

**Project 1120-11-03**  
**WIS 26 – Breezewood Lane**  
**US 41**  
**Winnebago County**

**Traffic Management Plan**



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## **Executive Summary**

Enclosed is the Traffic Management Plan (TMP) for the USH 41 Winnebago County expansion project. This project is a Type 4 action as determined by Departments *DRAFT* guidelines for *Work Zone Transportation Management Plan* established in October 2006. This TMP document lays out the project procedures for handling and managing traffic during the construction phase. It addresses overall work zone impacts, selected work zone management strategies, and incident management techniques expected to be implemented during various construction operations.

Because these type plans are considered “living “ documents, a final TMP plan will not be complete until the construction plans approach finalization and then there are reporting activities as to the effectiveness of the TMP plan.

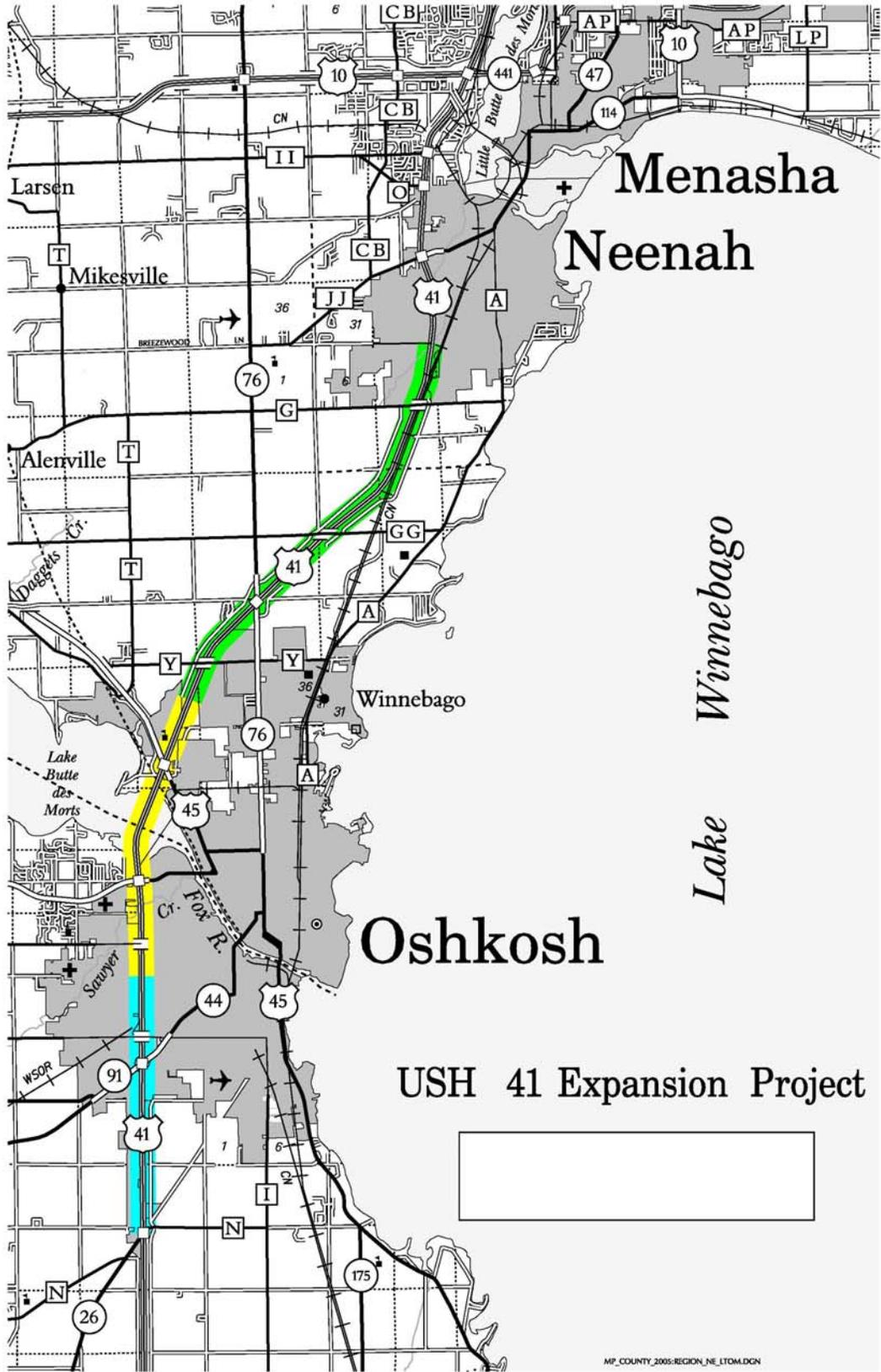
## **Project Description**

The US 41 project is a 17-mile project that plans to reconstruct US 41 from four to six lanes in Winnebago County. The project extends ½ mile south of the WIS 26 interchange and extends ½ mile north of the Breezewood Lane interchange. The project includes reconstruction of the 9<sup>th</sup> Avenue, WIS 21, and US 45 interchanges. Moderate interchange improvements will be completed at WIS 44 and WIS 76 interchanges and minor improvements at WIS 26 interchange. Grade separation structures at 20<sup>th</sup> Avenue and Witzel Avenue will be replaced to meet vertical clearance requirements. New grade separation structures will be added at Lake Butte des Morts Drive and Fountain/Snell roads to provide local road connections near the US 41/45 interchange.

The project is currently scheduled in the majors program to be constructed from 2010 to 2015. The project is funded through the Majors program and the schedule is subject to change based on project estimates and available funding.

The goal of the project is to expand US 41 from 4 to 6 lanes and upgrade the interchanges to handle the projected traffic volumes. Interchanges will be designed with ramp metering calculated into the ramp lengths so meters can be added in the future. The reconstruction of US 41 will provide a much safer facility with better merge/diverge design at the interchanges to handle the future projected traffic.

The proposed construction staging is being determined during the design process. One of the constraints placed on the project is that US 41 remains open to 2 lanes of traffic in each direction during the entire project duration. The reason this constraint has been placed on the project is the hourly volumes for US 41 exceed 1500 vehicles per lane per hour for the entire weekday from 6:00 am to 7:00 pm. Traffic does not reduce down during the daytime that a lane closure can be implemented without causing traffic backups. See Attachment E for traffic volumes. Northeast Region has experienced that by witnessing some of the county maintenance activities and the backup they cause. Nighttime lane closures will be allowed at times for structure demolition and other work. This constraint is necessary to handle the volume of traffic using US 41. We plan to construct the project using various stages to maintain traffic on US 41. US 41 is the only major arterial that crosses the Lake Butte des Morts/Fox River system; alternative routes to handle the large traffic volumes are not present. We propose to close various interchanges and grade separation bridges during construction so we can go in, do the work, do it quickly, get it done, and stay out for a long time in the future. We believe this approach gets the construction done quicker and a better quality product than trying to maintain traffic on cross streets and interchanges extending the work influence for longer periods of time.



**USH 41 Expansion Project**



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## Existing and Future Conditions

The Department developed the existing traffic data on US 41 in 2000 and updated it in 2005. The Department spent time collecting data on the mainline, ramps, and side roads so it could be used to study the existing traffic conditions and accurately project the future traffic of the facility. Attached is the technical memo entitled *US 41 Traffic Study – Winnebago County Base Year 2005 Traffic Volume Network* and is attached in Attachment A. The 2005 Annual Average Daily Traffic (AADT) Traffic Volumes on US 41 range from 44,800 on the south end of the project to the highest volume of 68,400 between WIS 21 and US 45. US 41 is used as a tourist route for access to northern Wisconsin so Friday pm and Sunday pm peaks are typical throughout the corridor. During peak travel times Friday night, US 41 northbound travelers experience backups from WIS 44 to US 45. The close interchange spacing in this area combined with the large Friday night peak traffic causes US 41 northbound traffic to be stopped or slowed down to less than 25 mph at peak times. Sunday afternoon return trips also cause backup on US 45 near US 41 as well.

Forecasted traffic projections were completed for years 2015 and 2035 in the technical memo entitled *US 41 Traffic Study – Winnebago County Forecasted Traffic Volume Network* and are attached in Attachment B. The 2035 Traffic Volumes range from 80,000 to 111,000 within the project limits of WIS 26 to Breezewood Lane with the highest volumes between WIS 21 and US 45. Truck percentages in the corridor are included in Appendix B and average around 14%.

In 2000, the Department completed a crash study of the entire corridor. Five years (1994 – 1998) of crash records were reviewed for US 41 between WIS 26 and Breezewood Lane. Several segments have higher crash rates than statewide average but the northbound US 41 at the WIS 21 interchange and southbound US 41 at the US 45 interchange have significantly higher crash rates. Crash rates during construction may be reduced during construction in the WIS 21 Interchange and US 45 Interchange because the construction staging plans will have those interchanges closed during construction and thus reducing the conflict.

Community and business concerns include addressing the congestion and safety of the corridor. Concerns were high regarding the WIS 21 area along with the Lake Butte des Morts crossing. The Lake Butte des Morts crossing does experience snow drifting issues while the lake is frozen and low wind speeds from the west or northwest. Maintenance crews have to do continuous plowing and salting operations during those periods when drifting occurs.

The WIS 21 corridor has large commercial development along with high residential development to the west of US 41 that experiences traffic congestion during the am and pm peak. The community and business leaders asked the Department to address the congestion issues with the design.

## **Work Zone Assessment Impacts**

The designers have given considerable thought to the constraint of fitting a design that will allow two lanes in each direction be maintained during construction. This can be done throughout most of the corridor without much issue. Temporary bypass lanes will need to be constructed at the WIS 21 and US 45 interchanges to allow the work on US 41 mainline to be completed. Temporary bypass lanes along the east side of US 41 were chosen to allow the contractor the most room in which to work and the access materials. Quarries and borrow pits are available to the west of these interchanges.

Lane closures will be allowed at night for material deliveries or structure demolition. Because the existing traffic volumes are large and do not go below 1500 vehicle per hour per lane during daytime, only night time/off peak closures will be allowed. See Attachment E.

The WIS 21 and US 45 interchanges will be closed during construction. Proposed detour routes have been established and are attached in Attachments C & D. To minimize impacts to the local traffic during the interchange closures, improvements to the local road connections are scheduled prior to the interchange closures. The work at the Witzel Avenue Overpass, Lake Butte des Morts Overpass, Fountain/Snell Overpass, Washburn Street, and 9<sup>th</sup> Avenue Interchange will be done in advance so that when the interchanges are closed, the local traffic has a system that can handle the added capacity.

Pedestrian/bicyclists will be impacted during construction when we close an interchange or overhead. Pedestrians/bicyclists will have to plan alternate route around the construction.

The NE Region has currently scheduled other WisDOT projects to avoid conflicts while the US 41 project is under construction. Currently, resurfacing projects on WIS 76 are programmed in advanced of US 41 work so that WIS 76 can be used as a relief route. No work is anticipated to be needed on the detour routes for US 45 and WIS 21 interchange closures. While side roads are under construction, various strategies will be used to get the work completed and maintain traffic on US 41. Strategies being considered are to allow short duration off peak lane closures, long-term shoulder closures, redirecting traffic onto ramps for off peak periods, intermediate completion dates for various aspects of work with potential/disincentive clauses.

NE Region will coordinate schedule with local community leaders, emergency services, schools, and local businesses so they can plan early the construction and necessary changes that impact them.

## **Selected Work Zone Impact Management Strategies**

Numerous work zone traffic control strategies and devices will be considered in the upcoming projects on US 41. Some of the devices presently being considered are changeable message signs, fixed message signs, and variable speed message signs. Several strategies being considered are enhanced enforcement contracts, crash investigation sites, and emergency pullouts.

### ***Innovative construction contracting***

Unique contracting will be considered for US 41 that can speed up contracting and lessen the impacts to the travelling public. For example, A+B bidding and lane rental contracts will be considered. Incentive/Disincentive clauses and interim completion date concepts will be investigated and used as necessary to expedite contracts.

### ***Traffic control devices, positive protection devices, off-peak lane closure, night work, and ramp closure***

The numerous strategies listed above will be considered in final design. The strategies to be used in construction depend on the type of work, duration of the work, and the impacts to the travelling public.

### **Community Involvement**

Work zone impacts have and will be addressed through community involvement prior to the project. Impacts and schedules will need to be communicated with the local officials and business leaders prior to the project so that they can plan accordingly. Businesses directly affected by construction will be allowed to provide temporary business signing during construction to help direct customers to their place of business. The temporary signing will follow the NE Region policy that is already in place.

## **Incident Management**

### ***Tow/freeway service patrol***

Tow and freeway service patrols will be considered along US 41 corridor during construction activities.

### ***Deployment of 511***

This strategy could be deployed in the NE Region. The determination of its use will be determined by the statewide progress in developing the 511 system.

### ***State Traffic Operations Center - STOC***

The STOC will be used as the primary contact for any infrastructure repair needs. The STOC will as be utilized to either monitor or operate field devices deployed as part of the major projects.

### ***Law Enforcement***

The state patrol and other law enforcement agencies may be used for extra-ordinary enforcement purposes. The level of effort will need to be determined as the design of the project increases.

### ***Coordinate with Media***

Coordination with the media will be critical to a successful project. Information such as lane closures times and locations, detour route changes and other planned events that affect traffic will be shared with the media in various methods. The current lane closure form will be utilized as ramp, lane or shoulder closures are needed.

### ***Local Detour Routes***

No local detour routes are planned. While work is taking place on the local routes, local municipalities may incorporate their own detours for those affected routes.

### ***Incident/Emergency Response Plan***

The Winnebago County Freeway Incident Management team meets as needed to discuss traffic incident response procedures. This team will be a valuable resource to work with as the design project progress along.

### ***Temporary Pullouts for Disabled Vehicles***

One or two temporary pullouts in each direction for disabled may be necessary between WIS 76 and Breezewood Lane. All other tangent sections of freeway have interchanges located within 1-3 miles of each other. Crash investigation sites will also be constructed on the off-ramps to many of the interchanges.

### ***Temporary Crash Investigation Sites***

If any temporary crash investigation sites are constructed they are expected to be located where permanent ones will be placed as part of the projects. The crash investigation sites may be constructed in the early stages of construction to fully utilize their purpose.

### ***Special Events***

Certain special events affect US 41 that need to be considered and addressed through the project final design and special provisions. Green Bay Packer home games, Experimental Aircraft Association (EAA) Fly-in, Country USA country music festival, and Ducks Unlimited Festival are events that need to be addressed in final plans. Coordination with law enforcement prior to construction will need to be done for these special events.

## **Work Zone Safety Management Strategies**

### ***Speed Limit Reduction***

Regulatory speed limit will be reduced to 55 mph when traffic control requires counter-directional traffic. The regulatory speed limits will also be reduced to 55 mph when

workers are present and working adjacent to the through lane of traffic. At all other times the regulatory speed limit will be 65mph. Any hazards throughout the project should be identified with a warning sign with an appropriate advisory speed plaque.

#### ***Law Enforcement Mitigation Contract***

The state patrol and other law enforcement agencies may be used for extra-ordinary enforcement purposes. The level of effort will need to be determined as the design of the project increases.

#### ***Temporary Traffic Signals***

Temporary Traffic Signals will be needed only at existing traffic signal locations that will need to be moved due to traffic control staging or construction operations. This work will be included in the contract as bid items, and described in the bid document.

#### ***Moveable Barriers, Crash Cushions, Temporary Rumble Strips, Warning Lights, Project Onsite Safety Training, and Construction Safety Inspector***

These items will be considered for use in the appropriate place and installation.

#### ***Community Involvement***

In March 2004, WisDOT met with City of Oshkosh local officials to investigate if any local arterials needed modifications or upgrades prior to the work on US 41. The local arterials that will be used during US 41 construction are already 4 lane arterials. DOT asked if turn lanes or signal timing adjustments needed to be done. City did not think any turn lanes adjustments are needed and signal timings could be adjusted at time of construction if necessary.

### **Traffic management communication plan**

This plan actually starts during the public outreach part of the project, where we meet with local officials, businesses and citizens. We communicate about the project and receive feedback regarding issues, needs and concerns. This information is used in developing the traffic management communication plan.

Communication is targeted locally on commuters, area businesses and safety agencies. Regional and interstate communication focuses on tourists, trucking firms, and businesses.

There are a number of goals to be achieved with this communication. They include communicating the necessity for the work, the benefits once the work is completed, the project schedule, impacts and access plan and how to deal or cope with it.

Project updates and status will be issued frequently – hourly if necessary. Alternate routes will be suggested as appropriate. Safety messages will also be provided, including urging the public to slow down and be patient.

This information will be communicated to a number of venues. Included will be brochures and posters distributed throughout the corridor and both up and down state. Print and electronic media will be brought in as partners in the outreach. WisDOT will also provide updated information through its web site, e-mail, conventional mail, public service announcements, paid advertising (if needed) and public meetings.

## Motorist Information Strategies (MIS) (traveler)

### ***STOC***

The STOC will be used as the primary contact for any infrastructure repair needs. The STOC will as be utilized to either monitor or operate field devices, which will be used in part to provide traveler information.

### ***Portable Changeable Message Signs - PCMS***

PCMS will be utilized throughout the project. The use will be for incident management, notification of lane, shoulder, and/or ramp closures, and other traveler information necessary.

### ***Electronic Message Signs***

Permanent message boards are planned to be installed as part of the project. These signs could be utilized once installed if construction is ongoing downstream.

### ***Work Zone Traveler Warning & Information Systems***

Smart work zones will likely be utilized throughout work zones.

### ***Highway Advisory Radio-HAR***

HAR is not expected to be used as part of this project. The need for HAR is diminished if the 511 traveler information system is functional.

### ***Availability of Detour Routes***

There are no readily available detour routes for US 41 along this segment of highway. An emergency detour route can be used, but it will not handle an extended period of high volumes of traffic directed to it.

### ***Availability of Alternate Routes***

Two alternate routes around the Lake Butte des Morts are signed. Other alternate routes are identified in the Green Bay/Fox Cities/Oshkosh Alternate Route Plan Guide, but are not signed. County highway departments have equipment available to sign an alternate route due to an incident on the freeway.

### ***Planned Lane Closure Website***

The Department is proposing the development a lane closure website on a statewide basis. It is unknown at this time if it will be ready for implementation for these contracts.

### ***Bicycle & Pedestrian Information***

Bicycle and pedestrian information will be disseminated through the local officials and concerned groups as part of the regions public outreach for the projects.

### **TMP Monitoring**

Traffic Management Plan monitoring will be developed as the project moves closer to construction. Roles and responsibilities of who will do what part of monitoring is still under development. WisDOT is still developing guidance in this area.

An Evaluation Report will be developed upon completion of construction to document lessons learned and provide recommendations on how to improve the WisDOT TMP process and/or modify the guidelines. The reports will address the following:

- A statement reflecting the usefulness of the TMP
- Updates necessary to correct oversights in the TMP
- Modifications made to the original plan and their level of success
- Public reaction to the TMP
- The maximum and average delay time encountered (e.g., average queues, slowdowns) during construction, and history of delay (if any) over the duration of the project
- If there were any peak traffic periods exceeding the predicted
- Frequency of legitimate complaints and the nature of those complaints
- Types and numbers of crashes that occurred during construction
- Types and numbers of safety service patrols incidents
- The level of success and performance log for each strategy of the TMP implemented
- Recommended or suggested improvements or changes for similar future projects

## **Attachment A**

## USH 41 Traffic Study – Winnebago County Base Year 2005 Traffic Volume Network

TO: Tom Buchholz/WisDOT Northeast Region

FROM: Andrea Guptail/CH2M HILL  
Brian Roper/ CH2M HILL

CC: Rich Coakley/ CH2M HILL

DATE: June 7, 2006

RE: Project I.D. 1120-11-03  
STH 26 – Breezewood Lane

### Introduction

This memo summarizes existing traffic volumes within the study area. Figures depicting the traffic volumes are included in Appendices A-C. The study area extends from ½ mile south of the STH 26 interchange to ½ mile north of the Breezewood Lane interchange, a distance of 15 miles. The USH 41 mainline, ramps, and crossroads between STH 26 and Breezewood Lane, are included with the following interchanges:

- STH 26
- STH 44
- 9<sup>th</sup> Avenue
- STH 21
- USH 45
- STH 76
- Breezewood Lane

In addition, traffic data was collected at the CTH E overpass and along frontage roads near the USH 45 interchange.

### Traffic Data Collection

In the fall of 2005, traffic data were collected throughout the study area. Twelve-hour turning movement counts were conducted at thirty-three intersections by staff from TranSmart Technologies, Inc. (TranSmart).

Mainline, ramp, and crossroad data was collected by Traffic Analysis and Design, Inc. (TAD) staff using Peek ADR 1000 automatic traffic recorders and by WisDOT staff at Automatic Traffic Recorder (ATR) stations located on USH 41. TAD's mainline and ramp setups were meant to collect classification counts, while the crossroad locations only collected the total number of vehicles. Most of the mainline locations were recounted in May 2006.

## Base Year Network Development

After the traffic data was collected, the individual values were reviewed for reasonableness and consistency. This process included comparison of daily, AM peak hour, and PM peak hour values to the 2004 Wisconsin Highway Traffic Volume Data book and to the 2000 base year network from the previous study. In addition, peak hour volumes from the turning movement counts were compared to the USH 41 ramp counts.

At the USH 41 mainline locations counted by TAD in the fall of 2005, the volumes were significantly lower than counts taken in previous years. Upon further review and discussion, it was determined that the setup used to collect classification data for both lanes simultaneously had unwittingly resulted in significant undercounting. As a result, the ATR data was used with the ramp volumes to synthesize the remaining mainline data. Many of these synthesized values were revised upward slightly after considering the factored recounts collected in May 2006.

This data was applied to the study network, with adjustments made as necessary to the individual values to achieve balanced traffic. The balanced AADT volumes for the mainline sections and ramps are shown in Appendix A. The AM and PM peak period traffic volumes for the mainline sections and ramps are shown in Appendix B. For the seven interchange crossroads and the two other locations, AM and PM peak period traffic volumes are shown in Appendix C.

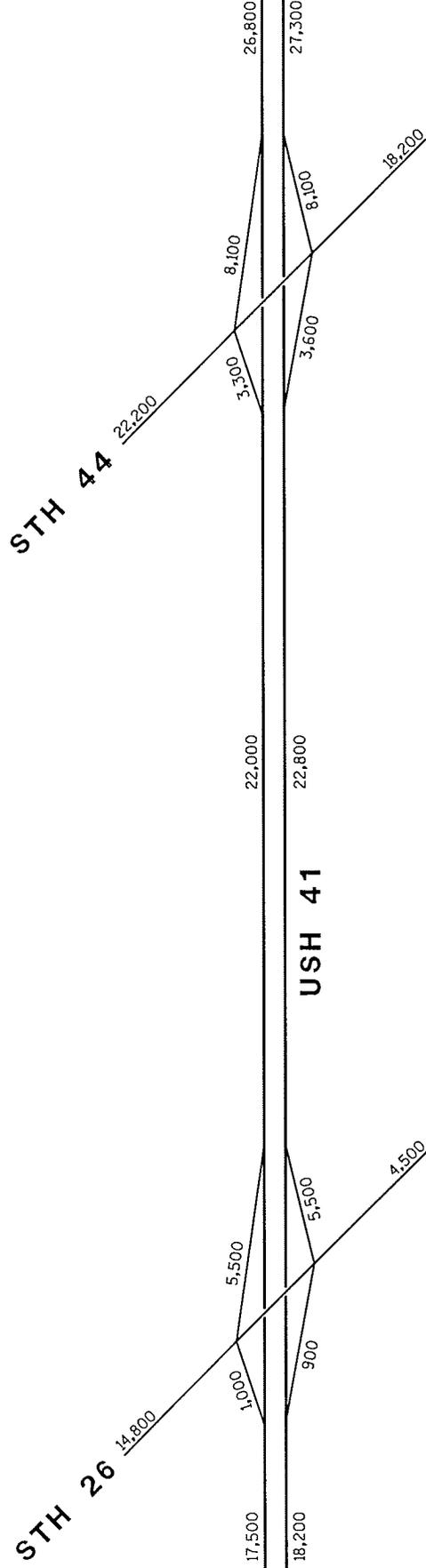
# Appendix A

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## Existing AADT Traffic Volumes Summary Figures



NOT TO SCALE



**USH 41 Traffic Study**  
**Year 2005 Average Daily Traffic**  
**STH 26 to STH 44**  
 Winnebago County  
 Figure A-1

**LEGEND**  
 000 Balanced Annual Average Weekday Traffic

PREPARED JUNE 2006





**USH 41 Traffic Study**  
**Year 2005 Average Daily Traffic**  
**STH 76**  
Winnebago County  
Figure A-3

**LEGEND**  
000 Balanced Annual Average Weekday Traffic

PREPARED JUNE 2006



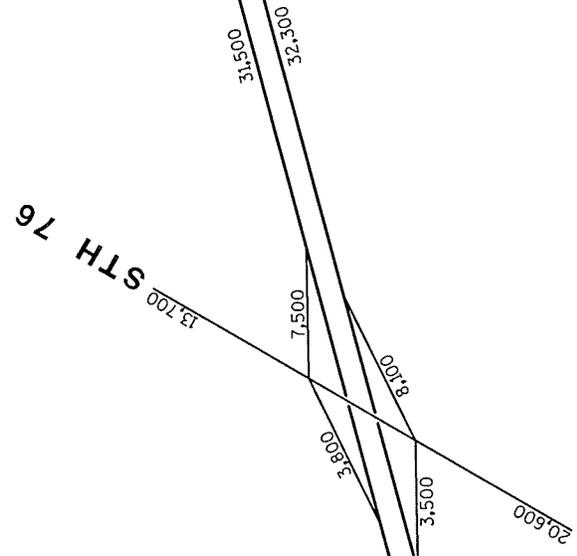
NOT TO SCALE

STH 76

FOUNTAIN AVENUE

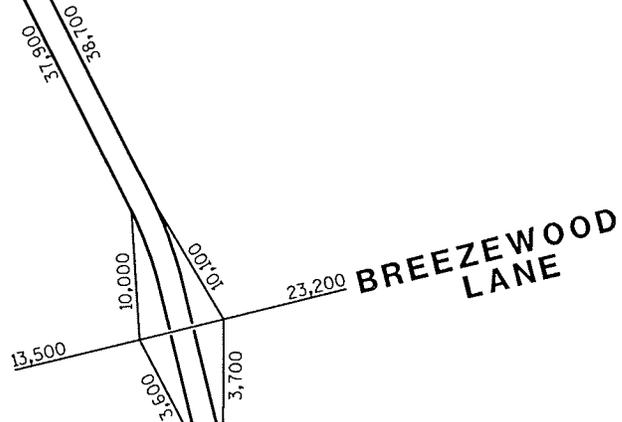
USH 41

SNELL ROAD





NOT TO SCALE



USH 41 Traffic Study  
 Year 2005 Average Daily Traffic  
 Breezewood Lane  
 Winnebago County  
 Figure A-4

**LEGEND**  
 000 Balanced Annual Average Weekday Traffic

PREPARED JUNE 2006

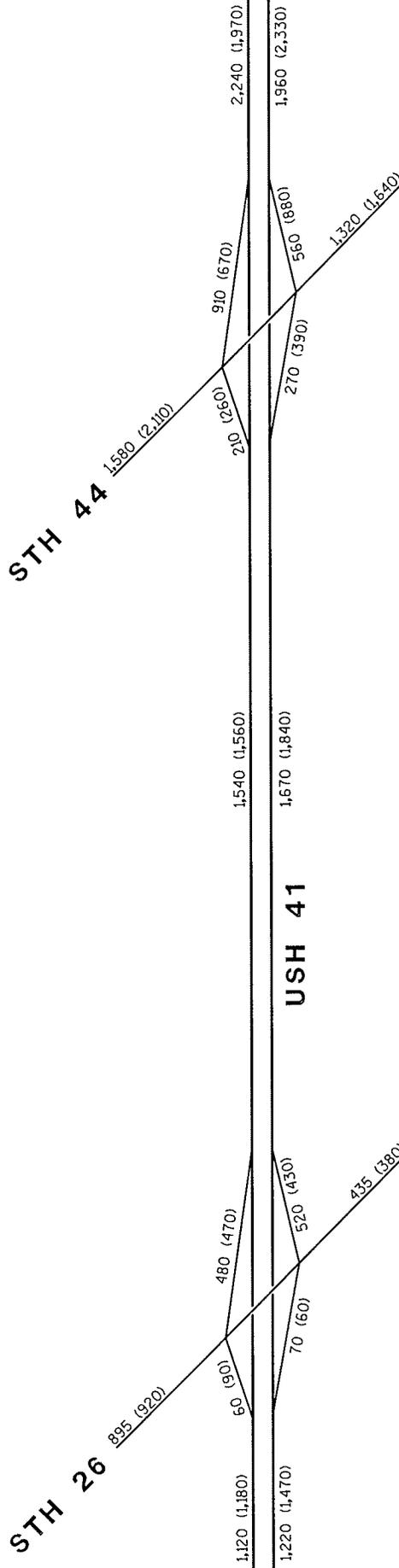
# Appendix B

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## Existing Mainline and Ramp AM and PM Peak Hour Volumes Summary Figures



NOT TO SCALE



**LEGEND**  
 000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)

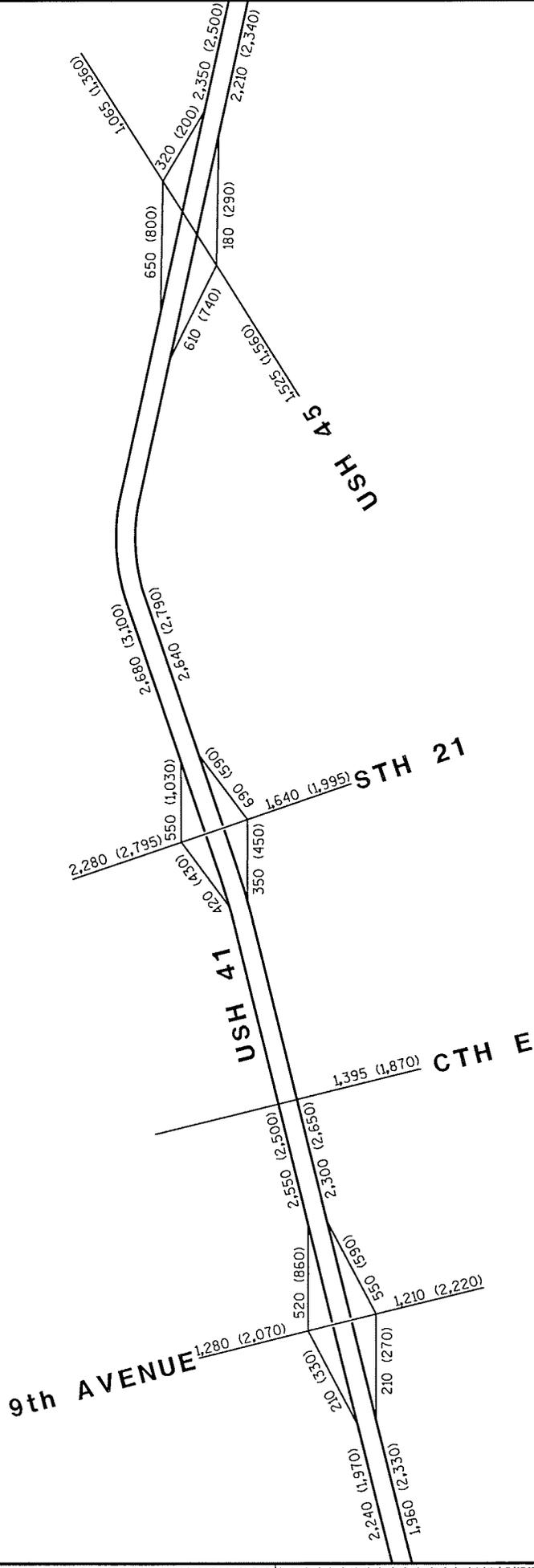


**USH 41 Traffic Study**  
**Year 2005 Peak Hour Traffic**  
**STH 26 to STH 44**  
 Winnebago County  
 Figure B-1

PREPARED JUNE 2006



NOT TO SCALE



**USH 41 Traffic Study**  
**Year 2005 Peak Hour Traffic**  
**9th Avenue to USH 45**  
 Winnebago County  
 Figure B-2

**LEGEND**  
 000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)

PREPARED JUNE 2006



**USH 41 Traffic Study**  
**Year 2005 Peak Hour Traffic**  
**STH 76**  
 Winnebago County  
 Figure B-3



NOT TO SCALE

STH 76

1,035 (1,055)

2,110 (2,930)

0,018 (2,043)

710 (760)

350 (330)

750 (750)

320 (280)

1,885 (1,905)

FOUNTAIN AVENUE

20 (20)

2,350 (2,500)

2,210 (2,340)

575 (619)

SNELL ROAD

USH 41

**LEGEND**  
 000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)

PREPARED JUNE 2006



NOT TO SCALE

1,340 (1,360)  
930 (700)  
370 (500)  
340 (400)

USH 41

2,710 (2,930)  
2,640 (2,810)

2,110 (2,210)  
130 (1,080)  
BREEZEWOOD LANE



**USH 41 Traffic Study**  
**Year 2005 Peak Hour Traffic**  
**Breezewood Lane**

Winnebago County  
Figure B-4

**LEGEND**

000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)

PREPARED JUNE 2006

LEVELS ON - 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63

# Appendix C

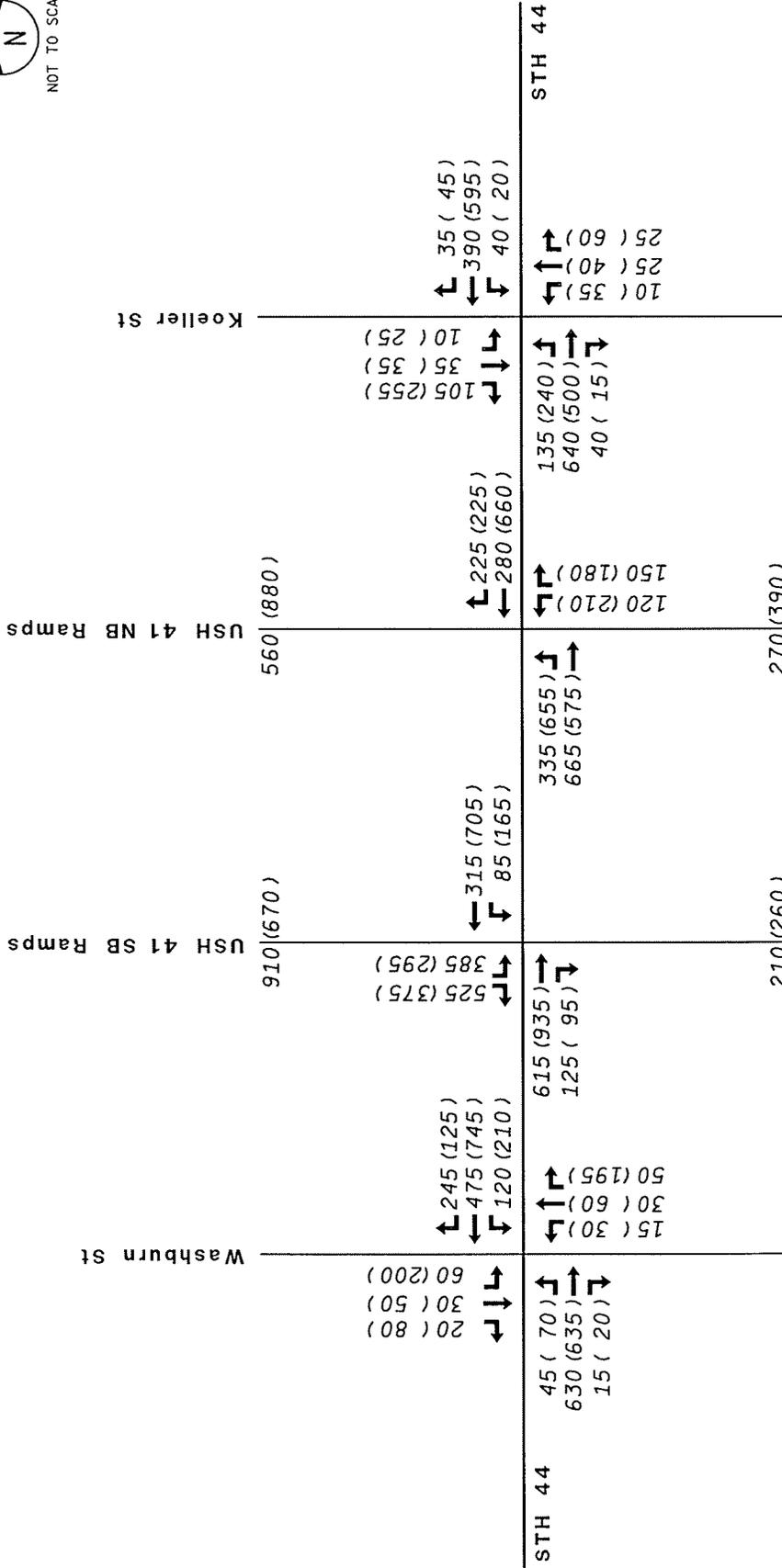
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## Existing Intersection AM and PM Peak Hour Volumes Summary Figures





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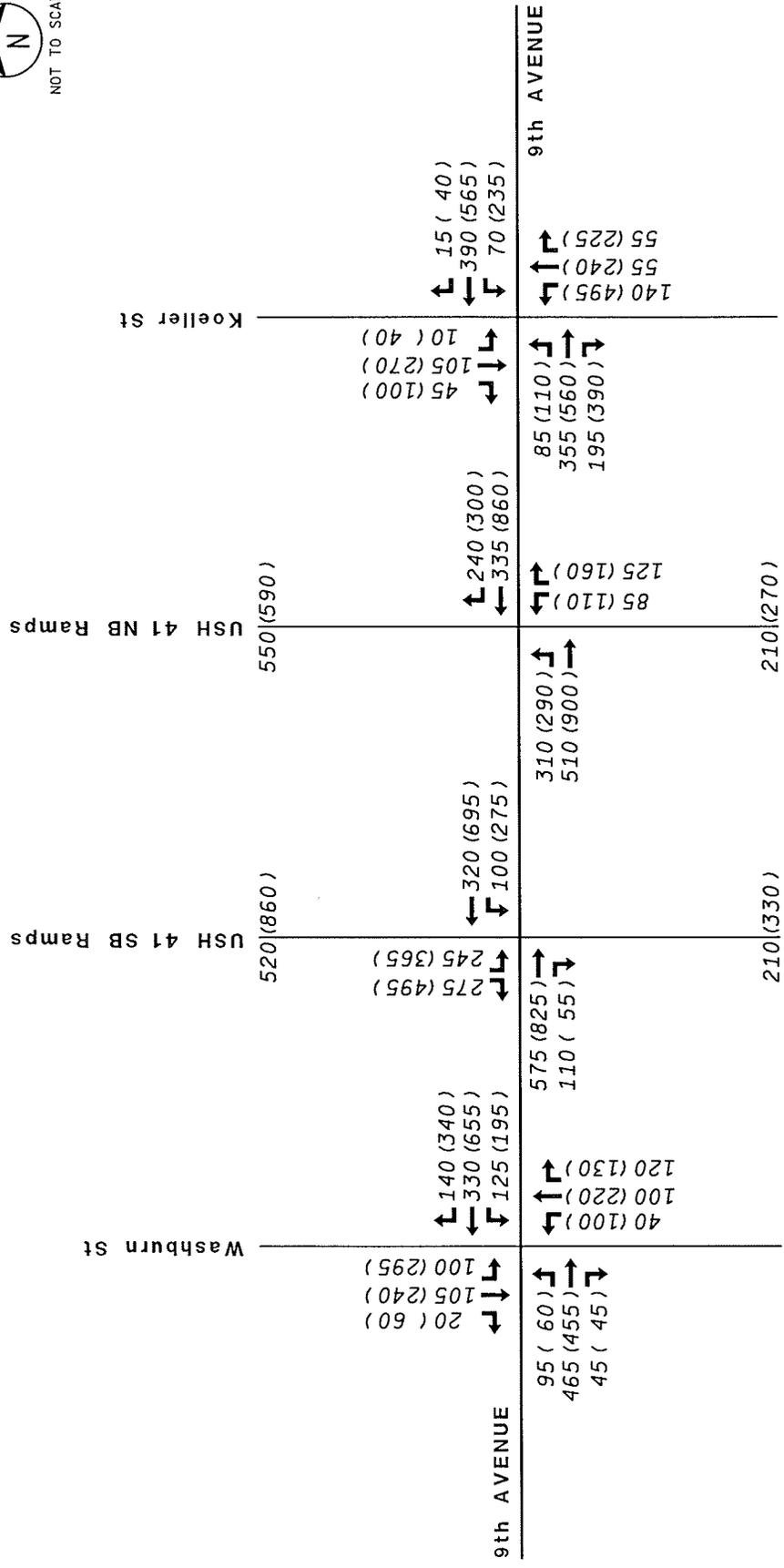
**USH 41 Traffic Study**  
**Year 2005 Peak Hour Traffic**  
**Along STH 44**  
 Winnebago County  
 Figure C-2

**LEGEND**  
 000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)

PREPARED JUNE 2006



NOT TO SCALE



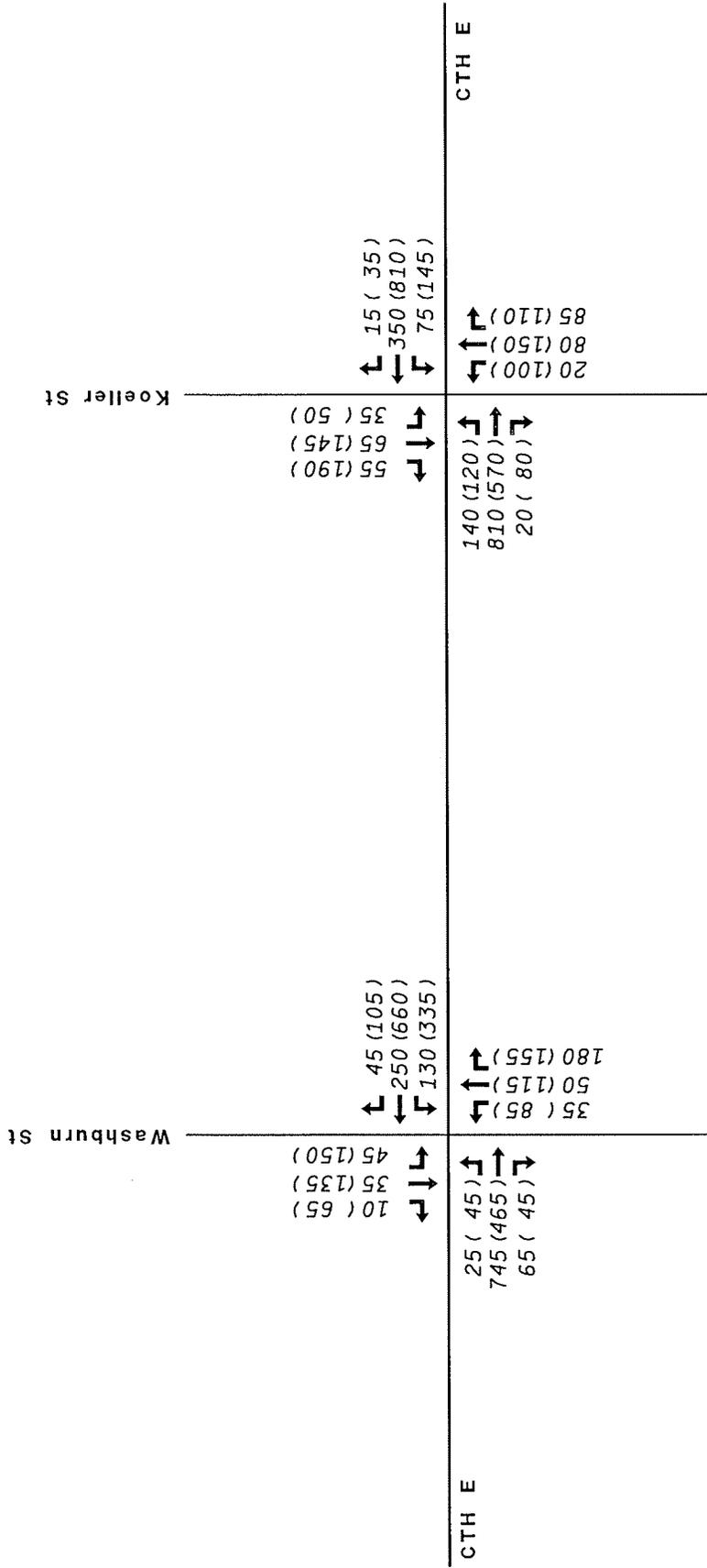
**USH 41 Traffic Study**  
**Year 2005 Peak Hour Traffic**  
**Along 9th Avenue**  
 Winnebago County  
 Figure C-3

**LEGEND**  
 000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)

PREPARED JUNE 2006



NOT TO SCALE



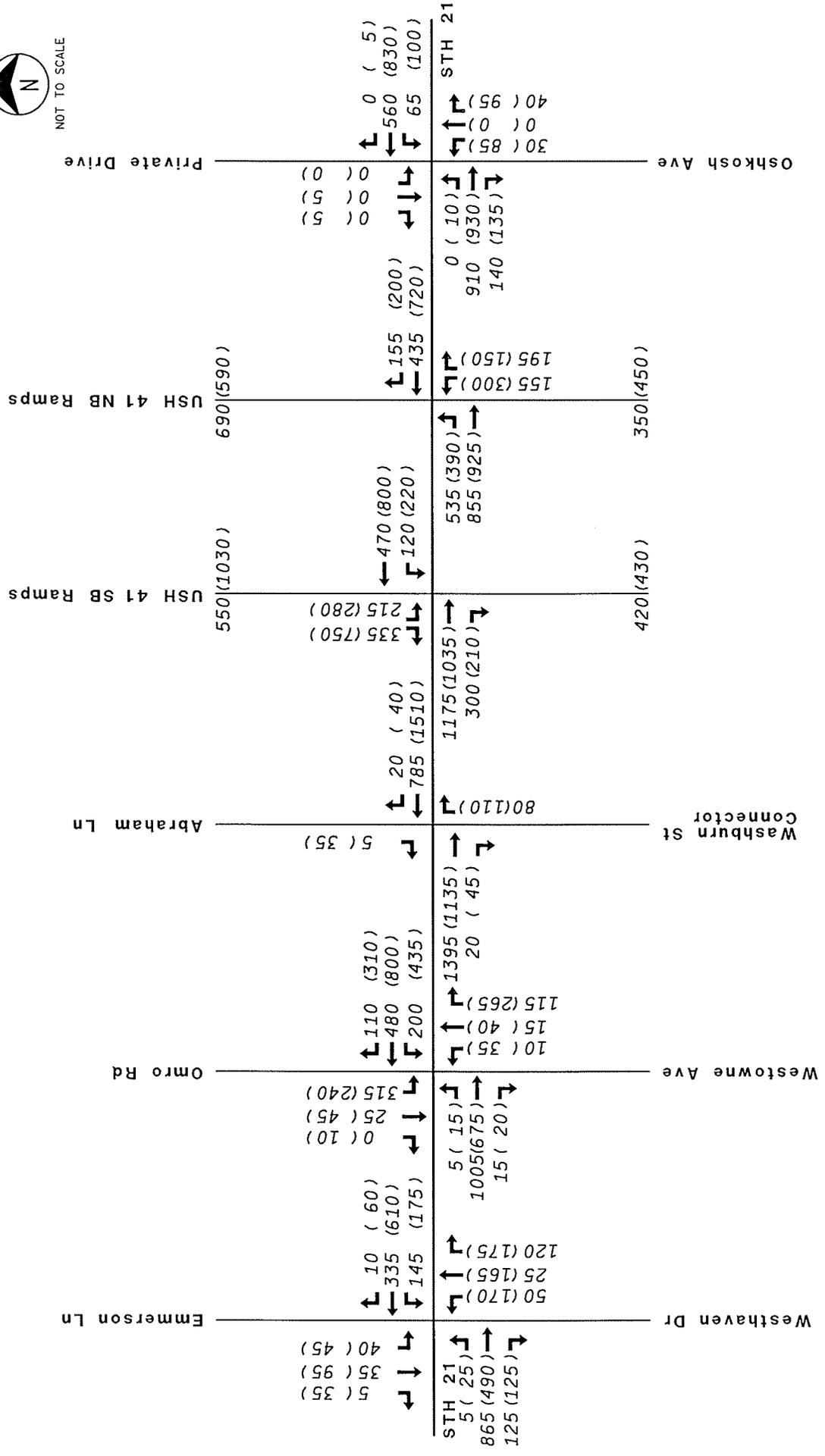
**U.S. 41 Traffic Study**  
**Year 2005 Peak Hour Traffic**  
**Along CTH E**  
 Winnebago County  
 Figure C-4

**LEGEND**  
 000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)

PREPARED JUNE 2006



NOT TO SCALE



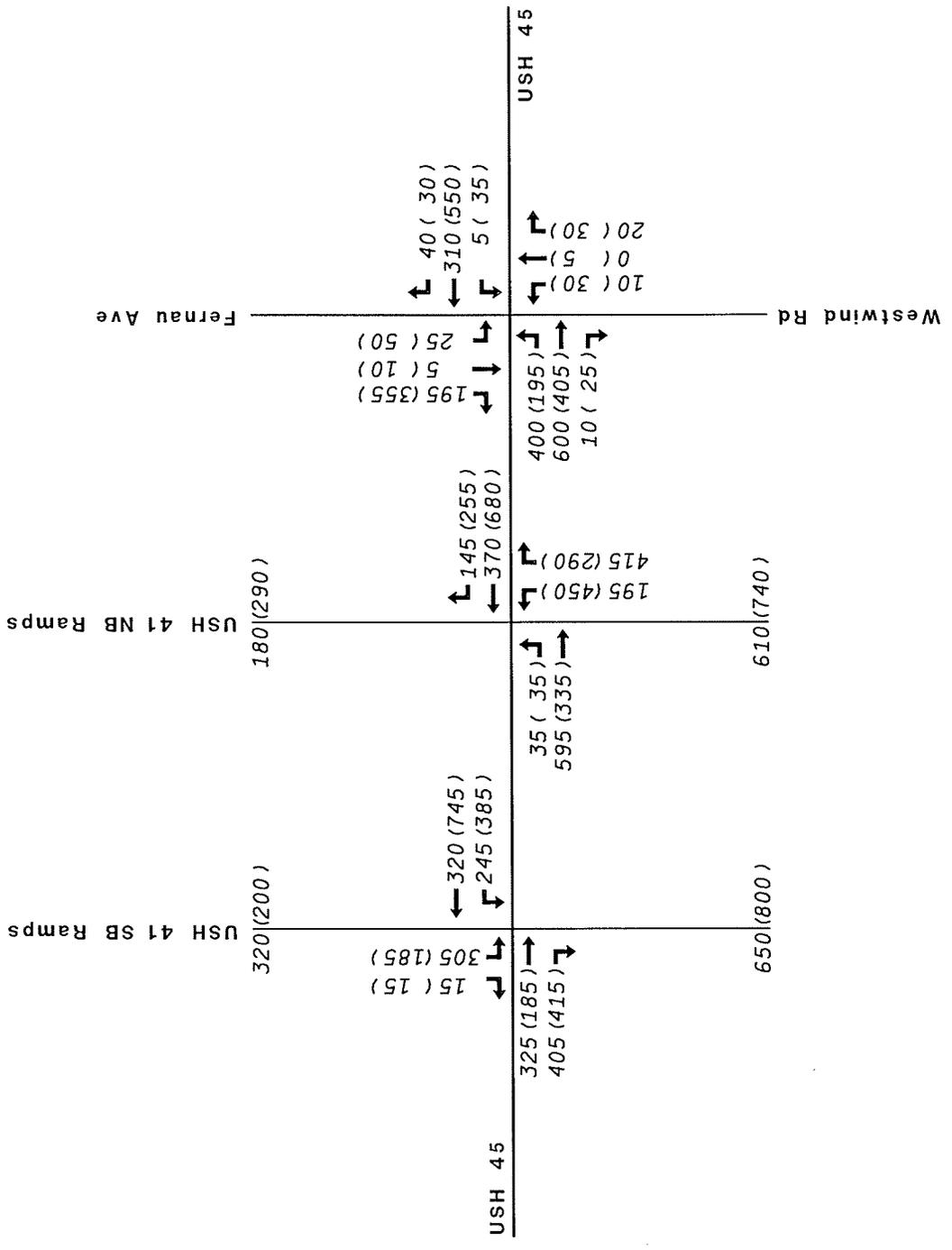
**USH 41 Traffic Study**  
**Year 2005 Peak Hour Traffic**  
**Along STH 21**  
 Winnebago County  
 Figure C-5

**LEGEND**  
 000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)

PREPARED JUNE 2006



NOT TO SCALE



**USH 41 Traffic Study**  
**Year 2005 Peak Hour Traffic**  
**Along USH 45**  
 Winnebago County  
 Figure C-6

**LEGEND**  
 000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)

PREPARED JUNE 2006



NOT TO SCALE

Green Valley

10 ( 10 )  
0 ( 0 )



Fountain Ave

10 ( 10 )  
0 ( 0 )



0 ( 0 )



USH 41 SB

USH 41 NB

170 ( 265 )  
80 ( 105 )



Snell Road



225 ( 110 )  
5 ( 15 )



Vinland Street



20 ( 15 )  
100 ( 130 )

**LEGEND**

000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)

USH 41 Traffic Study  
Year 2005 Peak Hour Traffic  
Along Fountain Avenue & Snell Road  
Winnebago County  
Figure C-7

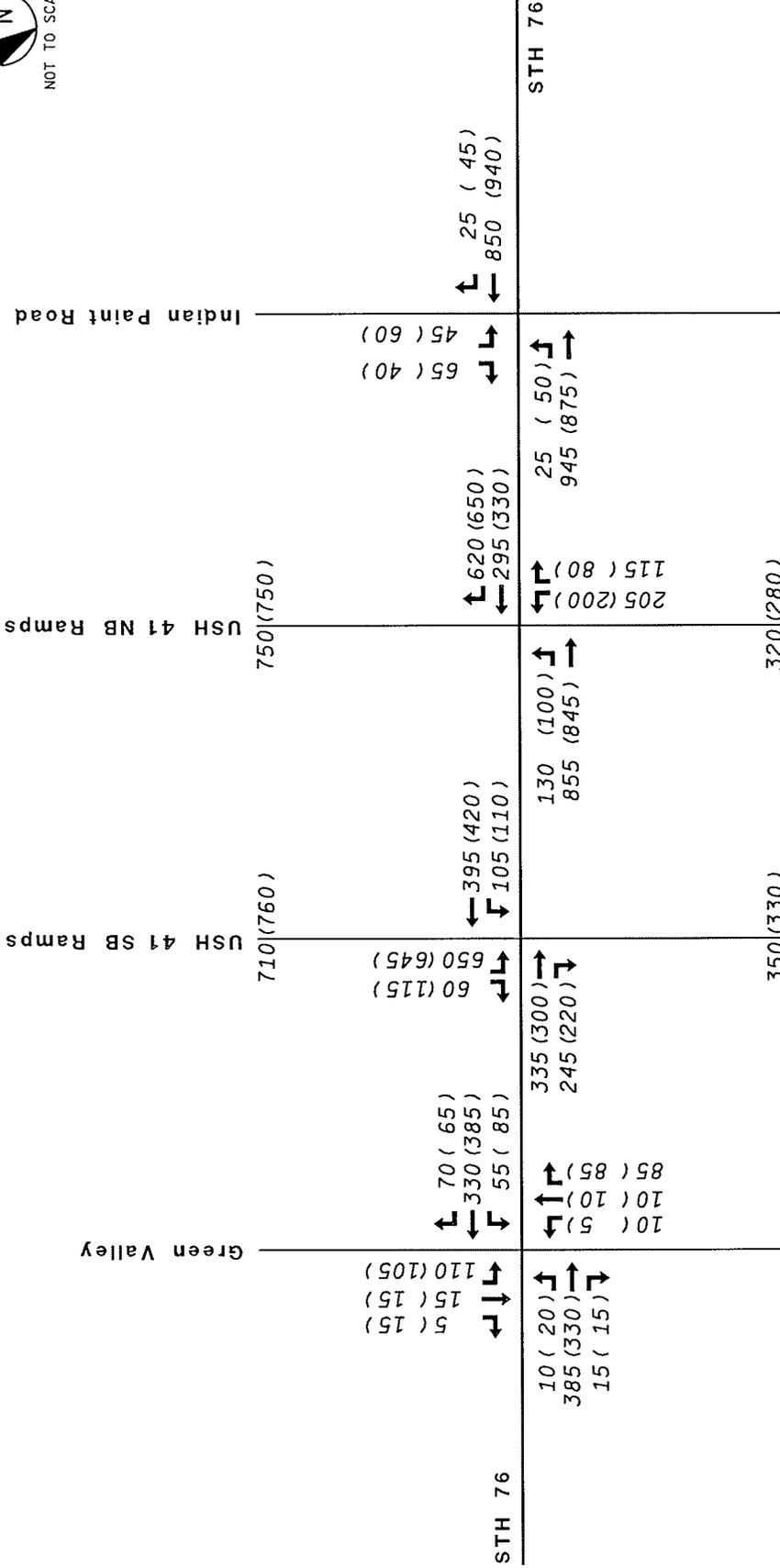


PREPARED JUNE 2006

LEVELS 0W - 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63



NOT TO SCALE



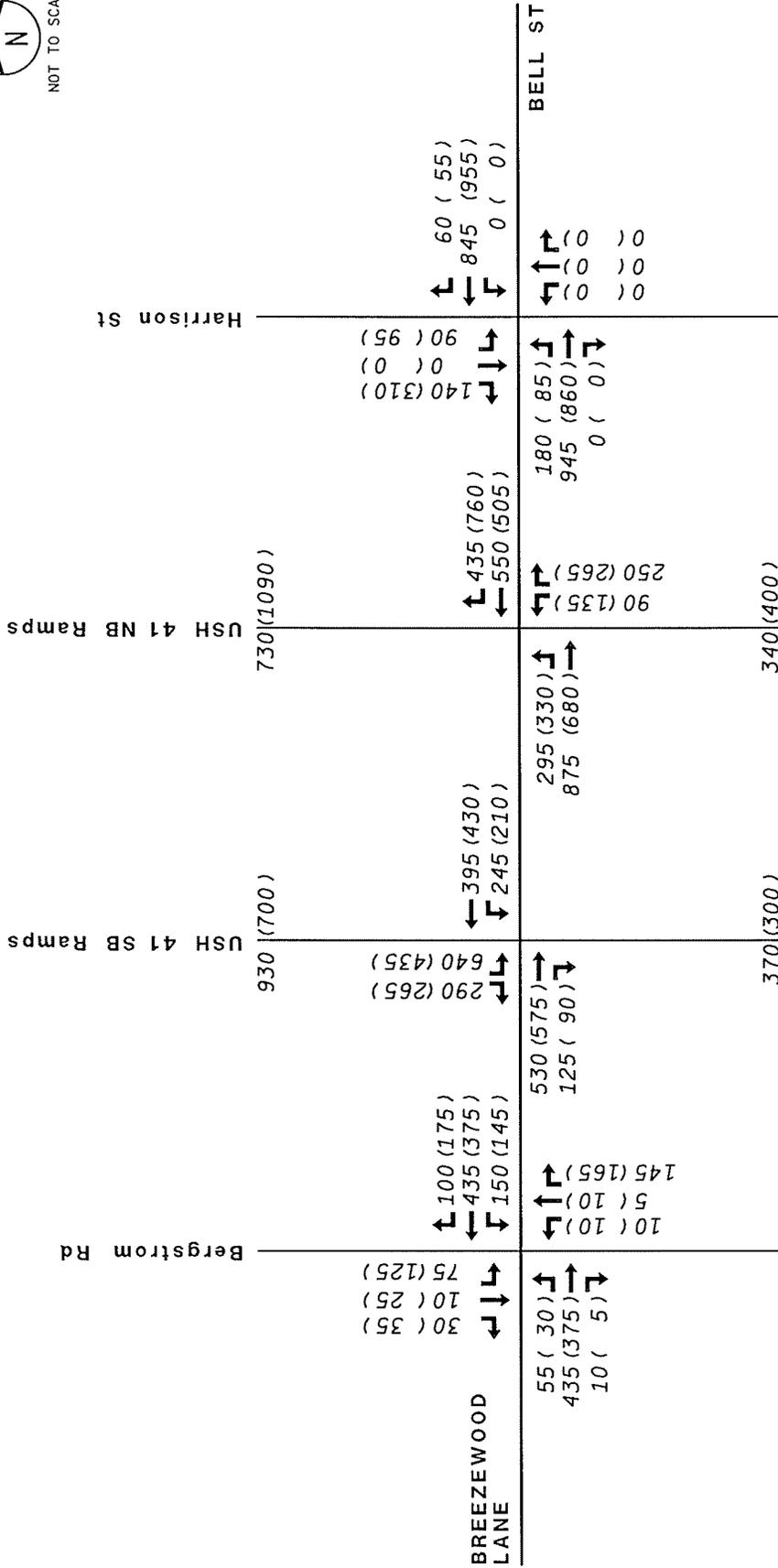
**USH 41 Traffic Study**  
**Year 2005 Peak Hour Traffic**  
**Along STH 76**  
 Winnebago County  
 Figure C-8

**LEGEND**  
 000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)

PREPARED JUNE 2006



NOT TO SCALE



**USH 41 Traffic Study**  
**Year 2005 Peak Hour Traffic**  
**Along Breezewood Lane**  
 Winnebago County  
 Figure C-9

**LEGEND**  
 000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)

PREPARED JUNE 2006

## **Attachment B**

# USH 41 Traffic Study – Winnebago County Year 2035 Traffic Operations Analysis

PREPARED FOR: Tom Buchholz/WisDOT Northeast Region

PREPARED BY: Brian Roper/CH2M HILL  
Andrea Guptail/CH2M HILL  
Marcus Januario/CH2M HILL

COPIES: Rich Coakley/CH2M HILL

DATE: September 29, 2006

RE: Project I.D. 1120-11-03  
STH 26 – Breezewood Lane

## Introduction

This memorandum summarizes Year 2035 traffic operations analysis within the study area. The USH 41 traffic study corridor extends from 0.5 mile south of the STH 26 interchange to 0.5 mile north of the Breezewood Lane interchange, a distance of 15 miles. The study encompassed freeway, ramp, and crossroad facilities at the following interchanges:

- STH 26
- STH 44
- 9th Avenue
- STH 21
- USH 45
- STH 76
- Breezewood Lane/Bell Street  
(Breezewood/Bell)

In addition, traffic operations were analyzed at the CTH E and Fountain/Snell overpasses.

Operational analyses were based on the Transportation Research Board's *Highway Capacity Manual* (HCM, 2000) procedures. The reader is referred to the HCM for a more detailed description of the analysis procedures. Figures depicting the traffic volumes and analysis results are included in the appendixes of this memorandum.

## Future Traffic Data Development

Using data collected in the fall of 2005 and the spring of 2006, a balanced base year network was developed for the USH 41 corridor. This task was discussed in the *USH 41 Traffic Study – Winnebago County Base Year 2005 Traffic Volume Network* memorandum.

Year 2035 forecasts were developed and accepted after a thorough review of estimates provided by the East Central Wisconsin Regional Planning Commission and Wisconsin Department of Transportation's (WisDOT's) Traffic Forecasting Section. This task was discussed in the *USH 41 Traffic Study – Winnebago County Forecasted Traffic Volume Network* memorandum.

The 2035 forecasts included the AM peak period, the PM peak period (approximately K100), and the 30th highest (K30) design hour volume. The K30 mainline forecasts were developed

by applying the appropriate K30 percentage from WisDOT's Estimated Design Hourly Traffic Volume Percentages for Wisconsin State Trunk Highways (1996) to the Year 2035 average annual daily traffic (AADT) forecasts. In addition, a review of recent data for six similar six-lane freeway ATR sites confirmed the validity of these values.

## Level of Service

The primary metric by which transportation professionals assess traffic operations is level of service (LOS). The HCM contains the specific methodologies used to calculate this metric for various facility types (freeway sections, ramps, signalized intersections, and unsignalized intersections). Chapter 2 includes the following definition:

*Quality of service requires quantitative measures to characterize operational conditions within a traffic stream. Level of service (LOS) is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.*

*Six LOS are defined for each type of facility that has analysis procedures available. Letters designate each level, from A to F, with LOS A representing the best operating conditions and LOS F the worst. Each level of service represents a range of operating conditions and the driver's perception of those conditions. Safety is not included in the measures that establish service levels.*

*Most design or planning efforts typically use service flow rates of LOS C or D to ensure an acceptable operating service for facility users.*

The quantitative measures for LOS vary among various facility types. For freeway facilities, LOS declines as density increases, with a corresponding speed decrease. One of the Federal Highway Administration's (FHWA's) interstate standards is that a complete reconstruction should result in LOS C or better for the 30th highest hourly volume of the design year (K30). For unsignalized and signalized intersections, LOS declines as the vehicle delay increases. In those cases, LOS D for the AM and PM peak periods has been established as the minimum benchmark of acceptability. Any location falling below that threshold would require some type of corrective action (such as added turn lanes, signalization, or added travel lanes) to return to acceptable operations.

## Mainline Operational Analysis Procedures

The study corridor includes two types of analyses: basic freeway sections and ramp junctions. The performance measures for each are described below.

### Basic Freeway Sections Performance Measures

Chapter 23 of the HCM defines the methodology and applications pertinent to basic freeway sections. An excerpt from the discussion of LOS is presented below.

*A basic freeway segment can be characterized by three performance measures: density in terms of passenger cars per mile per lane, speed in terms of mean passenger-car speed, and volume-to-capacity (v/c) ratio. Each of these measures is an indication of how well traffic flow is being accommodated by the freeway.*

*The measure used to provide an estimate of level of service is density. The three measures of speed, density, and flow or volume are interrelated. If values for two of these measures are known, the third can be computed.*

Table 1 summarizes the range of density used to define LOS for basic freeway segments.

## Ramp Junction Performance Measures

Chapter 25 of the HCM (2000) defines the methodology and applications pertinent to ramps and ramp junctions. An excerpt from the discussion of level of service is presented below.

*LOS in merge (and diverge) influence areas is determined by density for all cases of stable operation, represented by LOS A through E. LOS F exists when the total flow departing from the merge area (v) exceeds the capacity of the downstream freeway segment. No density will be predicted for such cases. Refer to Chapter 22 for procedures to analyze LOS F conditions.*

Table 2 summarizes the range of density values used to define LOS for ramp-freeway junctions.

## Capacity Analysis Data Inputs and Assumptions

Proposed lane arrangements and ramp spacing dimensions along USH 41 were obtained from the 2002 functional plan set. This information was supplemented with the latest preliminary designs under development by the design teams for the central (CTH E to Fountain Avenue/Snell Road) and north (Fountain Avenue/Snell Road to Breezewood/Bell) sections of the corridor. The Year 2006 and 2009 improvements to STH 76 also were incorporated. Roadway geometric and traffic inputs required for the capacity analyses were obtained from that source and from the data collected and reviewed for this study.

The following parameters were used in the freeway mainline analysis of future conditions:

- Ideal free-flow speed = 70 miles per hour (mph), varied by operational observations and characteristics
- Level terrain and 12-foot lane widths
- 0 percent recreational vehicles

TABLE 1  
LOS for Basic Freeway Segments

Level of Service	Density Range (pc/mi/ln)
A	0 – 11.0
B	11.1 – 18.0
C	18.1 – 26.0
D	26.1 – 35.0
E	35.1 – 45.0
F	>45.0

pc/mi/ln = passenger car per mile per lane

TABLE 2  
LOS for Ramp-Freeway Junctions

Level of Service	Maximum Density (pc/mi/ln)
A	0 – 10.0
B	> 10.1 – 20.0
C	> 20.1 – 28.0
D	> 28.1 – 35.0
E	> 35.0
F	Demand exceeds capacity

- Passenger car equivalent for trucks = 1.5
- Driver population adjustment factor = 1.0 (commuter traffic)

The interchange density for each mainline freeway segment was based on the number of interchanges within a 6-mile section centered on the midpoint of the analysis segment. Table 3 presents the interchange densities for each analysis segment.

For the mainline freeway segments, average values were used for the AM and the PM peak hour factors (PHF) and truck percentages through the corridor. The factors and percentages calculated were based on the collection of previously mentioned field data.

The traffic inputs for all mainline freeway segments are summarized in Table 4.

For all ramp junctions, PHFs and individual truck percentages were calculated. A minimum PHF of 0.90 was used for the Year 2035 analyses if the base year PHF was less than 0.90. In addition, the ramp free-flow speeds were assumed to be 55 mph.

To reflect planned changes to exit and entrance ramp design, the taper ramp configurations shown in the functional plan set were not used. At STH 21 and USH 45, the latest configurations prepared by the design team were used. For the remaining interchanges, minimum values for parallel ramps were estimated using the draft roadway design criteria for the north section. For exit ramps, a minimum taper (at 15:1 for 12 feet) plus a minimum auxiliary lane length (390 feet) resulted in an overall minimum deceleration lane length of 570 feet. For entrance ramps, a minimum taper (at 30:1 for 12 feet) plus a minimum auxiliary lane length (600 feet) resulted in an overall minimum acceleration lane length of 960 feet. Table 5 summarizes these ramp inputs.

TABLE 3  
USH 41 Mainline Interchange Densities

Segment	Interchange Density
South of STH 26	0.00
STH 26	0.33
STH 26 to STH 44	0.50
STH 44	0.50
STH 44 to 9th Avenue	0.50
9th Avenue	0.67
9th Avenue to STH 21	0.67
STH 21	0.67
STH 21 to USH 45	0.50
USH 45	0.33
USH 45 to STH 76	0.50
STH 76	0.33
STH 76 to Breezewood/Bell	0.33
Breezewood/Bell	0.50
North of Breezewood/Bell	0.50

TABLE 4  
USH 41 Mainline Traffic Inputs

	AM	PM	K30
Peak Hour Factor (PHF)	0.91	0.95	0.96
Truck Percentage	13%	11%	11%

TABLE 5  
Ramp Traffic Inputs

Interchange Ramp Location		AM				PM			
		PHF	Truck %	End of Taper to Gore (ft)	Free Flow Speed	PHF	Truck %	End of Taper to Gore (ft)	Free Flow Speed
<b>STH 26</b>	NB Off	0.96	13	570	55	0.90	13	570	55
	NB On	0.95	13	960	55	0.90	13	960	55
	SB Off	0.92	13	570	55	0.93	13	570	55
	SB On	0.90	13	960	55	0.90	13	960	55
<b>STH 44</b>	NB Off	0.90	13	570	55	0.93	10	570	55
	NB On	0.92	10	960	55	0.90	10	960	55
	SB Off	0.90	11	570	55	0.92	8	570	55
	SB On	0.90	13	960	55	0.90	11	960	55
<b>9th Avenue</b>	NB Off	0.90	9	570	55	0.90	5	570	55
	NB On	0.94	4	960	55	0.90	3	960	55
	SB Off	0.90	4	570	55	0.94	4	570	55
	SB On	0.90	11	960	55	0.90	4	960	55
<b>STH 21</b>	NB Off	0.90	11	570	55	0.91	5	570	55
	NB On	0.90	13	*	55	0.93	10	*	55
	SB Off	0.90	8	**	55	0.94	5	**	55
	SB On	0.90	7	960	55	0.91	5	960	55
<b>USH 45</b>	NB Off	0.90	13	**	55	0.93	13	**	55
	NB On	0.90	13	960	55	0.90	6	960	55
	SB Off	0.90	7	215	55	0.90	7	215	55
	SB On	0.91	13	*	55	0.90	13	*	55
<b>STH 76</b>	NB Off	0.90	13	570	55	0.93	13	570	55
	NB On	0.90	9	960	55	0.90	6	960	55
	SB Off	0.90	9	570	55	0.92	8	570	55
	SB On	0.90	13	960	55	0.90	12	960	55
<b>Breezewood/ Bell</b>	NB Off	0.90	13	570	55	0.92	10	570	55
	NB On	0.90	13	960	55	0.90	9	960	55
	SB Off	0.90	9	570	55	0.91	13	570	55
	SB On	0.93	9	960	55	0.90	4	960	55

\* A lane add condition.

\*\* A major diverge condition.

## Mainline Operational Analysis Results

Results of the Year 2035 AM and PM peak period analyses for basic freeway segments and ramps are summarized on Figures A1 through A4 in Appendix A.

### USH 41 Mainline Analysis Results

Operational performance measures recorded for the mainline, *density* and *speed*, are listed with the AM and PM peak LOS for the mainline sections in Table 6.

TABLE 6  
USH 41 Mainline Freeway Analysis Results

Segment	AM Peak			PM Peak		
	LOS	Density (pc/mi/ln)	Speed (mph)	LOS	Density (pc/mi/ln)	Speed (mph)
<b>USH 41 Northbound</b>						
South of STH 26	C	19.3	70.0	C	22.2	69.7
STH 26 Off to STH 26 On	A	10.3	67.0	B	12.7	67.0
STH 26 On to STH 44 Off	B	17.9	67.0	C	18.7	67.0
STH 44 Off to STH 44 On	B	15.3	67.0	B	15.2	67.0
STH 44 On to 9th Avenue Off	C	20.3	67.0	C	22.7	66.9
9th Ave. Off to 9th Ave. On	C	18.8	66.1	C	20.8	66.1
9th Avenue On to STH 21 Off	C	23.5	66.0	C	25.7	65.6
STH 21 Off to STH 21 On	C	19.6	66.1	C	20.8	66.1
STH 21 On to USH 45 Off	C	18.6	68.5	C	18.6	68.5
USH 45 Off to USH 45 On	C	20.7	67.0	C	19.9	67.0
USH 45 On to STH 76 Off	C	22.6	66.9	C	22.6	66.9
STH 76 Off to STH 76 On	C	18.1	67.0	C	18.8	67.0
STH 76 On to Breezewood Off	C	24.2	69.0	C	24.6	68.9
Breezewood/Bell Off - On	C	19.3	67.0	C	19.0	67.0
North of Breezewood/Bell On	<b>D</b>	26.9	65.8	<b>D</b>	30.5	63.8
<b>USH 41 – Southbound</b>						
North of Breezewood/Bell Off	<b>D</b>	30.0	64.1	<b>D</b>	28.9	64.7
Breezewood/Bell Off - On	C	20.0	67.0	C	21.8	67.0
Breezewood On to STH 76 Off	C	25.3	68.5	C	25.9	68.2
STH 76 Off to STH 76 On	C	18.0	67.0	C	18.6	67.0
STH 76 On to USH 45 Off	C	23.6	66.8	C	23.7	66.8
USH 45 Off to USH 45 On	C	20.6	67.0	C	21.9	67.0
USH 45 On to STH 21 Off	C	19.3	68.5	C	21.1	68.5
STH 21 Off to STH 21 On	C	21.2	66.1	C	19.5	66.1
STH 21 On to 9th Avenue Off	<b>D</b>	26.5	65.3	C	24.4	65.9
9th Ave. Off to 9th Ave. On	C	21.2	66.1	B	16.4	66.1
9th Avenue On to STH 44 Off	C	23.0	66.9	C	19.2	67.0
STH 44 Off to STH 44 On	B	14.2	67.0	B	13.0	67.0
STH 44 On to STH 26 Off	B	16.9	67.0	B	16.2	67.0
STH 26 Off to STH 26 On	A	10.5	67.0	A	10.2	67.0
South of STH 26 On	C	18.3	70.0	C	19.0	70.0

For nearly all of the segments, USH 41 is expected to operate at LOS C or better during both peak periods. Only one segment within the corridor construction limits is expected to operate with a density 2 percent greater than the LOS C threshold. That location is USH 41 southbound between STH 21 and 9th Avenue during the AM peak period. The implementation of various traffic management strategies, such as ramp metering or other ITS, could result in the slight changes in traffic flow characteristics necessary to achieve LOS C for this segment.

The six-lane segment north of the Breezewood Lane interchange is also expected to operate at LOS D in both directions during both time periods. This segment was constructed in the mid-1990s, with no further improvements currently programmed.

A comparison of the Year 2035 AM and PM peak results with the Year 2025 results completed in 2002 revealed little to no change in expected mainline LOS throughout the corridor. Since forecasted traffic did increase between Year 2025 and 2035, the magnitude of change in LOS can be attributed to three specific differences. First, changes in the density/LOS threshold included in the 2000 HCM resulted in higher service flow rates for a given LOS. In addition, the base free-flow speed used for the 2035 analysis was increased from 65 to 70 mph. Finally, the AM and PM peak hour factors used for the 2035 analyses were increased. The cumulative effect of these changes was an increase in the maximum service flow rate for a given LOS between 50 and 222 passenger cars per hour per lane.

In addition to the AM and PM peak period analyses described above, Year 2035 mainline analysis was also conducted using the 30th highest hourly volume (K30). Operational performance measures recorded for the mainline, *density* and *speed*, are listed with the LOS in Table 7.

TABLE 7  
USH 41 Mainline Freeway Analysis Results – K30

		K30 Factor	K30 Forecast	LOS	Density (pc/mi/ln)	Speed (mph)
<b>USH 41 Northbound</b>	South of STH 26	9.65%	3500	C	18.3	70.0
	STH 26 On to STH 44 Off	9.39%	4070	C	22.3	67.0
	STH 44 On to 9th Avenue Off	9.27%	4690	C	26.0	66.2
	9th Avenue On to STH 21 Off	9.15%	4940	D	28.0	64.7
	STH 21 On to USH 45 Off	9.08%	4980	C	20.0	68.5
	USH 45 On to STH 76 Off	9.26%	4280	C	23.5	66.8
	STH 76 On to Breezewood Off	9.18%	4600	C	24.5	68.9
	North of Breezewood/Bell On	9.06%	5270	D	30.2	63.9
<b>USH 41 – Southbound</b>	North of Breezewood/Bell Off	9.06%	5390	D	31.2	63.3
	Breezewood On to STH 76 Off	9.18%	4800	C	25.7	68.3
	STH 76 On to USH 45 Off	9.26%	4470	C	24.6	66.6
	USH 45 On to STH 21 Off	9.08%	5410	C	21.7	68.4
	STH 21 On to 9th Avenue Off	9.15%	5090	D	29.1	64.1
	9th Avenue On to STH 44 Off	9.27%	4600	C	25.4	66.4
	STH 44 On to STH 26 Off	9.39%	3680	C	20.1	67.0
	South of STH 26 On	9.65%	3170	B	16.6	70.0

For nearly all of the segments, USH 41 is expected to operate at LOS C or better during the 30th highest hour of the design year (K30). Only one six-lane segment within the corridor construction limits (9th Avenue to STH 21) is expected to operate greater than the LOS C threshold. To address FHWA's interstate standards, the impacts and costs associated with achieving LOS C in this segment will be investigated. These potential mitigation measures will be reviewed and discussed with FHWA and WisDOT.

## USH 41 Ramp Analysis Results

Ramp merge and diverge analyses were performed at the interchanges along the corridor. Figures A-1 through A-4, in Appendix A, as well as Table 8, summarize the results of the AM and PM peak period ramp analysis.

Most of the ramps in the USH 41 corridor are expected to operate at LOS C or better in the Year 2035. Of the nine locations where LOS D is expected, four of the locations could improve to LOS C with a modest increase in the acceleration/deceleration lane length (under 145 feet).

- Northbound 9th Avenue off-ramp = +145 feet
- Northbound STH 21 off-ramp = +20 feet
- Northbound Breezewood/Bell off-ramp = +110 feet
- Southbound STH 44 off-ramp = +80 feet

Four locations would require larger increases to achieve LOS C:

- Northbound Breezewood/Bell on-ramp = +700 feet
- Southbound Breezewood/Bell off-ramp = + 530 feet
- Southbound STH 76 off-ramp = +280 feet
- Southbound 9th Avenue off-ramp = +305 feet

The final location is the southbound USH 45 ramp to USH 41. Since it is a lane add, this ramp was analyzed using HCM 2000 methodology for a basic freeway segment. While the lane add itself would operate at LOS D, the four-lane basic freeway segment over Lake Butte des Morts would operate at LOS C. Thus, no mitigation is necessary.

A comparison of the Year 2035 results in this memo with the Year 2025 results completed in 2002 revealed little to no change in expected ramp LOS throughout the corridor. Since forecasted traffic did increase between Year 2025 and 2035, the magnitude of change in LOS can be attributed to two specific differences. The mainline base free-flow speed used for the 2035 analysis was increased from 65 to 70 mph. In addition, the AM and PM peak hour factors were increased.

TABLE 8  
Ramp/Freeway Junction Analysis Results

Ramp	AM Peak		PM Peak	
	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)
STH 26 Off	B	16.3	B	18.2
STH 26 On	C	20.0	C	21.0
STH 44 Off	C	20.8	C	21.9
STH 44 On	C	21.2	C	25.5
9th Avenue Off	C	24.1	<b>D</b>	29.3
9th Avenue On	C	23.4	C	24.9
<b>USH 41 Northbound</b> STH 21 Off	C	27.2	<b>D</b>	29.8
STH 21 On	C	*	C	*
USH 45 Off	B	13.9	B	13.8
USH 45 On	C	21.8	C	22.4
STH 76 Off	C	25.8	C	25.6
STH 76 On	B	18.0	B	18.5
Breezewood/Bell Off	<b>D</b>	28.3	<b>D</b>	29.0
Breezewood/Bell On	C	26.6	<b>D</b>	32.3
Breezewood/Bell Off	<b>D</b>	32.7	<b>D</b>	31.0
Breezewood/Bell On	C	27.1	C	25.6
STH 76 Off	<b>D</b>	28.1	<b>D</b>	30.5
STH 76 On	C	24.7	C	25.0
USH 45 Off	C	22.9	C	21.9
USH 45 On	C	*	<b>D</b>	*
<b>USH 41 – Southbound</b> STH 21 Off	B	14.4	B	15.7
STH 21 On	C	26.4	C	25.7
9th Avenue Off	<b>D</b>	30.5	<b>D</b>	30.7
9th Avenue On	C	23.4	B	18.7
STH 44 Off	<b>D</b>	28.7	C	24.3
STH 44 On	B	16.9	B	16.7
STH 26 Off	C	21.3	C	20.7
STH 26 On	B	12.7	B	13.9

\* Analyzed Ramp as a Basic Freeway Segment

## Crossroad Intersection Operational Analysis Procedures

Thirty-two intersections within the study corridor were analyzed. For each crossroad, this typically included the intersections for each ramp terminus and each adjacent side or frontage road. The signal timings were optimized for the forecast year traffic.

### Performance Measures

As noted earlier, LOS is used as a measure of a roadway's operational performance. LOS designations for intersections are related to the average delay each vehicle experiences while passing through in intersection. WisDOT typically designates LOS D as the minimum acceptable LOS for intersection traffic operations. Table 9 summarizes LOS designations for signalized and unsignalized intersections.

TABLE 9  
Intersection LOS Designations

LOS	Signalized Intersections	Unsignalized Intersections (Two-Way Stop Controlled)
	Average Delay per Vehicle (s/veh) for All Entering Traffic	Average Delay per Vehicle (s/veh) for Each Minor Movement
A	< 10.0	< 10.0
B	10.1 – 20.0	10.1 – 15.0
C	20.1 – 35.0	15.1 – 25.0
D	35.1 – 55.0	25.1 – 35.0
E	55.1 – 80.0	35.1 – 50.0
F	> 80.0	> 50.0

### Capacity Analysis Data Inputs and Assumptions

Proposed lane arrangements were obtained from the functional plan set completed in 2002. This information was supplemented with the latest preliminary designs under development by the design teams for the central (CTH E to Fountain Avenue/Snell Road) and north (Fountain Avenue/Snell Road to Breezewood/Bell) sections of the corridor. The Year 2006 and 2009 improvements to STH 76 also were incorporated.

Based on a review of existing turning movement counts and interim year traffic forecasts, the region has added three traffic signal installations to those shown in the functional plans. Two of the locations are at the STH 26 interchange (southbound ramps and northbound ramps). The third location is at the STH 76 interchange (Green Valley).

Timing data required for the capacity analyses were obtained from the signal design plans. For all intersections, individual PHFs and truck percentages were calculated. A minimum peak hour factor of 0.90 was used for the Year 2035 analyses if the base year factor was less than 0.90. Table 10 summarizes the various PHF and truck percentage parameters used at each intersection.

TABLE 10  
Intersection Traffic Inputs

Crossroad Intersections		AM					PM				
		PHF	Truck % Approach				PHF	Truck % Approach			
			EB	WB	NB	SB		EB	WB	NB	SB
<b>STH 26</b>	Planeview Drive	0.90	16	19	61	20	0.94	15	18	34	5
	USH 41 Southbound ramps	0.90	22	15	X	13	0.92	17	10	X	15
	USH 41 Northbound ramps	0.90	22	4	26	X	0.90	12	5	12	X
	Black Oak School Road	0.94	6	2	9	0	0.90	2	8	0	7
<b>STH 44</b>	Washburn Street	0.90	10	13	16	14	0.90	9	7	3	2
	USH 41 Southbound ramps	0.90	12	13	X	8	0.91	6	5	X	7
	USH 41 Northbound ramps	0.91	6	8	12	X	0.90	6	2	8	X
	Koeller Street	0.92	2	2	4	4	0.92	4	3	1	3
<b>9th Avenue</b>	Washburn Street	0.90	0	2	2	1	0.99	1	1	1	2
	USH 41 Southbound ramps	0.90	2	2	X	5	0.93	1	0	X	1
	USH 41 Northbound ramps	0.90	4	4	7	X	0.91	1	1	2	X
	Koeller Street	0.90	2	1	5	0	0.93	1	1	1	0
<b>CTH E</b>	Washburn Street	0.90	2	4	4	3	0.90	1	1	1	1
	Koeller Street	0.90	1	5	2	3	0.90	1	2	1	1
<b>STH 21</b>	Westhaven Drive/ Emmers Lane	0.95	4	9	5	4	0.91	3	3	1	1
	Washburn Street/ Brooks Lane	0.92	2	5	1	0	0.96	5	2	1	0
	USH 41 Southbound ramps	0.92	4	6	X	9	0.96	3	1	X	1
	USH 41 Northbound ramps	0.91	3	2	7	X	0.96	3	1	3	X
	Oshkosh Avenue/ Koeller Street	0.91	3	3	0	0	0.96	1	1	2	0
<b>USH 45</b>	USH 41 Southbound ramps	0.90	X	5	19	10	0.94	X	6	5	12
	USH 41 Northbound ramps	0.90	3	9	9	X	0.90	4	3	12	X
	Lake Butte des Morts Drive/ Fernau Avenue	0.90	7*	7*	8	3	0.92*	7*	7*	4	7

TABLE 10  
Intersection Traffic Inputs

Crossroad Intersections		AM					PM				
		PHF	Truck % Approach				PHF	Truck % Approach			
			EB	WB	NB	SB		EB	WB	NB	SB
<b>Fountain Avenue/ Snell Road</b>	Green Valley Road	0.90	7*	7*	X	9	0.90	7*	7*	X	15
	Snell Road	0.90	7*	7*	9	X	0.90	7*	7*	7	X
<b>STH 76</b>	Green Valley Road	0.96	9	19	20	15	0.92	2	9	13	8
	USH 41 Southbound ramps	0.91	X	5	16	13	0.90	X	5	9	6
	USH 41 Northbound ramps	0.92	11	X	7	7	0.93	13	X	4	5
	Indian Point Road	0.91	X	5	6	6	0.96	X	3	4	2
<b>Breezewood/Bell</b>	Bergstrom Road	0.90	2	3	29	4	0.91	1	10	15	2
	USH 41 Southbound ramps	0.90	10	6	X	4	0.98	5	6	X	7
	USH 41 Northbound ramps	0.94	5	4	7	X	0.95	5	4	11	X
	Harrison Street	0.90	4	5	0	5	0.93	5	4	0	2

X – Movement does not exist

\* - Estimate

## Crossroad Intersections Operational Analysis Results

Capacity analysis results are depicted in Figures B1 through B9 in Appendix B. For all signalized intersections, an overall LOS could be taken from the HCM analyses. However, for unsignalized intersections, where LOS is reported for both minor and major street approaches, results are summarized only in tabular format in the following sections.

### Signalized Intersections Results

Signalized intersection analyses were performed using Version 6.0 of Synchro and optimal traffic signal timings. Table 11 summarizes level of service and the corresponding delay.

TABLE 11  
Signalized Intersection Capacity Analysis Results

Crossroad Intersections	AM		PM		
	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	
<b>STH 26</b>	USH 41 Southbound ramps	D	44.2	D	41.5
	USH 41 Northbound ramps	D	43.0	D	35.2
<b>STH 44</b>	Washburn Street	B	13.5	C	29.9
	USH 41 Southbound ramps	C	30.8	D	39.8
	USH 41 Northbound ramps	C	22.6	D	37.1
	Koeller Street	B	10.2	B	16.1
<b>9th Avenue</b>	Washburn Street	C	32.0	C	28.1
	USH 41 Southbound ramps	C	23.1	C	34.7
	USH 41 Northbound ramps	C	20.3	B	19.8
	Koeller Street	D	35.4	D	42.9
<b>CTH E</b>	Washburn Street	C	29.1	C	28.4
	Koeller Street	B	15.4	C	32.6
<b>STH 21</b>	Westhaven Drive/Emmers Lane	B	12.3	B	19.6
	Washburn Street/Brooks Lane	D	39.7	C	29.6
	USH 41 Southbound ramps	C	26.0	D	43.0
	USH 41 Northbound ramps	C	24.0	C	23.2
	Oshkosh Avenue/Koeller Street	A	5.6	A	7.0
<b>USH 45</b>	USH 41 Southbound ramps	C	26.7	B	17.3
	Lake Butte des Morts Drive/ Fernau Avenue	C	24.1	D	35.1
<b>STH 76</b>	Green Valley Road	C	22.4	C	20.7
	USH 41 Southbound ramps	C	34.7	C	32.3
	USH 41 Northbound ramps	B	18.1	B	17.4
<b>Breezewood/Bell</b>	Bergstrom Road	C	27.5	C	30.3
	USH 41 Southbound ramps	D	41.8	C	32.8
	USH 41 Northbound ramps	C	29.3	E	58.8
	Harrison Street	C	25.2	D	37.9

As highlighted in Table 11, nearly all of the signalized intersections within the study area during both the AM and PM peak periods are expected to operate with a minimum acceptable LOS D or higher. Only one intersection is expected to operate at LOS E. This location would need more mitigation, such as additional turn lanes, to improve its level of service.

Tables 12 and 13 present the queuing analysis results by approach for the dedicated turn lanes in the study area. The storage lengths estimated from the functional plans were compared against the 95th percentile AM and PM queues estimated with Synchro. For approximately one-third of the lanes, the estimated queue length exceeds the estimated storage length. At these locations, both geometric (additional turn lanes) and operational (cycle length, phase length, coordinate) improvements should be considered as the project proceeds into preliminary and final design.

### Unsignalized Intersections Results

For the two-way stop controlled intersections, the performance measures reported are LOS and delay (seconds/vehicle [sec/veh]). These measures are reported for both the major and minor street approaches. The USH 41 crossroad that interchanged with the mainline was designated as the major street, while all minor streets were either the ramps or the frontage roads.

As highlighted in Tables 14 and 15, the minor street approaches of nearly all of the two-way stop-controlled intersections are expected to operate at a LOS F during the AM and/or PM peak periods. At these locations, the minor street volumes are not expected to be high enough to warrant installation of a traffic signal.

TABLE 12  
Signalized Intersection Queuing Analysis Results – Northbound and Southbound Approach

		Northbound						Southbound					
		Left-Turn Lane(s)			Right-Turn Lane(s)			Left-Turn Lane(s)			Right-Turn Lane(s)		
Crossroad Intersection		Storage (per lane)	AM Queue	PM Queue	Storage (per lane)	AM Queue	PM Queue	Storage (per lane)	AM Queue	PM Queue	Storage (per lane)	AM Queue	PM Queue
<b>STH 26</b>	USH 41 SB ramps	X	X	X	X	X	X	⊙	161	225	120	#691	#706
	USH 41 NB ramps	⊙	#315	#410	80	#286	157	X	X	X	X	X	X
<b>STH 44</b>	Washburn Street	150	41	70	*	*	*	150	98	#354	*	*	*
	USH 41 SB ramps	X	X	X	X	X	X	⊙	258	253	400	478	#441
	USH 41 NB ramps	400	217	#474	⊙	167	174	X	X	X	X	X	X
	Koeller Street	*	*	*	90	28	43	*	*	*	90	55	85
<b>9th Avenue</b>	Washburn Street	270	52	90	80	58	92	210	82	174	*	*	*
	USH 41 SB ramps	X	X	X	X	X	X	180	187	261	⊙	246	#480
	USH 41 NB ramps	180	83	89	⊙	71	190	X	X	X	X	X	X
	Koeller Street	210	105	#369	130	28	81	240	33	80	*	*	*
<b>CTH E</b>	Washburn Street	180	54	111	175	73	74	200	74	213	*	*	*
	Koeller Street	190	39	137	*	*	*	190	61	76	*	*	*
<b>STH 21</b>	Westhaven/Emmers	100	103	#324	*	*	*	40	88	89	*	*	*
	Washburn/ Brooks	155	36	#93	⊙	268	362	⊙	#467	#372	*	*	*
	USH 41 SB ramps	X	X	X	X	X	X	440	172	159	440	222	#724
	USH 41 NB ramps	530	142	256	440	209	69	X	X	X	X	X	X
	Oshkosh/Koeller	*	*	*	⊙	23	39	*	*	*	*	*	*
<b>USH 45</b>	USH 41 SB ramps	425	181	226	X	X	X	X	X	X	X	X	X
	Lake Butte des Morts Dr./ Fernau Ave.	420	45	62	*	*	*	425	365	#314	*	*	*
<b>STH 76</b>	Green Valley Rd	130	69	98	100	31	33	130	25	45	100	24	24
	USH 41 SB ramps	400	#250	M#266	X	X	X	X	X	X	180	129	111
	USH 41 NB ramps	X	X	X	250	163	161	400	M16	M13	X	X	X
<b>Breezewood /Bell</b>	Bergstrom Road	*	*	*	90	68	61	*	*	*	*	*	*
	USH 41 SB ramps	X	X	X	X	X	X	⊙	#577	324	400	239	218
	USH 41 NB ramps	⊙	109	181	400	392	#532	X	X	X	X	X	X
	Harrison Street	*	*	*	*	*	*	*	*	*	⊙	76	#580

M – Volume for 95th percentile queue is metered by upstream signal.  
# - 95th percentile volume exceeds capacity, queue may be longer.

X – Movement does not exist  
\* - Shared Lane

⊙-Storage length equals link length

TABLE 13  
Signalized Intersection Queuing Analysis Results – Eastbound and Westbound Approach

Crossroad Intersection		Eastbound						Westbound					
		Left-Turn Lane(s)			Right-Turn Lane(s)			Left-Turn Lane(s)			Right-Turn Lane(s)		
		Storage (per lane)	AM Queue	PM Queue	Storage (per lane)	AM Queue	PM Queue	Storage (per lane)	AM Queue	PM Queue	Storage (per lane)	AM Queue	PM Queue
<b>STH 26</b>	USH 41 SB ramps	X	X	X	50	<b>187</b>	<b>#402</b>	160	M#130	M#126	X	X	X
	USH 41 NB ramps	600	<b>#1014</b>	<b>#885</b>	X	X	X	X	X	X	70	<b>#301</b>	<b>74</b>
<b>STH 44</b>	Washburn Street	280	64	#159	280	15	20	280	106	<b>#324</b>	280	33	29
	USH 41 SB ramps	X	X	X	150*	136	115	350	112	M#162	X	X	X
	USH 41 NB ramps	400	226	<b>M#504</b>	X	X	X	X	X	X	300	72	73
	Koeller Street	380	42	226	*	*	*	100	15	12	240	14	28
<b>9th Avenue</b>	Washburn Street	210	74	55	*	*	*	240	110	183	240	49	66
	USH 41 SB ramps	X	X	X	*	*	*	150	37	<b>#472</b>	X	X	X
	USH 41 NB ramps	180	<b>184</b>	<b>207</b>	X	X	X	X	X	X	150	49	<b>197</b>
	Koeller Street	170	81	95	*	*	*	180	59	<b>#203</b>	*	*	*
<b>CTH E</b>	Washburn Street	115	21	30	*	*	*	250	177	<b>339</b>	*	*	*
	Koeller Street	80	M30	89	*	*	*	255	52	104	*	*	*
<b>STH 21</b>	Westhaven /Emmers	140	6	33	240	17	32	280	<b>#289</b>	<b>#311</b>	110	5	30
	Washburn/ Brooks	240	17	36	240	34	42	400	<b>#358</b>	<b>#628</b>	⊙	8	25
	USH 41 SB ramps	X	X	X	480	84	94	⊙	211	<b>#505</b>	X	X	X
	USH 41 NB ramps	⊙	93	M129	X	X	X	X	X	X	300	69	66
	Oshkosh/Koeller	230	8	9	⊙	15	17	180	34	71	145	4	6
<b>USH 45</b>	USH 41 SB ramps	X	X	X	X	X	X	⊙	417	242	210	0	0
	Lake Butte des Morts Dr./ Fernau Ave.	350	90	124	*	*	*	100	<b>#226</b>	<b>#407</b>	⊙	0	0
<b>STH 76</b>	Green Valley Rd	*	*	*	*	*	*	*	*	*	*	*	*
	USH 41 SB ramps	X	X	X	X	X	X	400	<b>#598</b>	<b>575</b>	⊙	42	76
	USH 41 NB ramps	400	251	261	⊙	<b>#315</b>	192	X	X	X	X	X	X
<b>Breezewood /Bell</b>	Bergstrom Road	160	44	34	140	18	16	100	<b>121</b>	<b>161</b>	⊙	35	51
	USH 41 SB ramps	X	X	X	⊙	78	55	180	<b>#400</b>	<b>291</b>	X	X	X
	USH 41 NB ramps	180	<b>M206</b>	<b>#371</b>	X	X	X	X	X	X	200	<b>393</b>	<b>#799</b>
	Harrison Street	280	<b>#381</b>	<b>#219</b>	*	*	*	*	*	*	*	*	*

M – Volume for 95th percentile queue is metered by upstream signal.  
# - 95th percentile volume exceeds capacity, queue may be longer.

X – Movement does not exist  
\* - Shared Lane

⊙-Storage length equals link length

TABLE 14  
Two-Way Stop Intersection Results - AM

Year 2035								
Two-way Stop Unsignalized Intersections	Left Turn from Major Street				Minor Street Approach			
	NB or EB		SB or WB		NB or EB		SB or WB	
	Delay (sec/vh)	LOS	Delay (sec/vh)	LOS	Delay (sec/vh)	LOS	Delay (sec/vh)	LOS
STH 26/Planeview Drive	10.8	B	12.9	B	*	F	*	F
CTH N/Black Oak School Rd.	8.8	A	8.5	A	35.9	E	20.4	C
USH 45/USH 41 Northbound Ramps	N/A	N/A	11.2	B	97.4	F	N/A	N/A
Fountain Ave./Green Valley Rd.	8.5	A	N/A	N/A	N/A	N/A	19.7	C
Fountain Ave./Snell Rd.	N/A	N/A	9.2	A	67.6	F	N/A	N/A
STH 76/Indian Point Rd.	N/A	N/A	3.2	A	N/A	N/A	*	F

\*Delay exceeds analysis period, failing LOS occurring

TABLE 15  
Two-Way Stop Intersection Results – PM

Year 2035								
Two-way Stop Unsignalized Intersections	Left Turn from Major Street				Minor Street Approach			
	NB or EB		SB or WB		NB or EB		SB or WB	
	Delay (sec/vh)	LOS	Delay (sec/vh)	LOS	Delay (sec/vh)	LOS	Delay (sec/vh)	LOS
STH 26/Planeview Drive	10.7	B	13.8	B	*	F	*	F
CTH N/Black Oak School Rd.	8.0	A	8.5	A	17.2	C	17.8	C
USH 45/USH 41 Northbound Ramps	N/A	N/A	21.3	C	22.7	C	N/A	N/A
Fountain Ave./Green Valley Rd.	8.7	A	N/A	N/A	N/A	N/A	27.6	D
Fountain Ave./Snell Rd.	N/A	N/A	9.7	A	145.0	F	N/A	N/A
STH 76/Indian Point Rd.	N/A	N/A	6.3	A	N/A	N/A	*	F

\*Delay exceeds analysis period, failing LOS occurring

**Appendix A**  
**Year 2035 Mainline and Ramp**  
**AM and PM Peak Hour Volume Operations**  
**Summary Figures**

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NOT TO SCALE

LOS	
AM	PM
<b>C</b>	<b>C</b>

**STH 26**

LOS	
AM	PM
<b>B</b>	<b>B</b>

LOS	
AM	PM
<b>C</b>	<b>C</b>

**STH 44**

<b>B</b>	<b>B</b>
AM	PM

<b>C</b>	<b>C</b>
AM	PM

<b>B</b>	<b>B</b>
AM	PM

<b>D</b>	<b>C</b>
AM	PM

2190 (2390)

380 (550)

1090 (1090)

2900 (2930)

460 (580)

1510 (1130)

3950 (3480)

2310 (2780)

550 (480)

1320 (1090)

**USH 41**

3080 (3390)

450 (640)

860 (1360)

3490 (4110)

<b>B</b>	<b>B</b>
AM	PM

<b>C</b>	<b>C</b>
AM	PM

<b>C</b>	<b>C</b>
AM	PM

<b>C</b>	<b>C</b>
AM	PM

LOS	
AM	PM
<b>C</b>	<b>C</b>

LOS	
AM	PM
<b>B</b>	<b>C</b>

LOS	
AM	PM
<b>C</b>	<b>C</b>

**LEGEND**

000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)

 Mainline Level of Service (LOS)

 Entrance Ramp Level of Service (LOS)

 Exit Ramp Level of Service (LOS)

**USH 41 Traffic Study  
Year 2035 Peak Hour Traffic Operations  
STH 26 to STH 44**

Winnebago County

Figure A-1



PREPARED SEPTEMBER 2006

LEVELS ON - 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63



NOT TO SCALE

9th AVENUE

USH 41

5TH STH 21

USH 45

6TH E

LOS	
AM	PM
C	C

LOS	
AM	PM
D	C

LOS	
AM	PM
C	C

LOS	
AM	PM
C	C

LOS	
AM	PM
C	C

LOS	
AM	PM
C	C

LOS	
AM	PM
C	C

LOS	
AM	PM
C	C

**LEGEND**

- 000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)
- |  |  |
|--|--|
|  |  |
|--|--|

 Mainline Level of Service (LOS)
- |   |
|---|
| △ |
|---|

 Entrance Ramp Level of Service (LOS)
- |   |
|---|
| ▽ |
|---|

 Exit Ramp Level of Service (LOS)
- |   |
|---|
| ◇ |
|---|

 Ramp Analyzed as Basic Freeway Segment (LOS)
- |   |
|---|
| ✱ |
|---|

 Major Diverge

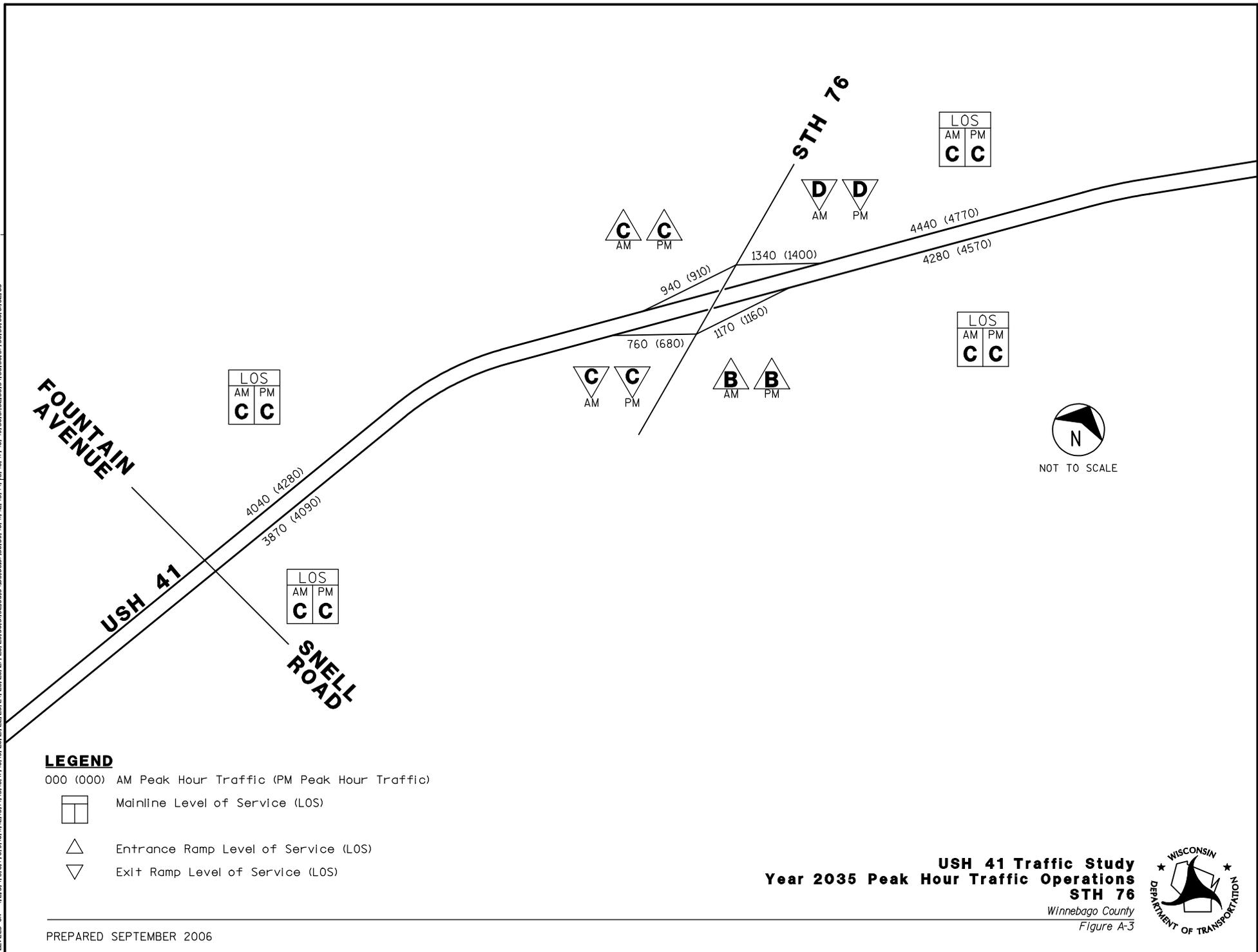
**USH 41 Traffic Study**  
**Year 2035 Peak Hour Traffic Operations**  
**9th Avenue to USH 45**  
 Winnebago County  
 Figure A-2



PREPARED SEPTEMBER 2006

LEVELS ON - 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63

LEVELS ON - 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63



**LEGEND**

000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)



Mainline Level of Service (LOS)



Entrance Ramp Level of Service (LOS)



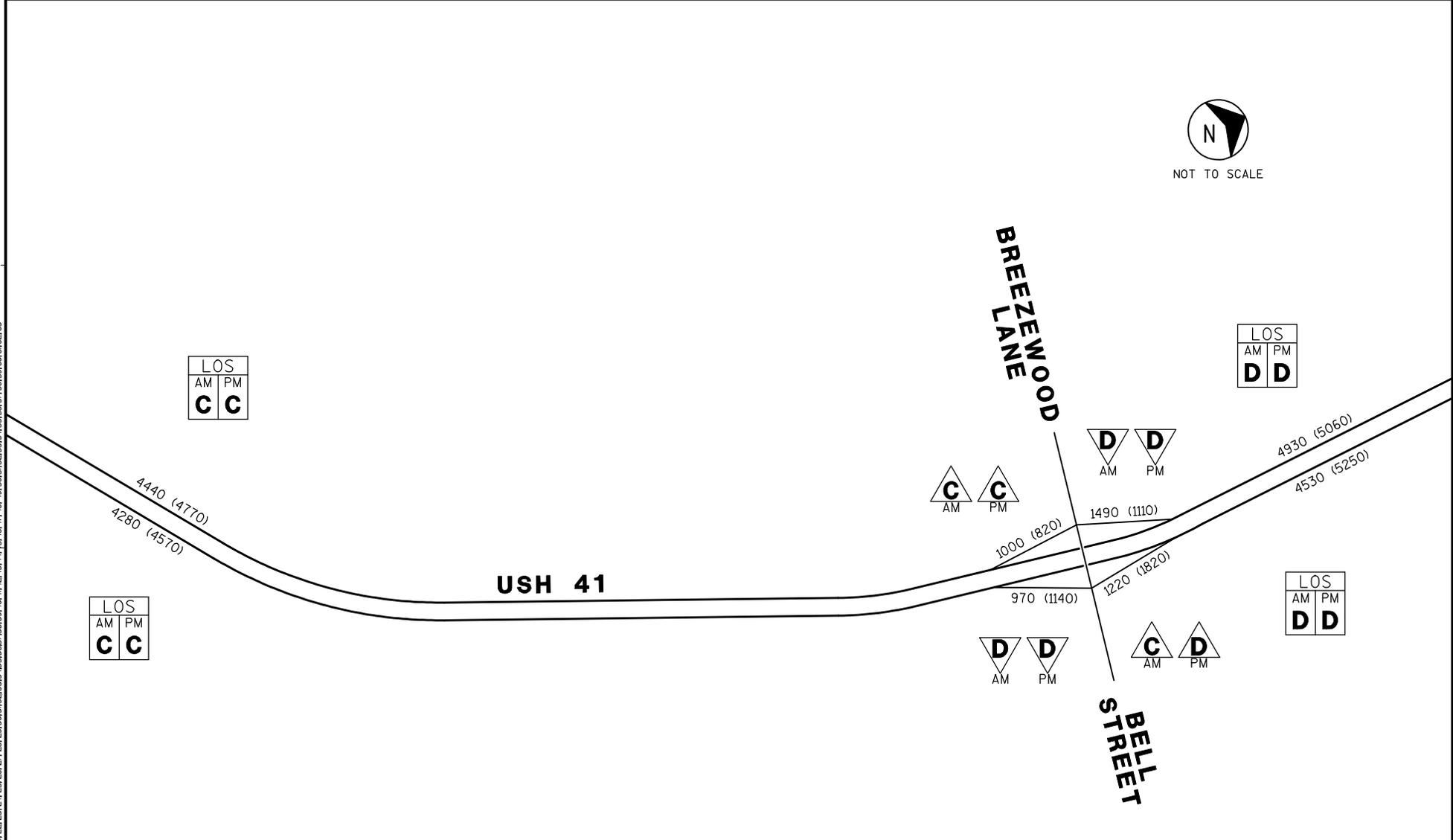
Exit Ramp Level of Service (LOS)

**USH 41 Traffic Study  
Year 2035 Peak Hour Traffic Operations  
STH 76**

Winnebago County  
Figure A-3



PREPARED SEPTEMBER 2006



**LEGEND**

000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)

- Mainline Level of Service (LOS)
- Entrance Ramp Level of Service (LOS)
- Exit Ramp Level of Service (LOS)

**USH 41 Traffic Study  
Year 2035 Peak Hour Traffic Operations  
Breezewood Lane/Bell Street**

Winnebago County  
Figure A-4



PREPARED SEPTEMBER 2006

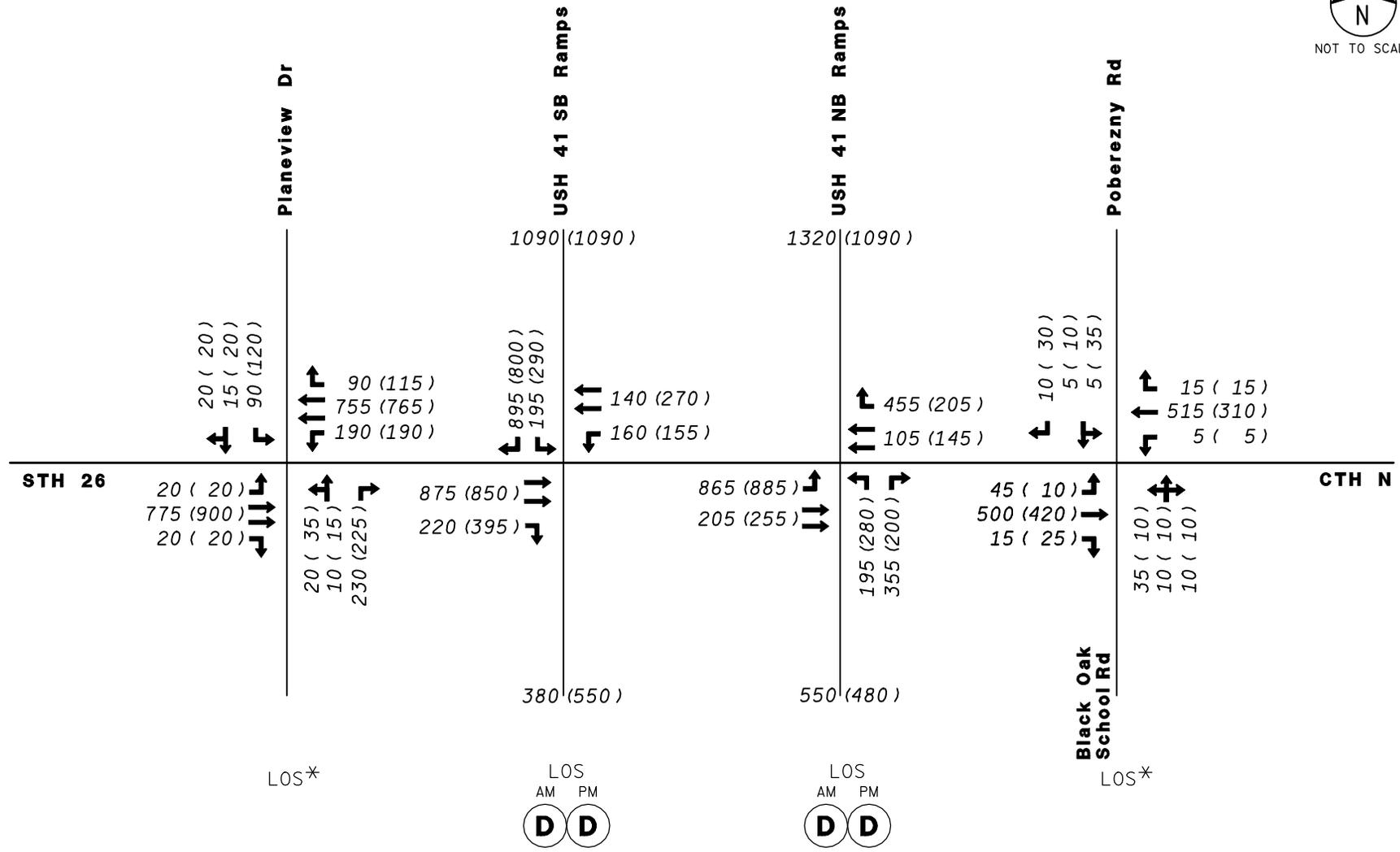
LEVELS ON - 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63

**Appendix B**  
**Year 2035 Intersection**  
**AM and PM Peak Hour Volume Operations**  
**Summary Figures**

---



NOT TO SCALE



**LEGEND**

000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)

\*Unsignalized Intersection, results printed in table

**USH 41 Traffic Study  
Year 2035 Peak Hour Traffic Operations  
Along STH 26**

Winnebago County

Figure B-1

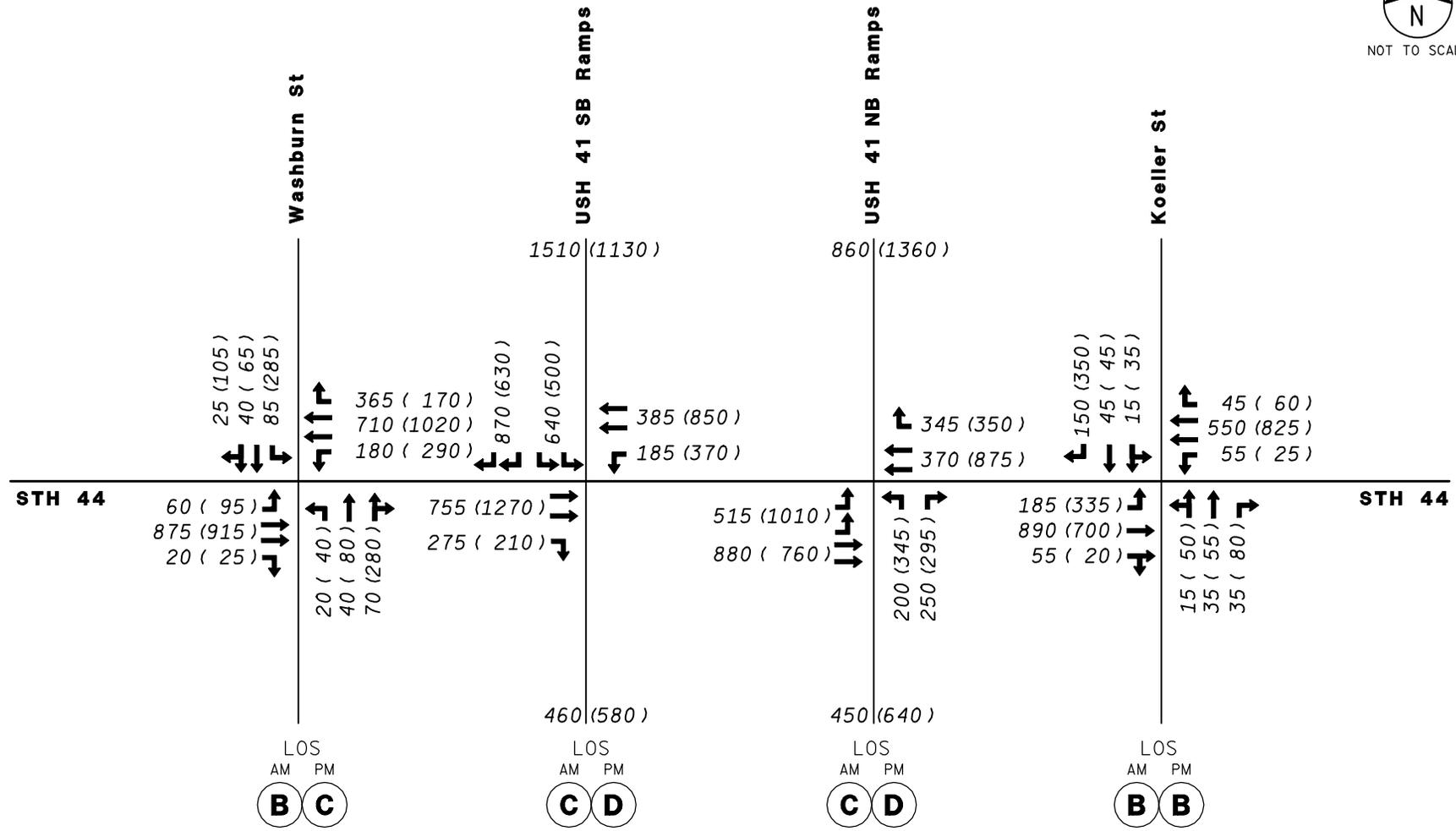


PREPARED SEPTEMBER 2006

LEVELS ON - 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63



NOT TO SCALE



**LEGEND**

000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)

PREPARED SEPTEMBER 2006

**USH 41 Traffic Study  
Year 2035 Peak Hour Traffic Operations  
Along STH 44**

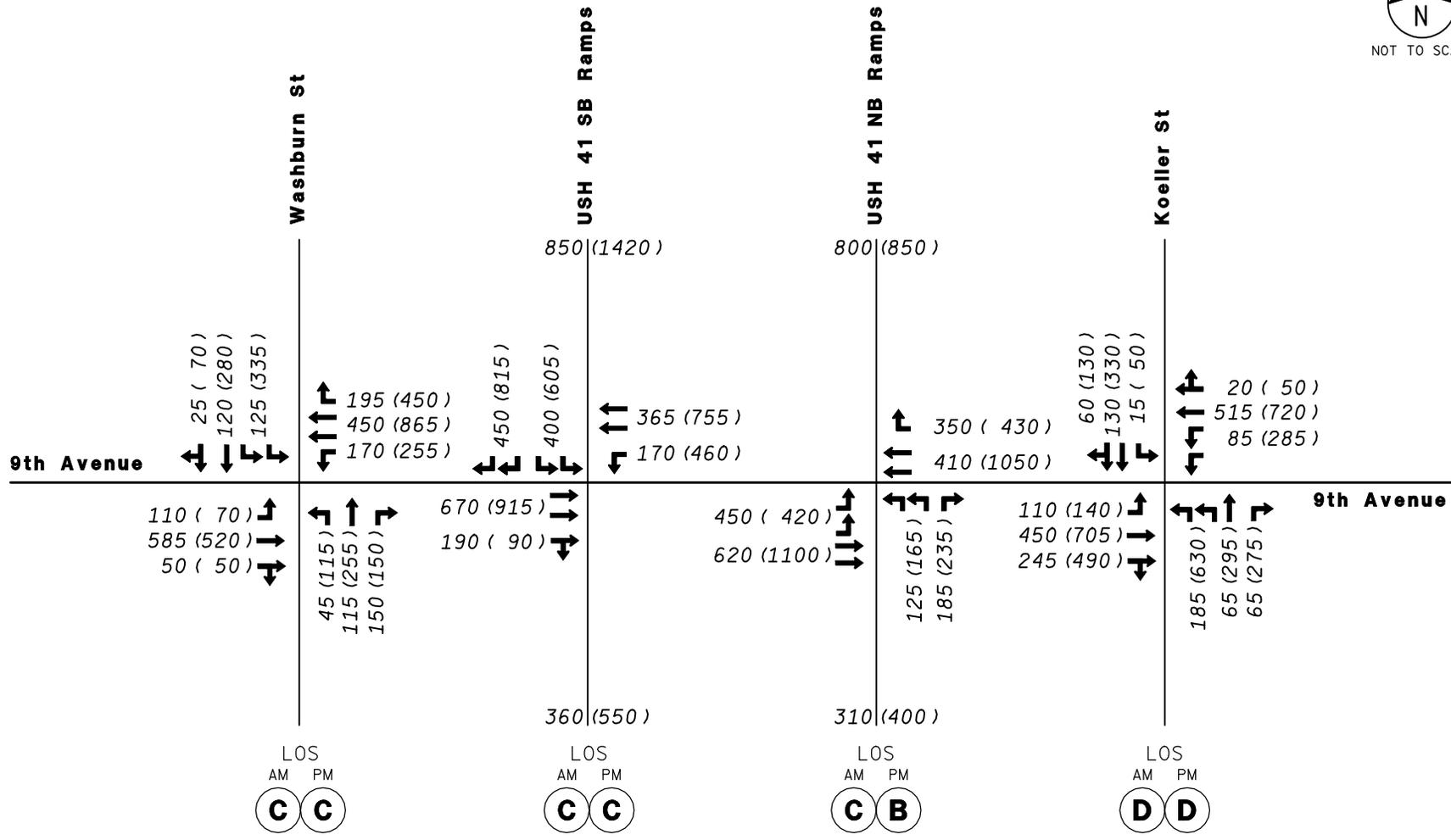
Winnebago County

Figure B-2



LEVELS ON - 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63

LEVELS ON - 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63



**LEGEND**

000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)

PREPARED SEPTEMBER 2006

**USH 41 Traffic Study  
Year 2035 Peak Hour Traffic Operations  
Along 9th Avenue**

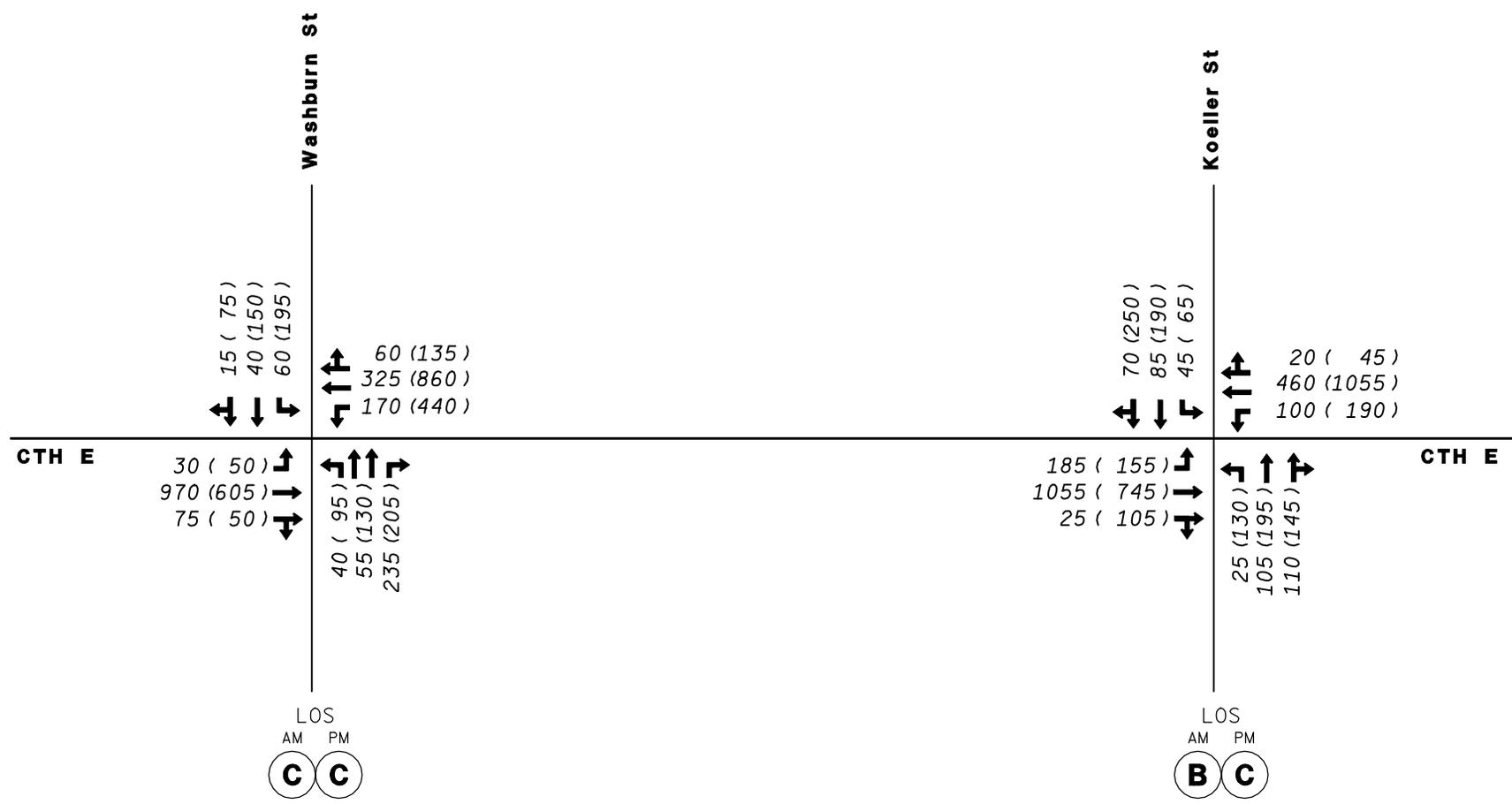
Winnebago County

Figure B-3





NOT TO SCALE



**LEGEND**

000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)

PREPARED SEPTEMBER 2006

**USH 41 Traffic Study  
Year 2035 Peak Hour Traffic Operations  
Along CTH E**

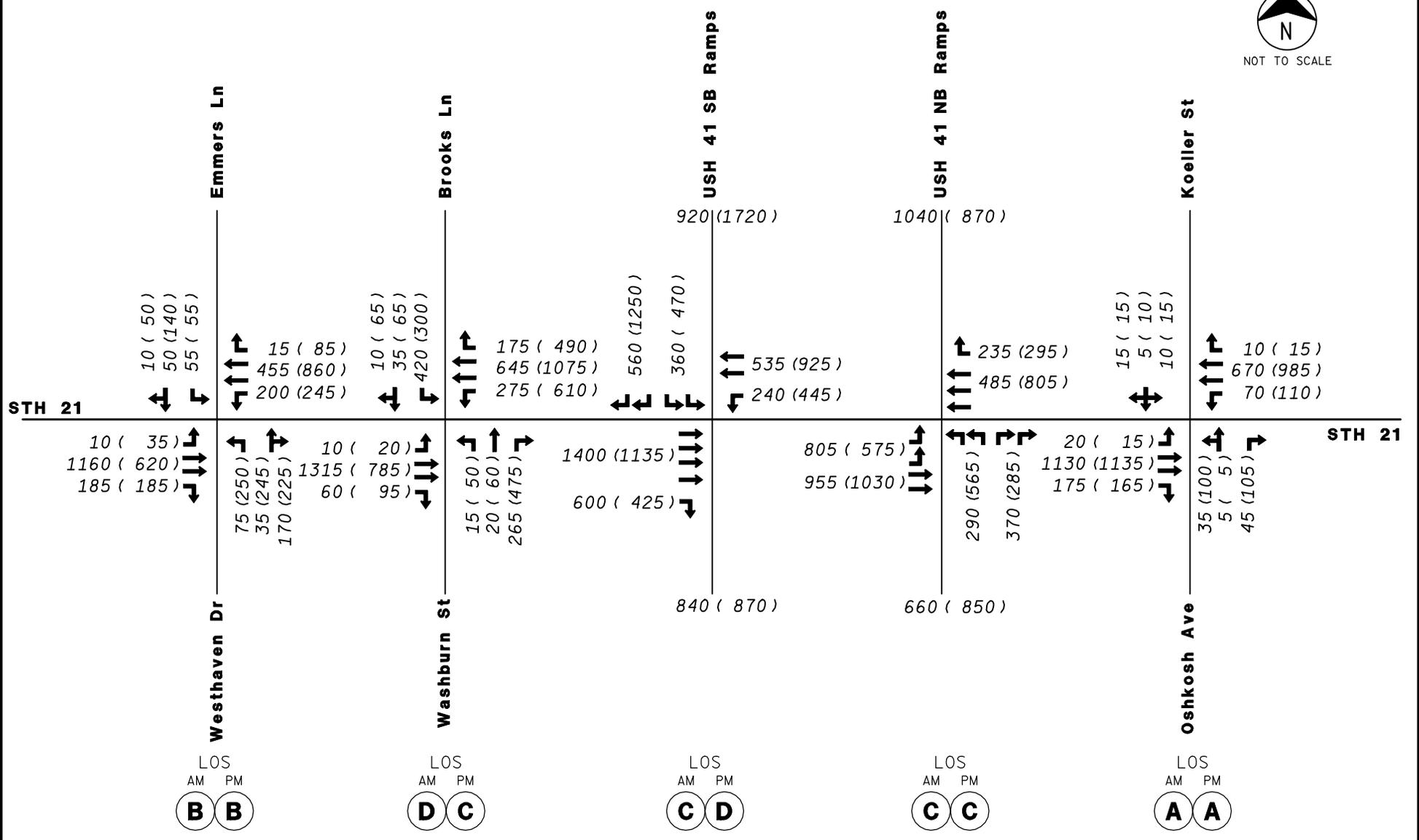
Winnebago County

Figure B-4



LEVELS ON - 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63

LEVELS ON - 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63



**LEGEND**  
 000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)

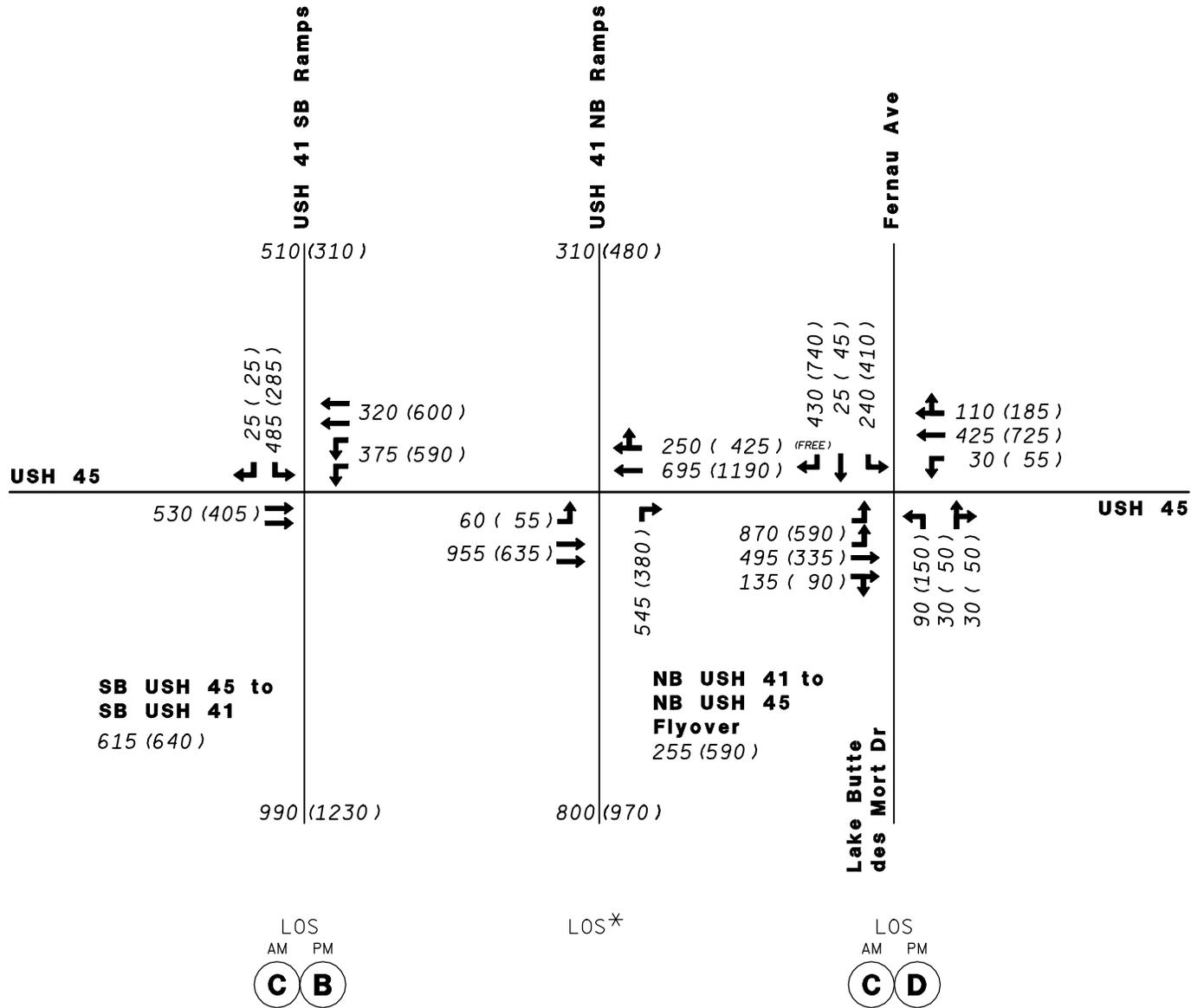
**USH 41 Traffic Study**  
**Year 2035 Peak Hour Traffic Operations**  
**Along STH 21**  
 Winnebago County  
 Figure B-5



PREPARED SEPTEMBER 2006



NOT TO SCALE



**LEGEND**

000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)

\*Unsignalized intersection, results printed in table

PREPARED SEPTEMBER 2006

**USH 41 Traffic Study  
Year 2035 Peak Hour Traffic Operations  
Along USH 45**

Winnebago County

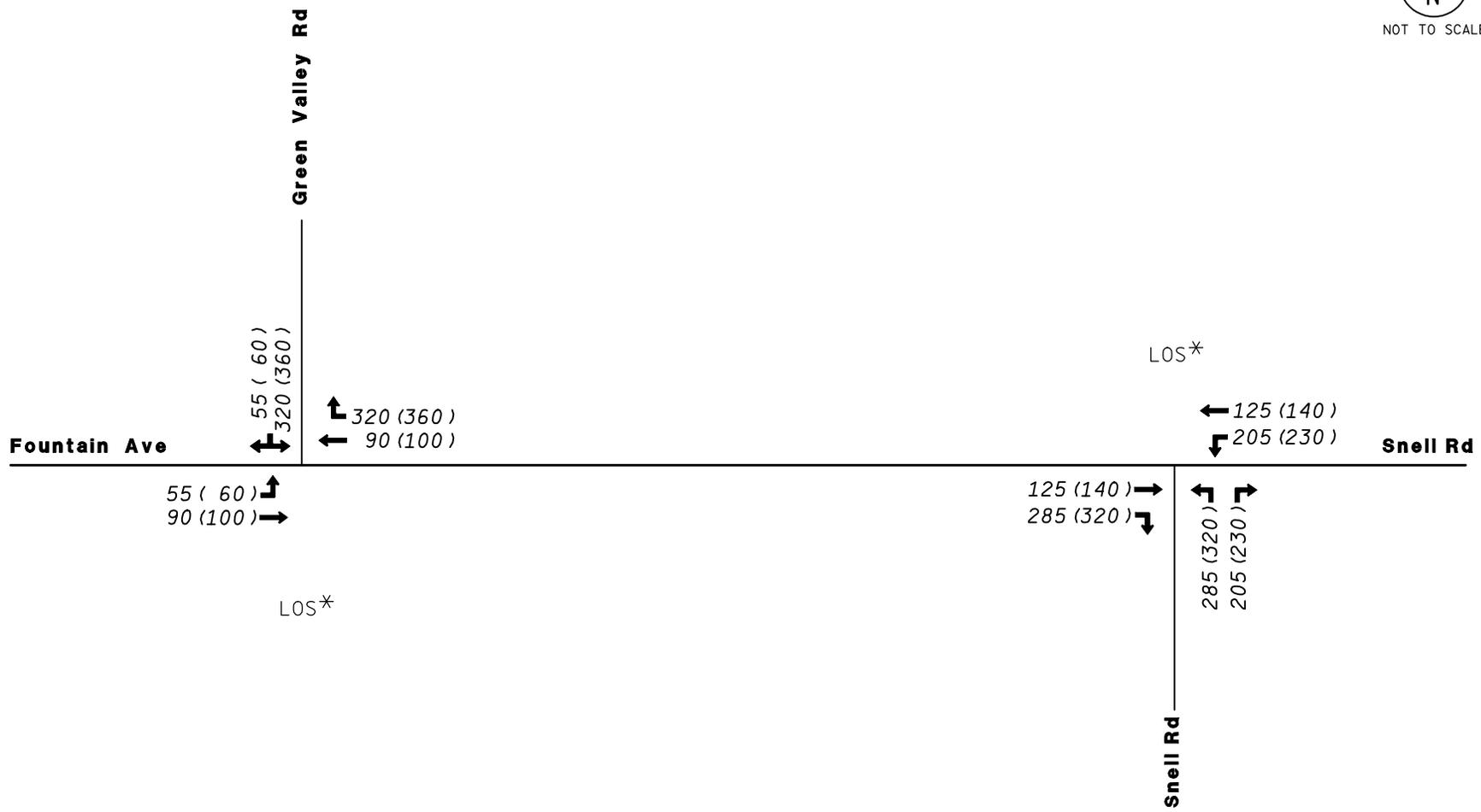
Figure B-6



LEVELS ON - 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63



NOT TO SCALE



**LEGEND**

000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)

**\*Unsignalized intersection, results printed in table**

PREPARED SEPTEMBER 2006

**USH 41 Traffic Study  
Year 2035 Peak Hour Traffic Operations  
Along Fountain Avenue**

Winnebago County

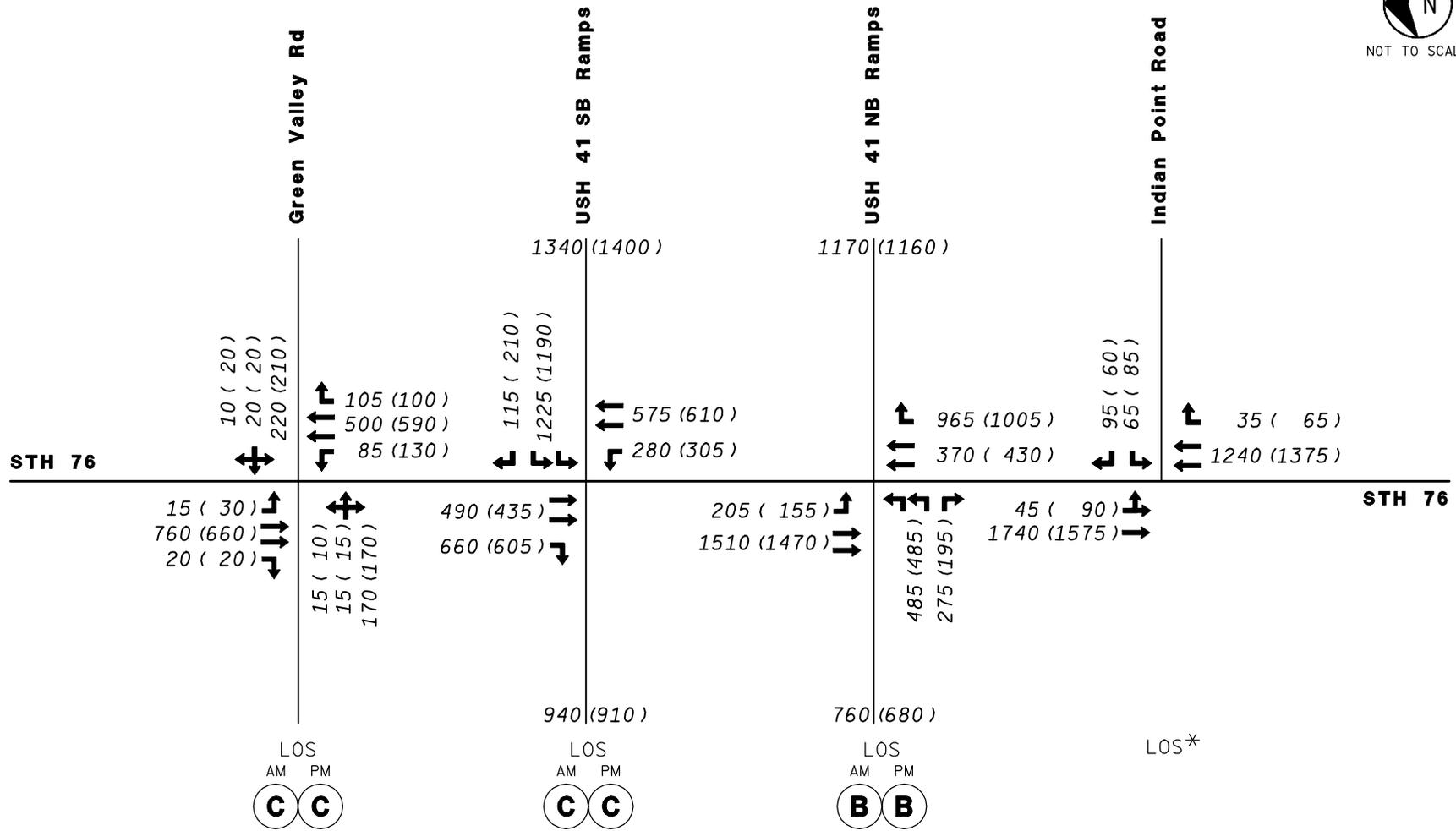
Figure B-7



LEVELS ON - 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63



NOT TO SCALE



**LEGEND**

000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)

\*Unsignalized intersection, results printed in table

PREPARED SEPTEMBER 2006

**USH 41 Traffic Study  
Year 2035 Peak Hour Traffic Operations  
Along STH 76**

Winnebago County

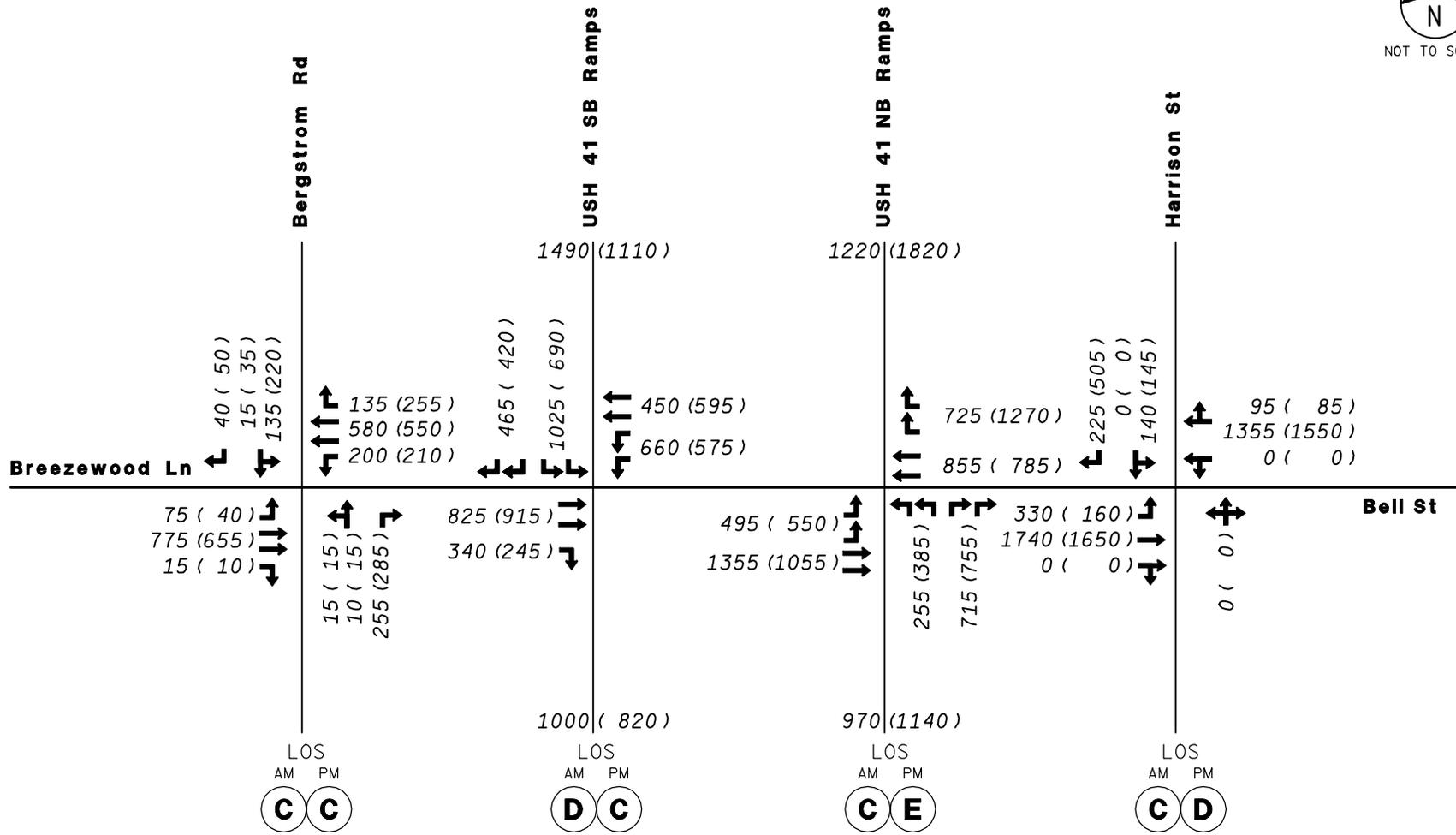
Figure B-8



LEVELS ON - 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63



NOT TO SCALE



**LEGEND**

000 (000) AM Peak Hour Traffic (PM Peak Hour Traffic)

PREPARED SEPTEMBER 2006

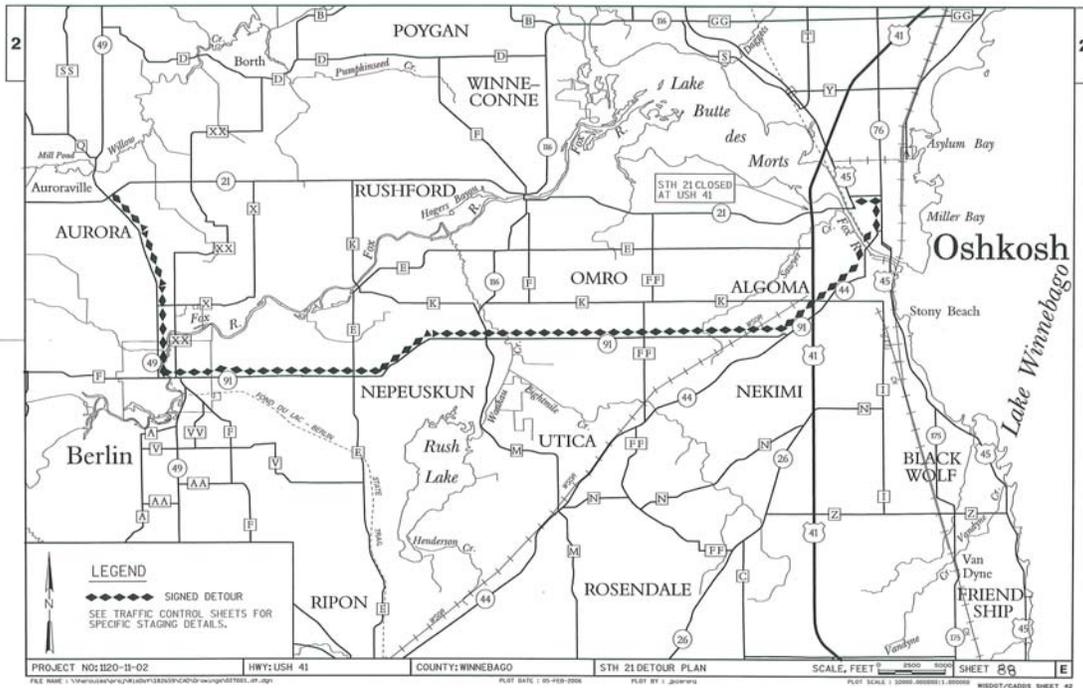
**USH 41 Traffic Study**  
**Year 2035 Peak Hour Traffic Operations**  
**Along Breezewood Lane/Bell Street**  
 Winnebago County  
 Figure B-9



LEVELS ON - 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63

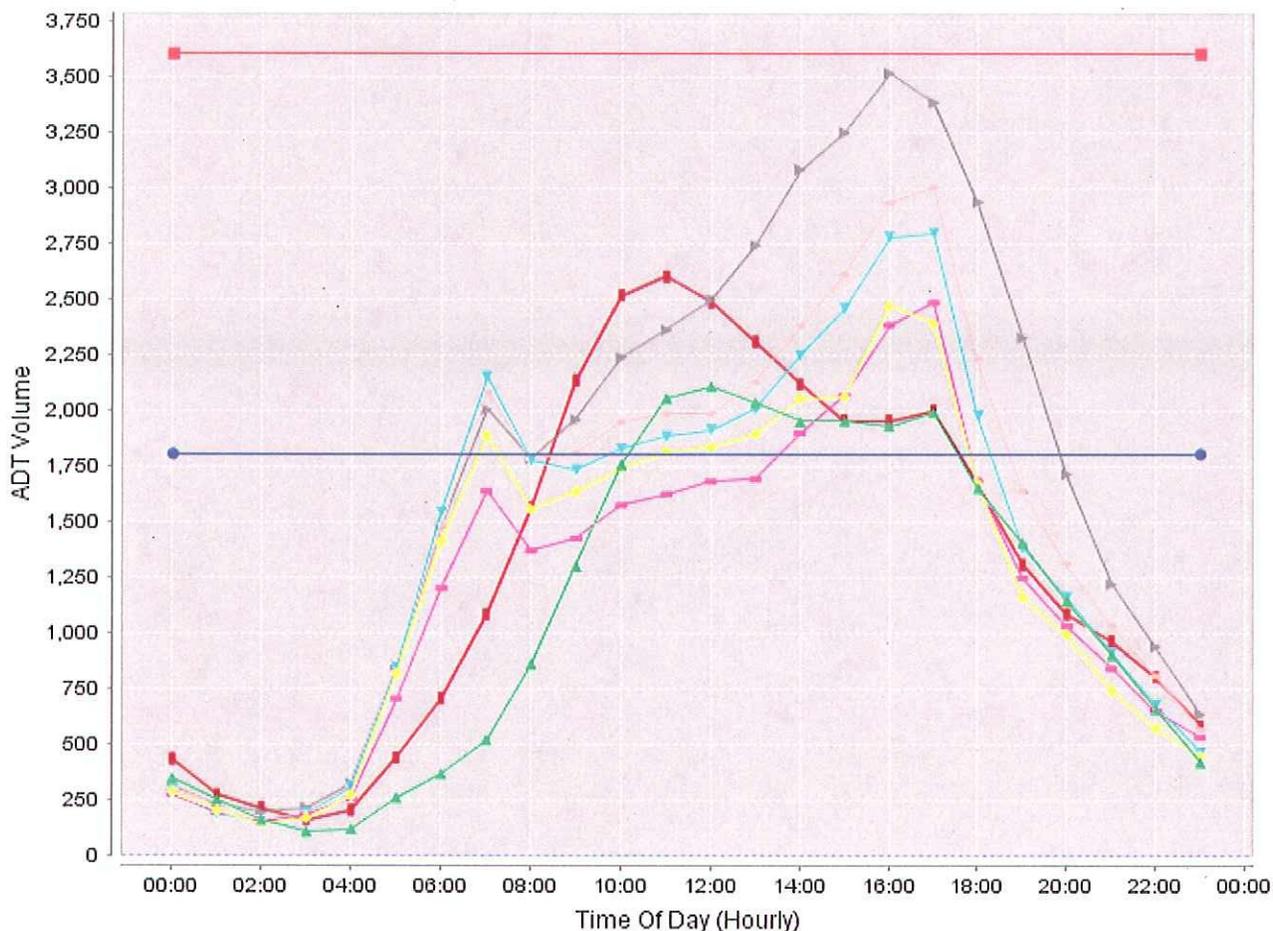


# Attachment D



## **Attachment E**

### TRADAS ADT Volumes for JUL 2006



■ Capacity Per Lane Value:1800 With 2 Of 2 Lanes Open = 3600 Total Available Capacity  
● Capacity Per Lane Value:1800 With 1 Of 2 Lanes Open = 1800 Total Available Capacity  
▲ Sunday ◆ Monday ■ Tuesday ▲ Wednesday ▲ Thursday ▲ Friday ■ Saturday

**Meta Data Section:**

County:  
WINNEBAGO

TRADAS Site:  
(700160) USH 41 SOUTH OF STH 21 OSHKOSH #3

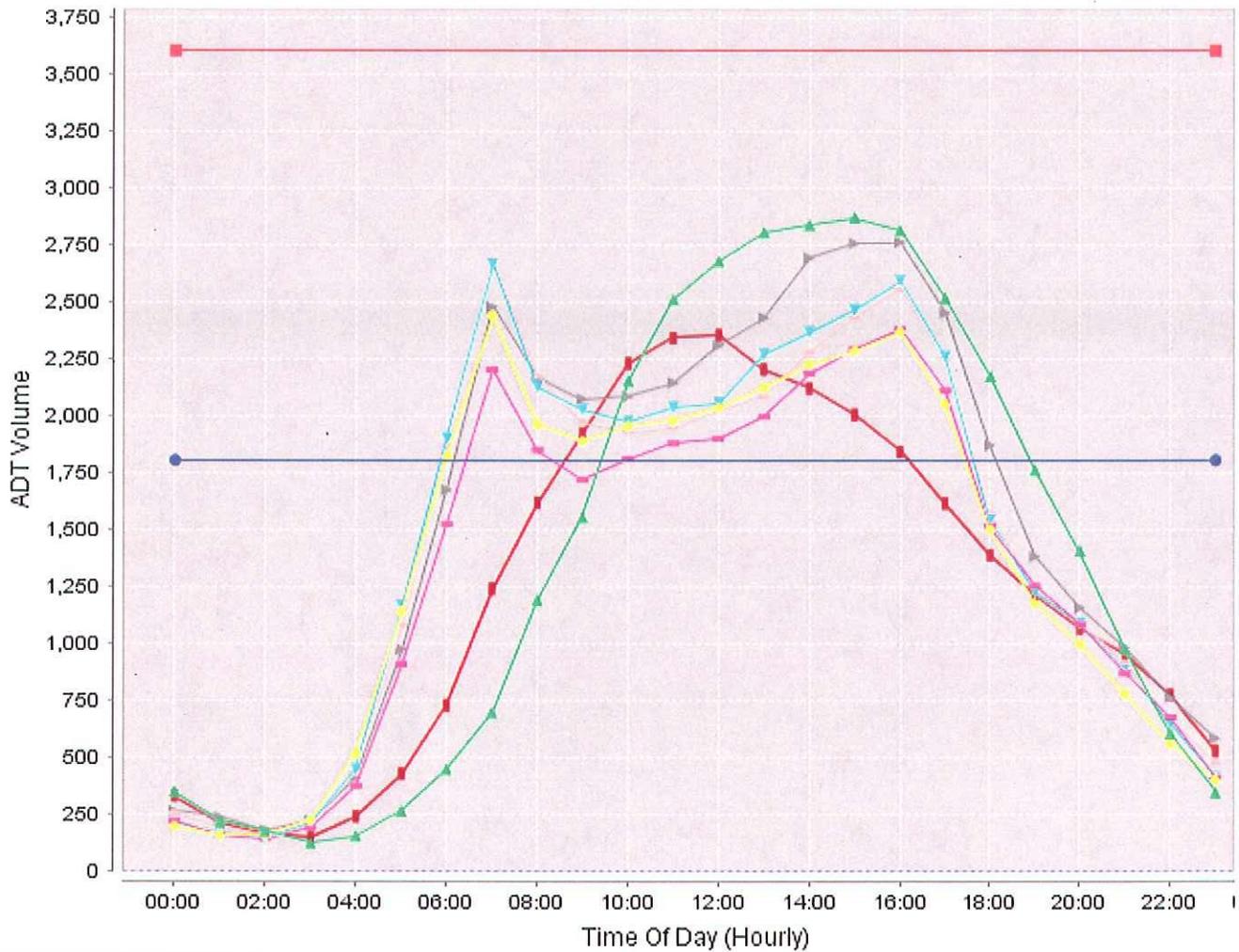
Cardinal Direction:  
Positive(+) North/East

- Selected Days Of Week:
- Sunday
  - Monday
  - Tuesday
  - Wednesday
  - Thursday
  - Friday
  - Saturday

Number of Lanes in the Positive Direction = 2  
Graph Creation Date/Time: Jun 01, 2007 08:27

Print Close [Zoom In](#) | [Zoom Out](#)

### TRADAS ADT Volumes for JUL 2006



■ Capacity Per Lane Value:1800 With 2 Of 2 Lanes Open = 3600 Total Available Capacity  
● Capacity Per Lane Value:1800 With 1 Of 2 Lanes Open = 1800 Total Available Capacity  
▲ Sunday ▲ Monday ▲ Tuesday ▲ Wednesday ▲ Thursday ▲ Friday ▲ Saturday

**Meta Data Section:**

County:  
WINNEBAGO

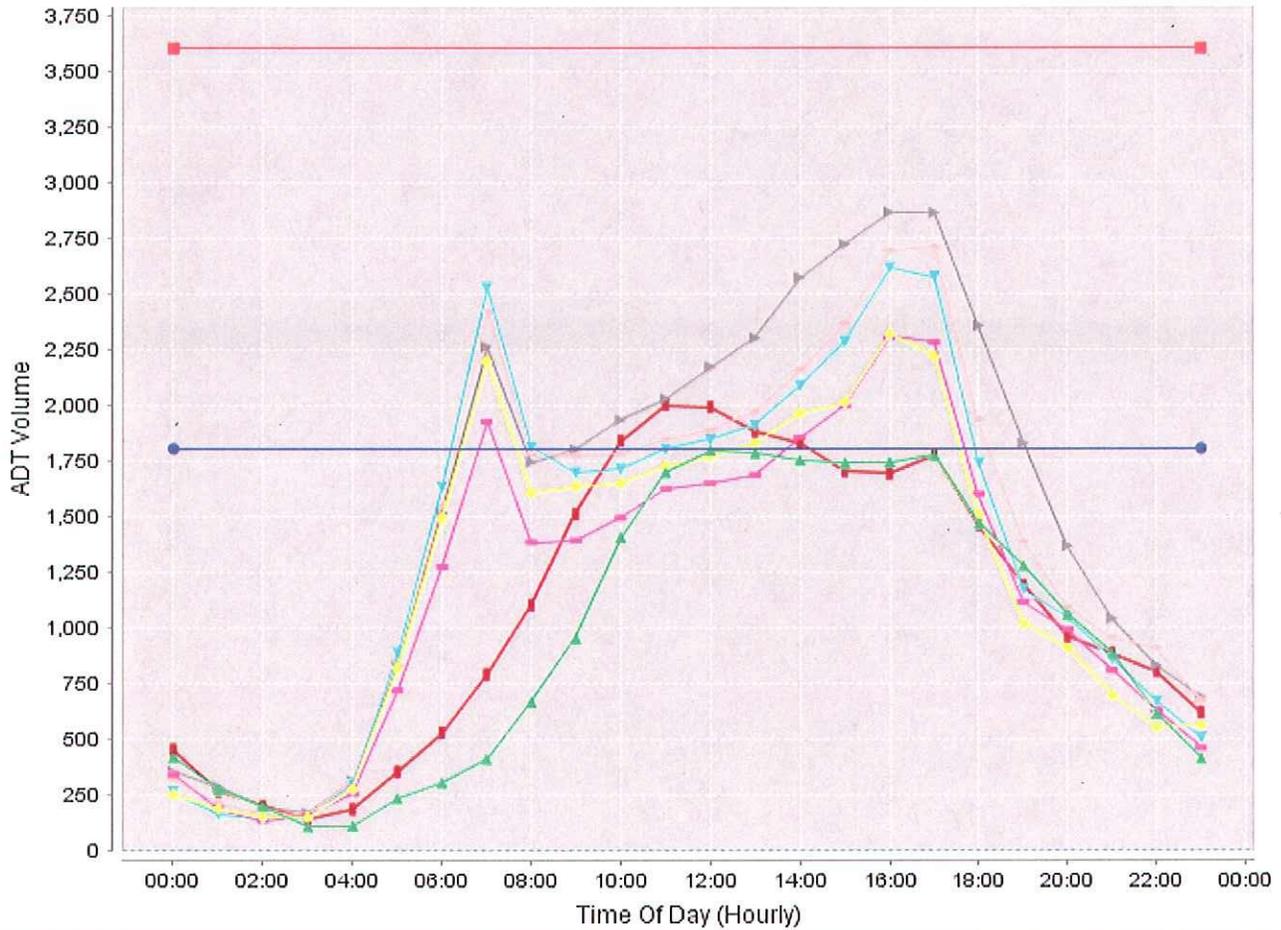
TRADAS Site:  
(700160) USH 41 SOUTH OF STH 21 OSHKOSH #3

Cardinal Direction:  
Negative(-) South/West

Selected Days Of Week:  
 Sunday  
 Monday  
 Tuesday  
 Wednesday  
 Thursday  
 Friday  
 Saturday

Number of Lanes in the Negative Direction = 2  
 Graph Creation Date/Time: Jun 01, 2007 08:28

### TRADAS ADT Volumes for JUL 2006



■ Capacity Per Lane Value:1800 With 2 Of 2 Lanes Open = 3600 Total Available Capacity  
● Capacity Per Lane Value:1800 With 1 Of 2 Lanes Open = 1800 Total Available Capacity  
▲ Sunday ■ Monday ◆ Tuesday ● Wednesday ■ Thursday ▲ Friday ■ Saturday

**Meta Data Section:**

County:  
WINNEBAGO

TRADAS Site:  
(700001) USH 41 NORTH OF STH 76

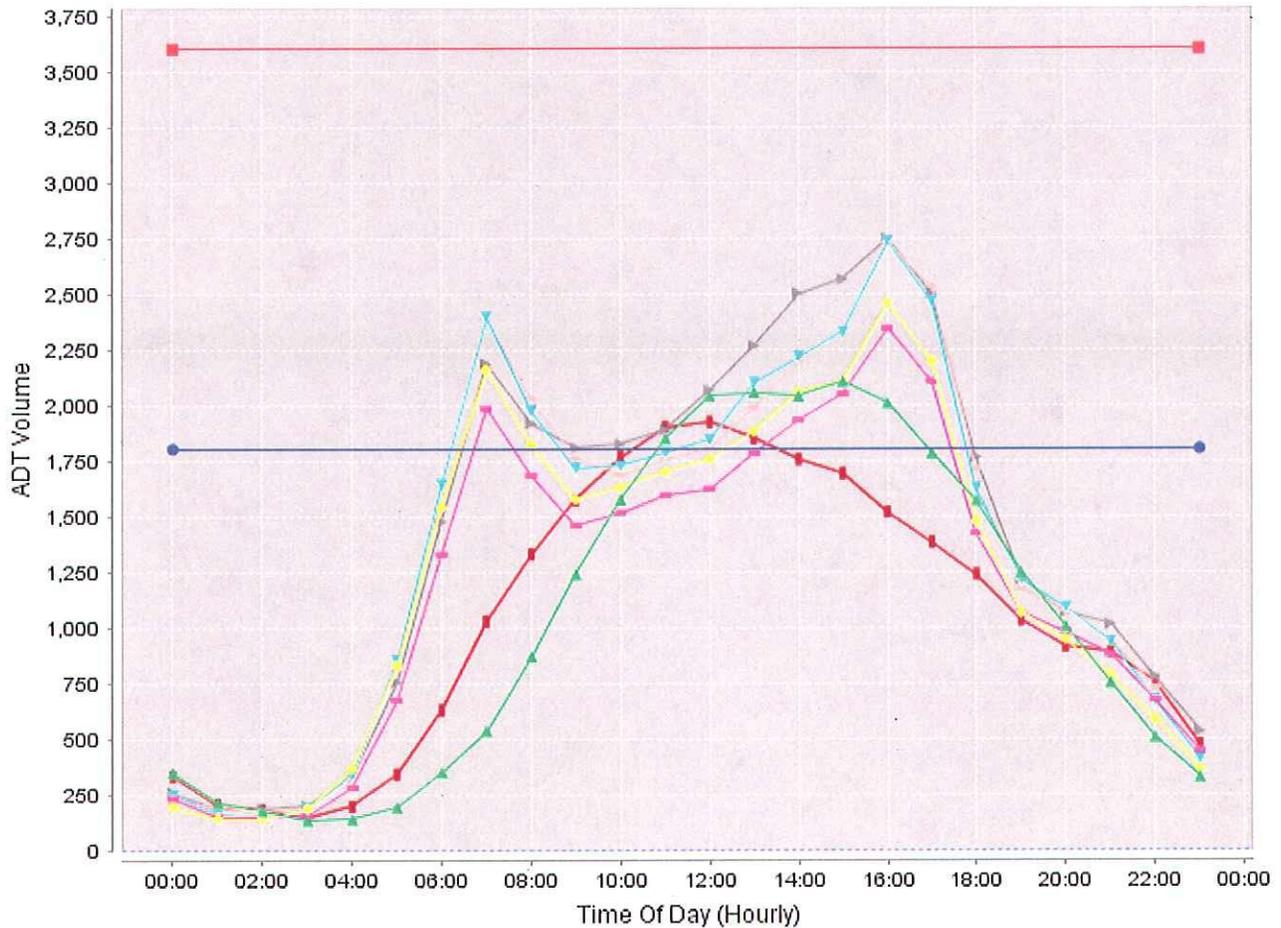
Cardinal Direction:  
Positive(+) North/East

Selected Days Of Week:  
 Sunday  
 Monday  
 Tuesday  
 Wednesday  
 Thursday  
 Friday  
 Saturday

Number of Lanes in the Positive Direction = 2  
 Graph Creation Date/Time: Jun 01, 2007 08:30

Print Close [Zoom In](#) | [Zoom Out](#)

### TRADAS ADT Volumes for JUL 2006



■ Capacity Per Lane Value:1800 With 2 Of 2 Lanes Open = 3600 Total Available Capacity  
● Capacity Per Lane Value:1800 With 1 Of 2 Lanes Open = 1800 Total Available Capacity  
▲ Sunday ■ Monday ◆ Tuesday ▲ Wednesday ■ Thursday ▲ Friday ■ Saturday

**Meta Data Section:**

County:  
WINNEBAGO

TRADAS Site:  
(700001) USH 41 NORTH OF STH 76

Cardinal Direction:  
Negative(-) South/West

- Selected Days Of Week:
- Sunday
  - Monday
  - Tuesday
  - Wednesday
  - Thursday
  - Friday
  - Saturday

Number of Lanes in the Negative Direction = 2  
Graph Creation Date/Time: Jun 01, 2007 08:29

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