TO: **Honorable Mayor and City Council**

FROM: **City Administrator Ron Johnson**

SUBJECT: **Highway 52 Development Discussion**

DATE: **March 6, 2015**

BACKGROUND

The City Council set this special meeting to discuss the development of Highway 52 subsequent to receipt and review of the SEH Access Safety Study.

MnDOT and the city of Cannon Falls commissioned the services of Short Elliott Hendrickson (SEH) to conduct a TH52 Access Safety Study, and this study was presented at the February 3 council meeting. Also received for that meeting was a response letter regarding the report from MnDOT. The report and letter are included in this packet for review.

Subsequent to this meeting, an email/memo was received from SEH project engineer Tom Sohrweide regarding the potential accident rate if right-outs only (northbound and southbound) were constructed. This is included in this packet.

Greg Anderson, SEH, was asked to provide cost estimates to construct right-ins/right-outs and that info is also included.

The other document included in this packet is a letter received from Naji & Melinda Aljabry, Cannon Falls Super America.

REQUESTED COUNCIL ACTION

No specific action is being requested by staff.

Attachment(s):
SEH Access Safety Study and memos; Letter from Naji & Melinda Aljabry, Cannon Falls Super America

On Feb 16, 2015, at 12:05 PM, Greg Anderson <ganderson@sehinc.com> wrote:

Ron,

We've prepared some estimates for you.

Construction of the full right in/outs from the study: $2,850,000 (this includes final design and construction services)
Construction of right outs (off of TH 52) only: $1,750,000 (this includes final design and construction services)

Now for the caveats:
* NO ROW costs included (unknown if additional will be needed)
* the above costs include $240,000 for new lighting on TH 52 (not sure if needed or existing lighting can be upgraded) The access will require some sort of lighting.
* NO costs included for additional EA work as mentioned by MnDOT in 1/27/15 letter from Jeff Vlaminck Could easily range from 7-10% of construction costs.

Greg

Greg Anderson, PE | Project Manager
SEH
3535 Vadnais Center Drive, St. Paul, MN 55110
651.490.2172 direct
888.908.8166 fax
sehinc.com
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Ron,
Using the same methodology we have estimated the crashes for only the right-outs.

Area Intersection Crashes per Year
Without Rt-In/Rt-Out = 4.09 (from report)
With Rt-In/Rt-Out = 5.12 (from report, 25% increase)
With Rt-In Only = 5.03 (23% increase)

TH 52 Only - Crashes per Year
Rt-In/Rt-Out = 1.42
Rt-In Only = 1.09

The reduction for the area is not as great as it is for TH 52 due to rerouting the Rt-Out traffic to the other intersections thereby increasing crashes there.

Let me know if you have any questions.
Tom

Thomas A. Sohrweide, PE, PTOE | Principal
Manager, Traffic Engineering Services
SEH | 3535 Vadnais Center Drive | St. Paul, MN 55110-5196
651.490.2072 direct | 651.485.7926 cell
www.sehinc.com

Ron Johnson

From: Melinda Aljabry <melinda.aljabry@gmail.com>
Sent: Wednesday, March 04, 2015 10:38 PM
To: Ron Johnson
Subject: Letter to City Council

Ron,

Please forward this email to the Mayor Robinson and the City Council prior to Tuesday's meeting.

Thank you.

Dear Mayor and Council Members,

We are unable to attend Tuesday's meeting. In lieu of attending, we wanted to send this message to reitterate our position and needs regarding Hwy 52 Access.

We thank you for your support in doing the Safety Study.

It is clear to us as it has been since we came to you 4 years ago that we need to maintain convenient access to Highway 52. The position of the current interchange has been detrimental not only to our business but to all of Cannon Falls. Delivered to you was a petition with almost 2000 signatures, all of which, were obained locally and after Septebmer 2015. This is your local community needs.

We realize that safety is a concern. Unfortunately there is no 100% safe situation. The 25% increase of accidents the Safety Study projects is compared to no on/off access at all.

Although we understand the need for the overpass, it will not help bring business back to Cannon Falls and it will not help our business. We need on/off access. We need an Interchange.

Last Friday, Naji spoke with Sen. Matt Schmit. He said that alhtough there is not money this year, there is next year. Although, that is later than we hoped, it is better than nothing. Also, he said that he interpreted the results of the Saefty Study that an Interchange would be within reason at the (old) Co Rd 24 location.

There have been mistakes made and MNDOT does not want to admit it. Please do not let it sway you from asking for what the city really needs, an Interchange.

Thank you,

Naji & Melinda AlJabry
Cannon Fall Super America
Cell: 612-597-0584 / 612-240-0240

Minnesota Department of Transportation
District 6 Rochester
2900 48th St NW
Rochester, MN 55901

507-286-7501
jeff.vlaminck@state.mn.us

January 27, 2015

Ron Johnson
Cannon Falls City Administrator
Cannon Falls City Hall
918 River Road
Cannon Falls, MN 55009

Dear Mr. Johnson:

Thank you for the opportunity to meet with you and your staff to review and discuss the Cannon Falls Access Safety Study prepared by SEH. We had a good discussion at the meeting and I'm writing as follow up to your question regarding potential next steps for the City if they decide to pursue a project to add access to Highway 52.

As you probably know, opening new access on a newly created freeway segment is not a normal or frequent practice, so there isn't a standard process. The next steps are fairly general and will be dependent on decisions by the City and guidance from the Federal Highway Administration (FHWA). Following are some of the questions and potential steps that would need to be addressed.

First, as stated at the November 2013 council meeting, MnDOT does not support a new at grade access at Cannon Falls and the results of the study do not change that position. As we discussed at the meeting, it is the City's choice whether to pursue a project. The City would be responsible for developing and leading the proposed project and would be at 100 percent City cost. These project costs include development, planning, construction, right of way, utility, engineering and any other costs associated with the project. This is standard for any community in this type of circumstance.

The interchange project's purpose and need was based on the 2002 Highway 52 Corridor Study vision for a freeway corridor, between Rochester and the Twin Cities. Opening access on a new freeway segment is not consistent with this vision, so the Corridor Study should be updated to ensure future projects are developed in alignment with any new vision. This corridor study update should include all corridor stakeholders and be jointly funded by the state and the local government agencies along the corridor.

The interchange project was developed through the Federal Environmental Assessment process and includes future plans for a highway overpass in the same proximity of the proposed new access. Developing an access point in this location would be in conflict with developing a future overpass. One of the first questions that need to be addressed is, would the City plan on dropping plans for a future overpass if access was added in this location? The answer will affect the design and development of a potential future project.

Once the City identifies the proposed scope of the project, we would suggest meeting with the City and FHWA to discuss the proposed project and determine the appropriate environmental and public involvement process. FHWA must be involved in this discussion because of their oversight role on National Highway System routes like Highway 52 and the fact that the interchange project received

federal funding and required use of the federal environmental process. The Stewardship Agreement executed between FHWA and MnDOT guides and directs this relationship.

Once a project is developed through the public involvement and environmental development process, the City would need to obtain a permit from MnDOT to construct the project. Since the current vision for Highway 52 is for a freeway corridor, new at grade accesses are considered temporary access, so time limits or other provisions and requirements could be included in the permit. MnDOT's top priority is to ensure a safe highway system and has the statutory obligation and authority to close the access immediately if safety issues develop. I'm sorry I'm unable to give a definitive timeline on how long it might take for this to unfold. It's uncertain how long these processes would take because much depends on whether the City seeks new access and the type of access.

This generally is the process depending on what the council decides. As part of your deliberations and discussions, here are some points to consider with the safety study and if additional access is pursued:

1) The safety study anticipates an average of 1.4 crashes per year (a 25 percent increase) at the temporary right-in/right-out location and would not occur if the access were not constructed. These crashes could involve vehicles traveling at relatively high speeds so the potential for injury and death are high. The projected crash rate is based on average rates from other similar locations; however, all locations are unique. Driver behavior is unpredictable; if a right-in/right-out is built here, the actual experienced crash rate may very well be higher than the 1.4 per year average. We remain seriously concerned for the safety of the citizens and visitors to Cannon Falls, as well as the through traffic on Highway 52, if a right-in/right-out is constructed.

2) The interchange was constructed as part of a conversion to a freeway type roadway. This is consistent with past corridor studies and agreements, which have concluded the vision for this corridor is a fully access controlled facility from Rochester to St. Paul. Other county and city governments have agreed with and cooperated to advance this freeway vision. If a right-in/right-out access is constructed here, it would conflict with the freeway vision.

3) The development of this interchange location and design was the culmination of years of studies and planning. Numerous location alternates were explored and the design specifics of the interchange were fully evaluated. Government and public input was regularly obtained, numerous public meetings were held and the City granted Municipal Consent for interchange construction. A right-in/right-out access was never considered or evaluated because it is inconsistent with the freeway vision.

4) Following the National Environmental Policy Act (NEPA) rules, an Environmental Assessment (EA), with subsequent Finding of No Significant Impact (FONSI) by the Federal Highway Administration (FHWA), was completed. This assessment studied and considered the various expected effects of the interchange project. The project was approved for final design and construction based on the EA. Construction of a right-in/right-out access was not considered within the EA and was not included as a basis for the FHWA FONSI. It's likely the EA will have to be amended, and a new FONSI may be necessary, if a right-in/right-out is proposed here.

5) This corridor has utilized federal funding for construction, and because the corridor is designated as a future freeway, we fully expect that the FHWA will not look favorably upon a proposed right-in/right-out here. We have heard from them informally and they've expressed concern; their views and input would have bearing on the eventual outcome.

6) If a right-in/right-out is allowed and constructed, this would eliminate or substantially affect the potential for a future overpass. One of the concerns expressed by City staff and by the concerned public is regarding the overpass that was not constructed with this interchange project. Even though this project, as presented for funding, did not include the overpass and the EA did include the overpass, the right-in/right-out would need to be removed if an overpass is constructed.

Also, a large number of signs were added to accommodate implementation of the Logo Sign Program here. The program, and its associated signs, is intended to inform motorists of specific gas, food, or lodging establishments available at the interchange. If a right-in/right-out is constructed, it is likely that a significant change in signs will be necessary. The Logo signs in place, which direct traffic to, and through, the interchange would likely not be appropriate and would be removed. Also, allowance of an at grade access within this access controlled segment, would jeopardize the critical justification for use of the Logo program at this interchange. The incorporation of Logo signs for this interchange was the first use of them on a roadway of this type in the state of Minnesota.

MnDOT cares about the city of Cannon Falls and its citizens, including its economic vitality and quality of life. I hope that this helps provide some information on issues that would need to be addressed in the next steps for developing a project. Defining an absolute process is difficult because there are project questions, as outlined above, that must be answered, which will influence the direction it will take. Again, thank you for our productive meeting. We will continue to work with you, the city of Cannon Falls and other stakeholders to resolve local questions and concerns.

Sincerely,

Jeffrey L. Vlaminck, PE
Transportation District Engineer
MnDOT District 6

SEH

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MEMORANDUM

TO: Mike Schweyen, PE, MnDOT District 6
Ron Johnson, City of Cannon Falls

FROM: Thomas A. Sohrweide, PE, PTOE

DATE: December 17, 2014

RE: TH 52 Access Safety Study
MnDOT Contract No. 05952
SEH No. MNT06 128314 Task 7.0

As a result of the construction of a new interchange on TH 52 in the City of Cannon Falls, the signalized at-grade intersection of TH 52/315th Street was removed. The City has requested that right-in/right-out access be allowed for 315th Street at TH 52. The City and MnDOT have agreed to jointly contribute to a study to evaluate the safety implications of this access.

The scope of this study included, the development of traffic forecasts, safety analysis, concept development, and traffic operational analysis. The detail of those components of the study are attached as individual memorandums. This memorandum serves as a summary of the findings.

Traffic Forecasts
AM and PM Peak Hour traffic volumes were developed and forecast to year 2015 and 2030 for the interchange area with and without right-in/right-out access at TH 52/315th Street. The basis for these traffic forecasts were the Traffic Forecasting (2007) and Traffic Operations Analysis (2008) memorandums completed for the interchange project.

Safety Analysis
Research by MnDOT found that for right-in/right-out intersections, crashes will increase as traffic volumes increase and crashes will increase as the ratio of the main roadway traffic volume to the side street traffic volume becomes more unbalanced.

Since vehicle crashes are generally quantified in rates, which generally indicates there will be more crashes with higher traffic volumes; and the traffic volumes will change at the area intersections with and without a right-in/right-out at 315th Street; in addition to the right-in/right-out, our analysis included the new roundabout ramp intersections and the intersection of 315th Street/65th Avenue. Specifically for the right-in/right-out, our analysis used a direct comparison of crashes at two existing right-in/right-out intersections in proximity to an interchange.

We have estimated that with 2015 estimated traffic volumes, the intersections described above will have 4.09 crashes per year without the right-in/right-out and 5.12 crashes per year with the right-in/right-out. The increase is comprised of 3.70 crashes per year at the three study intersections (reduced due to rerouting traffic) and 1.42 crashes per year at the right-in/right-out.

Concepts
Four concepts were developed that are capable of going to final design. The concepts include standard turn lanes, auxiliary lanes, and acceleration lanes. Each concept is shown as a complete right-in/right-out for both northbound and southbound. However, a right-in or a right-out could be considered separately for northbound or southbound with just that portion of the concept being used.

Traffic Operational Analysis
The 2030 AM and PM Peak Hour traffic forecasts were used to analyze the operation of vehicles entering and exiting TH 52 from the right-in/right-out and intermixing with the vehicles entering and exiting the interchange. This operational analysis reports reasonable peak hour traffic operating conditions.

Findings
1. Safety – It is estimated that a right-in/right-out will average 1.42 vehicle crashes per year.
2. Design – A right-in/right-out design is feasible that will meet trunk highway design standards.
3. Traffic Operations – A right-in/right-out is estimated to provide reasonable traffic operating conditions.

This study has been based on the best forecasts and estimates with the data available at this point in time. As development and access changes occur, the traffic flows may change from what has been forecast. Therefore, if a right-in/right-out access is constructed, consideration should be given to revisit the future safety and traffic operations of this access.

ts
Attachments
c: Dave Maroney, City of Cannon Falls
Greg Anderson, SEH

SEH

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MEMORANDUM

TO: Mike Schweyen, PE, MnDOT District 6
Ron Johnson, City of Cannon Falls

FROM: Thomas A. Sohrweide, PE, PTOE
Haifeng Xiao, PE

DATE: July 31, 2014

RE: US 52 Traffic Forecasts
MnDOT Contract No. 05952
SEH No. MNT06 128314 Task 3.0

INTRODUCTION

In the US 52 Cannon Falls Project completed in 2009 (the 2009 Project), a number of improvement alternatives were studied for the US 52 corridor and its adjacent and crossing roadways in the City of Cannon Falls. A travel demand model was developed to conduct traffic forecasts for different alternatives. Year 2030 daily and peak hour traffic forecasts were developed for the no-build and several build alternatives and they were documented in two memorandums: *Technical Memorandum Five – Traffic Forecasting,* dated June 2007 and *Technical Memorandum Six – Traffic Operations Analysis,* dated April 2008. The review of the documents indicates that the model had incorporated the latest land use plan for the city, including the relocation of the Hospital.

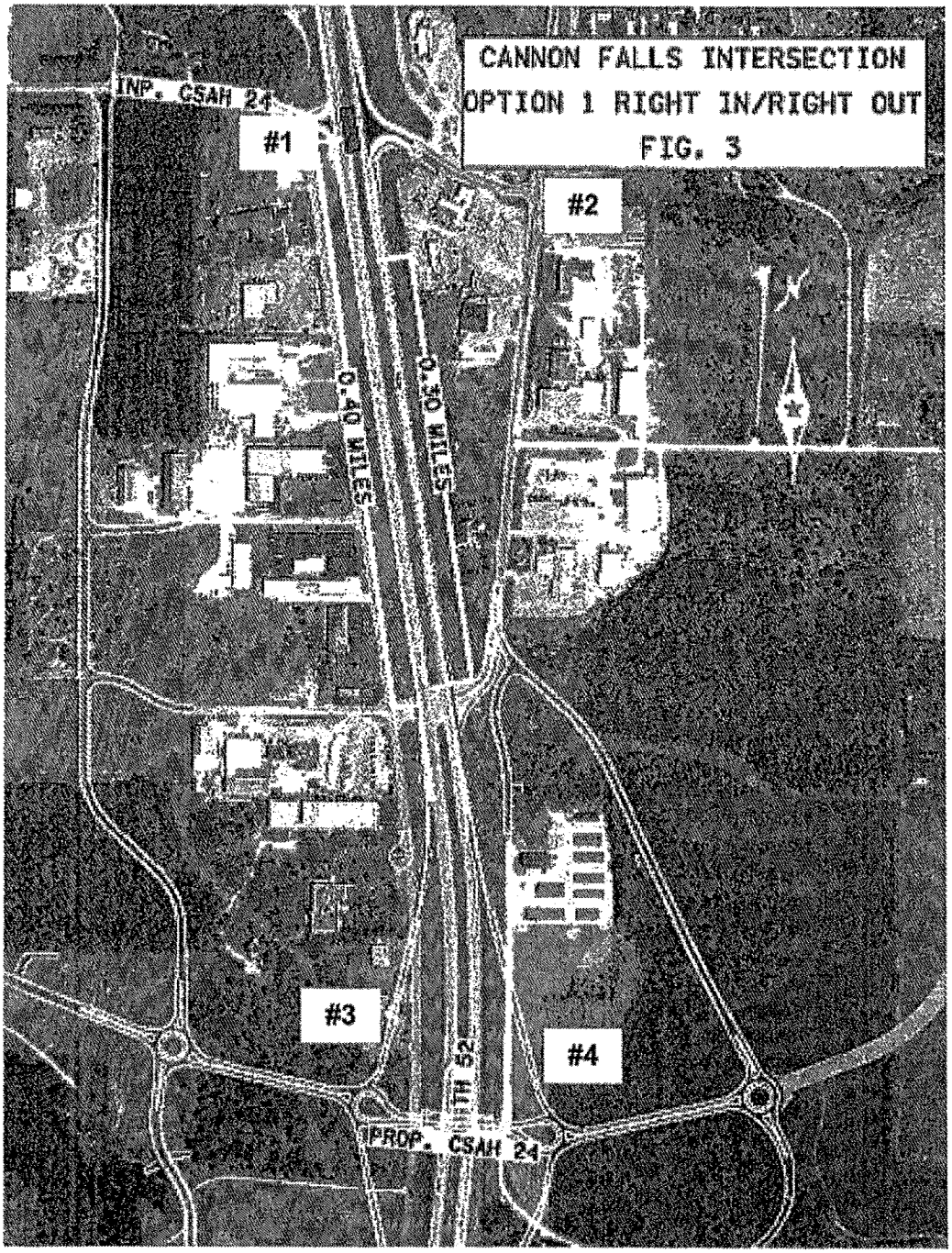
The Alternative 2 in the 2009 Project proposed the construction of a full access US 52 interchange near 324th Street with closure of all the local at-grade street accesses between the new interchange and the existing TH 19 interchange (Main Street) with two variations: with and without an overpass bridge at the existing CSAH 24/US 52 intersection. It is noted that year 2030 daily traffic forecasts were developed for both scenarios with and without the overpass while 2030 peak hour traffic forecasts for major intersections were available only for the scenario with the overpass.

In early 2014, several variations to the previous Alternative 2 in the 2009 Project were studied the Alternative with Right in/Right Out Access (shown in Figure 1) was selected for further operations and safety analysis. The alternative proposes constructing auxiliary lanes on US 52 to provide right in and right out access at the existing CSAH 24/US 52 intersection without an overpass. The US 52 Safety Study addresses the operations and safety concerns on the US 52 and four following major intersections (shown in **Figure 1**) due to the access change.

#1: US 52/CSAH 24 Right In/Out Intersection
#2: Old CSAH 24/65th Avenue Intersection
#3: New CSAH 24/US 52 Interchange West Ramp
#4: New CSAH 24/US 52 Interchange East Ramp

This memorandum documents the traffic forecast methodology and the results for the Right In/Out Alternative. The forecasts will be used for operations and safety analysis.

Figure 1
Right In/Right Out Alternative and Study Intersections



YEAR 2015 TRAFFIC FORECASTS

The year 2015 daily and peak hour traffic forecasts were developed based on the following steps.

1. The daily traffic forecasts for major roadway segments under 2015 No Build conditions were developed based on the historical trend analysis. (as shown in **Table 1**)
2. The daily growth factors were applied to 2006 peak hour turning movements from the 2009 Project to develop peak hour turning movement forecasts under 2015 No Build conditions
3. The 2015 traffic forecast under the No Build conditions were manually rerouted to develop the base 2015 build traffic forecasts to reflect the accessibility changes in the study area.
4. The new trips generated from the hospital were obtained from the traffic model for the 2009 Project and they were distributed to the four study intersections under build conditions to develop the final build forecasts. **Table 2** summarizes the hospital new trips and distributions via the study intersections. The assumptions on the directional distributions of the new trips using the four study intersections are as following:
    - The new trips going TH 52 North use the Right in/out while new trips from TH 52 North use the new interchange
    - The new trips from/to TH 52 South and West of TH 52 use the new interchange
    - The new trips from/to CSAH 24 North use the study intersection #2.

Table 1
Historical Daily Traffic Trend Analysis Summary

Segment	Historical ADT								2015 Forecast*	Total Growth 2007-2015
	2000	2002	2003	2004	2006	2007	2009	2011		
CSAH 24 North of 315th Street			6,700			6,300		6,000	6,100	
CSAH 24 South of 315th Street			4,300			4,350		4,400	4,600	6%
CSAH 24 East of TH 52			4,450			4,700		4,950	5,700	21%
CSAH 24 West of TH 52			1,650			1,650		1,950	1,900	15%
TH 52	18,400	18,900		17,800	17,900		18,800	18,400	19,600	9%

* Based on Historical Trend Analysis

Table 2
Hospital New Trips Generation and Distributions via Study Intersections

Daily Trips*		4,322		Distribution via study intersections				
				TH 52 north	TH 52 south	West of TH 52	CSAH 24 north	Other**
AM	% of daily	8%		30%	15%	10%	20%	25%
	In	69%	225	68	34	23	45	55
	Out	31%	101	30	15	10	20	26
PM	% of daily	9%		30%	15%	10%	20%	25%
	In	33%	108	32	16	11	22	27
	Out	67%	219	66	33	22	44	54

* The daily trips for the new Hospital is obtained from the traffic model (TAZ 28) for the 2009 Project.

** New trips don't use any of the study intersections

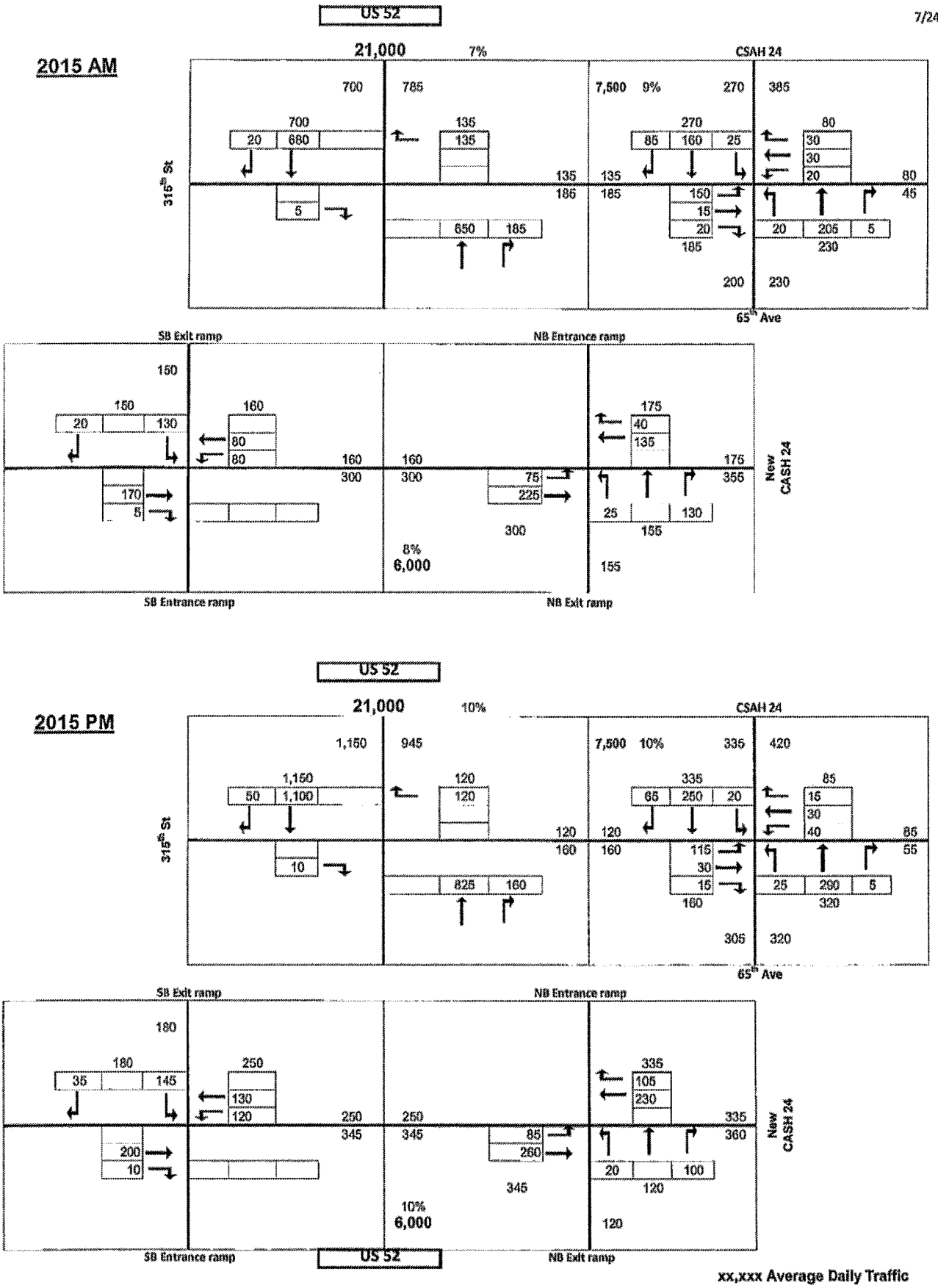
The 2015 daily and peak hour traffic forecasts for the Right In/Right Out Alternative are illustrated in the **Figure 2**.

YEAR 2030 TRAFFIC FORECASTS

Due to the similarity, the year 2030 traffic forecasts for the Right In/Right Out Alternative were developed based on the analysis on the Alternative 2 in the 2009 Project. The 2030 daily traffic forecasts for the No Build and Alternative 2 from the 2009 Project are illustrated side by side in **Figure 3**. The figure shows that the forecasted 2030 daily traffic on the overpass is 6,200 in the Alternative 2 with Overpass. The traffic patterns change noticeably under the Alternative 2 without Overpass. Daily traffic increases 4,000 from 32,000 to 36,000 on the US 52 segment between the new CSAH 24 interchange and the TH 19 interchange while no changes on the segments to the south and north. It is also noted that daily traffic increases 6,100 from 3,600 to 9,700 on the west side of the new CSAH 24 while it increases only 2,900 from 8,900 to 11,800 on the east side of the new CSAH 24. These traffic volume changes indicate that a substantial amount of local trips (approximately 4,000 daily trips) between the east and west sides of US 52 would use the new CSAH 24 interchange, US 52 and the TH 19 interchange under the Alternative 2 without Overpass.

Based on the analysis, the 2030 daily and peak hour traffic forecasts for the for the Build Alternative 2 in the 2009 Project were manually rerouted to develop the traffic forecasts for the Right In/Right Out Alternative to reflect the removal of the overpass and accessibility changes. The forecast results are illustrated in the **Figure 4**.

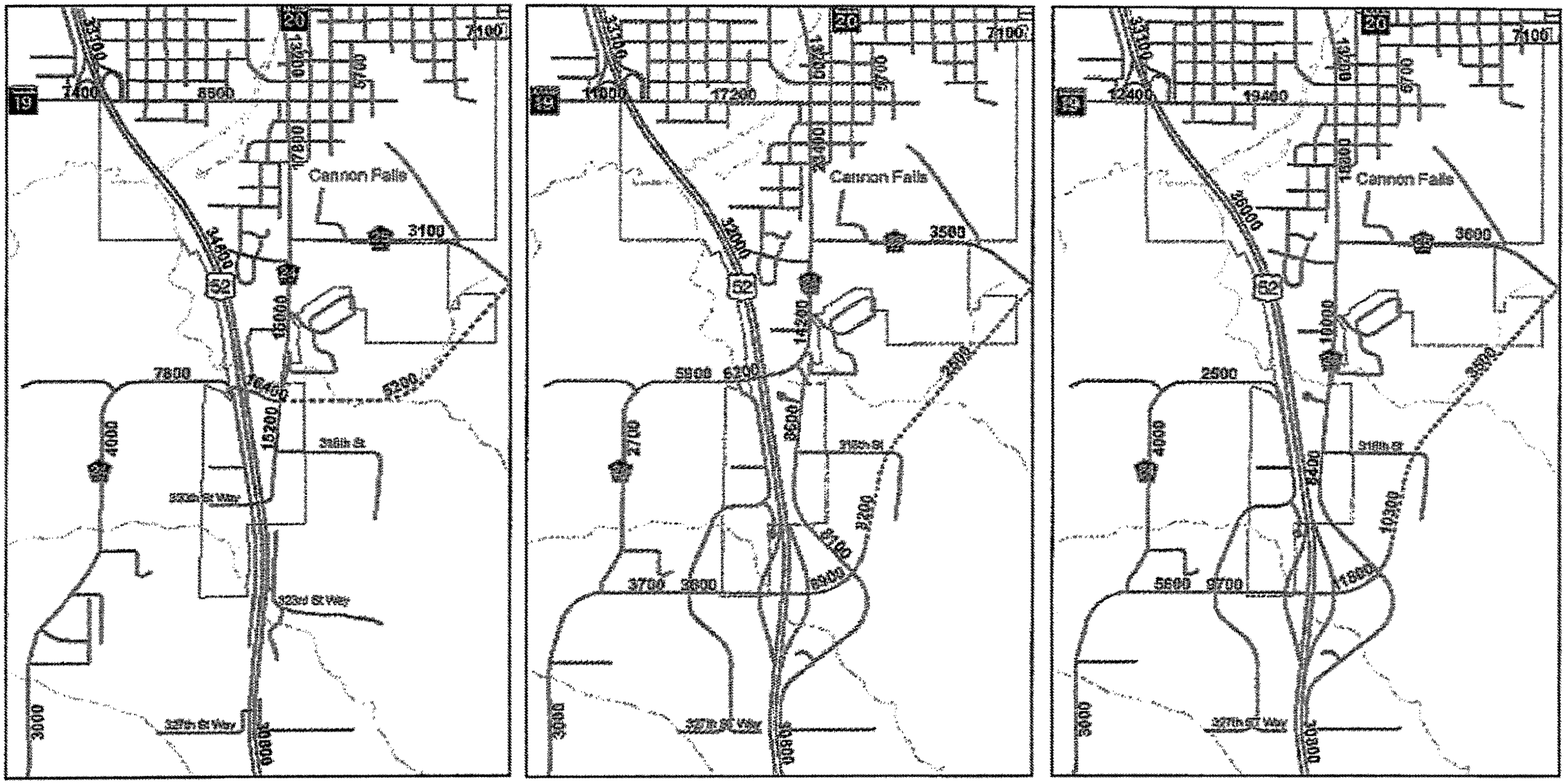
Attachments
s:\ko\m\mnt06\128314\th 52 - rt in access\traffic forecasts\forecast memo\us 52 safety forecast memo.docx



SEH

US 52 Safety Study
Cannon Falls, MN

Figure 2
Build Alternative with RI/RO at US 52/315th Street
2015 AM and PM Peak Hours



No Build

Alternative 2 with Overpass in the 2009 Project

Alternative 2 without Overpass in the 2009 Project

Source: Figures 3, 4 & 5 in Technical Memorandum Five – Traffic Forecasting, TH 52 Cannon Falls

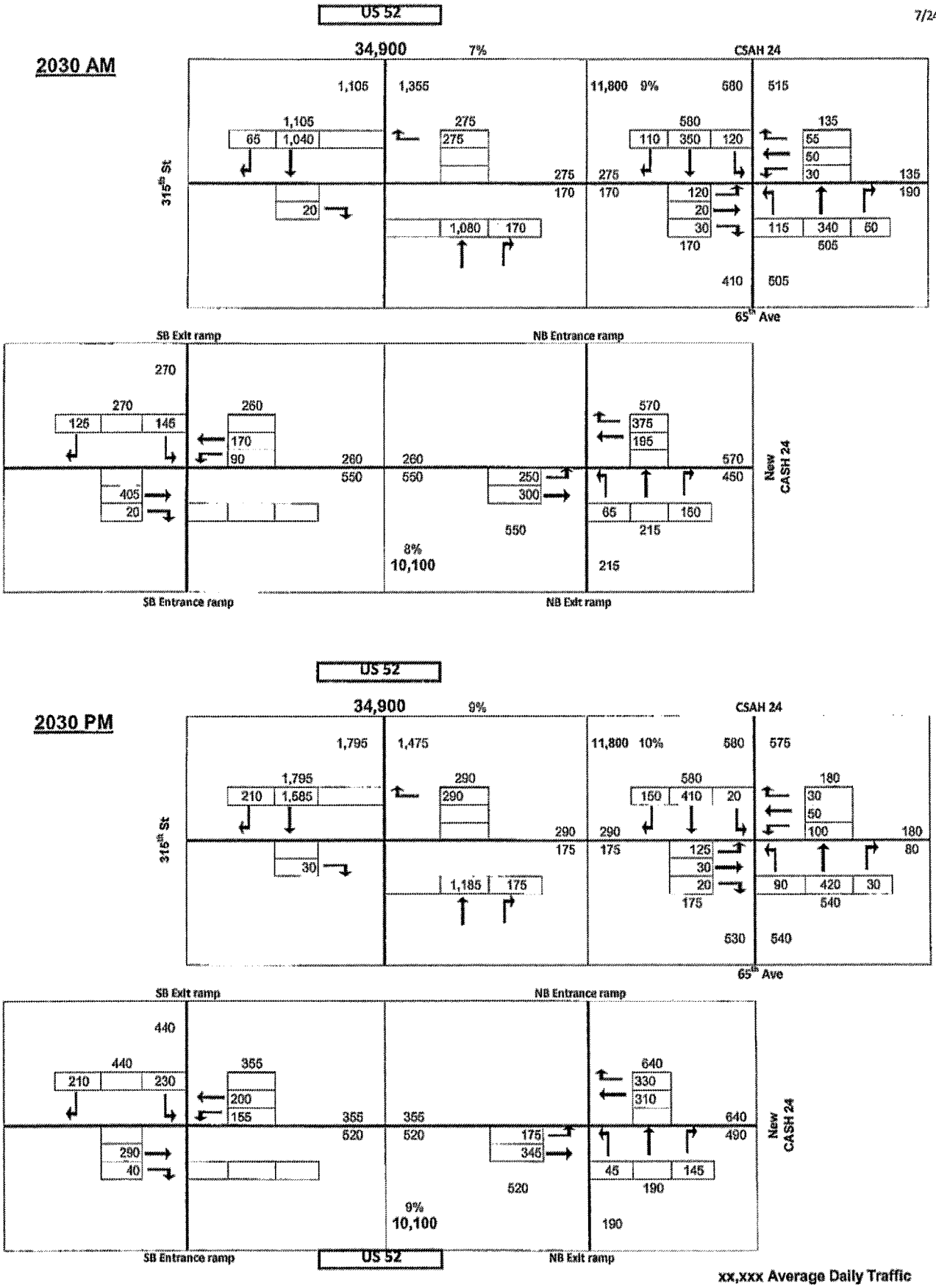
2030 Daily Traffic Forecasts for No Build and Alternative 2 in the 2009 Project

US 52 Safety Study in City of Cannon Falls

District 6, MnDOT

Figure 3

SEH



SEH

US 52 Safety Study
Cannon Falls, MN

Figure 4
Build Alternative with RI/RO at US 52/315th Street
2030 AM and PM Peak Hours

SEH

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MEMORANDUM

TO: Mike Schweyen, PE, MnDOT District 6
Ron Johnson, City of Cannon Falls

FROM: Thomas A. Sohrweide PE, PTOE
Chad M. Jorgenson, EIT

DATE: December 17, 2014

RE: TH 52 Safety Analysis
MnDOT Contract No. 05952
SEH No. MNT06 128314 Task 4.0

We have conducted a safety analysis for a potential right-in/right-out access at the TH 52/315th Street intersection in Cannon Falls. Our analysis is based on an estimate of the number of future crashes for the following intersections both with and without the right-in/right-out access:

- 315th Street/65th Avenue
- The roundabout intersection ramps at proposed CSAH 24/TH 52.
- Right-in/right-out at TH 52/315th Street

The attached page "TH 52 Crash Comparisons" uses year 2015 forecast daily traffic volumes to calculate the estimated number of crashes both with and without the right-in/right-out. Crash rates for these calculations are from MnDOT's 2012 Intersection Crash Rates, MnDOT rates for comparable roundabouts, and from comparable right-in/right/out intersections. A rate of 0.18 crashes per million entering vehicles is the urban thru/stop rate and was used for the 315th Street/65th Avenue intersection, and a rate of 0.55 crashes per million entering vehicles was used for the roundabouts at the interchange ramps. Table 1 is crash and severity data from comparable right-in/right-out intersections identified by MnDOT. However, after review and discussion with MnDOT, it was agreed that two of the nine intersections analyzed better reflected the proposed location. Therefore, Table 2 is the data for the two intersections and provides a crash rate of 0.16 for the right-in/right-out.

As seen in Tables 1 and 2, the severity rate for the right-in/right-out is extremely small. In addition, our research did not reveal any usable severity rate data for roundabouts. Therefore severity rates were not estimated for the future conditions. However, it should be noted that due to the higher speed differentials between TH 52 thru traffic and the right-in/right-out traffic, the expected severity of crashes is likely to be higher for the right-in/right-out than at the roundabout interchange ramps.

In summary of the attached calculations, the three study intersections without the right-in/right-out access have an estimated 4.09 crashes per year. The three study intersections plus the right-in/right-out at TH 52 & 315th Street have an estimated 5.12 crashes per year. This is comprised of 3.70 crashes per year at the three study intersections (reduced due to rerouting traffic) and 1.42 crashes per year at the right-in/right-out.

The MnDOT Office of Traffic, Safety & Technology further researched crashes at right-in/right-out locations and found there to be statistical significance to an increase in crashes from an increase in traffic volume and an increase in crashes as ratio of the main roadway traffic volume to the side street traffic volume becomes more unbalanced. These findings are attached.

Attachment

Project: TH 52 Crash Comparisons

Subject:

Date: 11/17/2014 By: Chad M. Sorgenson SEH #: MNTOG 128314

Checked by: Date: Office: St. Paul File #:

Sheet No: 1 Of: 1

Crashes w/ RI-RO

- 315TH @ 65TH — 2800 ADT for 315TH + 7500 ADT for CSAH 24 = 10,300 vpd
- Urban Thru/Stop crash rate = 0.18 (MnDOT Green Sheets)

$$\text{Number of Crashes} = \frac{(0.18)\cdot(365\text{ days})\cdot(10{,}300\text{ vpd})}{1{,}000{,}000\text{ vehicles entering}} = 0.68\text{ crashes/yr}$$

- Roundabouts

NB Ramp: 6000 ADT for CSAH 24 + 1200 ADT NB Ramp = 7200 vpd, 0.55 crash rate for TH RABs comparable to TH52: Wentworth

$$\text{Number of Crashes} = \frac{(0.55)\cdot(365\text{ days})\cdot(7200\text{ vpd})}{1{,}000{,}000\text{ vehicles entering}} = 1.45\text{ crashes/yr}$$

SB Ramp: 6000 ADT for CSAH 24 + 1800 ADT for SB Ramp = 7800 vpd, 0.55 crash rate

$$\text{Number of Crashes} = \frac{(0.55)\cdot(365\text{ days})\cdot(7800\text{ vpd})}{1{,}000{,}000\text{ vehicles entering}} = 1.57\text{ crashes/yr}$$

- RI/RO:

Total crash rate: 0.16 from comparable locations spreadsheet

$$\text{Number of Crashes} = \frac{(0.16)\cdot(365\text{ days})\cdot(21{,}000\text{ vpd} + 3400\text{ vpd})}{1{,}000{,}000\text{ vehicles entering}} = 1.42\text{ crashes/yr}$$

Total # of Crashes: 5.12 crashes/yr

Crashes w/o RI-RO

- 315TH @ 65TH — 7500 vpd for CSAH 24 + 2800 vpd for 315TH SB + 400 vpd indirect trips = 9900 vpd
- Urban Thru/Stop crash rate = 0.18 (MnDOT Green Sheets)

$$\text{Number of Crashes} = \frac{(0.18)\cdot(365\text{ days})\cdot(9{,}900\text{ vpd})}{1{,}000{,}000\text{ vehicles entering}} = 0.65\text{ crashes/yr}$$

- Roundabouts

NB Ramp: 6000 ADT for CSAH 24 + 2800 ADT NB Ramp = 8,800 vpd, 0.55 crash rate

$$\text{Number of Crashes} = \frac{(0.55)\cdot(365\text{ days})\cdot(8{,}800\text{ vpd})}{1{,}000{,}000\text{ veh. entering}} = 1.77\text{ crashes/yr}$$

- SB Ramp: 6000 ADT for CSAH 24 + 2300 ADT SB Ramp = 8,300 vpd, 0.55 crash rate

$$\text{Number of Crashes} = \frac{(0.55)\cdot(365\text{ days})\cdot(8{,}300\text{ vpd})}{1{,}000{,}000\text{ veh. entering}} = 1.67\text{ crashes/yr}$$

Total # of Crashes: 4.09 crashes/yr

RIGHT-IN / RIGHT-OUT INTERSECTIONS
2011 – 2013 Minnesota Crashes

1.0 Summary

- As volume increases, crashes increase.
  - ✓ +0.552 correlation
  - ✓ Statistically significant
  - ✓ Comparing two intersections, one with 1,000 additional vehicles would expect 1 additional crash every 15 years (0.07 more annually).
- As volume on legs becomes more unbalanced, crashes increase.
  - ✓ +0.608 correlation
  - ✓ Statistically significant

2.0 Analysis

Linear regression of total number of crashes per year. This is calculated by dividing the total number of crashes by the number of days included multiplied by 365.25 days per year.

33 similar intersections were identified: 7 in Greater Minnesota, 26 in Metro. Entering volumes averaged 26,400 vehicles, ranging from 9,350 to 45,300. The "unbalance ratio" of the legs is calculated by dividing the ADT from the highest volume leg by the entering volume.

3.0 Results

	Total Correlation	Part Correlation
Entering Volume (MEV)	+.552 (*p*=.000)	+.382
Unbalance Ratio	+.608 (*p*=.000)	+.362
Speed Limit	+.017 (*p*=.462)	-.272

The part correlation is the contribution of each variable towards total explained variance independent of the others.

Variable	Coefficient	Std. Error	Significance
[Constant]	-4.554	3.076	.150
Entering Volume (MEV)	66.638	22.322	.006
Unbalance Ratio	4.028	1.422	.008
Speed Limit	-0.065	.031	.042

$R^2 = 0.526$

There is a positive, significant correlation between entering volume and crashes. Similarly, as the volumes become more unequal, the number of crashes significantly increases.

Speed limits are also correlated to higher number of crashes. However, roads with higher volumes tend to have higher posted speeds. The part correlation controls for the part of speed limits independent of volume; here we see that increased speed limits has a negative correlation with crashes.

Table 1

TH 52 Right-in/Right-out Crash Comparison (500 ft)

Intersection	Intersection Type	Adjacent Access Distance/Type	Minor Road ADT	Total Entering ADT	TOTAL Crash Severity					Crash Type - 3r					Number of Existing Crashes					Number of Existing Crashes					TOTAL Crashes				
					A	B	C	PDO	TOT	A	B	C	PDO	TOT	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
TH 52/CSAH 86 - Kilkenny	T-308	Right-out = 1,500' downstream of exit; right-in/out/cross with downstream access	10,000	7,000	0	0	0	3	7	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0.200	0.200	0.054	0.000	0.0014285714
W Lake Street/TH 7	T	Right-out = 1,500' upstream of signalized intersection; Right-in = 330' downstream of entrance ramp	20,000	3,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.400	0.400	0.091	0.000	0.0000000000
TH 52/Hadley Drive	T	Right-out = 330' upstream of entrance ramp; Right-in = 1650' downstream from signalized intersection	500,000	30000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.000	0.000	0.000	0.000	0.0000000000
TH 52/Dupont Ave	T	Right-out = 1200' upstream of entrance ramp; Right-in = 2640' downstream from signalized intersection	50,000	20000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.000	0.000	0.000	0.000	0.0000000000
TH 52/Randolph Parkway Road	T	Right-out = 1320' upstream of entrance ramp; Right-in = 2640' downstream from signalized intersection	50,000	20000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.000	0.000	0.000	0.000	0.0000000000
TH 52/Cayuga Avenue	T	Right-out = 660' downstream of entrance ramp; Right-in = 1320' upstream of signalized intersection	20,000	12000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.000	0.000	0.000	0.000	0.0000000000
TH 52/Wentworth Avenue	T	Right-out = 1320' upstream of exit ramp; Right-in = 2640' from signalized intersection	20,000	8000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.000	0.000	0.000	0.000	0.0000000000
TH 52/Concord Street	T	Right-out = 1320' upstream of exit ramp; Right-in = 2640' access from signalized intersection	20,000	8000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.000	0.000	0.000	0.000	0.0000000000
TH 52/Bruce Street	T	Right-out = 1320' downstream of entrance ramp; Right-in = 2640' upstream of signalized intersection	10,000	4000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.000	0.000	0.000	0.000	0.0000000000
TH 52/Argenta Street	T	Right-out = 1320' downstream of entrance ramp; Right-in = 2640' upstream of signalized intersection	10,000	4000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.000	0.000	0.000	0.000	0.0000000000
Average # of Crashes															0.0					0.0					0.0					

* Revision estimated volume

Table 2

TH 52 Right-in/Right-out Crash Comparison - Similar Access Control (500 ft)

Intersection	Intersection Type	Adjacent Access Distance/Type	Minor Road ADT	Total Minor ADT	Crash Severity					Crash Severity					Number of Existing Crashes					Number of Existing Crashes					TOTAL Crashes				
					A	B	C	PDO	TOT	A	B	C	PDO	TOT	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
TH 52/Lexington Avenue/TH 7	S	Right-out = 1320' upstream of signalized intersection; Right-in = 1320' downstream of entrance ramp	30,000	3,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.000	0.000	0.0000000000
TH 52/Hadley Drive	S	Right-out = 660' upstream of entrance ramp; Right-in = 1320' downstream from signalized intersection	500,000	30000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.000	0.000	0.0000000000
Average # of Crashes															0.0					0.0					0.0					

* Revision estimated volume

SEH

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MEMORANDUM

TO: Mike Schweyen, PE, MnDOT District 6
Ron Johnson, City of Cannon Falls

FROM: Thomas A. Sohrweide, PE, PTOE
Scott Hotchkin, PE

DATE: December 4, 2014

RE: TH 52 Access Concepts
MnDOT Contract No. 05952
SEH No. MNT06 128314 Task 6.0

The attached Figures 1 – 4, depict four geometric concepts of a right-in/right-out access.

- Figure 1
  - Northbound
    - Right turn exit lane
    - Acceleration lane
  - Southbound
    - Right turn exit lane
    - Auxiliary lane
- Figure 2
  - Same as Figure 1, except the northbound right turn exit lane is replaced with an auxiliary lane
- Figure 3
  - Same as Figure 1, except the northbound right turn lane is separated from the exit to create an interchange type exit.
  - This in only shown for Northbound, but could also be used for southbound
- Figure 4
  - Same as Figure 3, except the Northbound right turn exit lane is replaced with an auxiliary lane

Due to the proximity of the southbound interchange exit to a southbound right-out from 315th Street, it is our recommendation that if developed, this movement should be designed as an auxiliary lane.

The concepts all show right-in/right-out access for both north and southbound. The concepts could be further modified to provide right-in or right-out only and could be different for north and southbound.

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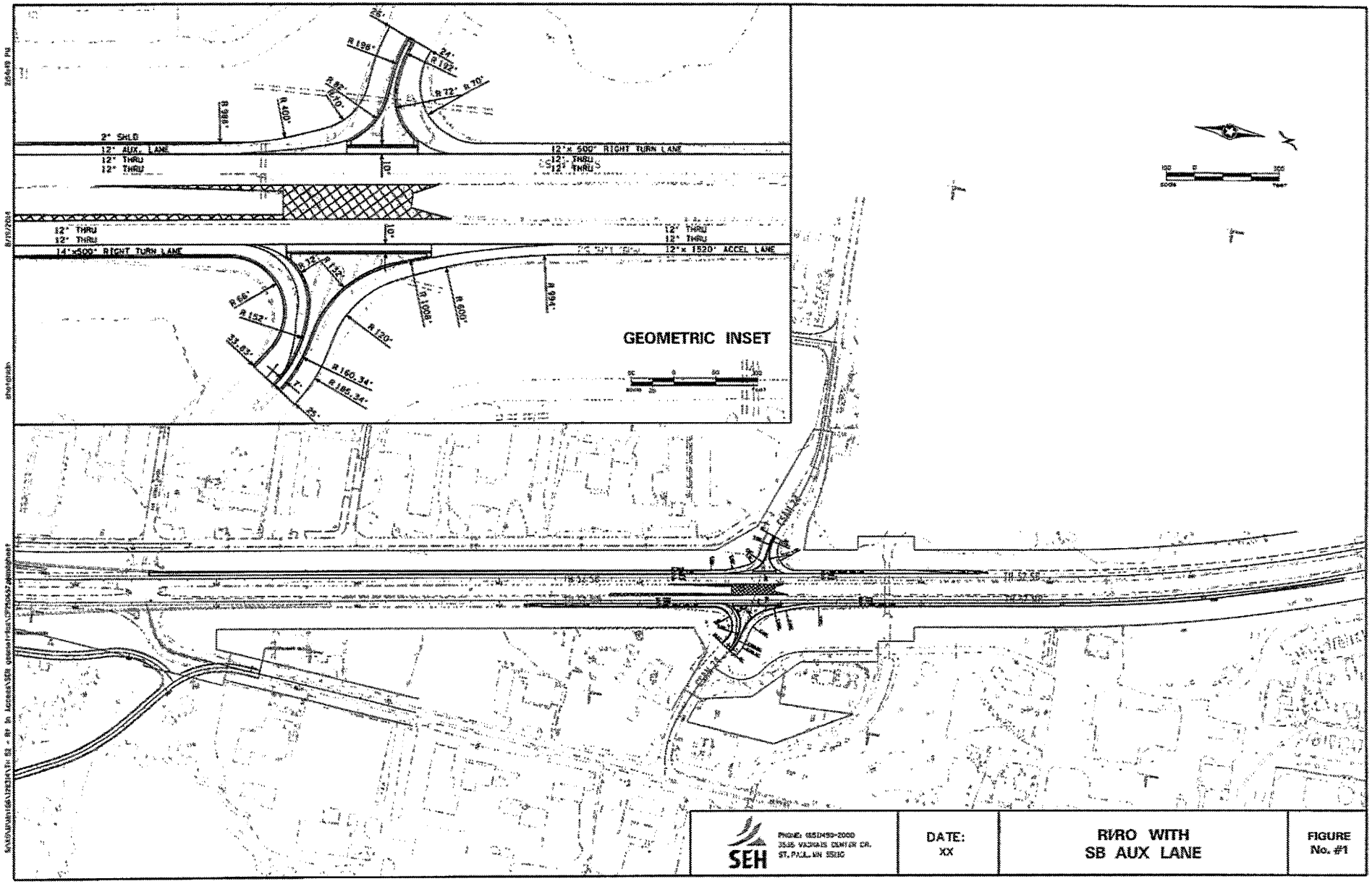
Attachments



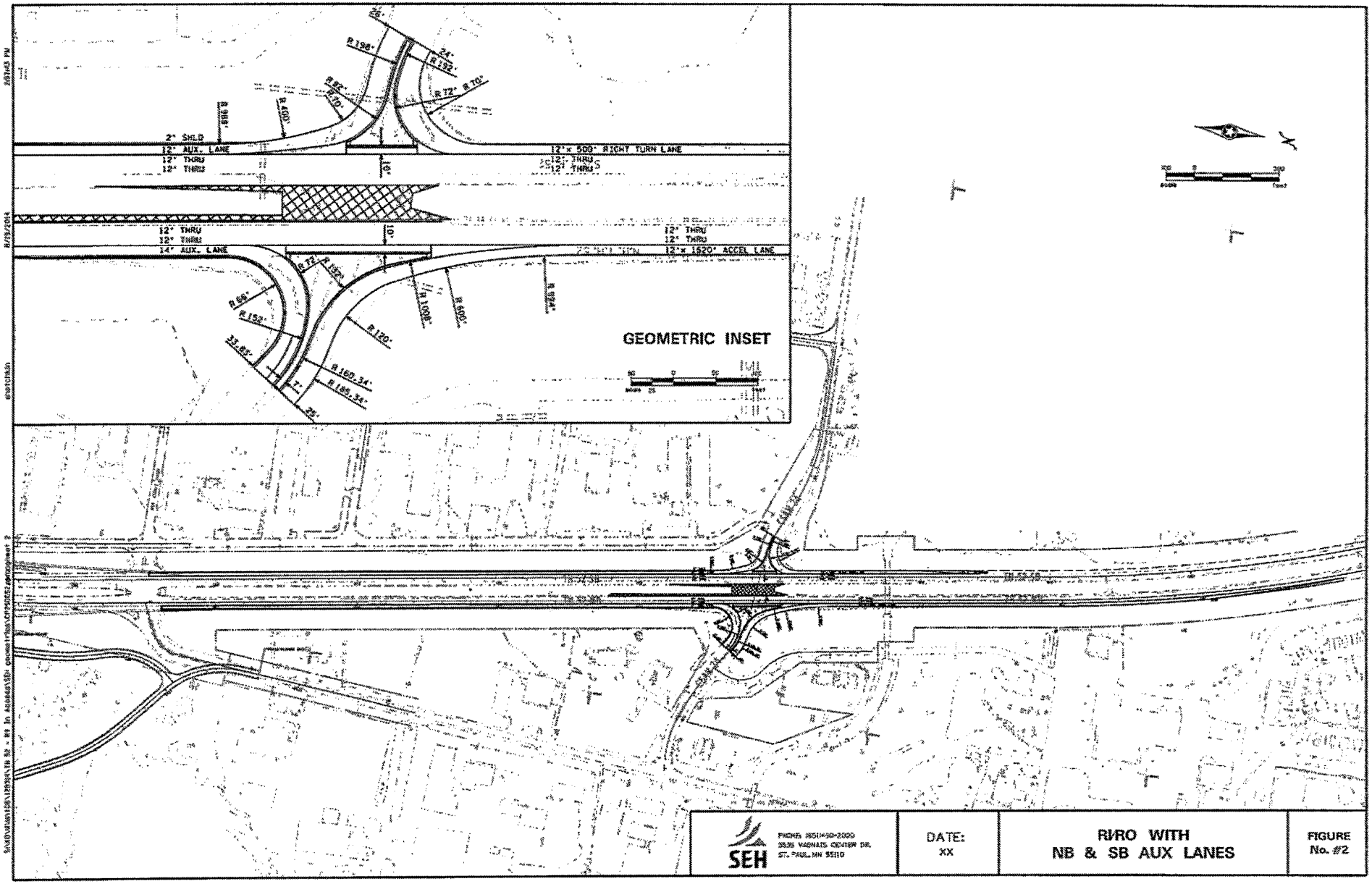
SEH

PHONE: (651)490-2000
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110

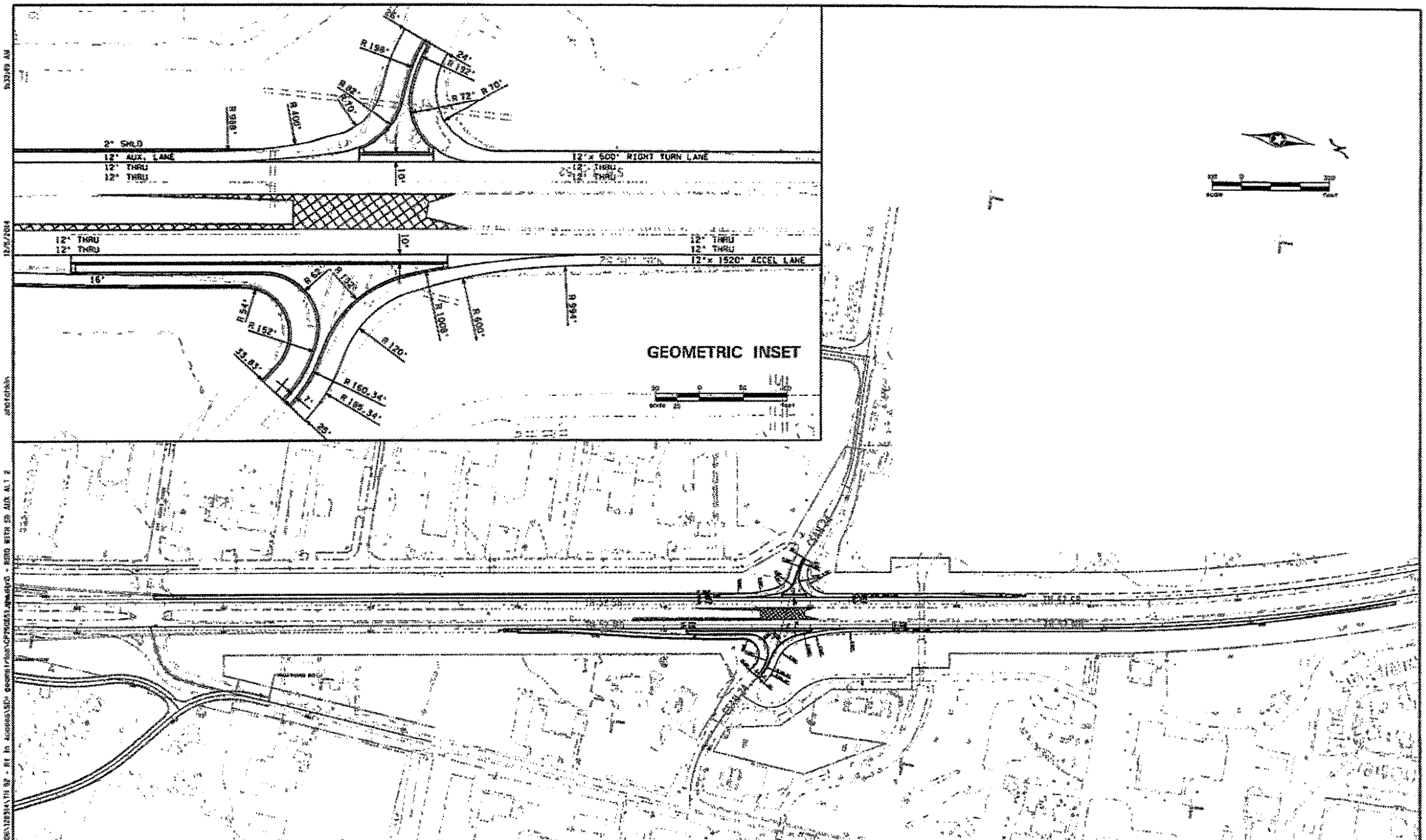
DATE:
XX

RI/RO WITH
SB AUX LANE

FIGURE
No. #1



SEH PHONE (651)490-2000 3535 VADNAIS CENTER DR. ST. PAUL, MN 55110	DATE: XX	R/RO WITH NB & SB AUX LANES	FIGURE No. #2

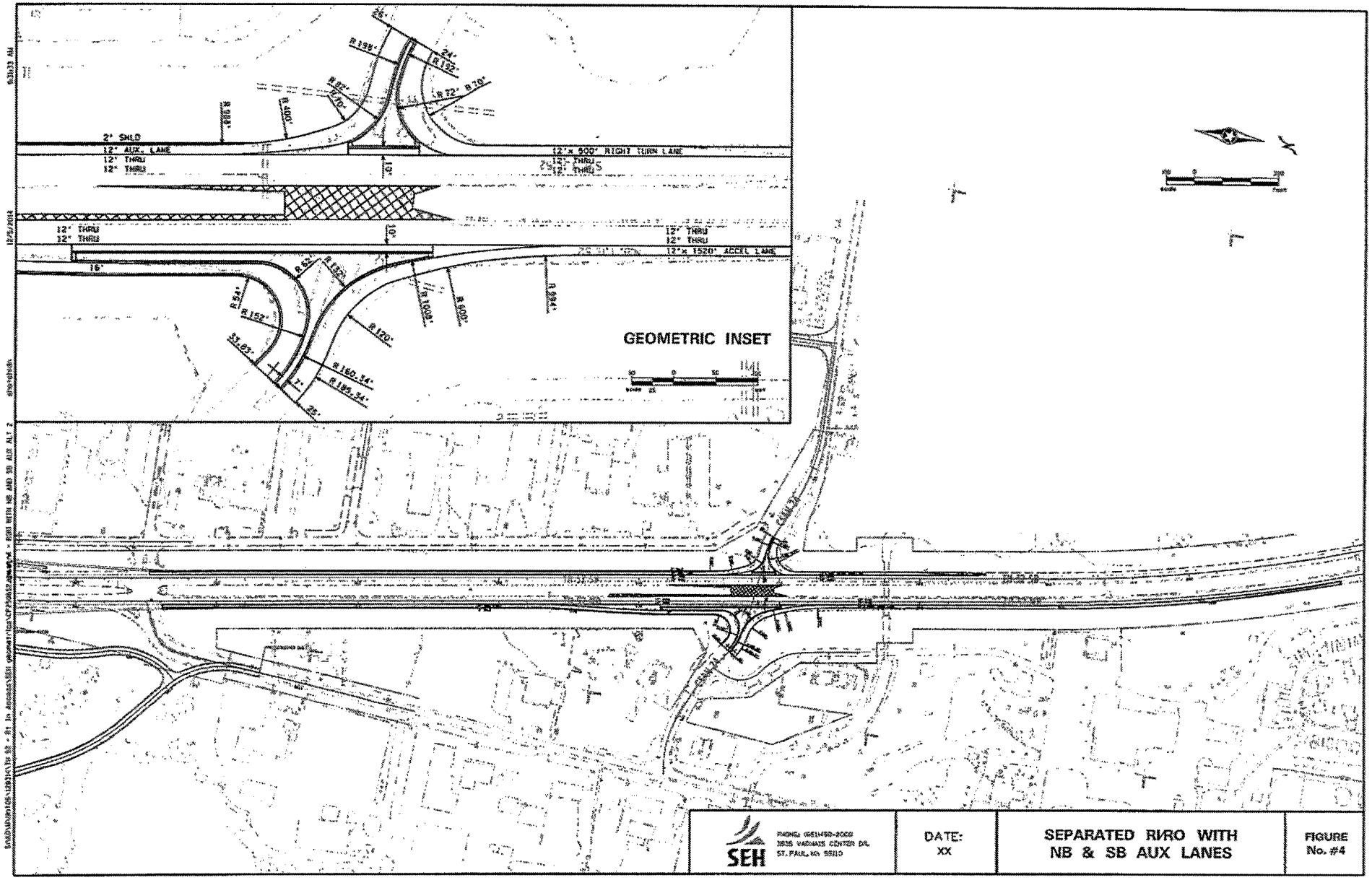


SEH

DATE:
XX

SEPARATED RI/RO WITH
SB AUX LANE

FIGURE
No. #3



SEH

DATE: XX

SEPARATED RI/RO WITH NB & SB AUX LANES

FIGURE No. #4

SEH

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MEMORANDUM

TO: Mike Schweyen, PE, MnDOT District 6
Ron Johnson, City of Cannon Falls

FROM: Thomas A. Sohrweide, PE, PTOE
Graham Johnson, PE

DATE: December 17, 2014

RE: TH 52 Operational Analysis
MnDOT Contract No. 05952
SEH No. MNT06 128314 Task 6.0

This memorandum summarizes the traffic operational analysis conducted for the potential right-in/right-out access on TH 52 at 315th Street in Cannon Falls.

The Highway Capacity Manual (HCM) outlines procedures for evaluating the quality of traffic flow. The quality of traffic flow is expressed as a Level of Service (LOS) A – F, where LOS A represents the best operating conditions from the traveler's perspective and LOS F represents the worst.

Of concern with traffic operations at this location are:

- Traffic entering from a stop or yield condition onto a high speed roadway.
- Traffic exiting a high speed roadway.
- The proximity of an interchange to an at-grade access.

The original intent of the study was to analyze the concerns using HCM freeway type analysis, which consists of weaving (vehicles changing lanes), merging (vehicles entering from and interchange to the highway), and diverging (vehicles exiting the highway).

With the right-in/right-out condition being analyzed, these conditions don't totally cover the operation of the right-out traffic entering the highway. Therefore we also used Synchro/SimTraffic intersection modeling software to address the availability of gaps in traffic to accept the entering traffic.

The year 2030 AM and PM Peak Hour traffic forecasts were used for the operational analysis.

The attached Figures 1 – 3 report the results of the weaving, merge, and diverge analyses.

As noted on Figure 1, weaving analysis requires an auxiliary lane. The one-lane entrance ramp from the interchange followed by a one-lane exit and not connected by an auxiliary lane, is not considered as a weaving configuration, but as isolated merge and diverge configurations. Therefore, to analyze the weaving traffic for the conditions where there is not an auxiliary lane, as shown on the top of Figures 1 and 2, the analysis assumed one through lane on TH 52 and an auxiliary lane. While not depicting the geometry that would be present, this is a conservative analysis. This analysis indicates a LOS B for both directions and both peak hours.

The bottom of Figures 1 and 2, is the analysis with an auxiliary lane present. As indicated, this analysis found LOS A/B.

Figure 3 reports the results of the merge and diverge analyses. LOS B is reported for all merge and diverge levels of service.

As mentioned above, Synchro/SimTraffic was used as a tool address the ability of the entering traffic to access TH 52. This software was used for the ease of use, and is not the necessarily the most appropriate tool to use for freeway access. However, it was used to provide additional data on the availability of gaps along TH 52 to compliment the above described HCM analysis.

As reported in Tables 1 and 2, analysis was completed for three scenarios.

- Version 1 – Auxiliary lane between the interchange and the right-in/right-out; northbound acceleration lane.
- Version 2 – No auxiliary lanes; north and southbound acceleration lanes.
- Version 3 – No auxiliary lanes; no acceleration lanes.

As reported in the tables, all movements are LOS A, which assures there will be gaps in traffic for the right-out traffic to enter TH 52. Also attached is the detailed modeling results of this analysis.

The operational analysis reports reasonable peak hour traffic operating conditions.

ts
Attachments
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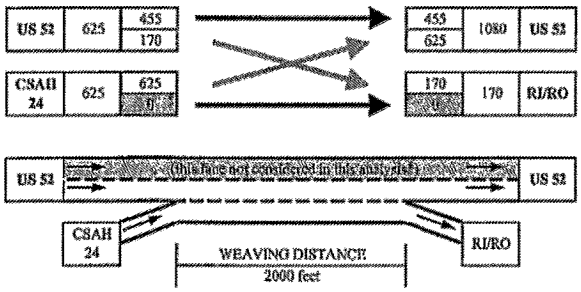
Figure 1
NORTHBOUND US 52
WEAVING ANALYSIS

ASSUMPTIONS:
10% Heavy Vehicle (2150/20300 HCAADT/AADT); 1% Recreational Vehicle.
Speed Limit 65 mph; PHF 0.9
100% Weaving Demands (worst case scenario)

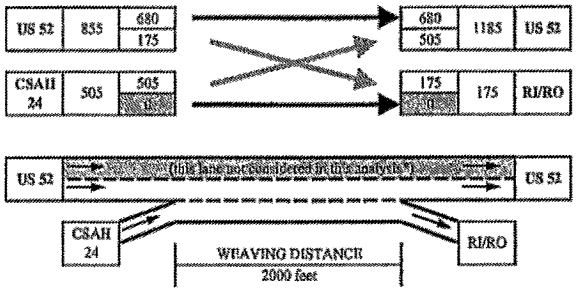
2030 WEAVING ANALYSIS - NO AUXILIARY LANES (see note)

AM PEAK HOUR ANALYSIS



Weaving Segment Data		
Flow Rate	1389	veh/hr
Capacity	3382	veh/hr
V/C Ratio	0.411	
LOS	B	

PM PEAK HOUR ANALYSIS

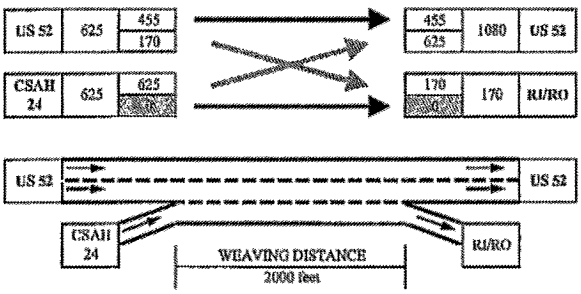


Weaving Segment Data		
Flow Rate	1512	veh/hr
Capacity	3620	veh/hr
V/C Ratio	0.417	
LOS	B	

*Weaving segments require auxiliary lanes (see note below); therefore for this analysis, 2 weaving lanes were used which assumes US 52 would only have a single freeway lane.

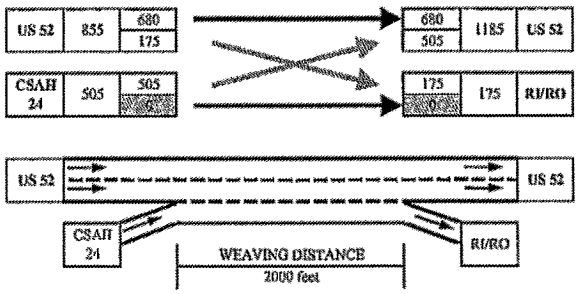
2030 WEAVING ANALYSIS - AUXILIARY LANES

AM PEAK HOUR ANALYSIS



Weaving Segment Data		
Flow Rate	1389	veh/hr
Capacity	3586	veh/hr
V/C Ratio	0.387	
LOS	A	

PM PEAK HOUR ANALYSIS



Weaving Segment Data		
Flow Rate	1512	veh/hr
Capacity	4563	veh/hr
V/C Ratio	0.331	
LOS	A	

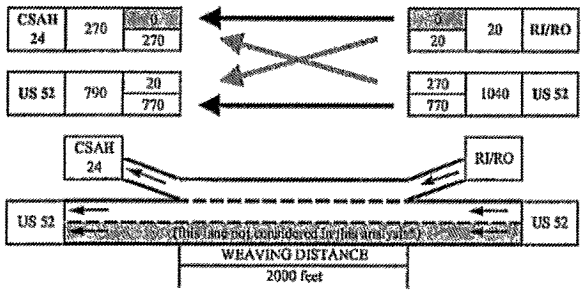
NOTE:
Weaving distance from entrance ramp painted gore to full 12' wide right turn lane beginning point.
Page 12-5 (2010 HCM): It is important to note that the case of a one-lane ramp closely followed by a one-lane off ramp, but not connected by a continuous freeway auxiliary lane, is not considered to be a weaving configuration. Such cases are treated as isolated merge and diverge segments by using methodology described in Chapter 13. The distance between the on ramp and off ramp is not a factor in this determination.

Figure 2
SOUTHBOUND US 52
WEAVING ANALYSIS

ASSUMPTIONS:
10% Heavy Vehicle (2150/20300 HCAADT/AADT); 1% Recreational Vehicle.
Speed Limit 65 mph; PHF 0.9
100% Weaving Demands (worst case scenario)

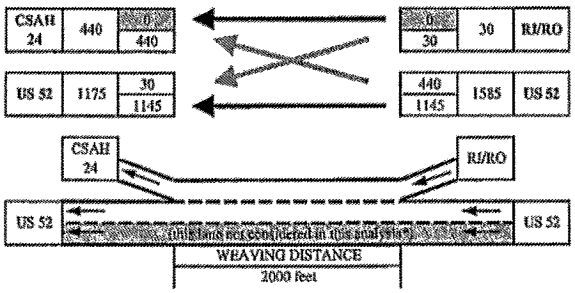
2030 WEAVING ANALYSIS - NO AUXILIARY LANES (see note)

AM PEAK HOUR ANALYSIS



Weaving Segment Data		
Flow Rate	1178	veh/hr
Capacity	4046	veh/hr
V/C Ratio	0.291	
LOS	B	

PM PEAK HOUR ANALYSIS

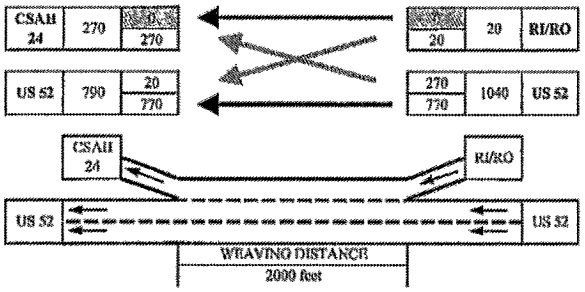


Weaving Segment Data		
Flow Rate	1795	veh/hr
Capacity	4019	veh/hr
V/C Ratio	0.446	
LOS	B	

*Weaving segments require auxiliary lanes (see note below); therefore for this analysis, 2 weaving lanes were used which assumes US 52 would only have a single freeway lane.

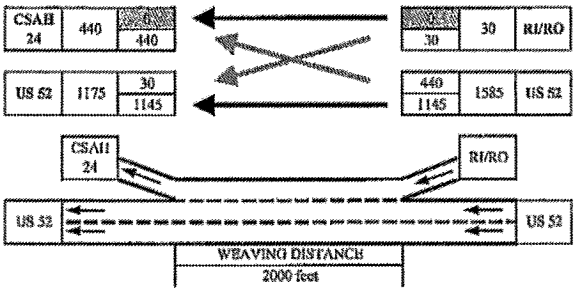
2030 WEAVING ANALYSIS - AUXILIARY LANES

AM PEAK HOUR ANALYSIS



Weaving Segment Data		
Flow Rate	1178	veh/hr
Capacity	5980	veh/hr
V/C Ratio	0.197	
LOS	A	

PM PEAK HOUR ANALYSIS



Weaving Segment Data		
Flow Rate	1795	veh/hr
Capacity	5940	veh/hr
V/C Ratio	0.302	
LOS	B	

NOTE:
Weaving distance assumes 500' acceleration length for the eastbound right turn to the southbound exit ramp painted gore.
Page 12-5 (2010 HCM): It is important to note that the case of a one-lane ramp closely followed by a one-lane off ramp, but not connected by a continuous freeway auxiliary lane, is not considered to be a weaving configuration. Such cases are treated as isolated merge and diverge segments by using methodology described in Chapter 13. The distance between the on ramp and off ramp is not a factor in this determination.