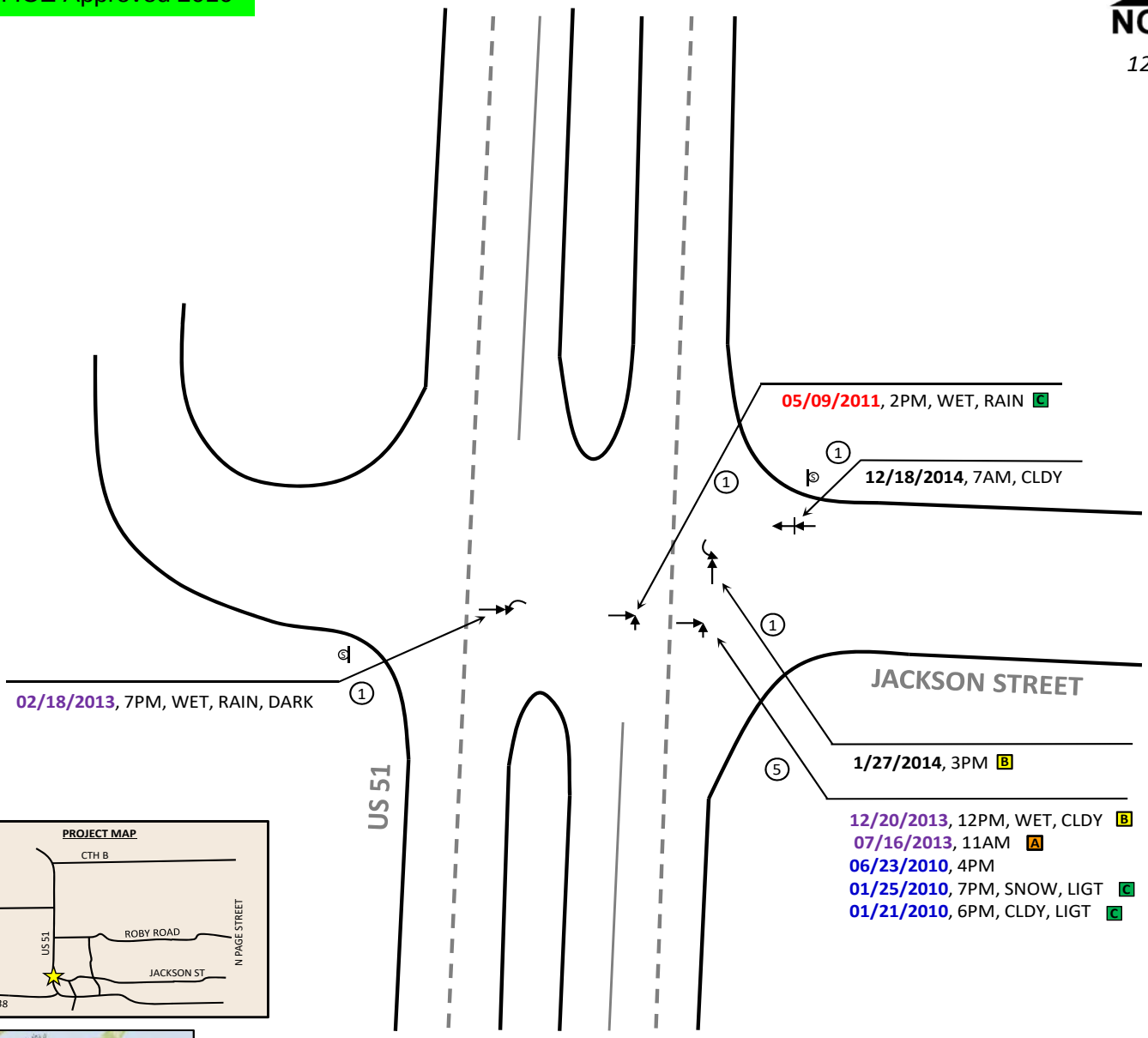
EXHIBIT B2
INTERSECTION CRASH STATISTICS
US 51 & WIS 138 (WEST)
DANE COUNTY, WISCONSIN

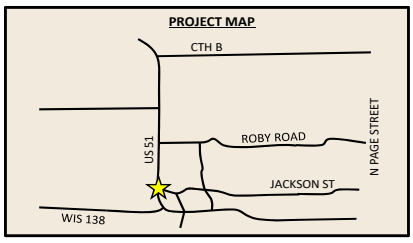
STRAND ASSOCIATES

Phase II ICE Approved 2016

NORTH

12-15-15





YEAR

2010 BLUE
2011 RED
2012 GREEN
2013 PURPLE
2014 BLACK

CRASH RATE

0.42 Crashes

Per Million
Entering Vehicles

Entering Vehicles: 11,630/day

CRASH FREQUENCY/SEVERITY

9 Crashes

0	Fatal Crash (K)
1	Incapacitating (A-Level)
2	Non-Incapacitating (B-Level)
3	Possible (C-Level)
3	Property Damage Only

LEGEND

- Moving Vehicle
- Backing Vehicle
- Pedestrian
- Bicyclist
- Parked Vehicle
- Stop/Yield Sign
- (T) Tree
- (U) Utility Pole
- (F) Fixed Object
- (N) Non-Fixed Object
- Angle (Right Angle)
- Angle (Left-Turn)
- Angle (Right-Turn)
- Sideswipe-Same
- Sideswipe-Opposite
- Head-On
- Rear-End
- Out of Control
- Overtake
- Overturn

(#) = CRASH FREQUENCY

"LETTER" = USED FOR REFERENCING CRASHES IN REPORT AS NEEDED
DATE OF CRASH
HOUR
SEVERITY (SEE SEVERITY DEFINITIONS)
ROAD CONDITIONS (DRY IF BLANK)
LIGHT CONDITIONS (DAYTIME IF BLANK)
ALCOHOL/DRUG INVOLVEMENT AL/DG

CRASH SEVERITY DEFINITIONS

- K = Fatal Crash
- A = Incapacitating Injury Crash
- B = Non-Incapacitating Injury Crash
- C = Possible Injury Crash
- = Property Damage Only Crash

Note: Intersection crashes without available MV4000 crash reports were not placed on diagram, but included in calculations

EXHIBIT C1
INTERSECTION COLLISION DIAGRAM
US 51 & JACKSON STREET
DANE COUNTY, WISCONSIN

STRAND ASSOCIATES

Phase II ICE Approved 2016

GENERAL INFORMATION

INTERSECTION: US 51/JACKSON STREET
MUNICIPALITY: STOUGHTON
COUNTY: DANE
STATE: WI
PROJECT ID: 5845-06-02

CRASHES FROM: 1/1/2010
TO: 12/31/2014

DURATION
5 YEARS
0 MONTHS

PREPARED BY: AJW

DATE: 12/15/2015

INTERSECTION CHARACTERISTICS

TRAFFIC CONTROL: STOP CONTROL ON JACKSON ST
INTERSECTION AADT: Year (2012): 11,630
NUMBER OF LEGS: 4

POSTED SPEED (MAJOR): 45
DEER CRASHES INCLUDED: NO
AREA TYPE: URBAN

CRASH STATISTICS

CRASH FREQUENCY & SEVERITY

YEAR	PD	UNKNOWN	C-LEVEL	B-LEVEL	A-LEVEL	FATAL	TOTAL
2010	1	0	2	0	0	0	3
2011	0	0	1	0	0	0	1
2012	0	0	0	0	0	0	0
2013	1	0	0	1	1	0	3
2014	1	0	0	1	0	0	2
TOTAL	*3*	*0*	*3*	*2*	*1*	*0*	*9*
PERCENT	*33.3%*	*0.0%*	*33.3%*	*22.2%*	*11.1%*	*0.0%*	*100.0%*
YEAR AVG.	*0.6*	*0.0*	*0.6*	*0.4*	*0.2*	*0.0*	*1.8*

ROAD CONDITIONS		**PERCENT**
DRY	5	55.6%
WET	3	33.3%
SNOW	1	11.1%
ICE	0	0.0%
MUD	0	0.0%
OTHER/UNKN	0	0.0%
TOTAL	*9*	*100.0%*

CRASH TYPE		**PERCENT**
ANGLE	8	88.9%
REAR-END	1	11.1%
HEAD-ON	0	0.0%
SS-SAME	0	0.0%
SS-OPPOSITE	0	0.0%
PEDESTRIAN	0	0.0%
BICYCLE	0	0.0%
FIXED	0	0.0%
NO COLLISION	0	0.0%
OVERTURN	0	0.0%
OTHER/UNKN	0	0.0%
TOTAL	*9*	*100.0%*

CRASH RATES	**per MEV**
CRASH RATE	0.42
INJURY CRASH RATE	0.28

LIGHT CONDITIONS		**PERCENT**
DAY	6	66.7%
DARK	3	33.3%
TOTAL	*9*	*100.0%*

Note: Dawn, dusk or street lighted conditions included in dark total.

VEHICLE TYPES		**PERCENT**
CAR	13	72.2%
TRUCK	5	27.8%
OTHER/UNKN	0	0.0%
TOTAL	*18*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

DAY AND TIME - BOTH DIRECTIONS

DAY OF WEEK	*EARLY MORNING* 2:00 AM TO 5:59 AM	*AM PEAK* 6:00 AM TO 9:59 AM	*MIDDAY* 10:00 AM TO 1:59 PM	*PM PEAK* 2:00 PM TO 5:59 PM	*EVENING* 6:00 PM TO 9:59 PM	*LATE EVENING* 10:00 PM TO 1:59 AM	*UNKNOWN*	*TOTAL*	
MONDAY	0	0	1	1	2	0	0	4	
TUESDAY	0	0	1	0	0	0	0	1	
WEDNESDAY	0	0	0	1	0	0	0	1	Weekday
THURSDAY	0	1	0	0	1	0	0	2	
FRIDAY	0	0	1	0	0	0	0	1	
SATURDAY	0	0	0	0	0	0	0	0	Weekend
SUNDAY	0	0	0	0	0	0	0	0	
TOTAL	*0*	*1*	*3*	*2*	*3*	*0*	*0*	*9*	

DRIVER AGES		**PERCENT**
<25	1	5.6%
25-34	4	22.2%
35-44	1	5.6%
45-54	4	22.2%
55-64	1	5.6%
65-74	5	27.8%
75-84	2	11.1%
85+	0	0.0%
UNKNOWN	0	0.0%
TOTAL	*18*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

VEHICLE DAMAGE		**PERCENT**
OTHER/UNKN	0	0.0%
NONE	0	0.0%
VERY MINOR	0	0.0%
MINOR	2	11.1%
MODERATE	7	38.9%
SEVERE	8	44.4%
VERY SEVERE	1	5.6%
TOTAL	*18*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

AVERAGE NUMBER OF VEHICLES PER CRASH	*2.1*

Note: Statistics based on all vehicles in crashes.

BY SEASON		**PERCENT**
SPRING	4	44.4%
SUMMER	0	0.0%
FALL	0	0.0%
WINTER	5	55.6%
TOTAL	*9*	*100.0%*

Note: Wint=Jan-Mar, Spr=Apr-June, Sum=July-Sept, Fall=Oct-Dec

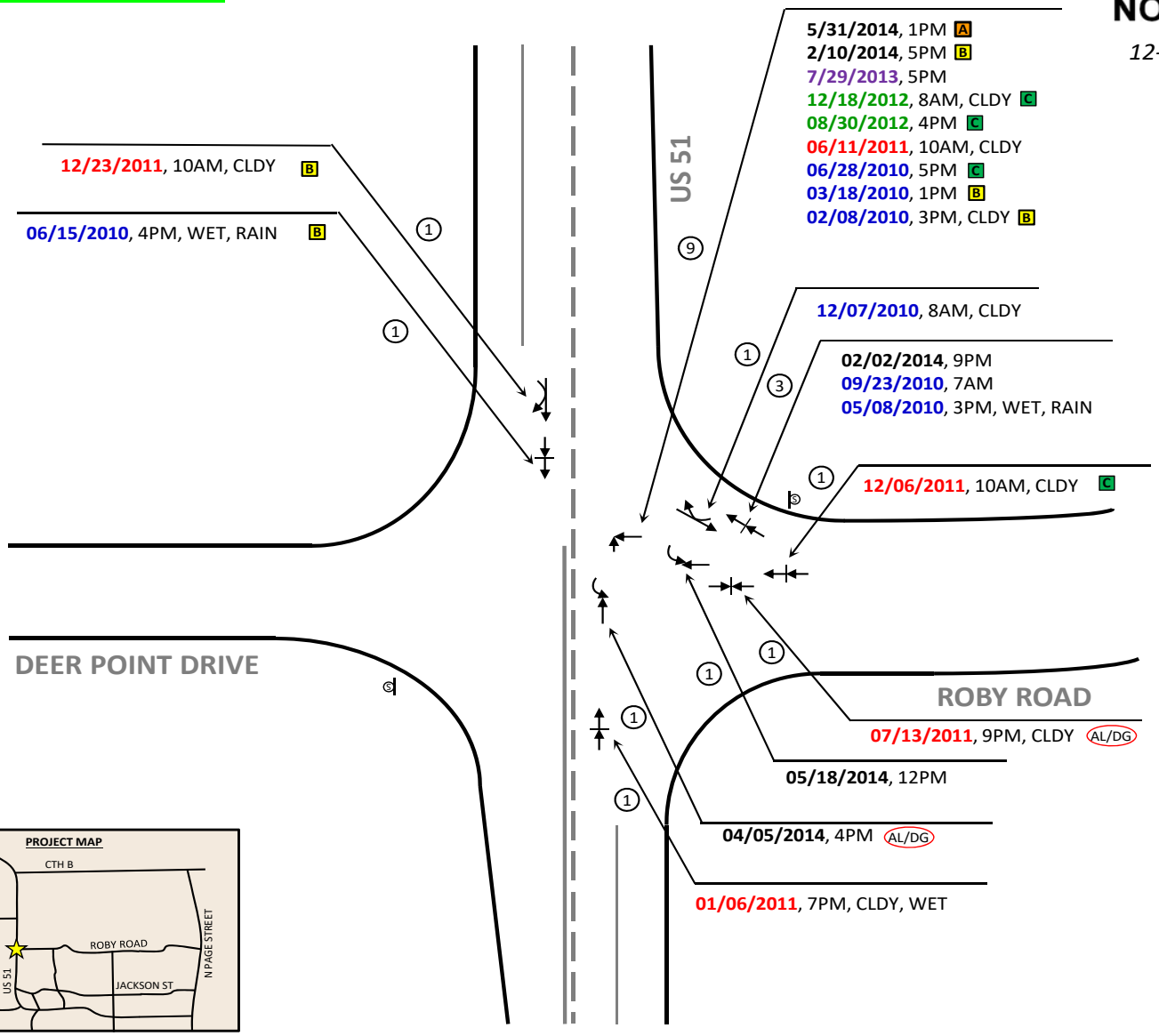
ALCOHOL RELATED CRASHES	
TOTAL	0
PERCENTAGE OF TOTAL	0.00%

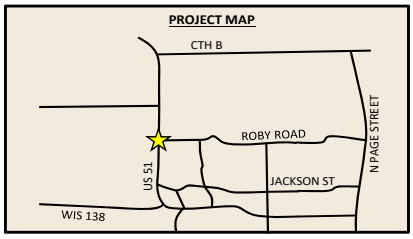
EXHIBIT C2
INTERSECTION CRASH STATISTICS
US 51 & JACKSON STREET
DANE COUNTY, WISCONSIN

Phase II ICE Approved 2016

NORTH

12-15-15





YEAR

2010 BLUE
2011 RED
2012 GREEN
2013 PURPLE
2014 BLACK

CRASH RATE

0.80 Crashes
Per Million
Entering Vehicles

Entering Vehicles: 13,710/day

CRASH FREQUENCY/SEVERITY

20 Crashes

0	Fatal Crash (K)
1	Incapacitating (A-Level)
5	Non-Incapacitating (B-Level)
4	Possible (C-Level)
10	Property Damage Only

LEGEND

- Moving Vehicle
- Backing Vehicle
- Pedestrian
- Bicyclist
- Parked Vehicle
- Stop/Yield Sign
- (T) Tree
- (U) Utility Pole
- (F) Fixed Object
- (N) Non-Fixed Object
- Angle (Right Angle)
- Angle (Left-Turn)
- Angle (Right-Turn)
- Sideswipe-Same
- Sideswipe-Opposite
- Head-On
- Rear-End
- Out of Control
- Overtake
- Overturn

(#) = CRASH FREQUENCY

"LETTER" = USED FOR REFERENCING CRASHES IN REPORT AS NEEDED
DATE OF CRASH
HOUR
SEVERITY (SEE SEVERITY DEFINITIONS)
ROAD CONDITIONS (DRY IF BLANK)
LIGHT CONDITIONS (DAYTIME IF BLANK)
ALCOHOL/DRUG INVOLVEMENT AL/DG

CRASH SEVERITY DEFINITIONS

- K = Fatal Crash
- A = Incapacitating Injury Crash
- B = Non-Incapacitating Injury Crash
- C = Possible Injury Crash
- = Property Damage Only Crash

Note: Intersection crashes without available MV4000 crash reports were not placed on diagram, but included in calculations

EXHIBIT D1
INTERSECTION COLLISION DIAGRAM
US 51 & ROBY ROAD/DEER POINT DRIVE
DANE COUNTY, WISCONSIN

STRAND ASSOCIATES

Phase II ICE Approved 2016

GENERAL INFORMATION

INTERSECTION: US 51/ROBY ROAD
MUNICIPALITY: STOUGHTON
COUNTY: DANE
STATE: WI
PROJECT ID: 5845-06-02

CRASHES FROM: 1/1/2010
TO: 12/31/2014

DURATION
5 YEARS
0 MONTHS

PREPARED BY: AJW

DATE: 12/14/2015

INTERSECTION CHARACTERISTICS

TRAFFIC CONTROL: STOP CONTROLLED ON ROBY RD
INTERSECTION AADT: Year (2012): 13,710
NUMBER OF LEGS: 4
POSTED SPEED (MAJOR): 45
DEER CRASHES INCLUDED: NO
AREA TYPE: URBAN

CRASH STATISTICS

CRASH FREQUENCY & SEVERITY

YEAR	PD	UNKNOWN	C-LEVEL	B-LEVEL	A-LEVEL	FATAL	TOTAL
2010	3	0	1	3	0	0	7
2011	3	0	1	1	0	0	5
2012	0	0	2	0	0	0	2
2013	1	0	0	0	0	0	1
2014	3	0	0	1	1	0	5
TOTAL	*10*	*0*	*4*	*5*	*1*	*0*	*20*
PERCENT	*50.0%*	*0.0%*	*20.0%*	*25.0%*	*5.0%*	*0.0%*	*100.0%*
YEAR AVG.	*2.0*	*0.0*	*0.8*	*1.0*	*0.2*	*0.0*	*4.0*

ROAD CONDITIONS		PERCENT
DRY	17	85.0%
WET	3	15.0%
SNOW	0	0.0%
ICE	0	0.0%
MUD	0	0.0%
OTHER/UNKN	0	0.0%
TOTAL	*20*	*100.0%*

CRASH TYPE		PERCENT
ANGLE	9	45.0%
REAR-END	6	30.0%
HEAD-ON	2	10.0%
SS-SAME	2	10.0%
SS-OPPOSITE	0	0.0%
PEDESTRIAN	0	0.0%
BICYCLE	0	0.0%
FIXED	0	0.0%
NO COLLISION	1	5.0%
OVERTURN	0	0.0%
OTHER/UNKN	0	0.0%
TOTAL	*20*	*100.0%*

CRASH RATES	per MEV
CRASH RATE	0.80
INJURY CRASH RATE	0.40

LIGHT CONDITIONS		PERCENT
DAY	17	85.0%
DARK	3	15.0%
TOTAL	*20*	*100.0%*

Note: Dawn, dusk or street lighted conditions included in dark total.

VEHICLE TYPES		PERCENT
CAR	35	87.5%
TRUCK	4	10.0%
OTHER/UNKN	1	2.5%
TOTAL	*40*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

DAY AND TIME - BOTH DIRECTIONS

DAY OF WEEK	*EARLY MORNING* 2:00 AM TO 5:59 AM	*AM PEAK* 6:00 AM TO 9:59 AM	*MIDDAY* 10:00 AM TO 1:59 PM	*PM PEAK* 2:00 PM TO 5:59 PM	*EVENING* 6:00 PM TO 9:59 PM	*LATE EVENING* 10:00 PM TO 1:59 AM	*UNKNOWN*	*TOTAL*	
MONDAY	0	0	0	4	0	0	0	4	
TUESDAY	0	2	1	1	0	0	0	4	
WEDNESDAY	0	0	0	0	1	0	0	1	Weekday
THURSDAY	0	2	1	1	0	0	0	4	
FRIDAY	0	0	1	0	0	0	0	1	
SATURDAY	0	0	2	2	0	0	0	4	Weekend
SUNDAY	0	0	1	0	1	0	0	2	
TOTAL	*0*	*4*	*6*	*8*	*2*	*0*	*0*	*20*	

DRIVER AGES		PERCENT
<25	8	20.0%
25-34	3	7.5%
35-44	10	25.0%
45-54	5	12.5%
55-64	7	17.5%
65-74	4	10.0%
75-84	2	5.0%
85+	1	2.5%
UNKNOWN	0	0.0%
TOTAL	*40*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

VEHICLE DAMAGE		PERCENT
OTHER/UNKN	0	0.0%
NONE	1	2.5%
VERY MINOR	0	0.0%
MINOR	11	27.5%
MODERATE	15	37.5%
SEVERE	11	27.5%
VERY SEVERE	2	5.0%
TOTAL	*40*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

AVERAGE NUMBER OF VEHICLES PER CRASH	*2.0*

Note: Statistics based on all vehicles in crashes.

BY SEASON		PERCENT
SPRING	6	30.0%
SUMMER	4	20.0%
FALL	0	0.0%
WINTER	10	50.0%
TOTAL	*20*	*100.0%*

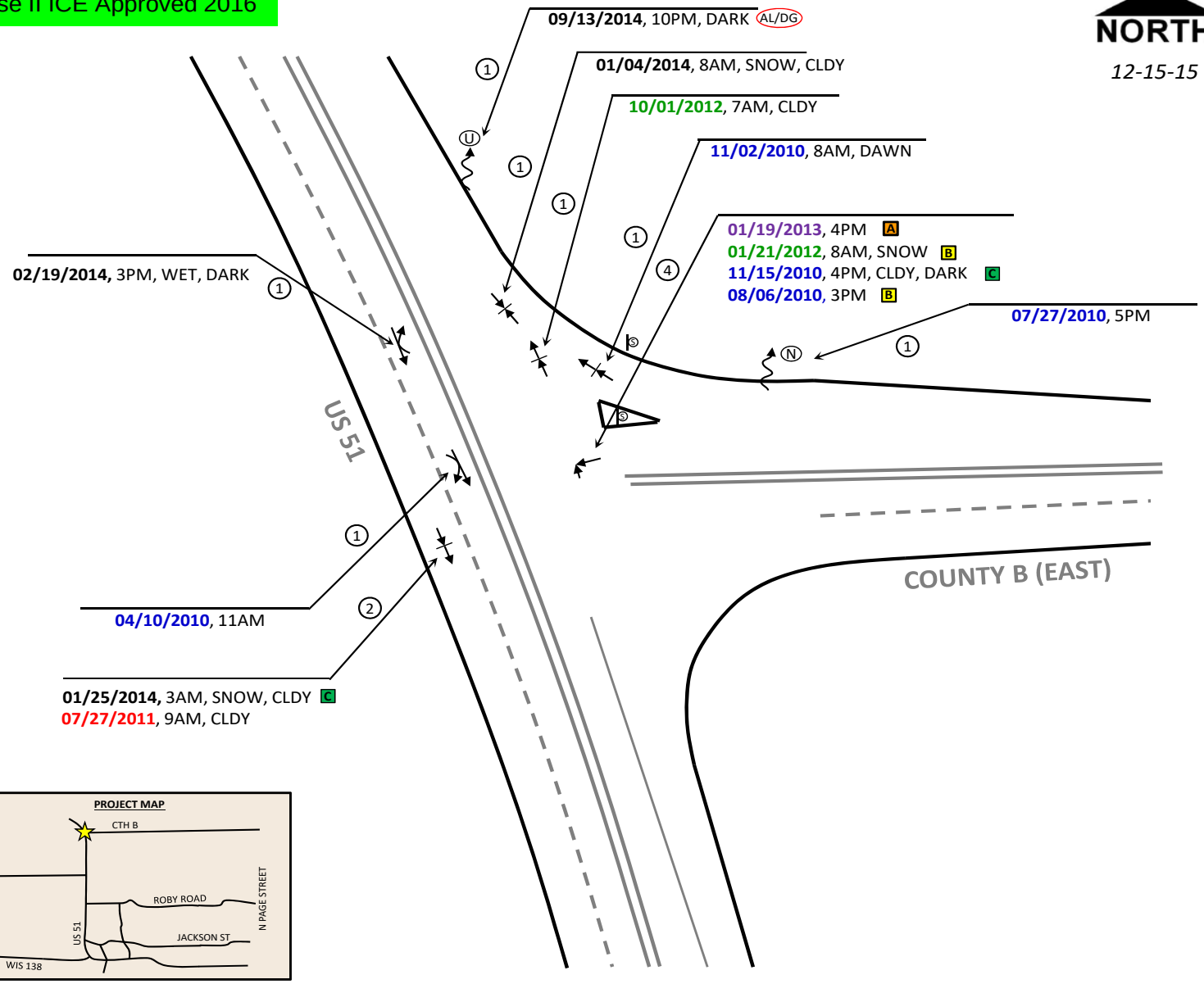
Note: Wint=Jan-Mar, Spr=Apr-June, Sum=July-Sept, Fall=Oct-Dec

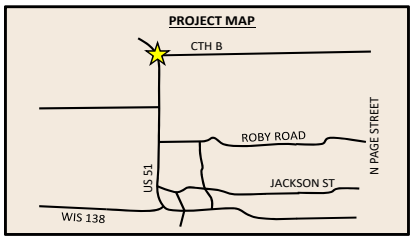
ALCOHOL RELATED CRASHES	
TOTAL	2
PERCENTAGE OF TOTAL	10.00%

EXHIBIT D2
INTERSECTION CRASH STATISTICS
US 51 & ROBY ROAD/DEER POINT DRIVE
DANE COUNTY, WISCONSIN

STRAND ASSOCIATES

Phase II ICE Approved 2016





YEAR

2010 BLUE
2011 RED
2012 GREEN
2013 PURPLE
2014 BLACK

CRASH RATE

0.55 Crashes
Per Million
Entering Vehicles

Entering Vehicles: 12,960/day

CRASH FREQUENCY/SEVERITY

13 Crashes

0	Fatal Crash (K)
1	Incapacitating (A-Level)
2	Non-Incapacitating (B-Level)
2	Possible (C-Level)
8	Property Damage Only

LEGEND

- Moving Vehicle
- Backing Vehicle
- Pedestrian
- Bicyclist
- Parked Vehicle
- Stop/Yield Sign
- (T) Tree
- (U) Utility Pole
- (F) Fixed Object
- (N) Non-Fixed Object
- Angle (Right Angle)
- Angle (Left-Turn)
- Angle (Right-Turn)
- Sideswipe-Same
- Sideswipe-Opposite
- Head-On
- Rear-End
- Out of Control
- Overtake
- Overturn

(#) = CRASH FREQUENCY

"LETTER" = USED FOR REFERENCING CRASHES IN REPORT AS NEEDED
DATE OF CRASH
HOUR
SEVERITY (SEE SEVERITY DEFINITIONS)
ROAD CONDITIONS (DRY IF BLANK)
LIGHT CONDITIONS (DAYTIME IF BLANK)
ALCOHOL/DRUG INVOLVEMENT AL/DG

CRASH SEVERITY DEFINITIONS

- K = Fatal Crash
- A = Incapacitating Injury Crash
- B = Non-Incapacitating Injury Crash
- C = Possible Injury Crash
- = Property Damage Only Crash

Note: Intersection crashes without available MV4000 crash reports were not placed on diagram, but included in calculations

EXHIBIT E1
INTERSECTION COLLISION DIAGRAM
US 51 & COUNTY B (EAST)
DANE COUNTY, WISCONSIN

STRAND ASSOCIATES

Phase II ICE Approved 2016

GENERAL INFORMATION

INTERSECTION: US 51/COUNTY B (EAST)
MUNICIPALITY: STOUGHTON
COUNTY: DANE
STATE: WI
PROJECT ID: 5845-06-02

CRASHES FROM: 1/1/2010
TO: 12/31/2014

DURATION
5 YEARS
0 MONTHS

PREPARED BY: AJW

DATE: 12/15/2015

INTERSECTION CHARACTERISTICS

TRAFFIC CONTROL: STOP CONTROL ON COUNTY B (EAST)
INTERSECTION AADT: Year (2012): 12,960
NUMBER OF LEGS: 3
POSTED SPEED (MAJOR): 55
DEER CRASHES INCLUDED: NO
AREA TYPE: RURAL

CRASH STATISTICS

CRASH FREQUENCY & SEVERITY

YEAR	PD	UNKNOWN	C-LEVEL	B-LEVEL	A-LEVEL	FATAL	TOTAL
2010	3	0	1	1	0	0	5
2011	1	0	0	0	0	0	1
2012	1	0	0	1	0	0	2
2013	0	0	0	0	1	0	1
2014	3	0	1	0	0	0	4
TOTAL	*8*	*0*	*2*	*2*	*1*	*0*	*13*
PERCENT	*61.5%*	*0.0%*	*15.4%*	*15.4%*	*7.7%*	*0.0%*	*100.0%*
YEAR AVG.	*1.6*	*0.0*	*0.4*	*0.4*	*0.2*	*0.0*	*2.6*

CRASH RATES

	per MEV
CRASH RATE	0.55
INJURY CRASH RATE	0.21

LIGHT CONDITIONS

		PERCENT
DAY	8	61.5%
DARK	5	38.5%
TOTAL	*13*	*100.0%*

Note: Dawn, dusk or street lighted conditions included in dark total.

VEHICLE TYPES

		PERCENT
CAR	23	88.5%
TRUCK	2	7.7%
OTHER/UNKN	1	3.8%
TOTAL	*26*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

ROAD CONDITIONS

		PERCENT
DRY	9	69.2%
WET	1	7.7%
SNOW	3	23.1%
ICE	0	0.0%
MUD	0	0.0%
OTHER/UNKN	0	0.0%
TOTAL	*13*	*100.0%*

CRASH TYPE

		PERCENT
ANGLE	4	30.8%
REAR-END	4	30.8%
HEAD-ON	1	7.7%
SS-SAME	1	7.7%
SS-OPPOSITE	1	7.7%
PEDESTRIAN	0	0.0%
BICYCLE	0	0.0%
FIXED	0	0.0%
NO COLLISION	2	15.4%
OVERTURN	0	0.0%
OTHER/UNKN	0	0.0%
TOTAL	*13*	*100.0%*

DAY AND TIME - BOTH DIRECTIONS

DAY OF WEEK	*EARLY MORNING* 2:00 AM TO 5:59 AM	*AM PEAK* 6:00 AM TO 9:59 AM	*MIDDAY* 10:00 AM TO 1:59 PM	*PM PEAK* 2:00 PM TO 5:59 PM	*EVENING* 6:00 PM TO 9:59 PM	*LATE EVENING* 10:00 PM TO 1:59 AM	*UNKNOWN*	*TOTAL*	
MONDAY	0	1	0	1	0	0	0	2	
TUESDAY	0	1	0	1	0	0	0	2	
WEDNESDAY	0	1	0	0	1	0	0	2	Weekday
THURSDAY	0	0	0	0	0	0	0	0	
FRIDAY	0	0	0	1	0	0	0	1	
SATURDAY	1	2	1	1	1	0	0	6	Weekend
SUNDAY	0	0	0	0	0	0	0	0	
TOTAL	*1*	*5*	*1*	*4*	*2*	*0*	*0*	*13*	

DRIVER AGES

		PERCENT
<25	7	35.0%
25-34	3	15.0%
35-44	4	20.0%
45-54	1	5.0%
55-64	4	20.0%
65-74	1	5.0%
75-84	0	0.0%
85+	0	0.0%
UNKNOWN	0	0.0%
TOTAL	*20*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

VEHICLE DAMAGE

		PERCENT
OTHER/UNKN	1	4.0%
NONE	2	8.0%
VERY MINOR	2	8.0%
MINOR	3	12.0%
MODERATE	9	36.0%
SEVERE	4	16.0%
VERY SEVERE	4	16.0%
TOTAL	*25*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

AVERAGE NUMBER OF VEHICLES PER CRASH *2.0*

Note: Statistics based on all vehicles in crashes.

BY SEASON

		PERCENT
SPRING	3	23.1%
SUMMER	6	46.2%
FALL	0	0.0%
WINTER	4	30.8%
TOTAL	*13*	*100.0%*

Note: Wint=Jan-Mar, Spr=Apr-June, Sum=July-Sept, Fall=Oct-Dec

ALCOHOL RELATED CRASHES

TOTAL	1
PERCENTAGE OF TOTAL	7.69%

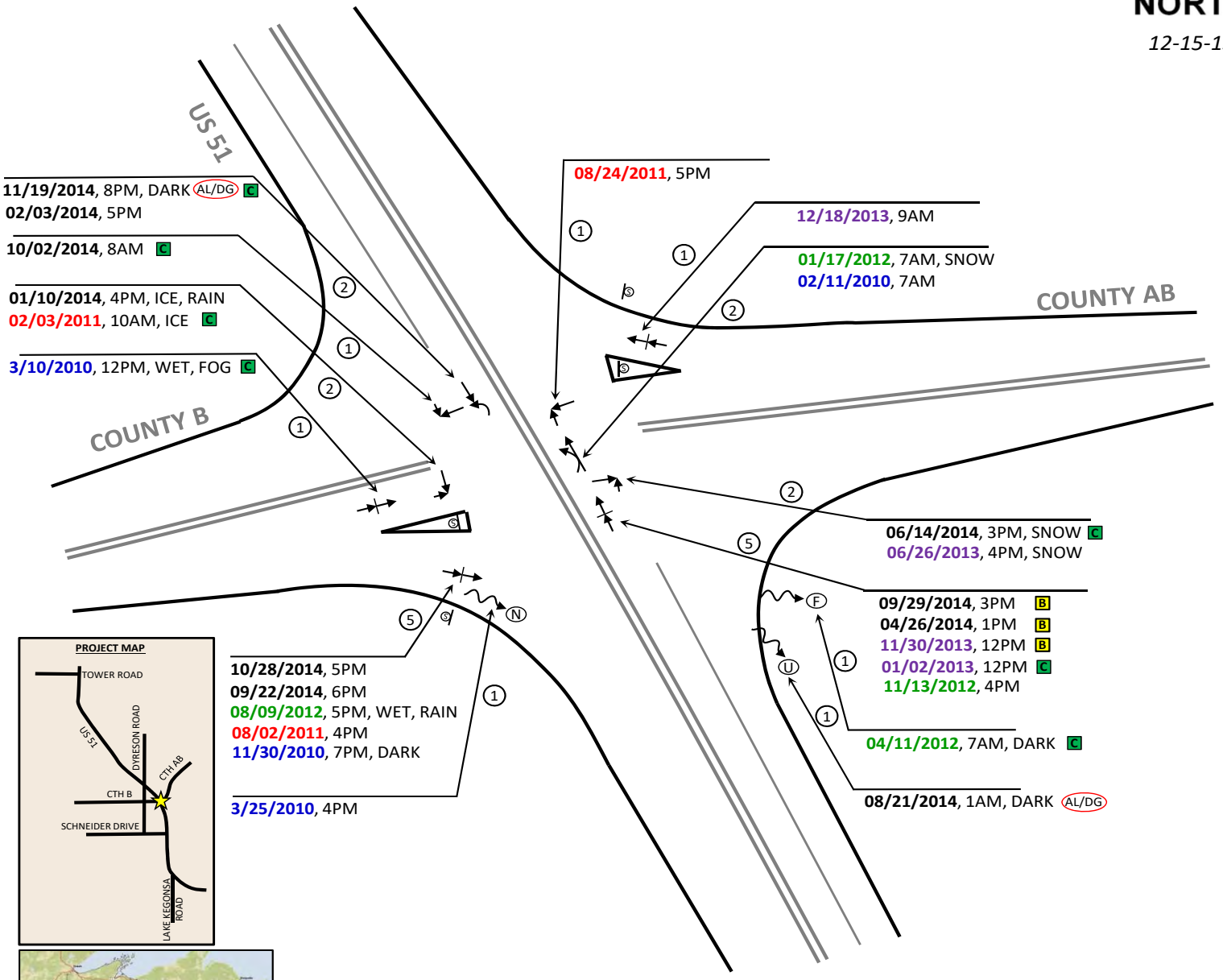
EXHIBIT E2
INTERSECTION CRASH STATISTICS
US 51 & COUNTY B (EAST)
DANE COUNTY, WISCONSIN

STRAND ASSOCIATES

Phase II ICE Approved 2016

NORTH

12-15-15



YEAR

2010 BLUE
2011 RED
2012 GREEN
2013 PURPLE
2014 BLACK

CRASH RATE

1.20 Crashes
Per Million
Entering Vehicles

Entering Vehicles: 11,440/day

CRASH FREQUENCY/SEVERITY

25 Crashes

0	Fatal Crash (K)
0	Incapacitating (A-Level)
3	Non-Incapacitating (B-Level)
7	Possible (C-Level)
15	Property Damage Only

LEGEND

- Moving Vehicle
- Backing Vehicle
- Pedestrian
- Bicyclist
- Parked Vehicle
- Stop/Yield Sign
- (T) Tree
- (U) Utility Pole
- (F) Fixed Object
- (N) Non-Fixed Object
- Angle (Right Angle)
- Angle (Left-Turn)
- Angle (Right-Turn)
- Sideswipe-Same
- Sideswipe-Opposite
- Head-On
- Rear-End
- Out of Control
- Overtake
- Overturn

(#) = CRASH FREQUENCY

"LETTER" = USED FOR REFERENCING CRASHES IN REPORT AS NEEDED
DATE OF CRASH
HOUR
SEVERITY (SEE SEVERITY DEFINITIONS)
ROAD CONDITIONS (DRY IF BLANK)
LIGHT CONDITIONS (DAYTIME IF BLANK)
ALCOHOL/DRUG INVOLVEMENT AL/DG

CRASH SEVERITY DEFINITIONS

- K = Fatal Crash
- A = Incapacitating Injury Crash
- B = Non-Incapacitating Injury Crash
- C = Possible Injury Crash
- = Property Damage Only Crash

Note: Intersection crashes without available MV4000 crash reports were not placed on diagram, but included in calculations

EXHIBIT F1
INTERSECTION COLLISION DIAGRAM
US 51 & COUNTY B/AB
DANE COUNTY, WISCONSIN

STRAND ASSOCIATES

Phase II ICE Approved 2016

GENERAL INFORMATION

INTERSECTION: US 51/COUNTY B/AB
MUNICIPALITY: MCFARLAND
COUNTY: DANE
STATE: WI
PROJECT ID: 5845-06-02

CRASHES FROM: 1/1/2010
TO: 12/31/2014

DURATION
5 YEARS
0 MONTHS

PREPARED BY: AJW

DATE: 12/15/2015

INTERSECTION CHARACTERISTICS

TRAFFIC CONTROL: STOP CONTROL ON COUNTY B & AB
INTERSECTION AADT: Year (2012): 11,440
NUMBER OF LEGS: 4
POSTED SPEED (MAJOR): 55
DEER CRASHES INCLUDED: NO
AREA TYPE: RURAL

CRASH STATISTICS

CRASH FREQUENCY & SEVERITY

YEAR	PD	UNKNOWN	C-LEVEL	B-LEVEL	A-LEVEL	FATAL	TOTAL
2010	3	0	1	0	0	0	4
2011	2	0	1	0	0	0	3
2012	3	0	1	0	0	0	4
2013	2	0	1	1	0	0	4
2014	5	0	3	2	0	0	10
TOTAL	*15*	*0*	*7*	*3*	*0*	*0*	*25*
PERCENT	*60.0%*	*0.0%*	*28.0%*	*12.0%*	*0.0%*	*0.0%*	*100.0%*
YEAR AVG.	*3.0*	*0.0*	*1.4*	*0.6*	*0.0*	*0.0*	*5.0*

CRASH RATES

	per MEV
CRASH RATE	1.20
INJURY CRASH RATE	0.48

LIGHT CONDITIONS

		PERCENT
DAY	19	76.0%
DARK	6	24.0%
TOTAL	*25*	*100.0%*

Note: Dawn, dusk or street lighted conditions included in dark total.

VEHICLE TYPES

		PERCENT
CAR	39	78.0%
TRUCK	10	20.0%
OTHER/UNKN	1	2.0%
TOTAL	*50*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

ROAD CONDITIONS

		PERCENT
DRY	20	80.0%
WET	2	8.0%
SNOW	1	4.0%
ICE	2	8.0%
MUD	0	0.0%
OTHER/UNKN	0	0.0%
TOTAL	*25*	*100.0%*

CRASH TYPE

		PERCENT
ANGLE	8	32.0%
REAR-END	12	48.0%
HEAD-ON	0	0.0%
SS-SAME	2	8.0%
SS-OPPOSITE	0	0.0%
PEDESTRIAN	0	0.0%
BICYCLE	0	0.0%
FIXED	0	0.0%
NO COLLISION	3	12.0%
OVERTURN	0	0.0%
OTHER/UNKN	0	0.0%
TOTAL	*25*	*100.0%*

DAY AND TIME - BOTH DIRECTIONS

DAY OF WEEK	*EARLY MORNING* 2:00 AM TO 5:59 AM	*AM PEAK* 6:00 AM TO 9:59 AM	*MIDDAY* 10:00 AM TO 1:59 PM	*PM PEAK* 2:00 PM TO 5:59 PM	*EVENING* 6:00 PM TO 9:59 PM	*LATE EVENING* 10:00 PM TO 1:59 AM	*UNKNOWN*	*TOTAL*	
MONDAY	0	0	0	2	1	0	0	3	
TUESDAY	0	0	0	4	1	0	0	5	
WEDNESDAY	0	0	3	2	1	1	0	7	Weekday
THURSDAY	0	2	1	2	0	1	0	6	
FRIDAY	0	0	0	1	0	0	0	1	
SATURDAY	0	0	2	1	0	0	0	3	Weekend
SUNDAY	0	0	0	0	0	0	0	0	
TOTAL	*0*	*2*	*6*	*12*	*3*	*2*	*0*	*25*	

DRIVER AGES

		PERCENT
<25	4	8.3%
25-34	8	16.7%
35-44	9	18.8%
45-54	14	29.2%
55-64	7	14.6%
65-74	4	8.3%
75-84	2	4.2%
85+	0	0.0%
UNKNOWN	0	0.0%
TOTAL	*48*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

VEHICLE DAMAGE

		PERCENT
OTHER/UNKN	0	0.0%
NONE	3	6.1%
VERY MINOR	4	8.2%
MINOR	6	12.2%
MODERATE	10	20.4%
SEVERE	20	40.8%
VERY SEVERE	6	12.2%
TOTAL	*49*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

AVERAGE NUMBER OF VEHICLES PER CRASH *2.3*

Note: Statistics based on all vehicles in crashes.

BY SEASON

		PERCENT
SPRING	14	56.0%
SUMMER	3	12.0%
FALL	0	0.0%
WINTER	8	32.0%
TOTAL	*25*	*100.0%*

Note: Wint=Jan-Mar, Spr=Apr-June, Sum=July-Sept, Fall=Oct-Dec

ALCOHOL RELATED CRASHES

TOTAL	2
PERCENTAGE OF TOTAL	8.00%

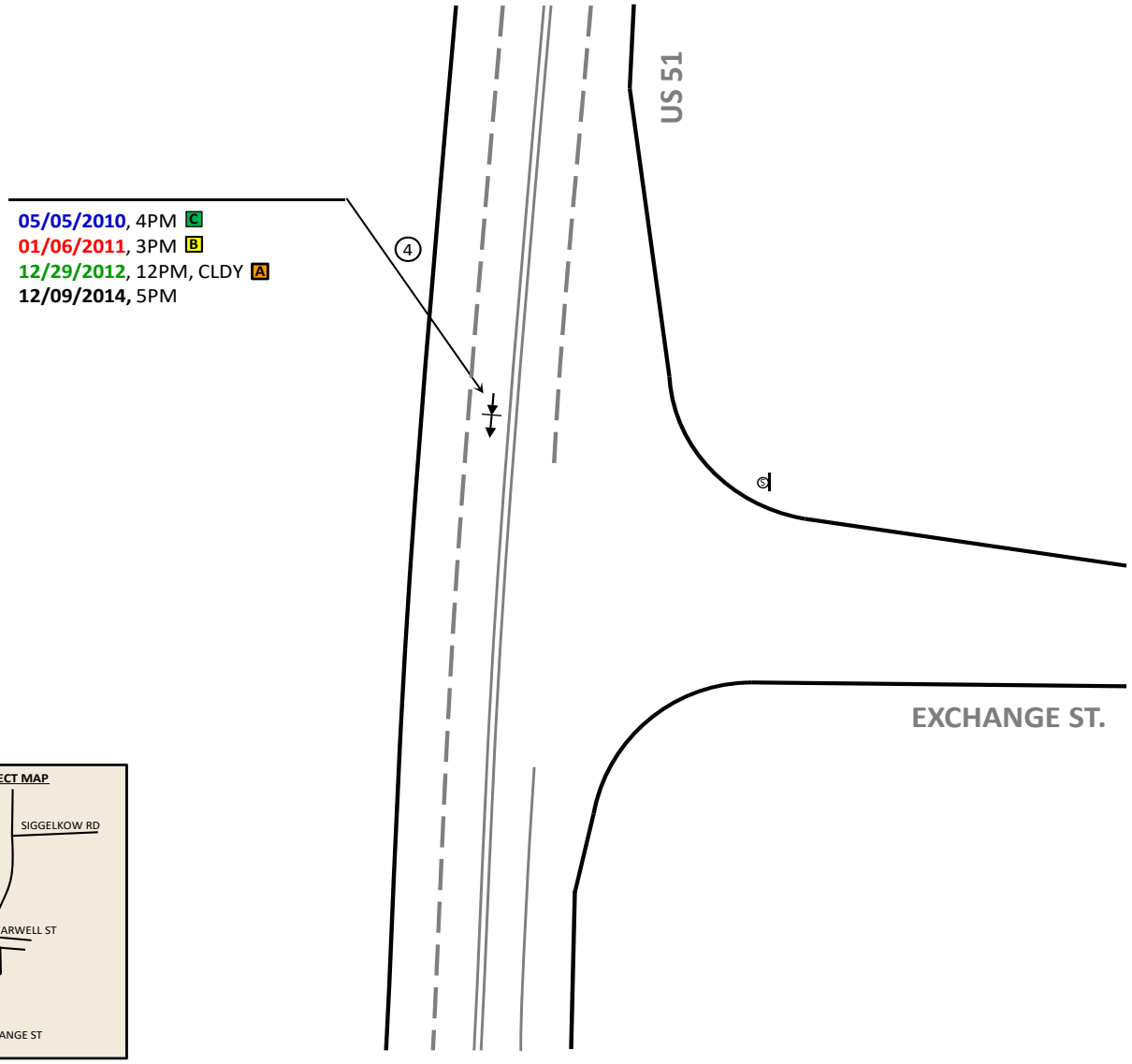
EXHIBIT F2
INTERSECTION CRASH STATISTICS
US 51 & COUNTY B/AB
DANE COUNTY, WISCONSIN

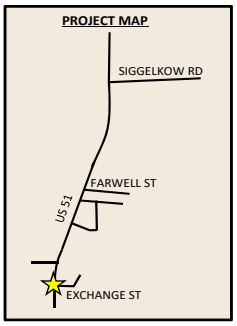
STRAND ASSOCIATES

Phase II ICE Approved 2015

NORTH

FINAL
9-8-15





YEAR

2010 BLUE
2011 RED
2012 GREEN
2013 PURPLE
2014 BLACK

CRASH RATE

0.17 Crashes
Per Million
Entering Vehicles

Entering Vehicles: 13,200/day

CRASH FREQUENCY/SEVERITY

4 Crashes

0	Fatal Crash (K)
1	Incapacitating (A-Level)
1	Non-Incapacitating (B-Level)
1	Possible (C-Level)
1	Property Damage Only

LEGEND

- Moving Vehicle
- Backing Vehicle
- Pedestrian
- Bicyclist
- Parked Vehicle
- Stop/Yield Sign
- (T) Tree
- (U) Utility Pole
- (F) Fixed Object
- (N) Non-Fixed Object
- Angle (Right Angle)
- Angle (Left-Turn)
- Angle (Right-Turn)
- Sideswipe-Same
- Sideswipe-Opposite
- Head-On
- Rear-End
- Out of Control
- Overtake
- Overturn

(#) = CRASH FREQUENCY

"LETTER" = USED FOR REFERENCING CRASHES IN REPORT AS NEEDED
DATE OF CRASH
HOUR
SEVERITY (SEE SEVERITY DEFINITIONS)
ROAD CONDITIONS (DRY IF BLANK)
LIGHT CONDITIONS (DAYTIME IF BLANK)
ALCOHOL/DRUG INVOLVEMENT (AL/DG)

CRASH SEVERITY DEFINITIONS

- K = Fatal Crash
- A = Incapacitating Injury Crash
- B = Non-Incapacitating Injury Crash
- C = Possible Injury Crash
- = Property Damage Only Crash

EXHIBIT G1
INTERSECTION COLLISION DIAGRAM
US 51 & EXCHANGE ST
DANE COUNTY, WISCONSIN

STRAND ASSOCIATES

Phase II ICE Approved 2015

GENERAL INFORMATION

INTERSECTION: US 51/EXCHANGE ST
MUNICIPALITY: MCFARLAND
COUNTY: DANE
STATE: WI
PROJECT ID: 5845-06-02

CRASHES FROM: 1/1/2010
TO: 12/31/2014

DURATION
5 YEARS
0 MONTHS

PREPARED BY: CRD

DATE: 09/08/2015

INTERSECTION CHARACTERISTICS

TRAFFIC CONTROL: STOP CONTROLLED ON EXCHANGE
INTERSECTION AADT: Year (2011): 13,200
NUMBER OF LEGS: 3
POSTED SPEED (MAJOR): 55
DEER CRASHES INCLUDED: NO
AREA TYPE: RURAL

CRASH STATISTICS

CRASH FREQUENCY & SEVERITY

YEAR	PD	UNKNOWN	C-LEVEL	B-LEVEL	A-LEVEL	FATAL	TOTAL
2010	0	0	1	0	0	0	1
2011	0	0	0	1	0	0	1
2012	0	0	0	0	1	0	1
2013	0	0	0	0	0	0	0
2014	1	0	0	0	0	0	1
TOTAL	*1*	*0*	*1*	*1*	*1*	*0*	*4*
PERCENT	*25.0%*	*0.0%*	*25.0%*	*25.0%*	*25.0%*	*0.0%*	*100.0%*
YEAR AVG.	*0.2*	*0.0*	*0.2*	*0.2*	*0.2*	*0.0*	*0.8*

ROAD CONDITIONS		PERCENT
DRY	4	100.0%
WET	0	0.0%
SNOW	0	0.0%
ICE	0	0.0%
MUD	0	0.0%
OTHER/UNKN	0	0.0%
TOTAL	*4*	*100.0%*

CRASH TYPE		PERCENT
ANGLE	0	0.0%
REAR-END	4	100.0%
HEAD-ON	0	0.0%
SS-SAME	0	0.0%
SS-OPPOSITE	0	0.0%
PEDESTRIAN	0	0.0%
BICYCLE	0	0.0%
FIXED	0	0.0%
NOT FIXED	0	0.0%
OVERTURN	0	0.0%
OTHER/UNKN	0	0.0%
TOTAL	*4*	*100.0%*

CRASH RATES	per MEV
CRASH RATE	0.17
INJURY CRASH RATE	0.12

LIGHT CONDITIONS		PERCENT
DAY	3	75.0%
DARK	1	25.0%
TOTAL	*4*	*100.0%*

Note: Dawn, dusk or street lighted conditions included in dark total.

VEHICLE TYPES		PERCENT
CAR	8	88.9%
TRUCK	1	11.1%
OTHER/UNKN	0	0.0%
TOTAL	*9*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

DAY AND TIME - BOTH DIRECTIONS

DAY OF WEEK	*EARLY MORNING* 2:00 AM TO 5:59 AM	*AM PEAK* 6:00 AM TO 9:59 AM	*MIDDAY* 10:00 AM TO 1:59 PM	*PM PEAK* 2:00 PM TO 5:59 PM	*EVENING* 6:00 PM TO 9:59 PM	*LATE EVENING* 10:00 PM TO 1:59 AM	*UNKNOWN*	*TOTAL*	
MONDAY	0	0	0	0	0	0	0	0	
TUESDAY	0	0	0	1	0	0	0	0	
WEDNESDAY	0	0	0	1	0	0	0	0	Weekday
THURSDAY	0	0	0	1	0	0	0	0	
FRIDAY	0	0	0	0	0	0	0	0	
SATURDAY	0	0	1	0	0	0	0	0	Weekend
SUNDAY	0	0	0	0	0	0	0	0	
TOTAL	*0*	*0*	*1*	*3*	*0*	*0*	*0*	*4*	

DRIVER AGES		PERCENT
<25	1	11.1%
25-34	3	33.3%
35-44	1	11.1%
45-54	1	11.1%
55-64	3	33.3%
65-74	0	0.0%
75-84	0	0.0%
85+	0	0.0%
UNKNOWN	0	0.0%
TOTAL	*9*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

VEHICLE DAMAGE		PERCENT
OTHER/UNKN	0	0.0%
NONE	0	0.0%
VERY MINOR	0	0.0%
MINOR	0	0.0%
MODERATE	2	22.2%
SEVERE	4	44.5%
VERY SEVERE	3	33.3%
TOTAL	*9*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

AVERAGE NUMBER OF VEHICLES PER CRASH	*2.25*

Note: Statistics based on all vehicles in crashes.

BY SEASON		PERCENT
SPRING	1	25.0%
SUMMER	0	0.00%
FALL	0	0.0%
WINTER	3	75.0%
TOTAL	*4*	*100.0%*

Note: Wint=Jan-Mar, Spr=Apr-June, Sum=July-Sept, Fall=Oct-Dec

ALCOHOL RELATED CRASHES	
TOTAL	0
PERCENTAGE OF TOTAL	0.0%

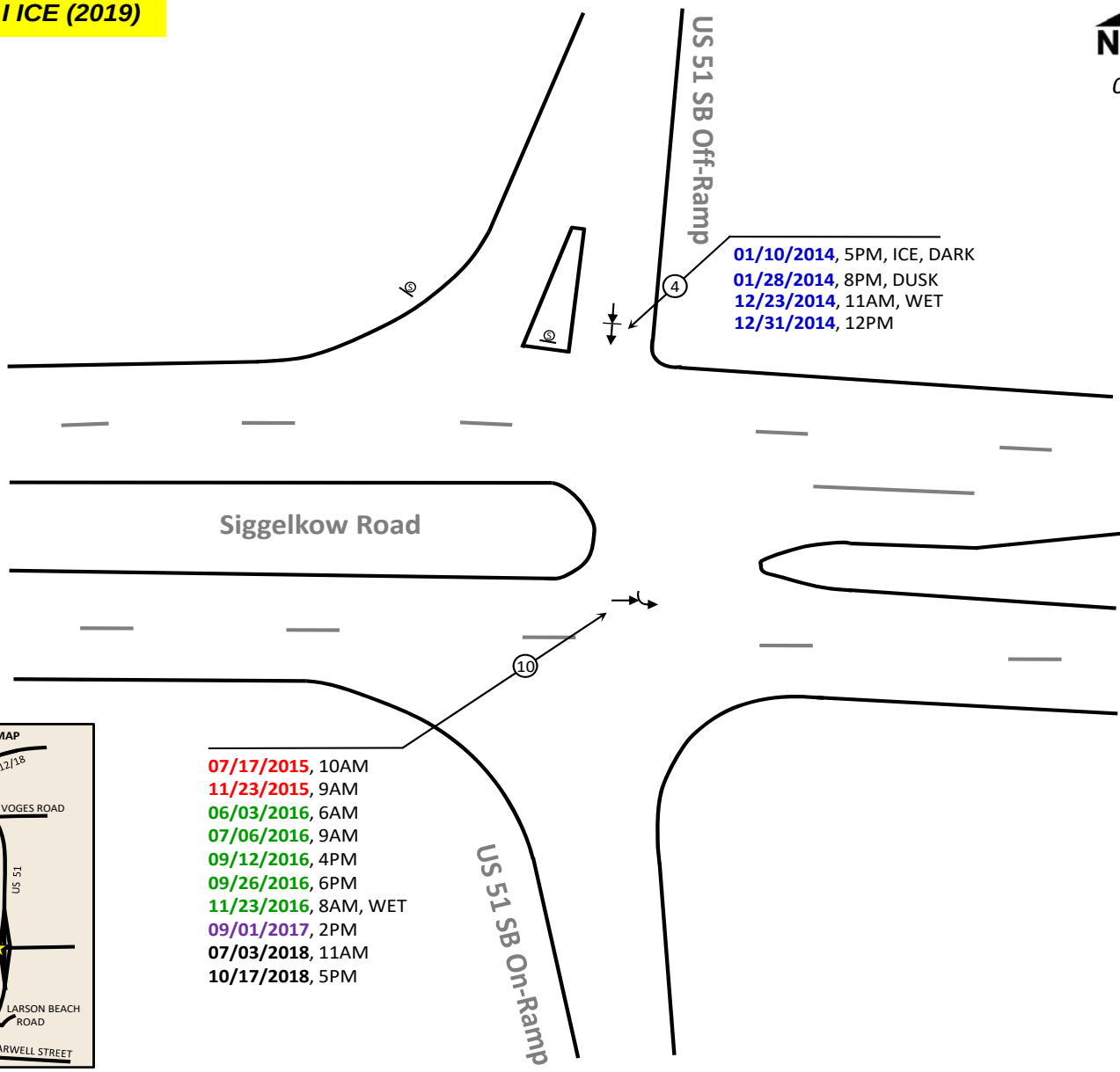
EXHIBIT G2
INTERSECTION CRASH STATISTICS
US 51 & EXCHANGE ST
DANE COUNTY, WISCONSIN

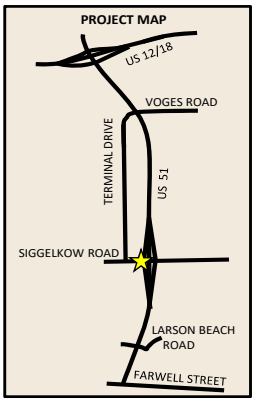
STRAND ASSOCIATES

For Phase I ICE (2019)

NORTH

08-30-19





YEAR

2014 BLUE
2015 RED
2016 GREEN
2017 PURPLE
2018 BLACK

CRASH RATE

0.98 Crashes

Per Million
Entering Vehicles

Entering Vehicles: 7830/day

CRASH FREQUENCY/SEVERITY

14 Crashes

0	Fatal Crash (K)
0	Incapacitating (A-Level)
0	Non-Incapacitating (B-Level)
0	Possible (C-Level)
14	Property Damage Only

LEGEND

- Moving Vehicle
- Backing Vehicle
- Pedestrian
- Bicyclist
- Parked Vehicle
- Stop/Yield Sign
- (T) Tree
- (U) Utility Pole
- (F) Fixed Object
- (N) Non-Fixed Object
- Angle (Right Angle)
- Angle (Left-Turn)
- Angle (Right-Turn)
- Sideswipe-Same
- Sideswipe-Opposite
- Head-On
- Rear-End
- Out of Control
- Overtake
- Overturn

(#) = CRASH FREQUENCY

"LETTER" = USED FOR REFERENCING CRASHES IN REPORT AS NEEDED
DATE OF CRASH
HOUR
SEVERITY (SEE SEVERITY DEFINITIONS)
ROAD CONDITIONS (DRY IF BLANK)
LIGHT CONDITIONS (DAYTIME IF BLANK)
ALCOHOL/DRUG INVOLVEMENT (AL/DG)

CRASH SEVERITY DEFINITIONS

- K = Fatal Crash
- A = Incapacitating Injury Crash
- B = Non-Incapacitating Injury Crash
- C = Possible Injury Crash
- = Property Damage Only Crash

EXHIBIT H1
INTERSECTION COLLISION DIAGRAM
US 51 SB RAMPS & SIGGELKOW ROAD
DANE COUNTY, WISCONSIN

STRAND ASSOCIATES

For Phase I ICE (2019)

GENERAL INFORMATION

INTERSECTION:	US 51 SB RAMPS & SIGGELKOW ROAD			***DURATION***	
MUNICIPALITY:	MCFARLAND	***CRASHES FROM:***	1/1/2014	5 YEARS	
COUNTY:	DANE	***TO:***	12/31/2018	0 MONTHS	
STATE:	WI				
PROJECT ID:	5845-06-02	***PREPARED BY:***	KRT	***DATE:***	08/30/2019

INTERSECTION CHARACTERISTICS

TRAFFIC CONTROL:	STOP CONTROL ON OFF-RAMP	***POSTED SPEED (US 51):***	55
INTERSECTION AADT (2014-2018 Avg):	7830	***DEER CRASHES INCLUDED:***	NO
NUMBER OF LEGS:	4	***AREA TYPE:***	RURAL

CRASH STATISTICS

CRASH FREQUENCY & SEVERITY

YEAR	PD	UNKNOWN	C-LEVEL	B-LEVEL	A-LEVEL	FATAL	TOTAL
2014	*4*	*0*	*0*	*0*	*0*	*0*	4
2015	*2*	*0*	*0*	*0*	*0*	*0*	2
2016	*5*	*0*	*0*	*0*	*0*	*0*	5
2017	*1*	*0*	*0*	*0*	*0*	*0*	1
2018	*2*	*0*	*0*	*0*	*0*	*0*	2
TOTAL	*14*	*0*	*0*	*0*	*0*	*0*	*14*
PERCENT	*100.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*100.0%*
YEAR AVG.	*2.8*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*2.8*

CRASH RATES

	per MEV
CRASH RATE	0.98
KAB CRASH RATE	0.00

LIGHT CONDITIONS

		PERCENT
DAY	12	85.7%
DARK	2	14.3%
TOTAL	*14*	*100.0%*

Note: Dawn, dusk or street lighted conditions included in dark total.

VEHICLE TYPES

		PERCENT
CAR	20	71.4%
TRUCK	8	28.6%
OTHER/UNKN	0	0.0%
TOTAL	*28*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

ROAD CONDITIONS

		PERCENT
DRY	11	78.6%
WET	2	14.3%
SNOW	0	0.0%
ICE	1	7.1%
MUD	0	0.0%
OTHER/UNKN	0	0.0%
TOTAL	*14*	*100.0%*

CRASH TYPE

		PERCENT
ANGLE	10	71.4%
REAR-END	4	28.6%
HEAD-ON	0	0.0%
SS-SAME	0	0.0%
SS-OPPOSITE	0	0.0%
PEDESTRIAN	0	0.0%
BICYCLE	0	0.0%
FIXED	0	0.0%
NO COLLISION	0	0.0%
OVERTURN	0	0.0%
OTHER/UNKN	0	0.0%
TOTAL	*14*	*100.0%*

DAY AND TIME - BOTH DIRECTIONS

DAY OF WEEK	*EARLY MORNING* 2:00 AM TO 5:59 AM	*AM PEAK* 6:00 AM TO 9:59 AM	*MIDDAY* 10:00 AM TO 1:59 PM	*PM PEAK* 2:00 PM TO 5:59 PM	*EVENING* 6:00 PM TO 9:59 PM	*LATE EVENING* 10:00 PM TO 1:59 AM	*UNKNOWN*	*TOTAL*	
MONDAY	0	1	0	1	1	0	0	3	
TUESDAY	0	0	2	0	1	0	0	3	
WEDNESDAY	0	2	1	1	0	0	0	4	Weekday
THURSDAY	0	0	0	0	0	0	0	0	
FRIDAY	0	1	1	2	0	0	0	4	
SATURDAY	0	0	0	0	0	0	0	0	Weekend
SUNDAY	0	0	0	0	0	0	0	0	
TOTAL	*0*	*4*	*4*	*4*	*2*	*0*	*0*	*14*	

DRIVER AGES

		PERCENT
<25	2	7.1%
25-34	10	35.7%
35-44	5	17.9%
45-54	3	10.7%
55-64	1	3.6%
65-74	3	10.7%
75-84	3	10.7%
85+	0	0.0%
UNKNOWN	1	3.6%
TOTAL	*28*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

VEHICLE DAMAGE

		PERCENT
OTHER/UNKN	2	7.1%
NONE	0	0.0%
VERY MINOR	3	10.7%
MINOR	8	28.6%
MODERATE	13	46.4%
SEVERE	2	7.1%
VERY SEVERE	0	0.0%
TOTAL	*28*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

AVERAGE NUMBER OF VEHICLES PER CRASH *2.1*

Note: Statistics based on all vehicles in crashes.
Note: One of the fourteen crashes involved three vehicles.

BY SEASON

		PERCENT
SPRING	1	7.1%
SUMMER	6	42.9%
FALL	5	35.7%
WINTER	2	14.3%
TOTAL	*14*	*100.0%*

Note: Wint=Jan-Mar, Spr=Apr-June, Sum=July-Sept, Fall=Oct-Dec

ALCOHOL RELATED CRASHES

TOTAL	0
PERCENTAGE OF TOTAL	0.00%

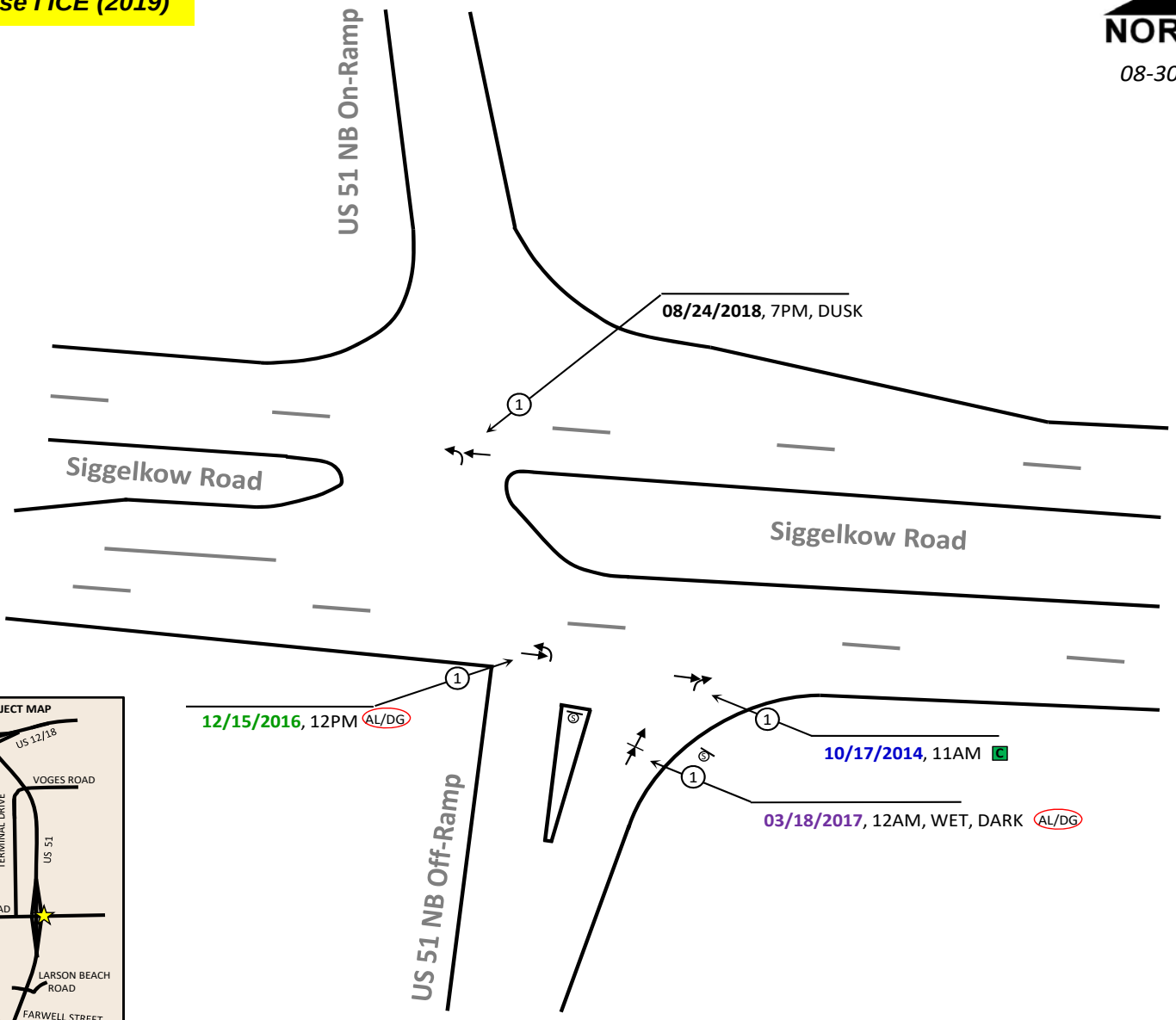
EXHIBIT H2
INTERSECTION CRASH STATISTICS
US 51 SB RAMPS & SIGGELKOW ROAD
DANE COUNTY, WISCONSIN

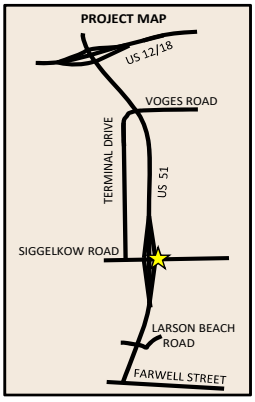
STRAND ASSOCIATES

For Phase I ICE (2019)

NORTH

08-30-19





YEAR

2014 BLUE
2015 RED
2016 GREEN
2017 PURPLE
2018 BLACK

CRASH RATE

0.28 Crashes
Per Million
Entering Vehicles

Entering Vehicles: 7830/day

CRASH FREQUENCY/SEVERITY

4 Crashes

0	Fatal Crash (K)
0	Incapacitating (A-Level)
0	Non-Incapacitating (B-Level)
1	Possible (C-Level)
3	Property Damage Only

LEGEND

- Moving Vehicle
- Backing Vehicle
- Pedestrian
- Bicyclist
- Parked Vehicle
- Stop/Yield Sign
- (T) Tree
- (U) Utility Pole
- (F) Fixed Object
- (N) Non-Fixed Object
- Angle (Right Angle)
- Angle (Left-Turn)
- Angle (Right-Turn)
- Sideswipe-Same
- Sideswipe-Opposite
- Head-On
- Rear-End
- Out of Control
- Overtake
- Overturn

(#) = CRASH FREQUENCY

"LETTER" = USED FOR REFERENCING CRASHES IN REPORT AS NEEDED
DATE OF CRASH
HOUR
SEVERITY (SEE SEVERITY DEFINITIONS)
ROAD CONDITIONS (DRY IF BLANK)
LIGHT CONDITIONS (DAYTIME IF BLANK)
ALCOHOL/DRUG INVOLVEMENT AL/DG

CRASH SEVERITY DEFINITIONS

- K = Fatal Crash
- A = Incapacitating Injury Crash
- B = Non-Incapacitating Injury Crash
- C = Possible Injury Crash
- = Property Damage Only Crash

EXHIBIT I1
INTERSECTION COLLISION DIAGRAM
US 51 NB RAMPS & SIGGELKOW ROAD
DANE COUNTY, WISCONSIN

STRAND ASSOCIATES

For Phase I ICE (2019)

GENERAL INFORMATION

INTERSECTION: US 51 NB RAMPS & SIGGELKOW ROAD
MUNICIPALITY: MCFARLAND
COUNTY: DANE
STATE: WI
PROJECT ID: 5845-06-02

CRASHES FROM: 1/1/2014
TO: 12/31/2018

DURATION
5 YEARS
0 MONTHS

PREPARED BY: KRT

DATE: 08/30/2019

INTERSECTION CHARACTERISTICS

TRAFFIC CONTROL: STOP CONTROL ON OFF-RAMP
INTERSECTION AADT (2014-2018 Avg): 7830
NUMBER OF LEGS: 4

POSTED SPEED (US 51): 55
DEER CRASHES INCLUDED: NO
AREA TYPE: RURAL

CRASH STATISTICS

CRASH FREQUENCY & SEVERITY

YEAR	PD	UNKNOWN	C-LEVEL	B-LEVEL	A-LEVEL	FATAL	TOTAL
2014	*0*	*0*	*1*	*0*	*0*	*0*	*1*
2015	*0*	*0*	*0*	*0*	*0*	*0*	0
2016	*1*	*0*	*0*	*0*	*0*	*0*	1
2017	*1*	*0*	*0*	*0*	*0*	*0*	1
2018	*1*	*0*	*0*	*0*	*0*	*0*	1
TOTAL	*3*	*0*	*1*	*0*	*0*	*0*	*4*
PERCENT	*100.0%*	*0.0%*	*33.3%*	*0.0%*	*0.0%*	*0.0%*	*100.0%*
YEAR AVG.	*0.6*	*0.0*	*0.2*	*0.0*	*0.0*	*0.0*	*0.8*

ROAD CONDITIONS		PERCENT
DRY	3	75.0%
WET	1	25.0%
SNOW	0	0.0%
ICE	0	0.0%
MUD	0	0.0%
OTHER/UNKN	0	0.0%
TOTAL	*4*	*100.0%*

CRASH TYPE		PERCENT
ANGLE	3	75.0%
REAR-END	1	25.0%
HEAD-ON	0	0.0%
SS-SAME	0	0.0%
SS-OPPOSITE	0	0.0%
PEDESTRIAN	0	0.0%
BICYCLE	0	0.0%
FIXED	0	0.0%
NO COLLISION	0	0.0%
OVERTURN	0	0.0%
OTHER/UNKN	0	0.0%
TOTAL	*4*	*100.0%*

CRASH RATES	per MEV
CRASH RATE	0.28
KAB CRASH RATE	0.00

LIGHT CONDITIONS		PERCENT
DAY	2	50.0%
DARK	2	50.0%
TOTAL	*4*	*100.0%*

Note: Dawn, dusk or street lighted conditions included in dark total.

VEHICLE TYPES		PERCENT
CAR	7	87.5%
TRUCK	1	12.5%
OTHER/UNKN	0	0.0%
TOTAL	*8*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

DAY AND TIME - BOTH DIRECTIONS

DAY OF WEEK	*EARLY MORNING* 2:00 AM TO 5:59 AM	*AM PEAK* 6:00 AM TO 9:59 AM	*MIDDAY* 10:00 AM TO 1:59 PM	*PM PEAK* 2:00 PM TO 5:59 PM	*EVENING* 6:00 PM TO 9:59 PM	*LATE EVENING* 10:00 PM TO 1:59 AM	*UNKNOWN*	*TOTAL*	
MONDAY	0	0	0	0	0	0	0	0	
TUESDAY	0	0	0	0	0	0	0	0	
WEDNESDAY	0	0	0	0	0	0	0	0	Weekday
THURSDAY	0	0	1	0	0	0	0	1	
FRIDAY	0	0	1	0	1	0	0	2	
SATURDAY	0	0	0	0	0	1	0	1	Weekend
SUNDAY	0	0	0	0	0	0	0	0	
TOTAL	*0*	*0*	*2*	*0*	*1*	*1*	*0*	*4*	

DRIVER AGES		PERCENT
<25	0	0.0%
25-34	4	50.0%
35-44	1	12.5%
45-54	1	12.5%
55-64	1	12.5%
65-74	1	12.5%
75-84	0	0.0%
85+	0	0.0%
UNKNOWN	0	0.0%
TOTAL	*8*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

VEHICLE DAMAGE		PERCENT
OTHER/UNKN	0	0.0%
NONE	0	0.0%
VERY MINOR	1	12.5%
MINOR	3	37.5%
MODERATE	2	25.0%
SEVERE	2	25.0%
VERY SEVERE	0	0.0%
TOTAL	*8*	*100.0%*

Note: Statistics based on first and second vehicles in crashes.

AVERAGE NUMBER OF VEHICLES PER CRASH	*2.0*

Note: Statistics based on all vehicles in crashes.

BY SEASON		PERCENT
SPRING	0	0.0%
SUMMER	1	25.0%
FALL	2	50.0%
WINTER	1	25.0%
TOTAL	*4*	*100.0%*

Note: Wint=Jan-Mar, Spr=Apr-June, Sum=July-Sept, Fall=Oct-Dec

ALCOHOL RELATED CRASHES	
TOTAL	2
PERCENTAGE OF TOTAL	50.00%

EXHIBIT I2
INTERSECTION CRASH STATISTICS
US 51 NB RAMPS & SIGGELKOW ROAD
DANE COUNTY, WISCONSIN

APPENDIX C
TRAFFIC

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Strand Associates, Inc.®
910 West Wingra Drive
Madison, WI 53715
(P) 608.251.4843

TECHNICAL MEMORANDUM

To: Jeff Berens, P.E.–Wisconsin Department of Transportation, Southwest Region
Ruchi Dutta, P.E., PTOE–Wisconsin Department of Transportation, Southwest Region

From: Joe Urban, P.E.–Strand Associates, Inc.®
Joan Petersen, P.E.–Strand Associates, Inc.®

Date: July 16, 2019
Updated April 9, 2020

Re: Project ID 5845-06-03
US 51 Environmental Assessment
Stoughton-McFarland
Dane County
Base Year Traffic Data Review

Background

The purpose of this memorandum is to review the validity of the base year traffic counts and 2045 traffic forecasts used in the United States (US) 51 Environmental Assessment (EA) in light of newer traffic data available along the corridor. The project team coordinated with Wisconsin Department of Transportation (WisDOT) Traffic Forecasting Section (TFS) on the discussion and recommendations within this document.

The traffic forecasts for the US 51 EA were completed in 2015 and included a horizon year (or design year) of 2045. The WisDOT Transportation Planning Manual (TPM) states the following: [1]

> *"WisDOT uses a standard, multi-step traffic forecasting process and procedure to develop roadway traffic forecasts. The necessity of a forecast is determined during project scoping.* ***Scoping activities require one forecast for required projects****. WisDOT's FDM 3-1 Attachments 1.1 and 1.2 contain more information about the facilities development process. New data cannot be used until it is usable, analyzed, and has been integrated into WisDOT forecasting's tools. The WisDOT Bureau of Planning and Economic Development must make the preliminary determination that an updated forecast is required…"*

This memorandum compares the current base year traffic volumes versus the most recent (2018) traffic volumes to assist in determining if updated traffic forecasts are needed for the preferred alternative (Alternative H) identified in the draft US 51 EA. The other alternatives under consideration in the US 51 EA are anticipated to be dismissed for reasons outside of traffic volumes and operations, which are described in detail within the environmental document.

The US 51 EA limits are shown in Figure 1 along with the 12 locations where roadway traffic counts were compared.

[1] WisDOT TPM Chapter 9, Section 1.4.c (Accessed April 18, 2019). Emphasis added

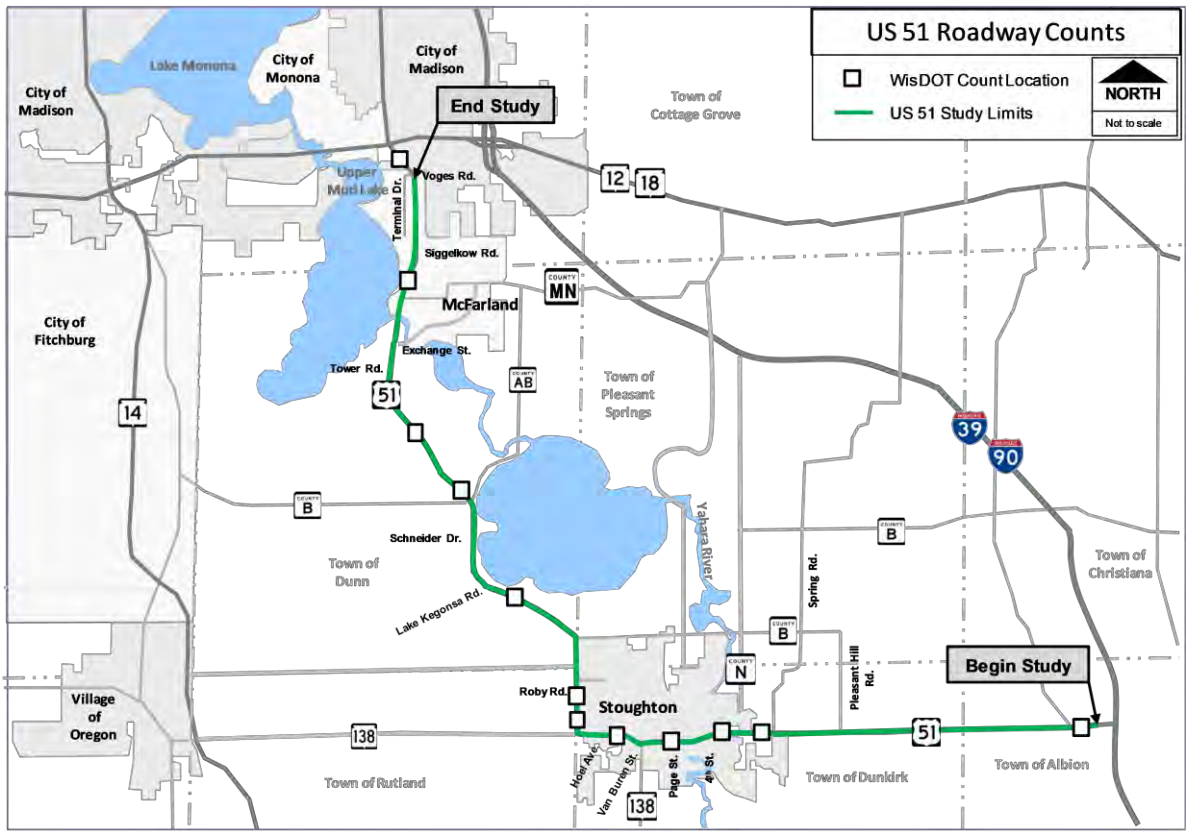

Figure 1 US 51 Study Area and WisDOT Roadway Count Locations

Traffic Volume Comparison Results

WisDOT roadway counts were completed along US 51 in 2012, 2015, and 2018 as part of WisDOT's coverage count program. Intersection traffic counts were collected along US 51 in 2014 at 30 locations as part of the US 51 EA efforts. The base year of the traffic analysis performed for the study is 2014 to be consistent with the intersection traffic counts. Because of this, the 2012 WisDOT roadway counts were inflated by two years to be consistent with the study's 2014 base year. For the purposes of this memorandum, the 2014 base year volumes were compared to the most recent (2018) WisDOT roadway volumes.

The results of the comparison between 2014 base year roadway volumes used in the US 51 EA (inflated from 2012 counts) and 2018 roadway volumes (from 2018 roadway counts) are shown in Table 1.

Base Conditions Roadway Volumes (Along US 51)				AADT Comparisons (2018 vs. 2014)		Are Study Volumes Reasonable?
Section of Corridor	**US 51 Limits (North to South)**	**2014 AADT[1]**	**2018 AADT[2]**	**Absolute Difference**	**Percent Difference**	
McFarland	Beltline to Siggelkow Road	33,500	34,600	1,100	3.3%	Yes
	Siggelkow Road to County MN	19,000	18,700	-300	-1.6%	
McFarland to Stoughton	Tower Road to Dyreson Road	10,800	13,700	2,900	26.9%	Yes (see discussion)
	Dyreson Road to County B/AB	10,500	10,900	400	3.8%	
	Lake Kegonsa Road to Halverson Road/ Quam Drive	11,100	11,200	100	0.9%	
West Side of Stoughton	Roby Road to Jackson Street	10,500	10,400	-100	-1.0%	Yes (see discussion)
	Jackson Street to State Trunk Highway (STH) 138	8,700	10,300	1,600	18.4%	
In or near downtown Stoughton	Hoel Avenue to King Street	14,500	12,800	-1,700	-11.7%	Yes (see discussion)
	Prairie Street to Page Street	15,100	12,900	-2,200	-14.6%	
	7th Street to Hillside Avenue	10,100	10,300	200	2.0%	
	County N to Race Track Road	6,300	9,100	2,800	44.4%	
East of Stoughton	County W to County A	4,200	5,000	800	19.0%	Yes (see discussion)

Notes:
AADT=annual average daily traffic
[1]2014 AADT volumes derived from interpolation between 2012 WisDOT roadway counts and No-Build traffic forecasts.
[2]2018 AADT volume source (Accessed July 16, 2019): https://wisconsindot.gov/Pages/projects/data-plan/traf-counts/default.aspx

Table 1 Roadway Traffic Count Comparison Results (2014 versus 2018)

Traffic Forecast Development and Usage

The traffic forecasts completed in 2015 were developed using Versions 2 and 3 of the Dane County Travel Demand Model (Demand Model). These traffic forecasts were used for the study's traffic operations analysis. Traffic Forecasting reviewed the current version (Version 6.5.1) of the Demand Model to assess the degree of change relative to the original project analysis. Correspondence with WisDOT TFS can be found in Attachment A. Additional documentation is available upon request.

The roadway forecasts were primarily used for K30, K100, and K250 analysis to show a range of Level of Service (LOS) results for different 2-lane portions of the corridor. The intersection forecasts were used to assess intersection operations using Synchro and/or Sidra software.

There have been updates to WisDOT Facilities Development Manual (FDM) guidance (e.g., LOS threshold updates) since the traffic operations analysis was completed for this study.[2] These changes will be documented in the US 51 EA and are not discussed in this memorandum.

Discussion

Observations and discussion by section of the corridor are as follows:

1. McFarland

    a. Both locations reviewed have 2014 volumes within 5 percent of the 2018 volumes.

    b. Mainline capacity expansion is not proposed within this section for Alternative H. Siggelkow Road interchange ramp improvements and the addition of an auxiliary lane in each direction north of Siggelkow Road are proposed.

2. McFarland to Stoughton

    a. Two of the three locations reviewed have 2014 volumes within 5 percent of the 2018 volumes. Between Tower Road to Dyerson Road, the 2018 volumes are approximately 27 percent higher than the 2014 base year volumes. However, the 2018 volumes are only 5 percent higher than the 2009 count volumes.

        (1) Volumes at this location have fluctuated over time, meaning that while there is a relatively large difference between the 2014 and 2018 volumes, there has not been steady growth in traffic volumes based on the count history. This is shown by the following traffic count volumes:

            (a) 2005 = 11,300 vehicles per day (vpd)
            (b) 2006 = 12,500 vpd
            (c) 2009 = 13,000 vpd
            (d) 2012 = 10,600 vpd
            (e) 2015 = 11,200 vpd
            (f) 2018 = 13,600 vpd

        (2) Differences in volume trends at this location will be noted in the environmental documentation or appendices.

[2] WisDOT FDM 11-5-3, Table 3.1 Desirable Levels of Service. Accessed April 4, 2019

b. Mainline capacity expansion is not proposed within this section for Alternative H. Intersection improvements such as left-turn lanes, right-turn lane extensions, or roundabout control (at two locations) are proposed.

3. West Side of Stoughton

a. From Jackson Street to STH 138, the 2018 volumes could be higher than previous years because of development and recently installed traffic signals (permanent at Jackson Street, temporary at STH 138). Updates to the 2014 base year volumes or traffic forecasts are not needed at this time, as the traffic analysis for this area included several analyses for full build out conditions of the Kettle Park West development.

b. It is also possible that the growth in recent years between STH 138 and Jackson Street is not due to the Kettle Park West development or installation of traffic signals. The traffic volumes at this location have fluctuated over time, leading to the high growth percentage (approximately 18 percent) reported between the 2014 base year volumes and 2018 count volumes:

(1) 2005 = 11,000 vpd
(2) 2006 = 10,000 vpd
(3) 2009 = 9,200 vpd
(4) 2012 = 8,500 vpd
(5) 2015 = 9,400 vpd
(6) 2018 = 10,300 vpd

The Jackson Street and STH 138 intersections were converted from sidestreet stop-control to signal control in 2016. The 2018 traffic volumes are similar to (within 3 to 6 percent of) pre-Kettle Park West development and presignalized traffic volumes from 2005 and 2006. Additionally, it should be noted that intersection control, such as traffic signals or roundabouts, are typically not accounted for within the Demand Model.

c. From Roby Road to Jackson Street, just north of the "Jackson Street to STH 138" count site, the traffic data shows nearly equal (within 1 percent) volumes in 2014 and 2018 and minimal fluctuation overall from 2012 to 2018. This indicates a different trend than the "Jackson Street to STH 138" count site in that the traffic signals and development do not appear to be having a substantial impact on daily traffic volumes along US 51 north of Jackson Street.

d. Mainline capacity expansion (from 2-lanes to 4-lanes) is proposed within this section for Alternative H. Intersection improvements on the west side of Stoughton such as roundabout control are proposed as part of this study or are currently in design (as separate independent projects) at several locations.

4. In or Near Downtown Stoughton

   a. The four locations reviewed show greater variations in traffic volumes (both decreases and increases) than other areas of the corridor. One location, from County N to Racetrack Road, shows a 44 percent increase between the 2014 and 2018 volumes. Observations of this location and the surrounding locations include the following:

      (1) The five counts performed at this location between 2005 and 2015 reported daily volumes ranging from 5,200 vpd to 6,900 vpd. The 2018 count was higher than each of the previous counts, reported at 9,100 vpd.

      (2) A similar trend is found along County N north of US 51, where the five counts between 2005 and 2015 reported daily volumes ranging from 5,100 vpd to 6,200 vpd. The 2018 count was higher than each of the previous counts, reported at 7,600 vpd. This suggests that some traffic may be rerouting to County N rather than traveling through downtown Stoughton.

      (3) There are six count sites along US 51 to the west of this location between County N and Page Street (just over 1 mile) that show varying trends over the WisDOT count cycles. Two of these locations are shown in Table 1.

      (4) The amount of projected growth to the 2045 design year in the completed traffic forecast along US 51 between County N and Racetrack Road was approximately 2,200 vpd. If that same growth was applied to the 2018 count volume of 9,100 vpd, a projected volume of 11,300 vpd would result. This potential projected volume would still be less than existing volumes in downtown Stoughton.

   b. Mainline capacity expansion is not proposed within this section for Alternative H. Minor safety improvements are proposed. Because no major improvements to roadway capacity are proposed in and around downtown Stoughton, and the one location with high percentage growth in the base year is a relatively low volume (US 51 between County N and Racetrack Road), updating base year data from 2014 to 2018 is not anticipated to substantially affect the study's horizon year traffic analysis.

5. East of Stoughton

   a. From County W to County A, the traffic data shows a higher percent growth than other areas of the corridor, which is mainly due to a fairly low daily volume compared to rest of the corridor.

   b. Mainline capacity expansion is not proposed within this section for Alternative H. Slightly higher base year (2018) volumes in the rural portion east of Stoughton are not anticipated to change conclusions of the operations analysis because the traffic volumes are modest for a 2-lane highway.

Summary

Based on the discussion above, in September 2019 WisDOT and Federal Highway Administration staff concluded that updated traffic forecasts are not needed for the US 51 EA. This conclusion is based on the following factors:

1. The traffic volume comparisons presented in Table 1 show that while there a few locations with fluctuations along US 51; the 2014 study volumes appear to be reasonable.

2. The 2045 horizon year included in the forecasts sufficiently covers the typical design year guidance in the WisDOT FDM.[3]

3. The traffic forecasts took into account planned development in and around Stoughton, as well as other areas of the corridor. Alternative H includes proposed mainline capacity expansion on the west side of Stoughton, which is an area with a higher concentration of planned development compared to the rest of the corridor. This statement was verified by WisDOT TFS using the current version (Version 6.5.1) of the Demand Model. Correspondence with WisDOT TFS can be found in Attachment A.

4. Traffic volumes will be reviewed again during the final design phase of the project. During the design phase, items such as turn lane lengths and details on proposed intersection traffic control are anticipated to be refined based on newer traffic counts and forecasts.

[3] WisDOT FDM 11-10-1.1 (Accessed May 23, 2019): *The design years for projects are normally 20 years from the date projects are proposed to be opened to traffic. Shorter design periods may be used when highways are to be constructed in stages or designed for shorter pavement improvement life-spans*. The traffic forecasts for US 51 were developed assuming an estimated construction year of 2025.

Hellermann, Luke

From: Urban, Joseph M.
Sent: Tuesday, June 4, 2019 1:10 PM
To: Hellermann, Luke
Cc: Kobryn, Jennifer; Petersen, Joan
Subject: FW: Final Draft Memo

For Admin record: WisDOT TFS approval of Base Year Traffic Data Review memo

---

From: Murray, Jennifer - DOT <Jennifer.Murray@dot.wi.gov>
Sent: Tuesday, June 4, 2019 1:07 PM
To: Dutta, Ruchi R - DOT <Ruchi.Dutta@dot.wi.gov>
Cc: Berens, Jeff - DOT <Jeff.Berens@dot.wi.gov>; Urban, Joseph M. <Joseph.Urban@strand.com>; Zhang, Miao X - DOT <miao.zhang@dot.wi.gov>; Lamers, Brandon - DOT <Brandon.Lamers@dot.wi.gov>
Subject: Re: Final Draft Memo

Ok looks fine to me.

Jennifer Murray, AICP
Traffic Forecasting Chief
Wisconsin Dept. of Transportation
Division of Transportation Investment Management, Bureau of Planning and Economic Development
4822 Madison Yards Way
Madison, WI 53707-7913
(608) 264-8722 Desk
(608) 294-7487 Mobile

On Jun 4, 2019, at 9:39 AM, Dutta, Ruchi R - DOT <Ruchi.Dutta@dot.wi.gov> wrote:

> Jen – Brandon suggested a slight change to how we worded the highlighted portions before, making it more clear. Please review the attached document and ignore the previous one.
>
> Thank you.
>
> Ruchi
>
> ---
>
> From: Dutta, Ruchi R - DOT
> Sent: Tuesday, June 4, 2019 11:14 AM
> To: Murray, Jennifer - DOT <Jennifer.Murray@dot.wi.gov>
> Cc: Berens, Jeff - DOT <Jeff.Berens@dot.wi.gov>; Urban, Joseph M. <Joseph.Urban@strand.com>; Zhang, Miao X - DOT <miao.zhang@dot.wi.gov>; Lamers, Brandon - DOT <Brandon.Lamers@dot.wi.gov>
> Subject: RE: Final Draft Memo
>
> Hi Jen,
>
> We have made revisions (highlighted in yellow) to the attached traffic memo, as discussed earlier today. Please let us know if it meets your approval.
>
> Thanks.
> Ruchi

From: Murray, Jennifer - DOT
Sent: Monday, June 3, 2019 1:42 PM
To: Dutta, Ruchi R - DOT <Ruchi.Dutta@dot.wi.gov>
Cc: Berens, Jeff - DOT <Jeff.Berens@dot.wi.gov>; Urban, Joseph M. <Joseph.Urban@strand.com>
Subject: Re: Final Draft Memo

Hi Ruchi

I am on the west coast and attending a conference. I have time at 10:00 your time tomorrow (8am my time). Let me know if that works. Do you want anyone from my team about the work we provided... if it's a modeling question too? If so, Miao would be good to invite too.

Thanks Ruchi,

Jen
Jennifer Murray, AICP
Traffic Forecasting Chief
Wisconsin Dept. of Transportation
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On Jun 3, 2019, at 10:22 AM, Dutta, Ruchi R - DOT <Ruchi.Dutta@dot.wi.gov> wrote:

> Hi Jen,
>
> Are you available today afternoon or tomorrow (between 10 am and 2 pm) to talk about the revisions needed to this memo? Joe Urban and I would also like to expand upon the usage of K factors for the operations analysis for this project. Let me know of your availability and I'll send you a conference line to call into.
>
> Thanks!
>
> Ruchi

> From: Murray, Jennifer - DOT
> Sent: Thursday, May 30, 2019 1:25 PM
> To: Dutta, Ruchi R - DOT <Ruchi.Dutta@dot.wi.gov>; Berens, Jeff - DOT <Jeff.Berens@dot.wi.gov>; Wilson, Holly J - DOT <Holly.Wilson@dot.wi.gov>
> Cc: Chritton, Chris - DOT <Chris.Chritton@dot.wi.gov>; Zhang, Miao X - DOT <miao.zhang@dot.wi.gov>
> Subject: FW: Final Draft Memo
>
> Hi Ruchi,
> See our analysis and the notes/emails below. I have talked with the forecasting team on your memo. This email is to clarify the degree of change in the travel demand model as it is unstated in your memo as it currently reads.
>
> The volumes in the above attachments are not to be confused with traffic forecasts... these are generalized views of traffic assignments. The data in the above attachments uses the 2012

base traffic count data. The reason 2012 is used, is because our job was to compare the models side by side. Thank you to Miao for putting this together.

As my Tuesday 4:25 email indicates, this is one half of the picture and because we do not see traffic volumes on your K100/250, etc.... analysis, forecasting cannot gage if this affects the operations analysis. That is something that your project team will have to help you identify and we can participate on that if needed.

At this time, it may be helpful to add to the memo, "Traffic Forecasting reviewed the travel demand model to assess the degree of change relative to the original project analysis. Documentation is available upon request."

Thank you for your consideration of our comments,

Jen

Jen

Jennifer Murray, AICP
WisDOT Traffic Forecasting Section Chief
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6th Floor South, S603.12
Madison – Hill Farms State Office Building
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From: Zhang, Miao X - DOT
Sent: Thursday, May 30, 2019 11:29 AM
To: Murray, Jennifer - DOT <Jennifer.Murray@dot.wi.gov>
Cc: Dercks, Kory - DOT <Kory.Dercks@dot.wi.gov>; Chritton, Chris - DOT <Chris.Chritton@dot.wi.gov>
Subject: RE: Final Draft Memo

Jen,
Attached are the updated excel file and a pdf version.
All the sites along the corridor are marked on the map, as well as their 2012 counts, V3 and V6.5.1 growth rates, current base year assignment change compared to V3.
I put the site 130210 on the map too, since its V6.5.1 base year assignment is 80% more than the V3.

Then it is easy to find
"Current model puts more assignment on USH 51 passing McFarland (site 130577 increased 52% base year and 55% future year), STH 138 west of Stoughton (site 130210 increased 80% base year and 40% future year);
puts less assignment on USH 51 passing west side of Stoughton (site 132264 decreased 34% base year and 57% future year)."

Thanks,
Miao

From: Murray, Jennifer - DOT
Sent: Thursday, May 30, 2019 8:06 AM

To: Zhang, Miao X - DOT <miao.zhang@dot.wi.gov>
Cc: Dercks, Kory - DOT <Kory.Dercks@dot.wi.gov>; Chritton, Chris - DOT <Chris.Chritton@dot.wi.gov>
Subject: Re: Final Draft Memo

Hi Miao

Since I am having locational challenges without the web or Gus right with me currently, can you do a couple things for me?

1. Highlight the rows with the counts between Stoughton and McFarland (the corridor limits, as I understand it in Rucchis memo).
2. Also can you calculate the growth rate for me in a columns for the 2010 to future year using the base assignment to future assignment for both versions?

After that, please resend me the excel file. Basically, what I am thinking is that the growth can be assessed for reasonableness relative to each rate.

Thank you.

Jen

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On May 29, 2019, at 2:55 PM, Zhang, Miao X - DOT <miao.zhang@dot.wi.gov> wrote:

> Jen,
> Sorry I put the wrong current version number, it should be Model Version 6.5.1.
> I corrected the version number in the file.
>
> Attached is the Model V2 and V3 No Build output compared to current model V6.5.1.
>
> Current model puts more assignment on USH 51 passing McFarland (site 130577 increased 52% base year and 55% future year), STH 138 west of Stoughton (site 130210 increased 80% base year and 40% future year); while puts less assignment on USH 51 passing west side of Stoughton (site 132264 decreased 34% base year and 57% future year).
>
> Thanks,
> Miao
>
> ---
> From: Zhang, Miao X - DOT

Sent: Wednesday, May 29, 2019 1:53 PM
To: Murray, Jennifer - DOT <Jennifer.Murray@dot.wi.gov>; Dercks, Kory - DOT <Kory.Dercks@dot.wi.gov>
Cc: Chritton, Chris - DOT <Chris.Chritton@dot.wi.gov>
Subject: RE: Final Draft Memo

Hi Jen,
Kory has helped me locate the Dane model V2 and V3 that were used in the forecast 5141, Version 2 does not have Ho Chunk Generator while Version 3 has Ho Chunk Generator.
Attached is the Model V2 and V3 No Build output compared to current model V6.5.

Current model puts more assignment on USH 51 passing McFarland (site 130577 increased 52% base year and 55% future year), STH 138 west of Stoughton (site 130210 increased 80% base year and 40% future year); while puts less assignment on USH 51 passing west side of Stoughton (site 132264 decreased 34% base year and 57% future year).
<< File: US 51 Forecast Review.xlsx >>

Thanks,
Miao

From: Murray, Jennifer - DOT
Sent: Tuesday, May 28, 2019 4:25 PM
To: Dercks, Kory - DOT <Kory.Dercks@dot.wi.gov>; Zhang, Miao X - DOT <miao.zhang@dot.wi.gov>
Cc: Chritton, Chris - DOT <Chris.Chritton@dot.wi.gov>
Subject: RE: Final Draft Memo

Hi Miao and Kory,

It would be good to identify that the forecasts used for this project were in the K100/250 analysis and indeed state that the travel demand model has not substantially changed (ver 2/3 went to version 6.5.1); therefore presumably not affecting the operations analysis. Is there anything you can tell me about the model that might help me make this statement? Or if you refute it and find that the "assignments only" have changed substantially, please tell me that as well. Does our new SRF memo help with this description?

Jen

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From: Dutta, Ruchi R - DOT
Sent: Tuesday, May 28, 2019 10:28 AM
To: Murray, Jennifer - DOT <Jennifer.Murray@dot.wi.gov>
Cc: Berens, Jeff - DOT <Jeff.Berens@dot.wi.gov>; Lamers, Brandon - DOT <Brandon.Lamers@dot.wi.gov>; Wilson, Holly J - DOT <Holly.Wilson@dot.wi.gov>; Dercks, Kory - DOT <Kory.Dercks@dot.wi.gov>; Zhang, Miao X - DOT <miao.zhang@dot.wi.gov>
Subject: RE: Final Draft Memo

Hi Jen,

Please see the revised memo with the changes highlighted in yellow. One revision that I wanted to point out was the way the TPM language is now worded: *"The WisDOT Bureau of Planning and Economic Development must make the preliminary determination that an updated forecast is required..."*

Please let us know as soon as you can if the updated memo meets your approval. We need to send it to FHWA this week, for their review.

Thanks much.
Ruchi

From: Murray, Jennifer - DOT
Sent: Tuesday, May 28, 2019 10:17 AM
To: Dutta, Ruchi R - DOT <Ruchi.Dutta@dot.wi.gov>
Cc: Berens, Jeff - DOT <Jeff.Berens@dot.wi.gov>; Wilson, Holly J - DOT <Holly.Wilson@dot.wi.gov>; Dercks, Kory - DOT <Kory.Dercks@dot.wi.gov>; Zhang, Miao X - DOT <miao.zhang@dot.wi.gov>
Subject: Final Draft Memo

Hi Ruchi,
I wondered if you had a final draft memo yet?

Please let me know.

Jen

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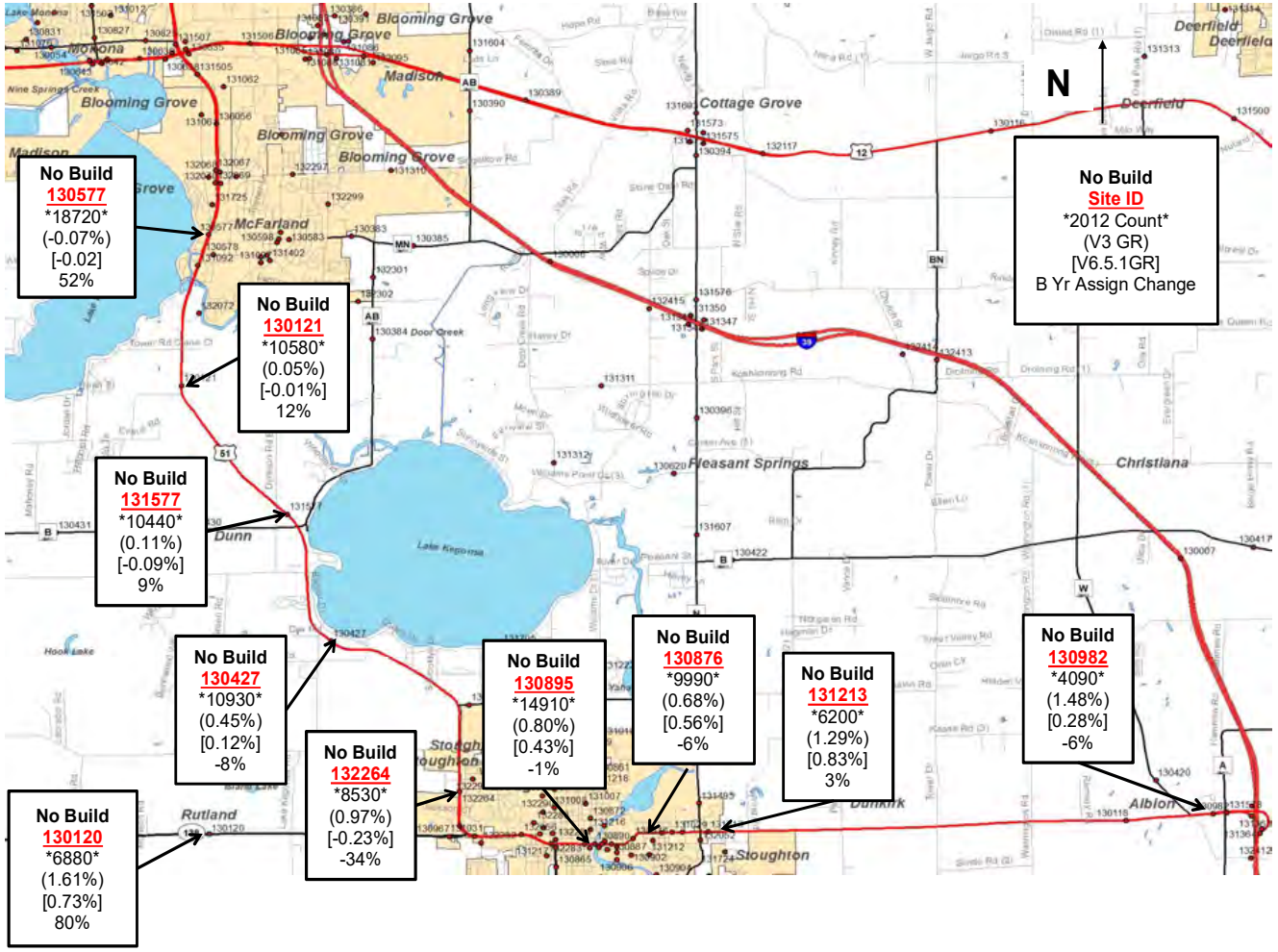
Mobile: (608) 294-7487

<US 51 Forecast Review.xlsx>

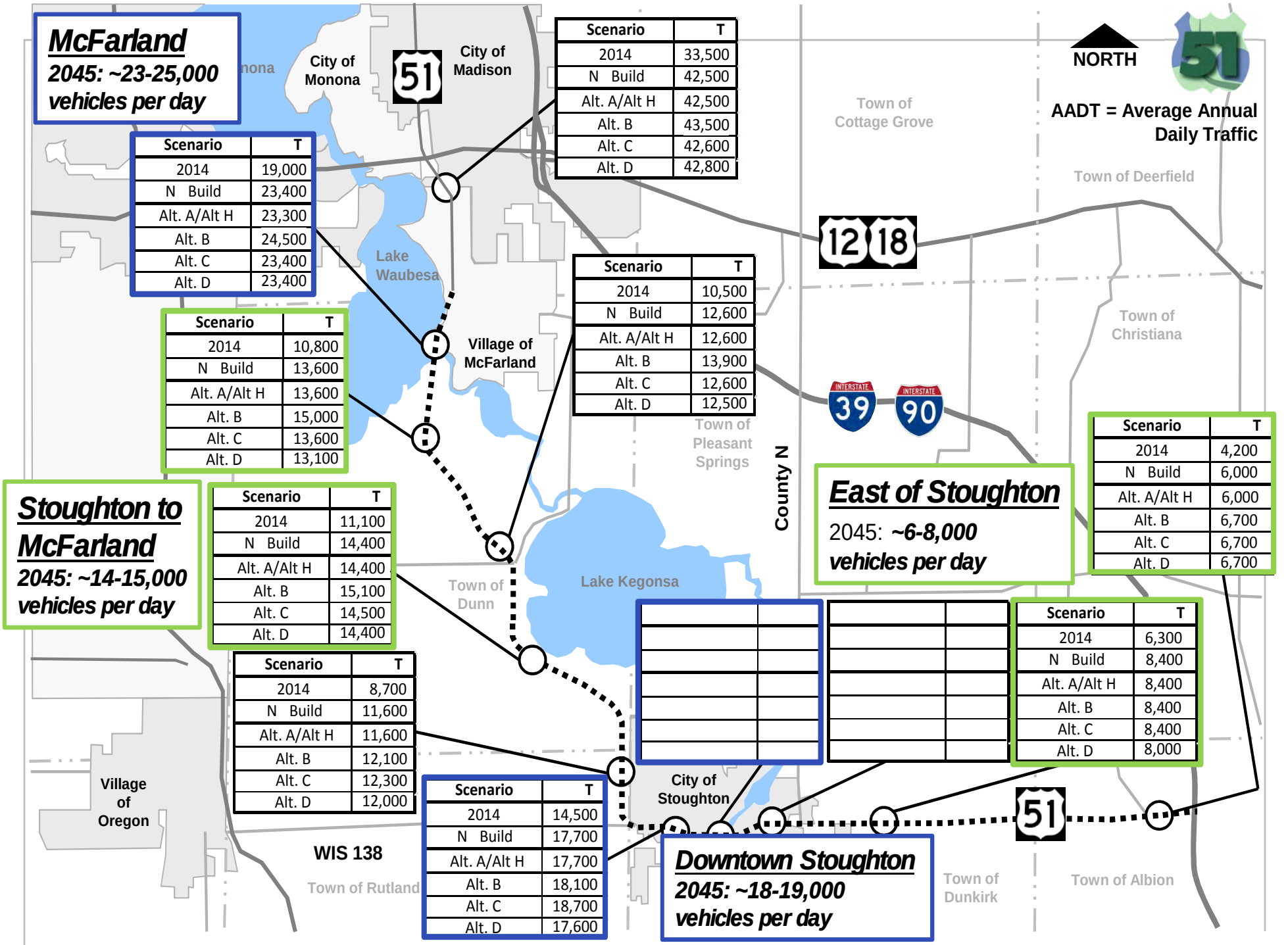
<2019-06-04 US 51 EA_Traffic Data Review Memo (Draft) - changes.pdf>

The original forecast (Control # 5141) was done using Dane Version 2 and Version 3, and current Dane model is V6.5.1.

							Dane Model V2 No Build			Dane Model V3 No Build			Dane Model V 6.5.1 Current No Build			
Forecast Year 1	TRADAS ID	Road Name	COUNT	Count Year	Seasonal Factor	Functional Class	Base Year Assignment	Future Year Assignment	Growth Rate	Base Year Assignment	Future Year Assignment	Growth Rate	Base Year Assignment	Future Year Assignment	Growth Rate	Base Year Assignment Change V6.5.1 vs V3
2025	130577	USH 51	18720	2012	2	14	20498	20476	0.00%	20761	20151	-0.07%	31547	31233	-0.02%	52%
Forecast Year 2	130121	USH 51	10580	2012	4	2	15314	15648	0.05%	13894	14171	0.05%	15600	15555	-0.01%	12%
2035	131577	USH 51	10440	2012	4	2	12125	12427	0.06%	12179	12723	0.11%	13216	12723	-0.09%	9%
Final Forecast Year	130427	USH 51	10930	2012	4	2	15855	18756	0.46%	14939	17652	0.45%	13727	14383	0.12%	-8%
2045	132264	USH 51	8530	2012	2	14	10817	11848	0.24%	11338	15727	0.97%	7515	6833	-0.23%	-34%
	130895	USH 51	14910	2012	2	14	10725	12680	0.46%	10671	14082	0.80%	10554	12354	0.43%	-1%
Model Base Year	130876	USH 51	9990	2012	2	14	11169	13422	0.50%	11130	14140	0.68%	10501	12844	0.56%	-6%
2010	131213	USH 51	6200	2012	2	16	7554	10851	1.09%	7523	11413	1.29%	7735	10308	0.83%	3%
Model Future Year	130982	USH 51	4090	2012	4	6	6675	10628	1.48%	6636	10568	1.48%	6248	9453	1.28%	-6%
2050																
	130120	STH 138	6880	2012	4	6	5945	8078	0.90%	5946	9769	1.61%	10710	13846	0.73%	80%
	130006	I-39/90	56320	2013	3	1	50951	74661	1.16%	51061	74126	1.13%	52795	81132	1.34%	3%
	131495	CTH N	5100	2012	2	16	8668	10666	0.58%	6896	8419	0.55%	7739	9839	0.68%	12%



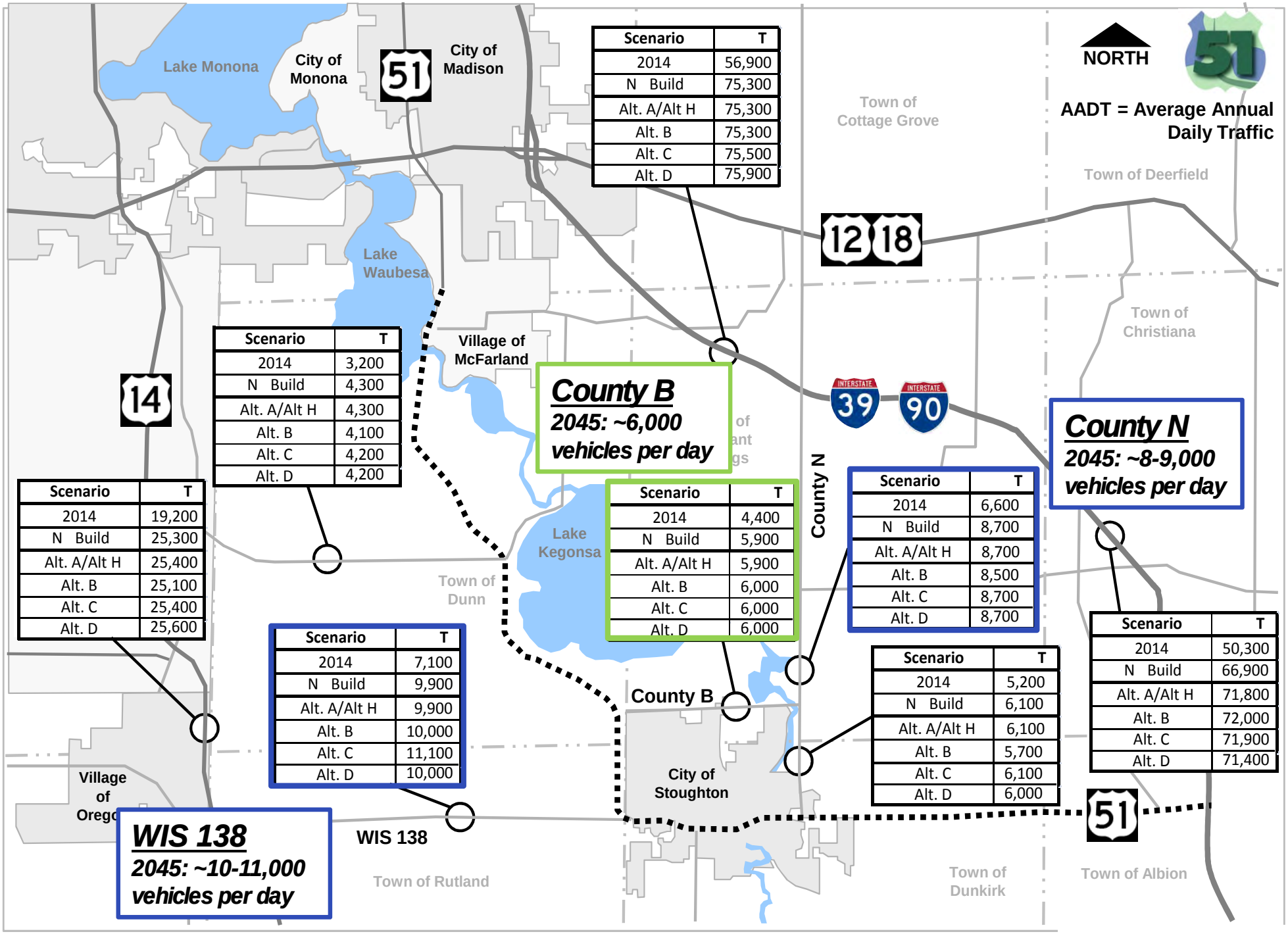
Existing and 2045 Projected Mainline Traffic Volumes



NOTE: Projected volumes are for 2045 using Time-of-Day Travel Demand Model

August 2015

Existing and 2045 Projected Traffic Volumes for Other Area Roads



Scenario	T
2014	56,900
N Build	75,300
Alt. A/Alt H	75,300
Alt. B	75,300
Alt. C	75,500
Alt. D	75,900

Scenario	T
2014	3,200
N Build	4,300
Alt. A/Alt H	4,300
Alt. B	4,100
Alt. C	4,200
Alt. D	4,200

Scenario	T
2014	19,200
N Build	25,300
Alt. A/Alt H	25,400
Alt. B	25,100
Alt. C	25,400
Alt. D	25,600

Scenario	T
2014	4,400
N Build	5,900
Alt. A/Alt H	5,900
Alt. B	6,000
Alt. C	6,000
Alt. D	6,000

Scenario	T
2014	6,600
N Build	8,700
Alt. A/Alt H	8,700
Alt. B	8,500
Alt. C	8,700
Alt. D	8,700

Scenario	T
2014	7,100
N Build	9,900
Alt. A/Alt H	9,900
Alt. B	10,000
Alt. C	11,100
Alt. D	10,000

Scenario	T
2014	5,200
N Build	6,100
Alt. A/Alt H	6,100
Alt. B	5,700
Alt. C	6,100
Alt. D	6,000

Scenario	T
2014	50,300
N Build	66,900
Alt. A/Alt H	71,800
Alt. B	72,000
Alt. C	71,900
Alt. D	71,400

NOTE: Projected volumes are for 2045 using Time-of-Day Travel Demand Model

August 2015

Project ID 5845-06-03

C-18

APPENDIX C

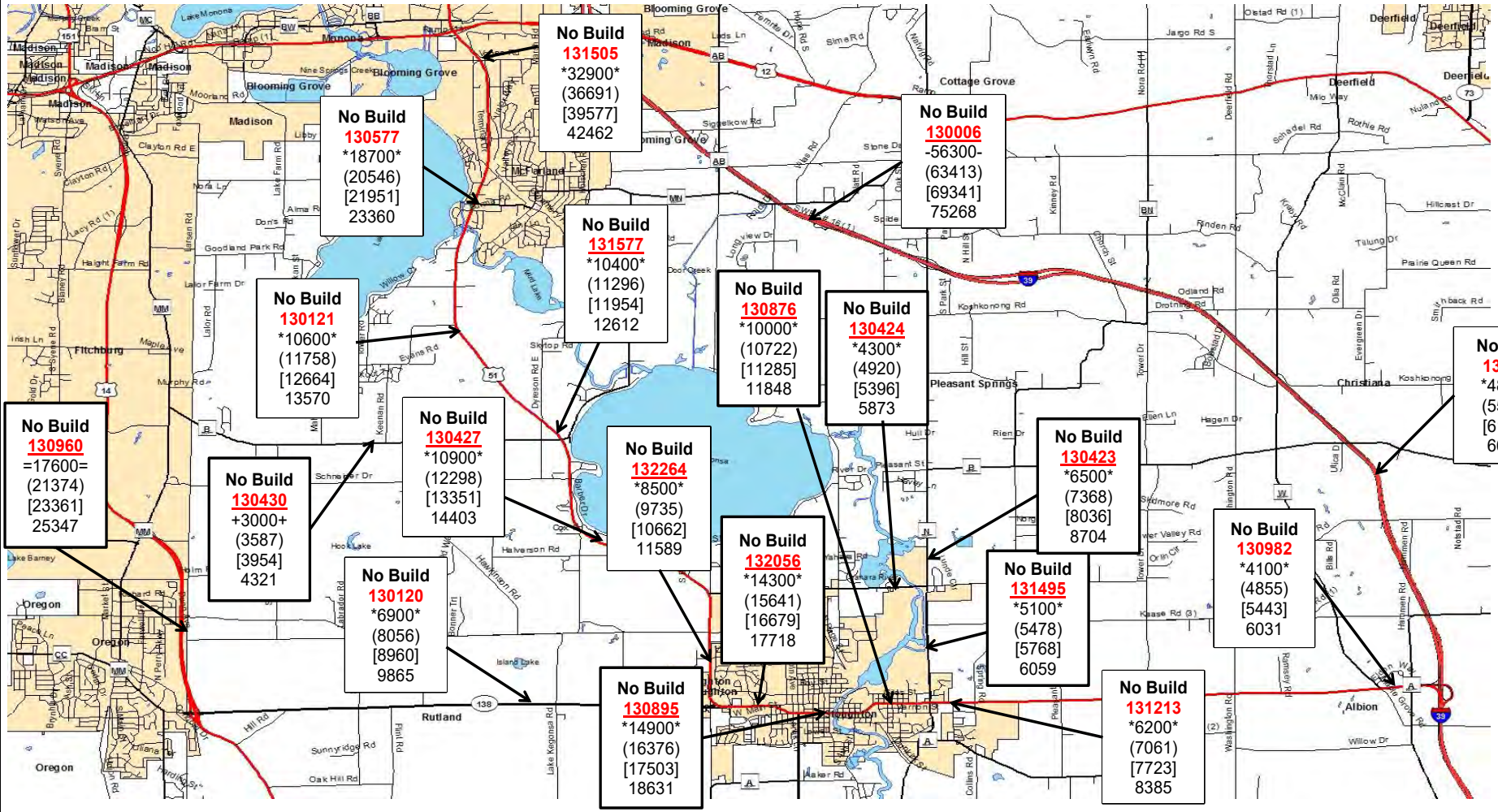
WisDOT TRAFFIC FORECAST REPORT

PROJECT ID(S): 5845-06-02
ROUTE(S): USH 51

Region/COUNTY(IES): SW / Dane **No Build**
LOCATION: Stoughton to McFarland
COMPLETED: 02/26/2015

Developed by: Urvashi Martin
Phone: (608) 267-3640
FAX #: (608) 267-0294
E-Mail: Urvashi.Martin@dot.wi.gov

Traffic Forecasting Section; Bureau of Planning and Economic Development; Division of Transportation Investment Management



Site IDs are Colored, **Bolded**, and Underlined

Design Values (%)			
Site(s)	130577		
Route(s)	USH 51		
Volume(s)	23360		
Site Growth %	0.75%		
K250	10.0		
K100	10.7		
K30	11.3		
P	12.8		
D(Dsgn. Hr.)	59/41		
T(DHV)	4.6		
T(PHV)	4.0		

-000- 2013 Count (000) 2025 AADT
000 2012 Count [000] 2035 AADT
+000+ 2009 Count 000 2045 AADT
=000= 2006 Count

Trucks	130577		
AADTT	1010		
2D	1.6		
3AX	1.6		
2S1+2S2	0.7		
3-S2	1.2		
DBL-BTM	0.3		
Total %	5.4%		

NOTES ON THE FORECAST:

1. This projection assumes that no major new traffic generators will be added to the development already included in the travel demand model.

2. Truck classification percentages were taken from a table representative of similar facilities and locations throughout the state of Wisconsin.

MORE NOTES ON THE FORECAST:

3. USH 51 is a Factor Group II (Urban-Other) highway (indicating low to moderate fluctuation in traffic from a seasonal perspective). It is functionally classified as a Urban Principal Arterial (14) for count purposes.

4. The Dane County Travel Demand Model was used to complete this forecast. The Traffic Analysis Forecasting Information System output was used as a comparison tool to check against the model output. Adjustments were made as needed.

Project ID 5845-06-03

C-19

APPENDIX C

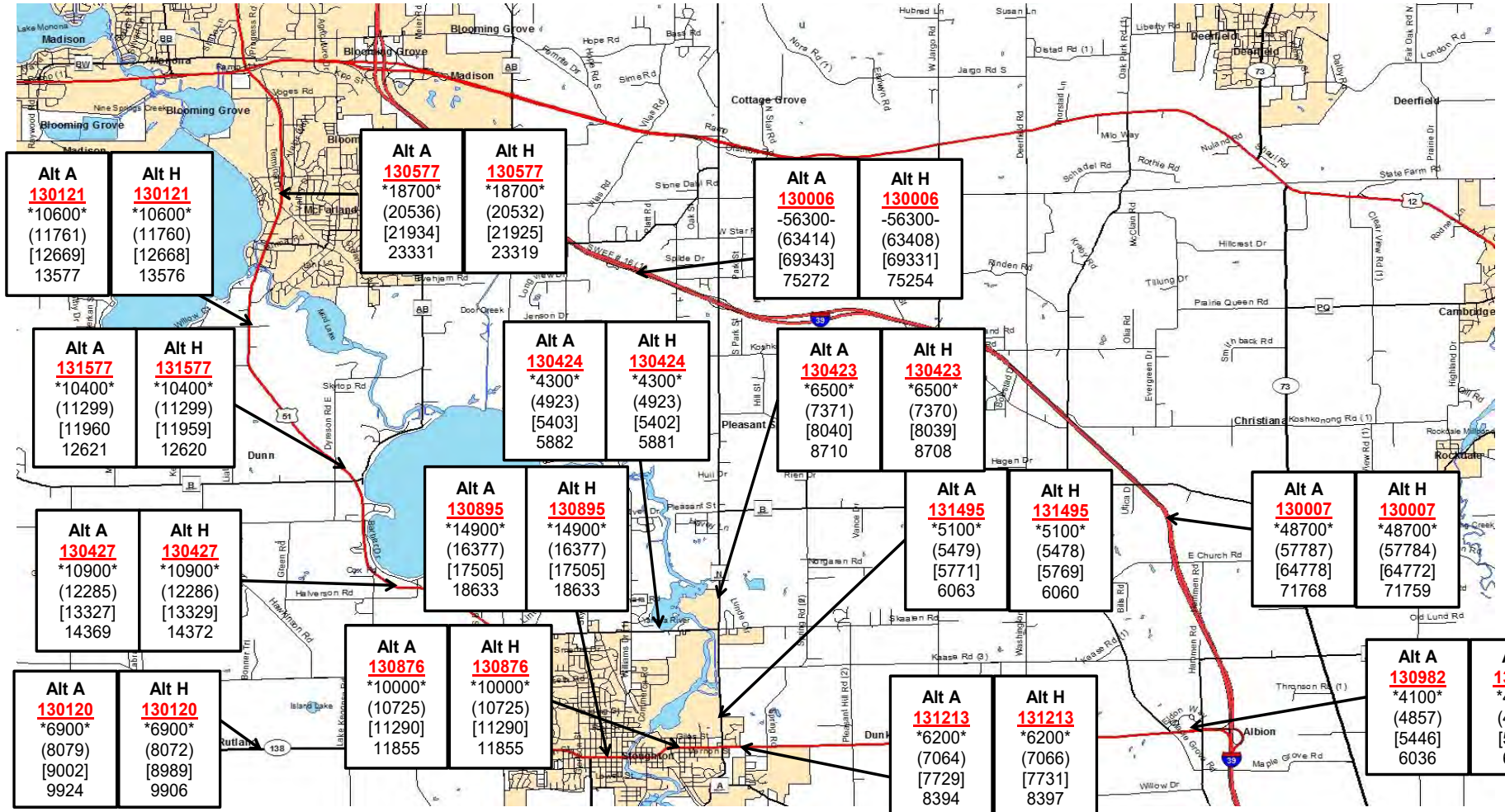
WisDOT TRAFFIC FORECAST REPORT

PROJECT ID(S): 5845-06-02
ROUTE(S): USH 51

Region/COUNTY(IES): SW / Dane **Alt A & Alt H**
LOCATION: Stoughton to McFarland
COMPLETED: 02/26/2015

Developed by: Urvashi Martin
Phone: (608) 267-3640
FAX #: (608) 267-0294
E-Mail: Urvashi.Martin@dot.wi.gov

Traffic Forecasting Section; Bureau of Planning and Economic Development; Division of Transportation Investment Management



Site IDs are Colored, **Bolded**, and Underlined

Design Values (%)			
Site(s)	130577	130577	
Route(s)	Alt A	Alt H	
Volume(s)	23330	23320	
Site Growth %	0.75%	0.74%	
K250	10.0	10.0	
K100	10.7	10.7	
K30	11.3	11.3	
P	12.8	12.8	
D(Dsgn. Hr.)	59/41	59/41	
T(DHV)	4.6	4.6	
T(PHV)	4.0	4.0	

-000- 2013 Count (000) 2025 AADT
000 2012 Count [000] 2035 AADT
+000+ 2009 Count 000 2045 AADT
=000= 2006 Count

Trucks	130577	130577
AADTT	1010	1010
2D	1.6	1.6
3AX	1.6	1.6
2S1+2S2	0.7	0.7
3-S2	1.2	1.2
DBL-BTM	0.3	0.3
Total %	5.4%	5.4%

NOTES ON THE FORECAST:

1. Alternative A assumes EB passing lane proposed from Tower to Washington and proposed access changes.

2. Alternative H assumes 4 lane expansion between Jackson St and CTH B, EB passing lane between Tower to Washington and other access modifications considered.

3. Truck classification percentages were taken from a table representative of similar facilities and locations throughout the state of Wisconsin.

MORE NOTES ON THE FORECAST:

4. USH 51 is a Factor Group II (Urban-Other) highway (indicating low to moderate fluctuation in traffic from a seasonal perspective). It is functionally classified as a Urban Principal Arterial (14) for count purposes.

5. The Dane County Travel Demand Model was used to complete this forecast. The Traffic Analysis Forecasting Information System output was used as a comparison tool to check against the model output. Adjustments were made as needed.

Project ID 5845-06-03

C-20

APPENDIX C

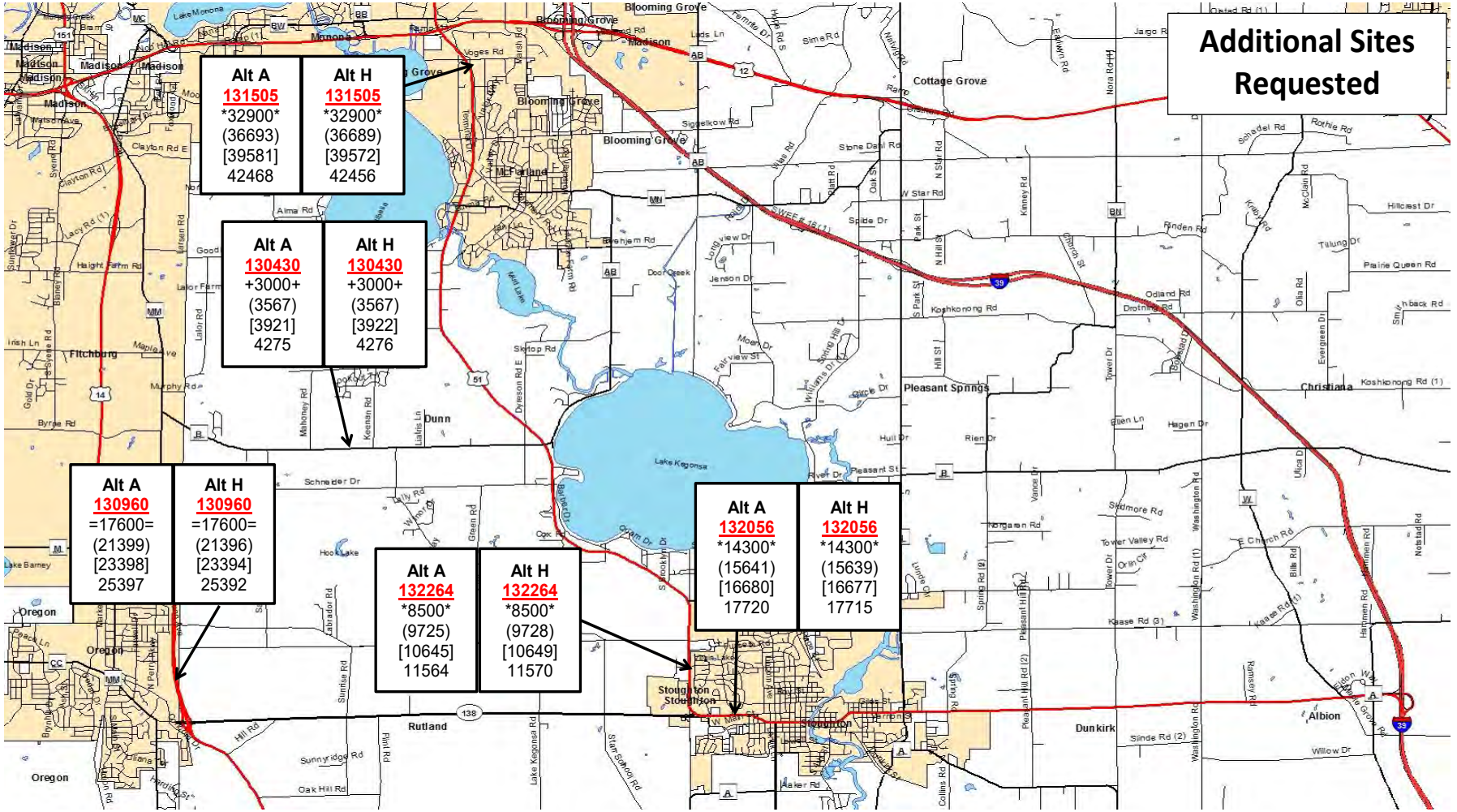
WisDOT TRAFFIC FORECAST REPORT

PROJECT ID(S): 5845-06-02
ROUTE(S): USH 51

Region/COUNTY(IES): SW / Dane **Alt A & Alt H**
LOCATION: Stoughton to McFarland
COMPLETED: 02/26/2015

Traffic Forecasting Section; Bureau of Planning and Economic Development; Division of Transportation Investment Management

Developed by: Urvashi Martin
Phone: (608) 267-3640
FAX #: (608) 267-0294
E-Mail: Urvashi.Martin@dot.wi.gov



Site IDs are Colored, **Bolded**, and Underlined

Design Values (%)			
Site(s)	131505	131505	
Route(s)	Alt A	Alt H	
Volume(s)	42468	42456	
Site Growth %	0.88%	0.88%	
K250	9.5	9.5	
K100	10.0	10.0	
K30	10.4	10.4	
P	11.2	11.2	
D(Dsgn. Hr.)	59/41	59/41	
T(DHV)	4.5	4.5	
T(PHV)	4.0	4.0	

-000- 2013 Count (000) 2025 AADT
000 2012 Count [000] 2035 AADT
+000+ 2009 Count 000 2045 AADT
=000= 2006 Count

Trucks	131505	131505	
AADTT	1740	1740	
2D	1.5	1.5	
3AX	1.6	1.6	
2S1+2S2	0.7	0.7	
3-S2	1.2	1.2	
DBL-BTM	0.3	0.3	
Total %	5.3%	5.3%	

NOTES ON THE FORECAST:

1. Alternative A assumes EB passing lane proposed from Tower to Washington and proposed access changes were considered.

2. Alternative H assumes 4 lane expansion between Jackson St and CTH B, EB passing lane between Tower to Washington and other access modifications considered.

3. Truck classification percentages were taken from 2009 Wisconsin Vehicle Classification Data (Site # 680306).

MORE NOTES ON THE FORECAST:

4. USH 51 is a Factor Group II (Urban-Other) highway (indicating low to moderate fluctuation in traffic from a seasonal perspective). It is functionally classified as a Urban Principal Arterial (14) for count purposes.

5. The Dane County Travel Demand Model was used to complete this forecast. The Traffic Analysis Forecasting Information System output was used as a comparison tool to check against the model output. Adjustments were made as needed.

Project ID 5845-06-03

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APPENDIX C

WisDOT TRAFFIC FORECAST REPORT

PROJECT ID(S): 5845-06-02
ROUTE(S): US51,WIS138,CH-B/N,I-39/

Region/COUNTY(IES): Dane **Alternative B**
LOCATION: US51-I-39/90 to S of Trm Dr/Voges R
COMPLETED: 06-16-2015

Traffic Forecasting Section; Bureau of Planning and Economic Development; Division of Transportation Investment Management

Developed by: Asadur Rahman
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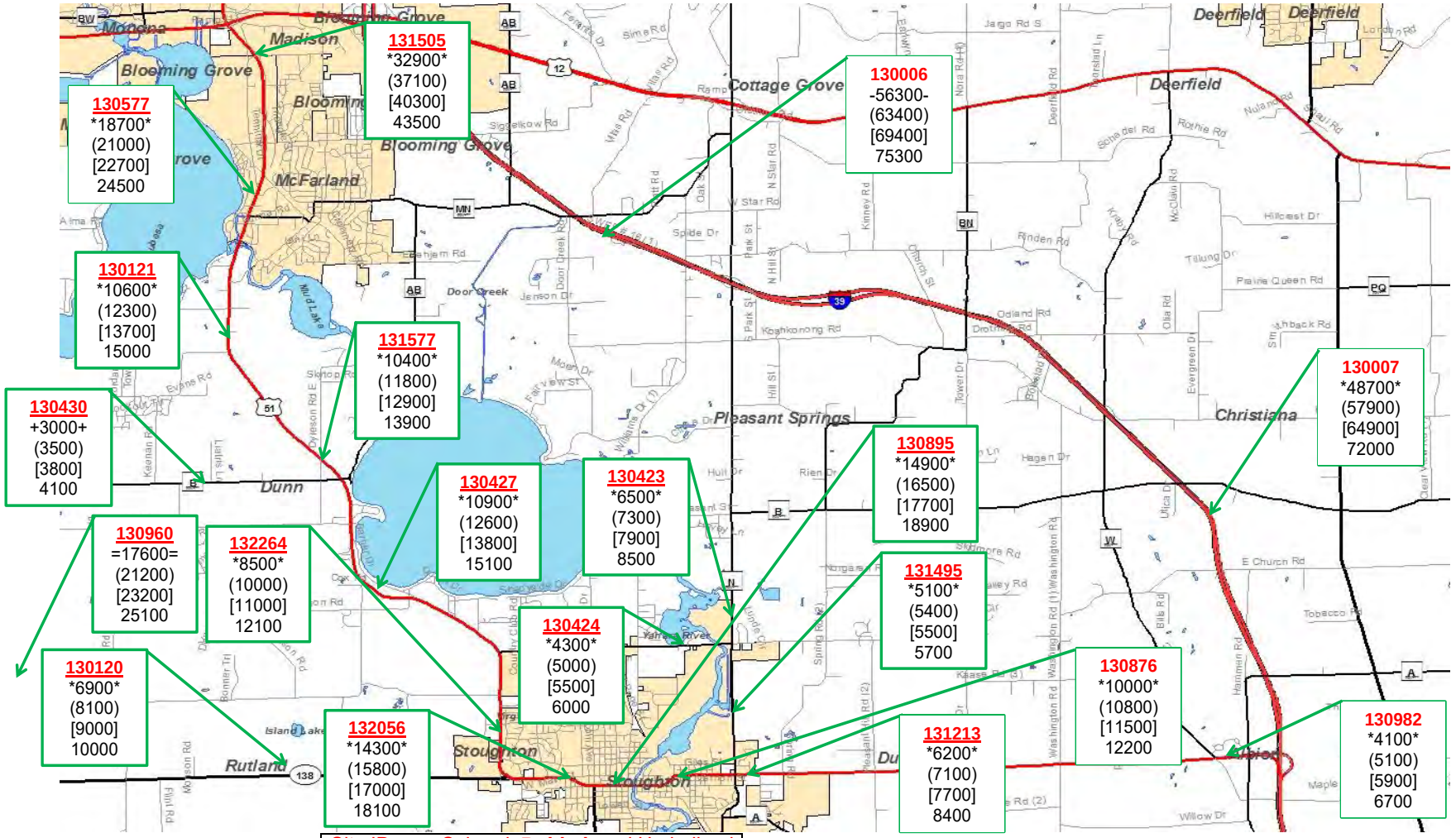


Site IDs are Colored, **Bolded**, and Underlined

Design Values (%)			
Site(s)	130577	130427	131213
Route(s)	USH 51	USH 51	USH 51
Volume(s)	24500	15060	8420
Site Growth %	0.94%	1.15%	1.09%
K250	9.9	9.8	12.1
K100	10.6	11.0	13.4
K30	11.2	11.9	14.6
P	12.6	14.5	19.0
D(Dsgn. Hr.)	59/41	60/40	59/41
T(DHV)	4.6	7.1	3.3
T(PHV)	4.0	3.8	2.9

-000- 2013 Count (000) 2025 AADT
000 2012 Count [000] 2035 AADT
+000+ 2009 Count 000 2045 AADT
=000= 2006 Count /000/ XXXX AADT

Trucks	130577	130427	131213
AADTT	1010	930	240
2D	1.6	2.1	1.4
3AX	1.6	1.3	1.3
2S1+2S2	0.7	1.3	0.5
3-S2	1.2	3.6	0.5
DBL-BTM	0.3	0.2	0.1
Total %	5.4%	8.5%	3.9%

NOTES ON THE FORECAST:

1. This projection assumes that no major new traffic generators will be added to the development already included in the travel demand model.

2. Truck classification percentages were taken from a table representative of similar facilities and locations throughout the state of Wisconsin.

3. Truck classification percentages were taken from 2009 Wisconsin Vehicle Classification Data (Site # 130577, 130427, 131213).

MORE NOTES ON THE FORECAST:

4. USH 151 is a Factor Group IV (Rural-Other) highway (indicating low to moderate fluctuation in traffic from a seasonal perspective). It is functionally classified as a Rural Principal Arterial (2) for count purposes.

5. The Dane County Travel Demand Model was used to complete this forecast. The Traffic Analysis Forecasting Information System output was used as a comparison tool to check against the model output. Adjustments were made as needed.

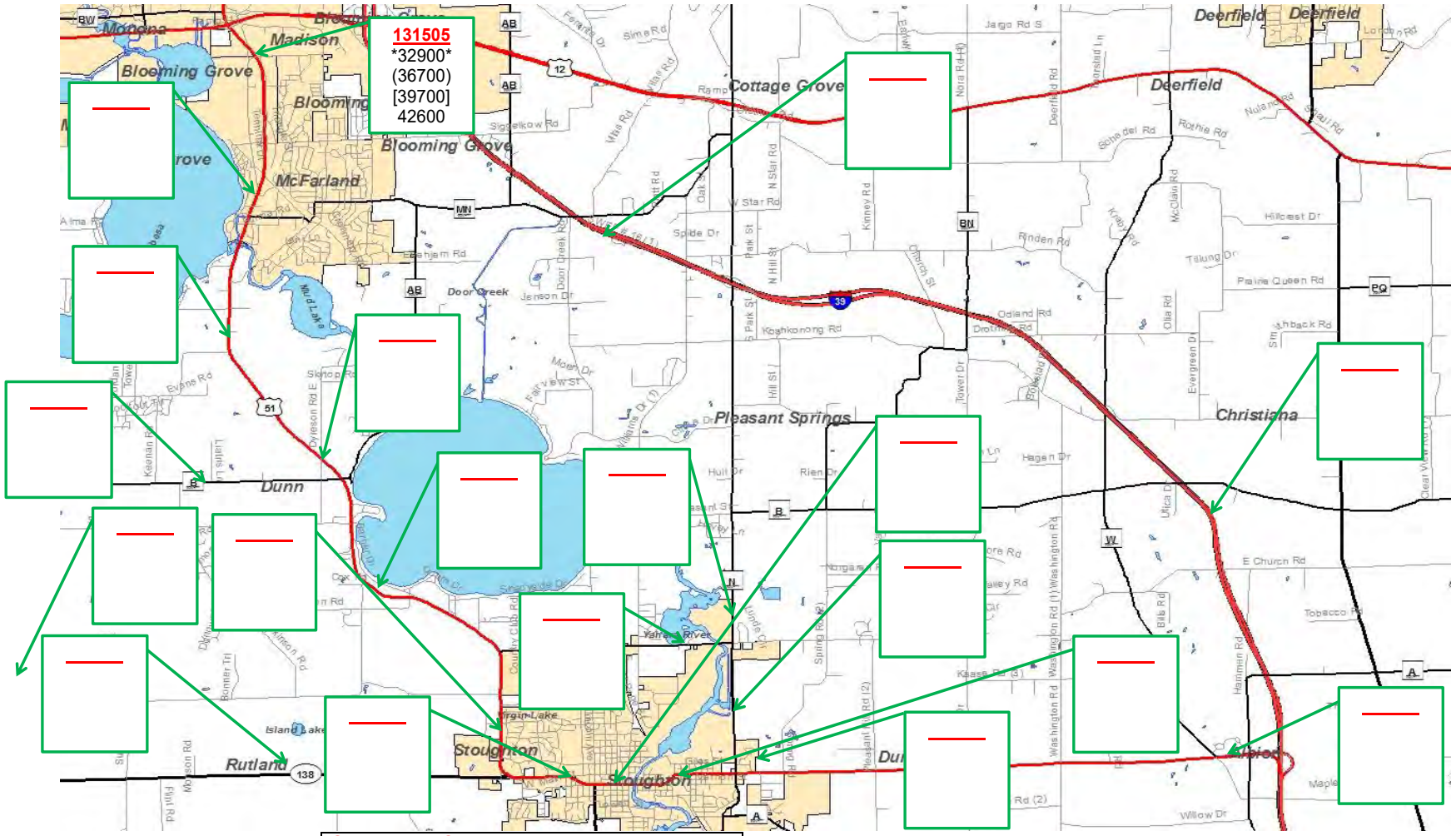
WisDOT TRAFFIC FORECAST REPORT

PROJECT ID(S): 5845-06-02
ROUTE(S): US51,WIS138,CH-B/N,I-39/

Region/COUNTY(IES): Dane **Alternative C**
LOCATION: US51-I-39/90 to S of Trm Dr/Voges R
COMPLETED: 06-25-2015

Developed by: Asadur Rahman
Phone: (608) 266-3322
FAX #: (608) 267-0294
E-Mail: asadur.rahman@dot.wi.gov

Traffic Forecasting Section; Bureau of Planning and Economic Development; Division of Transportation Investment Management



Site IDs are Colored, **Bolded**, and Underlined

Design Values (%)			
Site(s)	130577	130427	131213
Route(s)	USH 51	USH 51	USH 51
Volume(s)	23390	14460	8390
Site Growth %	0.76%	0.98%	1.07%
K250	10.0	9.8	12.1
K100	10.7	11.0	13.4
K30	11.3	11.9	14.6
P	12.8	14.5	19.0
D(Dsgn. Hr.)	59/41	60/40	59/41
T(DHV)	4.6	7.1	3.3
T(PHV)	4.0	3.8	2.9

-000- 2013 Count (000) 2025 AADT
000 2012 Count [000] 2035 AADT
+000+ 2009 Count 000 2045 AADT
=000= 2006 Count /000/ XXXX AADT

Trucks	130577	130427	131213
AADTT	1010	930	240
2D	1.6	2.1	1.4
3AX	1.6	1.3	1.3
2S1+2S2	0.7	1.3	0.5
3-S2	1.2	3.6	0.5
DBL-BTM	0.3	0.2	0.1
Total %	5.4%	8.5%	3.9%

NOTES ON THE FORECAST:

1. This projection assumes that no major new traffic generators will be added to the development already included in the travel demand model.

2. Truck classification percentages were taken from a table representative of similar facilities and locations throughout the state of Wisconsin.

3. Truck classification percentages were taken from 2009 Wisconsin Vehicle Classification Data (Site # 130577, 130427, 131213).

MORE NOTES ON THE FORECAST:

4. Alternat C

5. The Dane County Travel Demand Model was used to complete this forecast. The Traffic Analysis Forecasting Information System output was used as a comparison tool to check against the model output. Adjustments were made as needed.

WisDOT TRAFFIC FORECAST REPORT

PROJECT ID(S): 5845-06-02
ROUTE(S): US51,WIS138,CH-B/N,I-39/

Region/COUNTY(IES): Dane **Alternative D**
LOCATION: US51-I-39/90 to S of Trm Dr/Voges R
COMPLETED: 07-09-2015

Traffic Forecasting Section; Bureau of Planning and Economic Development; Division of Transportation Investment Management

Developed by: Asadur Rahman
Phone: (608) 266-3322
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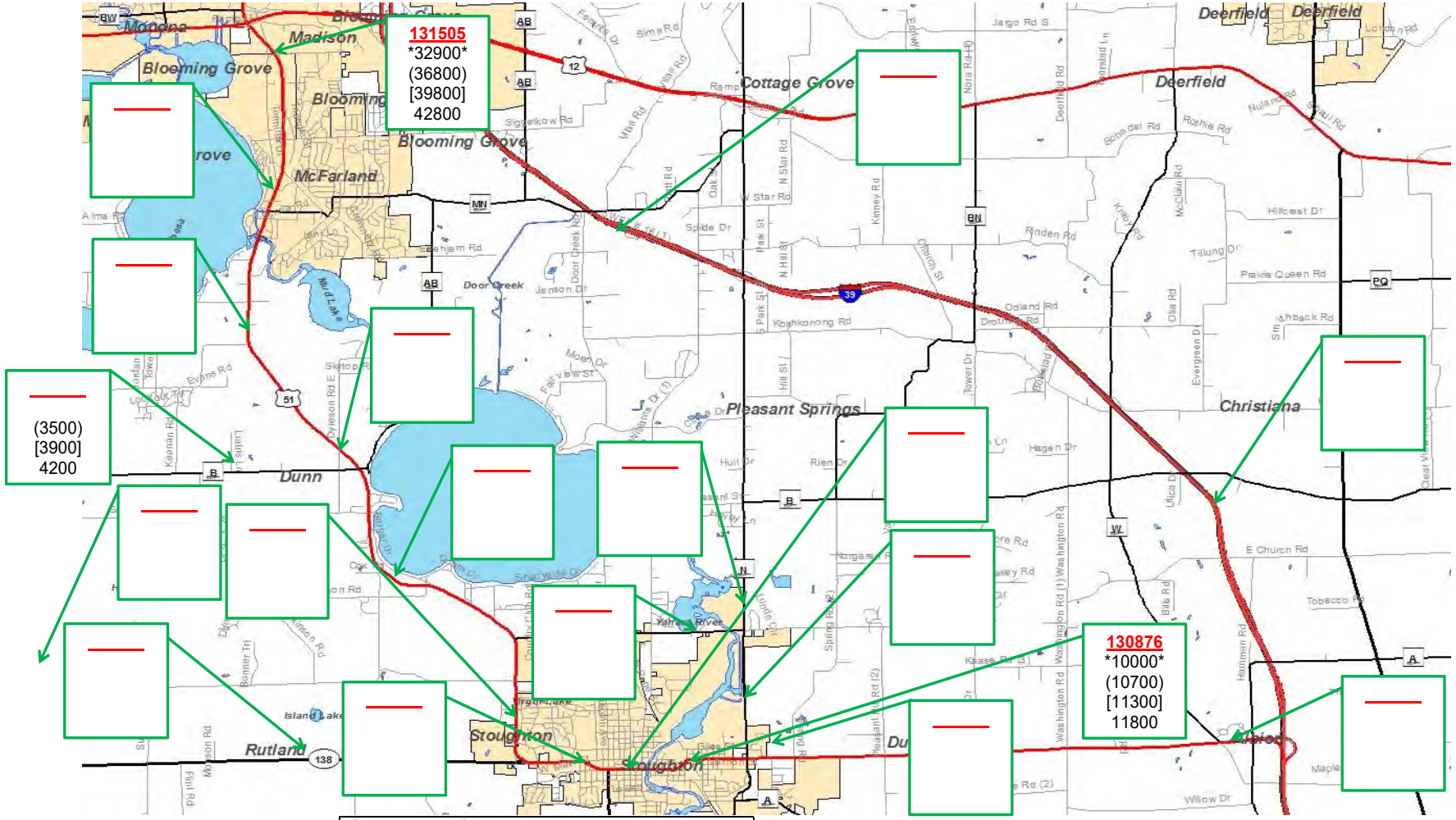
E-Mail: asadur.rahman@dot.wi.gov



Site IDs are Colored, **Bolded**, and Underlined

Design Values (%)			
Site(s)	130577	130427	131213
Route(s)	USH 51	USH 51	USH 51
Volume(s)	23410	14380	7970
Site Growth %	0.76%	0.96%	0.87%
K250	10.0	9.8	12.3
K100	10.7	11.0	13.6
K30	11.3	11.9	14.9
P	12.8	14.5	19.5
D(Dsgn. Hr.)	59/41	60/40	59/41
T(DHV)	4.6	7.1	3.3
T(PHV)	4.0	3.8	2.9

-000-	2013 Count	(000)	2025 AADT
000	2012 Count	[000]	2035 AADT
+000+	2009 Count	000	2045 AADT
=000=	2006 Count	/000/	XXXX AADT

Trucks	130577	130427	131213
AADTT	1010	930	240
2D	1.6	2.1	1.4
3AX	1.6	1.3	1.3
2S1+2S2	0.7	1.3	0.5
3-S2	1.2	3.6	0.5
DBL-BTM	0.3	0.2	0.1
Total %	5.4%	8.5%	3.9%

NOTES ON THE FORECAST:

1. This projection assumes that no major new traffic generators will be added to the development already included in the travel demand model.

2. Truck classification percentages were taken from a table representative of similar facilities and locations throughout the state of Wisconsin.

3. Truck classification percentages were taken from 2009 Wisconsin Vehicle Classification Data (Site # 130577, 130427, 131213).

MORE NOTES ON THE FORECAST:

4. Alternat D

5. The Dane County Travel Demand Model was used to complete this forecast. The Traffic Analysis Forecasting Information System output was used as a comparison tool to check against the model output. Adjustments were made as needed.

Peak Direction = US 51 Northbound/Westbound
Off-Peak Direction = US 51 Southbound/Eastbound

HCS Analysis Segment 1: Dyerson Road to Mahoney Road (1.6 miles)

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H		2045 Alternative B
	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)	Peak*
Average Speed (mph)	47.2	47.8	45.3	45.8	45.2	45.6	45.2	45.6	60.0
% Following	79.8%	68.2%	85.2%	73.0%	85.6%	73.5%	85.6%	73.5%	-
LOS (Numeric)	4.99	4.21	5.35	4.53	5.37	4.57	5.37	4.57	-
LOS	D	D	E	D	E	D	E	D	A

*NOTE: Analysis was done using HCS 2010 Freewaysw

HCS Analysis Segment 2: County B (East) to Lake Kegonsa Road (1.7 miles)

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H		2045 Alternative B
	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)	Peak*
Average Speed (mph)	46.4	47.0	44.2	44.7	44.1	44.5	44.1	44.6	60.0
% Following	81.6%	69.2%	87.1%	75.3%	87.7%	75.7%	87.7%	75.7%	-
LOS (Numeric)	5.11	4.28	5.47	4.69	5.51	4.71	5.51	4.71	-
LOS	E	D	E	D	E	D	E	D	A

*NOTE: Analysis was done using HCS 2010 Freewaysw

HCS Analysis Segment 3: Washington Road to Tower Drive (1.0 miles)

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H		2045 Alternative B	
	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)[1]	Northbound (Peak)	Southbound (Off-Peak)[1]	Northbound (Peak)	Southbound (Off-Peak)[1]
Average Speed (mph)	51.2	51.7	50.1	50.5	50.1	55.0	50.0	55.0	48.5	53.4
% Following	60.3%	47.4%	65.0%	53.2%	65.0%	34.1%	65.1%	34.1%	72.8%	39.5%
LOS (Numeric)	3.69	2.83	4.00	3.21	4.00	1.94	4.01	1.94	4.52	2.30
LOS	C	B	C	C	C	A	D	A	D	B

NOTE: K factor for Alternative B is higher than the other w alternatives in this segment, leading to poorer operations w results compared to other alternatives.w

Notes

Analysis volumes determined by using 2-way roadway forecast volume from WisDOT forecast * K factor * Directional Distribution Percentage (59/41 split)N

The results on Pages 1 and 5 differ slightly due to the percent of no passing zones included in the analysis, which varies slightly between peak direction of travel.N

[1] - Includes 550' passing lane for Eastbound traffic east of Tower Road.N

LOS	AN	BN	CN	D	E	F
% Following	< 35%N	35 - 50%N	50 - 65%N	65 - 80%N	> 80%N	volume/capacity > 1.0N
Numeric LOS	1.01 - 2.00N	2.01 - 3.00N	3.01 - 4.00N	4.01 - 5.00N	5.01 - 6.00N	6.01+N

Peak Direction = US 51 Northbound/Westbound
Off-Peak Direction = US 51 Southbound/Eastbound

HCS Analysis Segment 1: Dyerson Road to Mahoney Road (1.6 miles)

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H		2045 Alternative B
	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)	Peak*
Average Speed (mph)	47.5	48.1	45.9	46.4	45.8	46.2	45.8	46.2	60.0
% Following	78.3%	66.7%	82.9%	71.9%	83.3%	72.6%	83.3%	72.6%	-
LOS (Numeric)	4.89	4.11	5.19	4.46	5.22	4.51	5.22	4.51	-
LOS	D	D	E	D	E	D	E	D	A

**NOTE: Analysis was done using HCS 2010 Freewaysw*

HCS Analysis Segment 2: County B (East) to Lake Kegonsa Road (1.7 miles)

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H		2045 Alternative B
	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)	Peak*
Average Speed (mph)	46.8	47.4	44.8	45.2	44.6	45.1	44.6	45.1	60.0
% Following	80.5%	68.7%	86.0%	73.7%	86.7%	74.0%	86.7%	74.0%	-
LOS (Numeric)	5.03	4.25	5.40	4.58	5.45	4.60	5.45	4.60	-
LOS	E	D	E	D	E	D	E	D	A

**NOTE: Analysis was done using HCS 2010 Freewaysw*

HCS Analysis Segment 3: Washington Road to Tower Drive (1.0 miles)

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H		2045 Alternative B	
	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)[1]	Northbound (Peak)	Southbound (Off-Peak)[1]	Northbound (Peak)	Southbound (Off-Peak)[1]
Average Speed (mph)	51.4	51.8	50.3	50.7	50.3	55.2	50.3	55.2	49.0	53.8
% Following	59.5%	45.9%	63.8%	52.1%	63.8%	33.4%	63.8%	33.4%	71.1%	38.9%
LOS (Numeric)	3.63	2.73	3.92	3.14	3.92	1.89	3.92	1.89	4.41	2.26
LOS	C	B	C	C	C	A	C	A	D	B

NOTE: K factor for Alternative B is higher than the other w alternatives in this segment, leading to poorer operations w results compared to other alternatives.w

Notes

Analysis volumes determined by using 2-way roadway forecast volume from WisDOT forecast * K factor * Directional Distribution Percentage (59/41 split)N

The results on Pages 2 and 6 differ slightly due to the percent of no passing zones included in the analysis, which varies slightly between peak direction of travel.N

[1] - Includes 550' passing lane for Eastbound traffic east of Tower Road.N

LOS	AN	BN	CN	D	E	F
% Following	< 35%N	35 - 50%N	50 - 65%N	65 - 80%N	> 80%N	volume/capacity > 1.0N
Numeric LOS	1.01 - 2.00N	2.01 - 3.00N	3.01 - 4.00N	4.01 - 5.00N	5.01 - 6.00N	6.01+N

Peak Direction = US 51 Northbound/Westbound
Off-Peak Direction = US 51 Southbound/Eastbound

HCS Analysis Segment 1: Dyerson Road to Mahoney Road (1.6 miles)

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H		2045 Alternative B
	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)	Peak*
Average Speed (mph)	47.9	48.5	46.4	46.9	46.3	46.7	46.3	46.7	60.0
% Following	77.5%	65.2%	81.9%	69.9%	82.2%	70.6%	82.2%	70.6%	-
LOS (Numeric)	4.83	4.01	5.13	4.33	5.15	4.37	5.15	4.37	-
LOS	D	D	E	D	E	D	E	D	A

**NOTE: Analysis was done using HCS 2010 Freewaysw*

HCS Analysis Segment 2: County B (East) to Lake Kegonsa Road (1.7 miles)

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H		2045 Alternative B
	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)	Peak*
Average Speed (mph)	47.3	47.9	45.4	46.0	45.2	45.8	45.2	45.8	60.0
% Following	78.2%	66.9%	83.8%	72.4%	84.7%	72.8%	84.7%	72.8%	-
LOS (Numeric)	4.88	4.13	5.25	4.49	5.31	4.52	5.31	4.52	-
LOS	D	D	E	D	E	D	E	D	A

**NOTE: Analysis was done using HCS 2010 Freewaysw*

HCS Analysis Segment 3: Washington Road to Tower Drive (1.0 miles)

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H		2045 Alternative B	
	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)	Northbound (Peak)	Southbound (Off-Peak)[1]	Northbound (Peak)	Southbound (Off-Peak)[1]	Northbound (Peak)	Southbound (Off-Peak)[1]
Average Speed (mph)	51.6	52.0	50.5	50.9	50.5	55.5	50.5	55.5	49.4	54.3
% Following	56.9%	45.2%	62.5%	51.2%	62.5%	32.8%	62.5%	32.8%	68.2%	36.6%
LOS (Numeric)	3.46	2.68	3.83	3.08	3.83	1.85	3.83	1.85	4.21	2.11
LOS	C	B	C	C	C	A	C	A	D	B

NOTE: K factor for Alternative B is higher than the other w alternatives in this segment, leading to poorer operations w results compared to other alternatives.w

Notes

Analysis volumes determined by using 2-way roadway forecast volume from WisDOT forecast * K factor * Directional Distribution Percentage (59/41 split)N

The results on Pages 3 and 6 differ slightly due to the percent of no passing zones included in the analysis, which varies slightly between peak direction of travel.N

[1] - Includes 550' passing lane for Eastbound traffic east of Tower Road.N

LOS	AN	BN	CN	D	E	F
% Following	< 35%N	35 - 50%N	50 - 65%N	65 - 80%N	> 80%N	volume/capacity > 1.0N
Numeric LOS	1.01 - 2.00N	2.01 - 3.00N	3.01 - 4.00N	4.01 - 5.00N	5.01 - 6.00N	6.01+N

Peak Direction = US 51 Southbound/Eastbound
Off-Peak Direction = US 51 Northbound/Westbound

HCS Analysis Segment 1: Dyerson Road to Mahoney Road (1.6 miles)

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H		2045 Alternative B
	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)	Northbound (Off-Peak)	Peak
Average Speed (mph)	47.2	47.8	45.3	45.8	45.1	45.7	45.1	45.7	60.0
% Following	79.8%	68.2%	85.2%	73.0%	85.9%	73.3%	85.9%	73.2%	-
LOS (Numeric)	4.99	4.21	5.35	4.53	5.39	4.55	5.39	4.55	-
LOS	D	D	E	D	E	D	E	D	A

**NOTE: Analysis was done using HCS 2010 Freewaysw*

HCS Analysis Segment 2: County B (East) to Lake Kegonsa Road (1.7 miles)

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H		2045 Alternative B
	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)	Northbound (Off-Peak)	Peak
Average Speed (mph)	46.4	47.1	44.2	44.7	44.1	44.5	44.1	44.6	60.0
% Following	81.7%	69.2%	87.2%	75.3%	87.7%	75.7%	87.7%	75.7%	-
LOS (Numeric)	5.11	4.28	5.48	4.69	5.51	4.71	5.51	4.71	-
LOS	E	D	E	D	E	D	E	D	A

**NOTE: Analysis was done using HCS 2010 Freewaysw*

HCS Analysis Segment 3: Washington Road to Tower Drive (1.0 miles)

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H		2045 Alternative B	
	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)[1]	Northbound (Off-Peak)	Southbound (Peak)[1]	Northbound (Off-Peak)	Southbound (Peak)[1]	Northbound (Off-Peak)
Average Speed (mph)	51.4	51.5	50.2	50.4	54.7	50.4	54.6	50.4	53.4	49.0
% Following	59.4%	48.0%	64.4%	53.7%	41.8%	53.7%	41.9%	53.8%	46.9%	61.2%
LOS (Numeric)	3.63	2.87	3.96	3.25	2.45	3.25	2.46	3.25	2.79	3.75
LOS	C	B	C	C	B	C	B	C	B	C

NOTE: K factor for Alternative B is higher than the other w alternatives in this segment, leading to poorer operations w results compared to other alternatives.w

Notes

Analysis volumes determined by using 2-way roadway forecast volume from WisDOT forecast * K factor * Directional Distribution Percentage (59/41 split)N

The results on Pages 1 and 2 differ slightly due to the percent of no passing zones included in the analysis, which varies slightly between peak direction of travel.N

[1] - Includes 550' passing lane for Eastbound traffic east of Tower Road.N

LOS	AN	BN	CN	D	E	F
% Following	< 35%N	35 - 50%N	50 - 65%N	65 - 80%N	> 80%N	volume/capacity > 1.0N
Numeric LOS	1.01 - 2.00N	2.01 - 3.00N	3.01 - 4.00N	4.01 - 5.00N	5.01 - 6.00N	6.01+N

Peak Direction = US 51 Southbound/Eastbound
Off-Peak Direction = US 51 Northbound/Westbound

HCS Analysis Segment 1: Dyerson Road to Mahoney Road (1.6 miles)

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H		2045 Alternative B
	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)	Northbound (Off-Peak)	Peak*
Average Speed (mph)	47.5	48.1	45.9	46.4	45.6	46.3	45.6	46.3	60.0
% Following	78.3%	66.7%	82.9%	71.9%	83.6%	72.3%	83.6%	72.3%	-
LOS (Numeric)	4.89	4.11	5.19	4.46	5.24	4.49	5.24	4.49	-
LOS	D	D	E	D	E	D	E	D	A

**NOTE: Analysis was done using HCS 2010 Freewaysw*

HCS Analysis Segment 2: County B (East) to Lake Kegonsa Road (1.7 miles)

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H		2045 Alternative B
	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)	Northbound (Off-Peak)	Peak*
Average Speed (mph)	46.7	47.4	44.8	45.3	44.6	45.1	44.6	45.1	60.0
% Following	80.6%	68.7%	86.1%	73.7%	86.7%	74.0%	86.7%	74.0%	-
LOS (Numeric)	5.04	4.25	5.41	4.58	5.45	4.60	5.45	4.60	-
LOS	E	D	E	D	E	D	E	D	A

**NOTE: Analysis was done using HCS 2010 Freewaysw*

HCS Analysis Segment 3: Washington Road to Tower Drive (1.0 miles)

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H		2045 Alternative B	
	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)[1]	Northbound (Off-Peak)	Southbound (Peak)[1]	Northbound (Off-Peak)	Southbound (Peak)[1]	Northbound (Off-Peak)
Average Speed (mph)	51.5	51.7	50.4	50.6	54.9	50.6	54.9	50.6	53.4	49.4
% Following	58.6%	46.5%	63.2%	52.6%	41.0%	52.6%	41.0%	52.6%	45.8%	60.3%
LOS (Numeric)	3.57	2.77	3.88	3.17	2.40	3.17	2.40	3.17	2.72	3.69
LOS	C	B	C	C	B	C	B	C	B	C

NOTE: K factor for Alternative B is higher than the other w alternatives in this segment, leading to poorer operations w results compared to other alternatives.w

Notes

Analysis volumes determined by using 2-way roadway forecast volume from WisDOT forecast * K factor * Directional Distribution Percentage (59/41 split)N

The results on Pages 3 and 4 differ slightly due to the percent of no passing zones included in the analysis, which varies slightly between peak direction of travel.N

[1] - Includes 550' passing lane for Eastbound traffic east of Tower Road.N

LOS	AN	BN	CN	D	E	F
% Following	< 35%N	35 - 50%N	50 - 65%N	65 - 80%N	> 80%N	volume/capacity > 1.0N
Numeric LOS	1.01 - 2.00N	2.01 - 3.00N	3.01 - 4.00N	4.01 - 5.00N	5.01 - 6.00N	6.01+N

Peak Direction = US 51 Southbound/Eastbound
Off-Peak Direction = US 51 Northbound/Westbound

HCS Analysis Segment 1: Dyerson Road to Mahoney Road (1.6 miles)

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H		2045 Alternative B
	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)	Northbound (Off-Peak)	Peak*
Average Speed (mph)	47.9	48.5	46.4	46.9	46.1	46.8	46.1	46.8	60.0
% Following	77.5%	65.2%	81.9%	69.9%	82.5%	70.3%	82.5%	70.3%	-
LOS (Numeric)	4.83	4.01	5.13	4.33	5.17	4.35	5.17	4.35	-
LOS	D	D	E	D	E	D	E	D	A

**NOTE: Analysis was done using HCS 2010 Freewaysw*

HCS Analysis Segment 2: County B (East) to Lake Kegonsa Road (1.7 miles)

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H		2045 Alternative B
	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)	Northbound (Off-Peak)	Peak*
Average Speed (mph)	47.2	47.9	45.4	46.0	45.2	45.8	45.2	45.8	60.0
% Following	78.2%	66.8%	83.9%	72.4%	84.7%	72.8%	84.7%	72.8%	-
LOS (Numeric)	4.88	4.12	5.26	4.49	5.31	4.52	5.31	4.52	-
LOS	D	D	E	D	E	D	E	D	A

**NOTE: Analysis was done using HCS 2010 Freewaysw*

HCS Analysis Segment 3: Washington Road to Tower Drive (1.0 miles)

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H		2045 Alternative B	
	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)	Northbound (Off-Peak)	Southbound (Peak)[1]	Northbound (Off-Peak)	Southbound (Peak)[1]	Northbound (Off-Peak)	Southbound (Peak)[1]	Northbound (Off-Peak)
Average Speed (mph)	51.8	51.9	50.6	50.8	55.1	50.8	55.1	50.8	54.0	49.8
% Following	56.0%	45.9%	61.8%	51.7%	40.1%	51.7%	40.1%	51.9%	44.0%	57.6%
LOS (Numeric)	3.40	2.73	3.79	3.11	2.34	3.11	2.34	3.13	2.60	3.51
LOS	C	B	C	C	B	C	B	C	B	C

NOTE: K factor for Alternative B is higher than the other w alternatives in this segment, leading to poorer operations w results compared to other alternatives.w

Notes

Analysis volumes determined by using 2-way roadway forecast volume from WisDOT forecast * K factor * Directional Distribution Percentage (59/41 split)N

The results on Pages 5 and 6 differ slightly due to the percent of no passing zones included in the analysis, which varies slightly between peak direction of travel.N

[1] - Includes 550' passing lane for Eastbound traffic east of Tower Road.N

LOS	AN	BN	CN	D	E	F
% Following	< 35%N	35 - 50%N	50 - 65%N	65 - 80%N	> 80%N	volume/capacity > 1.0N
Numeric LOS	1.01 - 2.00N	2.01 - 3.00N	3.01 - 4.00N	4.01 - 5.00N	5.01 - 6.00N	6.01+N

HCS Analysis Segment 1: Dyerson Road to Mahoney Road (1.6 miles) - Mahoney Road Intersection Volumes

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H	
	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound
Average Speed (mph)	48.0	49.3	46.6	48.0	46.5	47.8	46.6	47.8
% Following	77.5%	53.2%	82.2%	56.4%	82.8%	56.8%	83.3%	58.1%
LOS (Numeric)	4.83	3.21	5.15	3.43	5.19	3.45	5.22	3.54
LOS	D	C	E	C	E	C	E	C

HCS Analysis Segment 2: County B (East) to Lake Kegonsa Road (1.7 miles) - County B Intersection Volumes

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H	
	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound
Average Speed (mph)	47.8	49.2	46.2	47.7	45.3	47.5	45.3	47.5
% Following	78.1%	50.2%	84.1%	55.8%	86.3%	56.8%	86.0%	57.0%
LOS (Numeric)	4.87	3.01	5.27	3.39	5.42	3.45	5.40	3.47
LOS	D	C	E	C	E	C	E	C

HCS Analysis Segment 3: Washington Road to Tower Drive (1.0 miles) - Pleasant Hill Intersection Volumes

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H	
	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound[1]	Northbound	Southbound[1]
Average Speed (mph)	51.3	51.7	50.3	50.7	50.3	50.7	50.3	55.3
% Following	59.1%	47.0%	65.2%	51.7%	64.9%	33.1%	64.9%	33.1%
LOS (Numeric)	3.61	2.80	4.01	3.11	3.99	1.87	3.99	1.87
LOS	C	B	D	C	C	A	C	A

Notes

Analysis volumes determined by using intersection forecast volumes from WisDOT forecast at the intersections indicated for each segment.N

The Peak Hour results differ from the K30 analysis on Pages 1 and 4 due to the directionality differences between the WisDOT intersection forecast and WisDOT roadway forecast.N

[1] - Includes 550' passing lane for Eastbound traffic east of Tower Road.N

LOS	A	B	C	D	E	F
% Following	< 35%	35 - 50%	50 - 65%	65 - 80%	> 80%	volume/capacity > 1.0N
Numeric LOS	1.01 - 2.00	2.01 - 3.00	3.01 - 4.00	4.01 - 5.00	5.01 - 6.00	6.01+N

HCS Analysis Segment 1: Dyerson Road to Mahoney Road (1.6 miles) - Mahoney Road Intersection Volumes

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H	
	Southbound	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound	Northbound
Average Speed (mph)	47.3	48.3	45.6	46.7	45.4	46.6	45.4	46.6
% Following	80.3%	60.5%	85.9%	62.9%	86.5%	63.2%	86.5%	64.7%
LOS (Numeric)	5.02	3.70	5.39	3.86	5.43	3.88	5.43	3.98
LOS	**E**	**C**	**E**	**C**	**E**	**C**	**E**	**C**

HCS Analysis Segment 2: County B (East) to Lake Kegonsa Road (1.7 miles) - County B Intersection Volumes

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H	
	Southbound	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound	Northbound
Average Speed (mph)	46.4	47.2	44.2	44.8	44.1	44.6	44.1	44.6
% Following	82.1%	67.5%	87.2%	73.7%	87.8%	74.1%	87.9%	74.0%
LOS (Numeric)	5.14	4.17	5.48	4.58	5.52	4.61	5.53	4.60
LOS	**E**	**D**	**E**	**D**	**E**	**D**	**E**	**D**

HCS Analysis Segment 3: Washington Road to Tower Drive (1.0 miles) - Pleasant Hill Intersection Volumes

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H	
	Southbound	Northbound	Southbound	Northbound	Southbound[1]	Northbound	Southbound[1]	Northbound
Average Speed (mph)	51.0	51.5	49.8	50.5	54.2	50.5	54.2	50.5
% Following	62.5%	40.4%	66.1%	44.9%	42.9%	44.9%	42.9%	42.9%
LOS (Numeric)	3.83	2.36	4.07	2.66	2.53	2.66	2.53	2.53
LOS	**C**	**B**	**D**	**B**	**B**	**B**	**B**	**B**

Notes

Analysis volumes determined by using intersection forecast volumes from WisDOT forecast at the intersections indicated for each segment.N

The Peak Hour results differ from the K30 analysis on Pages 1 and 4 due to the directionality differences between the WisDOT intersection forecast and WisDOT roadway forecast.N

[1] - Includes 550' passing lane for Eastbound traffic east of Tower Road.N

LOS	A	B	C	D	E	F
% Following	< 35%	35 - 50%	50 - 65%	65 - 80%	> 80%	volume/capacity > 1.0N
Numeric LOS	1.01 - 2.00	2.01 - 3.00	3.01 - 4.00	4.01 - 5.00	5.01 - 6.00	6.01+N

HCS Analysis Segment 1: Dyerson Road to Mahoney Road (1.6 miles) - Mahoney Road Intersection Volumes

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H	
	Southbound	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound	Northbound
No Passing %	55	55	55	55	73	61	73	61
AM Peak Volume	290	686	343	866	343	866	355	843
PM Peak Volume	759	378	953	448	953	448	938	469
K30 Peak Volume	719		904		904		905	
K30 Off Peak Volume	499		629		629		629	
K100 Peak Volume	680		857		857		857	
K100 Off Peak Volume	473		595		596		596	
K250 Peak Volume	636		801		801		801	
K250 Off Peak Volume	442		556		557		557	

HCS Analysis Segment 2: County B (East) to Lake Kegonsa Road (1.7 miles) - County B Intersection Volumes

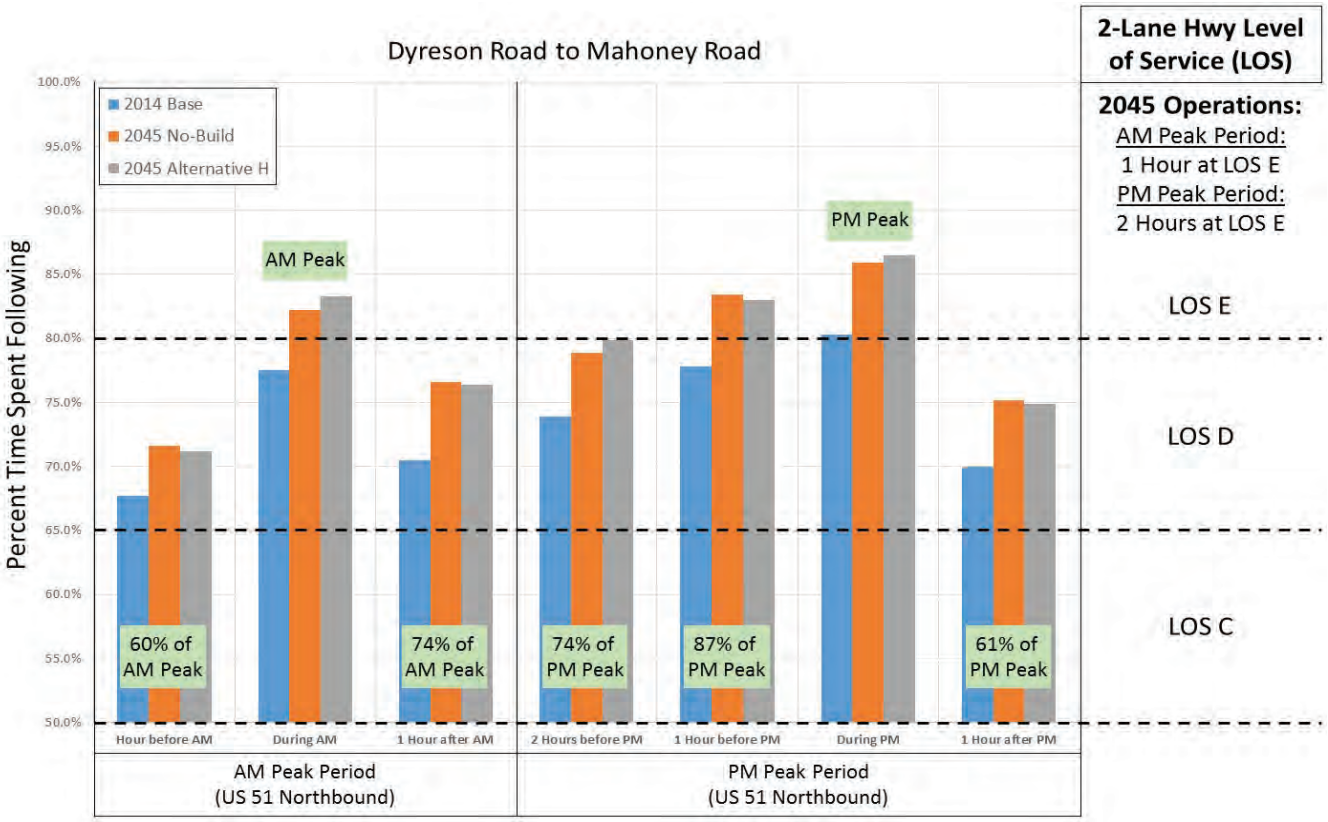
Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H	
	Southbound	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound	Northbound
No Passing %	77	75	77	75	100	100	100	100
AM Peak Volume	256	651	330	854	330	854	329	852
PM Peak Volume	747	490	971	640	971	640	969	638
K30 Peak Volume	741		960		960		958	
K30 Off Peak Volume	515		667		667		666	
K100 Peak Volume	702		909		907		907	
K100 Off Peak Volume	488		632		630		630	
K250 Peak Volume	656		850		848		848	
K250 Off Peak Volume	456		591		589		589	

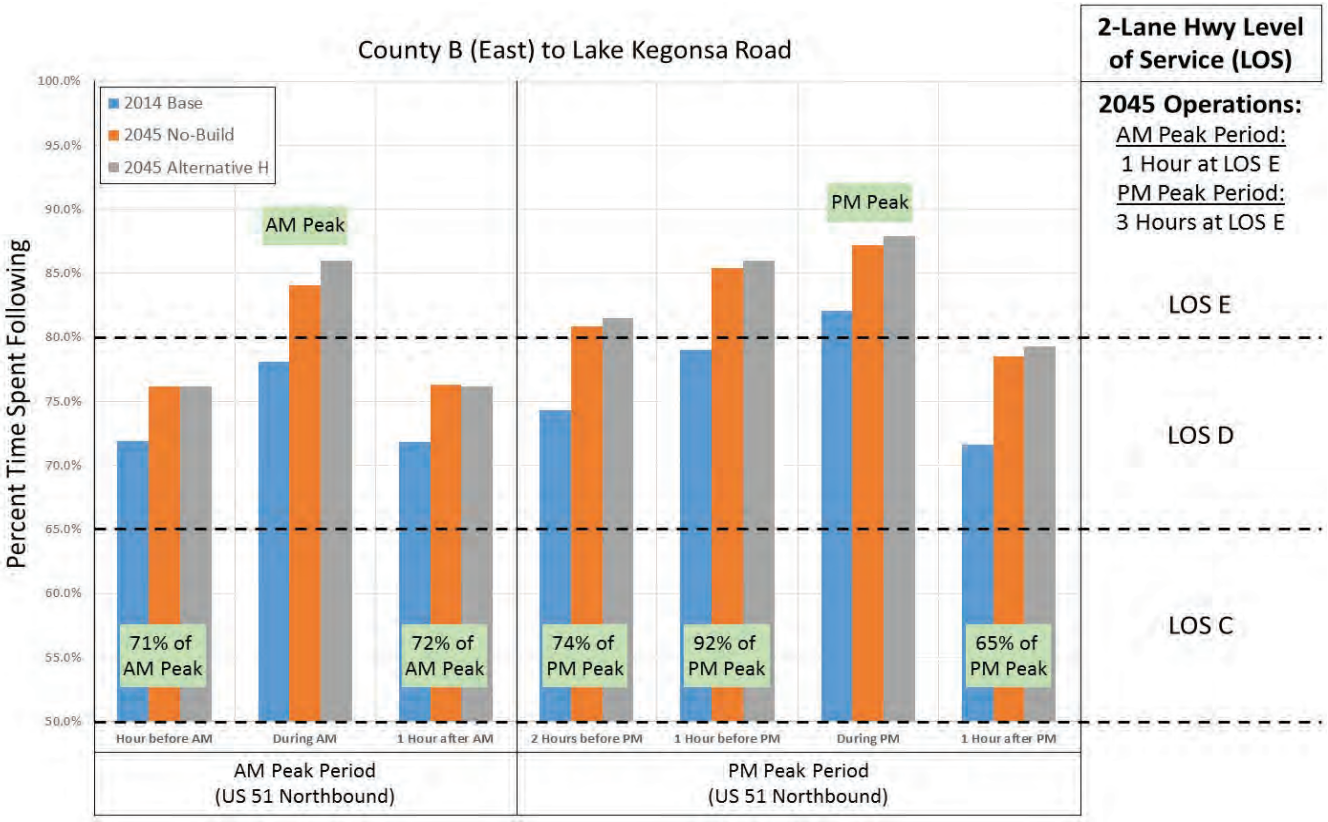
HCS Analysis Segment 3: Washington Road to Tower Drive (1.0 miles) - Pleasant Hill Intersection Volumes

Category	2014 Base Conditions		2045 No Build		2045 Alternative A		2045 Alternative H	
	Southbound	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound	Northbound
No Passing %	32	36	32	36	32	36	32	36
AM Peak Volume	193	267	257	386	257	386	257	386
PM Peak Volume	359	168	508	223	508	223	508	223
K30 Peak Volume	281		402		402		402	
K30 Off Peak Volume	195		279		279		280	
K100 Peak Volume	266		381		381		381	
K100 Off Peak Volume	185		265		265		265	
K250 Peak Volume	249		356		356		356	
K250 Off Peak Volume	173		247		247		248	

Notes

Analysis volumes determined by using 2-way roadway forecast volume from WisDOT forecast * K factor * Directional Distribution Percentage (59/41 split)N


Dyreson Road to Mahoney Road
2-Lane Hwy Level of Service (LOS)
2045 Operations:
AM Peak Period:
1 Hour at LOS E
PM Peak Period:
2 Hours at LOS E
2014 Base
2045 No-Build
2045 Alternative H
Percent Time Spent Following
100.0%
95.0%
90.0%
85.0%
80.0%
75.0%
70.0%
65.0%
60.0%
55.0%
50.0%
AM Peak
PM Peak
LOS E
LOS D
LOS C
60% of AM Peak
74% of AM Peak
74% of PM Peak
87% of PM Peak
61% of PM Peak
Hour before AM
During AM
1 Hour after AM
2 Hours before PM
1 Hour before PM
During PM
1 Hour after PM
AM Peak Period (US 51 Northbound)
PM Peak Period (US 51 Northbound)


County B (East) to Lake Kegonsa Road
2-Lane Hwy Level of Service (LOS)
2045 Operations:
AM Peak Period:
1 Hour at LOS E
PM Peak Period:
3 Hours at LOS E
2014 Base
2045 No-Build
2045 Alternative H
Percent Time Spent Following
100.0%
95.0%
90.0%
85.0%
80.0%
75.0%
70.0%
65.0%
60.0%
55.0%
50.0%
AM Peak
PM Peak
LOS E
LOS D
LOS C
71% of AM Peak
72% of AM Peak
74% of PM Peak
92% of PM Peak
65% of PM Peak
Hour before AM
During AM
1 Hour after AM
2 Hours before PM
1 Hour before PM
During PM
1 Hour after PM
AM Peak Period (US 51 Northbound)
PM Peak Period (US 51 Northbound)

1 Hour Before AM Peak (6:00 - 7:00 AM):						
Category	2014 Base Conditions		2045 No Build		2045 Alternative H	
	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound
Average Speed (mph)	50.2	51.3	49.4	50.7	49.3	50.4
% Following	67.7%	41.9%	71.6%	44.4%	71.2%	45.9%
LOS (Numeric)	4.18	2.46	4.44	2.63	4.41	2.73
LOS	D	B	D	B	D	B

AM Peak Hour (7:00 - 8:00 AM)						
Category	2014 Base Conditions		2045 No Build		2045 Alternative H	
	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound
Average Speed (mph)	48.0	49.3	46.6	48.0	46.6	47.8
% Following	77.5%	53.2%	82.2%	56.4%	83.3%	58.1%
LOS (Numeric)	4.83	3.21	5.15	3.43	5.22	3.54
LOS	D	C	E	C	E	C

1 Hour After AM Peak Hour (8:00 - 9:00 AM)						
Category	2014 Base Conditions		2045 No Build		2045 Alternative H	
	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound
Average Speed (mph)	49.5	50.7	48.4	49.8	48.2	49.6
% Following	70.5%	45.3%	76.6%	49.0%	76.4%	50.5%
LOS (Numeric)	4.37	2.69	4.77	2.93	4.76	3.03
LOS	D	B	D	B	D	C

2 Hours Before PM Peak (3:00 - 4:00 PM):						
Category	2014 Base Conditions		2045 No Build		2045 Alternative H	
	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound
Average Speed (mph)	50.0	48.9	48.9	47.7	48.7	47.5
% Following	52.6%	73.9%	56.8%	78.9%	58.5%	79.9%
LOS (Numeric)	3.17	4.59	3.45	4.93	3.57	4.99
LOS	C	D	C	D	C	D

1 Hour Before PM Peak Hour (4:00 - 5:00 PM)						
Category	2014 Base Conditions		2045 No Build		2045 Alternative H	
	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound
Average Speed (mph)	49.1	48.1	47.8	46.7	47.7	46.4
% Following	57.1%	77.8%	60.3%	83.4%	61.4%	83.0%
LOS (Numeric)	3.47	4.85	3.69	5.23	3.76	5.20
LOS	C	D	C	E	C	E

PM Peak Hour (5:00 - 6:00 PM)						
Category	2014 Base Conditions		2045 No Build		2045 Alternative H	
	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound
Average Speed (mph)	48.3	47.3	46.7	45.6	46.6	45.4
% Following	60.5%	80.3%	62.9%	85.9%	64.7%	86.5%
LOS (Numeric)	3.70	5.02	3.86	5.39	3.98	5.43
LOS	C	E	C	E	C	E

1 Hour After PM Peak Hour (6:00 - 7:00 PM)						
Category	2014 Base Conditions		2045 No Build		2045 Alternative H	
	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound
Average Speed (mph)	50.6	49.7	49.9	48.8	49.8	48.5
% Following	48.9%	70.0%	51.4%	75.2%	54.1%	74.9%
LOS (Numeric)	2.93	4.33	3.09	4.68	3.27	4.66
LOS	B	D	C	D	C	D

Notes

Peak hour analysis volumes determined by using intersection forecast volumes from WisDOT forecast at Mahoney Road.d

Peak period volumes were determined by using relationship between peak hours and shoulder hours of the existing WisDOT roadway coverage counts. d

LOS	A	B	C		E	F:
% Following	< 35%	35 - 50%	50 - 65%	65 - 80%	> 80%	volume/capacity > 1.0d
Numeric LOS	1.01 - 2.00	2.01 - 3.00	3.01 - 4.00	4.01 - 5.00	5.01 - 6.00	6.01+d

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1 Hour Before AM Peak (6:00 - 7:00 AM):						
Category	2014 Base Conditions		2045 No Build		2045 Alternative H	
	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound
Average Speed (mph)	49.2	50.5	48.1	49.6	48.1	49.6
% Following	71.9%	43.1%	76.2%	47.1%	76.2%	47.2%
LOS (Numeric)	4.46	2.54	4.75	2.81	4.75	2.81
LOS	D	B	D	B	D	B

AM Peak Hour (7:00 - 8:00 AM)						
Category	2014 Base Conditions		2045 No Build		2045 Alternative H	
	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound
Average Speed (mph)	47.8	49.2	46.2	47.7	45.3	47.5
% Following	78.1%	50.2%	84.1%	55.8%	86.0%	57.0%
LOS (Numeric)	4.87	3.01	5.27	3.39	5.40	3.47
LOS	D	C	E	C	E	C

1 Hour After AM Peak Hour (8:00 - 9:00 AM)						
Category	2014 Base Conditions		2045 No Build		2045 Alternative H	
	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound
Average Speed (mph)	49.2	50.5	48.0	49.5	48.1	49.5
% Following	71.8%	43.1%	76.3%	48.0%	76.2%	48.0%
LOS (Numeric)	4.45	2.54	4.75	2.87	4.75	2.87
LOS	D	B	D	B	D	B

2 Hours Before PM Peak (3:00 - 4:00 PM):						
Category	2014 Base Conditions		2045 No Build		2045 Alternative H	
	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound
Average Speed (mph)	48.9	48.2	47.5	46.7	47.3	46.3
% Following	62.3%	74.3%	67.1%	80.9%	67.5%	81.5%
LOS (Numeric)	3.82	4.62	4.14	5.06	4.17	5.10
LOS	C	D	D	E	D	E

1 Hour Before PM Peak Hour (4:00 - 5:00 PM)						
Category	2014 Base Conditions		2045 No Build		2045 Alternative H	
	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound
Average Speed (mph)	47.7	47.5	45.8	45.1	45.6	45.0
% Following	66.6%	79.0%	72.0%	85.4%	72.4%	86.0%
LOS (Numeric)	4.11	4.93	4.47	5.36	4.49	5.40
LOS	D	D	D	E	D	E

PM Peak Hour (5:00 - 6:00 PM)						
Category	2014 Base Conditions		2045 No Build		2045 Alternative H	
	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound
Average Speed (mph)	47.2	46.4	44.8	44.2	44.6	44.1
% Following	67.5%	82.1%	73.7%	87.2%	74.0%	87.9%
LOS (Numeric)	4.17	5.14	4.58	5.48	4.60	5.53
LOS	D	E	D	E	D	E

1 Hour After PM Peak Hour (6:00 - 7:00 PM)						
Category	2014 Base Conditions		2045 No Build		2045 Alternative H	
	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound
Average Speed (mph)	49.4	48.8	48.2	47.4	48.0	46.8
% Following	59.5%	71.6%	64.8%	78.5%	65.3%	79.3%
LOS (Numeric)	3.63	4.44	3.99	4.90	4.02	4.95
LOS	C	D	C	D	D	D

Notes

Peak hour analysis volumes determined by using intersection forecast volumes from WisDOT forecast at County B (east).d

Peak period volumes were determined by using relationship between peak hours and shoulder hours of the existing WisDOT roadway coverage counts. d

LOS	A	B	C		E	F:
% Following	< 35%	35 - 50%	50 - 65%	65 - 80%	> 80%	volume/capacity > 1.0d
Numeric LOS	1.01 - 2.00	2.01 - 3.00	3.01 - 4.00	4.01 - 5.00	5.01 - 6.00	6.01+d

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Traffic Operations Summary – 2045 AM and PM Peak Hours

		AM Peak Hour		PM Peak Hour	
	US 51 Intersection	Overall Level of Service		Overall Level of Service	
		Future No Build	Alternative H	Future No Build	Alternative H
Intersections	Farwell St (County MN)	Signalized C (3.05)	Signalized C (3.02)	Signalized B (2.78)	Signalized C (3.26)
	Exchange St	Unsignalized F (6+)	Roundabout A (1.86)	Unsignalized E (5.76)	Roundabout A (1.88)
	County B/AB	Roundabout A (1.85)	Roundabout A (1.87)	Roundabout B (2.11)	Roundabout A (2.01)
	County B (East)	Unsignalized E (5.52)	Roundabout A (1.68)	Unsignalized F (6+)	Roundabout A (1.89)
	Roby Rd	Roundabout A (1.66)	Roundabout A (1.88)	Roundabout A (1.79)	Roundabout A (1.74)
	WIS 138 (West)	Roundabout A (1.66)	Roundabout A (1.82)	Roundabout B (2.37)	Roundabout B (2.33)
	Hoel Ave	Roundabout A (1.67)	Roundabout A (1.68)	Roundabout A (1.80)	Roundabout A (1.80)
	County N	Signalized B (2.77)	Signalized B (2.82)	Signalized B (2.58)	Signalized B (2.69)
Downtown Stoughton	Van Buren St	Signalized B (2.36)	Signalized B (2.37)	Signalized A (1.82)	Signalized A (1.83)
Downtown Stoughton	Page St	Signalized B (2.20)	Signalized A (1.99)	Signalized B (2.12)	Signalized A (1.64)
Downtown Stoughton	Division St	Signalized A (1.65)	Signalized A (1.64)	Signalized A (1.75)	Signalized A (1.86)
Downtown Stoughton	S. 4th St	Signalized E (5.55)	Signalized B (2.18)	Signalized D (4.53)	Signalized A (1.90)
Peak Direction LOS:		AM Northbound		PM Southbound	
Two-Lane Roadway	US 51 Between Mahoney Rd and Dyreson Rd	E (5.15)	E (5.22)	E (5.39)	E (5.43)
Two-Lane Roadway	US 51 Between Lake Kegonsa Rd and County B East	E (5.27)	E (5.40)	E (5.48)	E (5.53)
Two-Lane Roadway	US 51 Between Washington Rd and Tower Dr	D (4.01)	C (3.99)	D (4.07)	B (2.53)
Off-Peak Direction LOS:		AM Southbound		PM Northbound	
Two-Lane Roadway	US 51 Between Mahoney Rd and Dyreson Rd	C (3.43)	C (3.54)	C (3.86)	C (3.98)
Two-Lane Roadway	US 51 Between Lake Kegonsa Rd and County B East	C (3.39)	C (3.47)	D (4.58)	D (4.60)
Two-Lane Roadway	US 51 Between Washington Rd and Tower Dr	C (3.11)	A (1.87)	B (2.66)	B (2.53)

Level of Service (LOS) Values	
LOS (Alpha Value)	LOS (Numeric Value)
A	1.01 to 2.00
B	2.01 to 3.00
C	3.01 to 4.00
D	4.01 to 5.00
E	5.01 to 6.00
F	> 6.00

LOS # (###)	Intersection LOS based on committed (funded) roundabout projects

Intersection Type	LOS determination
Unsignalized	Delay for Poorest Intersection Movement
All-way-stop	Weighted average delay of all intersection movements
Roundabout	
Signalized	Weighted average delay of all intersection movements

See Description of Motor Vehicle Levels of Service Exhibit for Unsignalized and Signalized LOS Scales

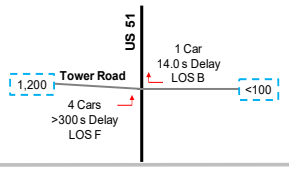
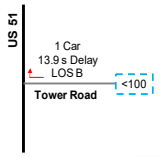
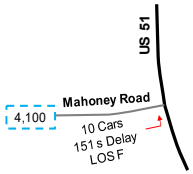
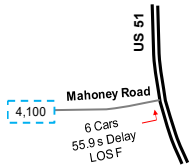
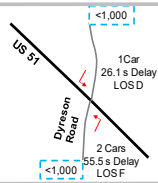
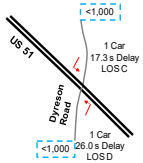
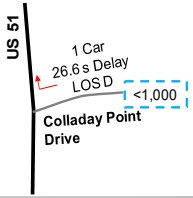
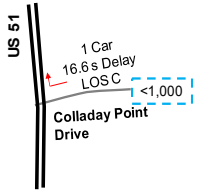
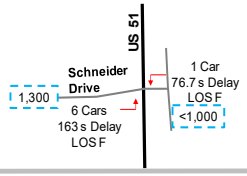
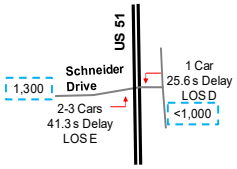
Roadway Type	LOS determination
2-lane Roadway Segment	Percent Time Spent Following

See Description of Motor Vehicle Levels of Service Exhibit for 2-lane Roadway LOS Scale

Nearing Capacity when:

LOS =	D

Comparison of Intersection Operations in Future Year 2045

	No Build (US 51 2-Lane, No Median)		Alternative H (US 51 2-Lane With Median)	
Tower Road	 EB: >1 hour at LOS F	Full Access		West Leg Closed
Mahoney Road	 EB: >1 hour at LOS F	Full Access	 EB: <15 minutes at LOS F	Full Access with Median*
Dyreson Road	 NB: <15 minutes at LOS F	Full Access		Full Access with Median*
Colladay Point Drive		Full Access		Full Access with Median*
Schneider Drive	 EB: >1 hour at LOS F WB: <1 hour at LOS F	Full Access		Full Access with Median*

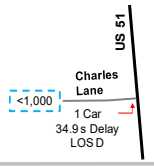
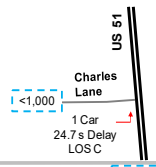
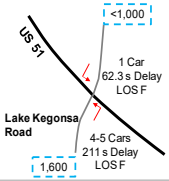
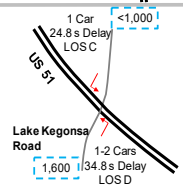
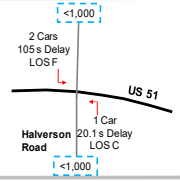
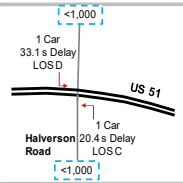
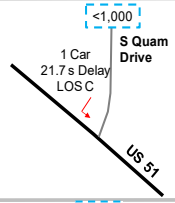
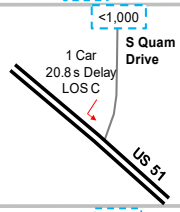
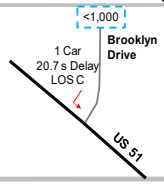
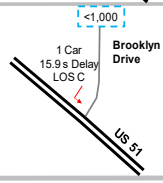
Legend

- 2045 Average Annual Daily Traffic (AADT)
- 2045 PM Peak Hour
  Number of Cars in Queue
  Control Delay (seconds)
  LOS
- Estimated Length of Delay at LOS F locations
- Type of Access to US 51
- N

Unsignalized Delay (seconds)	Level of Service (LOS)
25 to 35	D
35 to 50	E
50+	F

** = Median stores 1 vehicle*

Comparison of Intersection Operations in Future Year 2045

	No Build (US 51 2-Lane, No Median)		Alternative H (US 51 2-Lane With Median)	
Charles Lane		Full Access		Full Access with Median*
Lake Kegonsa Road	NB: >1 hour at LOS F 	SB: <15 mins at LOS F Full Access		Full Access with Median*
Halverson Road	SB: >1 hour at LOS F 	Full Access		Full Access with Median*
S. Quam Drive		Full Access		Full Access with Median*
Brooklyn Drive		Full Access		Full Access with Median*

Legend

- 2045 Average Annual Daily Traffic (AADT)
- 2045 PM Peak Hour
  Number of Cars in Queue
  Control Delay (seconds)
  LOS
- Estimated Length of Delay at LOS F locations
- Type of Access to US 51
- N

Unsignalized Delay (seconds)	Level of Service (LOS)
25 to 35	D
35 to 50	E
50+	F

** = Median stores 1 vehicle*

US 51 Travel Time Analysis
October 2015

Peak Direction = US 51 Northbound
Off-Peak Direction = US 51 Southbound

Distances (miles)

County B (East) to County B/AB	3.0
County B/AB to S of Exchange St	2.6

Peak Hour Analysis

Category	Base Conditions[1]		2045 No Build[2]		2045 Alternative A[2]		2045 Alternative H[2]		2045 Alternative B[3]	
	AM Northbound	PM Southbound	AM Northbound	PM Southbound	AM Northbound	PM Southbound	AM Northbound	PM Southbound	Peak Direction	
County B (East) to County B/AB Average Speed (mph)	*56.0*	*57.0*	*54.4*	*54.8*	*53.5*	*54.7*	*53.5*	*54.7*	60.0	
County B/AB to S of Exchange St Average Speed (mph)	*57.5*	*54.5*	*56.1*	*52.8*	*56.0*	*52.6*	*56.1*	*52.6*	60.0	
County B (East) to County B/AB Travel Time (min)	3.21	3.16	3.31	3.28	3.36	3.29	3.36	3.29	3.00	
County B/AB to S of Exchange St Travel Time (min)	2.71	2.86	2.78	2.95	2.79	2.97	2.78	2.97	2.60	
Total Travel Time (min)	*5.93*	*6.02*	*6.09*	*6.24*	*6.15*	*6.26*	*6.15*	*6.26*	*5.60*	
Base vs. No Build (min)	*0.16*	*0.22*	*No Build vs. Alt H (min)*		*0.06*	*0.02*	*Alt H vs. Alt B (min)*		*0.55*	*0.66*
Base vs. No Build (sec)	*10*	*13*	*No Build vs. Alt H (sec)*		*3*	*1*	*Alt H vs. Alt B (sec)*		*33*	*39*
Base vs. No Build (%)	*2.7%*	*3.6%*	*No Build vs. Alt H (%)*		*0.9%*	*0.3%*	*Alt H vs. Alt B (%)*		*9.7%*	*11.7%*

Travel Speed Data Sources:

[1] Average from US 51 speed data collected in October 2015	*[2] Future conditions US 51 speeds determined by applying speed reduction indicated from HCS modeling to base conditions field speeds.*	[3] Posted speed + 5 mph used for HCS analysis.

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