Highway 36 Corridor Study
Between Hadley Avenue and Highway 120 (Century Ave.)

Final Report

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Prepared for:

Minnesota Department of Transportation, City of Oakdale,City of North St. Paul, Ramsey County and Washington County

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Table of Contents

Title Page
Table of Contents

Page

Executive Summary **1**
Stakeholder and Public Involvement **3**
Project Management Team (PMT) 3
Public Involvement Activities 3
Public Open House Meetings 3
Study Website 4
City Council Workshops 4
Highway 36 Corridor Vision and Study Goals **4**
Corridor Vision 4
Study Goals 4
MnDOT Corridor Investment Management Strategy (CIMS) 4
Highway 36 Corridor Existing Conditions **5**
Existing Traffic Volumes 5
Forecast Traffic (2040): No-Build 5
Crash Analysis 6
Existing Traffic Operations 7
2040 No Build Traffic Operations 8
Social, Economic, and Environmental (SEE) Characteristics 8
Conceptual Design Alternatives **9**
Concept Alternatives Development 9
Phase I – Concept Alternatives Evaluation and Screening Process 10
Phase II – Refined Concept Alternatives Evaluation and Screening 13
Gateway Trail Crossing at Hadley Avenue 15
Next Steps **20**

List of Figures

Figure 1 – Project Study Area Issues Map 1
Figure 2 – Existing and 2040 No Build Daily Traffic Volumes 6
Figure 3 – Concept Alternative S2: Diamond Interchange at Highway 120 With Overpass at Hadley Ave. 16
Figure 4 – Concept Alternative T2: Diamond Interchange at Highway 120 and Folded Diamond at Hadley Ave. (Traditional Intersections) 17
Figure 5 – Concept Alternative T2: Diamond Interchange at Highway 120 and Folded Diamond at Hadley Ave. (Roundabout Intersections) 18

List of Tables

Table 1 – Phase I: Highway 36 Concept Alternatives Screeing Matrix 11
Table 2 – Phase II: Highway 36 Refined Conept Alternatives Screening Matrix 16

Table of Contents (Continued)

List of Corridor Study Report Appendices

Appendix A	Public Involvement Materials
Appendix B	Highway 36 Corridor Study - Existing Conditions and Study Goals Technical Memorandum
	Preliminary Environmental Findings Memorandum
	Study Area Wetland Map
Appendix C	Highway 36 - Alternatives Development and Screening Technical Memorandum
	Interchange Alternatives Traffic Analysis Memorandum
Appendix D	Alternatives Development and Screening Technical Memorandum
	Interchange Alternatives Traffic Analysis Memorandum
	Assessment of Gateway Trail Crossing at Hadley Avenue Technical Memorandum

Highway 36 Corridor Study

Between Hadley Avenue and Highway 120 (Century Ave.)

Final Report

Prepared for MnDOT, City of Oakdale, City of North St. Paul, Ramsey County and Washington County

Executive Summary

This Corridor Study Report is the final documentation in a series of technical memoranda that were developed to address safety and mobility issues along Highway 36 between Hadley Avenue on the east and the Highway 120 (Century Avenue) on the west. Figure 1 depicts the general study area and several transportation related issues identified at the onset of this corridor study. The Minnesota Department of Transportation (MnDOT), in cooperation with the City of Oakdale, City of North St. Paul, Ramsey County and Washington County, initiated this transportation planning effort in the spring of 2013. The purpose of this study was to develop preliminary concept designs for intersection improvements for Highway 36 at the intersections of Highway 120 (Century Ave.) and Hadley Avenue/County Highway 35, located just west of Interstate 694 (I-694).

Figure 1 – Project Study Area Issues Map

The Highway 36 corridor has seen a high level of investment over the last decade with transportation improvements aimed at improving safety and traffic operations. In 2005, the McKnight Street Interchange Project was completed in the cities of Maplewood and North St. Paul that included a diamond interchange at

McKnight Street and the removal of several at-grade intersections and signals. The Margaret Street overpass and westbound exit ramp was also included with the 2005 project. In 2011, the Highway 36/Rice Street interchange was reconstructed as an off-set single point interchange. The Highway 36 Interchange Project at English Street was completed in 2013 and included the construction of a tight diamond interchange and the removal of a signal and several at-grade intersections. Just east of I-694, the Highway 36/Hilton Trail Project is currently under construction and includes the removal of another signalized at-grade intersection with the construction of a grade separated interchange. Because of these past investments and the fact that the segment of Highway 36 between Hadley Avenue and Highway 120 (Century Ave.) contains the only remaining at-grade intersections west of I-694, MnDOT and the project partners, wanted to define the long range vision for this segment of the corridor. Furthermore, since there has been a decrease in transportation funding both at the state and federal levels, a thorough review of the corridor and future needs would ensure continued investments reflect the maximum return on investment in the way of improved safety, mobility, and economic vitality along the corridor.

The scope of this study included an evaluation of existing safety and traffic operational conditions, an assessment of future forecast traffic conditions, the development of alternative intersection designs, interchange designs and concept level layouts. The preliminary concepts identified recommended access control and opportunities for supporting road connections in an attempt to improve safety and traffic operations along Highway 36. A series of conceptual design alternatives (low-, medium- and high-cost) were developed and evaluated. The concepts included multiple configurations of at-grade intersection improvements, single interchange options (interchange at either Hadley Ave. or Highway 120, but not both), and two interchange options (grade separation at both Hadley Ave. and Highway 120).

Initially, a total of ten conceptual alternatives (with several design options) were developed and evaluated. At the conclusion of the Phase I process, a number of alternatives were screened from further consideration and only three interchange alternatives were retained for additional concept design refinement and more detailed evaluation. It should be noted that the PMT decided that the three at-grade alternatives would not be further evaluated as part of the study because they do not achieve the long-term vision for Highway 36 inside the I-694 beltway, which is to create an access controlled expressway with spaced grade separated interchanges. However, if safety and capacity issues warrant an interim improvement these options will be revisited. The three remaining interchange alternatives were later reduced to two alternatives as it was determined that a two interchange alternative with reduced access (removal of access ramps) at Highway 120 and/or Hadley Avenue was not reasonable given local and regional concerns associated with local circulation, future land development, and emergency service access. Furthermore, no substantial incentive was identified with the reduced movement concept. As a result, this two interchange alternative with reduced access was not carried forward to a greater level of conceptual design and was dismissed from additional consideration. The remaining two alternatives were refined and evaluated against a more detailed set of evaluation criteria and were presented to the public at an open house meeting on October 29, 2013.

This Final Report has been prepared to document the overall study planning process and includes a summary of the technical memoranda completed as part of the study. A complete copy of each technical memorandum is included as appendices of this report.

Stakeholder and Public Involvement

The Highway 36 Corridor Study planning process included a stakeholder and public involvement program that was initiated at the beginning of the study. There were several elements to the involvement program, which are detailed below.

Project Management Team (PMT)

The PMT was formed to provide input to the study and to review the technical work of the consultant team. PMT agencies include:

- MnDOT
- City of Oakdale
- City of North St. Paul
- Ramsey County
- Washington County
- Metropolitan Council
- Federal Highway Administration
- Minnesota Department of Natural Resources
- SEH, Inc. (Consultant Team)
- ZAN, Assoc.(Consultant Team)

The PMT met a total of ten times during the study planning process. The PMT members have guided the study process, reviewed technical products, and served as a conduit between the study team and the local residents, businesses, and the organizations they represent.

Public Involvement Activities

Public Open House Meetings

The study planning process included two public open house meetings. The first public meeting was held on July 17, 2013 at the Oakdale Discovery Center (4444 Hadley Ave. N, Oakdale). Approximately 115 people attended the open house. The purpose of the meeting was to introduce the study to the public, gather input on study area issues and concerns, and present a series of intersection improvement concepts. It also provided an opportunity for the PMT members (study partners) to share the results of the traffic forecasting and operational analysis with the public and answer questions and collect feedback from area stakeholders. A copy of the open house meeting summary of comments is included in Appendix A.

A second public open house meeting was held on October 29, 2013 at the North St. Paul City Hall (2400 Margaret St. N, North St. Paul). Approximately 90 people attended the open house. The purpose of the second meeting was to provide an update on the study progress and to gather feedback on the three refined interchange design concepts that remained under consideration. At the open house meeting, PMT members also answered questions and gathered feedback from areas stakeholders. Appendix A contains a copy of the second open house meeting summary of comments.

Study Website

A study website was developed and maintained by MnDOT. The site provided an additional means of distributing information and gathering input with an e-mail reply feature. Throughout the study process technical and public involvement materials have been posted on the study website. The web address is as follows: http://www.dot.state.mn.us/metro/projects/hwy36study/index.html

City Council Workshops

Periodic updates on the study progress were provided to City Council members at regularly scheduled meetings and as part of council workshops. The purpose of these meetings was to establish a communication link with Oakdale and North St. Paul and to discuss specific issues affecting each community. The input gathered was then taken into consideration in the development and evaluation of concept alternatives.

Highway 36 Corridor Vision and Study Goals

Corridor Vision

Highway 36 is a critical east-west transportation corridor in the northeast Twin Cities Metro Area that serves local residents, businesses, and commuters. While the Highway 36 Corridor Study focused on the roadway segment between Hadley Avenue and Highway 120 (Century Ave.), regional needs beyond the study limits played an important factor in identifying short- and long-term improvements that would complement the substantial investments recently completed and/or currently under construction that are intended to improve mobility, safety and support the economic vitality of the surrounding areas. As a result, the long-term vision for the segment of Highway 36 west of I-694 is an access controlled expressway with grade separated intersections.

Study Goals

A set of study goals and strategies were prepared at the onset of the planning process. The study goals are action statements intended to respond to the key issues along the corridor and within the study area. The goals were used in the study process to evaluate the range of concept alternatives. The goals presented below are listed in no particular order or rank:

Goal 1: Identify concept alternatives to improve travel mobility on Highway 36.

Goal 2: Identify concept alternatives that improve travel safety on Highway 36.

Goal 3: Identify concept alternatives that provide reasonable access to local businesses and neighborhoods.

Goal 4: Identify concept alternatives that provide adequate local circulation on both sides and across Highway 36.

Goal 5: Identify concept alternatives that enhance bicycle, pedestrian, and transit facilities and encourage future use of these multi-modal travel modes.

Goal 6: Create a practical plan that considers potential impacts on important social, economic and environmental resources.

Goal 7: The recommendations shall recognize MnDOT's Corridor Investment Management Strategy (CIMS) initiative.

MnDOT Corridor Investment Management Strategy (CIMS)

In 2011, MnDOT initiated this corridor based initiative on a limited

number of corridors, including Highway 36 from the Minnesota/Wisconsin border to I-35W. The intent of the program is to bring MnDOT together with its partners to exchange information and discuss opportunities for collaborative and sustainable investment (lower cost/high benefit strategies). A series of corridor performance and investment strategies have been prepared by MnDOT. The 2011 Highway 36 CIMS information can be viewed at the following web site: http://www.dot.state.mn.us/cims/corridor/mn36-wisconsin-i35/index.html

Highway 36 Corridor Existing Conditions

The primary purpose of the existing conditions analysis was to develop a baseline condition for the local economy (commercial/retail, manufacturing, industrial developments), physical constraints (social and environmental factors), traffic operations and safety conditions from which to later compare the benefits of various improvement options. A summary of the existing conditions is provided below with a more detailed description found in Appendix B, which contains the "Highway 36 Corridor Study - Existing Conditions and Study Goals Technical Memorandum", dated June 5, 2013.

Existing Traffic Volumes

The 2010 MnDOT traffic volume maps were reviewed for the study area. The following traffic data is presented as annual average daily traffic (AADT) and heavy commercial average annual daily traffic (HCAADT) volumes:

Highway 36:

- 2010 AADT: 29,500 between I-694 ramps and Highway 120; and 35,500 west of Highway 120.
- 2010 HCAADT: 680 – 760 (approximately 2.3-2.6 percent of total daily traffic).

Highway 120

- 2010 AADT: 13,200 north of Highway 36; and 15,400 south between Highway 36 and 7th Ave. E.
- 2010 HCAADT: 175 – 355 (approximately 1.3-2.3 percent of total daily traffic).

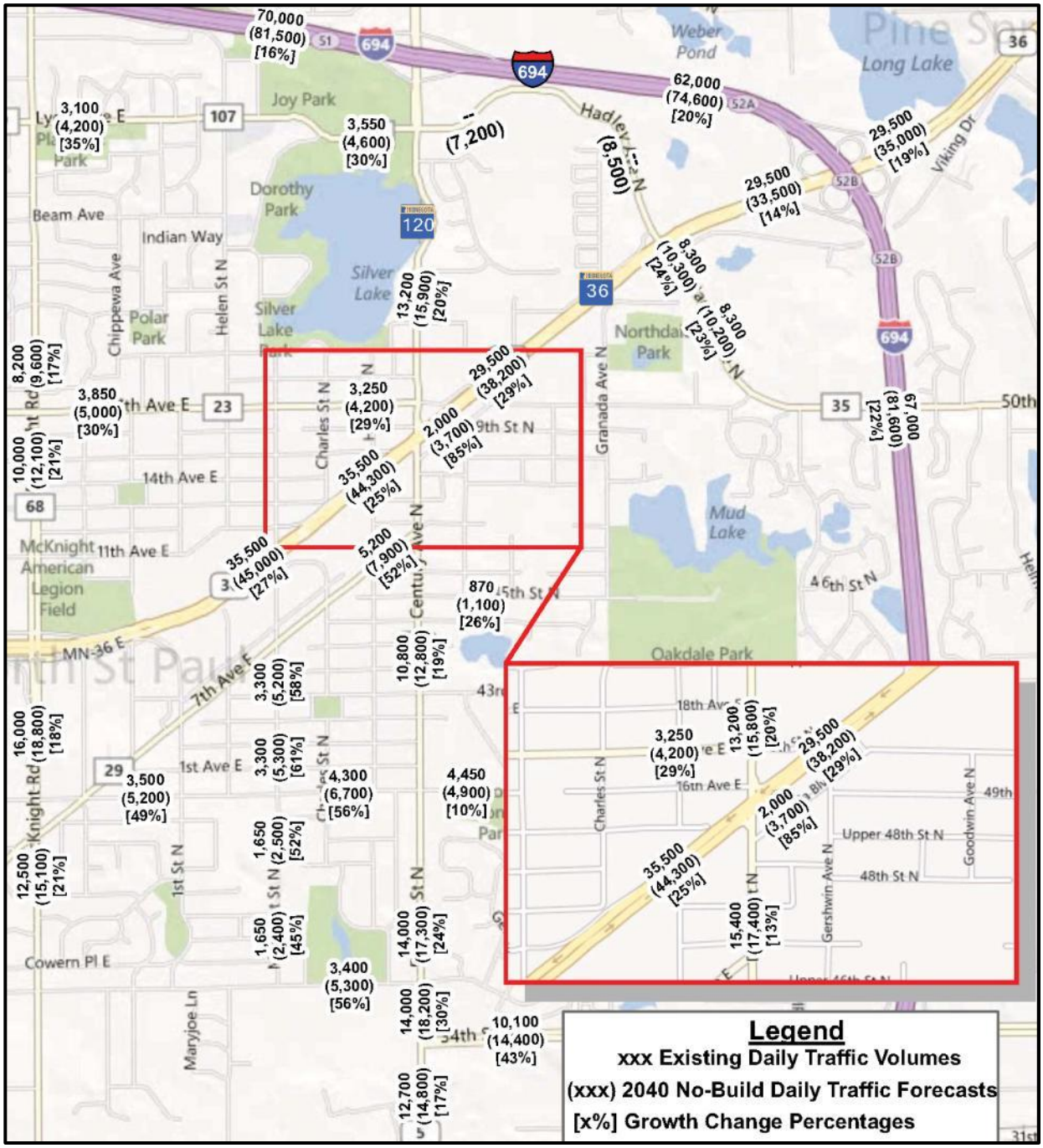
Hadley Avenue

- 2010 AADT: 6,700 north of Highway 36; and 8,300 south of Highway 36.

Forecast Traffic (2040): No-Build

The latest version of the Twin Cities Travel Demand Model (TCTD Model) was used to forecast traffic demands in the Study area into the year 2040 (see Figure 2 on the following page). More detailed Traffic Analysis Zones (TAZ) and roadway network connections were added to the model for the study area. Standard forecasting practices were utilized to ensure reasonable forecast demands for the project.

Figure 2 – Existing and 2040 No Build Daily Traffic Volumes



Crash Analysis

A 3-year (2009-2011) crash analysis was completed for the Highway 36 study area and the findings were published in the June 5, 2013 Existing Conditions and Study Goals Technical Memorandum (see Appendix B). The analysis included a review of crash data from January 1, 2009 through December 31, 2011. The data provided by MnDOT was obtained directly from the Minnesota Department of Public Safety (DPS) database and includes only crashes that were reported to DPS. It is important to recognize that some crashes do not get reported to DPS and many are not reported at all, in particular property damage only.

The type and severity of the crashes were reviewed and crash and severity rates were calculated for Highway 36 and the study intersections.

The analysis showed there were a total of 127 reported crashes within the study area. Of these crashes, 103 were intersection-related and the remaining 24 crashes are considered segment crashes based upon their distance from the intersections. The type and severity of the crashes were reviewed and crash and severity rates were calculated for the Highway 36/Highway 120 (Century Ave.) and Highway 36/Hadley Avenue intersections. Both intersections have crash and severity rates that are double the MnDOT Metro District averages for similar signalized intersections. It should also be noted that both of these intersections are listed in MnDOT's Top 200 intersections ranked by Crash Costs (2012); Highway 36 at Highway 120 is ranked #4 and Highway 36 at Hadley is ranked #95. It should be noted that these rankings often change because they are based on three year average crash data.

In order to fully assess the crash history in the study area, three segments of Highway 36 were also reviewed. The first segment is located between the eastern McKnight Avenue interchange ramps and the Highway 120 (Century Ave.) intersection; but does not include the Highway 120 (Century Ave.) intersection. The second segment is located between the Highway 120 (Century Ave.) and Hadley Avenue intersection, but does not include the intersections themselves and the associated crashes. The third segment is between the Hadley Avenue intersection and the I-694 interchange and does not include the Hadley Avenue intersection and associated crashes.

A complete copy of the Trunk Highway 36 Corridor Study - Existing Conditions and Study Goals Technical Memorandum is included in Appendix B.

Existing Traffic Operations

The Existing Conditions and Study Goals Technical Memorandum summarizes the traffic analysis methodology and results for the existing and future No-Build traffic conditions. A copy of the Existing Conditions and Study Goals Technical Memorandum is included in Appendix B and summarized below.

Traffic movement data along Highway 36 was collected at Highway 120 (Century Ave.) and Hadley Avenue in January of 2013. On-site traffic observations were completed in May 2013 to verify the traffic operations model was matching existing field conditions. The two traffic signals have high speed approaches as they are surrounded by expressway interchanges to the east and west of the study area. The signal timings at the Highway 120 (Century Ave.) and Hadley Avenue intersections favor the heavily traveled Highway 36 and are coordinated together to provide more free flow operations along Highway 36. Due to the long cycle lengths, the minor side streets (Highway 120 and Hadley Ave.) have long wait times before being served by the signal. From the traffic volume data it is also clearly evident that Highway 36 is a peak oriented roadway with a heavy AM peak demand (6-9 a.m.) in the westbound direction and a heavy PM peak demand (4-6 p.m.) in the eastbound direction.

The analysis software, Synchro/SimTraffic, was used to measure vehicle delay, level of service (LOS) and backup queue lengths. LOS is a qualitative rating system used to describe the efficiency of traffic operations. Six LOS values are defined, designated by letters A through F. LOS A represents the best

operating conditions (no congestion), while a LOS F represents the worst operating conditions (severe congestion). Currently, both the Highway 120 (Century Ave.) and Hadley Avenue intersections operate at a LOS D or better during both AM and PM peak hours. LOS D is typically considered acceptable in the metro area. However, during the AM and PM peaks several intersection approaches operate at either a LOS E or F, which are a direct implication of the protected turning phases and the long cycle lengths at the intersections.

2040 No Build Traffic Operations

Traffic demands were forecast out to the year 2040 for the study area. In the No Build scenario, there is only minor growth (approximately 1% per year) occurring along all corridors in the study area as there are existing high levels of congestion (capacity constraints) during both AM and PM peak hours along Highway 36 resulting from the existing signalized intersections at Hadley Avenue and Highway 120. Under the No Build scenario, the signalized intersections would remain resulting in continued high levels of congestion. The largest increases in traffic demands are in the off-peak direction as there is excess capacity (low levels of congestion) for these movements. Some additional demand is also expected during off peak periods where again there is available capacity along Highway 36. Appendix B contains the Existing Conditions and Study Goals Technical Memorandum that summarizes the traffic analysis methodology and results for the future No-Build traffic conditions.

Based on the forecast assessment, the existing traffic operations will continue to deteriorate through the year 2040. With no capacity improvements planned, any increase in traffic demands will have negative impacts to the existing capacity of the intersections. In the forecast AM peak, both the Highway 120 (Century Ave.) and Hadley Avenue intersections operate at a LOS D or better, while in the forecast PM peak the Highway 120 (Century Ave.) intersection will operate at a LOS F with significant traffic queuing problems. Similar to the existing conditions, the results of the forecast AM and PM peaks indicate several intersection approaches will operate at unacceptable levels of service (LOS E or F) under the No Build condition.

Social, Economic, and Environmental (SEE) Characteristics

Part of the assessment of existing conditions included a review of SEE features present in the study area that could be potentially affected by future transportation improvements. Existing characteristics of the following SEE features were gathered in the Existing Conditions and Study Goals Technical Memorandum and other supporting documentation (see Appendix B for more detail):

- Land Use
- Public Right-of-Way
- Wetlands
- Trails
- Parklands
- Transit Facilities
- Groundwater
- Wellhead Protection Areas
- Environmental Justice Populations
- Sensitive Noise Receptors
- Cultural Resources
- Potentially Contaminated Properties

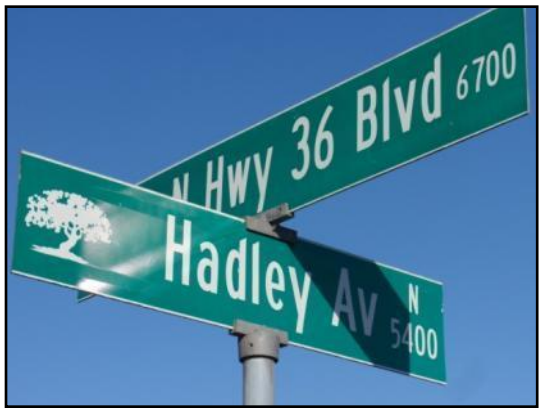
Conceptual Design Alternatives

Concept Alternatives Development

Based on the knowledge and information obtained in the review of existing conditions in the study area and future No Build conditions, ten high level conceptual alternatives (with several design options) were developed. The concept alternatives were grouped into four main categories that included at-grade intersection improvements, single interchange alternatives (grade separating both intersections but constructing only one interchange at either Highway 120 or at Hadley Ave.), combined interchange alternatives (single interchange that combines movements from both intersections), and two interchange alternatives (grade separated interchanges at both intersections). In addition to considering improvements at the Highway 120 and Hadley Avenue intersections with Highway 36, all of the conceptual alternatives assumed the closure of existing right-in/right-out access to Highway 36 at 50th St. N and Upper 51st St. N.

Appendix C contains the Highway 36 Concept Alternatives Development and Screening Technical Memorandum that summarizes the improvements considered and the evaluation and screening process used to reduce the total number of alternatives. The technical memorandum also contains visual drawings of the concept alternatives. Below is a listing of the ten initial concept alternatives developed and evaluated:

- At-Grade Concept Alternatives
  - A1: Conventional Intersections with Added Capacity – maintains the existing signal systems at Highway 120 and Hadley Avenue, while adding and/or extending turn lanes at both intersections, whereby providing the necessary capacity to maintain future traffic operations at the existing levels of operation.
  - A2: Bow-Tie Controlled Intersection – maintains the existing signal systems while displacing left turns off Highway 36 to the local system. Roundabout intersections both north and south of Highway 36 (on Highway 120 and Hadley Ave.) would be used to accommodate the movements.
  - A3: Median U-Turn Controlled Intersection – maintains the existing signal system and requires two additional signals near each intersection. Left turns would be displaced from the main intersection and redirected to the "U-Turn" point on either side of the main intersection.
- Single Interchange Concept Alternatives
  - S1: Folded Diamond Interchange only at Hadley Avenue – grade separate both Highway 120 and Hadley Avenue; however, direct access to Highway 36 would only be provided via a folded diamond interchange at Hadley Avenue an additional local collector (frontage) roads would be needed to collect and distribute traffic between Highway 120 and Hadley Avenue on both the north and south sides of Highway 36.



A folded diamond configuration was considered the most desirable at this location due to the proximity of the I-694 system interchange access/exit ramps.

  - S2: Interchange only at Highway 120 – this alternative would grade separate both Highway 120 and Hadley Avenue; however, direct access to Highway 36 would only be provided at Highway 120. Additional local collector (frontage) roads would be needed to collect and distribute traffic between Highway 120 and Hadley Avenue.

- Combined Interchange Concept Alternatives
  - C1: Modified Split Diamond – grade separate both Highway 120 and Hadley Avenue with access to Highway 36 split between the two intersections with Highway 120 accommodating the eastbound exit ramp and westbound entrance ramp and Hadley Avenue accommodating the westbound exit ramp and eastbound entrance ramp. Additional local collector (frontage) roads would be needed to collect and distribute traffic between Highway 120 and Hadley Avenue.
  - C2: Button Hooks – grade separate both Highway 120 and Hadley Avenue with access to Highway 36 provided by button hook ramps at Hadley Avenue for westbound traffic and button hook ramps located approximately 1,500-feet east of Highway 120 for eastbound traffic. Additional local collector (frontage) roads would be needed on both the north and south sides of Highway 36 to collect and distribute traffic between Highway 120 and Hadley Avenue.

- Two Interchange Concept Alternatives
  - T1: Diamond Interchange at both Highway 120 and Hadley Avenue – grade separate both intersections while providing full access via diamond interchanges at both locations.
  - T2: Diamond Interchange at Hwy 120 and Folded Diamond (to the west) at Hadley Avenue – grade separate both intersections while providing full access at Highway 120 via a diamond interchange and full access at Hadley Avenue via a folded diamond interchange configuration.

  - T3: Hybrid Folded Diamond at Highway 120 and Folded Diamond at Hadley Avenue – grade separate both intersections while providing full access via folded diamond configurations at both locations. At Highway 120 there are various configurations considered for diamond and loop ramps in the interchange quadrants (i.e. loops and ramps in NW and SE quadrants or loops and ramps in NE and SW quadrants).

Phase I – Concept Alternatives Evaluation and Screening Process

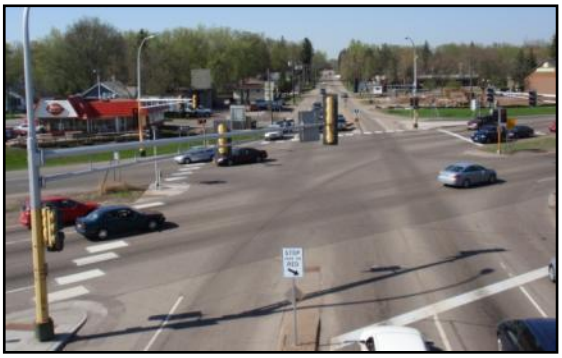
The ten concept alternatives considered were evaluated based on a set of screening criteria that considered a range of impacts on the local and regional transportation system as well as potential social and environmental issues. As part of the Phase I process, an evaluation matrix was prepared, see Table 1 on the following pages, which provides a comparative assessment of the ten concept alternatives. Information from the PMT members along with professional judgment and public input gathered at the first public open house meeting, held on July 17, 2013, was used to complete the evaluation matrix.

Table 1 – Phase I: Highway 36 Concept Alternatives Screening Matrix

Conceptual Alternatives		Evaluation/Screening Criteria							
		Supports Regional System Planning	**Highway 36 Safety Conditions**	**Hwy 36 Traffic Operations (Weave Distance, Queuing, LOS)**	**Site Access and Local Circulation (Directness/Travel Time)**	**Right-of-Way Impacts**	**Environmental Impacts**	**Gateway Trail (Safety/Operations)**	**RETAIN/DISMISS ALTERNATIVE?**
At-Grade Alternatives	A1: Conventional Intersections With Added Capacity	Does not achieve long-range vision of removing all signals on Hwy 36 within I-694 beltway.	No change	Similar to existing	Site access similar to existing conditions Minimal impact on existing travel patterns	Minimal	Minimal	Minimal Impact	The at-grade options will not be further evaluated as part of this study because they do not achieve the freeway vision for Highway 36. However, at-grade alternatives may be a viable short-term approach if improvements are warranted before a long-term solution can be funded and built.
	A2: Bow-Tie Controlled Intersections	Does not achieve long-range vision of removing all signals on Hwy 36 within I-694 beltway.	Rear end crashes would remain. Displaced left turns should reduce crash severity. Concerns with left turn compliance.	Moderate improvements	Indirect and non-intuitive traffic movements. Minimal impact on existing travel patterns.	Minimal	Minimal	Minimal Impact	
	A3: Median U-Turn Controlled Intersection at Highway 120	Does not achieve long-range vision of removing all signals on Hwy 36 within I-694 beltway. Inconsistent with MnPASS operations.	Rear end crashes would remain. Left turn compliance concerns.	Moderate improvements	Indirect and non-intuitive traffic movements. Minimal impact on existing travel patterns.	Minimal	Minimal	Minimal Impact	
Two Interchange Alternatives	T1: Diamond Interchanges at both Highway 120 and Hadley Avenue	Consistent with freeway vision. Interchange spacing guidelines are not met. Hadley Ave. is not an arterial.	Removes two signals on Hwy 36. Weave concerns due to close ramp spacing.	Easterly ramps at Hadley Ave. are too close to I-694. Weave concern between Hwy 120 and Hadley Ave.	Maintains site accessibility. Closely spaced intersections on Hwy 120. Minimal impact on existing travel patterns.	Major	Wetland Impacts at Hadley Ave.	Impacts at Hadley Ave.	Dismiss – inadequate ramp spacing between Hadley Ave. and I-694
	T2: Diamond Interchange at Highway 120 and Folded Diamond at Hadley Avenue	Consistent with freeway vision. Interchange spacing guidelines are not met. Hadley Ave. is not an arterial.	Removes two signals on Hwy 36. Weave concerns due to close ramp spacing.	Better weave distance with I-694. Weave concern between Hwy 120 and Hadley Ave.	Maintains site accessibility. Closely spaced intersections on Hwy 120. Minimal impact on existing travel patterns.	Moderate Undeveloped property exists for folded diamond interchange at Hadley Ave.	Minimal	Impacts at Hadley Ave.	Retain – With further input from the cities a refined alternative will be developed that provides full access at both locations. An additional alternative with elimination of some access at both locations will also be investigated.
	T3: Hybrid Folded Diamond at Highway 120 and Folded Diamond at Hadley Avenue	Consistent with freeway vision. Interchange spacing guidelines are not met. Hadley Ave is not an arterial.	Removes two signals on Hwy 36. Weave concerns due to close ramp spacing.	Better weave distance with I-694. Weave concern between Hwy 120 and Hadley Ave.	Maintains site accessibility. Closely spaced intersections on Hwy 120. Minimal impact on existing travel patterns.	Major Hwy 120 area is fully developed. Undeveloped property exists at Hadley Ave.	Minimal	Impacts at Hwy 120 and Hadley Ave.	Dismiss – higher level of impacts to existing developments near Hwy 120 as compared to Alternative T2.

Conceptual Alternatives		Evaluation/Screening Criteria							
		Supports Regional System Planning	**Highway 36 Safety Conditions**	**Hwy 36 Traffic Operations (Weave Distance, Queuing, LOS)**	**Site Access and Local Circulation (Directness/Travel Time)**	**Right-of-Way Impacts**	**Environmental Impacts**	**Gateway Trail (Safety/Operations)**	**RETAIN/DISMISS ALTERNATIVE?**
Single Interchange Alternatives	S1: Folded Diamond Interchange at Hadley Avenue with overpass at Highway 120	Inconsistent with regional planning, Hwy 120 the arterial route is not served; Hadley Ave is not an arterial roadway and has full access.	Removes two signals on Hwy 36.	Traffic demand can be served at a single Hwy 36 interchange. Some regional traffic would likely shift to the local roadway system.	Indirect access at Hwy 120. Local road system will have to be expanded to provide the necessary connectivity. North St. Paul has significant concerns with local access and circulation.	Moderate Undeveloped property exists for interchange at Hadley Ave. Additional R/W needed for frontage road connection between Hwy 120 and Hadley Ave.	Moderate; the impact of creating a frontage/local road system to connect Hadley Ave. to Hwy 120 has not been assessed.	Impacts at Hadley Ave.	Dismiss Not consistent with regional planning
	S2: Diamond Interchange at Highway 120 with overpass at Hadley Avenue	Consistent with regional planning since Hwy 120 is an arterial roadway.	Removes two signals on Hwy 36.	Traffic demand can be served at a single Hwy 36 interchange. Some regional traffic would likely shift to the local roadway system.	Indirect access at Hadley Ave. Local road system will have to be expanded to provide the necessary connectivity. Closely spaced intersections on Hwy 120. Does not address emergency services access to the east. Oakdale has significant concerns since this does not comply with local land use plans for maintaining access at Hadley Ave.	Moderate Additional R/W needed for frontage road connection between Hwy 120 and Hadley Ave.	Moderate; the impact of creating a frontage/local road system to connect Hadley Ave. to Hwy 120 has not been assessed.	Minimal	Retain Need to further evaluate impacts and feasibility of creating a frontage/local road connection between Hadley Ave. and Hwy 120.
Combined Interchange Alternatives	C1: Modified Split Diamond	Consolidates access to one set of on ramps and one set of off ramps.	Removes two signals on Hwy 36.	Demand can be served with a combined interchange. Some regional traffic would likely shift to the local system.	Local road system will have to be expanded to provide the necessary connectivity. Less direct traffic movements. North St. Paul and Oakdale have significant concerns with local access and circulation.	Moderate Additional R/W needed for frontage road connection between Hwy 120 and Hadley Ave.	Moderate; the impact of creating a frontage/local road system to connect Hadley Ave. to Hwy 120 has not been assessed.	Moderate; would require relocation of Gateway Trail between Hwy 120 and Hadley Ave.	Dismiss No local support. Impacts to Gateway Trail.
	C2: Button Hooks	Consolidates access to one set of on ramps and one set of off ramps.	Removes two signals on Hwy 36.	Demand can be served with a combined Hwy 36 interchange. Some regional traffic would likely shift to the local system.	Local road system will have to be expanded to provide the necessary connectivity. Less direct traffic movements. North St. Paul and Oakdale have significant concerns with local access and circulation.	Major Additional R/W needed for frontage road connection between Hwy 120 and Hadley. R/W impacts to residential area south of Hwy 36.	Moderate; the impact of creating a frontage road to connect Hadley Ave to Hwy 120 has not been assessed.	Moderate; would require relocation of Gateway Trail between Hwy 120 and Hadley Ave.	Dismiss No local support. Impacts to Gateway Trail. Wetland impacts. R/W impacts.

Utilizing the information shown in Table 1, the study partners (PMT representatives) discussed and evaluated the alternatives considered. Below is a summary of the reasons for dismissing certain concept alternatives and retaining others for further consideration:



- PMT Dismissed Concept Alternatives:
  - Concept Alternatives A1, A2, and A3: it was decided that the three at-grade alternatives will not be further evaluated as part of the study because they do not achieve the long-term vision for Highway 36 inside the I-694 beltway, which is to create an access controlled expressway with spaced grade separated interchanges. However, if crash/severity rates warrant an interim improvement these options will be revisited.
  - Concept Alternative T1: this two interchange alternative was dismissed because a diamond configuration at Hadley Avenue would place the Highway 36 westbound exit and eastbound entrance ramps too close to the I-694 system interchange.
  - Concept Alternative S1: this single interchange alternative was dismissed because it is not consistent with regional planning in that Hadley Ave. is not an arterial roadway while Highway 120 is an arterial.
  - Concept Alternatives C1 and C2: the combined interchange alternatives were dismissed due to lack of local support and impacts to the natural and built environments (i.e. wetlands, Gateway Trail, and existing development) caused by developing a parallel frontage road on each side of Highway 36.
  - Concept Alternative T3: this two interchange alternative was dismissed due to the potential impacts to the built environment associated with existing developments located in all four quadrants of the hybrid folded diamond interchange at Highway 120.
- PMT Retained Concept Alternatives:
  - Concept Alternative S2: this single interchange concept is retained and will be further developed including the creation of a continuous frontage road system between Hadley Avenue and Highway 120.
  - Concept Alternative T2: this concept includes interchanges at both Highway 120 and Hadley Avenue. Further input from the PMT will help refine the interchange design configurations and any modifications needed to the local street system (intersections, road closures, access changes, etc.). A folded diamond configuration at Hadley Avenue was considered the most desirable due to the close proximity of the I-694 system interchange access/exit ramps.
  - Concept Alternative T4: this new two interchange concept is intended to investigate opportunities to eliminate some access (possible removal of access ramps) at Highway 120 and/or Hadley Avenue.

Phase II – Refined Concept Alternatives Evaluation and Screening

The concept alternatives retained from the Phase I process were refined and further evaluated. The new T4 – two interchange concept alternative that was retained in order to further investigate opportunities to eliminate some access (possible removal of access/exit ramps) at Highway 120 and/or Hadley Avenue was discussed at

a PMT meeting with the study partners. Based on several concerns related to adverse effects on local traffic circulation, future land development concerns, emergency service access, the lack of significant cost savings, and similar levels of impact (e.g. right-of-way, wetlands, Gateway Trail), the T4 concept alternative was not carried forward to a greater level of conceptual design and was dismissed from additional consideration.

As part of the Phase II process, the remaining interchange alternatives (S2 and T2) went through several design iterations in an attempt to minimize potential impacts while maximizing traffic safety and operations throughout the study area. An important design element that was reviewed in the Phase II process included the profile of Highway 36. Since the land surrounding the Hwy 36/Hwy 120 intersection is primarily developed, it was determined that the current Highway 120 alignment would need to be maintained to the greatest extent possible in order to limit potential impacts to existing businesses, access points, and avoid impacts to the Gateway Trail bridge located immediately south of Highway 36. Therefore, a study as to whether the future profile of Highway 36 should cross under or over Highway 120 was conducted. Several items were taken into consideration including potential groundwater impacts associated with a high seasonal water table, noise impacts, and visual impacts. As part of discussions with North St. Paul and Oakdale, concerns were raised regarding the design option that would raise the Highway 36 profile over Highway 120 due to increased noise levels for adjacent properties and the possibility of the highway creating a visual barrier between land uses on the north and south sides of the highway corridor. Information on the high groundwater levels in the area was gathered from the reconstruction of Highway 36 under Margaret Street and soil boring information from the Gateway Trail Bridge at Highway 120. The groundwater data indicated that conditions near the potential Highway 36/Highway 120 interchange would be similar to those that exist near Margaret Street and since this issue was addressed before that an engineering solution could be developed to deal with high groundwater levels near Highway 120. However, further investigations, analysis, and design details will still be needed as part of the project development process.

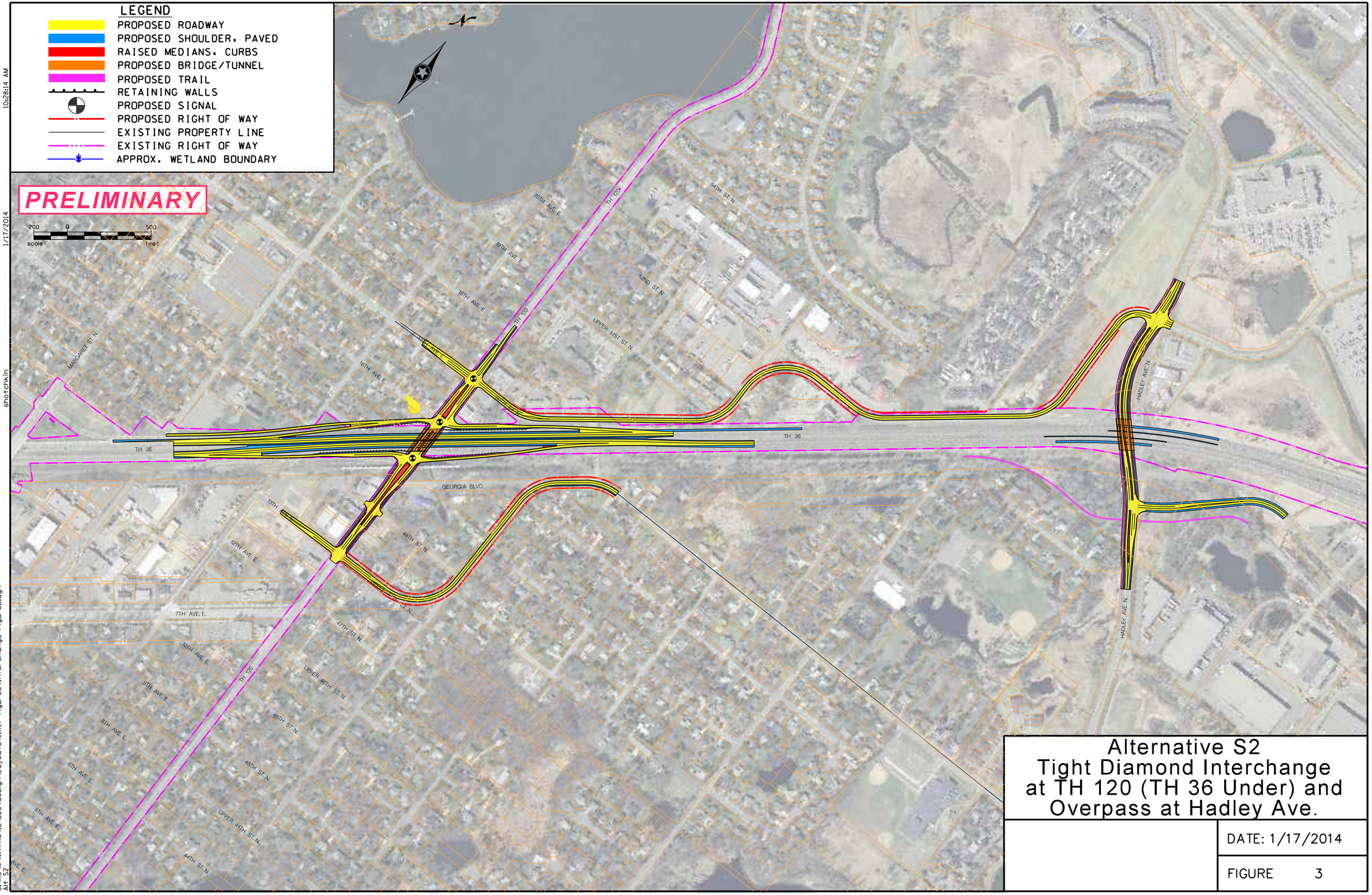
As part of the Phase II evaluation and screening process, additional traffic analysis, including traffic simulations were completed to ensure both the S2 and T2 conceptual options would operate efficiently under forecast traffic conditions. Appendix C contains a copy of the Interchange Alternatives Traffic Technical Memorandum. Furthermore, a comparative evaluation matrix was prepared that provides an assessment of the remaining interchange concept alternatives (see Table 2 on the following page). In order to gather additional public input on the S2 and T2 alternatives, a second public open house meeting was held on October 29, 2013 to present the conceptual layouts and comparison matrix. In general, the public preferred the T2 alternative that retains full access at both Highway 120 and Hadley Avenue.

Additional supporting local roadway improvements were added as well as a review of alternative intersection control options (i.e. roundabouts or signals) were considered along Highway 120 and Hadley Avenue. Figures 3 through 5, located on pages 16-18, illustrate the refined conceptual S2 and T2 interchange options. Figure 5 is the two interchange option (T2) with roundabout intersections rather than traditional intersections.

Table 2 – Phase II: Highway 36 Refined Concept Alternatives Screening Matrix

Evaluation/Screening Criteria	Concept Alternative							
	Concept Alternative T2[a] Diamond Interchange at Highway 120 and Folded Diamond at Hadley Ave.				Concept Alternative S2[a] Diamond Interchange at Highway 120 With Overpass at Hadley Ave.			
Regional System Planning	Achieves freeway vision within the beltway. Requires Hadley Ave. functional classification change to minor arterial. Improvements not identified in the MnDOT Long Range Transportation Plan or Met Council Transportation Policy Plan (TPP). Does not preclude future MnPASS vision.				Achieves freeway vision within the beltway. Improvements not identified in the MnDOT Long Range Transportation Plan or Met Council Transportation Policy Plan (TPP). Does not preclude future MnPASS vision.			
Highway 36 Safety Conditions	Removes two high crash locations (signalized intersections) along Highway 36. Removes four remaining uncontrolled access points between Highway 120 and Hadley Ave.				Removes two high crash locations (signalized intersections) along Highway 36. Removes four remaining uncontrolled access points between Highway 120 and Hadley Avenue.			
Subarea[b] Vehicle Miles Traveled (VMT), Vehicle Hours Traveled (VHT), Speed	Alternative T2			No Build Alternative	Alternative S2			
Daily Subarea VMT	583,463 miles			567,095	584,119 miles			
Daily Subarea VHT	14,619 hours			15,032	14,750 hours			
Subarea Average Speed	39.91 mph			37.73	39.60 mph			
Subarea Daily Operating Costs[c] (Automobiles)	$400,159/daily			$401,280/daily	$402,327/daily			
Subarea Operating Cost Difference Compared to No Build Condition	Cost Savings = $1,121/daily and $409,165/annual			N/A	Cost Increase = $1,047/daily and $382,155/annual			
Highway 120[d] Arterial Performance	*Northbound*		*Southbound*		*Northbound*		*Southbound*	
Measures of Effectiveness (MOE)	*AM*	*PM*	*AM*	*PM*	*AM*	*PM*	*AM*	*PM*
Travel Time (minutes)	5.5	5.9	5.4	6.2	5.8	6.6	5.7	6.5
Delay (minutes)	1.1	1.5	1.0	1.9	1.4	2.1	1.3	2.2
Highway 120 Speed (mph)	30	27	30	26	28	25	28	25
Percent Traffic at Free Flow (35 mph) Speed	86%	77%	86%	74%	80%	71%	80%	71%
Highway 120 Corridor LOS	A	B	A	B	B	B	B	B
Right-of-Way Impacts	18.1 acres of private right-of-way needed. Potential Relocations: 5 residential and 5 commercial properties. Opportunity for public/private partnership near Hadley Ave.				12.5 acres of private right-of-way needed. Potential Relocations: 5 residential and 6 commercial properties.			
Environmental/Natural Resource Constraints	No known substantial environmental constraints				No known substantial environmental constraints.			
Gateway Trail Accommodation	Impacts trail R/W near Highway 120, but existing trail bridge maintained. Impacts at Hadley Avenue due to bringing Hadley over Highway 36 (overpass) and eastbound entrance/exit ramps.				Impacts trail R/W near Highway 120, but existing trail bridge maintained. Impacts at Hadley Avenue due to bringing Hadley over Highway 36 (overpass).			
Serves Existing and Future Access Needs	Maintains high level of accessibility at Highway 120 and Hadley Avenue. Provides reasonable access to Margaret Street.				Indirect access at Hadley Avenue. Does not address Oakdale emergency service access to the east. Provides reasonable access to Margaret Street			
Consistent With Local Comprehensive Plan	Is consistent with all local land use plans.				Does not comply with City of Oakdale Comprehensive Plan or Washington County Transportation Plan for maintaining access at Hadley Avenue.			
Local Government Support	High Support; local project partners (Oakdale, North St. Paul, Ramsey County and Washington County) support two interchanges.				Low Support; local project partners have expressed concern with not providing access to Highway 36 at Hadley Avenue. Oakdale Municipal Consent issues			
Estimated Construction Cost[e] (2013 dollars)	$33,300,000 – $36,600,000				$28,000,000 - $30,800,000 Higher level of local participation likely due to greater local roadway improvements			

Table Notes: [a] Assumes Highway 36 under Highway 120 and Highway 36 under Hadley Avenue.
[b] Study subarea bounded by I-694, White Bear Avenue, and Highway 5. VMT, VHT, and Average Speed values based on subarea traffic model outputs.
[c] Automobile cost calculations assumed costs = $0.31/mile and $15.00/hour.
[d] Highway 120 Study segment from Highway 5 to Hadley Ave./Joy Ave.
[e] Cost estimate assumes signalized intersections, all local roadway improvements (i.e. frontage roads), new Gateway Trail underpass at Hadley Avenue, does not include potential right-of-way/relocation costs or engineering costs. All costs are in 2013 dollars.



Alternative S2
Tight Diamond Interchange at TH 120 (TH 36 Under) and Overpass at Hadley Ave.

DATE: 1/17/2014

FIGURE 3

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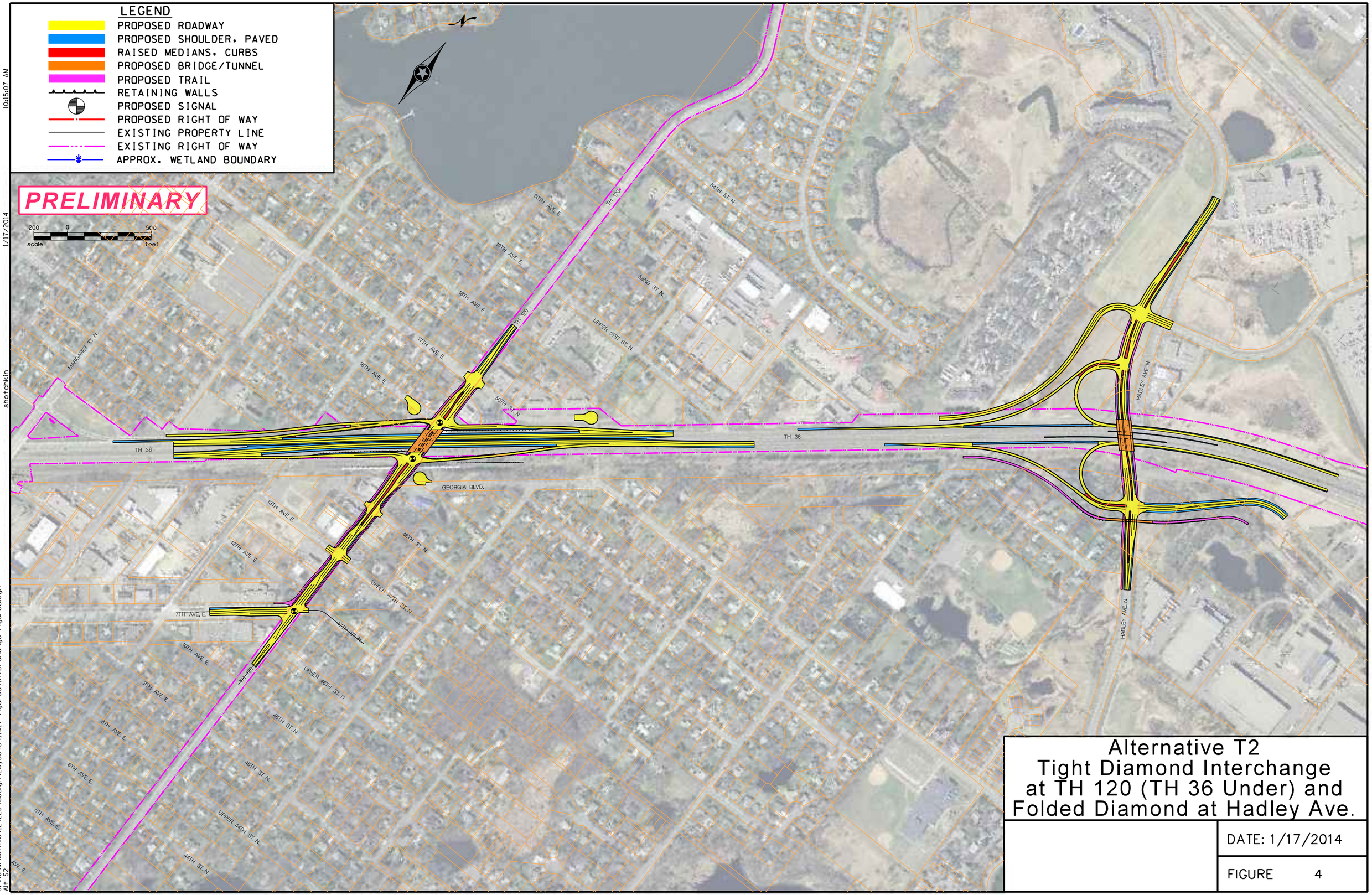
Alt S2



Alternative T2
Tight Diamond Interchange at TH 120 (TH 36 Under) and Folded Diamond at Hadley Ave.

DATE: 1/17/2014

FIGURE 4

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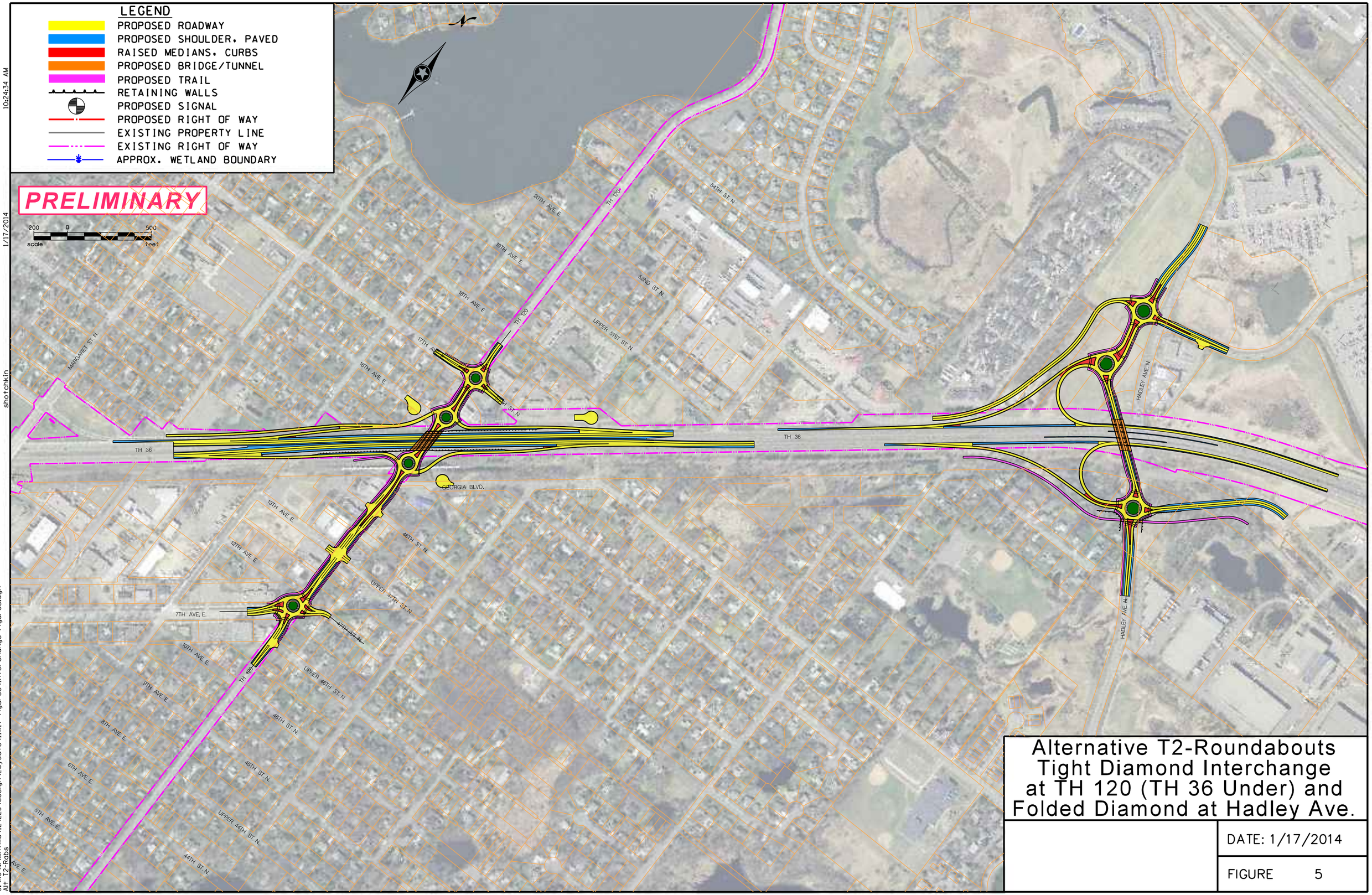
Alt: S2



Alternative T2-Roundabouts
Tight Diamond Interchange
at TH 120 (TH 36 Under) and
Folded Diamond at Hadley Ave.

DATE: 1/17/2014

FIGURE 5

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Alt T2-Robs

Gateway Trail Crossing at Hadley Avenue

An assessment of possible future Gateway Trail crossing options was considered at Hadley Avenue as part of the Highway 36 Corridor Study. The heavily used multi-use trail corridor is owned and operated by the Minnesota Department of Natural Resources (MNDNR). Currently, the Gateway State Trail crosses Hadley Avenue at-grade; however, this location recently received fiscal year 2015 funding through the Surface Transportation Program (STP) for the construction of a grade separated crossing. Throughout the Highway 36 Corridor Study process, the MNDNR worked cooperatively with MnDOT and the City of Oakdale on the future improvements to the trail. A technical memorandum entitled "Assessment of Gateway Trail Crossings at Hadley Avenue" was completed and included in Appendix D of this report.

Existing Gateway Trail crossing at Hadley Avenue (looking west)

The scope of the trail crossing assessment considered a range of conceptual crossing options that considered the future roadway profile of Hadley Avenue (since Hadley Ave. is proposed to go up and over Highway 36) and the distance the trail crossing should be setback from Highway 36 in order to accommodate a potential future folded diamond interchange.

Three primary trail crossing options were considered including:

- *Option 1: Underpass (Tunnel)* – this option would grade separate the trail corridor from Hadley Avenue by means of an underpass structure (see figures in Appendix D). The underpass (tunnel) would be constructed approximately 260-feet south of the existing trail crossing in order to accommodate a potential future folded diamond interchange configuration for Highway 36/Hadley Avenue. The underpass would consist of a box culvert style structure and would be approximately 12 feet high by 14 feet wide and 107 feet in length and the profile of Hadley Avenue would be raised approximately 7 feet above the existing elevation.

- *Option 2: Overpass (Bridge)* – this option would grade separate the trail corridor from Hadley Avenue with the construction of a bridge structure. It has been assumed that a similar bridge type to the recently constructed trail bridge overpass at Highway 120/Century Avenue would be constructed at Hadley Avenue. The trail bridge would be constructed approximately 260-feet south of the existing trail crossing in order to accommodate the future folded diamond interchange configuration for Highway 36/Hadley Avenue. The bridge would be approximately 278 feet in length and set at an elevation which would accommodate the future improvements to Hadley Avenue associated with the folded diamond interchange.

- *Option 3: Overpass (Bridge) at the Existing Crossing to be Relocated in the Future* – this option would grade separate the trail corridor from Hadley Avenue with the construction of a bridge structure as close to the existing crossing as possible. However, a minor shift to the south is expected (approximately 40 feet) to accommodate the construction of retaining walls, while also allowing the existing trail corridor to remain open during construction. Again, the bridge structure would be approximately 278 feet in length and constructed in a manner that would allow for large

portions of the overpass structure to be relocated to the south at the time the Highway 36/Hadley Avenue interchange is constructed.

Under all options considered, a local trail connection between the underpass /overpass would be made to the city trail that runs along the west side of Hadley Avenue. The details of this local connection will need to be identified as part of the more detailed design phase of project development.

The trail crossing options underwent an evaluation process to determine the feasibility and/or constructability of each option. As part of this process it was determined that the area is characterized by very high seasonal groundwater elevations. As a result, the underpass option set the base of the structure (culvert) three feet above the groundwater. Other items considered in the feasibility evaluation were whether or not the trail options would be compatible with the long term vision for Highway 36 that includes a potential folded diamond interchange at Hadley Avenue and could the roadway and trail improvements be constructed to meet all current design standards, including American's with Disabilities Act (ADA) requirements. The evaluation process also considered potential impacts from construction. The three trail options were evaluated based on a set of comparison criteria that considered project effects and commitments associated with social and environmental impacts and financial costs. The trail options comparison matrix is included in the technical memorandum located in Appendix D.

Gateway Trail Findings

The options for grade separating the Gateway Trail at Hadley Avenue and the findings presented in this technical memorandum were discussed by the project partners. A preferred single trail crossing option was not identified, but rather the MNDNR will consider this information and further study the trail crossing options. However, based on the evaluation of the conceptual options and input received during this study process it appears that the underpass option could be constructed at the lowest cost while having equally comparable impacts as the other option considered. Construction of an underpass could be completed in the near term and designed in a manner that would not hinder the construction and would not require additional costs if an interchange were constructed at Highway 36/Hadley Avenue in the future. It should be noted that additional design considerations and further discussions within the MNDNR need to occur before a final options can be identified.

Highway 36 Corridor Next Steps

In order to plan for the future and potentially preserve the right of way for the improvements, several next steps should occur.

- Ongoing Coordination: The Highway 36 Corridor Study established good lines of communication among the study partners and area stakeholders. An essential component of future project development activities will be to maintain the coordination between the study partners so that all agencies are informed and involved in future decisions related to improvements in the Highway 36 study area.
- Identify a Preferred Concept Alternative: A first step in the project development process is to identify a preferred alternative. As previously stated, the at-grade alternatives were not carried forward for further evaluation because they do not achieve the vision for Highway 36, which includes the elimination of at-grade intersections within the I-694 beltway. However, at-grade alternatives may be a viable short-term approach if improvements are warranted before a long-term solution can be funded and built. The remaining "interchange" alternatives that do achieve the corridor vision include the one interchange concept (Alternative S2) and the two interchange concept (Alternative T2). Based on feedback from the

study partners and the public (area residents and business owners) the T2 Alternative was viewed as the most favorable because it provides full access to Highway 36 at both Highway 120 (Century Ave.) and Hadley Avenue.

- Preliminary Design: Additional design refinements and preparation of a preliminary geometric layout will better define the extent of the future project impacts. Included in this process may be additional traffic analysis in order to better define the type of intersection control (e.g. traditional intersections vs. roundabouts) for the various intersections in the study area. Also, technical reviews such as geotechnical investigations (groundwater, soil conditions, and contamination) would be considered to better understand the design constraints and costs associated with bridge foundations, retaining walls, and the grade separated Gateway Trail crossing at Hadley Avenue.
- Environmental Review: The preparation of a state environmental assessment worksheet (EAW) would assist in determining the type and degree of potential social, economic, and environmental impacts from the proposed improvements.
- Official Map: Following the completion of a preliminary layout and an EAW, an official map of the future right-of-way footprint could be prepared. An official map is a tool that can be used by the cities and counties to preserve the necessary right-of-way to construct the future improvements.
- Seek and Identify Funding: A range of traditional and non-traditional funding programs may be used to construct all or portions of the improvements. The following list is not meant to be all inclusive, but instead highlight possible programs and strategies that are currently available: Trunk Highway (TH) funds, County State Aid Highway (CSAH) funds, Municipal State Aid Street (MSAS) funds, Legislative funds for turnback, Surface Transportation Program (STP) funds, Transportation and Economic Development (TED) funds, Cooperative Agreement funds, Corridor Investment Management (CIMS) program, public-private partnerships, and many others. As the proposed improvements advance in the project development process, it is probable that some of these programs and strategies may become more or less applicable; therefore it is recommended that the project partners actively investigate and pursue these and other funding programs/strategies.

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APPENDIX A – HIGHWAY 36 CORRIDOR STUDY REPORT

Public Involvement Materials

- Open House #1 Summary (July 17, 2013)
- Open House #2 Summary(October 29, 2013)

Highway 36/Century Ave/Hadley Ave Study
July 17, 2013 Public Open House Summary

A public open house was held for the Highway 36/Century Ave/Hadley Ave Study on Wednesday, July 17, 2013. The purpose of the public open house was to provide information about the study, including background information and schedule, present nine design concepts under consideration and to answer questions and collect feedback from area stakeholders.

The public open house was held at Oakdale Discovery Center, 4444 Hadley Avenue N., Oakdale. The meeting was two hours in length and conducted in an open house format with visual displays and design layouts, handouts and an opportunity to provide written comments. One hundred and fifteen attendees signed in, and staff from the Minnesota Department of Transportation (MnDOT), Washington County, Ramsey County, City of Oakdale, City of North St. Paul and consultant staff, S.E.H. Inc. and Zan Associates, answered questions and took comments.

The public information meeting was advertised on the MnDOT project website and City of Oakdale and City of North St. Paul websites. A newsletter was provided to the Project Management Team for distribution; the newsletters were mailed by each city to local businesses adjacent to the corridor. A news release was also sent out to local media, and email updates were sent out via Constant Contact to those on email lists for nearby construction projects by MnDOT.

Public Comments

Twenty-nine written comments were submitted at the open house. The comments overall were focused on the specific design concepts; below is a summary of the comments regarding each design concept, with additional comments included at the end.

T-1: Diamond interchanges at both Highway 120 and Hadley Ave

- It is important to [have] a complete and easy interchange at Hwy 120. This is necessary so as not to isolate North St. Paul. Concept T-1 or T-2 seems to make sense (with modifications). *[This comment also included in T-2 section]*
- Prefer option T-1 with caveats:
    - Preserve as much commercial redevelopment land on southwest Hwy 36/120 intersection (need wall)
    - Preserve Gateway Bridge at Hwy 120
- T-1 plan best of tonight's plans.
- T-1: Ok
- T-1 120 intersections.
- Either T-1 or T-2. They make the most sense. *[This comment also included in T-1 section]*
- [Prefer T-2], second choice T-1. Do not like the roundabouts, or long frontage roads of the other plans. T-1 Hadley to the east—ramps too close to 694 interchange; folded diamond the better solution.
- T-1 would be great for North St. Paul regarding access to our city.
- T-1—don't like the diamond at Hadley.

T-2: Diamond interchange at Highway 120 and folded diamond at Hadley Ave

- I like T-2 the best. Tight diamond on 120/36 makes sense.
- T-2 seems the way to go. Less impact for businesses and residences. On and off access at both 120 and Hadley. Long term solution. Most efficient traffic flow solution. Least disruptive to the flow of traffic and patterns of people.
- It is important to [have] a complete and easy interchange at Hwy 120. This is necessary so as not to isolate North St. Paul. Concept T-1 or T-2 seems to make sense (with modifications). *[This comment also included in T-1 section]*
- T-2: Ok *[Two comments]*
- T-2 for North St. Paul- Hwy 120 exit/entrance. Seems reasonable for Hadley also.
- Either T-1 or T-2. They make the most sense. *[This comment also included in T-1 section]*
- My preferred alternative is option T-2. Diamond interchange at 120 and a folded diamond interchange at Hadley. Both of these options appear to be the most logical, feasible, and technically sound from a planning and engineering standpoint.
- Prefer T-2
- T-2 seems to work for me.
- After reviewing all the options for Hwy 36 and talking with the various staff at each map, we are of the opinion that T-2 provides the best access to cross Hwy 36 at 120 and Hadley with the least displacement of residences and businesses. Option T-2 also provides the least disruption to the existing Gateway Trail.
- There must be an exit ramp on 120. 3M and Century College are major destinations. T-2 seems to be the best. There needs to be access to Hadley, although Fleet Farm is the business most affected by that. If you can design something that makes them happy that would be good. I am a retired local business person and I'm very aware of the business interests. T-2 is cheaper than T-3.
- I like T-1 with the diamond intersection at Hadley but I understand that probably won't happen, so T-2 is my best plan. You must maintain access at both Hwy 120 and Hadley Ave. To eliminate access at Hadley with Fleet Farm, Marcus Theaters, and that big apartment complex would be ridiculous. The city of North St. Paul has already been impacted by the new high school complex and the revisions to Hwy 36 from Century to White Bear Ave. To cut through the neighborhoods would be harmful to the community.
- T-2: Ok, not perfect
- I think some kind of off ramps are necessary. I would very much like to see access on and off at 36/120 and Hadley/36. I think a diamond interchange at 120 & 36 would be the best and disrupt the area least and I think the folded diamond interchange at Hadley and 36 would work nicely with the option for street lights at the ramps to Hadley if the traffic is very heavy and you are taking your life in your hands to make a left hand turn to go to Fleet Farm. Thank you.
- Prefer the T-2 option or something like it. Need an option that gets rid of intersections/signals.
- Of the options presented I feel option T-2 is by far the best. Closing one intersection or the other would only force more traffic into our neighborhood. We already deal with the noise from Hwy 36, we don't need additional surface traffic on the local streets also.
- Personally I believe the T-2 concept will be best for the long haul. It is traditional and will be well accepted with minimal impact to local businesses and neighborhoods.

T-3: Hybrid folded diamond at Highway 120 and folded diamond at Hadley Ave

- [First preference is option T-1]; other preference T-3 with caveats:
    - But keep all modified interchange on east side of highway
    - Better highway signage to get to downtown North St. Paul
- T-3 Fleet Farm.
- T-3 second choice [T-1 first choice], but modifying some.
- T-3 looks like it needs much more property [than T-2] and will impact home owners.
- No to T-3

A-1: Conventional intersections with added capacity

- A-1: Bad—lights!
- A-1 #2 [choice]- not to impact [illegible] and some of the businesses.
- My least preferred alternatives are to not construct interchanges A-1 and A-2 as well as removing access to either Hadley or 120 from 36. Both of these access routes are critical to the businesses and residents who live in the area. Thank you. *[This comment also included in A-2 section]*
- A-1 is cost effective.

A-2: Bow-tie controlled intersection

- A-2: Terrible—roundabouts arg!
- My least preferred alternatives are to not construct interchanges A-1 and A-2 as well as removing access to either Hadley or 120 from 36. Both of these access routes are critical to the businesses and residents who live in the area. Thank you. *[This comment also included in A-1 section]*
- A-2: Not good either—too many roundabouts
- No to A-2

C-1: Modified split diamond

- C-1: Ok
- No to C-1 *[Two comments]*

C-2: Button hooks

- C-2: No way
- No to C-2 *[Two comments]*

S-1: Folded diamond interchange at Hadley Ave with overpass at Highway 120

- S-1: Bad, 120 needs access
- S-1: Need more info
- No to S-1

S-2: Diamond interchange at Highway 120 with overpass at Hadley Ave

- S-2: Bad, no access to Hadley
- S-2 #1 [choice]- westbound slip ramp at Fleet Farm.
- S-2: Not good for folks living east when shopping at Fleet Farm
- S-2 option also looks like a good option even though it takes out the Hadley access. Prefer keeping the Century access if a choice must be made.
- No to S-2

Other

- Better and understandable signage is also a must.
- Also need to work on traffic flow on Hwy 120 north and south of Hwy 36 and pedestrian movement along Hwy 120. Thanks!
- Like plan for Hwy 36 and Hilton.
- The best solution would be diamond interchanges at Margaret, 120, and Hadley. People need full access instead of pinch points restricting travel. Funding should be gotten by installing a temporary toll booth and collect the needed money. Remove the toll both when the money needed is collected. Thanks for the attention to the much needed improvements.
- Buy land now—it is ridiculous that the gas station at NE corner of 36 and 120 sat vacant for years, and now a Caribou Coffee is being built, which you almost certainly will have to buy, relocate and demo for big money. Buy the gas station (vacant) on the SW corner of 36 and 120 now—don't make the same mistake twice! Also, once the Century and Hadley traffic signals are gone, the bottleneck shifts to 36 from Edgerton to 35W. This needs to be increased to 3 lanes in each direction ASAP. This has been needed (6 lanes in Roseville) since the 1980s!!!
- We live on 50th St. A number of your plans will turn our street into a highway as people are trying to get on or off of 36. This will not be good for our neighborhood!!
- I understand you have to make changes. Taking away the exit at 120 could kill what is left of North St. Paul. Please, please keep exits at 120!
- My concern is with the Hadley intersection with easy access to 36. I support the diamond interchanges and folded interchange at this section. All the other options would be very inconvenient and take much longer to access Hadley southbound to reach my house. I really do not support the frontage road options that close the intersection access to both Hadley and Century.
- Gateway Trail needs to be a top priority.

Open House #2 Summary(October 29, 2013)

Highway 36/Century Ave/Hadley Ave Study
October 29, 2013 Public Open House Summary

A public open house was held for the Highway 36/Century Ave/Hadley Ave Study on Tuesday, October 29, 2013. The purpose of the public open house was to provide updated progress information about the study, particularly three refined interchange design concepts, and to answer questions and collect feedback from area stakeholders.

The public open house was held at North St. Paul City Hall, 2400 Margaret Street N, North St. Paul. The meeting was two hours in length and conducted in an open house format with visual displays and design layouts, handouts and an opportunity to provide written comments. Ninety-one attendees signed in, and staff from the Minnesota Department of Transportation (MnDOT), Washington County, City of Oakdale, City of North St. Paul, S.E.H. Inc. and Zan Associates were on hand to answer questions and take comments.

The public information meeting was advertised on the MnDOT project website and City of Oakdale and City of North St. Paul websites. A newsletter was provided to the Project Management Team for distribution; the newsletters were mailed by each city to local businesses adjacent to the corridor. A news release was also sent out to local media, and email updates were sent out via Constant Contact to those on email lists for nearby construction projects by MnDOT.

Public Comments

Nineteen written comments were submitted at the open house, and several additional comments were submitted the following week. The comments overall were focused on the design concepts and design features; below is a summary of the comments regarding each design concept and various design features, with additional comments included at the end.

Alternative S2: Tight Diamond Interchange at Highway 120 and Overpass at Hadley Ave

- S2 is the worst of the three. That would impact Fleet Farm, etc. and route more traffic down residential streets like Gershwin, where I live.
- Alternative S2 – definitely out. It puts too much pressure on local streets, it will be a killer for Fleet Farm business. Too much traffic going by elementary school (Castle). You need to slow down in school area. It would need constant police monitoring.
- Also, the plan with no access to Hadley would also have huge traffic impacts for the neighborhood.
- S2: Not at all – access needed at Hadley.
- In my view the S2 without direct access at Hadley is a no go. I have a couple of friends who live on the streets that would become part of the frontage road to Hadley and they, not surprisingly, felt the same way.
- I am absolutely opposed to removing access to Hwy 36 at Hadley, this would significantly impact my neighborhood. There is a relatively new fire station within a half mile of that intersection and this would delay access to the freeway system. There is also an elementary school right there and buses would be funneled through one area to reach the schools, increasing traffic. A brand new business, Park Tool, just opened up along Hadley which will require freeway access. Hadley is a major collector road for the City of Oakdale and to remove access to Hwy 36 would just be unacceptable.

Alternative T2: Tight Diamond Interchange at Highway 120 and Folded Diamond at Hadley Ave

- Prefer alternative T2. Tight Diamond interchange at Highway 120 (TH 36 under) folded Diamond at Hadley Ave.
- Keeping access to 36 at Hadley is critical to future development and current property owners in the neighborhoods of northern Oakdale.
- T2 with tight diamond is my first choice. The roundabouts would be okay, but there doesn't seem to be enough room.
- Alternative T2 Tight Diamond works better with stoplights I think roundabouts will be problematic with high traffic volume asking for trouble. Need to work on both AT2 designs (combination)
- PLEASE No more stop signals at 36 and Century or 36 and Hadley – we want interchanges!
- T2 without roundabouts is my favorite. If a signal or roundabout is at 17th and 120
- I prefer either of the T2 Alternatives: Folded Diamond Interchange at Hadley and Tight Diamond Interchange at Hwy 120, with or without roundabouts. I am not sure exactly what the implications of including the roundabouts are, so I would be curious to learn more about that.

Alternative T2 with Roundabouts and Hadley Ave Trail Underpass

- I like the idea of upgrading the two sections at the same time I wish it would happen sooner because of the added community traffic from the new bridge in Stillwater; out the two I like the roundabout better than lights to control traffic through intersections.
- Alternative T2 with roundabouts: roundabouts on 120 are way too close. Is there a way to do one large roundabout? Could two roundabouts north of 36 on Hadley be combined into one roundabout? In general roundabouts are nice so don't need to stop.
- The plan with roundabouts is preferable to signals.
- I would like to see traffic circles at Hadley. Traffic flow at that intersection is high during rush hour and also on weekends. However traffic circles on 120 would be too evasive and take too much land. Also it would depend on which proposal will make trails and pedestrian traffic easier and safe.
- I like Alternative T2 even with the roundabouts.
- Not sure how all the roundabouts work at 120 on T2 with roundabouts. I do like the idea of either a roundabout at 120 and 17th Ave or a signal.
- Get rid of this roundabout obsession. English St and McKnight are the best.
- Both T2 options would work but I personally prefer the T-2 with the roundabouts, at least at Hadley Ave, and the Gateway Trail underpass at Hadley Ave. There seems to be more space at Hadley for roundabouts than there is at Century, but that is up to you people to determine.
- I have been thinking about the options for the Hadley Avenue interchange and I went to the interchange and tried to visualize the proposals. I believe option T2 with roundabouts will best serve the neighborhood:
    - Utilizes vacant land that is readable available.
    - Fleet Farm doesn't have to relocate gas pumps and possibly the entire gas station.

    - Eliminates the need for traffic signals such as the ones used at the McKnight Road interchange that slow down traffic.
- I offer the following comments concerning option T2 with roundabouts:
    - Would have preferred Hadley Avenue going under Highway 36. This would appear to be easier on all the trucks that service industry located on/near Hadley Avenue. Raising Hadley Avenue 22 feet above Highway 36 would seem to create a problem for loaded trucks. Traffic is slow enough on Hadley Avenue as it is and we don't need loaded trucks slowly going up, over and down to get over the highway.
    - Would be easier for emergency vehicles if Hadley Avenue went under Highway 36.
    - Fleet Farm should be given the option of having an access from the traffic circle directly to their service station.

Local System

- Do not turn 50th into a main road to get to Hadley or 120.
- Closing the access point of Georgia Blvd at Hwy 120 would be a disaster for the Oakdale neighborhood. It would severely restrict access to 120/36 and neighbors living on 47th, upper 47th and 48th streets will see a severe traffic impact in front of their homes, as will all along 50th St.
- Is it possible to tie Georgia Blvd into the roundabout on the south side of 36?
- Frontage roads are a must! Upgrading existing roads and adding new, would keep local traffic on local streets. But you know that!!!

Pedestrian/Bicycle Access

- Be sure to plan for all users. Be sure there are safe bike and ped facilities along and across Hwy 36. Be sure there are connections from the Gateway to the crossings.
- I would like bike ped access between the Gateway Trail and Hadley, even with a trail underpass option. I like the service road option north of Highway 36 and don't believe you need an interchange at Hadley. Now that Highway 36 is becoming a true freeway and inaccessible to cyclists, can we turn the Gateway Trail to a true 24/7 facility where it crosses 694? I've biked at night on Highway 36 just to get inside of the 694 loop on my ride home from Stillwater.
- I like the idea of keeping the brand new Gateway Trail bridge over Hwy 120 in place. Otherwise that would be a huge waste of taxpayer money. I do not have an opinion on whether to make the Gateway Trail crossing at Hadley an over or underpass. I do not know enough about the implications to surrounding infrastructure. I would think making it an underpass could pose a flooding concern under severe weather conditions which might pose a maintenance headache for the City.

Other Design Comments

- Drop 36 and bike trail into a trench below Century.
- Please do what you can to eliminate this [Hwy 120] dangerous stop and create a full access interchange. I believe it is negligent not to.
- As a longtime North St. Paul resident living close to the intersections of Highways 36 and 120, I grow tired of the regular sound of car crashes. It was disheartening, but not surprising,

to learn that this intersection is rated one of the most dangerous in our state and that several deaths have occurred here. At the open house I also learned that approximately 40,000 cars drive Highway 36 each day. This volume must be similar to other highways in the area (694, 94), yet we continue to force cars to stop along it. Obviously many cars are surprised and not prepared for the stops or turns which results in accidents. I expect the amount of traffic will continue to increase when the St. Croix bridge opens and when the North St. Paul industrial park launches. Unless the intersection is changed, this will result in even more accidents and deaths. I applaud Maplewood and Pine Springs for recently eliminating stops on this highway. It is about time North St. Paul also comes to the realization that this is a highway and eliminate the stop at Highway 120. The council would also be wise to take the opportunity to create a gateway to North St. Paul and the new industrial park.

- Keep Hadley level with its current buildings: Fleet Farm, Gas Station etc. Run 36 OVER Hadley (if Hadley went over 36, you'd need to drive two blocks south to get back to the gas station!).
- Alternative 2 would be the worst choice! Number 1 is best one for me. [no additional concept indication]
- McKnight/Hwy 36 directions to North St. Paul: sign needs to be north of light—too hard to cross over!
- I would also like to comment on the interchanges at Highlands Trail and Demontreville Trail. I miss having an opportunity to turn left from westbound Highway 36 to Highlands Trail! This was the fastest and safest way for hundreds of Lake Elmo and Oakdale residents to get to our homes. Turning left at Demontreville Trail forces traffic to use a quaint country road that was designed for a leisurely Sunday drive. The route is heavily populated with deer and other wildlife. I hit one deer a few weeks ago and don't want to encounter another! During the winter months this road is extremely slippery as evidenced by all the cars that slide off the road and hit things. If we must use Demontreville Trail to access the cities of Lake Elmo and Oakdale, please give us a longer left turn lane on Highway 36. At present we top the hill and must slam on the brakes before we can enter the short left turn lane. It's only a matter of time before accidents occur.

Additional Comments

- I just wanted to comment that I am in support of any project that you choose. I am located right across from the Dairy Queen and next door to the NSP Auto Clinic. Once again you have my full support!
- Your diagrams are totally confusing. Which goes over? [Included sketch of intersections]. Now mine: See the difference?
- We are willing to work with you, make us an offer we can't refuse. The sooner the better. We believe in being proactive.
- How would the businesses north and south of Hwy 36 on Century be affected by either option, lights or roundabouts? Thanks for the excellent work you are doing. Now to raise the money?!
- This is confusing tonight. The staff are busy. Keep me posted and keep it simple in the future.

APPENDIX B – HIGHWAY 36 CORRIDOR STUDY REPORT

Trunk Highway 36 Corridor Study - Existing Conditions and Study Goals Technical Memorandum (June 5, 2013)

Preliminary Environmental Findings Memorandum (November 21, 2013)

Study Area Wetland Map

TECHNICAL MEMORANDUM

TO: Karen Scheffing
MnDOT Project Manager

FROM: Mark Benson, P.E.
Bob Rogers, AICP

DATE: June 5, 2013

RE: Trunk Highway 36 Corridor Study – Existing Conditions and Study Goals
SEH No. 124228

TH 36 Corridor Study Introduction and Background

This Existing Conditions Technical Memorandum is the first in a series of technical memoranda to identify infrastructure needs and requirements along Trunk Highway (TH) 36 between Hadley Avenue and TH 120. A separate high level access management task is proposed for TH 120 between Halloway Avenue and 20th Avenue East. The Minnesota Department of Transportation (MnDOT), in cooperation with Ramsey County, Washington County, the Minnesota Department of Natural Resources (MNDNR), the City of Oakdale and the City of North St. Paul, initiated this planning effort with the ultimate goal of identifying feasible long-term access and intersection improvements, so that near term decisions are made that will support the vision for the corridor.

Issues or challenges in terms of physical constraints, environmental factors, financial considerations, traffic operations, and political and public perception are key factors in determining future improvements in the corridor. The first step in this process is to develop an understanding of the existing transportation conditions in the study corridor. This Existing Conditions Technical Memorandum is divided into the following sections:

- TH 36 Corridor Study Introduction and Background
- TH 36 Study Corridor Description
- Traffic Volumes
- Traffic Operations Analysis
- Crash Analysis
- Social, Economic, and Environmental Characteristics
- TH 36 Corridor Vision
- Study Purpose and Goals

Overall, the purpose of this existing conditions analysis of the TH 36 corridor is to develop a baseline condition for the local economy (commercial/retail, manufacturing, industrial developments), physical constraints (social and environmental factors), mobility, and safety conditions from which to later compare the benefits of various improvement options.

TH 36 Study Corridor Description

From the east, TH 36 begins in the City of Stillwater (Washington County) at the Minnesota-Wisconsin state line and generally runs east-west and connects to I-35W in the City of Roseville (Ramsey County).TH 36 is designated as a Principal Arterial and serves as an important link for commuters in the northeastern suburbs as a connection to I-694, TH 61, I-35E, and I-35W (see Appendix A for a regional context map).

The TH 36 study corridor extends from just east of Hadley Avenue to just west of TH 120 in the cities of Oakdale and North St. Paul. Within the study area, TH 36 is a four-lane divided expressway section. Land use between Hadley Avenue and TH 120 is a mix of commercial/retail, light industrial, and low- and medium-density residential developments. Some open (undeveloped/vacant) lots exist near the Hadley Avenue intersection. These lots are privately owned and have been considered for commercial development in the past.

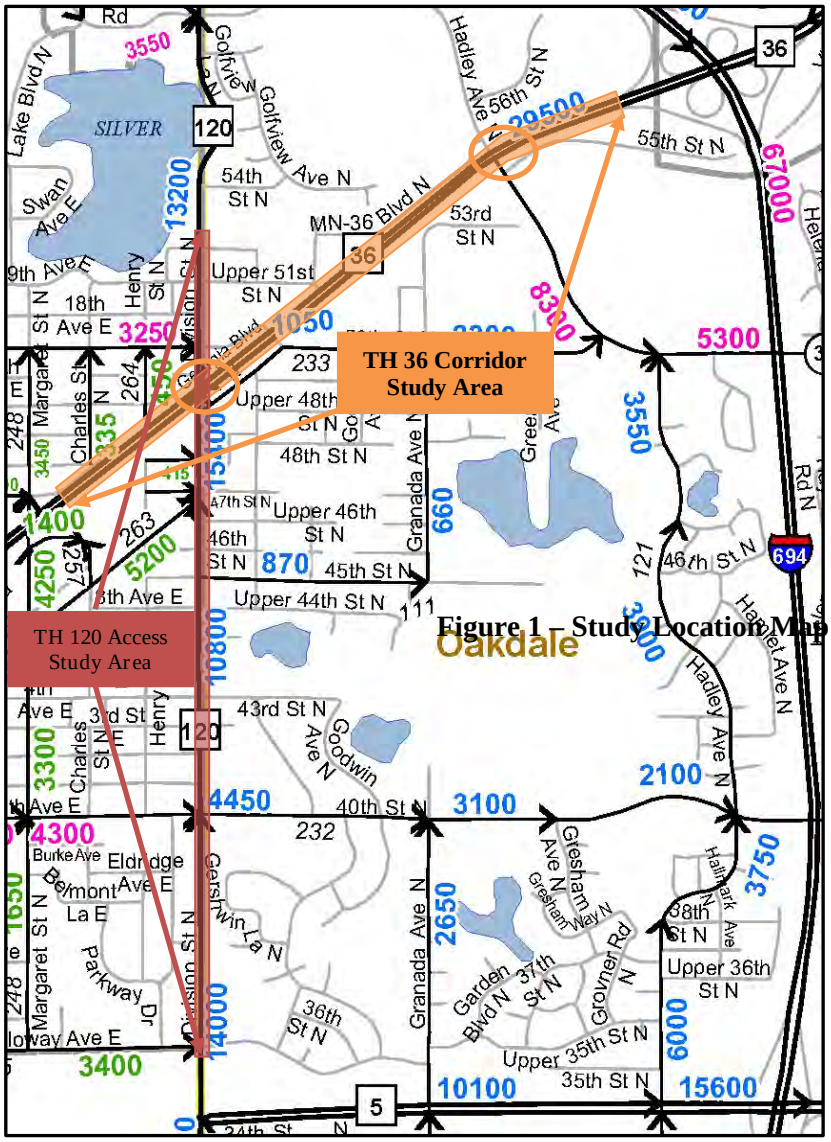


Figure 1 – Study Location Map

West of the study area, TH 36 was recently reconstructed as a conrolled access highway with a diamond interchange at McKnight Avenue and a partial interchange (WB exit ramp only) at Margaret Street. Further west, a new interchange is currently being constructed at TH 36/English Street in the City of Maplewood. Immediately east of the study area is I-694, which includes a full access interchange with TH 36. East of I-694, the TH 36 is experiencing additional safety and mobility improvements with a new interchange at Hilton Trail, which is located in communities of Pine Springs and Lake Elmo. A new TH 36 bridge over

the St. Croix River near the City of Stillwater is also currently under construction, which will greatly benefit travelers using the eastern end of the highway corridor.

Traffic Volumes

Existing Traffic

The most recent MnDOT traffic volumes maps were reviewed for the study area. The following data is presented as annual average daily traffic (AADT) and heavy commercial average annual daily traffic (HCAADT) volumes:

TH 36

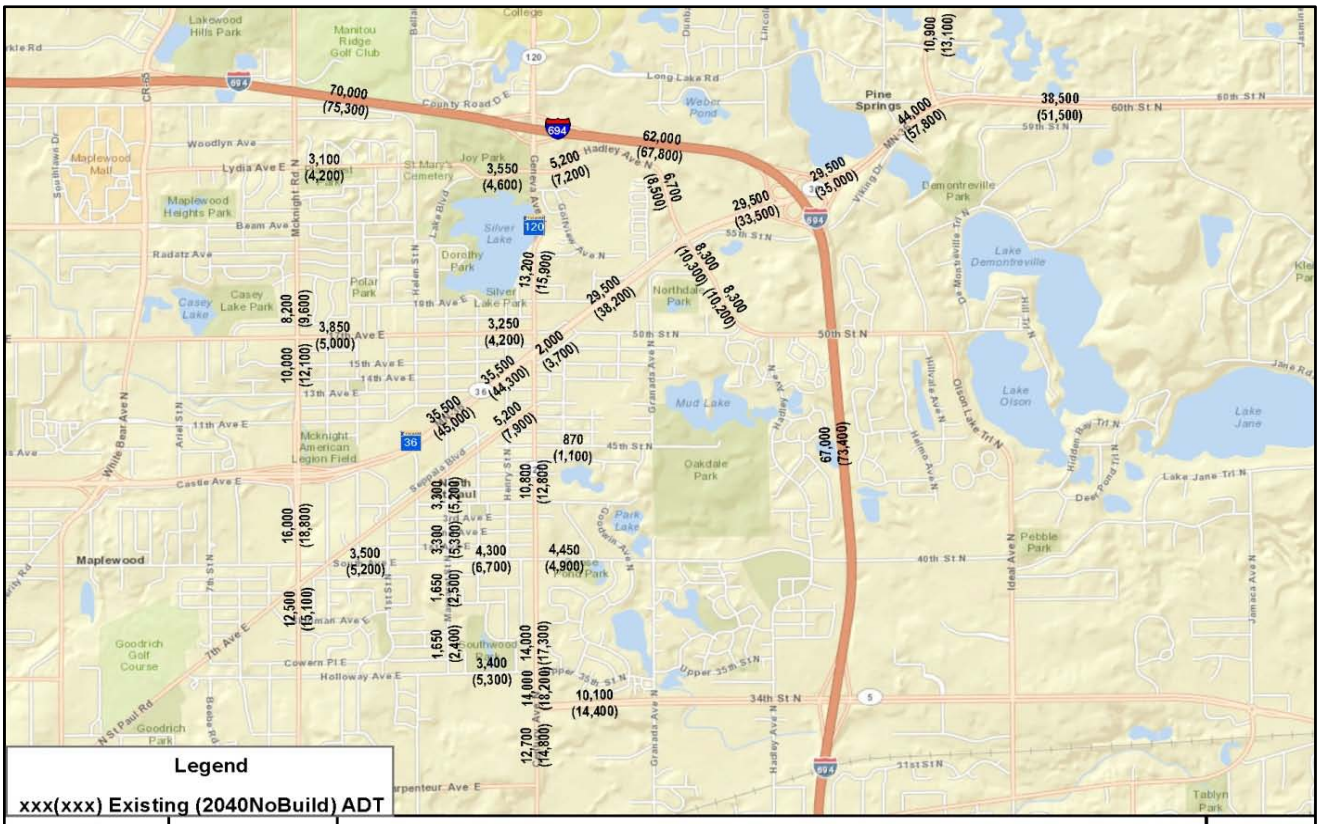
- 2010 AADT: 29,500 between I-694 ramps and TH 120; and 35,500 west of TH 120.
- 2010 HCAADT: 680 – 760 (Approx. 2.3-2.6 percent of total daily traffic)

TH 120

- 2010 AADT: 13,200 north of TH 36; and 15,400 south between TH 36 and 7th Ave. E.
- 2010 HCAADT: 175 – 355 (Approximately 1.3-2.3 percent of total daily traffic)

Forecast Traffic (2040): No-Build

The latest version of the Twin Cities Travel Demand Model (TCTD Model) was used to forecast traffic demands in the project area into the 2040 design year. More detailed Traffic Analysis Zones (TAZ) and roadway network connections were included in the project area. Standard MnDOT forecasting practices were utilized to ensure reasonable forecast demands for the project.



Existing and 2040 NoBuild Daily Traffic Volumes
TH 36/TH120/Hadley Ave Study Area
MnDOT

Figure 2

Traffic Operations Analysis

Existing Traffic Operations:

Traffic data along TH 36 was collected at TH 120 and Hadley Avenue in January of 2013. Additional data along TH 120 was also collected in April of 2013. On-site traffic observations were completed in May 2013 to verify the traffic operations model was matching existing field conditions.

TH 36 at TH 120 looking north

The two traffic signals have high speed approaches as they are surrounded by expressway interchanges. The signal timings at the intersections favor the heavily traveled TH 36 and are coordinated together to provide more free flow operations along the mainline. Due to the long cycle lengths, the minor side streets have long wait times before being served by the signal; however the majority of the minor street traffic is served within one cycle. The 2013 existing AM and PM peak hour volumes are shown in Table 1.

Table 1 TH 36 Existing Intersection Traffic Demands

Intersection	Peak	Northbound			Southbound			Eastbound			Westbound			Total
		LT	T	RT	LT	T	RT	LT	T	RT	LT	T	RT	
TH 36 at TH 120	AM	199	205	23	80	127	119	77	638	127	50	1,465	42	3,152
	PM	177	209	55	82	225	118	154	1,462	234	62	909	65	3,752
TH 36 at Hadley Ave	AM	187	67	170	48	43	54	25	689	57	77	1,330	98	2,845
	PM	125	87	116	182	133	99	113	1,368	179	91	897	186	3,577

From the traffic volume data it is easily seen that TH 36 is a peak oriented roadway with a heavy AM peak demand in the westbound direction and a heavy PM peak demand in the eastbound direction. The directional split is approximately 65 percent westbound traffic in the AM peak hour and approximately 60 percent eastbound traffic in the PM peak hour. The PM peak hour has the highest total traffic demand at both the TH 120 and Hadley Avenue intersections.

The analysis software, Synchro/SimTraffic, provides measures of effectiveness (MOE's) for vehicle delay, level of service (LOS) and queues based on FHWA Highway Capacity Manual Methodology. LOS is a qualitative rating system used to describe the efficiency of traffic operations at an intersection. Six LOS values are defined, designated by letters A through F. LOS A represents the best operating conditions (no congestion), while a LOS F represents the worst operating conditions (severe congestion)

Currently, both the TH 120 and Hadley Avenue intersections operate at a LOS D or better during both AM and PM peak hours. Table 2 below provides a summary of the existing approach and intersection delays for both intersections. See Appendix B for a more detailed MOE table.

Table 2 TH 36 Existing Intersection MOE's

Intersection	Approach	AM Peak Hour		PM Peak Hour	
		Approach	Intersection	Approach	Intersection
		Delay / LOS	Delay / LOS	Delay / LOS	Delay / LOS
TH 36 at TH 120 (Signal)	EB	24.3 / C	36.5 / D	47.2 / D	46.3 / D
	WB	30.6 / C		35.4 / D	
	NB	**73.6 / E**		**63.4 / E**	
	SB	42.9 / D		48.6 / D	
TH 36 at Hadley (Signal)	EB	18 / B	19.4 / B	45.1 / D	41.5 / D
	WB	11.5 / B		24.9 / C	
	NB	54.9 / D		**59.2 / E**	
	SB	51.9 / D		**67.7 / E**	

Both intersections are coordinated together to allow for optimal traffic flow for the high through demands on TH 36. The cycle lengths during both peak hours are just over 3-minutes long at 190 seconds; TH 36 is given roughly 120 seconds of the total cycle length, approximately 64 percent. The long cycle length and duration of split given to TH 36 equates to longer wait times for the minor street traffic waiting for their phase to come up. For this type of facility, these longer wait times are typical for the minor street approaches and often times result in a poor LOS (E and F).

Existing AM Peak Hour

In the AM peak hour, the TH 36 approaches at both intersections operate with a LOS C or better; however the protected left turn phases operate at either a LOS E or F for traffic turning from TH 36 to both TH 120 and Hadley Avenue. This poor LOS is a direct implication of the protected phasing and the long cycle length; but however all of the queued left turning traffic is served in one cycle.

TH 36 westbound approach at Hadley Avenue

At TH 120, the southbound approach queue does block access to 16th Avenue and the businesses on the west side of the roadway. The northbound approach queue does block access to Georgia Boulevard and does occasionally spill back as far south as 48th Street. During the field review, it was observed that a southbound vehicle making a left turn onto Georgia Boulevard can block the single southbound lane and create a queue that does extend into the TH 36 intersection for a brief time.

At Hadley Avenue, the southbound approach queue does extend beyond the closely spaced North Frontage Road intersection and the northbound approach queue does block access to 55th Street. It was observed that a southbound vehicle making a left turn onto 55th Street can block the single southbound lane and create a queue that does extend into the TH 36 intersection for a brief time.

Existing PM Peak Hour

In the PM peak hour the TH 36 approaches at both the TH 120 and Hadley Avenue intersections operate with a LOS D or better; however the protected left turn phases operate at a LOS F for traffic turning from TH 36 to both TH 120 and Hadley Avenue. This poor LOS is a direct implication of the protected phasing and the long cycle length; but however all of the queued left turning traffic is served in one cycle. The only exception is the eastbound left turn from TH 36 to TH 120 which does fill the entire storage lane provided at times and one or two vehicles can be stranded for another cycle.

The eastbound TH 36 approach can have very long queues due to the high speed expressway section to the west of the signal. The average queue is approximately 500 feet, with a maximum queue that can extend to almost 1,000 feet west of the signal. Due to the long queues, vehicles turning at TH 120 sometimes drive on the shoulder to try and bypass the congestion.

TH 36 eastbound approach at TH 120

At TH 120, the southbound approach queue does block access to 16th Avenue and the businesses on the west side of the roadway; the queue does occasionally extend through the 17th Avenue intersection as well. The northbound approach queue does block access to Georgia Boulevard and occasionally spill back south of 48th Street. It was observed that a southbound vehicle making a left turn onto Georgia Boulevard can block the single southbound lane and create a queue that does extend into the TH 36 intersection for a brief time.

At Hadley Avenue, the southbound approach queue extends beyond the closely spaced Glenbrook Avenue intersection and the northbound approach queue does block access to 55th Street. It was observed that a southbound vehicle making a left turn onto 55th Street can block the single southbound lane and create a queue that does extend into the TH 36 intersection for a brief time.

<u>2040 No Build Traffic Operations:</u>

Traffic demands were forecast out to the 2040 design year for the entire study area. In the No Build scenario, there is only minor growth (approximately 1% per year) occurring along all corridors in the study area as there are existing capacity constraints along the corridor that are currently not planned to be improved.

The only planned capacity improvements before 2040 are construction of a new St. Croix River crossing near Stillwater and replacing the existing at-grade signals at English Street (3 miles west of project area) and Hilton Trail (1.25 miles east of project area) with grade-separated interchanges; all three of these projects are currently under construction in 2013.

The forecast 2040 No Build AM and PM peak hour volume demands are shown in Table 3. The largest increases in traffic demands are in the off-peak direction as there is excess capacity for these movements.

Table 3 TH 36 2040 No Build Forecast Intersection Traffic Demands

Intersection	Peak	Northbound			Southbound			Eastbound			Westbound			Total
		LT	T	RT	LT	T	RT	LT	T	RT	LT	T	RT	
TH 36 at TH 120	AM	245	265	45	115	160	120	85	920	165	75	1,680	55	3,930
	PM	235	265	80	100	285	135	160	1,680	285	100	1,300	90	4,715
TH 36 at Hadley Ave	AM	250	100	160	60	60	100	60	980	90	65	1,430	120	3,475
	PM	180	120	90	215	180	215	220	1,505	230	80	1,200	235	4,470

The existing traffic operations will continue to deteriorate through the 2040 forecast year. With no capacity improvements planned any increase in demands can have negative impacts to the existing capacity. In the AM peak, both intersections operate at a LOS D or better, while in the PM peak the TH 120 intersection will operate at a LOS F with major queuing problems. Table 4 shows a summary of the 2040 No Build approach and intersection delays; for a more detailed MOE table, see Appendix B.

Table 4 TH 36 2040 No Build Intersection MOE's

Intersection	Approach	AM Peak Hour		PM Peak Hour	
		Approach	Intersection	Approach	Intersection
		Delay / LOS	Delay / LOS	Delay / LOS	Delay / LOS
TH 36 at TH 120 (Signal)	EB	31.1 / C	49.4 / D	**139 / F**	**107.6 / F**
	WB	52.3 / D		**86.1 / F**	
	NB	**82.2 / F**		**104.3 / F**	
	SB	46.2 / D		**63.5 / E**	
TH 36 at Hadley (Signal)	EB	30.2 / C	24.5 / C	47.9 / D	50.5 / D
	WB	14.5 / B		31.9 / C	
	NB	**59.1 / E**		**111.2 / F**	
	SB	50.3 / D		**84.2 / F**	

Both intersections will remain coordinated together to allow for optimal traffic flow for the high through demands on TH 36. The cycle lengths during both peak hours will remain at 190 seconds; the minor street approaches were given slightly more green time than the existing timing plans in order to try and balance the delays.

No Build AM Peak Hour

In the AM peak hour the delays at both study intersections do not change much compared to the existing conditions. TH 36 volumes and delays stay relatively close to the existing demands with the exception that the off-peak direction, eastbound in the morning rush hour, through volume does increase at a higher rate. The protected left turn phases will continue to operate at LOS F for traffic turning from TH 36 to both TH 120 and Hadley Avenue. This poor LOS is a direct

implication of the protected phasing and the long cycle length; but however all of the queued left turning traffic is served in one cycle.

At TH 120, the southbound approach queue extends slightly further than existing and can block the 17th Avenue intersection. The northbound approach queue extends further and blocks access to 13th Avenue/47th Street, approximately 775 feet south of TH 36 the northbound left turning vehicles will operate at a LOS F and the through movement will operate just under the criteria at a LOS E.

At Hadley Avenue, the southbound approach queue extends slightly further than existing and can block the Glenbrook Avenue intersection. The northbound approach queue will continue to extend through the 55th Street intersection. Both the Hadley Avenue approaches will have vehicle movements operating at a LOS F.

The minor street approach queues along both TH 120 and Hadley Avenue will continue to extend beyond the closely spaced intersections and access points. This will create additional delays for vehicles trying to exit or enter the driveways that are not accounted for in this analysis.

No Build PM Peak Hour

In the PM peak hour the delays at both study intersections increase compared to the existing conditions; the TH 36 at TH 120 intersection will fail. While the TH 36 volumes do increase over the existing demands, the side street traffic increases enough to require more green time and thus deteriorate the signal operations. The protected left turn phases will continue to operate at LOS F for traffic turning from TH 36 to both TH 120 and Hadley Avenue. This poor LOS is a direct implication of the protected phasing and the long cycle length most of the queued left turning traffic is served in one cycle. However, the eastbound left turns at TH 120 and Hadley Avenue can fill the entire storage lane provided and ultimately two or more vehicles can be stranded for another cycle.

The eastbound TH 36 approach will continue to have very long queues due to the high speed expressway section to the west of the signal and increased volumes on TH 120. The average queue will increase to approximately 1,600 feet, with a maximum queue that can extend to 3,000 feet west of the signal. The long queue requires extended green time in order to serve all the queued demands; however some vehicles require two cycles to be served through the intersection due to the queue lengths. The average delay times for the eastbound approach will be over 2 minutes.

At TH 120, the northbound and southbound approach will also see an increase in approach delay. The southbound approach queue extends much further than existing and will block the 17th Avenue intersection most of the time; the queue will extend north of 17th Avenue by over 400 feet. The northbound approach queue extends further and blocks access down to 47th Street, approximately 950 feet south of TH 36. The northbound left turning vehicles will see the greatest increase in delay as the permissive phase will be used up by the increased southbound through movement; it will operate with an average of 2.5 minutes of delay per vehicle.

At Hadley Avenue, the southbound approach queue extends further than existing with a maximum queue of almost 600 feet. The northbound approach queue will continue to extend through the 55th Street intersection and beyond. Both the Hadley Avenue approaches will be operating at LOS F.

The minor street approach queues along both TH 120 and Hadley Avenue will continue to extend beyond the closely spaced intersections and access points. This will create additional delays for vehicles trying to exit or enter the driveways that are not accounted for in this analysis.

Crash History

Crash data from January 1, 2009 through December 31, 2011 was obtained from MnDOT through the use of the Minnesota Department of Public Safety (DPS) database. The type and severity of the crashes were reviewed and crash and severity rates were calculated for each TH 36 segment and intersection within the study area. This crash information is summarized in Tables 5 and 6 below and is compared to the Metro District average crash and severity rates from 2011 data. It should be noted that the two signalized intersections within the study area are on the MnDOT Top 200 Statewide Crash list. Appendix C contains additional crash data including crash diagrams.

In order to fully assess the crash history in the study area, three segments of TH 36 were reviewed. The first segment is located between the eastern McKnight Avenue interchange ramps and the TH 120 intersection; but does not include the TH 120 intersection; this segment is approximately 0.72 miles long. The second segment is located between the TH 120 and Hadley Avenue intersection, but does not include the intersections themselves and the associated crashes; this segment is approximately 0.61 miles long. The third segment is between the Hadley Avenue intersection and the I-694 interchange; this segment is only approximately 250 feet long and does not include the Hadley Avenue intersection and associated crashes. Table 5 shows the crash history for this segment of TH 36.

Table 5 – TH 36 Existing Segment Crashes (2009 to 2011)

Segment	ADT	Fatal	Sev. A	Sev. B	Sev. C	Property Damage	Total	Crash Rate	Severity Rate	MnDOT Metro Average Crash Rate*	MnDOT Metro Average Severity Rate*
McKnight to TH 120	35,500	0	0	3	2	13	18	0.6	0.9	0.6	0.8
TH 120 to Hadley Ave	29,500	0	0	0	0	6	6	0.3	0.3	0.6	0.8
Hadley Ave to I-694	29,500	0	0	0	0	0	0	0.0	0.0	0.6	0.8
	Total	0	0	3	2	19	24				

*MnDOT Metro District Average Crash Rates for similar intersections

Crash and severity rates for the first segment are similar to the MnDOT Metro district averages for a four-lane divided roadway. Segments 2 and 3 are below the average crash and severity rates. For the segment between the McKnight Avenue interchange and TH 120 there were a total of 18 crashes; 14 of those crashes were single vehicle collisions were the vehicle ran off the roadway. There seems to be multiple contributing factors for the crashes that occur on this segment including driver behavior and roadway conditions; 4 of the crashes involved vehicles traveling at unsafe speeds and 7 of the crashes included either wet or icy pavement.

There are two signalized intersections in the study area along TH 36: TH 120 and Hadley Avenue. There are also two additional right-in/right-out (RI/RO) access locations at 50th Street and Glenbrook Avenue. There were no crashes at the two RI/RO access locations. Table 6 shows the intersection crash history.

Table 6 – TH 36 Existing Intersection Crashes (2009 to 2011)

Segment	Fatal	Sev. A	Sev. B	Sev. C	Property Damage	Total	Crash Rate	Severity Rate	MnDOT Metro Average Crash Rate*	MnDOT Metro Average Severity Rate*
TH 36 at TH 120	3	0	1	14	43	61	1.2	1.7	0.6	0.9
TH 36 at Hadley Avenue	0	1	2	15	24	42	1.1	1.7	0.6	0.9
	3	1	3	29	67	103				

*MnDOT Metro District Average Crash Rates for similar intersections

Both intersections have crash and severity rates that are double the MnDOT Metro District averages for a high speed (>45 mph) and high volume (>15,000 entering ADT) signalized intersection. Both of these intersections are listed in MnDOT's Top 200 intersections ranked by Crash Costs; TH 36 at TH 120 is ranked #4 and TH 36 at Hadley is ranked #95.

At the TH 36 and TH 120 intersection there was a total of 61 reported crashes that occurred during the three-year analysis period. There were three fatalities at the intersection, two of the fatalities were pedestrians struck by a vehicle and the other fatal crash involved a vehicle to vehicle collision. The majority, 45 crashes (74%), were rear-end collisions which are typical of a signalized intersection. The eastbound approach at TH 36/TH 120 had a total of 31 (51%) crashes with 21 being rear-end collisions. Unexpected stops on the high speed approach transitioning from a controlled access (expressway) section to a signalized corridor is likely the main cause.

- September 3rd, 2009 – Fatal crash involving two motor vehicles. An eastbound vehicle ran a red light while making a left turn onto TH 120 and was struck by a westbound TH 36 through vehicle. The eastbound vehicle drove in the center median to bypass the left turn queue at the red light and proceeded through the intersection into the oncoming vehicle.
- October 16th, 2010 – Fatal crash involving a pedestrian crossing TH 36 that was struck by an eastbound vehicle on TH 36. The pedestrian did not use the crosswalk; they ran through the median while the TH 36 traffic had a green light.
- July 28th, 2011 – Fatal crash involving a pedestrian pushing a child in stroller across TH 36. The pedestrian, heading northbound along TH 120, ran out against a red light and was struck by an eastbound vehicle on TH 36.

At the TH 36 and Hadley Avenue intersection there were a total of 42 crashes; almost 50% of the crashes involved a personal injury. There was 1 crash that involved a bicyclist, which involved personal injury to the bicyclist. Fourteen (14) of the crashes involved a left turning vehicle, of

which 11 vehicles either failed to yield the right of way or disregarded the traffic signal. The majority, 24 crashes (53%), were rear-end collisions which are typical of a signalized intersection.

- August 9th, 2011 – An eastbound vehicle making a right turn struck a bicyclist trying to cross Hadley Avenue (no marked crosswalk on south leg). The driver failed to yield the right of way to the bicyclist. There was a possible injury to the cyclist; however they refused transport to hospital.

It should be noted that along Hadley Avenue there are two closely spaced intersections north and south of TH 36 that consistently have queues that extend through them. Because of the close interaction with the TH 36 intersection, the crashes at these two intersections can be somewhat related to the TH 36 intersection. There were three bicycle crashes at the Glenbrook Avenue intersection (north of TH 36) and a single bicycle crash at the 55th Street (south of TH 36) intersection; there were no other vehicle crashes at either of these intersections.

- May 8th, 2009 – An eastbound vehicle, along Glenbrook Avenue, making a right turn struck a southbound bicycle along the path. The driver failed to yield the right of way to the bicyclist. There was a possible injury to the cyclist; however they refused transport to hospital.

- May 23rd, 2010 – An eastbound vehicle, along Glenbrook Avenue, making a right turn struck a northbound bicycle along the path. The driver failed to yield the right of way to the bicyclist. There was a possible injury to the cyclist; however they refused transport to hospital.

- June 9th, 2011 – An eastbound vehicle, along Glenbrook Avenue, making a right turn struck a northbound bicycle traveling along the path. The vehicle was traveling on the frontage road trying to inch out into the southbound queue at TH 36. There was a possible injury to the bicyclist; however they refused transport to hospital.

- August 26th, 2010 – A northbound vehicle struck an eastbound bicycle at the 55th Street crosswalk (Gateway Trail). The driver failed to yield the right of way due to driver distraction as the cyclist was already in the crosswalk heading eastbound. The cyclist had an incapacitating injury and was transported to the hospital.

Social, Economic, and Environmental Characteristics

Land Use – the land uses found within the study area are comprised of a mix of residential, commercial/retail, light industrial/manufacturing, and open space, which are in accordance with local zoning in the area.

Specific land uses near the TH 36/Hadley intersection include Fleet Farm, including retail store and gas station, located to the north of TH 36 and several light industrial and manufacturing businesses located south of TH 36 and east of Hadley Avenue. The northwest quadrant of this intersection is currently a large open space area, which has received several inquires for future development.

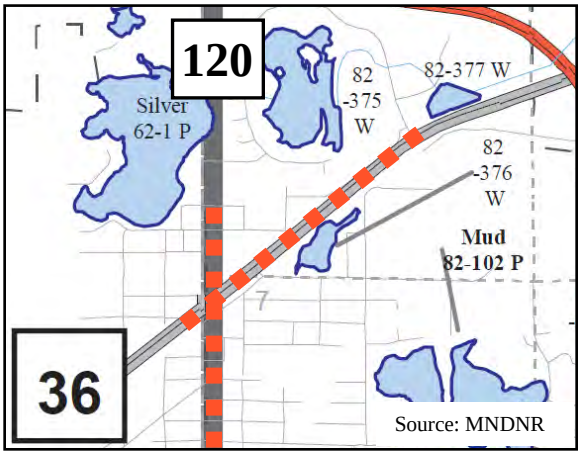
TH 120 (north leg) looking southbound toward TH 36.

Land uses located between Hadley Avenue and TH 120 primarily consist of low- and medium-residential developments and commercial developments. The south side of TH 36 is predominately single family dwellings, while the north side of the highway includes a mix of development. The Twenty-Nine Pines Manufactured Home Park is located north of TH 36. The manufactured home park includes more than 125 units and gains access off the North Frontage Road. This type of residential development is often considered an identifiable environmental justice population (low income) and requires special review on projects involving federal funding. Other first tier land uses include commercial/retail establishments and light industrial developments that are accessed off 51st Street and 17th Avenue where right-in/right-out access exists on TH 36.

The area surrounding the TH 36 and TH 120 intersection is fully developed with the first tier of development consisting of a combination of destination-oriented and convenience-oriented commercial businesses and light industrial businesses. The southwest and northeast quadrants of the intersection have recently seen redevelopment and reinvestment into this area. Further to the north (second tier) the land use transitions to light industrial and single family residential development. South of the intersection and along TH 120 the land use consists of a mix of low density residential and commercial businesses. Seventh Avenue East is located approximately three blocks south, which leads into downtown North St. Paul.

Other land use features found within the study corridor include the Gateway State Trail and wetlands. These land use features are further described below.

Right-Of-Way – according to electronic data provided by MnDOT, the existing right-of-way along TH 36 ranges from 166-feet (between TH 120 and Hadley Ave.) to 300 feet (east of Hadley Ave.). In several locations the right-of-way width varies from parcel to parcel and is dependent upon the adjacent land use. The right-of-way along TH 120 near its intersection with TH 36 is approximately 66-feet. The evaluation of concept alternatives will consider potential effects on adjacent properties and the need to acquire additional right-of-way since costs can be a prohibiting factor on the feasibility a particular improvement.



Source: MNDNR

Wetlands – according to Minnesota Department of Natural Resources (MNDNR) data, a few large and small wetland basins are located within the study area. In addition, the Protected Waters Inventory (PWI) map identifies two "protected waters" lying adjacent to TH 36 (See figure in Appendix D).

- PWI 82-377W – located in the NE quadrant of the TH 36/Hadley Avenue intersection;
- PWI 82-376W – located immediately south of TH 36 (across from Patio Town).

These natural features carry special protections that will need to be avoided to the extent practicable and considered in the evaluation of concept alternatives.

Wellhead Protection Zones – according to Minnesota Department of Health (MDH) records, the study area lies within two wellhead protection zones (MN-00159 and MN-00470). Both zones have medium- to high-vulnerability areas (greater potential for contamination) within the study area.

Sensitive Noise Receptors – as discussed above, the surrounding area is characterized by commercial/retail, light industrial, and medium- and low-density residential developments. While traffic related noise can be an issue for all land uses, the most sensitive uses are commonly residential developments, nursing homes, and outdoor recreational areas (parks). The eastern portion of the study area has a greater level and higher densities of residential development. Noise related impacts can be influenced by are number of factors including roadway grades. Therefore, the evaluation of concept alternatives will consider changes in roadway elevation and potential noise effects on sensitive receptors.

Cultural Resources – no known culturally significant resources/properties exist within the immediate study area. Previous environmental review documents have identified culturally significant resources in the City of North St. Paul. An area of particular concern is located north of TH 36 near Margaret Avenue. The evaluation of concept alternatives will need to consider potential impacts on previously identified cultural properties.

Contaminated Properties – A planning level assessment of known contaminated properties was completed using the Minnesota Pollution Control Agency's "What's in My Backyard" database and a more comprehensive government database review from EDR (formally FirstSearch). The datasets indentified several sites with elevated risk for encountering contaminated soil and/or groundwater (see figure in Appendix D). These sites include many that are considered "small-quantity" generators of hazardous materials and other that have a report historical spill of hazardous chemicals. However, based on this limited file search no sites appear to have environmental risk concerns at a level that would preclude a site from being considered for future transportation improvements. A more detailed Phase I Environmental Site Assessment (ESA) will need to be completed during the preliminary design phase of any proposed improvements.

Trails – the MNDNR owns and operates the Gateway State Trail, which is located immediately south of TH 36 through the study area (see figure in Appendix D). The trail offers approximately 18 miles of paved trail for non-motorized use. The trail begins in the city of St. Paul, travels northeast through the cities of Maplewood, North St. Paul, and Oakdale, and ends at Pine Point Regional Park in Washington County. The trail is heavily used by cycle commuters and for recreational enjoyment. Within the TH 36 Corridor Study area the Gateway State Trail crosses

Gateway State Trail Bridge over TH 120

Hadley Avenue at-grade; however, this location has recently received funding for the construction of a grade separated crossing. The trail also crosses over TH 120 on a recently constructed trail bridge. The evaluation of concept alternatives will consider potential impacts to the trail corridor as well as impacts to the existing and proposed trail bridges.

A City of Oakdale owned trail is located along the west side of Hadley Avenue.

Parks – no parklands are located immediately adjacent to TH 36. The closest park (Northdale Park) is located approximately two blocks south of TH 36 between TH 120 and Hadley Avenue. The park can be accessed from Granada Avenue.

Transit Facilities – According to the Metropolitan Council's 2030 Transportation Policy Plan (TPP), amended May 2013, TH 36 has been identified as a transitway (see figure in Appendix D). However, no transit routes currently utilize this segment of TH 36. Metro Transit Route 219 runs along TH 120 in the study area and includes stops both north (17th Ave. and 19th Ave.) and south (13th Ave.) of TH 36. MnDOT and the Metropolitan Council have been in discussions regarding a transitway study along TH 36 and this effort will likely follow the completion of the I-94-Gateway Study.

TH 36 Corridor Vision

TH 36 is a critical east-west transportation corridor in the northeast Twin Cities Metro Area that serves local residents, businesses, and commuters. While the TH 36 Corridor Study will focus on the roadway segment between Hadley Avenue and TH 120 (Century Avenue), regional needs beyond the study limits will play a large factor in identifying short- and long-term improvements that will complement the substantial investments recently completed and/or currently under construction that improve mobility, safety, and support the economic vitality of the surrounding areas. As a result, the long-term vision for the segment of TH 36 west of I-694 is an access controlled expressway with appropriately spaced grade separated intersections.

Study Purpose and Goals

The primary purpose of the TH 36 Corridor Study is to provide guidance for transportation improvements between Hadley Avenue and TH 120 (Century Avenue) located in the cities of Oakdale and North St. Paul. The study will identify investments needs and show how they: 1) address system performance on TH 36; 2) improve the safety of the corridor for motorists and non-motorized users (pedestrians/bicyclists) and 3) support local economic and community development along and adjacent to TH 36.

The study goals must respond to the key issues along the corridor and within the study area. The goals will be used later in the study process to evaluate the range of concept alternatives on their ability to meet these study goals. The goals presented below are listed in no particular order or rank:

Goal 1: Identify alternatives to improve travel mobility on TH 36.

Goal 2: Identify alternatives that improve travel safety on TH 36.

Goal 3: Identify alternatives that provide reasonable access to local businesses and neighborhoods in the study area.

Goal 4: Identify alternatives that provide adequate local circulation on both sides and across TH 36.

Goal 5: Identify alternatives that enhance bicycle, pedestrian, and transit facilities and encourage future use of these multi-modal travel modes.

Goal 6: Create a practical plan that considers potential impacts on important social, economic and environmental resources.

Goal 7: The recommendations shall recognize MnDOT's Corridor Investment Management Strategy (CIMS) initiative.

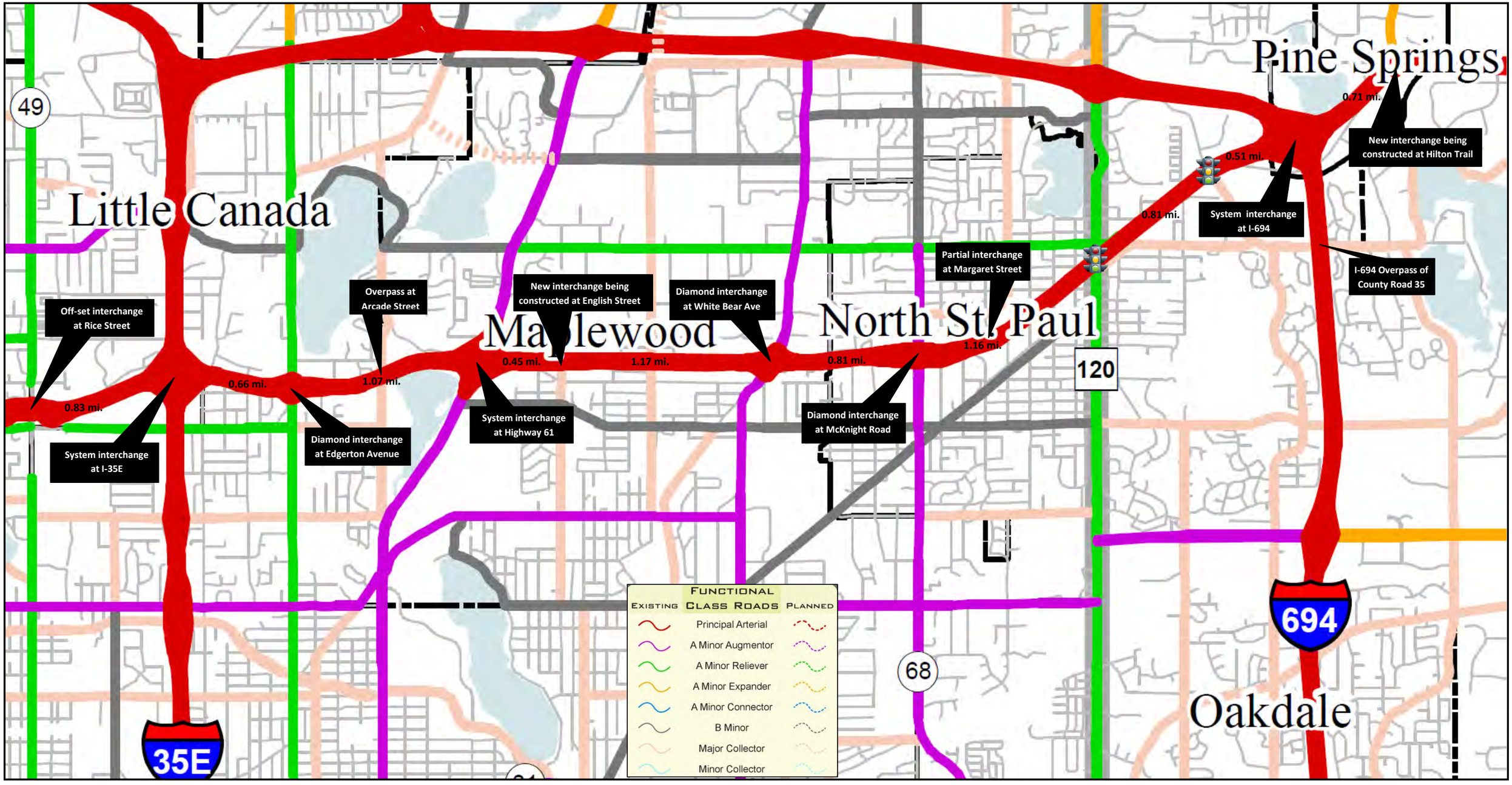
MnDOT Corridor Investment Management Strategy (CIMS)

MnDOT has initiated this corridor based initiative on a limited number of corridors, including TH 36 from the Minnesota/Wisconsin border to I-35W. The intent of the program is to bring MnDOT together with its partners to exchange information and discuss opportunities for collaborative and sustainable investment (lower cost/high benefit strategies). A series of corridor performance and investment strategies have been prepared by MnDOT and are included in Appendix E of this technical memorandum. The TH 36 CIMS information can be viewed at the following web site: http://www.dot.state.mn.us/cims/corridor/mn36-wisconsin-i35/index.html

Tech Memo: Appendix A

Regional Context Map

Twin Cities Metropolitan Area
Functional Classification System (Met Council May 2012)



Tech Memo: Appendix B

TH 36 Traffic Analysis – Measures of Effectiveness (MOE) Tables

Table 1
TH 36 at TH 120/Hadley
Existing Conditions

Intersection - AM Peak Hour	Approach	Demand Volumes				Delay (s/veh)						LOS By Approach		LOS By Intersection		Queing Information (feet) Through			Left Turn			Right Turn		
		L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Link Length	Avg.	Max	Storage	Avg.	Max	Storage	Avg.	Max
TH 36 at TH 120 (Signal)	EB	77	638	127	842	92.2	F	19.5	B	6.9	A	24.3	C	36.5	D	3369	123	249	400	68	170	400	1	18
	WB	50	1465	42	1,557	85.9	F	29.2	C	12.9	B	30.6	C			4152	235	455	350	37	115	0		
	NB	199	205	23	427	87.6	F	68.0	E	9.8	A	73.6	E			1138	201	581	200	187	299	175	5	28
	SB	80	127	119	326	69.6	E	59.0	E	1.5	A	42.9	D			366	101	248	150	71	181	0	13	54
TH 36 at Hadley (Signal)	EB	25	689	57	771	79.2	E	16.6	B	8.2	A	18.0	B	19.4	B	4152	84	173	325	29	86	300	10	48
	WB	77	1330	98	1,505	96.6	F	9.4	A	5.4	A	11.5	B			1413	203	416	300	70	168	300	18	122
	NB	187	67	170	424	86.0	F	78.1	E	8.7	A	54.9	D			329	105	384	330	201	318	130	38	133
	SB	48	43	54	145	63.7	E	86.7	F	11.4	B	51.9	D			614	40	103	400	39	119	50	17	94

Intersection - PM Peak Hour	Approach	Demand Volumes				Delay (s/veh)						LOS By Approach		LOS By Intersection		Queing Information (feet) Through			Left Turn			Right Turn		
		L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Link Length	Avg.	Max	Storage	Avg.	Max	Storage	Avg.	Max
TH 36 at TH 120 (Signal)	EB	154	1462	234	1,850	102.2	F	46.1	D	18.9	B	47.2	D	46.3	D	3369	502	938	400	162	398	400	72	500
	WB	62	909	65	1,036	82.5	F	33.8	C	12.8	B	35.4	D			4152	197	420	350	53	217	350	6	178
	NB	177	209	55	441	91.8	F	51.8	D	36.2	D	63.4	E			1138	221	607	200	178	299	175	30	202
	SB	82	225	118	425	64.8	E	61.3	E	1.5	A	48.6	D			366	231	378	150	67	233	0	11	61
TH 36 at Hadley (Signal)	EB	113	1369	179	1,661	86.6	F	44.0	D	28.1	C	45.1	D	41.5	D	4152	308	626	325	112	293	300	66	399
	WB	91	897	186	1,174	95.8	F	22.1	C	8.3	A	24.9	C			1413	215	521	300	104	284	300	47	275
	NB	125	87	116	328	73.9	E	84.2	F	21.2	C	59.2	E			329	84	216	330	121	273	130	44	162
	SB	182	133	99	414	80.3	F	84.4	F	16.6	B	67.7	E			614	148	326	400	171	329	50	46	150

Table 1
TH 36 at TH 120/Hadley
2040 No Build Conditions

Intersection - AM Peak Hour	Approach	Demand Volumes				Delay (s/veh)						LOS By Approach		LOS By Intersection		Queing Information (feet)								
																Through			Left Turn			Right Turn		
		L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Link Length	Avg.	Max	Storage	Avg.	Max	Storage	Avg.	Max
TH 36 at TH 120 (Signal)	EB	85	920	165	1,170	96.4	F	28.5	C	8.8	A	31.1	C			3369	223	405	400	83	167	400	1	21
	WB	75	1680	55	1,810	102.3	F	51.1	D	22.4	C	52.3	D	49.4	D	4152	426	703	350	65	200	350	21	360
	NB	245	265	45	555	97.3	F	79.2	E	20.7	C	82.2	F			1138	343	775	200	229	299	175	31	274
	SB	115	160	120	395	77.9	E	54.5	D	1.6	A	46.2	D			366	131	273	150	106	217	0	12	75
TH 36 at Hadley (Signal)	EB	60	980	90	1,130	80.4	F	29.1	C	13.2	B	30.2	C			4152	214	390	325	53	142	300	22	127
	WB	65	1430	120	1,615	90.7	F	13.2	B	8.7	A	14.5	B	24.5	C	1413	300	537	300	62	179	300	45	400
	NB	250	100	160	510	79.2	E	83.4	F	13.1	B	59.1	E			329	165	388	330	231	321	130	45	181
	SB	60	60	100	220	65.2	E	90.3	F	19.0	B	50.3	D			614	58	189	400	51	149	50	44	148

Intersection - PM Peak Hour	Approach	Demand Volumes				Delay (s/veh)						LOS By Approach		LOS By Intersection		Queing Information (feet)								
																Through			Left Turn			Right Turn		
		L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Link Length	Avg.	Max	Storage	Avg.	Max	Storage	Avg.	Max
TH 36 at TH 120 (Signal)	EB	160	1680	285	2,125	191.3	F	140.8	F	101.2	F	139.0	F			3369	1625	2973	400	200	449	400	140	500
	WB	100	1300	90	1,490	119.8	F	86.3	F	46.3	D	86.1	F	107.6	F	4152	630	1020	350	99	399	350	55	448
	NB	235	265	80	580	167.8	F	76.1	E	67.6	E	104.3	F			1138	521	934	200	256	299	175	54	241
	SB	100	285	135	520	95.1	F	77.9	E	2.3	A	63.5	E			366	315	385	150	105	250	0	20	126
TH 36 at Hadley (Signal)	EB	220	1505	230	1,955	84.9	F	45.5	D	28.6	C	47.9	D			4152	314	537	325	191	344	300	76	351
	WB	80	1200	235	1,515	96.0	F	31.1	C	16.9	B	31.9	C	50.5	D	1413	434	644	300	107	358	300	153	400
	NB	180	120	90	390	163.3	F	94.0	F	32.6	C	111.2	F			329	223	396	330	228	320	130	44	205
	SB	215	180	215	610	104.1	F	100.9	F	52.0	D	84.2	F			614	280	565	400	248	438	50	120	150

Table x1
TH 36 Segment Crash Summary
2009 to 2011 Crash Data
MN DPS Crash Information

TH 36 — **Crash Severity** — **Rates**

From	To	Road Section Type	Length (Miles)	Segment ADT	Fatal	A	B	C	Property	Total	Crash Rate	Severity Rate
McKnight Ave Ramps	TH 120	Urban 4-Lane Divided	0.72	35,500	0	0	3	2	13	18	**0.6**	**0.9**
TH 120	Hadley Avenue	Urban 4-Lane Divided	0.61	29,500	0	0	0	0	6	6	**0.3**	**0.3**
Hadley Avenue	I-694 Ramps	Urban 4-Lane Divided	0.05	29,500	0	0	0	0	0	0	**0.0**	**0.0**
		TOTALS	**1.37**	**31500**	**0**	**0**	**3**	**2**	**19**	**24**		
					0%	**0%**	**13%**	**8%**	**79%**			

TH 36 — **Diagram - Crash Type** — **Rates**

From	Total	Road Section Type	Rear End	Left Turn	Right Angle	Side Swipe	Head On	Ran Off Road	Other	Total	Crash Rate	Severity Rate
McKnight Ave Ramps	TH 120	Urban 4-Lane Divided	3	0	0	0	0	13	2	18	**0.6**	**0.9**
TH 120	Hadley Avenue	Urban 4-Lane Divided	4	0	0	0	1	1	0	6	**0.3**	**0.3**
Hadley Avenue	I-694 Ramps	Urban 4-Lane Divided	0	0	0	0	0	0	0	0	**0.0**	**0.0**
		TOTALS	**7**	**0**	**0**	**0**	**1**	**14**	**2**	**24**		
			29%	**0%**	**0%**	**0%**	**4%**	**58%**	**8%**			

Metro District Averate Rates (Similar Roadways)		
Mn/DOT 2011 Data		
Section Type	Crash Rate	Severity Rate
Urban 4-Lane Divided	0.6	0.8
Urban Freeway	0.7	1.0

SEH

Table x2
TH 36 Intersection Crash Summary
2009 to 2011 Crash Data
MN DPS Crash Information

TH 36	Crash Severity						Rates	
From	**Fatal**	**A**	**B**	**C**	**Property**	**Total**	**Crash Rate**	**Severity Rate**
TH 36 at TH 120	3	0	1	14	43	61	1.19	1.74
TH 36 at 50th St (RI/RO)	0	0	0	0	0	0	0.00	0.00
TH 36 at Glennbrook Ave (WB RI/RO)	0	0	0	0	0	0	0.00	0.00
TH 36 at Hadley	0	1	2	15	24	42	1.13	1.72
TOTAL	**3**	**1**	**3**	**29**	**67**	**103**		
	3%	**1%**	**3%**	**28%**	**65%**			

	Metro District Averate Rates		
	Mn/DOT 2008 Data		
	Intersection Type	Crash Rate	Severity Rate
1	Signal-High Vol. & High Speed	0.60	0.90
2	Signal-High Vol. & Low Speed	0.70	1.10
3	Thru/Stop	0.20	0.20

Table x3
TH 36 Intersection Crash Summary
2009 to 2011 Crash Data
MN DPS Crash Information

TH 36	Diagram - Crash Type								Rates	
From	**Rear End**	**Left Turn**	**Right Angle**	**Side Swipe**	**Head On**	**Ran Off Road**	**Other**	**Total**	**Crash Rate**	**Severity Rate**
TH 36 at TH 120	45	3	5	1	0	4	3	61	1.19	1.74
TH 36 at 50th St (RI/RO)	0	0	0	0	0	0	0	0	0.00	0.00
TH 36 at Glennbrook Ave (WB RI/RO)	0	0	0	0	0	0	0	0	0.00	0.00
TH 36 at Hadley	24	11	3	1	0	1	2	42	1.13	1.72
TOTAL	**69**	**14**	**8**	**2**	**0**	**5**	**5**	**103**		
	67%	**14%**	**8%**	**2%**	**0%**	**5%**	**5%**			

Tech Memo: Appendix C

TH 36 Corridor Study – Crash Table and Diagrams

Mn/DOT 2942 (rev 9-11-92)

Collision Diagram

Minnesota Department of Transportation

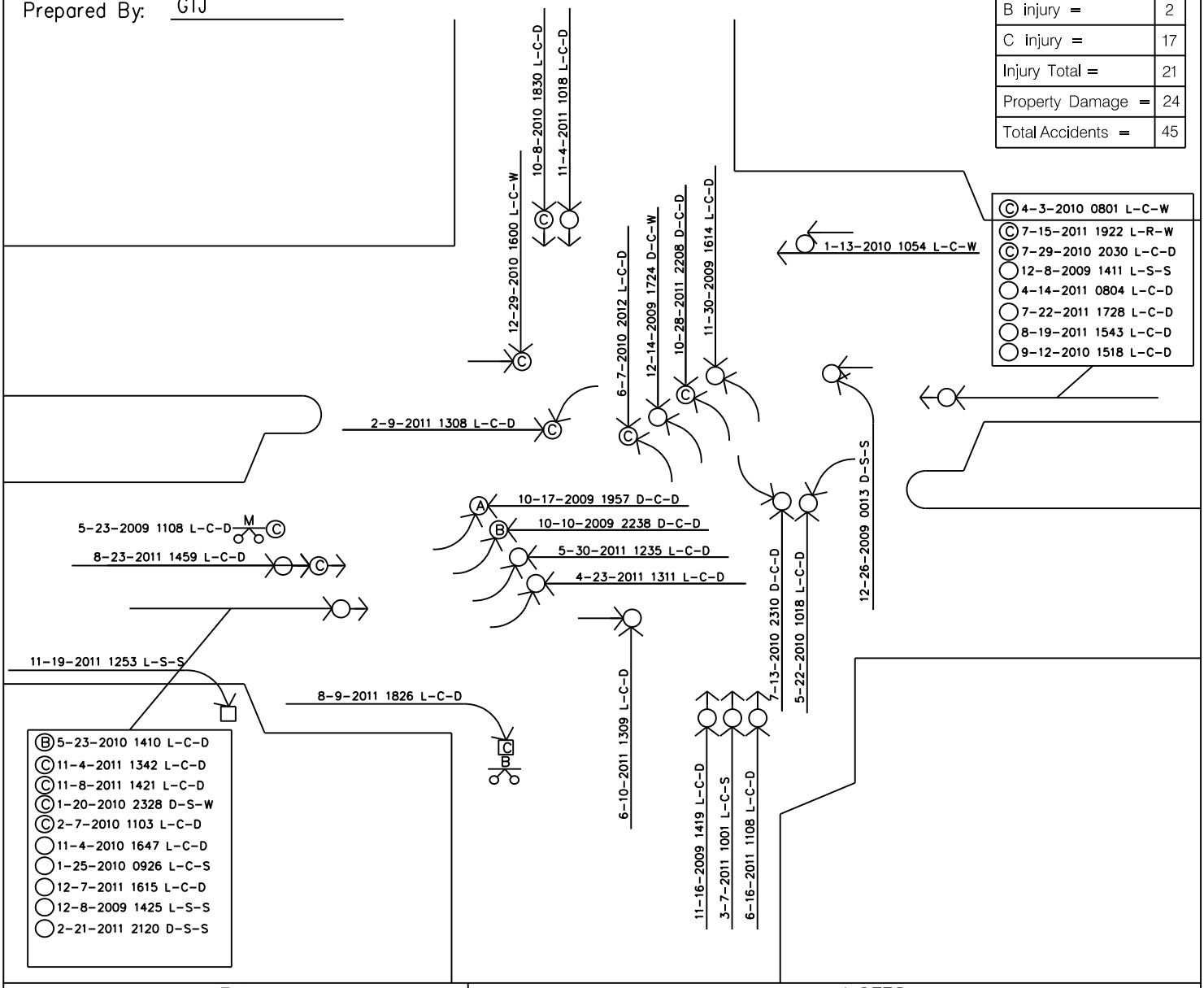
Location: TH 36 at Hadley Avenue

Time Period: 01/01/2009 - 12/31/2011 Date: May 2013

Prepared By: GTJ

No. of Accidents

Fatal =	0
A injury =	2
B injury =	2
C injury =	17
Injury Total =	21
Property Damage =	24
Total Accidents =	45



KEY

- Motor Vehicle Backing Up
- Motor Vehicle Out of Control
- Motor Vehicle Ahead
- Motor Vehicle Slideswipe
- Truck
- Fixed Object
- Fatal Acc.
- A Injury Acc.
- B Injury Acc.
- C Injury Acc.
- Property Damage Acc.
- * Details Unclear
- Deer
- Parked Vehicle
- Pedestrian
- Bicycle/Moped
- Motorcycle
- Rear End Property Damage
- Right Angle B Injury

NOTES

[1]
[2]
[3]

Light:

L= Daylight (1)
DN= Dawn (2)
Du= Dusk (3)
Dl= Dark, Lighted (4)
Do= Dark, Lights Off (5)
D= Dark, Unlighted (6)
X= Unknown (99)

Weather:

C= Clear or Cloudy (1 or 2)
R= Rain (3)
S= Snow/Sleet/Hail/Freezing Rain (4 or 5)
F= Fog, Smog, Smoke (6)
B= Blowing Sand/Dust/Snow (7)
W= Severe Cross Winds (8)
X= Other or Unknown (99)

Surface:

D= Dry (1)
W= Wet or Water (2 or 6)
S= Snow, Slush or Ice (3, 4 or 5)
M= Muddy (7)
Db= Debris (8)
O= Oily (9)
X= Other or Unknown (99)

(X) = Number of Vehicles in Crash

Other Vehicle (X)

Injury Type

DATE TIME(HR) LIGHT-WEATHER-SURFACE

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

AMNTMD 124281

DATE: MAY 2013

TH 36 at Hadley Avenue
Oakdale, MN

FIGURE No. 2

Mn/DOT 2942 (rev 9-11-92)

Collision Diagram

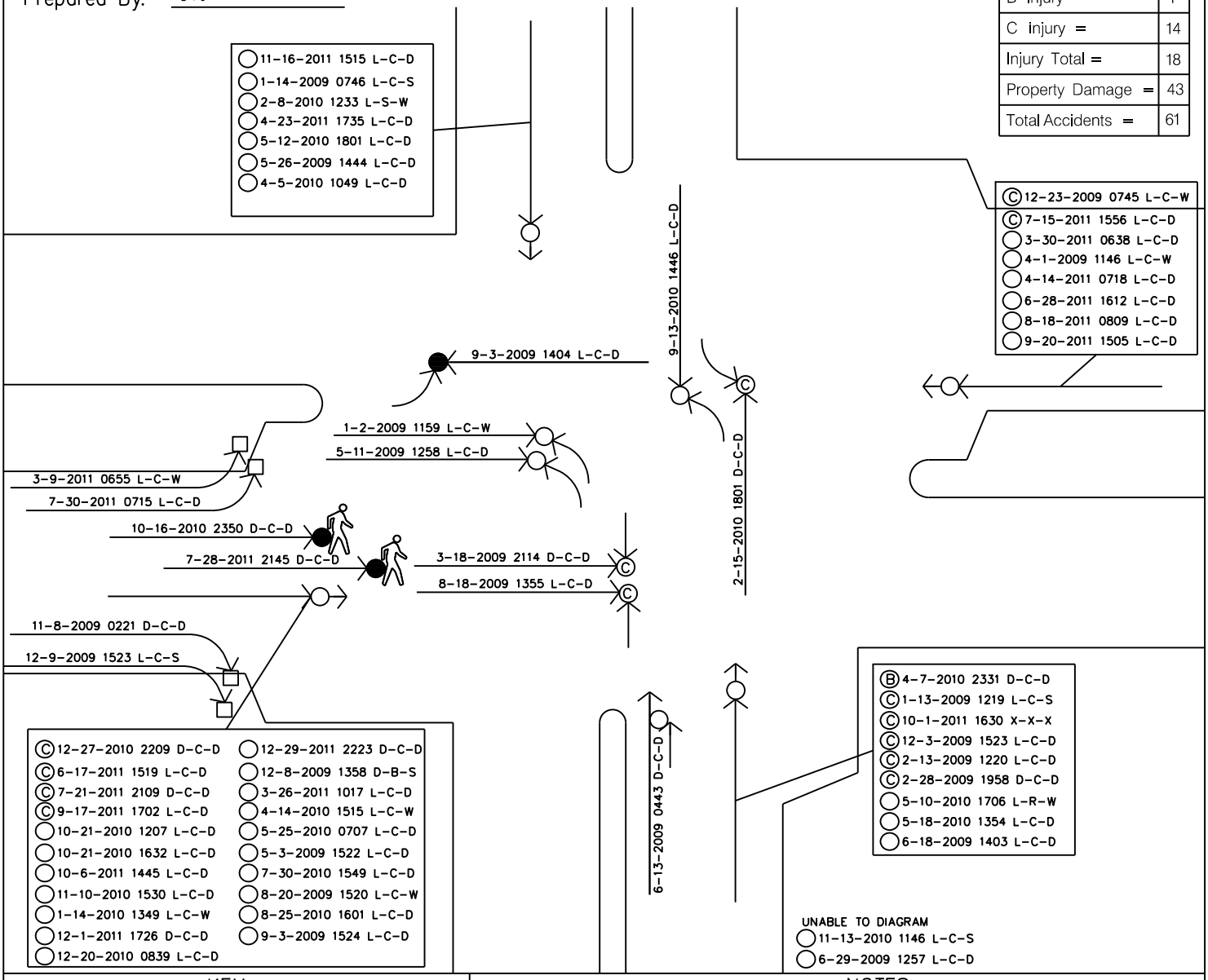
Minnesota Department of Transportation

Location: TH 36 at TH 120

Time Period: 01/01/2009 - 12/31/2011 Date: May 2013

Prepared By: GTJ

No. of Accidents	
Fatal =	3
A injury =	0
B injury =	1
C injury =	14
Injury Total =	18
Property Damage =	43
Total Accidents =	61



KEY

- Motor Vehicle Backing Up
- Motor Vehicle Out of Control
- Motor Vehicle Ahead
- Motor Vehicle Slideswipe
- Truck
- Fixed Object
- Fatal Acc.
- A Injury Acc.
- B Injury Acc.
- C Injury Acc.
- Property Damage Acc.
- * Details Unclear
- Deer
- Parked Vehicle
- Pedestrian
- Bicycle/Moped
- Motorcycle
- Rear End Property Damage
- Right Angle B Injury

NOTES

[1]
[2]
[3]

Light:	Weather:	Surface:
L= Daylight (1)	C= Clear or Cloudy (1 or 2)	D= Dry (1)
DN= Dawn (2)	R= Rain (3)	W= Wet or Water (2 or 6)
Du= Dusk (3)	S= Snow/Sleet/Hail/Freezing Rain (4 or 5)	S= Snow, Slush or Ice (3, 4 or 5)
Dl= Dark, Lighted (4)	F= Fog, Smog, Smoke (6)	M= Muddy (7)
Do= Dark, Lights Off (5)	B= Blowing Sand/Dust/Snow (7)	Db= Debris (8)
D= Dark, Unlighted (6)	W= Severe Cross Winds (8)	O= Oily (9)
X= Unknown (99)	X= Other or Unknown (99)	X= Other or Unknown (99)

(X) = Number of Vehicles in Crash

Other Vehicle (X) — Injury Type — DATE TIME(HR) LIGHT-WEATHER-SURFACE

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

AMNTMD 124281

DATE: MAY 2013

TH 36 at TH 120
Oakdale, MN

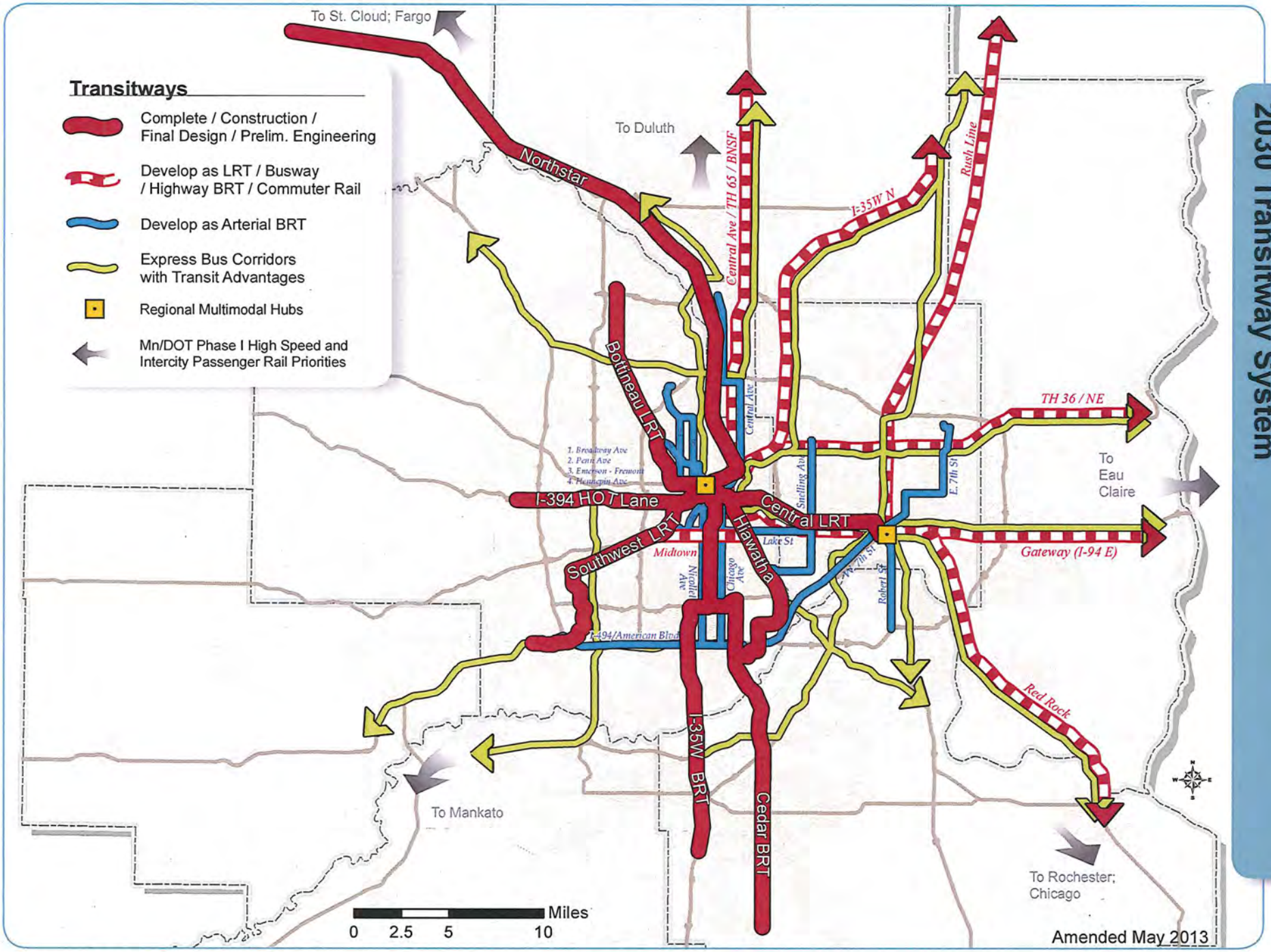
FIGURE No. 1

Tech Memo: Appendix D

TH 36 Corridor Environmental Characteristics Map

2030 Metropolitan Council's Transitway System Map

© Copyright 2009 MPCA Printed on Wed Jun 5 2013 03:38:04 PM.


2030 Transitway System
Transitways
Complete / Construction / Final Design / Prelim. Engineering
Develop as LRT / Busway / Highway BRT / Commuter Rail
Develop as Arterial BRT
Express Bus Corridors with Transit Advantages
Regional Multimodal Hubs
Mn/DOT Phase I High Speed and Intercity Passenger Rail Priorities
To St. Cloud; Fargo
To Duluth
To Eau Claire
To Mankato
To Rochester; Chicago
Northstar
Central Ave / TH 65 / BNSF
I-35W N
Rush Line
TH 36 / NE
Gateway (I-94 E)
Red Rock
Bottineau LRT
I-394 HOT Lane
Southwest LRT
Central LRT
Hiawatha
I-35W BRT
Cedar BRT
Midtown
Lake St
Central Ave
Snelling Ave
E. 7th St
Nicollet Ave
Chicago Ave
Robert St
I-494/American Blvd
Miles
0 2.5 5 10
Amended May 2013

Tech Memo: Appendix E

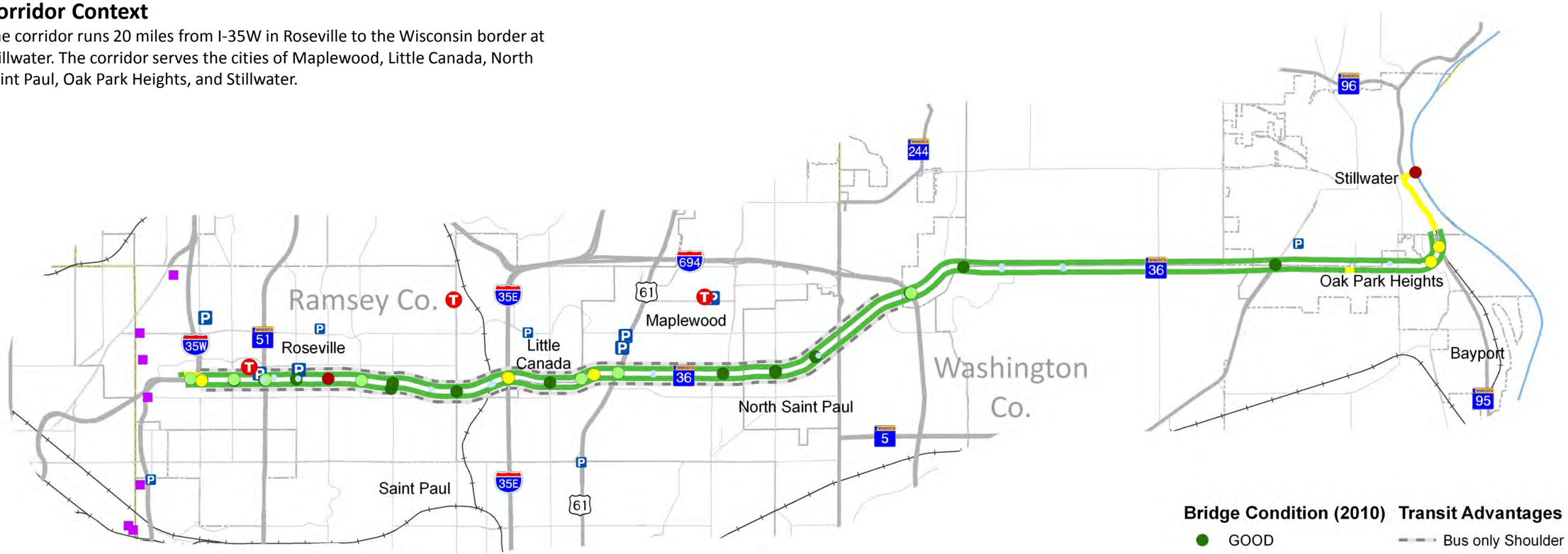
TH 36 Corridor Investment Management Strategy (CIMS) Performance and Investment Maps

MN 36
Existing Conditions

Map A

Corridor Context

The corridor runs 20 miles from I-35W in Roseville to the Wisconsin border at Stillwater. The corridor serves the cities of Maplewood, Little Canada, North Saint Paul, Oak Park Heights, and Stillwater.



Current Corridor Characteristics

Highway: MN 36

- 2009 AADT:11,000 – 79,000
- 2009 HCADT:335 – 2,600
- Number of lanes: 4
- Key highway connections: I-35W, I-35E, I-694, MN 51, MN 95, US 61

Public Transit

- Transit Centers: Rosedale Transit Center
- Three Park and Ride lots with a capacity of 590 parking spaces

Rail

- SOO line to St. Paul
- UP line (Stillwater Industrial Spur)

MN 36 Corridor Performance

Measure	Result	Statewide Result
Infrastructure Preservation		
Bridge		
Bridge Condition--% Good and satisfactory (by deck area)	**71.8%**	86.9%
Bridge Condition--% Poor (by deck area)	**10.0%**	3.2%
Pavement		
Ride Quality Good--% of miles	**96.7%**	70.2%
Ride Quality Poor--% of miles	**0%**	3.7%

Population Trends

City	Population 2000	Population 2010
Maplewood	34,947	38,018
Oak Park Heights	3,957	4,339
Roseville	33,690	33,660
Saint Paul	287,151	285,068
Stillwater	15,143	18,225
Total	374,888	379,310

Bridge Condition (2010)
- GOOD
- SATIS
- FAIR
- POOR

Pavement Condition
RQI in 2011
- Good
- Fair
- Poor

MnDOT Culverts/Pipes
- Condition 4 (Poor) Pipes

Roads
- Trunk Highways
- County Highways

Transit Advantages
- Bus only Shoulder
- Existing Managed Lane
- Transit Centers

Park and Rides
- 0 - 100 Spaces
- 101 - 500 Spaces
- 501 - 1482 Spaces

Other Modes
- Class 1 Railroads
- Major Intermodal Terminals

Disclaimer: Changes may be made periodically to the information on the map. If you find any errors or omissions, we encourage you to report them online at www.mndot.gov/cims

0 1 2 4 Miles

MN 36
Existing Conditions - Safety

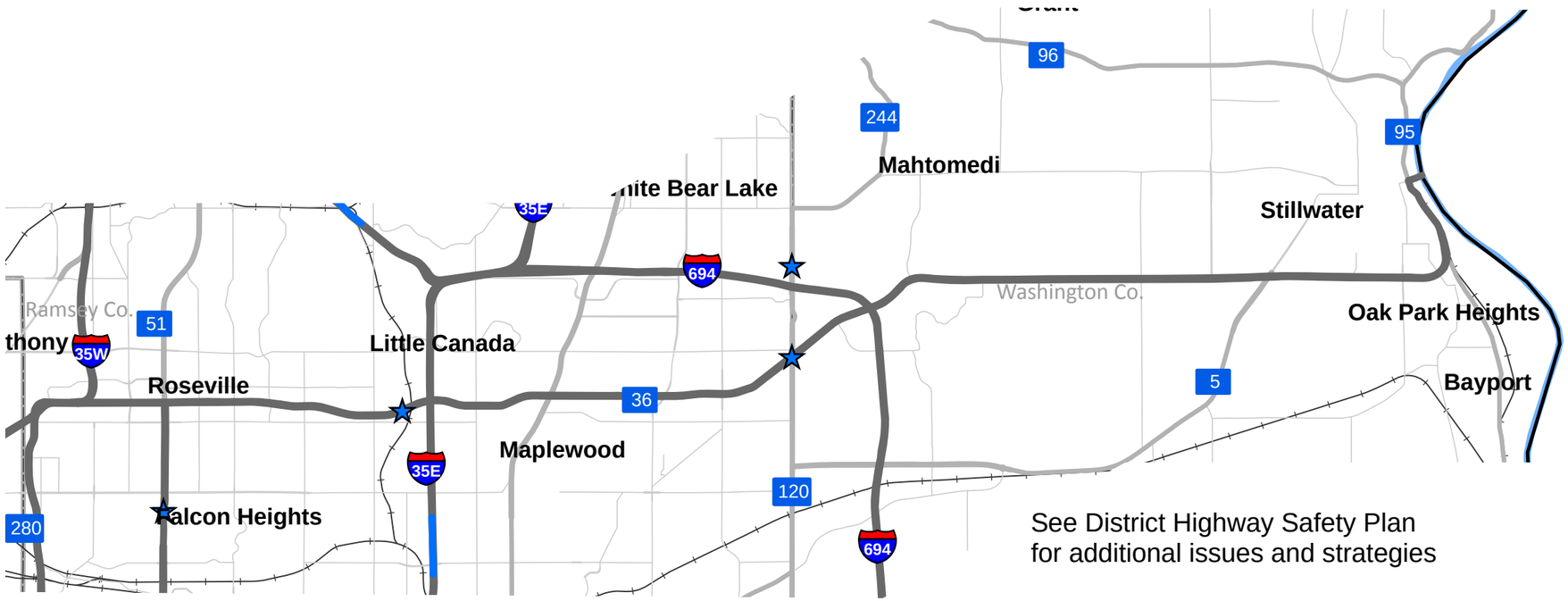
Map S

Safety Needs

- CMSP Problem Locations
- CMSP Problem Segments
- Trunk Highways
- County Highways
- Class 1 Railroads
- County Boundaries

Toward Zero Deaths Efforts

County	2012 TZD Safe Roads Grant	2012 TZD Enforcement Grant	TZD Region Year Established (ATP)	County Safety Plan Completion Date
Ramsey	No	Yes	Metro, Planned 2012 (ATP 5)	Jan. 2013
Washington	No	Yes	Metro, Planned 2012 (ATP 5)	Jan. 2013



See District Highway Safety Plan for additional issues and strategies

Metro To Be Completed May 2012

MN 36 Corridor Safety Performance (Wisconsin to I-35)

Measure	Fatal and Serious Injury Crashes in Corridor	Percent of All Severe Crashes in Corridor
Top Four Driver Related Crash Issues		
Impaired Driver*	3	25.0%
Older Driver	2	16.7%
Invalid License	1	8.3%
Unalert Driver	1	8.3%
Top Three Infrastructure Related Crash Issues		
Intersection Crashes	7	58.3%
Lane Departure Crashes	3	25.0%
Head-on Crashes	1	8.3%
Corridor Comparison to State Crashes		
	In Corridor	Statewide Total for Trunk Highways
Total Fatal and Serious Injury Crashes	12	2440
Total Miles	28	10,980
Total Fatal and Serious Injury Crashes per Mile	0.43	0.22

* Crashes may be under reported as this number is according to officer's first impression.

Note. Data presented include all fatal and serious injury crashes between 2006-2010.

N

0 0.5 1 2 3 4 Miles

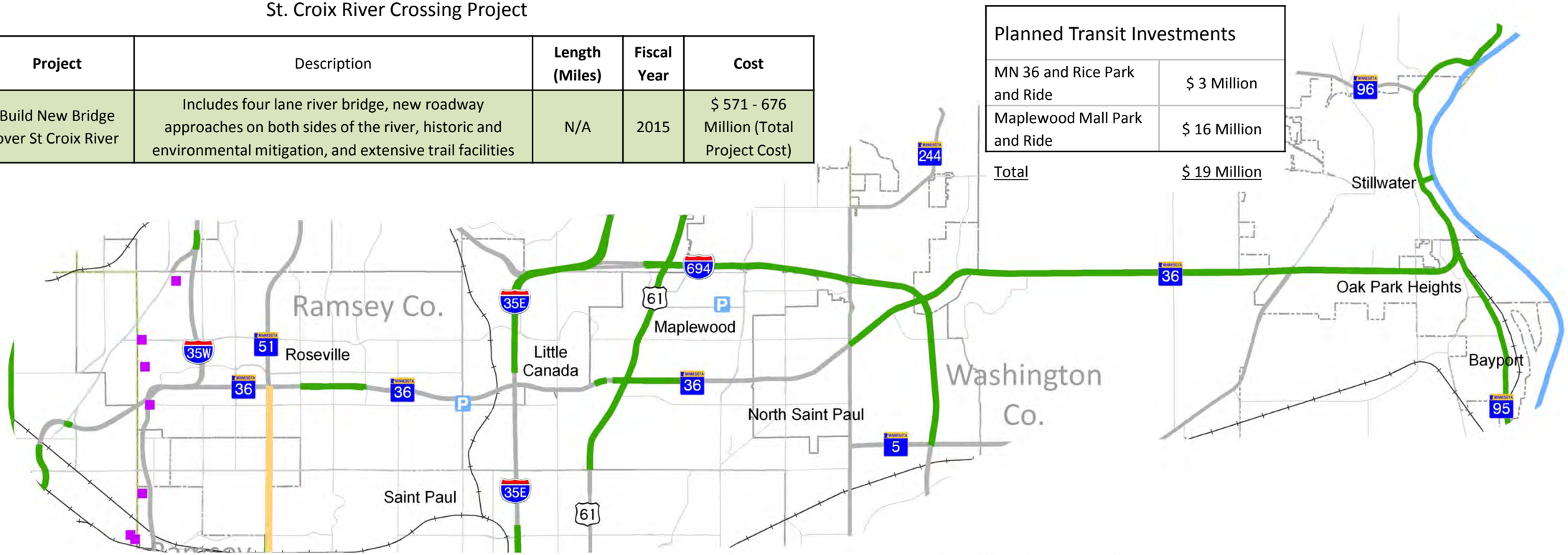
MN 36
2012-2015 STIP Projects

Map B

St. Croix River Crossing Project

Project	Description	Length (Miles)	Fiscal Year	Cost
Build New Bridge over St Croix River	Includes four lane river bridge, new roadway approaches on both sides of the river, historic and environmental mitigation, and extensive trail facilities	N/A	2015	$ 571 - 676 Million (Total Project Cost)

Planned Transit Investments	
MN 36 and Rice Park and Ride	$ 3 Million
Maplewood Mall Park and Ride	$ 16 Million
Total	$ 19 Million



MN 36 Projects

Investment Area	Project	Length (Miles)	Fiscal Year	Cost
Mobility	Construct Interchange at Hilton Trail	N/A	2012	$ 11.3 Million
Drainage	Storm Sewer Repair *MN 120 to Stillwater Blvd*	9.4	2013	$ 735,000
Bridge	Replace Bridge, Storm Sewer *Keller Lake in Maplewood*	N/A	2013	$ 3.7 Million
Mobility	Construct Interchange at English St, ¾ access at Demontreville Trail, J-turns with acceleration lanes	N/A	2014	$ 10.1 Million
Bridge	Replace Bridge *Lexington Ave in Roseville*	N/A	2015	$ 12 Million
			Total:	$ 37.8 Million

MN 36 Adjacent Projects

Investment Area	Project	Length (Miles)	Route	Fiscal Year	Cost
Pavement	Unbonded Concrete Overlay, Reconstruct Ramps *40th St to US 61*	6.6	I-694	2012	$ 20 Million
Transit	Signal Retiming for Future Transit *Larpenteur Ave to Ramsey Co Rd 9*	12.3	US 61	2013	$ 1.8 Million
				Total	$ 21.8 Million

Planned Highway Projects
- 2012-2015 STIP Projects

Planned Transit Investments
- Arterial BRT Line

Park and Ride
- New or Expanded Facility

Roads
- Trunk Highways
- County Highways

Other Modes
- Class 1 Railroads
- Major Intermodal Terminals

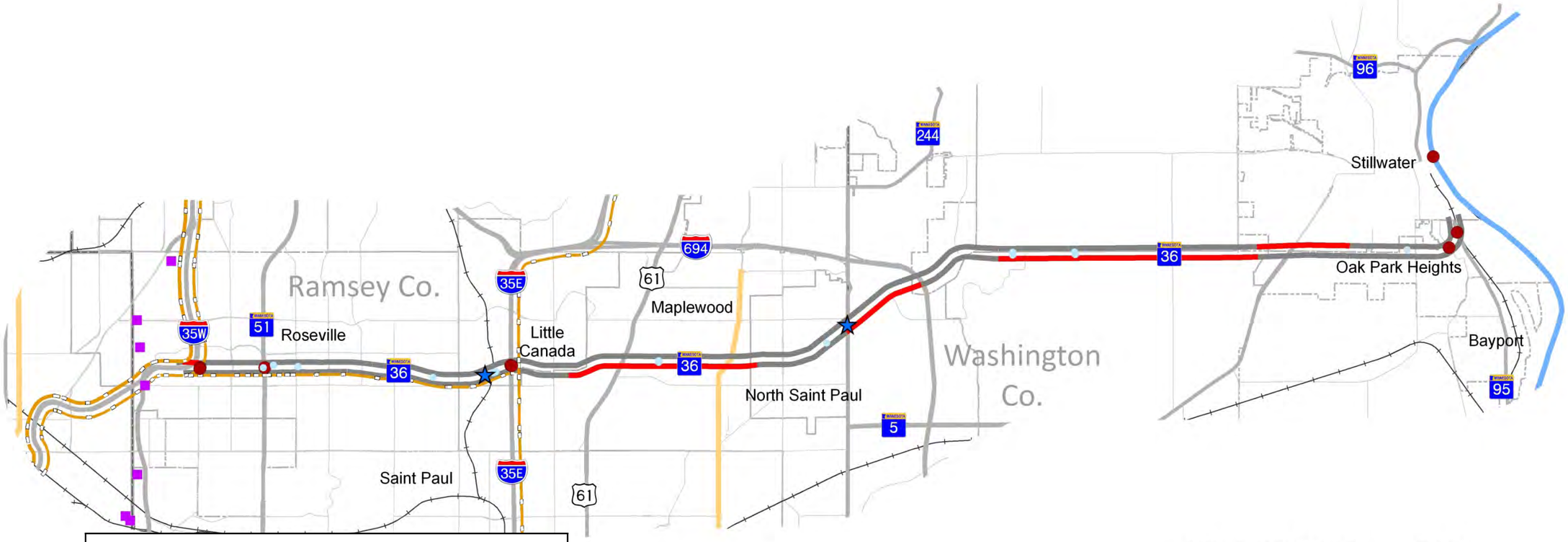
N

Disclaimer: Changes may be made periodically to the information on the map. If you find any errors or omissions, we encourage you to report them online at www.mndot.gov/cims

0 1 2 4 Miles

MN 36
Anticipated Performance Based Investment Needs (2016-2021)*

Map C



Corridor Performance Based Needs (2016-2021)

Bridge Preservation	6 Bridges
Pavement Preservation	6 miles of poor pavement
Culvert Preservation	0
Pipe Replacement	10 Poor pipes
Safety Improvements*	2 CMSP Locations 0 CMSP Segments
Mobility	Future MnPASS Corridor

Infrastructure Needs
- Pavement in need of repair/reconstruction
- Bridges in need of replacement/repair
- Culverts in need of Replacement/Repair
- Condition 4 (Poor) Pipes

Mobility
- CMSP Problem Locations
- CMSP Problem Segments
- Future Managed Lane

Roads
- Trunk Highways
- County Highways

Future Transit
- Arterial BRT

Park and Rides
- New or Expanded Facility

Other Modes
- Class 1 Railroads
- Major Intermodal Terminals

*Assumes completion of '12-'15 STIP projects.
*Systematic safety improvements are included as part of most highway projects. Refer to safety map for additional safety information

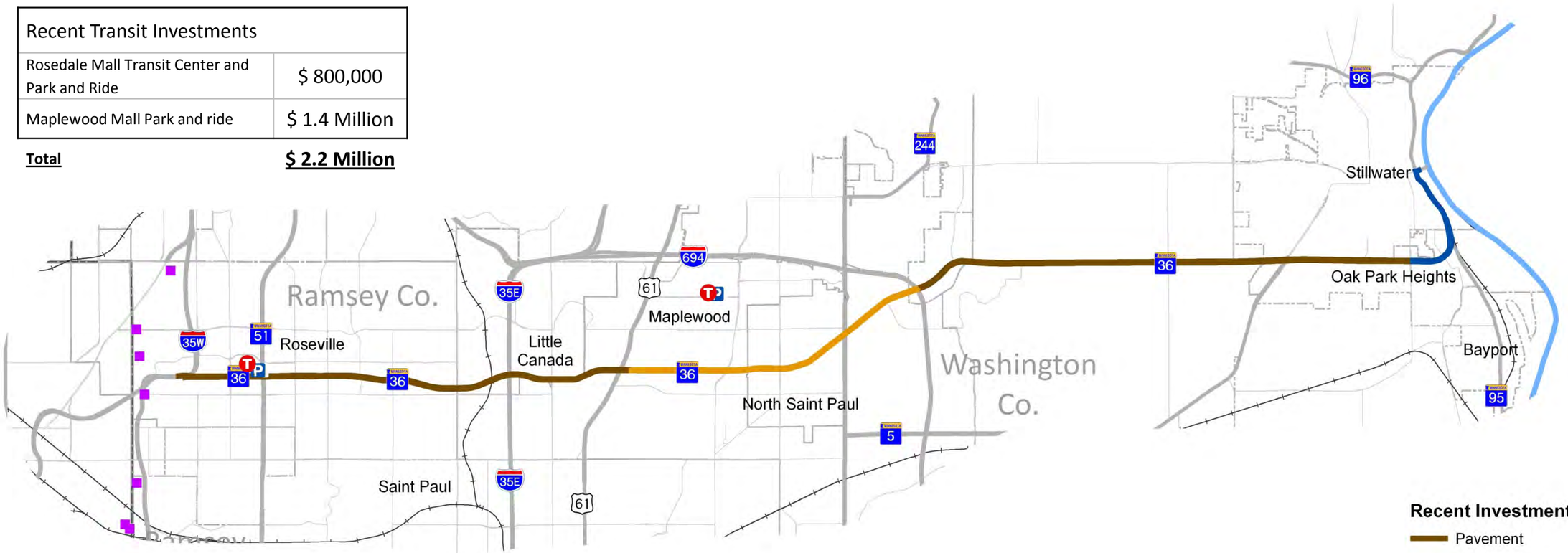
0 1 2 4 Miles

Disclaimer: Changes may be made periodically to the information on the map. If you find any errors or omissions, we encourage you to report them online at www.mndot.gov/cims

MN 36
Recent Investments 2002-2011

Map D

Recent Transit Investments	
Rosedale Mall Transit Center and Park and Ride	$ 800,000
Maplewood Mall Park and ride	$ 1.4 Million
Total	**$ 2.2 Million**



Recent Investments (2002-2011)*

Project	Description	Cost
Bridge Projects	• 2010: Reconstruct Bridges (Rice Street) • 2007: Repair Bridge at TH 95	$ 17.5 Million
Pavement Projects	• 2009: Mill and Overlay (TH 95 to Stillwater) • 2008: Pavement Preservation (Century Ave to TH 95) • 2008: Pavement Resurface and Rehab, Bridge Repair (I-35W to Edgerton)	$ 16.1 Million
Safety	• 2009: Cable Median Barrier (TH 61 to I-694) • 2003: Lake Elmo Ave Signal	$ 700,000
Mobility	• 2003: Bypass construction (Stillwater/Oak Park Heights)	$ 8 Million
Total		**$ 42.3 Million**

*Only includes projects over $500,000. Systematic safety improvements are routinely included as part of most highway projects

Recent Investments
- Pavement
- Safety
- Mobility

Recent Park and Rides
- 0 - 100 Spaces
- 101 - 500 Spaces
- 501 - 1482 Spaces
- Transit Centers

Roads
- Trunk Highways
- County Highways

Other Modes
- Class 1 Railroads
- Major Intermodal Terminals

N

Disclaimer: Changes may be made periodically to the information on the map. If you find any errors or omissions, we encourage you to report them online at www.mndot.gov/cims

0 1 2 4 Miles

Preliminary Environmental Findings Memorandum (November 21, 2013)

Building a Better World for All of Us®

MEMORANDUM

TO: Minnesota Department of Transportation (MnDOT), City of Oakdale, City of North St. Paul, Ramsey County and Washington County

FROM: Short Elliott Hendrickson Inc. (SEH Inc.)

DATE: November 21, 2013

RE: Preliminary Environmental Findings
TH36 Corridor from TH120 to I-694
SEH No. MNTMD 124228

The purpose of this memorandum is to document the preliminary environmental findings in the area of the Highway 36 and Hadley Avenue intersection.

1.0 Records Review

The records review was performed to obtain and review reasonably ascertainable records from standard sources (including government records, physical setting sources, and historical use records) to assist in identifying RECs or HRECs in connection with the TH36 corridor from TH120 to I-694.

1.1 Standard Environmental Record Sources

SEH retained Historical Information Gatherers (HIG) to perform a computer database search of documents published by Environmental Protection Agency (EPA) and the Minnesota Pollution Control Agency (MPCA). The information search by HIG includes sites with identified or potential contamination, facilities that generate hazardous wastes and sites that contain or have contained aboveground or underground registered storage tanks (ASTs/USTs). SEH reviewed the document package provided by HIG to identify potential environmental concerns for the project corridor.

Sites identified within the search radius are summarized in **Table 1**. A summary of all records retrieved by the search, the minimum search distances, and the date that source information was last updated is included in the search report in **Attachment A**. The HIG GeoSearch report did not include a comprehensive, exhaustive review of all records. The following federal and state databases were searched in preparing the database report:

- Agricultural Spills Listing (AGSPILLS);
- Permitted Air Facilities (AIRS);
- Aerometric Information Retrieval System/ Air Facility Subsystem (AIRSAFS);
- Brownfields Management System (BF);
- Biennial Reporting System (BRS);
- Bulk Storage Permits (BULKSTORAGE);

- Clandestine Drug Laboratory Locations (CDL);
- Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS);
- Registered Dry Cleaning Facilities (CLEANERS);
- Agricultural Contingency Sites (CONTINGENCIES);
- Delisted National Priority List (DNPL);
- EPA Docket Data (DOCKETS);
- Federal Engineering Institutional Control Sites (EC);
- Emergency Response Notification System (ERNSMN);
- Facility Registry System (FRSMN);
- Historical Gas Stations (HISTPST);
- Hazardous Materials Incident Reporting System (HMIRSR05);
- Hazardous Waste Generator Sites (HWGS);
- Hazardous Waste Treatment Storage Disposal Sites (HWSTSD);
- Integrated Compliance Information System (ICIS);
- Integrated Compliance Information System National Pollutant Discharge Elimination System (ICISNPDES);
- Indian Reservations (INDIANRES);
- Registered Leaking Storage Tanks (LUAST);
- Land Use Control Information System (LUCIS);
- Leaking Underground Storage Tanks On Tribal Lands (LUSTR05);
- Material Licensing Tracking System (MLTS);
- CERCLIS No Further Remedial Action Planned (NFRAP);
- No Longer Regulated RCRA Corrective Action Facilities (NLRRCRAC);
- No Longer Regulated RCRA Generator Facilities (NLRRCRAG);
- No Longer Regulated RCRA Non-CORRACTS TSD Facilities (NLRRCRAT);
- National Pollutant Discharge Elimination System (NPDESR05);
- National Priority List (NPL);
- Open Dump Inventory (ODI);
- Open Dump Inventory on Tribal Lands (ODINDIAN);
- PCB Activity Database System (PADS);
- Petroleum Brownfields Program Sites (PBF);
- Spills Listing (PCASPILLS);
- Permit Compliance System (PCSR05);
- Proposed National Priorities List (PNPL);
- Potential Voluntary Investigation and Cleanup Program Sites (PVICP);
- Resource Conservation & Recovery Act - Corrective Action Facilities (RCRAC);
- Resource Conservation & Recovery Act - Generator Facilities (RCRAGR05);
- RCRA Sites with Controls (RCRASC);

- Resource Conservation & Recovery Act - Treatment, Storage & Disposal Facilities (RCRAT);
- Recycling Markets Directory (RECYCLERS);
- Record of Decision System (RODS);
- State Assessment Sites (SAS);
- Superfund Site Information Listing (SF);
- CERCLIS Liens (SFLIENS);
- Site Response Section Database (SRS);
- Section Seven Tracking System (SSTS);
- Tier Two Facility Listing (TIERII);
- Toxics Release Inventory (TRI);
- Toxic Substance Control Act Inventory (TSCA);
- Registered Storage Tanks (UAST);
- Underground Storage Tanks On Tribal Lands (USTR05);
- Voluntary Investigation and Cleanup Program Sites (VICP); and
- Water Discharge Permits (WDP).

1.1.1 Federal ASTM Databases

The following Federal ASTM Databases had listings identified during the database search. Results of the database review are summarized in the "File Search Summary" Section.

1.1.1.1 Facility Registry System (FRSMN)

The United States EPA's Office of Environmental Information (OEI) developed the Facility Registry System (FRS) as the centrally managed database that identifies facilities, sites or places subject to environmental regulations or of environmental interest.

1.1.1.2 No Longer Regulated RCRS Generator Facilities (NLRRCRAG)

This database includes RCRA Generator facilities that are no longer regulated by the EPA or do not meet other RCRA reporting requirements. This listing includes facilities that formerly generated hazardous waste.

- Large Quantity Generators (LQGs) are categorized as such if they fulfill one of the following conditions.
    - Generate 1,000 kg or more of hazardous waste during any calendar month.
    - Generate more than 1 kg of acutely hazardous waste during any calendar month.
    - Generate more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste during any calendar month.
    - Generate 1 kg or less of acutely hazardous waste during any calendar month, and accumulate more than 1 kg of acutely hazardous waste at any time.
    - Generate 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulated more than 100 kg of that material at any time.

- Small to Minimal Quantity Generators are categorized as such if they fulfill one of the following conditions.
    - Small Quantity Generator (SQGs)
        - Generate more that 100 and less than 1,000 kg of hazardous waste during any calendar month and accumulate less than 6,000 kg of hazardous waste at any time.
        - Generate 100 kg or less of hazardous waste during any calendar month, and accumulate more than 1,000 kg of hazardous waste at any time.
    - Very Small Quantity Generators (VSQGs)
        - Generates less than 100 kg of hazardous waste per month.

- Conditionally Exempt Small Quantity Generators are categorized as such if they fulfill one of the following conditions.
    - Generate 100 kg or less of hazardous waste per calendar month and accumulate 1,000 kg or less of hazardous waste at any time.
    - Generate one kg or less of acutely hazardous waste per calendar month and accumulate at any time:
        - 1 kg or less of acutely hazardous waste;
        - Or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste.
    - Generate 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste during any calendar month, and accumulate at any time:
        - 1 kg or less of acutely hazardous waste;
        - Or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste.

1.1.1.3 Resource Conservation & Recovery Act – Generator Facilities (RCRAGR05)

This database includes RCRA sites located in EPA Region 5. This region includes the following states: Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin. **Section 1.1.1.2** provides the definition for LQGs, SQGs, VSQGs, and Conditionally Exempt Small Quantity Generators.

1.1.2 State ASTM Databases

The following State ASTM Databases identified sites during the database search.

1.1.2.1 Spills Listing

The Minnesota Pollution Control Agency's Emergency Response Team maintains this listing of reported petroleum product, hazardous substance, and/or other spills.

1.1.2.2 Tier Two Facility Listing (TIERII)

The Minnesota Department of Public Safety's Emergency Planning and Community Right-to-Know Act Program (EPCRA) maintains this listing of Tier Two facilities that store hazardous chemicals on-site.

1.1.2.3 Hazardous Waste Generator Sites (HWGS)

The MPCA provides this list of active and inactive Hazardous Waste Generator Sites, including large quantity and small to minimal quantity generators. **Section 1.1.1.2** provides the definition for these types of generators.

1.1.2.4 Water Discharge Permits (WDP)

This MPCA database includes the following types of water permits.

- Construction Stormwater Permits: Designed to limit pollution during and after construction by controlling the erosion associated with construction activities.
- Construction Stormwater Site Subdivisions: A site where a construction project with an existing stormwater permit has been subdivided into smaller parcels.
- Industrial Stormwater Permits: Designed to limit the amount of harmful contaminants that reach surface water and groundwater, by requiring good practices for storing and handling materials.
- Municipal Separate Storm Sewer System (MS4): A system of conveyances that is used as a path for stormwater. Regulated MS4s cover large areas, and are owned or operated by a public entity such as a city, county, township, or watershed district.
- Wastewater Dischargers: A facility that generates or treats wastewater for discharge onto land or into water.

1.1.2.5 Bulk Storage Permits (BULKSTORAGE)

The MDA's Licensing Information System (LIS) lists individuals or companies who hold licenses, certificates and/or permits required by state law and regulated by the Department. This database only contains those LIS licenses related to anhydrous ammonia storage facilities and bulk pesticide/ fertilizer storage facilities.

1.1.2.6 Registered Storage Tanks (UAST)

The Registered Storage Tanks Database provides information on aboveground and underground storage tanks registered with the Minnesota Pollution Control Agency. Owners of USTs and ASTs with a capacity of 500 gallons or more which contain petroleum or hazardous substances must notify the MPCA of the existence of these tanks. Tanks not subject to notification include farm and residential motor fuel tanks less than 1,100 gallons; heating oil tanks less than 1,100 gallons; flow-through process tanks; septic tanks; and agricultural chemical tanks.

1.1.2.7 Agricultural Spills Listing (AGSPILLS)

This list of reported spill incidents is provided by the MDA. The MDA has grouped these spills into three categories;

- Old Emergencies: emergencies which were closed prior to March 1, 2004. These files and the locations plotted have not been reviewed for accuracy and completeness.
- Smalls Spills and Investigations: spills and investigations which were closed after March 1, 2004.
- Investigation Boundaries: the approximate extent of large spills and other types of facility investigations.

1.1.2.8 Registered Leaking Storage Tanks (LUAST)

The Minnesota Pollution Control Agency maintains this listing of leaking aboveground and underground storage tanks. Tank owners are required to immediately report a leak or spill of more than five gallons of petroleum, or any amount of a hazardous substance, from any tank or

piping. All leaks and spills from USTs and ASTs and associated piping must be cleaned up to protect the environment and public health.

1.1.2.9 Recycling Markets Directory (RECYCLERS)

The Recycling Markets Directory is provided by the Minnesota Pollution Control Agency. The markets in this database accept large (commercial) quantities of materials.

1.1.2.10 Site Response Section Database (SRS)

The SRS Database contains summary information about the nature of contamination found at several types of cleanup sites that have institutional controls, restrictive covenants and deed notices throughout the state.

1.1.2.11 Unpermitted Dump Sites (UNPERMDUMPS)

Unpermitted dump sites are landfills that never held a valid permit from the Minnesota Pollution Control Agency (MPCA). Generally, these dumps existed prior to the permitting program established with the creation of the MPCA in 1967. These dumps are not restricted to any type of waste, but were often old farm or municipal disposal sites that accepted household waste. State assessment staff have investigated many of these dump sites.

1.1.2.12 Voluntary Investigation and Cleanup Program Sites (VICP)

The Voluntary Investigation and Cleanup (VIC) Program site listing is provided by the Minnesota Pollution Control Agency. This program encourages timely property transactions by reducing potential health or environmental risks from contamination and promoting the redevelopment of these properties.

1.1.3 Non-Geocoded Sites

HIG database reports typically include a number of “non-geocoded sites.” HIG could not specifically locate these sites due to poor address information or limitations of the US Census Bureau TIGER files. A total of NUMBER additional non-geocoded sites are listed in the HIG environmental database report. SEH attempted to identify non-geocoded sites located on or near the subject property based on site name, address, and available resources. The focus of this search is placed on sites that may pose the greatest potential for environmental impacts to the subject property. It is not within the scope to conduct an exhaustive investigation to verify the locations of all non-geocoded sites.

Non-geocoded sites identified as possible RECs to the subject property are incorporated into the report. Additional information regarding the non-geocoded sites may be found in the HIG report in **Attachment A**.

1.1.4 Additional Environmental Record Sources

HIG did not search additional databases beyond the standard list required by the ASTM standard.

SEH reviewed additional environmental record sources, including the MPCA “What’s In My Neighborhood” interactive mapping program, MPCA “Petroleum Remediation Program (PRP)”, MDA County Spill Records, and the MDA “What’s in my Neighborhood” interactive mapping program. The purpose of the review was to identify non-geocoded properties and properties not identified in the HIG review which are located on or within the search radius of the subject property. The additional record sources can also be used to verify information received in the HIG report.

2.0 Findings and Opinions

Based on the information provided above, the following known or suspected RECs, HRECs, or *de minimis* conditions were identified for the subject property.

- **Former Oakdale Kwik Stop (Tank Site 12645 – Active)**, 6014 Highway 36 Boulevard North.
    - **Leak 19061:** On 12/17/2012 a corroded tank resulted in a release of unleaded gasoline however the release was not reported until 2/19/2013. Groundwater contamination occurred but it is unknown if offsite contamination occurred or if contaminated soils remain on-site. On 12/19/2013 Leak 19061 received closure.
    - **Petroleum Brownfield 4306:** Active from 4/1/2013 to 9/9/2013 and is listed with a name of Oakdale Caribou Coffee.
- **Former ISD 622 Bus Garage (RCRA Generator MND985712553 – Active, Tank Site 3736 – Active)**, 2710 13th Avenue East.
    - **Leak 18376:** On 4/15/2011 diesel was released when a corroded dispenser overfilled the tank. Groundwater contamination occurred and it is unknown if contaminated soils or offsite contamination remains.
    - **Leak 17335:** A release of diesel occurred on 8/6/2008. It is unknown if contaminated soil or offsite contamination remains.
    - **Leak 61:** A release of leaded gasoline occurred on 4/10/1985. Groundwater contamination occurred and free product was observed. Multiple cleanup actions occurred on-site. From 4/15/1985 to 10/26/1995 3073 gallons of free product recovery occurred. From 7/1/1994 to 11/6/1995 soil venting took place in ground. This resulted in 758 gallons of product removed. Lastly, pump and treat cleanup occurred from 4/15/1985 to 10/26/1995 resulting in 122 gallons of product removed and 3059127 gallons of water treated. Remedial investigation monitoring occurred on-site from 2/29/1988 to 7/19/1996. Site closure occurred on 12/4/1996.
    - **Leak 8208:** A release of waste oil occurred on 2/15/1995. On 2/24/1995 one cubic yard of soil was thin spread as treatment. No contaminate soils remain and it is unknown if offsite contamination occurred. Site closure occurred on 6/27/1997.
    - **Petroleum Brownfield 3884:** Inactive with a site name of Proposed Commerce Park Redevelopment.
- **VJ Engineering Inc (RCRA Generator MND006454896)/Haberman Machine Inc (RCRA Generator MND985754183 – Inactive)**, 6290 Highway 36 Boulevard North.
    - **Petroleum Brownfield 3580:** Site name of Haberman Machine Inc and received closure on 6/14/2005.
- **Greens North**, Hadley Avenue.
    - **Voluntary Investigation and Cleanup (VIC) VP9880:** Active site from 5/11/1998 to 3/31/2002. Unpermitted dump site at a size of 22.27 acres.
- **Hillcrest Brake & Alignment (RCRA ID MND985708569 – Inactive, Tank Site 17814 – Inactive)**, 2475 East 7th Avenue.
    - **Leak 3124:** Discovered date (1/1/1901)?? On 8/27/1990 a release of leaded gasoline resulting in soil and some groundwater contamination was reported. On 7/2/1996 seventy-two (72) tons of soil was treated with thermal treatment. No offsite contamination occurred from the release however contaminated soils remain on-site. Leak 3124 received closure on 12/13/1996.

- **West Oaks Center**, 1949 Geneva Avenue.
    - **Leak 6253:** On 4/21/1993 a release of an unknown type of gasoline was discovered. It is unknown whether offsite contamination occurred or if contaminated soils remain on-site. On 7/25/1996 the site received closure.
- **Former Grocery Store**, 2486 East 7th Avenue.
    - **Leak 16504:** On 6/22/2006 during a tank removal, a release of Fuel Oil 1 & 2 was observed due to corrosion of the tank. This resulted in groundwater and soil contamination. It is unknown if offsite contamination occurred or if contaminated soils remain. Site closure occurred on 1/3/2007.
- **Amoco Station Store #9574**, 2634 Century Avenue.
    - **Leak 287:** On 7/2/1987 a release of unleaded gasoline resulted in soil and free product and groundwater contamination. Multiple cleanup activities were performed that treated approximately 300 cubic yards of soil. In addition, over 194 gallons of free product was removed throughout the active years. The site received closure on 3/27/1995.
- **Twenty Nine Pines Mobile Home Community (Tank Site 10928 – Inactive)**, 6450 Highway 36 Boulevard North.
    - **Leak 11221:** Fuel Oil 1&2 was released on 4/3/1998. Site closure was received on 7/21/2000 and it is unknown whether contaminated soil or offsite contamination remains.
- **Mills Fleet Farm (RCRA Generator MND985762467 – Active, Tank Site 17528 - Active)**, 3635 Hadley Avenue & 5501 Hadley Avenue.
    - **Leak 15407:** Unleaded gasoline was released on 9/16/2003 when an equipment malfunction in the tank basin occurred. Groundwater contamination occurred and free product was observed. Free product recovery and pump and treat cleanup activities were performed. Site Closure occurred on 6/12/2008 and contaminated soils remain on-site.
    - **PCASPILLS 24544, 64598, 84483, 59155, 62754:** a
- **Laurie Gas (RCRA Generator MNR000009480 – Inactive, Tank Site 17618 – Inactive)**, 2733 East 17th Avenue.
    - **Leak 12058:** An unknown type of gasoline was released on 11/4/1998. Soil and groundwater contamination occurred. Contaminated soils remain on-site and offsite contamination occurred. The site received closure on 1/31/2003.
    - **Leak 378:** An unknown type of gasoline was released on 7/23/1985 resulting in soil and groundwater contamination. Contaminated soils remain on-site and offsite contamination occurred from the release. Closure was issued on 12/1/1987.
- **Berwald Roofing Inc**, 2440 North Charles Street.
    - **Leak 11713:** On 8/26/1998 a release of diesel resulted in contaminated soils and groundwater contamination. Site closure was received on 8/26/2003.
    - **Unpermitted Dump Site 173533:** Unpermitted Dump Site - REM03613 (Inactive); State Assessment Site - SA8360 (Active)
- **Eastgate Apartments (Tank Site 11608 – Inactive)**, 6048 51st Street North.
    - **Leak 6930:** On 7/12/1994 a release of Fuel Oil 1 & 2 occurred. It is unknown if contaminated soils or offsite contamination remains. Site closure occurred on 7/12/1994.
- **ISD 622 Central Maintenance Shop (RCRA Generator MNS000107532 – Active)**, 6056 Upper 47th.

  - **Leak 16417:** During tank removal on 5/1/2006, a failure of piping resulted in a release of hydraulic fluid. Groundwater contamination occurred and contaminated soils remain on-site. This site is still active.
- **Century Avenue Collision Center**, 2501 North Division Street.
  - **Leak 6470:** On 6/29/1993 a release of Fuel Oil 1 & 2 was discovered. From 7/2/1993 to 8/26/1993 49 tons of soil was treated with thermal treatment. Site closure occurred on 6/9/1994. Contaminated soils remain on-site and no offsite contamination occurred from this release.
- **Saint Croix Hudson Inc (Tank Site 4283 – Active)**, 5262 Glenbrook Avenue North.
  - **Leak 5040:** A release of diesel occurred on 3/17/1992 resulting in soil and groundwater contamination. From 5/15/1992 to 6/9/1992 eighty-seven (87) tons of soil was treated by thermal treatment. On 8/22/1995 the site received closure. Contaminated soils remain on-site and it is unknown if offsite contamination occurred due to this release.
- **Former Gas Station/Elite Chiropractic – North Saint Paul (RCRA Generator MND985673227 – Inactive)**, 2597 7th Avenue East.
  - **Leak 16711:** On 1/4/2007 a release of diesel was discovered on-site. The cause of the release is unknown. The station has been out of service since the 1960s. No groundwater contamination occurred from this release however contaminated soils remain on-site. Site closure was issued on 3/13/2007.
- **Saint Peters Catholic Church (Tank Site 13778 – Active)**, 2590 Margaret Street North.
  - **Leak 16905:** During tank removal on 7/23/2007 corrosion on the piping resulted in the release of fuel oil 1 & 2. No groundwater contamination occurred from this release however it is unknown if contaminated soils remain on-site or offsite contamination occurred. On 9/12/2007 closure was issued.
- **Kopeska Property**, 4715 Glenbrook Avenue North.
  - **Leak 16989:** During tank removal on 9/11/2007 corrosive piping resulted in a release of Fuel Oil 1 & 2. Groundwater contamination occurred on-site however no contaminated soils remain on-site and no offsite contamination occurred.
- **Former Body Shop Building**, 2369 North Helen Street.
  - **Leak 16605:** During tank removal on 10/5/2006 a release of hydraulic fluid was observed. No groundwater contamination or offsite contamination occurred however contaminated soils remain on-site.
  - **VP21640:** No EPA ID # Reported
- **Peterson Property**, 2516 7th Avenue East.
  - **Leak 17154:** During a site assessment on 1/31/2008 a release of Fuel Oil 1 & 2 was observed due to a rusted tank in very poor condition. Groundwater contamination occurred from the release and it is unknown whether contaminated soils remain on-site or if offsite contamination occurred due to the release. Site closure was issued on 8/11/2009.
  - **VP26580:** No EPA ID # Reported
- **Northwest Bituminous Inc/Sprint/Total Mart**, Highway 36 and 120.
  - **PCASPILLS: 27924, 13845, 20893:**
- **Richardson Elementary School**, 2615 1st Street.
  - **Leak 4353:** A release of Fuel Oil 1 & 2 was observed on 8/7/1991 resulting in contaminated soil however no groundwater contamination occurred. From 1/1/1991 to 9/30/1991 153 tons of soil was treated by a thermal treatment. No

offsite contamination occurred due to the release and it is unknown whether contaminated soils remain on-site. The site received closure on 8/20/1993.

- **Mulcahy Inc – Oakdale (RCRA Generator MND985674548 – Inactive)**, 5232 Glenbrook Avenue North.
- **Anderson Cabinets Inc (RCRA Generator MND078669124 – Active)**, 2500 Charles Street North.
- **Barrett Chiropractic Center (RCRA Generator MNR000041533)**, 6070 50th Street North.
- **The Used Car Company/Tolerance Tool Inc (RCRA Generator MND985705730 – Active)**, 2700 East Highway 36.
- **Gateway Cycle (RCRA Generator MND985747716 – Active)/Arvold Chiropractic Clinic – Oakdale (RCRA Generator MND071360804 – Active)**, 6028 Highway 36 Boulevard North.
- **United Rentals – Maplewood (MND985712678 – Inactive)**, 2700 East Highway 36.
- **Manson & Associates dba/ Carpenters Small Engine (MND982206070 – Active)**, 2621 7th Avenue East.
- **Two Guys Fix It (MND985714435)**, 4777 Gentry Avenue North.
- **Ayshire Electronics of Minnesota (MNS000103721 – Active)**, 7015 55th Street North.
- **Bighley Auto Body Inc (MND068158989 – Active)**, 2409 Margaret Street North.
- **Brown Tank LLC (MND052738556 – Inactive)**, 6995 55th Street North.
- **CDI (MNS000194555 – Active)**, 2601 Centennial Drive Ste 108.
- **East Metro Family Practice (MNS000122101 – Active)**, 2601 Centennial Drive Ste 100.
- **Nelson Paul E Dbs (MND985673276 – Active)**, 2377 Margaret Street North.
- **North Saint Paul Police Department (MND985681154 – Active)**, 2400 Margaret Street North.
- **Oakdale Par 4 (MNR000041871)**, 5585 Golfview Avenue North.
- **Pola Pharmacy (MNS000155598 – Active)**, 2564 7th Avenue East.
- **Raintree Homeowners Association (MNR000026575)**, 4969 Grenwich Trail North.
- **Recognitionworx Inc – Oakdale (MNS000110296 – Active)**, 5201 Gershwin Avenue North.
- **Recognitionworx Inc (MND030007140 – Active)**, 5215 Gerschwin Avenue North.
- **Rossbach Construciton Inc (MNR000042945 – Active)**, 2578 7th Avenue East.
- **North Saint Paul Automotive (RCRA Generator MND982207243 – Active, Tank Site 3819 – Active)**, 2617 Division Street North.
- **BP Station Store #2272 (Tank Site 10238 – Active)/ACA Management 396 (RCRA Generator MND985724210 – Inactive)**, 2545 Division Street.
- **Gates Auto Service (Tank Site 54363 – Active)**, 2621 7th Avenue East.
- **Parnell Enterprises Inc/Larson Diesel Service (RCRA Generator MND985756337 – Active, Tank Site 4308)**, 5275 Geneva Avenue North.
- **Holiday Station Store #224 (Tank Site 3441 – Active)**, 2438 Margaret Street.
- **Shortstop 76 – Lake Elmo Oil (Tank Site 3627 – Active)**, 2473 North Division.
- **North High School (Tank Site 3634 – Active)**, 2520 East 12th Avenue.

3.0 Next Step

The next step in environmental investigation is to perform a Phase I Environmental Site Assessment in general accordance with ASTM Standard Practice E 1527-05. The Phase I ESA consists of the following four general tasks:

- Records Review – The purpose of the records review is to obtain and review reasonably ascertainable records from standard sources (including government records, physical setting sources, and historical use records) to assist in identifying RECs or HRECs in connection with the subject property. Publicly-available federal, tribal, state, county and/or city records are reviewed as appropriate to determine if the property has had a history of spills, leaks, hazardous waste storage, regulatory compliance and improper waste disposal practices. Reasonably ascertainable standard historical sources are reviewed as necessary to identify prior uses of the property from the time the property was first developed or 1940, whichever is earlier. Significant data gaps of greater than 5 years in property historical information are identified and discussed.
- Site Reconnaissance – The objective of the site reconnaissance is to observe the subject property to obtain information indicating the likelihood of RECs or HRECs in connection with the subject property. As part of the site reconnaissance, SEH observes the property and structures, if any, located on the property for indications of RECs or HRECs to the extent not obstructed by thick vegetation, bodies of water, stored materials or product, equipment, or other obstacles. Potential environmental concerns on the subject property and observable environmental concerns on adjoining properties that relate to improper waste storage and disposal, and hazardous materials are noted.
- Interviews – The purpose of conducting interviews is to obtain information indicating RECs or HRECs in connection with the subject property. As appropriate, past and present owners, operators, employees and occupants of the facility, and government officials are interviewed regarding the property. If the subject property is abandoned, one or more owners or occupants of neighboring properties are interviewed.
- Technical Report – SEH prepares the technical report summarizing the compiled information, and offers findings, opinions and conclusions based on the available data. If significant data gaps are identified, they are discussed in the report. Recognized Environmental Conditions and/or HRECs, if any, identified during performance of the Phase I ESA are described in the report. The report also includes SEH's opinion of the potential impact of each REC, if RECs are identified.

The records review task has been started by this memorandum however not as extensive as would be performed in the Phase I ESA.

4.0 References

Historical Information Gatherers Inc. (HIG), June 10, 2013, "*GeoSearch Radius Report*, Target Property: TH36 Corridor from TH120 to I-694, Oakdale, Ramsey County, MN 55109"

Minnesota Department of Agriculture (MDA), *County Spill Reports* for Olmsted County, Minnesota, www.mda.state.mn.us/chemicals/spills/incidentresponse/ countyspills.htm

MDA *What's in my neighborhood*, interactive online mapping, www.mda.state.mn.us/chemicals/spills/incidentresponse/disclaimer.htm

Minnesota Department of Health (MDH), *County Well Index*, www.health.state.mn.us/divs/eh/cwi/

Minnesota Pollution Control Agency (MPCA) *Aboveground/Underground Storage Tank Site Search*, online database, http://www.pca.state.mn.us/index.php/waste/waste-and-cleanup/waste-management/tank-compliance-and-assistance/minnesota-aboveground-/-underground-storage-tank-site-search-data.html

MPCA *Petroleum Remediation Program Maps* online, http://pca -gis02.pca.state.mn.us/prp/index.html

MPCA *What's in my neighborhood*, online database, www.pca.state.mn.us/backyard/neighborhood.html

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Table 1 GeoSearch Summary
Table 2 Summary of Tanks
Attachment A GeoSearch Database Report
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Map ID	Environmental Records Definitions	Acronym	Facility ID	Facility Name	Street	City	Zip Code	County	Distance	Direction	Notes
1	Ag Spill Listing	MNAGSPILLS	181101003065	MILLS FLEET FARM	Oakdale				0.01	NW	Emergency investigation concerning a swimming pool contamination. Closed on 12/20/2012
1	Hazardous Waste Generator Sites	MNHWGS	MND985762467	MILLS FLEET FARM - OAKDALE	5635 HADLEY AVE N	OAKDALE	55128	Washington	0.01	NW	Waste Activity: G8-Generation, VSQG
1	Spills Listing	MNPCASPILLS	24544	BEST LINE TRUCKING	5635 Hadley Avenue	OAKDALE		Washington	0.01	NW	Citizen drove into side of semi causing saddle tank to spill on 10/11/96. 180 gallons of motor/lube oil;trans/eng fluid spilt. Closure occurred on 10/15/96.
1	Spills Listing	MNPCASPILLS	64598	CUTTING EDGE COMPANY AT MILLS FLEET FARM ACCIDENT	5635 Hadley Avenue	OAKDALE		Washington	0.01	NW	On 11/1/05 a dump truck spilled 10 gallons of fuel due to an accident. FD applied floor-dri and cleaned up, a MnDOT inspector is on-site. PD case #05115540. Closure on 11/28/05.
1	Spills Listing	MNPCASPILLS	84483	FLEET FARM DUMPSTER/CHORINE PRODUCT FIRE	5635 Hadley Avenue	OAKDALE		Washington	0.01	NW	On 6/22/12 a store employee inadvertantly threw chlorine tablet, optimum chlorinating granulars; swimming pool chemical, in a trash compactor, smashed, not sure if it mixed with other products or chemicals, brownish colored smoke or gas coming from compactor, chlorine smell in the air. Store was evacuated and a fire in the dumpster occurred. Site closure on 7/11/12.
1	Spills Listing	MNPCASPILLS	59155	MILLS FLEET FARM	5635 Hadley Avenue	OAKDALE		Washington	0.01	NW	On 5/28/03 15 gallons of motor/lube oil; trans/eng fluid was release from a hose or pipe. Site closure occurred on the same day as release.
1	Spills Listing	MNPCASPILLS	62754	MILLS FLEET FARM	5635 Hadley Avenue	OAKDALE		Washington	0.01	NW	On 3/4/05 15 gallons of motor/lube oil was released after the swivel between the dispenser nozzle & hose broke. About 1.5 bags of floor-dri was used. Material did not reach a storm drain. The storm drain had pillows place in it and at the outfall. WCEC responded for clean-up. Site closure occurred on 3/10/05.
1	Spills Listing	MNPCASPILLS	182056		5635 Hadley Avenue	Oakdale			0.01	NW	
1	Spills Listing	MNPCASPILLS	266554		5635 Hadley Ave N	Oakdale	55128	Washington	0.01	NW	
1	Spills Listing	MNPCASPILLS	311736		5635 Hadley Ave N	Oakdale	55128	Washington	0.01	NW	
1	Spills Listing	MNPCASPILLS	339141		5635 Hadley Ave	Oakdale			0.01	NW	
1	Spills Listing	MNPCASPILLS	63381599		5635 Hadley Avenue North	Oakdale			0.01	NW	
1	Tier Two Facility Listing	MNTIERII	14921	MILLS FLEET FARM	5635 HADLEY AVENUE NORTH	OAKDALE	55109	Ramsey	0.01	NW	Active: Kerosene & Sulfuric Acid
1	Registered Storage Tank	MNUAST	17528	MILLS FLEET FARM	5635 HADLEY AVE N	Oakdale	55128	Washington	0.01	NW	
1	Facility Registry System	USFRSMN	110003880596	MILLS FLEET FARM - OAKDALE	5635 HADLEY AVE N	OAKDALE	55128	Washington	0.01	NW	SIC: 5399 - Miscellaneous General Merchandise Stores / NAICS: 45299 - All other General Merchandise Stores
1	Resource Conservation & Recovery Act - Generator Facilities	USRCRAGR05	MND985762467	MILLS FLEET FARM - OAKDALE	5635 HADLEY AVE N	OAKDALE	55128	Washington	0.01	NW	Received by agency on 4/16/93 - Large Quantity Generator
2	Spills Listing	MNPCASPILLS	27924	NORTHWEST BITUMINOUS INC	Hwy 36 & 120	OAKDALE	55128	Washington	0.01	West	On 5/6/98 20 gallons of fuel leak from a dump truck west bound on 36 when the truck developed a fuel leak from tank. Site closure occurred on 6/30/00.
2	Spills Listing	MNPCASPILLS	13845	SPRINT	Hwy 36 & 120	OAKDALE	55128	Washington	0.01	West	On 7/10/90 15 gallons of light fuel oil and diesel was released due to an overfill. Site closure on 7/10/90.
2	Spills Listing	MNPCASPILLS	20893	TOTAL MART	Hwy 36 & 120	OAKDALE	55128	Washington	0.01	West	On 3/4/95 30 gallons of light fuel oil and diesel was released while changing oil. Site closure occurred on the same day as release.
2	Spills Listing	MNPCASPILLS	172195		Hwy 36 & 120	Oakdale	55128	Washington	0.01	West	
2	Spills Listing	MNPCASPILLS	178702		Hwy 36 & 120	Oakdale	55128	Washington	0.01	West	
2	Spills Listing	MNPCASPILLS	185137		Hwy 36 & 120	Oakdale	55128	Washington	0.01	West	
2	Water Discharge Permits	MNWDP	57654217	SP 6227-70 GATEWAY TRAIL OVER CENTURY AV	SEE LOCATION DESCRIPTION	NORTH ST. PAUL	55109	Ramsey	0.02	South	Inactive construction stormwater permit (C00029289)
2	Facility Registry System	USFRSMN	110015867953	INDEPENDENT SCHOOL DIST N ST PAUL HS	HWY 36 AND 120	NORTH ST PAUL	55109	Ramsey	0.01	West	No SIC/NAICS data reported
3	Hazardous Waste Generator Sites	MNHWGS	MND071360804	ARVOLD CHIROPRACTIC CLINIC - OAKDALE	6028 HIGHWAY 36 BLVD N	OAKDALE	55128	Washington	0.02	West	
3	Hazardous Waste Generator Sites	MNHWGS	MND985747716	GATEWAY CYCLE	6028 HIGHWAY 36 BLVD N	OAKDALE	55128	Washington	0.02	West	Waste Activity: G8-Generation, VSQG
3	Facility Registry System	USFRSMN	110007606778	ARVOLD CHIROPRACTIC CLINIC - OAKDALE	6028 HWY 36 BLVD N	OAKDALE	55128	Washington	0.02	West	SIC: 8041 - Offices & Clinics of Chiropractos / NAICS: 62131 - Office of Chiropractors
3	Facility Registry System	USFRSMN	110006419599	GATEWAY CYCLE	6028 HIGHWAY 36 BLVD N	OAKDALE	55128	Washington	0.02	West	SIC: 5941 - Sporting Goods Stores & Bicycle Shops / NAICS: 45111 - Sporting Goods Stores
3	No longer regulated RCRA Generator Facilities	USNLRRCRAG	MND985747716	MERRY MAIDS	6028 HIGHWAY 36 BLVD N	OAKDALE	55128	Washington	0.02	West	Not a generator
3	Resource Conservation & Recovery Act - Generator Facilities	USRCRAGR05	MND071360804	ARVOLD CHIROPRACTIC CLINIC - OAKDALE	6028 HIGHWAY 36 BLVD N	OAKDALE	55128	Washington	0.02	West	Received by agency on 5/19/89 - Large Quantity Generator / Waste Activity: G8-Generation, VSQG / Hazardous Waste: D000 & D011 Silver
4	Registered Leaking Storage Tanks	MNLUAST	287	AMOCO SS #9574	2634 CENTURY AVE	OAKDALE	55128	Washington	0.02	NW	Unleaded gasoline released on 7/2/1987 and site closure was received on 3/27/1995. Free product and groundwater contamination observed. Contaminated Soils and Offsite Contamination remains. Multiple cleanup activities occurred that treated approximately 300 cubic yards of soil. In addition, over 194 gallons of free product was removed throughout the active years.
4	Registered Storage Tank	MNUAST	4036	AMOCO SS #9574	2634 CENTURY AVE	North St. Paul	55109	Ramsey	0.02	NW	
4	Registered Storage Tank	MNUAST	12645	Kwik Stop	6014 HIGHWAY 36 BLVD N	Oakdale	55128	Washington	0.02	NW	
5	Hazardous Waste Generator Sites	MNHWGS	MND982207243	NORTH ST PAUL AUTOMOTIVE	2617 N DIVISION ST	NORTH ST. PAUL	55109	Ramsey	0.04	NW	Waste Activity: G8-Generation, VSQG
5	Registered Storage Tank	MNUAST	3819	Jake's North St. Paul Automotive	2617 DIVISION ST N	North St. Paul	55109	Ramsey	0.04	NW	
5	Registered Storage Tank	MNUAST	12377	NORTH SAINT PAUL 66 SERVICE	2617 DIVISION ST	North St. Paul	55109	Ramsey	0.04	NW	appears to be a repeat of 3819 and was thus deleted
5	Resource Conservation & Recovery Act - Generator Facilities	USRCRAGR05	MND982207243	NORTH ST PAUL AUTOMOTIVE	2617 N DIVISION ST	NORTH ST. PAUL	55109	Ramsey	0.04	NW	NAICS ID 44711: Gasoline Stations w/ Convenience Stores. Hazardous Waste: D001 Ignitable waste; D002 Corrosive waste; D008 Lead
6	Hazardous Waste Generator Sites	MNHWGS	MND985705730	THE USED CAR CO	2700 E HIGHWAY 36	MAPLEWOOD	55109	Ramsey	0.05	SE	Waste Activity: G8-Generation, VSQG
6	Hazardous Waste Generator Sites	MNHWGS	MND985744945	TOLERANCE TOOL INC	2700 E HIGHWAY 36	MAPLEWOOD	55109	Ramsey	0.05	SE	Waste Activity: 51-Generation, Non-Generator
6	Resource Conservation & Recovery Act - Generator Facilities	USRCRAGR05	MND985705730	THE USED CAR CO	2700 E HIGHWAY 36	MAPLEWOOD	55109	Ramsey	0.05	SE	Received by agency on 5/14/91 - Large Quantity Generator. Hazardous Waste: D001 Ignitable Waste; D006 Cadmium; D008 Lead; D018 Benzene; D039 Tetrachloroethylene; D040 Trichlorethylene

Map ID	Environmental Records Definitions	Acronym	Facility ID	Facility Name	Street	City	Zip Code	County	Distance	Direction	Notes
6	Resource Conservation & Recovery Act - Generator Facilities	USRCRAGR05	MNR000000034	USED CAR CO THE	2700 HWY 36 SITE C	NORTH ST PAUL	55109	Ramsey	0.05	SE	Received by agency on 2/7/95 - Large Quantity Generator. Hazardous Waste: D001 Ignitable Waste; D006 Cadmium; D008 Lead; D018 Benzene; D039 Tetrachloroethylene; D040 Trichlorethylene
7	Hazardous Waste Generator Sites	MNHWGS	MNR000041533	BARRETT CHIROPRACTIC CENTER	6070 50TH ST N	OAKDALE	55128	Washington	0.05	West	Waste Activity: G8-Generation, VSQG
7	Resource Conservation & Recovery Act - Generator Facilities	USRCRAGR05	MNR000041533	BARRETT CHIROPRACTIC CENTER	6070 50TH ST N	OAKDALE	55128	Washington	0.05	West	Received by agency on 9/28/99 - Large Quantity Generator. Hazardous Waste: D011 Silver
8	Registered Leaking Storage Tanks	MNLUAST	11221	TWENTY NINE PINES MOBILE HOME COMMUNIT	6450 HIGHWAY 36 BLVD N	OAKDALE	55126	Ramsey	0.05	West	Fuel Oil 1&2 was released on 4/3/98. Site closure was received on 7/21/2000 and it is unknown whether contaminated soil or offsite contamination remains.
9	Registered Leaking Storage Tanks	MNLUAST	15407	MILLS FLEET FARM	5501 HADLEY AVE	OAKDALE	55128	Washington	0.05	NW	Unleaded gasoline was released on 9/16/03 when an equipment malfunction in the tank basin occurred. Groundwater contamination occurred and free product was observed. Free product recovery and pump and treat cleanup activites were performed. Site Closure occured on 6/12/08 and contaminated soils remain on-site.
10	Registered Storage Tank	MNUAST	10238	BP SS #2272	2545 DIVISION ST	North St. Paul	55109	Ramsey	0.05	SE	
10	No longer regulated RCRA Generator Facilities	USNLRRCRAG	MND985724210	ACA MANAGEMENT 396	2545 DIVISION ST N	NORTH ST. PAUL	55109	Ramsey	0.05	SE	Received by agency on 9/5/08 - Not a generator. NAICS 53112 - Lessors of Nonresidential Buildings (Except MINIW). Hazardous Waste: D001 Ignitable Waste; D002 Corrosive Waste; D008 Lead; D018 Benzene
11	Water Discharge Permits	MNWDP	82532	HILLTOP BUSINESS PARK	55TH ST. & HADLEY AVE.;W OF I-94	OAKDALE	55128	Washington	0.05	South	Inactive Construction Stormwater Permit ID C00008159
12	Hazardous Waste Generator Sites	MNHWGS	MND078669124	ANDERSEN CABINETS INC	2500 CHARLES ST N	NORTH ST. PAUL	55109	Ramsey	0.07	South	Waste Activity: G8-Generation, VSQG
12	Resource Conservation & Recovery Act - Generator Facilities	USRCRAGR05	MND078669124	ANDERSON CABINETS	2500 CHARLES ST N	NORTH ST. PAUL	55109	Ramsey	0.07	South	Received by agency on 11/16/89 - Large Quantity Generator. Hazardous Waste: D001 Ignitable Waste; F001 Spent Halogenated Solvents Used in Degreasing; F002 Spent Halogenated Solvents; F003 Spent Non-Halogenated Solvents; F005 Spent NonHalogenated Solvents
13	Registered Leaking Storage Tanks	MNLUAST	12058	LAURIE GAS	2733 E 17TH AVE	NORTH ST. PAUL	55109	Ramsey	0.09	NW	Unknown type of gasoline was released on 11/4/98. Soil and groundwater contamination occurred. Contaminated soil remains and offsite contamination occurred. Site closure occurred on 1/31/03.
13	Registered Leaking Storage Tanks	MNLUAST	378	RIGHT OF WAY FOR LAURIES GAS	2733 E 17TH AVE	NORTH ST. PAUL	55109	Ramsey	0.09	NW	Uknown type of gasoline was released on 7/23/85. Soil and groundwater contamination occurred. Contaminated soils and offsite contamination remains on-site. Site closure was issured on 12/1/87.
13	Registered Storage Tank	MNUAST	17618	LAURIE OIL CO	2733 E 17TH AVE	North St. Paul	55109	Ramsey	0.09	NW	
14	Hazardous Waste Generator Sites	MNHWGS	MND985712553	BUS GARAGE - NORTH SAINT PAUL	2710 13TH AVE E	NORTH ST. PAUL	55109	Ramsey	0.1	South	NAICS ID 61111 - elementary & secondary schools. Received by agency on 8/1/91 - Large Quantity Generator. Hazardous Waste: D001 Ignitable Waste; D002 Corrosive Waste; D008 Lead; X001
14	Registered Leaking Storage Tanks	MNLUAST	18376	FORMER ISD 622 BUS GARAGE	2710 13TH AVE E	NORTH ST. PAUL	55109	Ramsey	0.1	South	On 4/15/11 diesel was released when a corroded dispenser overfilled the tank. Groundwater contamination occurred and it is unknown if contaminated soils or offsite contamination remains
14	Registered Leaking Storage Tanks	MNLUAST	17335	INDEPENDENT SCHOOL DIST 622 BUS GARAGE	2710 13TH AVE E	NORTH ST. PAUL	55109	Ramsey	0.1	South	A release of diesel occurred on 8/6/08. It is unknown if contaminated soil or offsite contamination remains.
14	Registered Leaking Storage Tanks	MNLUAST	61	INDEPENDENT SCHOOL DISTRICT #622	2710 E 13TH AVE	NORTH ST. PAUL	55109	Ramsey	0.1	South	A release of leaded gasoline occurred on 4/10/85. Groundwater contamination occurred and free product was observed. Multiple cleanup actions occurred on-site. From 4/15/85 to 10/26/95 3073 gallons of free product recovery occurred. From 7/1/94 to 11/6/95 soil venting took place in ground. This resulted in 758 gallons of product removed. Lastly, pump and treat cleanup occured from 4/15/85 to 10/26/95 resulting in 122 gallons of product removed and 3059127 gallons of water treated. Remedial investigation monitoring occurred on-site from 2/29/88 to 7/19/96. Site closure occured on 12/4/96.
14	Registered Leaking Storage Tanks	MNLUAST	8202	ISD #622 BUS GARAGE	2710 E 13TH AVE	NORTH ST. PAUL	55109	Ramsey	0.1	South	A release of waste oil occurred on 2/15/95. On 2/24/95 one cubic yard of soil was thin spread as treatment. No contaminate soils remain and it is unknown if offsite contamination occurred. Site closure occurred on 6/27/97.
14	Registered Storage Tank	MNUAST	3736	INDEPENDENT SCHOOL DIST #622/BUS GARAGE	2710 E 13TH AVE	North St. Paul	55109	Ramsey	0.1	South	
14	Registered Storage Tank	MNUAST	52684	NORTH SAINT PAUL/MAPLEWOOD BUS GARAGE	2710 E 13TH	Maplewood	55119	Ramsey	0.1	South	
14	Resource Conservation & Recovery Act - Generator Facilities	USRCRAGR05	MND985712553	DISTRICT 622	2710 13TH AVE E	NORTH ST. PAUL	55109	Ramsey	0.1	South	Waste Activity: 58-Generation, temporary
15	Registered Leaking Storage Tanks	MNLUAST	11713	BERWALD ROOFING INC	2440 N CHARLES ST	NORTH ST. PAUL	55109	Ramsey	0.11	South	A release of diesel occurred on 8/26/98. Contaminated soils remain and groundwater contamination occurred. The site received closure on 8/26/03.
15	Registered Storage Tank	MNUAST	20954	BERWALD ROOFING	2440 N CHARLES	North St. Paul	55109	Ramsey	0.11	South	
15	Unpermitted Dump Sites	MNUNPERMDUMPS	173533	Berwald Roofing Company Dump	See location description	North St. Paul	55109	Ramsey	0.11	South	Unpermitted Dump Site - REM03613; State Assessment Site - SA8360
16	Registered Leaking Storage Tanks	MNLUAST	6930	EASTGATE APARTMENTS	6048 51ST ST N	OAKDALE	55128	Washington	0.12	NW	On 7/12/94 a release of Fuel Oil 1 & 2 occurred. It is unknown if contaminated soils or offsite contamination remains. Site closure occurred on 7/12/94.
16	Registered Storage Tank	MNUAST	11608	EASTGATE APARTMENTS	6048 51ST ST N	Oakdale	55128	Washington	0.12	NW	
17	Hazardous Waste Generator Sites	MNHWGS	MND006454896	VJ ENGINEERING INC	6290 HIGHWAY 36 BLVD N	NORTH ST. PAUL	55109	Ramsey	0.13	NW	Waste Activity: 51-Generation, Non-Generator
17	No longer regulated RCRA Generator Facilities	USNLRRCRAG	MND985754183	HABERMAN MACHINE INC	6290 HIGHWAY 36 BLVD N	OAKDALE	55128	Washington	0.13	NW	NAICS: 33271 - Machine Shops; 333511 - Industrial Mold Manufacturing. Received by agency on 2/12/10 - Not a Generator. Hazardous Waste: D001 Ignitable Waste
18	No longer regulated RCRA Generator Facilities	USNLRRCRAG	MND985674548	MULCAHY INC - OAKDALE	5232 GLENBROOK AVE N	OAKDALE	55128	Washington	0.13	NW	NAICS: 811111 - General Automotive Repair. Receved by agency on 11/13/89 - Not a Generator. Hazardous Waste: D000; D001 Ignitable Waste; F002 Spent Halogenated Solvents
19	Registered Leaking Storage Tanks	MNLUAST	16417	ISD 622 CENTRAL MAINTENANCE SHOP	6056 UPPER 47TH	OAKDALE	55128	Washington	0.14	SE	During tank removal on 5/1/06, a failure of piping resulted in a release of hydraulic fluid. Groundwater contamination occurred and contaminated soils remain on-site.
20	Registered Leaking Storage Tanks	MNLUAST	6470	CENTURY AVE COLLISION CENTER	2501 N DIVISION ST	NORTH ST. PAUL	55109	Ramsey	0.16	South	On 6/29/93 fuel oil 1 & 2 was released. From 7/2/93 to 8/26/93 49 tons of soil was treated with thermal treatment. On 6/9/94 site closure occurred. Contaminated soils remain and no offsite contamination occurred.

Map ID	Environmental Records Definitions	Acronym	Facility ID	Facility Name	Street	City	Zip Code	County	Distance	Direction	Notes
20	Registered Storage Tank	MNUAST	18162	CENTURY AVENUE COLLISION CENTER	2501 N DIVISION ST	North St. Paul	55109	Ramsey	0.16	South	
21	Registered Leaking Storage Tanks	MNLUAST	5040	SAINT CROIX HUDSON INC	5262 GLENBROOK AVE N	OAKDALE	55109	Ramsey	0.16	NW	A release of diesel occurred on 3/17/92. Soil and groundwater contamination occurred. From 5/15/92 to 6/9/92 87 tons of soil was treated by thermal treatment. On 8/22/95 the site received closure. Contaminated soil remains onsite and it is unknown if offsite contamination occurred.
21	Registered Storage Tank	MNUAST	4283	SAINT CROIX HUDSON INC	5262 GLENBROOK AVE N	Oakdale	55109	Ramsey	0.16	NW	
22	Registered Storage Tank	MNUAST	54363	GATES AUTO SERVICE	2621 7TH AVE E	North St. Paul	55109	Ramsey	0.18	South	
23	Recycling Markets Directory	MNRECYCLERS	2377205007	PARNELL ENTERPRISES INC	5275 GENEVA AVE	OAKDALE	55110	Ramsey	0.22	NW	Materials Accepted: bulbs & lamp ballasts: ballasts, non-PCB containing & PCB-containing, fluorescent lamps, HID lamps, incandescent lamps, neon lamps, mercury-containing; electronics: capacitors, non-PCB, CRTS, circuit boards, computers, data communication hardware, PCB
23	Registered Storage Tank	MNUAST	4308	LARSON DIESEL SERVICE	5275 GENEVA AVE N	Oakdale	55109	Ramsey	0.22	NW	
24	Registered Storage Tank	MNUAST	3441	HOLIDAY STATIONSTORE #224	2438 MARGARET ST	North St. Paul	55109	Ramsey	0.22	SW	
25	Registered Storage Tank	MNUAST	3627	SHORTSTOP 76-LAKE ELMO OIL	2473 N DIVISION	North St. Paul	55109	Ramsey	0.22	SE	
26	Registered Leaking Storage Tanks	MNLUAST	16711	FORMER GAS STATION	2597 7TH AVE E	NORTH ST. PAUL	55109	Ramsey	0.22	South	On 1/4/07 a release of diesel was discovered on-site. The cause of the release is unknown. The station has been out of service since the 1960s. No groundwater contamination occurred however contaminated soils remains on-site. Site closure occurred on 3/13/07.
27	Registered Leaking Storage Tanks	MNLUAST	16905	ST PETERS CATHOLIC CHURCH	2590 MARGARET ST N	NORTH ST. PAUL	55109	Ramsey	0.23	NW	During tank removal on 7/23/07 corrosion on the piping resulted in the release of fuel oil 1 & 2. No groundwater contamination occurred and it is unknown if contaminated soils or offsite contamination remains. On 9/12/07 the site received closure.
27	Registered Storage Tank	MNUAST	13778	Church of St. Peter O Riely Hall	2590 N MARGARET	North St. Paul	55109	Ramsey	0.23	NW	
28	Bulk Storage Permits	MNBULKSTORAGE	20072053	GREENER PASTURES DEVELOPMENT CORP INC	6989 55TH ST N STE A	OAKDALE	5512		0.24	South	Inactive bulk pesticide/fertilizer storage permit
29	Registered Storage Tank	MNUAST	3634	NORTH HIGH SCHOOL	2520 E 12TH AVE	North St. Paul	55109	Ramsey	0.25	West	
30	Registered Leaking Storage Tanks	MNLUAST	16989	KOPESKA PROPERTY	4715 GLENBROOK AVE N	OAKDALE	55128	Washington	0.37	SE	During tank removal on 9/11/07 corrosive piping resulted in a release of fuel oil 1 & 2. Groundwater contamination occurred on-site however no contaminated soils or offsite contamination remains.
31	Registered Leaking Storage Tanks	MNLUAST	16605	FORMER BARTHOLOMY BODY SHOP	2369 N HELEN ST	NORTH ST. PAUL	55109	Ramsey	0.42	SW	During tank removal on 10/5/06 a release of hydraulic fluid was observed. No groundwater contamination or offsite contamination occurred however contaminated soils remain on-site.
31	Site Response Section Database	MNSRS	VP21640	Body Shop Building	2369 HELEN STREET	NORTH ST. PAUL	55109	Ramsey	0.42	SW	No EPA ID # Reported
31	Voluntary Investigation and Cleanup Program Sites	MNVICP	VP21640	Body Shop Building	2369 HELEN STREET	NORTH ST. PAUL	55109	Ramsey	0.42	SW	No EPA ID # Reported
32	Ag Spill Listing	MNAGSPILLS	14256	TRUGREEN/CHEMLAWN	HWY 694 S BTW HWYS 36 & 5	Saint Paul	55128	Washington	0.44	SE	Closed on 10/16/03
33	Registered Leaking Storage Tanks	MNLUAST	17154	PETERSON PROPERTY	2516 7TH AVE E	NORTH ST. PAUL	55109	Ramsey	0.49	SW	During a site assessment on 1/31/08 a release of fuel oil 1 & 2 was observed. The tank was rusted through in very poor condition. Groundwater contamination occurred and it is unknown whether contaminated soils or offsite contamination remains. Site closure occurred on 8/11/09.
33	Site Response Section Database	MNSRS	VP26580	Peterson Property	2516 SEVENTH AVENUE EAST	NORTH ST. PAUL	55109	Ramsey	0.49	SW	No EPA ID # Reported
33	Voluntary Investigation and Cleanup Program Sites	MNVICP	VP26580	Peterson Property	2516 SEVENTH AVENUE EAST	NORTH ST. PAUL	55109	Ramsey	0.49	SW	No EPA ID # Reported
34	Registered Leaking Storage Tanks	MNLUAST	4353	RICHARDSON ELEMENTARY SCHOOL	2615 1ST ST	NORTH ST. PAUL	55109	Ramsey	0.51	West	A release of fuel oil 1 & 2 was observed on 8/7/91. No groundwater contamination occurred. From 1/1/91 to 9/30/91 153 tons of soil was treated by a thermal treatment. It is unknown whether contaminated soils remains and no offsite contamination remains. The site received closure on 8/20/93.

Not included in the report summary of locatable sites (pages 13 to 16 of GeoSearch report) however included later in GeoSearch report (Pages 17 to 191 of GeoSearch report)
Included in the report summary of locatable sites (pages 13 to 16 of GeoSearch report) however not included later in GeoSearch report (Pages 17 to 191 of GeoSearch report)

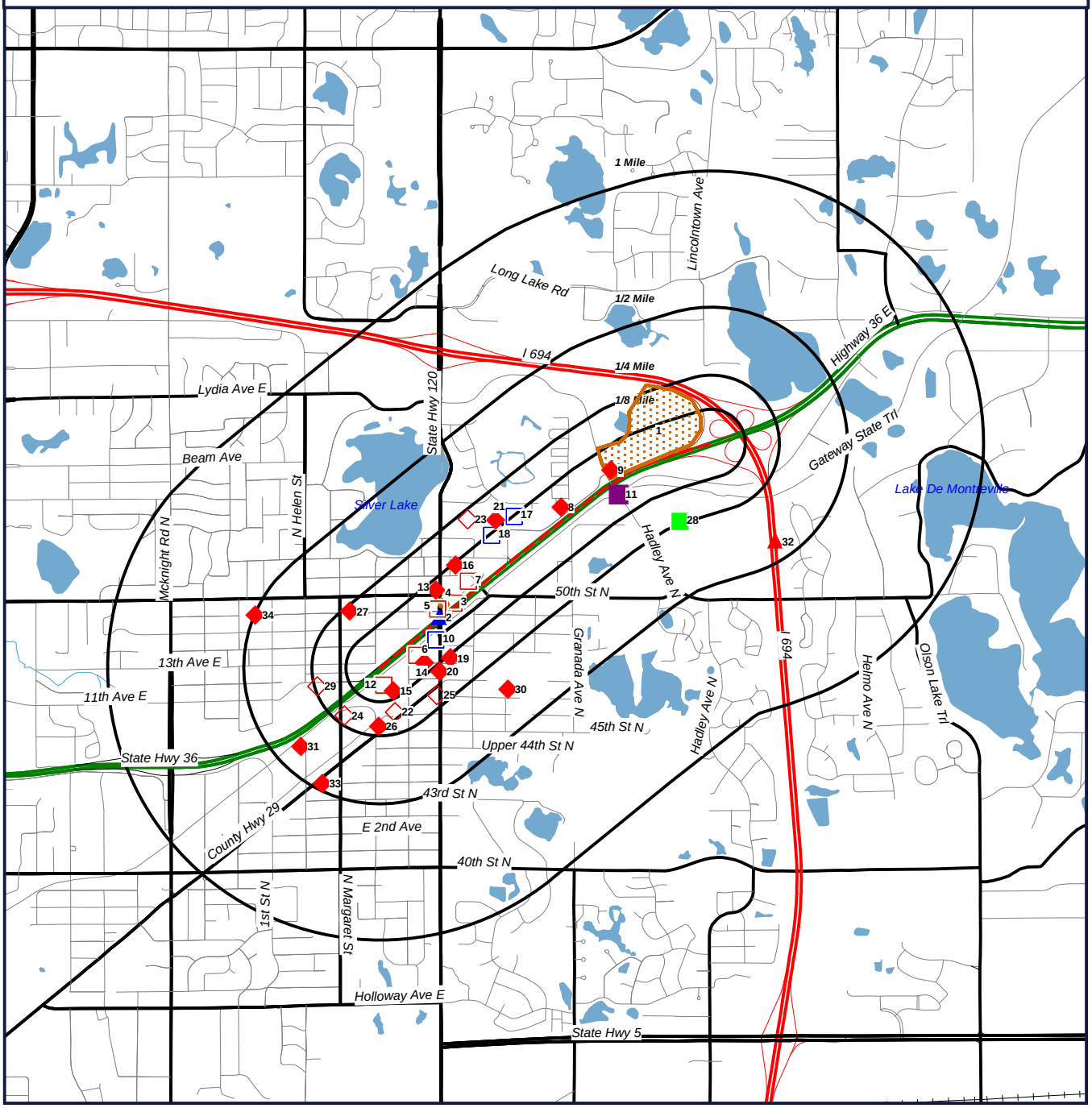
Summary of Tanks
TH36 Corridor from TH120 to I-694

UAST ID	Distance	Tank No.	Tank Status	Tank Contents	AST or UST
17528	0.01 NW	006	active	10000 gasoline	UST
		001	removed	1000 motor oil	UST
		005	active	10000 gasoline	UST
		002	removed	1000 motor oil	UST
		004	active	10000 gasoline	UST
		007	active	10000 gasoline	UST
		003	active	1000 used or waste oil	UST
		009	active	10000 kerosene	UST
		008	active	10000 diesel	UST
		010	active	10000 gasoline	UST
		1001	active	280 motor oil	AST
		1002	active	280 motor oil	AST
		011	active	15000 gasoline	UST
		012	active	15000 gasoline	UST
		013	active	15000 gasoline	UST
		014	active	15000 gasoline	UST
3819	0.04 NW	006	active	4000 gasoline	UST
		005	active	4000 gasoline	UST
		004	active	4000 gasoline	UST
		001	removed	3000 gasoline	UST
		002	removed	4000 gasoline	UST
		007	active	4000 gasoline	UST
		003	removed	3000 diesel	UST
10238	0.05 SE	001	temp closed	12000 alcohol blend	UST
		002	temp closed	10000 alcohol blend	UST
		003	temp closed	10000 alcohol blend	UST
52684	0.01 S	1001	active	275 'other substance'	AST
20954	0.11 S	003	removed	3000 gasoline	UST
		946	active	12000 gasoline	UST
		883	active	12000 diesel	UST
4283	0.16 NW	001	removed	10000 diesel	UST
		1001	active	265 diesel	AST
54363	0.18 S	1001	active	250 used or waste oil	AST
4308	0.22 NW	003	removed	10000 diesel	UST
		001	removed	2000 fuel oil	UST
		004	removed	2000 gasoline	UST
		002	removed	2000 used or waste oil	UST
		1001	active	2000 diesel	AST

UAST ID	Distance	Tank No.	Tank Status	Tank Contents	AST or UST
4036	0.02 NW	001	removed	6000 gasoline	UST
		004	removed	550 used or waste oil	UST
		002	removed	10000 gasoline	UST
		003	removed	10000 gasoline	UST
12645	0.02 NW	004	removed	12000 gasoline	UST
		003	removed	12000 gasoline	UST
		002	removed	12000 gasoline	UST
		001	removed	12000 diesel	UST
12377	0.04 NW	003	deleted	4000 gasoline	UST
		004	deleted	4000 gasoline	UST
		001	deleted	4000 gasoline	UST
		002	deleted	4000 gasoline	UST
17618	0.09 NW	001	removed	10000 gasoline	UST
		003	removed	unregulated	UST
		002	removed	5000 gasoline	UST
3736	0.1 S	117	removed	10000 gasoline	UST
		116	removed	10000 diesel	UST
		1	removed	5000 gasoline	UST
		2	removed	5000 diesel	UST
		3	removed	560 used or waste oil	UST
3441	0.22 SW	003	active	12000 gasoline	UST
		002	active	10000 gasoline	UST
		001	active	10000 gasoline	UST
		004	active	12000 gasoline	UST
3627	0.22 SE	003	active	6000 gasoline	UST
		006	active	6000 gasoline	UST
		001	active	10000 gasoline	UST
		004	active	6000 diesel	UST
		005	active	4000 kerosene	UST
		002	active	10000 gasoline	UST
13778	0.23 NW	001	removed	6000 fuel oil	UST
		2	removed	10000 diesel	UST
		1	active	5000 fuel oil	UST
3634	0.25 W	113	removed	12000 fuel oil	UST
		001	removed	8000 fuel oil	UST
		002	active	6000 fuel oil	UST
11608	0.12 NW	001	active	3000 fuel oil	UST
18162	0.16 S	001	removed	2000 fuel oil	UST

Notes:
Distance - distance and direction from the TH36 corridor area.
AST - Aboveground Storage Tank
UST - Underground Storage Tank

RADIUS MAP



Target Property (TP)

- HWGS
- PCASPILLS
- TIERII
- UAST
- FRSMN
- RCRAGR05
- AGSPILLS
- PCASPILLS
- RCRAGR05
- LUAST
- LUAST
- NLRRCRAG
- WDP
- UAST
- BULKSTORAGE
- AGSPILLS

TH36 Corridor from TH120 to I-694
TH36 from TH120 to I-694
Oakdale, Minnesota
55109

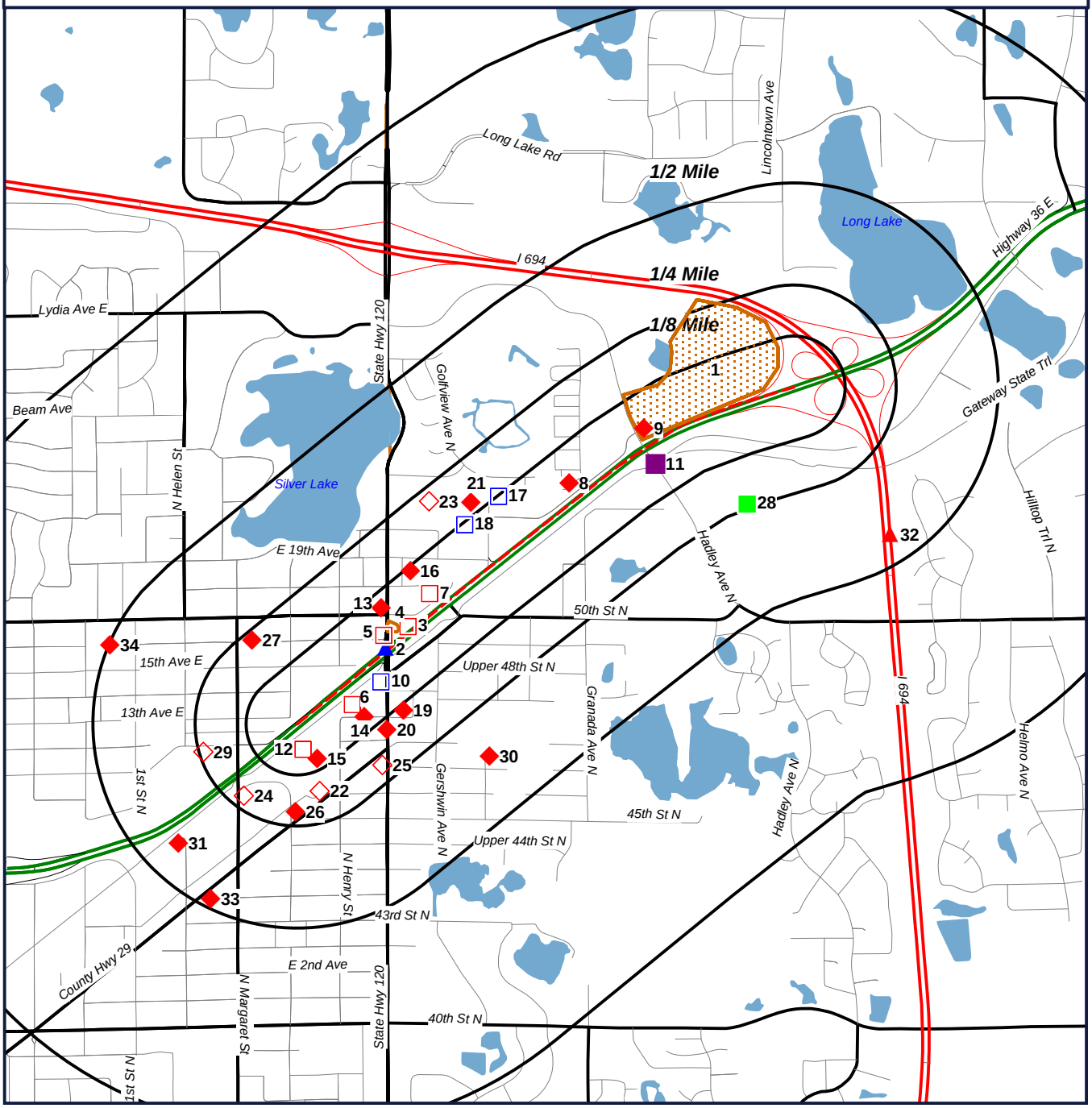
N W E S

0' 1500' 3000' 4500'
SCALE: 1" = 3000'

GeoSearch www.geo-search.com - phone: 888-396-0042 - fax: 512-472-9967

JOB #: 58849 - 6/10/2013

RADIUS MAP



Target Property (TP)

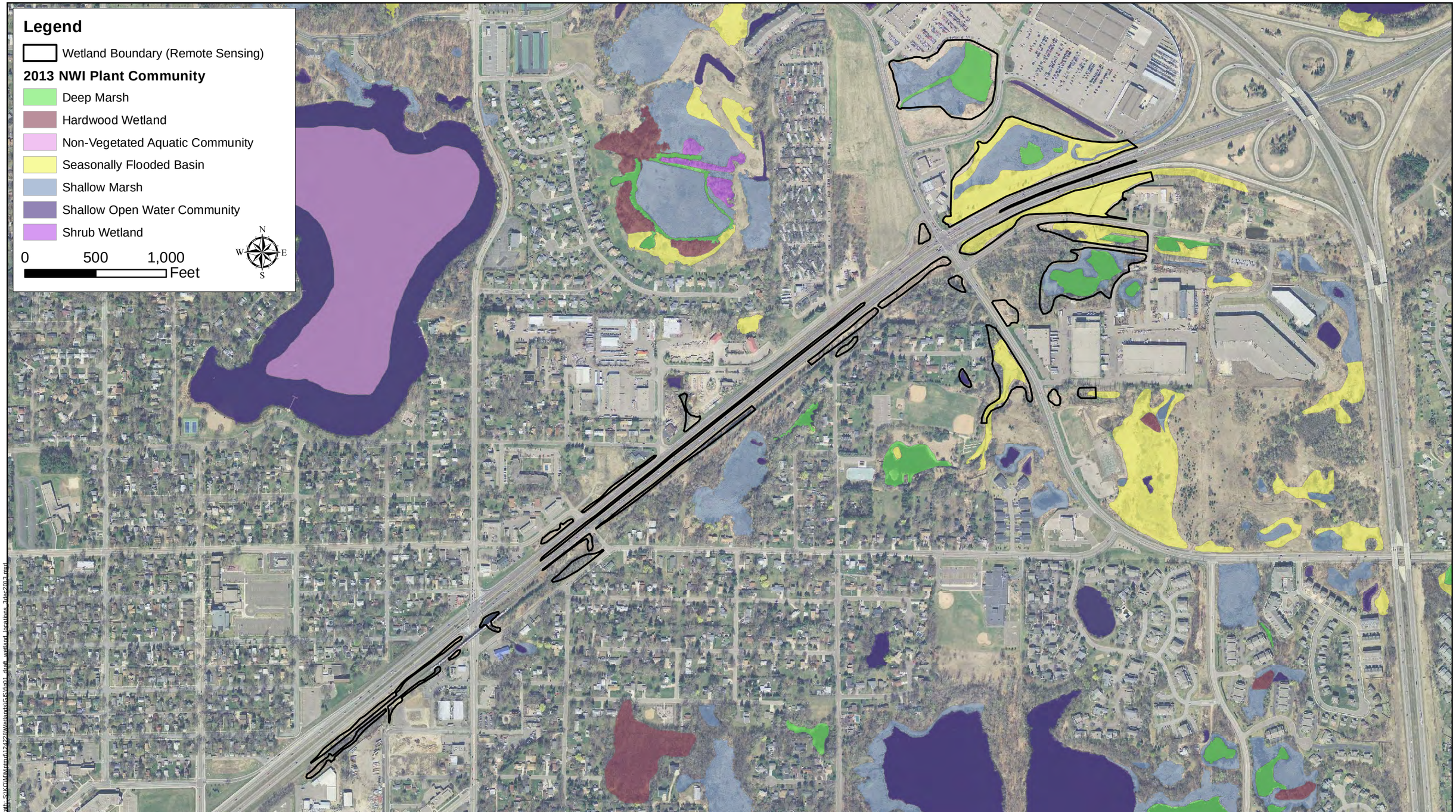
HWGS	RCRAGR05
PCASPILLS	LUAST
TIERII	LUAST
UAST	NLRRCRAG
FRSMN	WDP
RCRAGR05	UAST
AGSPILLS	BULKSTORAGE
PCASPILLS	AGSPILLS

TH36 Corridor from TH120 to I-694
TH36 from TH120 to I-694
Oakdale, Minnesota
55109

N
W E
S

0' 1000' 2000' 3000'
SCALE: 1" = 2000'

Study Area Wetland Map



Path: S:\KO\M\mntmd124228\Wetlands\GIS\fig01_draft_wetland_locations_3dec2013.mxd

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Project: MNTMD 124228
Print Date: 12/3/2013

Map by: bpt
Projection: NAD83 UTM15N
Source: MnDNR, SEHINC
Background: MnDNR 2012

WETLAND LOCATIONS (DRAFT)

Ramsey and Washington Counties, Minnesota

Figure 1

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.

APPENDIX C – HIGHWAY 36 CORRIDOR STUDY REPORT

Trunk Highway 36 – Alternatives Development and Screening Technical Memorandum (September 5, 2013)

Interchange Alternatives Traffic Analysis Memorandum (December 23, 2013)

TECHNICAL MEMORANDUM

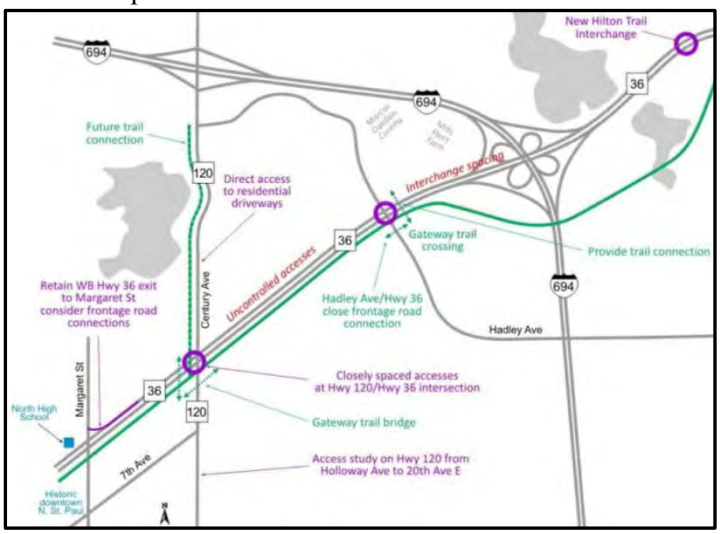
TO: Karen Scheffing
MnDOT Project Manager

FROM: Mark Benson, P.E.
Bob Rogers, AICP

DATE: September 5, 2013

RE: Trunk Highway (TH) 36 Corridor Study – Conceptual Design and Screening Process

This technical memorandum summarizes the conceptual design and screening process used in the development of preliminary concept designs for intersection improvements to TH 36 at TH 120 (Century Avenue) and Hadley Avenue/CSAH 35.



The scope of this task included the development of ten high level conceptual alternatives (with several design options). Furthermore, a high level comparative evaluation of the conceptual alternatives was conducted in order to identify three preferred concepts that will be further refined and evaluated as part of the corridor study.

Development of Concept Alternatives

The TH 36 Project Management Team (PMT), which is comprised of representatives from MnDOT, FHWA, Met Council, MNDNR, Ramsey and Washington Counties, the cities of Oakdale and North St. Paul, and SEH (the study consultant), recommended the conceptual improvements be grouped into four primary categories: 1) at-grade alternatives; 2) two interchange alternatives (at both TH 120 and Hadley Ave.); 3) single interchange alternatives (at TH 120 or Hadley Ave); and 4) combined interchange alternatives. The conceptual alternatives for each of the four primary categories are described below and depicted in Appendix A:

1. At-Grade Alternatives
   - A1: Conventional Intersections with Added Capacity – this alternative would maintain the existing signal system while adding and/or extending turn lanes at both the TH 120 and Hadley Avenue intersections, whereby providing the necessary capacity to maintain traffic operations at the existing (2013) level.
   - A2: Bow-Tie Controlled Intersection – this alternative would maintain the existing signal system while displacing left turns off TH36 to the local system. The roundabout intersection both north and south of TH 36 (on TH 120 and Hadley Ave) would be used to accommodate the movements.
   - A3: Median U-Turn Controlled Intersection – this alternative would maintain the existing signal system and require two additional signals near each intersection. Left turns would be displaced from the main intersection and redirected to the "U-Turn" point on either side of the main intersection. The median u-turns would have to be signalized.

2. Two Interchange Alternatives
    - T1: Diamond Interchange at both TH 120 and Hadley Avenue – this alternative would grade separate TH 36 from TH 120 and Hadley Avenue providing full access via a diamond interchange configuration at both intersections.
    - T2: Diamond Interchange at TH 120 and Folded Diamond (to the west) at Hadley Avenue – this alternative would grade separate TH 36 from both TH 120 and Hadley Avenue. Full access at TH 120 would be provided in the same configuration as described in Alternative T1. Full access at Hadley Avenue would be provided via a folded diamond interchange configuration.
    - T3: Hybrid Folded Diamond at TH 120 and Folded Diamond at Hadley Avenue – this alternative would grade separate TH 36 from both TH 120 and Hadley Avenue. Full access would be provided in the same configuration at Hadley Avenue as described in Alternative T2. Full access at TH 120 would be provided by various configurations of diamond and loop ramps in the interchange quadrants (i.e. loops and ramps in NW and SE quadrants or loops and ramps in NE and SW quadrants).
3. Single Interchange Alternatives
    - S1: Folded Diamond Interchange only at Hadley Avenue – this alternative would grade separate both TH 120 and Hadley Avenue; however direct access to TH 36 would only be provided via a folded diamond interchange configuration at Hadley Avenue an additional local collector (frontage) road would be needed to collect and distribute traffic between TH 120 and Hadley Avenue on both the north and south sides of TH36.
    - S2: Diamond Interchange only at TH 120 – this alternative would grade separate both TH 120 and Hadley Avenue, however direct access to TH 36 would only be provided via a diamond interchange configuration at TH 120. Additional local collector (frontage) roads would be needed to collect and distribute traffic between TH 120 and Hadley Avenue.
4. Combined Interchange Alternatives
    - C1: Modified Split Diamond – this alternative would grade separate both TH 120 and Hadley Avenue. Access to TH 36 would be split between the two intersections with TH 120 accommodating the eastbound exit ramp and westbound entrance ramp while Hadley Avenue would accommodate the westbound exit ramp and eastbound entrance ramp. Additional local collector (frontage) roads would be needed to collect and distribute traffic between TH 120 and Hadley Avenue.
    - C2: Button Hooks – this alternative would grade separate both TH 120 and Hadley Avenue. Access to TH 36 would be provided by button hook ramps at Hadley Avenue for westbound traffic and button hook ramps would be located approximately 1,500-feet east of TH 120 for eastbound traffic. Additional local collector (frontage) roads would be needed on both the north and south sides of TH 36 to collect and distribute traffic between TH 120 and Hadley Avenue.

It should be noted that other local street improvements (realignments, access closures, intersection modifications) would be needed with several of the conceptual alternatives. In addition, all alternatives involving grade separation (interchanges) would also include the closure of existing at-grade access points on TH 36 at 50th Street and Upper 51st Street N/Glenbrook Ave and a private drive near Hadley.

Evaluation of Concept Alternatives

The ten conceptual alternatives considered were evaluated based on a set of screening criteria that considered a range of impacts on the local and regional transportation system as well as potential social and environmental issues. The alternatives screening matrix, see Table 1 on the following page, provides a comparative assessment of the concept alternatives against the other alternatives considered. Information from the PMT members along with professional judgments and public input gathered at a public open house meeting held on July 17, 2013 was used to complete the evaluation/screening matrix.

Recommendations for Alternatives to be Further Considered in the TH 36 Corridor Study

A meeting held between MnDOT and the Metropolitan Council on August 19, 2013 confirmed that the long-term vision for TH 36 would be an access controlled freeway with appropriately spaced grade separated interchanges inside the I-694 beltway.

This joint agency decision helped define the recommendations for alternatives that will be further considered in the remainder of the TH 36 Corridor Study process. As a result, the at-grade alternatives will not be further evaluated as part of this study because they do not achieve the long-term vision. However, if crash/severity rates warrant an interim improvement these options will be revisited.

The study partners (PMT representatives) discussed and evaluated the various conceptual interchange alternatives considered. Below is a summary of the reasons for dismissing certain alternatives and recommending others be retained for further consideration:

- PMT Dismissed Alternatives:
  - T1: this two interchange alternative was dismissed because a diamond configuration at Hadley Ave. would place the TH 36 westbound exit and eastbound entrance ramps too close to the I-694 system interchange.
  - S1: this single interchange alternative was dismissed because it is not consistent with regional planning in that Hadley Ave. is not an arterial roadway while TH 120 is an arterial.
  - C1 and C2: the combined interchange alternatives were dismissed due to lack of local support and impacts to the natural and built environments (i.e. wetlands, Gateway Trail corridor, and residential/commercial developments) caused by having to develop a parallel frontage road on each side of TH 36.
- PMT Retained Alternatives:
  - S2: this single interchange alternative is retained and will be further developed including the creation of a continuous frontage/local road system to connect Hadley Ave. to TH 120.
  - T2/T3: these alternatives include interchanges at both TH 120 and Hadley Ave. Further input from the PMT will help refine this to a single option including the design configurations and any modifications needed to the local street system (intersections, road closures, access changes, etc.).
  - T4: this new two interchange concept will investigate opportunities to eliminate some access (removal of a particular ramp or two) at TH 120 and/or Hadley Ave.

Table 1 – Truck Highway 36 Alternatives Screening Matrix

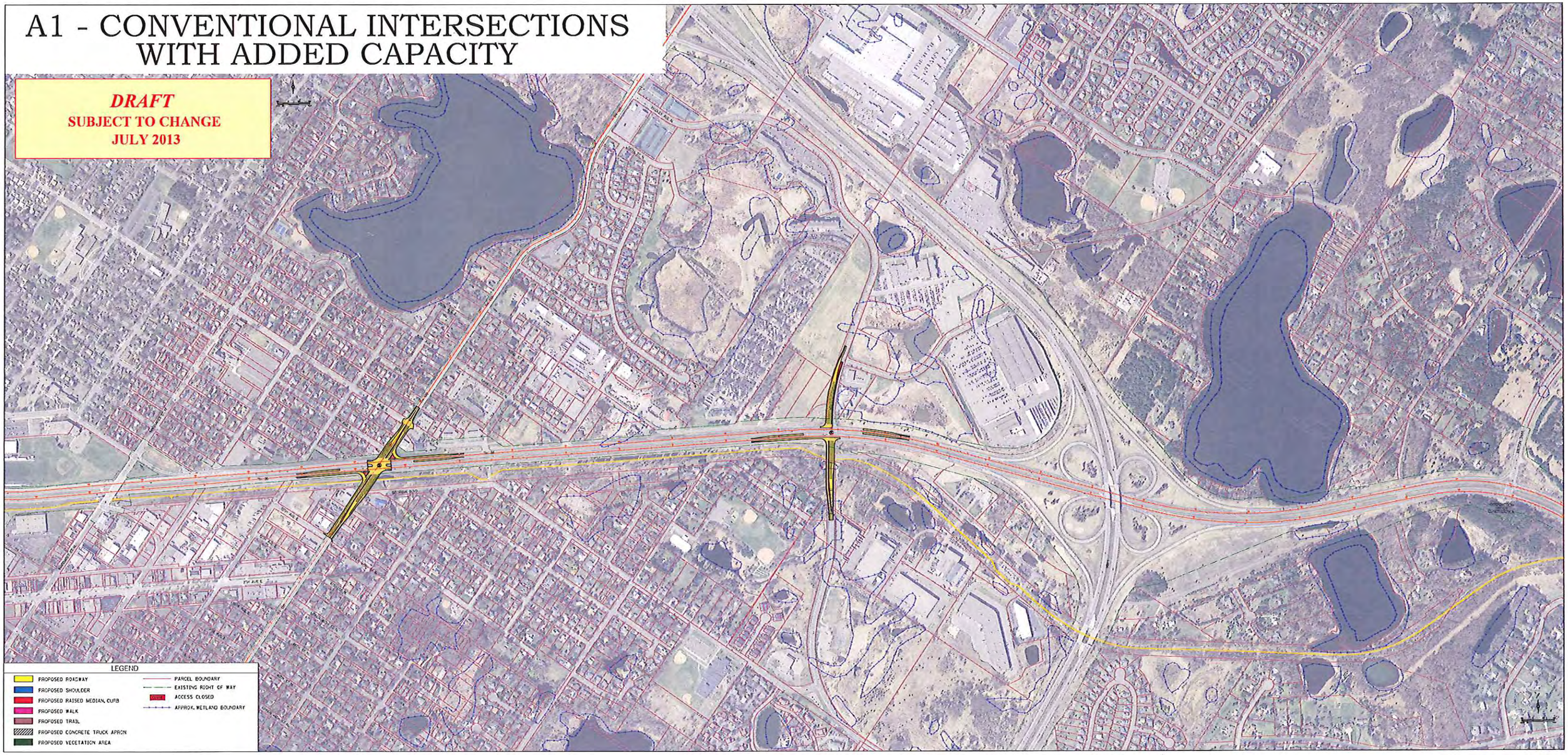
Conceptual Alternatives		Evaluation/Screening Criteria							
		Supports Regional System Planning	**Highway 36 Safety Conditions**	**TH 36 Traffic Operations (Weave Distance, Queuing, LOS)**	**Site Access and Local Circulation (Directness/Travel Time)**	**Right-of-Way Impacts**	**Environmental Impacts**	**Gateway Trail (Safety/Operations)**	**RETAIN/DISMISS ALTERNATIVE?**
At-Grade Alternatives	A1: Conventional Intersections With Added Capacity	Does not achieve long-range vision of removing all signals on TH 36 within I-694 beltway.	No change	Similar to existing	Site access similar to existing conditions Minimal impact on existing travel patterns	Minimal	Minimal	Minimal Impact	The at-grade options will not be further evaluated as part of this study because they do not achieve the freeway vision for TH 36. However, at-grade alternatives may be a viable short-term approach if improvements are warranted before a long-term solution can be funded/implemented
	A2: Bow-Tie Controlled Intersections	Does not achieve long-range vision of removing all signals on TH 36 within I-694 beltway.	Rear end crashes would remain. Displaced left turns should reduce crash severity. Concerns with left turn compliance.	Moderate improvements	Indirect and non-intuitive traffic movements. Minimal impact on existing travel patterns.	Minimal	Minimal	Minimal Impact	
	A3: Median U-Turn Controlled Intersection at TH 120	Does not achieve long-range vision of removing all signals on TH 36 within I-694 beltway. Inconsistent with MnPASS operations.	Rear end crashes would remain. Left turn compliance concerns.	Moderate improvements	Indirect and non-intuitive traffic movements. Minimal impact on existing travel patterns.	Minimal	Minimal	Minimal Impact	
Two Interchange Alternatives	T1: Diamond Interchanges at both TH 120 and Hadley Ave.	Consistent with freeway vision Interchange spacing guidelines are not met. Hadley Ave is not an arterial.	Removes two signals on TH 36. Weave concerns due to close ramp spacing.	Easterly ramps at Hadley Ave. are too close to I-694. Weave concern between TH 120 and Hadley Ave.	Maintains site accessibility. Closely spaced intersections on TH 120. Minimal impact on existing travel patterns.	Major	Wetland Impacts at Hadley Ave.	Impacts at Hadley Ave.	Dismiss – inadequate ramp spacing between Hadley Ave. and I-694
	T2: Diamond Interchange at TH 120 and Folded Diamond at Hadley Ave.	Consistent with freeway vision. Interchange spacing guidelines are not met. Hadley Ave is not an arterial.	Removes two signals on TH 36 Weave concerns due to close ramp spacing.	Better weave distance with I-694. Weave concern between TH 120 and Hadley Ave.	Maintains site accessibility. Closely spaced intersections on TH 120. Minimal impact on existing travel patterns.	Moderate Undeveloped property exists for folded diamond interchange at Hadley Ave.	Minimal	Impacts at Hadley Ave.	Retain – With further input from the cities a refined alternative will be developed that provides full access at both locations. An additional alternative with elimination of some access at both locations will also be investigated.
	T3: Hybrid Folded Diamond at TH 120 and Folded Diamond at Hadley Ave.	Consistent with freeway vision. Interchange spacing guidelines are not met. Hadley Ave is not an arterial.	Removes two signals on TH 36. Weave concerns due to close ramp spacing.	Better weave distance with I-694. Weave concern between TH 120 and Hadley Ave.	Maintains site accessibility Closely spaced intersections on TH 120. Minimal impact on existing travel patterns.	Major Undeveloped property exists for folded diamond interchange at Hadley Ave.	Minimal	Impacts at TH 120 and Hadley Ave.	

Conceptual Alternatives		Evaluation/Screening Criteria							
		Supports Regional System Planning	**Highway 36 Safety Conditions**	**TH 36 Traffic Operations (Weave Distance, Queuing, LOS)**	**Site Access and Local Circulation (Directness/Travel Time)**	**Right-of-Way Impacts**	**Environmental Impacts**	**Gateway Trail (Safety/Operations)**	**RETAIN/DISMISS ALTERNATIVE?**
Single Interchange Alternatives	S1: Folded Diamond Interchange at Hadley Ave. with overpass at TH 120	Inconsistent with regional planning, TH 120 the arterial route is not served, Hadley Ave is not an arterial roadway and has full access.	Removes two signals on TH 36.	Demand can be served at a single TH 36 interchange.	Indirect access at TH 120. Local road system will have to be expanded to provide the necessary connectivity. North Saint Paul has significant concerns with local access and circulation.	Moderate Undeveloped property exists for folded diamond interchange at Hadley Ave. Additional R/W needed for FR connection between TH 120 and Hadley.	Moderate; the impact of creating a frontage/local road system to connect Hadley Ave to TH 120 has not been assessed.	Impacts at Hadley Ave.	Dismiss Not consistent with regional planning
	S2: Diamond Interchange at TH 120 with overpass at Hadley Ave.	Consistent with regional planning since TH 120 is an arterial roadway.	Removes two signals on TH 36.	Demand can be served at a single TH 36 interchange. Some regional traffic would likely shift to the local roadway system.	Indirect access at Hadley Ave. Local road system will have to be expanded to provide the necessary connectivity. Closely spaced intersections on TH 120. Does not address emergency services access to the east. Oakdale has significant concerns since this does not comply with local land use plans for maintaining access at Hadley Ave.	Moderate Additional R/W needed for FR connection between TH 120 and Hadley.	Moderate; the impact of creating a frontage/local road system to connect Hadley Ave to TH 120 has not been assessed.	Minimal	Retain Need to further evaluate impacts and feasibility of creating a frontage/local road connection between Hadley Ave and TH 120
Combined Interchange Alternatives	C1: Modified Split Diamond	Consolidates access to one set of on ramps and one set of off ramps.	Removes two signals on TH 36.	Demand can be served with a combined interchange. Some regional traffic would likely shift to the local system.	Local road system will have to be expanded to provide the necessary connectivity. Less direct traffic movements. North Saint Paul and Oakdale have significant concerns with local access and circulation.	Moderate Additional R/W needed for FR connection between TH 120 and Hadley.	Moderate; the impact of creating a frontage/local road system to connect Hadley Ave to TH 120 has not been assessed.	Moderate; would require relocation of Gateway Trail between TH 120 and Hadley Ave.	Dismiss No local support. Impacts to Gateway Trail.
	C2: Button Hooks	Consolidates access to one set of on ramps and one set of off ramps.	Removes two signals on TH 36.	Demand can be served with a combined TH 36 interchange. Some regional traffic would likely shift to the local system.	Local road system will have to be expanded to provide the necessary connectivity. Less direct traffic movements. North Saint Paul and Oakdale have significant concerns with local access and circulation.	Major Additional R/W needed for FR connection between TH 120 and Hadley. R/W impacts to residential area south of TH 36.	Moderate; the impact of creating a frontage/local road system to connect Hadley Ave to TH 120 has not been assessed.	Moderate; would require relocation of Gateway Trail between TH 120 and Hadley Ave.	Dismiss No local support. Impacts to Gateway Trail. Wetland impacts. R/W impacts.

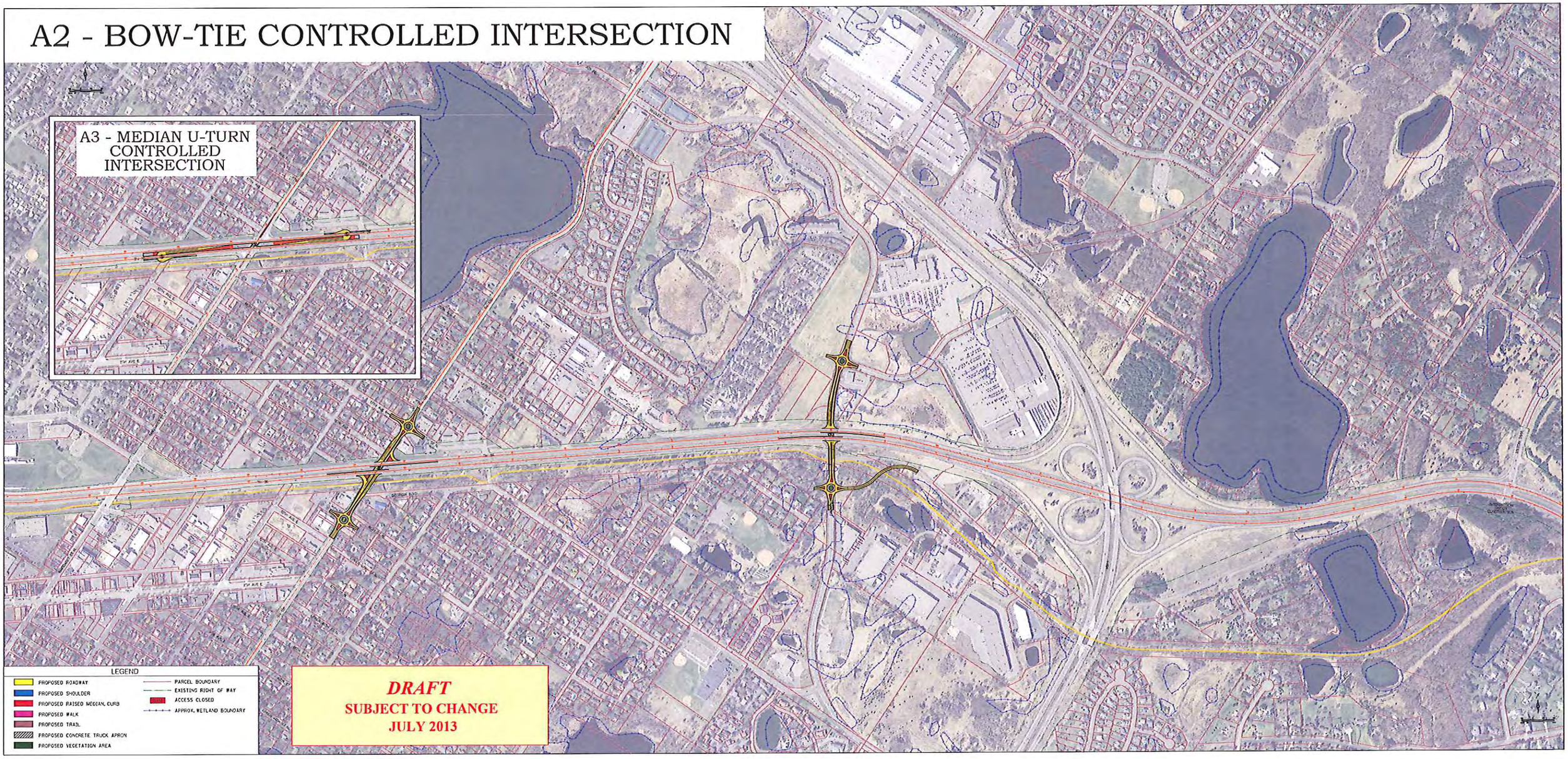
Tech Memo: Appendix A

TH 36 Corridor Study – Conceptual Alternatives

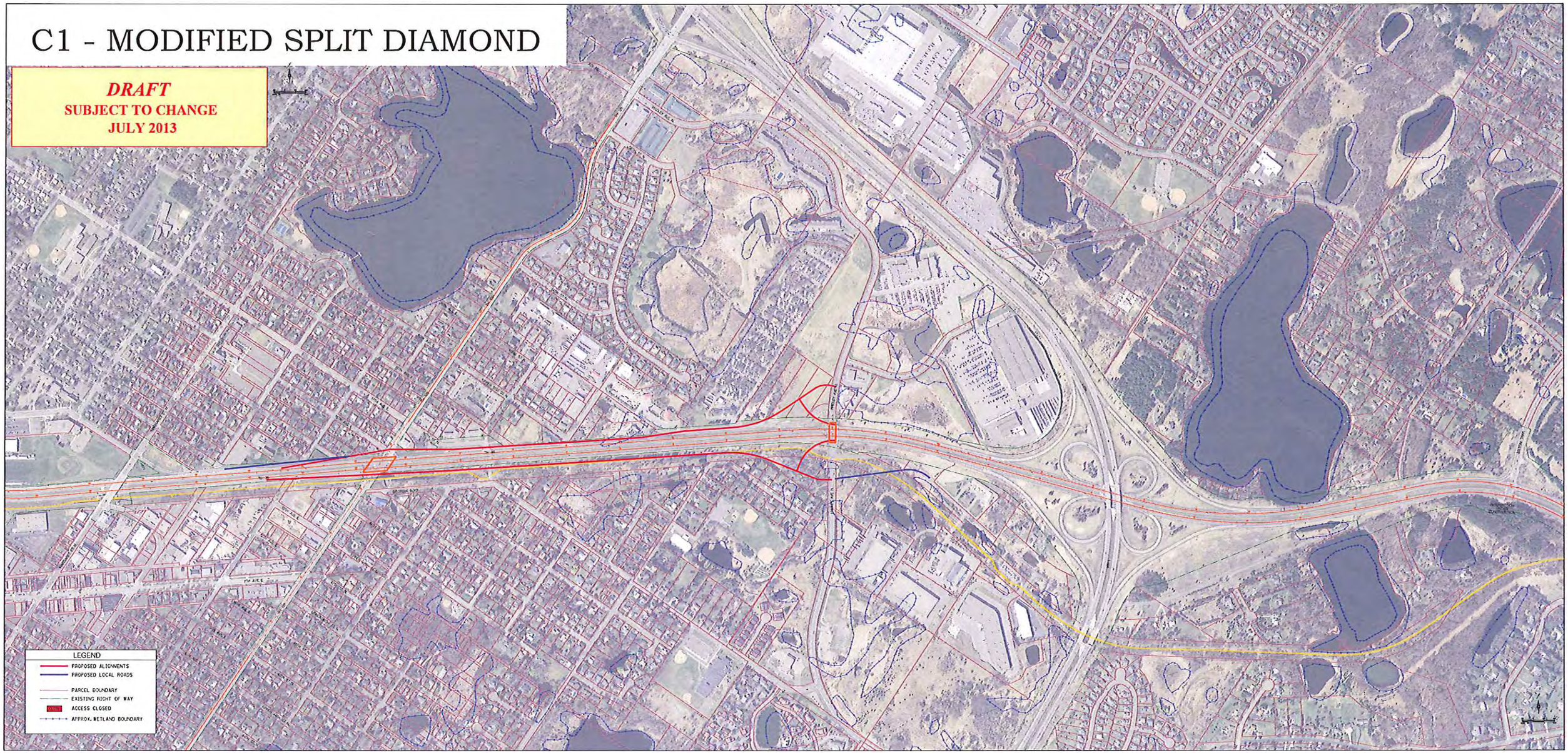
A1 - CONVENTIONAL INTERSECTIONS WITH ADDED CAPACITY



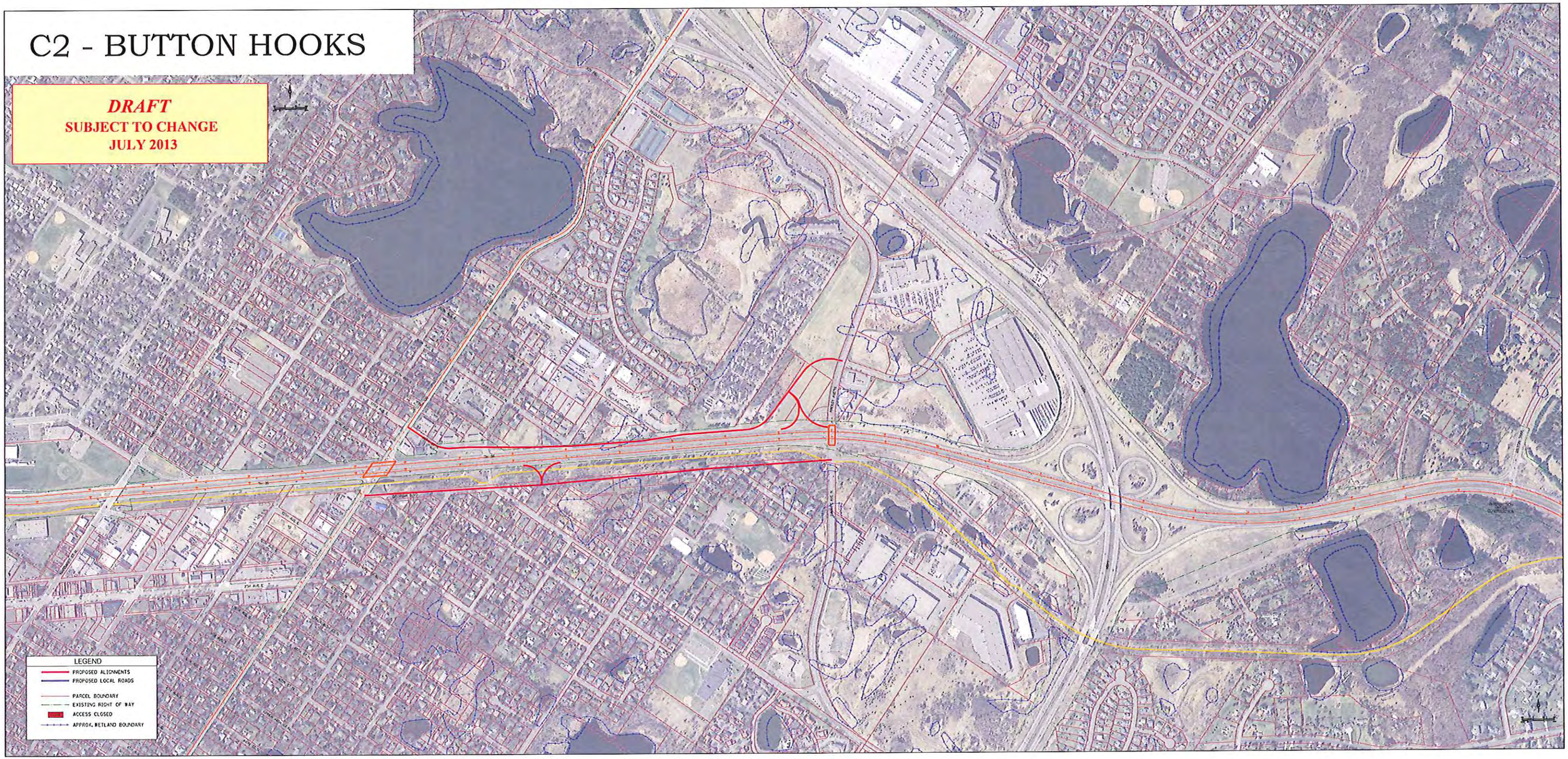
A2 - BOW-TIE CONTROLLED INTERSECTION



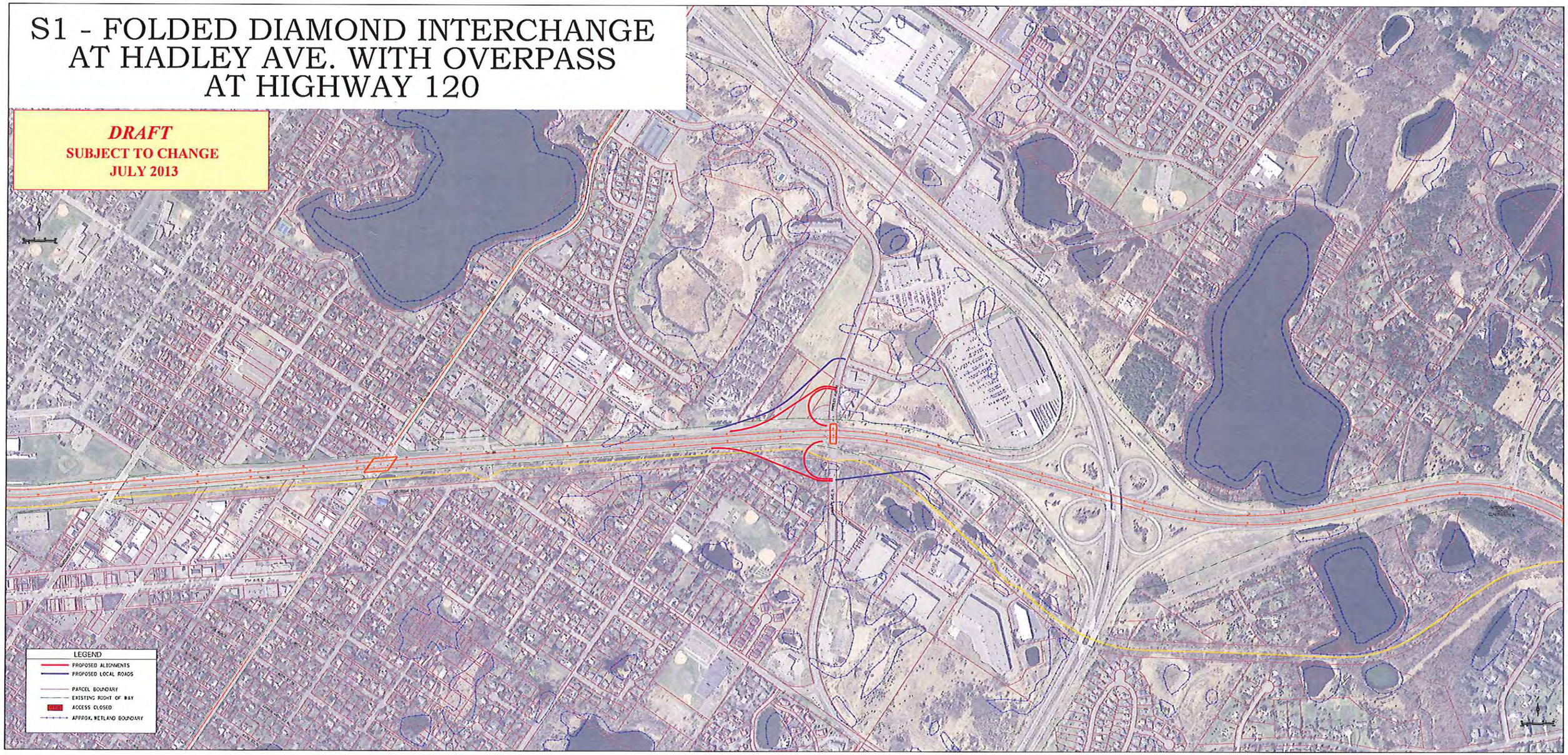
C1 - MODIFIED SPLIT DIAMOND



C2 - BUTTON HOOKS

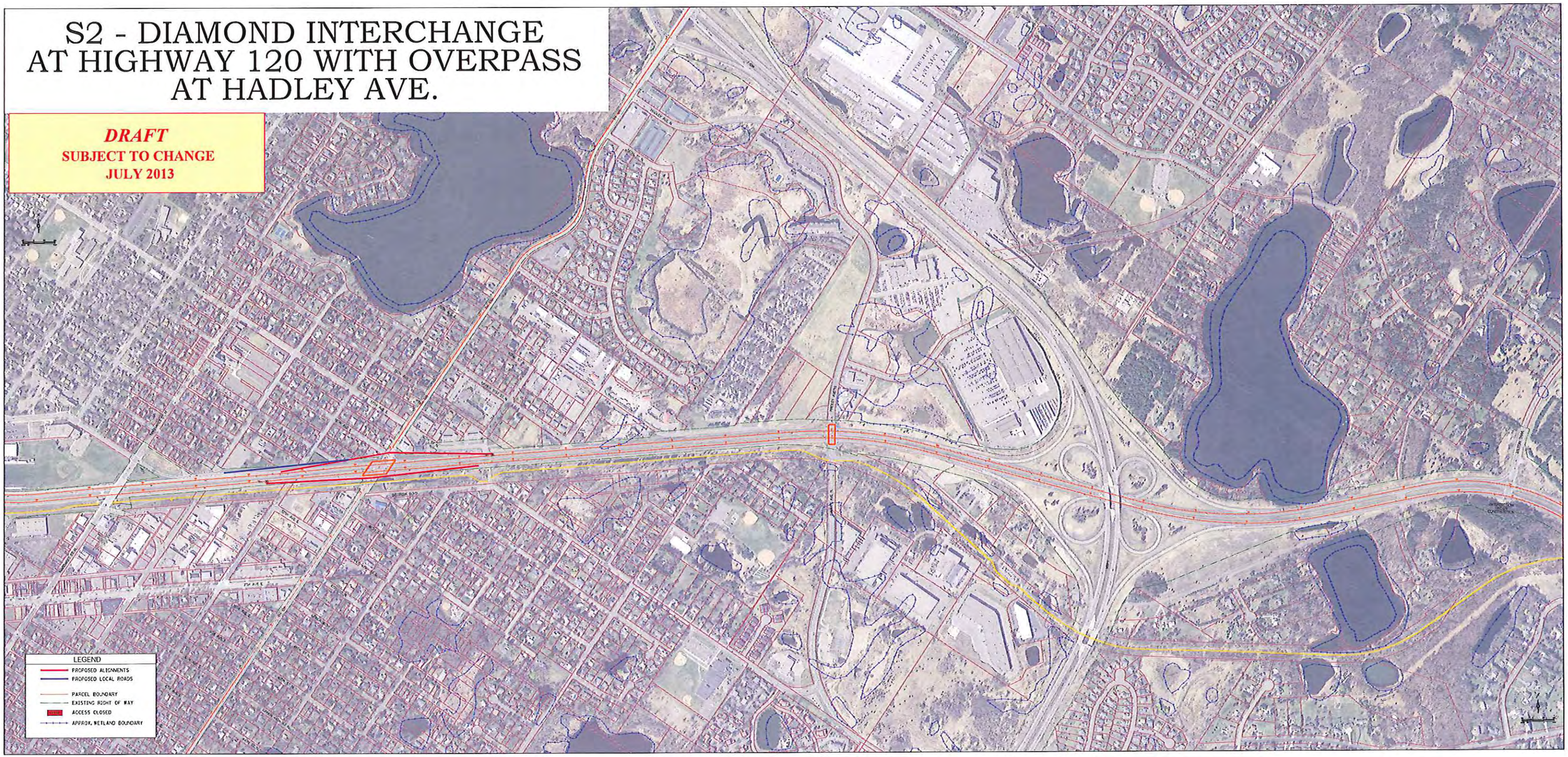


S1 - FOLDED DIAMOND INTERCHANGE AT HADLEY AVE. WITH OVERPASS AT HIGHWAY 120



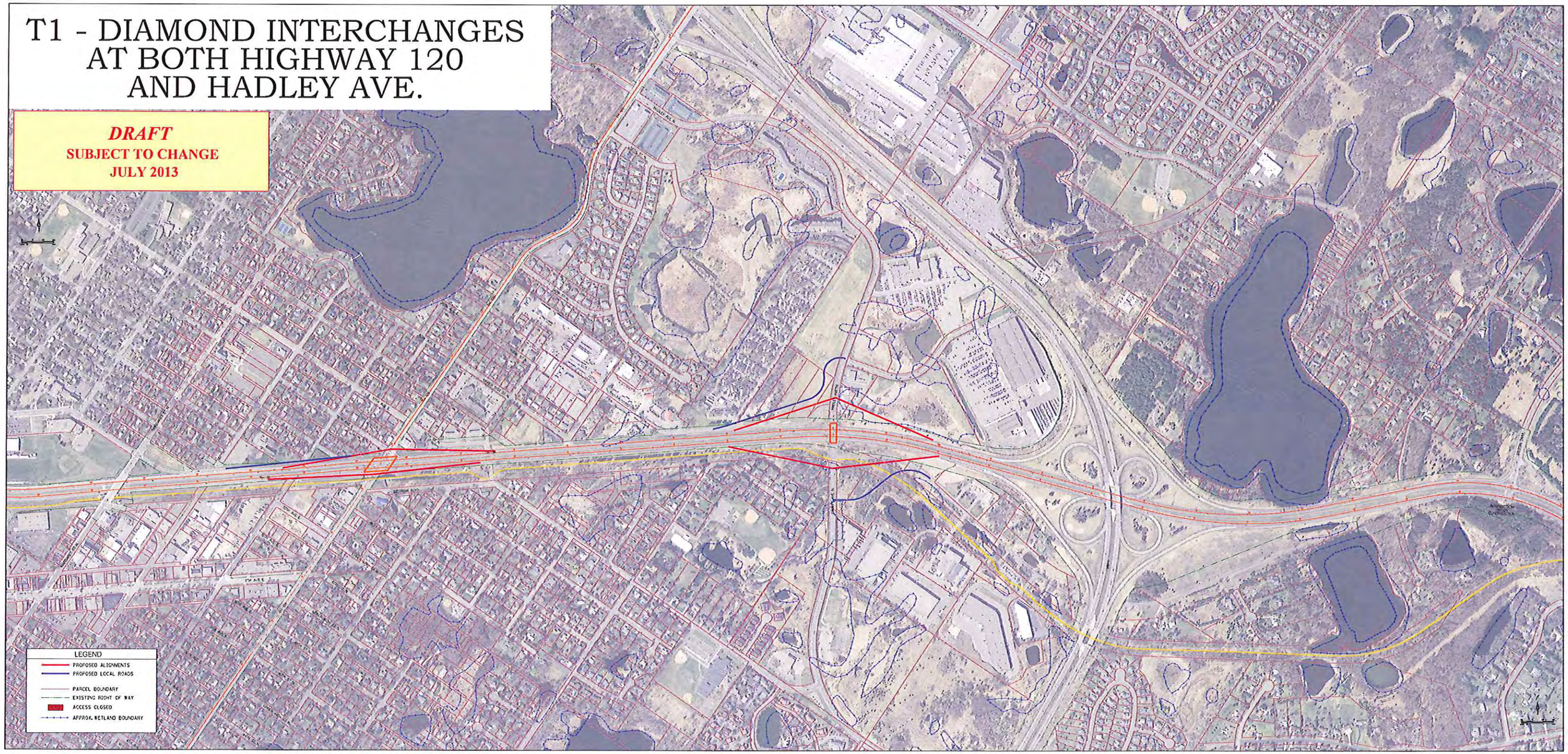
S2 - DIAMOND INTERCHANGE AT HIGHWAY 120 WITH OVERPASS AT HADLEY AVE.

DRAFT
SUBJECT TO CHANGE
JULY 2013

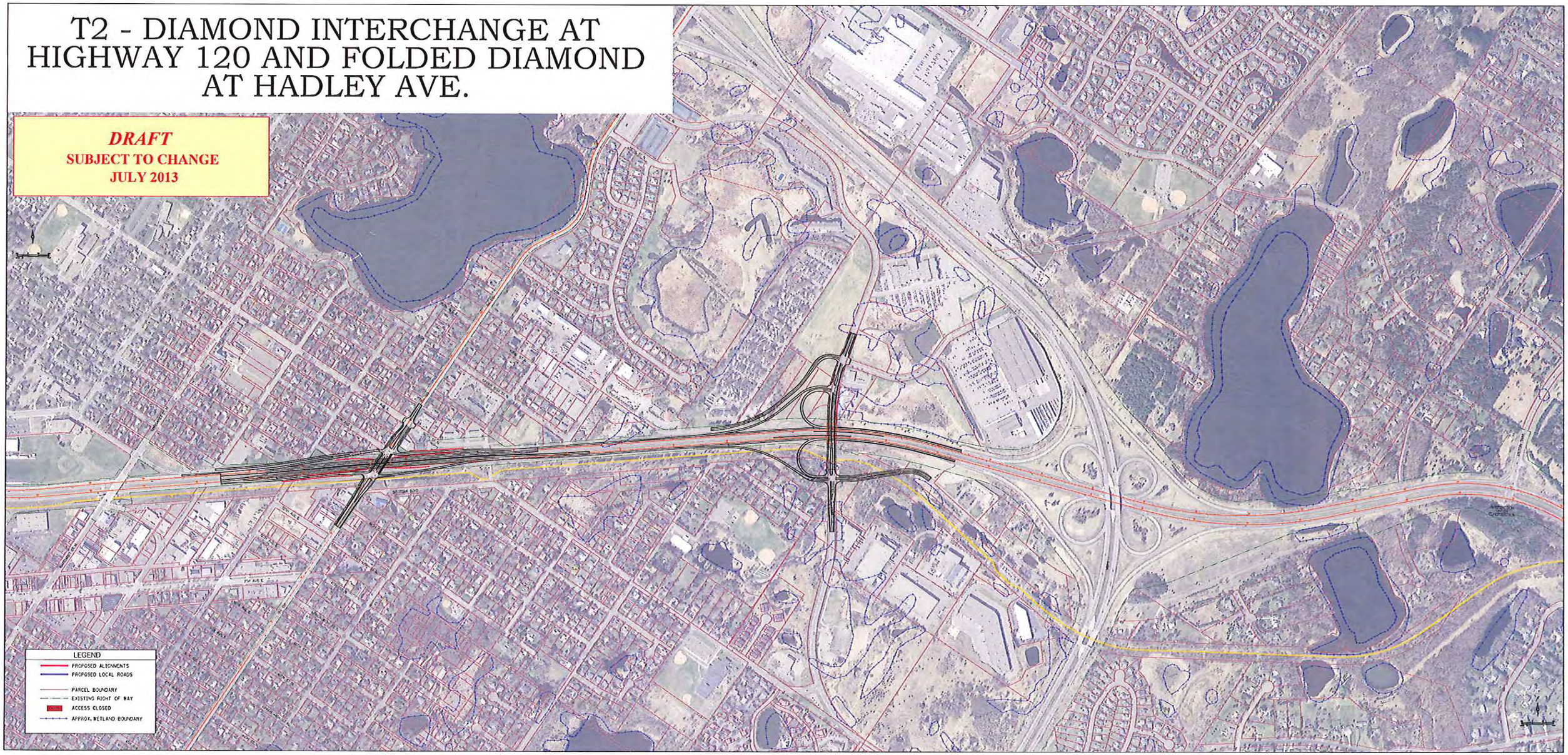


T1 - DIAMOND INTERCHANGES AT BOTH HIGHWAY 120 AND HADLEY AVE.

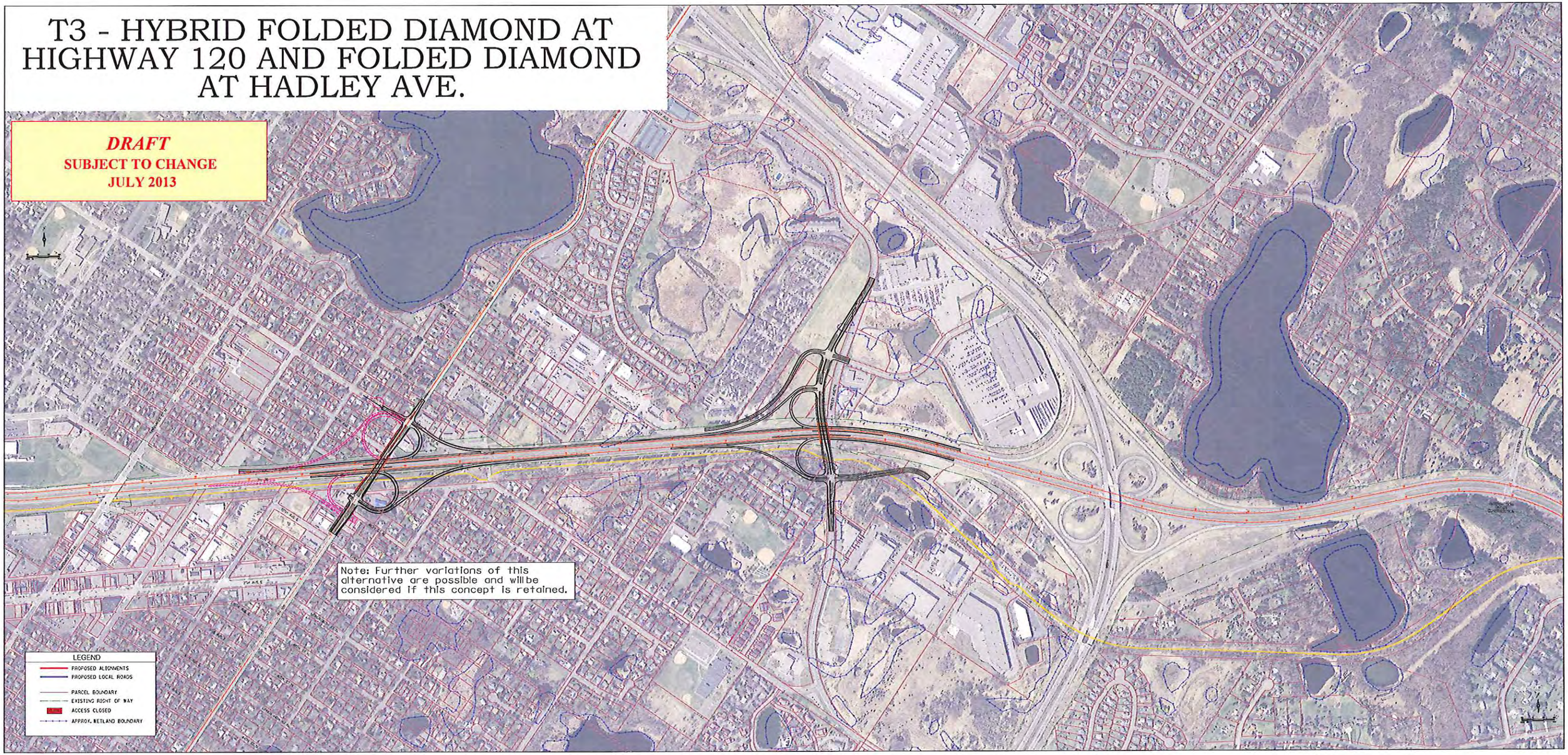
DRAFT
SUBJECT TO CHANGE
JULY 2013



T2 - DIAMOND INTERCHANGE AT HIGHWAY 120 AND FOLDED DIAMOND AT HADLEY AVE.



T3 - HYBRID FOLDED DIAMOND AT HIGHWAY 120 AND FOLDED DIAMOND AT HADLEY AVE.



Interchange Alternatives Traffic Analysis Memorandum (December 23, 2013)

TECHNICAL MEMORANDUM

TO: Mark Benson, SEH Project Manager
Bob Rogers, AICP

FROM: Haifeng Xiao, PE

DATE: December 23, 2013

RE: Trunk Highway (TH) 36 Corridor Study
Interchange Alternatives Traffic Analysis Memorandum
SEH No. 124228

1. Introduction

In the previous technical memorandum titled "*Trunk Highway (TH) 36 Corridor Study – Conceptual Design and Screening Process*" dated September 5, 2013, a high level comparative evaluation of the conceptual alternatives was conducted for a number of at-grade and grade-separated interchange alternatives for the TH 36/TH 120/Hadley Avenue intersections. It was concluded that the long-term vision for TH 36 would be an access controlled freeway with appropriately spaced grade separated interchange. Therefore, no at-grade alternative was recommended for further analysis. Two interchange alternatives, namely Two Interchanges Alternative (T2) and One Interchange Alternative (S2), were recommended in the memorandum for further analysis and evaluation. In later September, a two-way northern frontage road was proposed to be built to connect TH 120 and Hadley Avenue in the One Interchange Alternative. Figures 1 and 2 respectively illustrate those interchange alternatives. They are described as following:

- Two Interchanges Alternative: Diamond Interchange at TH 120 and Folded Diamond Interchange at Hadley Avenue
- One Interchange Alternative: Diamond Interchange at TH 120 with Overpass and Local Street Access Closure at Hadley Avenue; Two-way Frontage Road build north of TH 36 between TH 120 and Hadley Avenue. The frontage road aligns 17th Avenue at TH 120 and aligns 55th Street (Mills Fleet Farm Entrance)

This memorandum summarizes all the traffic analysis for the Two Interchanges Alternatives. The traffic analysis includes signal intersections operations analysis for the Two Interchanges Alternatives using Synchro/SimTraffic and TH 120 ramp terminal intersection roundabouts option using VISSIM. Vehicle Mile Travelled (VMT) and Vehicle Hour Travelled (VHT) were extracted from the Twin Cities Regional Model to evaluate traffic impacts of the Two Interchanges Alternatives on the roadways in the study area.

2. Intersection Operations Analysis in Synchro/SimTraffic

Peak hour traffic operations during project design year 2040 were analyzed for the Two Interchanges Alternatives at the new ramp terminal intersections and key intersections along TH 120 and Hadley Avenue. The peak hour turning movement traffic forecasts in the traffic forecast memorandum, dated on June 25, 2013, were used for the analysis. The intersections are listed as following.

- TH 36/TH 120 Intersections (one intersection for No Build and two intersections for interchange alternatives)
- TH 36/Hadley Intersection (one intersection for No Build and two intersections for interchange alternatives)
- TH 120/Joy Road/Hadley Avenue
- TH 120/17th Avenue/50th Street
- TH 120/7th Avenue/47th Street
- TH 120/County Road B/40th Street
- TH 120/Holloway Avenue/Upper 35th Street
- TH 120/County Road 5.

Synchro/SimTraffic software was used to perform 2040 peak hour traffic operations analysis for the signal option for the ramp terminal intersections in the two build alternatives. The existing, 2040 no-build and 2040 TH 120 Mitigated conditions were included for comparison purpose in the analysis. Major measures of effectiveness include delays and queues. A Level of Service (LOS, A through F) was identified at approach, movement and intersection levels for all the intersections based on the delays and the thresholds defined in the Highway Capacity Manual (HCM). LOS A indicates the best traffic operation and LOS F indicates the worst. LOS D or better is generally considered acceptable.

Table 1 below summarizes intersection LOS analysis results in Synchro/SimTraffic. Table 2 summarizes TH 120 Corridor LOS results. Detailed analysis results are included respectively in the appendices 1A/B, 2A/B, 3, 4A/B and 5A/B.

Table 1
Peak Hour Intersection LOS Analysis Results Summary (Synchro/SimTraffic)

Arterial	Intersection	Existing		2040						
		AM	PM	No-Build		* TH 120 Mitigated	Two Interchange		One Interchange	
				AM	PM	PM	AM	PM	AM	PM
TH 120	TH 120 at Joy/Hadley (Signal)	B	B	B	C	C	B	B	B	B
	TH 120 at 17th**	A	A	A	F	F	A	A	C	B
	TH 36 at TH 120 (Signal)	D	D	E	F	F				
	WB TH 36 Ramps at TH 120 (Signal)						A	A	A	A
	EB TH 36 Ramps at TH 120 (Signal)						A	A	B	B
	TH 120 at 7th (Signal)	B	B	B	F	D	B	C	B	C
	TH 120 at CR B (Signal)	B	B	B	B	B	B	B	B	B
	TH 120 at Halloway***	A	A	A	E	B	A	A	A	A
	TH 120 at TH 5 (Signal)	B	C	B	E	D	B	C	B	C
Hadley	Hadley/Fleet Farm Entrance	A	A	A	D	C	A	B	B	C
	TH 36 at Hadley (Signal)	C	D	D	E	E				
	WB TH 36 at Hadley						A	B		
	EB TH 36 at Hadley						A	B		
Appendix Reference		Appendix 1A/B		Appendix 2A/B		Appendix 3	Appendix 4A/B		Appendix 5A/B	

* Mitigations include: adding 150 ft SB left turn at 17th Ave and 300 ft EB exclusive left turn lane at 7th Ave and signal at Halloway; re-optimizating all signal intersections.
** Signal control for One-Interchange Alternative, Side-street Stop Control for others
*** Signal control for mitigated No Build Alternative, side-street stop control for others

Table 2
TH 120 Corridor LOS Analysis Results Summary (Synchro/SimTraffic)

Direction	MOEs	Existing		2040						
				No Build		*TH 120 Mitigate	Two-Interchanges Alternative		One Interchange Alternative	
		AM	PM	AM	PM	PM	AM	PM	AM	PM
Northbound	Travel Time (Min)	6.4	6.4	7.1	8.0	8.8	5.5	5.9	5.8	6.6
	Delay (Min)	2.0	2.1	2.7	3.7	4.4	1.1	1.5	1.4	2.1
	Speed (MPH)	25	25	23	20	18	30	27	28	25
	% of Free Flow Speed*	71%	71%	66%	57%	51%	86%	77%	80%	71%
	LOS	B	B	C	C	C	A	B	B	B
Southbound	Travel Time (Min)	6.2	6.3	6.3	7.8	8.0	5.4	6.2	5.7	6.5
	Delay (Min)	1.9	2.0	2.0	3.5	3.7	1.0	1.9	1.3	2.2
	Speed (MPH)	26	25	25	20	20	30	26	28	25
	% of Free Flow Speed	74%	71%	71%	57%	57%	86%	74%	80%	71%
	LOS	B	B	B	C	C	A	B	B	B

* Corridor Free Flow Speed is 35 MPH; Corridor length is 2.7 Miles between Hadley/Joy and TH 5

Table 1 shows that all study intersections currently operate at overall acceptable LOS D or better. However, the detailed MOE results in appendices 1A & 1B show unacceptable LOS E for the northbound approach at TH 120 and both northbound and southbound at Hadley Avenue. Under 2040 no-build and TH 120 Mitigated conditions, the TH 36 intersections at TH 120 and Hadley will operate at unacceptable LOS E or F. The queues in the southbound approach at the TH

36/TH 120 intersection extend to 17th Avenue, resulting in its unacceptable LOS F during 2040 PM peak hour.

Table 1 also shows that all the intersections in one or two interchanges build alternatives will operate at acceptable LOS C or better. Nevertheless, the TH 36/TH 120 ramp terminal intersections in the Two Interchanges Alternative will operate at LOS A, better than those in the One Interchange Alternative. It is also noted that the current side-street controlled intersection at TH 120/17th Avenue will need to be signalized to accommodate the traffic from/to Hadley Avenue via the two-way frontage road in the One Interchange Alternative.

It is noted in Table 1 and Table 2 that although the operations at the 7th Avenue and 17th Avenue intersections are improved in the 2040 TH 120 Mitigated conditions, the operations at the TH 36/TH 120 intersection operate worse due to more traffic fed into the intersection. The overall TH 120 corridor operates slightly worse than in the 2040 No Build conditions. The results indicate that from operations perspective we should improve the TH 36/TH 120 intersection before we do any other locations along the corridor.

3. TH 36/TH 120 Ramp Intersections Roundabout Option Analysis in VISSIM

A three-roundabout option was proposed for analysis for the two ramp terminal intersections and its adjacent TH 120/17th Avenue intersection in the Two Interchanges Alternative (The analysis didn't include the roundabouts for the TH 36/Hadley Ave ramp terminal intersections). Figure 3 illustrates the conceptual design for the option. VISSIM was used to evaluate the 2040 peak hour operations to obtain the most credible results for the three closely spaced roundabouts. Table 3 below summarizes the intersection LOS results for 2040 AM and PM peak hours. Detailed analysis results are included in the Appendix 6. The corresponding results for the signal option are included in Table 3 for comparison purpose.

Table 3
2040 Peak Hour Intersections LOS Results Summary for Roundabout and Signal Options

Intersection	Signal* (SimTraffic)		Roundabout (VISSIM)	
	AM	PM	AM	PM
TH 120 at 17th Ave/7th St Intersection	A	A	A	A
TH 120 at TH 36 Westbound Ramps Intersection	A	A	A	A
TH 120 at TH 36 Eastbound Ramps Intersection	A	A	A	A
Appendix Reference	Appendix 4A/B		Appendix 6	

*Signal at ramp terminal intersections, side street stop controlled at 17th Ave

Table 3 shows that all the three intersections will operate well at LOS A in both signal and roundabout options for the ramp terminal intersections in the Two Interchanges Alternative.

4. Study Area VMTs and VHTs in the Twin Cities Regional Model

The VMT and VHTs are extracted from the Twin Cities Regional Model to evaluate the impacts of the Two Interchanges Alternative on the roadways in the study area. Table 4 below summarizes VMT and VHT results in the study area. The existing and 2040 No Build conditions are included for comparison purpose.

Table 4
Study Area Daily VMT and VHT Results Summary

Alternative	VMT	VHT	Speed(MPH)
Existing	446,375	10,870	41.06
2040 No Build	567,095	15,032	37.73
2040 One Interchange	584,119	14,750	39.60
2040 Two Interchange	583,463	14,619	39.91

* Study Area bounded by I-694, TH 5 and White Bear Avenue

Table 4 shows that both VMTs and VHTs in all 2040 alternatives will increase and the average speed will decrease from existing conditions. The VMTs are greater in the 2040 two build alternatives than that in the 2040 No Build Alternative due to more traffic severed in the study area. Both build alternatives will improve the average speeds and thus lower VHTs than No Build Alternative in the study area. The lower VMT and VHT with higher average speed in the Two Interchanges Alternative than those in the One Interchange Alternative indicate the former provides better operations than the latter in the study area from regional network perspective.

5. Traffic Analysis Findings Summary

Below are the summary of the findings based on all the traffic analysis that was performed for existing, 2040 No Build and interchange alternatives:

- All study intersections currently operate at overall acceptable LOS D or better. However, the northbound approach at TH 120 and both northbound and southbound approaches at Hadley Avenue currently operate at unacceptable LOS E or F during AM and PM peak hours.
- Under 2040 no-build and TH 120 Mitigated conditions, the TH 36 intersections at TH 120 and Hadley will operate at unacceptable LOS E or F. The queues in the southbound approach at the TH 36/TH 120 intersection extend to 17th Avenue, resulting in its unacceptable LOS during 2040 PM peak hour.
- The TH 36/TH 120 ramp terminal intersections will operate well at LOS A in both signal and roundabout options. Other non-operational factors should be considered in determining the preferred option.
- All the study intersections operate at acceptable LOS C or better in both of the Two Interchanges Alternative and One Interchange Alternative. However, all the intersections in the TH 36/TH 120 interchange area, the TH 120 corridor and regional roadways in the

study area in the Two Interchanges Alternative operate better on average when compared to those in the One Interchange Alternative.

TH 36/TH 120/Hadley Two Interchanges Alternative

TH 36/TH120/Hadley Ave Study
MnDOT

Figure 1

SEH

TH 36/TH 120/Hadley One Interchange Alternative

TH 36/TH120/Hadley Ave Study
MnDOT

Figure
2

TH 36/TH 120/Hadley Ramp Terminal Intersection Roundabout Option for Two Interchanges Alternative

TH 36/TH120/Hadley Ave Study
MnDOT

Figure 3

SimTraffic MOE Table

Appendix 1A
TH 36 at TH 120/Hadley
AM Peak Hour - Existing Conditions

Arterial	Intersection	Approach	Demand Volumes				Delay (s/veh)						LOS By Approach		LOS By Intersection		Queing Information (feet)								
																	Through			Left Turn			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Link Length	Avg.	Max	Storage	Avg.	Max	Storage	Avg.	Max
TH 120	TH 120 at Joy/Hadley (Signal)	NB	10	478	9	497	7.4	A	6.9	A	4.0	A	6.9	A	10.2	B	582	52	154	200	3	32	200		
		SB	79	329	36	444	11.0	B	5.7	A	1.0	A	6.3	A			1289	54	166	250	26	81	1289	8	33
		EB	91	13	10	114	36.2	D	28.8	C	6.3	A	32.4	C			1170	11	42	175	58	146	0		
		WB	13	20	109	142	36.2	D	33.7	C	8.3	A	14.7	B			1489	48	132	200	10	42	0		
	TH 120 at 17th	NB	74	392	8	474	7.1	A	3.2	A	2.1	A	3.8	A	4.6	A	366			130	13	47	0		
		SB	6	282	73	361	5.4	A	3.5	A	2.1	A	3.2	A			1753	2	29	0			0		
		EB	53	5	75	133	14.2	B	11.2	B	6.8	A	10.0	B			1218	29	88	300			135	30	60
		WB	9	5	7	21	12.2	B	13.5	B	8.5	A	11.3	B			320	13	39	0			75	6	31
	TH 36 at TH 120 (Signal)	EB	77	638	127	842	92.2	F	22.2	C	6.8	A	26.2	C	40.9	D	3369	148	314	400	63	170	0		
		WB	50	1465	42	1,557	80.7	F	38.9	D	18.2	B	39.7	D			4152	323	637	350	42	118	350	6	179
		NB	199	205	23	427	84.8	F	69.3	E	10.5	B	73.2	E			1138	209	538	200	196	299	175	10	168
		SB	80	127	119	326	62.6	E	59.8	E	1.6	A	41.4	D			366	105	210	150	65	178	366	14	58
	TH 120 at 7th (Signal)	NB	51	384	0	435	10.1	B	8.6	A	0.0	A	8.8	A	14.5	B	3436	37	164	175	7	33	0		
		SB	3	237	79	319	14.0	B	11.1	B	8.5	A	10.5	B			1138	49	196	175	1	11	0		
		EB	59	14	16	89	47.5	D	41.9	D	6.1	A	39.1	D			1546	44	126	0			175	9	34
		WB	7	55	2	64	43.0	D	37.5	D	24.2	C	37.9	D			612	44	126	0			0		
	TH 120 at CR B (Signal)	NB	107	263	13	383	9.5	A	9.0	A	6.5	A	9.1	A	12.9	B	2568	60	151	300	32	90	0		
		SB	32	265	24	321	12.7	B	13.3	B	8.6	A	12.9	B			3436	79	215	200	17	61	0		
		EB	46	42	74	162	25.9	C	22.2	C	3.6	A	15.0	B			358	53	128	0			300	28	61
		WB	43	161	84	288	23.5	C	21.7	C	5.7	A	17.3	B			2000	78	159	0			300		
	TH 120 at Halloway	NB	208	378	3	589	6.4	A	1.6	A	2.2	A	3.2	A	5.0	A	747			250	30	86	250		
		SB	4	359	22	385	5.6	A	4.6	A	4.0	A	4.6	A			2568		7	200	1	15	0		
		EB	13	10	150	173	12.3	B	12.0	B	8.0	A	8.6	A			1921	19	48	0			200	49	96
		WB	25	20	22	67	15.5	C	13.6	B	7.1	A	12.0	B			1330	26	73	0			200	12	39
	TH 120 at TH 5 (Signal)	NB	0	213	133	346	0.0	A	15.0	B	6.1	A	11.5	B	11.5	B	1558	76	160	0			275	31	66
		SB	206	317	0	523	11.8	B	7.1	A	0.0	A	8.9	A			747	66	160	275	65	142	0		
		WB	227	0	246	473	24.2	C	0.0	A	5.5	A	14.5	B			2553			2553	96	178	2553	46	97
Hadley	Hadley/Fleet Farm Entrance	NB	0	104	86	190	0.0	A	3.3	A	2.1	A	2.8	A	3.7	A	612	1	19	0			0		
		SB	45	80	0	125	5.8	A	0.6	A	0.0	A	2.4	A			0			500	7	33	0		
		WB	65	0	64	129	6.5	A	0.0	A	5.4	A	6.0	A			1542			1542	29	66	1542	29	57
	TH 36 at Hadley (Signal)	EB	25	689	57	771	71.7	E	16.3	B	9.0	A	17.6	B	27.1	C	4152	83	182	325	27	89	300	8	44
		WB	77	1330	98	1,505	96.3	F	18.2	B	5.5	A	21.4	C			1413	245	516	300	89	194	300	25	330
		NB	187	67	170	424	83.2	F	83.2	F	8.4	A	53.3	D			329	93	314	330	194	317	130	42	174
		SB	48	43	54	145	69.1	E	88.8	F	19.0	B	56.4	E			612	49	144	400	48	130	50	26	108

TH 120 Between TH 5 and Hadley/Joy	Length(mile)	Speed (MPH)	Delay (min/veh)	Travel time (min)	Pct of FFS	LOS
Northbound	2.65	25	2.0	6.4	71%	B
Southbound		26	1.9	6.2	74%	B

SimTraffic MOE Table

Appendix 1B
TH 36 at TH 120/Hadley
PM Peak Hour - Existing Conditions

Arterial	Intersection	Approach	Demand Volumes				Delay (s/veh)						LOS By Approach		LOS By Intersection		Queing Information (feet)								
																	Through			Left Turn			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Link Length	Avg.	Max	Storage	Avg.	Max	Storage	Avg.	Max
TH 120	TH 120 at Joy/Hadley (Signal)	NB	38	468	16	522	11.3	B	10.2	B	6.4	A	10.2	B	17.9	B	582	70	207	200	19	67	200		
		SB	166	397	106	669	13.5	B	8.7	A	2.2	A	8.8	A			1289	86	215	250	48	106	1289	19	48
		EB	86	71	28	185	61.0	E	56.5	E	29.1	C	53.9	D			1170	79	186	175	67	144	0		
		WB	8	51	114	173	68.2	E	58.4	E	25.9	C	37.7	D			1489	98	219	200	11	54	0		
	TH 120 at 17th	NB	75	386	8	469	7.3	A	2.9	A	2.8	A	3.6	A	5.4	A	366		2	130	19	72	0		
		SB	6	414	46	466	6.3	A	5.3	A	4.1	A	5.2	A			1753	21	250	0			0		
		EB	26	6	94	126	15.1	C	16.1	C	9.9	A	11.2	B			1218	19	54	300			135	37	103
		WB	18	2	8	28	15.9	C	19.5	C	9.2	A	13.8	B			320	16	48	0			75	8	31
	TH 36 at TH 120 (Signal)	EB	154	1462	234	1,850	96.7	F	44.1	D	17.2	B	45.1	D	44.2	D	3369	462	847	400	165	463	400	68	500
		WB	62	909	65	1,036	78.8	E	33.0	C	13.0	B	34.3	C			4152	202	382	350	50	137	0		
		NB	177	209	55	441	85.4	F	48.8	D	35.1	D	59.4	E			1138	214	533	200	174	299	175	33	272
		SB	82	225	118	425	65.3	E	57.9	E	1.3	A	46.6	D			366	239	380	150	72	249	366	11	57
	TH 120 at 7th (Signal)	NB	46	349	7	402	18.6	B	12.4	B	11.8	B	13.0	B	19.9	B	3436	67	208	175	15	60	0		
		SB	8	481	109	598	14.0	B	18.3	B	14.3	B	17.5	B			1138	124	314	175	4	64	0		
		EB	174	50	53	277	40.7	D	42.6	D	10.2	B	35.3	D			1546	119	208	0			175	23	59
		WB	8	31	6	45	26.9	C	30.4	C	12.1	B	26.5	C			612	27	71	0			0		
	TH 120 at CR B (Signal)	NB	90	344	27	461	11.9	B	9.2	A	7.8	A	9.6	A	13.2	B	2568	86	257	300	31	95	0		
		SB	101	368	42	511	15.3	B	14.5	B	11.3	B	14.4	B			3436	104	267	200	42	104	0		
		EB	28	128	94	250	24.7	C	23.3	C	4.8	A	16.5	B			358	80	154	0			300	36	84
		WB	21	84	60	165	29.9	C	22.6	C	4.9	A	16.5	B			2000	49	113	0			300		
	TH 120 at Halloway	NB	150	562	39	751	7.4	A	2.6	A	2.3	A	3.5	A	5.9	A	747			250	32	87	250		2
		SB	17	508	13	538	8.9	A	5.2	A	4.4	A	5.3	A			2568	2	35	200	6	34	0		
		EB	3	20	219	242	15.6	C	20.9	C	12.8	B	13.5	B			1921	19	65	0			200	71	153
		WB	10	2	17	29	19.4	C	24.9	C	9.3	A	14.4	B			1330	11	34	0			200	9	25
	TH 120 at TH 5 (Signal)	NB	0	500	269	769	0.0	A	25.4	C	9.1	A	19.9	B	19.8	B	1558	216	490	0			275	53	200
		SB	354	341	0	695	31.2	C	7.1	A	0.0	A	18.6	B			747	92	330	275	163	318	0		
		WB	204	0	247	451	33.1	C	0.0	A	12.2	B	21.8	C			2553			2553	112	241	2553	76	172
Hadley	Hadley/Fleet Farm Entrance	NB	0	212	174	386	0.0	A	4.6	A	2.5	A	3.7	A	6.5	A	612	4	34	0			0		
		SB	114	228	0	342	9.1	A	1.6	A	0.0	A	4.2	A			0			500	29	74	0		
		WB	186	0	78	264	16.2	C	0.0	A	6.3	A	13.3	B			1474			1474	66	163	1474	32	61
	TH 36 at Hadley (Signal)	EB	113	1369	179	1,661	77.1	E	36.0	D	23.2	C	37.6	D	39.5	D	4152	252	488	325	112	285	300	52	282
		WB	91	897	186	1,174	90.9	F	26.1	C	6.6	A	28.4	C			1413	233	424	300	105	229	300	48	332
		NB	125	87	116	328	73.4	E	81.3	F	21.2	C	56.8	E			329	82	177	330	119	262	130	46	163
		SB	182	133	99	414	77.5	E	84.2	F	18.0	B	65.3	E			612	136	320	400	182	318	50	51	150

TH 120 Between TH 5 and Hadley/Joy	Length(mile)	Speed (MPH)	Delay (min/veh)	Travel time (min)	Pct of FFS	LOS
Northbound	2.65	25	2.1	6.4	71%	B
Southbound		25	2.0	6.3	71%	B

SimTraffic MOE Table

Appendix 2A
TH 36 at TH 120/Hadley
AM Peak Hour - 2040 No Build Conditions

Arterial	Intersection	Approach	Demand Volumes				Delay (s/veh)						LOS By Approach		LOS By Intersection		Queing Information (feet)								
																	Through			Left Turn			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Link Length	Avg.	Max	Storage	Avg.	Max	Storage	Avg.	Max
TH 120	TH 120 at Joy/Hadley (Signal)	NB	15	555	15	585	8.7	A	8.3	A	5.9	A	8.2	A	11.7	B	582	73	175	200	9	37	200		
		SB	100	380	40	520	13.1	B	6.9	A	1.4	A	7.6	A			1289	67	184	250	35	82	1289	10	42
		EB	110	20	15	145	36.4	D	28.1	C	5.7	A	32.8	C			1170	13	42	175	66	141	0		
		WB	20	30	140	190	36.0	D	37.1	D	11.1	B	18.3	B			1489	64	163	200	19	50	0		
	TH 120 at 17th	NB	100	465	10	575	8.7	A	3.5	A	3.2	A	4.4	A	6.0	A	366		2	130	21	78	0		
		SB	10	330	90	430	7.3	A	4.7	A	3.5	A	4.5	A			1753	8	112	0			0		
		EB	65	10	100	175	22.4	C	19.7	C	7.9	A	14.4	B			1218	40	102	300			135	33	76
		WB	15	10	10	35	14.6	B	12.0	B	11.3	B	12.7	B			320	19	52	0			75	8	36
	TH 36 at TH 120 (Signal)	EB	85	920	165	1,170	103.4	F	28.5	C	8.7	A	31.2	C	75.7	E	3369	230	377	400	77	189	0		
		WB	75	1680	55	1,810	133.7	F	98.8	F	64.5	E	99.2	F			4152	894	1651	350	105	447	350	36	450
		NB	245	265	45	555	140.8	F	101.8	F	43.7	D	114.1	F			1138	484	902	200	250	300	175	20	186
		SB	115	160	120	395	73.0	E	58.1	E	1.8	A	48.1	D			366	144	296	150	98	244	366	13	61
	TH 120 at 7th (Signal)	NB	55	455	0	510	15.1	B	12.2	B	0.0	A	12.5	B	19.5	B	3436	72	230	175	14	90	0		
		SB	10	280	135	425	15.4	B	16.5	B	12.2	B	15.1	B			1138	96	324	175	3	21	0		
		EB	100	20	20	140	60.0	E	59.0	E	6.0	A	51.1	D			1546	72	202	0			175	14	75
		WB	10	85	5	100	36.4	D	32.6	C	16.8	B	31.8	C			612	59	137	0			0		
	TH 120 at CR B (Signal)	NB	165	280	10	455	13.1	B	9.4	A	7.6	A	10.6	B	15.6	B	2568	60	172	300	51	104	0		
		SB	30	300	55	385	14.5	B	17.4	B	13.0	B	16.5	B			3436	108	268	200	15	45	0		
		EB	90	55	110	255	31.2	C	27.2	C	4.0	A	18.4	B			358	79	166	0			300	35	70
		WB	30	210	75	315	26.9	C	23.1	C	7.1	A	19.5	B			2000	89	171	0			300		
	TH 120 at Halloway	NB	305	425	5	735	8.6	A	2.3	A	4.5	A	4.9	A	8.0	A	747		2	250	53	154	250		
		SB	10	410	35	455	7.0	A	5.4	A	4.0	A	5.3	A			2568	1	28	200	3	29	0		
		EB	20	20	225	265	23.2	C	27.0	D	14.2	B	15.9	C			1921	30	74	0			200	71	177
		WB	40	40	30	110	25.9	D	22.6	C	8.1	A	20.2	C			1330	41	111	0			200	14	39
	TH 120 at TH 5 (Signal)	NB	0	260	125	385	0.0	A	18.5	B	6.1	A	14.6	B	13.0	B	1558	99	205	0			275	31	83
		SB	260	395	0	655	14.3	B	8.1	A	0.0	A	10.5	B			747	91	234	275	88	185	0		
		WB	220	0	310	530	24.9	C	0.0	A	7.6	A	14.9	B			2553			2553	99	198	2553	66	164
Hadley	Fleet Farm Entrance	NB	0	181	99	280	0.0	A	3.8	A	2.3	A	3.3	A	3.8	A	611		9	0			0		
		SB	52	145	0	197	6.6	A	0.6	A	0.0	A	2.0	A			0			500	10	45	0		
		WB	75	0	74	149	8.0	A	0.0	A	5.8	A	7.0	A			1492			1492	31	80	1492	30	63
	TH 36 at Hadley (Signal)	EB	60	980	90	1,130	86.7	F	29.2	C	13.6	B	31.1	C	36.1	D	4152	211	386	325	66	158	300	27	142
		WB	65	1430	120	1,615	103.0	F	28.9	C	9.7	A	30.4	C			1413	385	741	300	83	316	300	48	397
		NB	250	100	160	510	82.1	F	72.6	E	13.5	B	58.3	E			329	157	384	330	217	312	130	46	166
		SB	60	60	100	220	62.4	E	83.8	F	30.7	C	52.7	D			611	61	166	400	53	128	50	56	135

TH 120 Between TH 5 and Hadley/Joy	Length(mile)	Speed (MPH)	Delay (min/veh)	Travel time (min)	Pct of FFS	LOS
Northbound	2.65	23	2.7	7.1	66%	C
Southbound		25	2.0	6.3	71%	B

SimTraffic MOE Table

Appendix 2B
TH 36 at TH 120/Hadley
PM Peak Hour - 2040 No Build Conditions

Arterial	Intersection	Approach	Demand Volumes				Delay (s/veh)						LOS By Approach		LOS By Intersection		Queing Information (feet)								
																	Through			Left Turn			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Link Length	Avg.	Max	Storage	Avg.	Max	Storage	Avg.	Max
TH 120	TH 120 at Joy/Hadley (Signal)	NB	50	545	25	620	14.9	B	13.5	B	12.3	B	13.6	B	21.8	C	582	93	223	200	24	80	200		
		SB	210	460	120	790	17.9	B	13.5	B	2.8	A	13.0	B			1289	131	336	250	68	188	1289	22	64
		EB	95	100	40	235	59.1	E	53.3	D	39.9	D	53.3	D			1170	102	228	175	77	195	0		
		WB	15	75	145	235	69.0	E	55.8	E	30.7	C	40.8	D			1489	141	322	200	15	59	0		
	TH 120 at 17th	NB	100	460	15	575	16.2	C	3.6	A	2.7	A	5.7	A	53.6	F	366		1	130	32	109	0		
		SB	10	490	55	555	32.1	D	35.2	E	31.7	D	34.8	D			1753	269	755	0			0		
		EB	35	10	120	165	173.7	F	188.6	F	309.1	F	277.1	F			1218	298	590	300			135	132	218
		WB	25	5	10	40	158.9	F	61.8	F	14.7	B	113.0	F			320	49	131	0			75	11	48
	TH 36 at TH 120 (Signal)	EB	160	1680	285	2,125	229.4	F	183.4	F	142.5	F	181.2	F	134.6	F	3369	1979	2876	400	201	482	400	156	500
		WB	100	1300	90	1,490	130.7	F	97.2	F	55.0	E	96.9	F			4152	711	1229	350	102	422	350	85	450
		NB	235	265	80	580	230.4	F	103.6	F	104.8	F	147.5	F			1138	727	1124	200	274	299	175	40	214
		SB	100	285	135	520	102.7	F	85.1	F	2.6	A	70.6	E			366	339	385	150	109	250	366	17	68
	TH 120 at 7th (Signal)	NB	50	400	10	460	29.9	C	26.3	C	27.4	C	26.7	C	88.9	F	3436	137	426	175	19	106	0		
		SB	15	570	180	765	25.3	C	31.8	C	26.3	C	30.4	C			1138	299	631	175	5	56	0		
		EB	270	75	60	405	321.6	F	317.2	F	258.3	F	311.7	F			1546	804	1337	0			175	100	275
		WB	10	50	10	70	28.6	C	28.4	C	27.3	C	28.3	C			612	38	110	0			0		
	TH 120 at CR B (Signal)	NB	135	380	20	535	15.2	B	10.2	B	11.0	B	11.2	B	16.0	B	2568	97	240	300	47	124	0		
		SB	95	410	90	595	17.9	B	18.6	B	15.3	B	18.0	B			3436	136	339	200	42	155	0		
		EB	60	165	150	375	29.6	C	28.2	C	6.4	A	19.7	B			358	112	224	0			300	46	112
		WB	20	105	60	185	30.4	C	24.6	C	6.2	A	19.1	B			2000	56	115	0			300		
	TH 120 at Halloway	NB	230	645	60	935	11.0	B	2.8	A	2.6	A	4.9	A	36.5	E	747			250	62	168	250		9
		SB	25	580	20	625	10.4	B	9.6	A	5.9	A	9.5	A			2568	51	265	200	11	68	0		
		EB	5	35	320	360	103.9	F	151.2	F	184.3	F	179.7	F			1921	428	1022	0			200	197	297
		WB	20	5	25	50	76.3	F	57.3	F	10.5	B	41.6	E			1330	25	82	0			200	13	49
	TH 120 at TH 5 (Signal)	NB	0	610	250	860	0.0	A	31.6	C	11.1	B	25.6	C	38.6	D	1558	302	617	0			275	75	374
		SB	450	420	0	870	98.4	F	22.1	C	0.0	A	59.2	E			747	460	750	275	327	375	0		
		WB	190	0	315	505	39.1	D	0.0	A	17.4	B	25.5	C			2553			2553	117	230	2553	113	256
Hadley	Fleet Farm Entrance	NB	0	375	200	575	0.0	A	5.6	A	3.1	A	4.8	A	25.1	D	610	6	41	0			0		
		SB	131	396	0	527	13.4	B	2.7	A	0.0	A	5.4	A			803	5	59	500	40	108	0		
		WB	214	0	90	304	122.3	F	0.0	A	43.0	E	98.5	F			1274			1274	254	499	1274	86	236
	TH 36 at Hadley (Signal)	EB	220	1505	230	1,955	88.2	F	47.0	D	29.6	C	49.5	D	56.9	E	4152	318	558	325	193	385	300	72	346
		WB	80	1200	235	1,515	108.5	F	44.4	D	18.0	B	43.6	D			1413	462	771	300	109	380	300	128	400
		NB	180	120	90	390	160.2	F	84.1	F	28.7	C	105.6	F			329	220	392	330	235	315	130	46	190
		SB	215	180	215	610	99.2	F	94.6	F	54.2	D	82.2	F			610	269	568	400	248	443	50	122	150

TH 120 Between TH 5 and Hadley/Joy	Length(mile)	Speed (MPH)	Delay (min/veh)	Travel time (min)	Pct of FFS	LOS
Northbound	2.65	20	3.7	8.0	57%	C
Southbound		20	3.5	7.8	57%	C

SimTraffic MOE Table

Appendix 3
TH 36 at TH 120/Hadley
PM Peak Hour - 2040 No Build Conditions (TH 120 Mitigated)

Arterial	Intersection	Approach	Demand Volumes				Delay (s/veh)						LOS By Approach		LOS By Intersection		Queing Information (feet)								
																	Through			Left Turn			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Link Length	Avg.	Max	Storage	Avg.	Max	Storage	Avg.	Max
TH 120	TH 120 at Joy/Hadley (Signal)	NB	50	545	25	620	13.1	B	13.7	B	13.1	B	13.6	B	21.9	C	582	94	269	200	20	64	200		
		SB	210	460	120	790	18.1	B	11.6	B	3.0	A	12.1	B			1289	115	209	250	68	176	1289	22	45
		EB	95	100	40	235	63.1	E	55.7	E	42.1	D	56.4	E			1170	106	270	175	83	237	0		
		WB	15	75	145	235	57.7	E	58.4	E	31.1	C	41.3	D			1489	136	299	200	14	50	0		
	TH 120 at 17th	NB	100	460	15	575	19.8	C	4.0	A	3.9	A	6.9	A	84.2	F	366			130	47	150	0		
		SB	10	490	55	555	16.1	C	36.1	E	26.4	D	34.9	D			1753	283	891	150	2	24	0		
		EB	35	10	120	165	299.0	F	276.9	F	477.4	F	427.0	F			1218	507	1004	300			135	175	235
		WB	25	5	10	40	349.2	F	408.7	F	126.5	F	291.9	F			320	107	303	0			75	24	175
	TH 36 at TH 120 (Signal)	EB	160	1680	285	2,125	222.6	F	183.5	F	144.9	F	181.4	F	143.3	F	3369	2075	2846	400	238	499	400	122	500
		WB	100	1300	90	1,490	123.4	F	112.7	F	66.9	E	110.5	F			4152	822	1363	350	121	449	350	99	450
		NB	235	265	80	580	268.3	F	135.3	F	132.4	F	178.4	F			1130	875	1153	200	281	300	175	64	275
		SB	100	285	135	520	109.1	F	88.8	F	2.8	A	73.0	E			366	348	380	150	112	249	366	20	154
	TH 120 at 7th (Signal)	NB	50	400	10	460	32.1	C	36.9	D	34.1	C	36.4	D	54.9	D	3429	180	648	175	20	208	0		
		SB	15	570	180	765	19.7	B	29.2	C	23.4	C	27.6	C			1130	276	594	175	3	13	0		
		EB	270	75	60	405	167.0	F	91.3	F	64.9	E	136.7	F			1541	301	1226	300	249	400	175	27	98
		WB	10	50	10	70	31.8	C	27.4	C	26.5	C	27.8	C			608	34	96	0			0		
	TH 120 at CR B (Signal)	NB	135	380	20	535	14.1	B	8.7	A	8.3	A	9.7	A	15.1	B	2568	85	211	300	42	108	0		
		SB	95	410	90	595	16.9	B	18.3	B	14.9	B	17.6	B			3429	145	345	200	38	88	0		
		EB	60	165	150	375	30.4	C	24.8	C	5.9	A	18.2	B			358	105	203	0			300	47	102
		WB	20	105	60	185	32.6	C	23.5	C	6.7	A	19.0	B			2000	60	125	0			300		
	TH 120 at Halloway (Signal)	NB	230	645	60	935	10.1	B	2.9	A	2.7	A	4.6	A	16.2	B	747		14	250	51	136	250		8
		SB	25	580	20	625	10.9	B	6.6	A	4.9	A	6.7	A			2568	15	116	200	10	48	0		
		EB	5	35	320	360	51.9	D	52.0	D	59.4	E	58.5	E			1921	151	606	0			200	152	269
		WB	20	5	25	50	40.6	D	25.8	C	10.5	B	22.3	C			1330	17	47	0			200	17	75
	TH 120 at TH 5 (Signal)	NB	0	610	250	860	0.0	A	32.2	C	11.5	B	26.2	C	33.4	C	1558	287	671	0			275	64	280
		SB	450	420	0	870	77.0	E	15.0	B	0.0	A	44.9	D			747	332	734	275	299	374	0		
		WB	190	0	315	505	37.3	D	0.0	A	16.4	B	24.1	C			2553			2553	106	194	2553	110	257
Hadley	Fleet Farm Entrance	NB	0	375	200	575	0.0	A	5.8	A	3.4	A	5.0	A	19.5	C	610	8	55	0			0		
		SB	131	396	0	527	14.2	B	2.3	A	0.0	A	5.2	A			0			500	42	113	0		
		WB	214	0	90	304	96.3	F	0.0	A	13.3	B	71.8	F			1274			1274	209	479	1274	63	183
	TH 36 at Hadley (Signal)	EB	220	1505	230	1,955	94.6	F	47.9	D	29.8	C	51.1	D	56.9	E	4152	331	530	325	206	401	300	80	398
		WB	80	1200	235	1,515	105.8	F	45.9	D	19.6	B	44.8	D			1413	492	810	300	108	312	300	122	400
		NB	180	120	90	390	152.8	F	85.5	F	27.7	C	104.1	F			329	215	387	330	238	320	130	47	230
		SB	215	180	215	610	90.0	F	92.1	F	50.5	D	76.7	E			610	285	528	400	226	449	50	124	150

TH 120 Between TH 5 and Hadley/Joy	Length(mile)	Speed (MPH)	Delay (min/veh)	Travel time (min)	Pct of FFS	LOS
Northbound	2.65	18	4.4	8.8	51%	C
Southbound		20	3.7	8.0	57%	C

SimTraffic MOE Table

Appendix 4A
TH 36 at TH 120/Hadley
AM Peak Hour - 2040 Build Conditions (Two Interchanges)

Arterial	Intersection	Approach	Demand Volumes				Delay (s/veh)						LOS By Approach		LOS By Intersection		Queing Information (feet)								
																	Through			Left Turn			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Link Length	Avg.	Max	Storage	Avg.	Max	Storage	Avg.	Max
TH 120	TH 120 at Joy/Hadley (Signal)	NB	15	565	10	590	8.6	A	7.5	A	6.4	A	7.5	A	10.3	B	582	61	134	200	7	37	200		
		SB	90	390	45	525	12.2	B	6.5	A	1.0	A	7.0	A			1289	63	165	250	32	70	1289	9	37
		EB	110	15	15	140	34.8	C	27.0	C	5.9	A	30.6	C			1170	12	41	175	62	117	0		
		WB	15	25	125	165	32.8	C	33.4	C	9.1	A	14.3	B			1489	57	151	200	11	45	0		
	TH 120 at 17th	NB	90	470	10	570	4.1	A	1.4	A	1.0	A	1.8	A	4.2	A	746			130	20	75	0		
		SB	10	340	80	430	5.7	A	4.4	A	2.8	A	4.1	A			1753	4	44	0			0		
		EB	60	10	95	165	15.7	C	13.9	B	8.6	A	11.4	B			1231	35	82	300			135	36	73
		WB	15	10	10	35	12.2	B	11.6	B	12.4	B	12.1	B			320	17	44	0			75	8	39
	WB TH 36 at TH 120 (Signal)	NB	255	340	0	595	6.5	A	2.3	A	0.0	A	4.1	A	6.4	A	204	16	83	300	43	105	0		
		SB	0	275	120	395	0.0	A	4.6	A	1.4	A	3.7	A			237	27	112	0			150	2	27
		WB	90	0	60	150	32.8	C	0.0	A	8.8	A	23.5	C			746	44	110	0			746	21	60
	EB TH 36 at TH 120 (Signal)	NB	0	505	50	555	0.0	A	3.5	A	0.6	A	3.2	A	6.7	A	297	36	138	0			150		2
		SB	130	235	0	365	9.5	A	3.3	A	0.0	A	5.4	A			204	14	72	300	32	94	0		
		EB	90	0	170	260	33.5	C	0.0	A	7.8	A	16.1	B			649	39	112	0			649	28	65
	TH 120 at 7th (Signal)	NB	60	495	5	560	14.2	B	12.8	B	7.5	A	12.9	B	12.3	B	3436	75	191	175	13	43	0		
		SB	10	310	110	430	8.5	A	10.3	B	5.5	A	9.0	A			683	68	197	175	3	13	0		
		EB	80	20	20	120	20.9	C	19.7	B	6.3	A	18.0	B			1546	34	82	0			175	11	30
		WB	10	70	5	85	19.8	B	18.4	B	9.8	A	18.0	B			612	37	88	0			0		
	TH 120 at CR B (Signal)	NB	135	345	15	495	12.1	B	9.7	A	8.1	A	10.3	B	13.0	B	2568	75	210	300	40	86	0		
		SB	35	350	35	420	13.9	B	14.6	B	10.8	B	14.3	B			3436	102	218	200	18	57	0		
		EB	60	40	90	190	23.0	C	20.3	C	4.4	A	13.0	B			358	51	108	0			300	33	81
		WB	45	165	90	300	21.3	C	19.8	B	6.2	A	16.0	B			2000	77	138	0			300		
	TH 120 at Halloway	NB	235	450	5	690	8.0	A	1.9	A	1.7	A	4.0	A	6.7	A	747		3	250	43	108	250		
		SB	10	440	45	495	7.8	A	5.4	A	3.8	A	5.3	A			2568	1	28	200	3	34	0		
		EB	30	15	180	225	25.5	D	20.1	C	11.4	B	13.9	B			1921	33	71	0			200	59	141
		WB	25	30	35	90	24.7	C	21.1	C	8.7	A	17.7	C			1330	32	81	0			200	14	43
	TH 120 at TH 5 (Signal)	NB	0	250	140	390	0.0	A	17.4	B	6.1	A	13.3	B	12.5	B	1558	92	195	0			275	33	73
		SB	240	370	0	610	12.9	B	7.8	A	0.0	A	9.6	A			747	84	174	275	77	165	0		
		WB	240	0	290	530	26.2	C	0.0	A	6.8	A	15.5	B			2553			2553	113	228	2553	59	137
Hadley	Hadley at 55th St/Fleet Farm Ent	NB	5	182	98	285	7.4	A	10.0	B	5.3	A	8.4	A	7.7	A	272	37	72	100	4	30	100	31	58
		SB	52	135	5	192	8.4	A	9.1	A	5.9	A	8.8	A			1131	28	51	500	22	55	150	3	22
		EB	10	5	20	35	4.5	A	6.2	A	2.5	A	3.6	A			413	9	23	0			150	9	20
		WB	75	5	74	154	5.9	A	9.2	A	6.1	A	6.1	A			800	26	56	800	29	57	500		
	WB TH 36 at Hadley	NB	410	200	0	610	9.1	A	10.2	B	0.0	A	9.5	A	8.2	A	818	44	75	300	65	135	0		
		SB	0	95	135	230	0.0	A	9.7	A	6.1	A	7.6	A			272	32	59	0			100	38	68
		EB	85	0	50	135	4.7	A	0.0	A	0.5	A	3.0	A			400			250	20	44	250	5	22
	EB TH 36 at Hadley	NB	120	510	5	635	6.1	A	2.9	A	4.0	A	3.5	A	4.4	A	0			150	11	44	0		
		SB	5	105	40	150	6.6	A	4.9	A	4.3	A	4.8	A			0			150	1	11	150	1	15
		EB	100	0	160	260	10.5	B	0.0	A	3.3	A	6.2	A			400	36	91	150			150	30	71
		WB	5	5	5	15	10.9	B	10.8	B	6.4	A	10.0	B			2000	6	21	150	5	25	300		

TH 120 Between TH 5 and Hadley/Joy	Length(mile)	Speed (MPH)	Delay (min/veh)	Travel time (min)	Pct of FFS	LOS
Northbound	2.65	30	1.1	5.5	86%	A
Southbound		30	1.0	5.4	86%	A

SimTraffic MOE Table

Appendix 4B
TH 36 at TH 120/Hadley
PM Peak Hour - 2040 Build Conditions (Two Interchanges)

Arterial	Intersection	Approach	Demand Volumes				Delay (s/veh)						LOS By Approach		LOS By Intersection		Queing Information (feet)								
																	Through			Left Turn			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Link Length	Avg.	Max	Storage	Avg.	Max	Storage	Avg.	Max
TH 120	TH 120 at Joy/Hadley (Signal)	NB	45	555	20	620	11.6	B	10.8	B	8.8	A	10.8	B	14.0	B	582	76	155	200	24	70	200		
		SB	190	475	130	795	16.4	B	10.5	B	2.8	A	10.6	B			1289	98	243	250	59	142	1289	27	64
		EB	110	80	35	225	35.5	D	28.0	C	13.8	B	29.6	C			1170	50	134	175	64	135	0		
		WB	10	60	130	200	34.3	C	32.5	C	13.6	B	20.7	C			1489	77	163	200	9	40	0		
	TH 120 at 17th	NB	95	465	15	575	5.2	A	1.1	A	0.8	A	1.8	A	4.5	A	746			130	23	70	0		
		SB	10	495	50	555	5.7	A	4.4	A	3.1	A	4.3	A			1753	4	45	0			0		
		EB	30	10	115	155	15.8	C	13.6	B	11.9	B	12.7	B			1231	25	63	300			135	48	107
		WB	25	5	10	40	16.0	C	12.9	B	10.6	B	14.4	B			320	22	63	0			75	8	31
	WB TH 36 at TH 120 (Signal)	NB	245	415	0	660	8.6	A	3.0	A	0.0	A	5.1	A	7.7	A	204	30	111	300	50	128	0		
		SB	0	380	140	520	0.0	A	5.5	A	1.3	A	4.5	A			237	58	169	0			150	2	24
		WB	120	0	105	225	37.5	D	0.0	A	10.4	B	24.7	C			746	55	156	0			746	32	76
	EB TH 36 at TH 120 (Signal)	NB	0	490	90	580	0.0	A	3.4	A	0.6	A	3.0	A	8.8	A	297	30	184	0			150		5
		SB	115	385	0	500	14.1	B	6.0	A	0.0	A	7.8	A			204	45	168	300	33	89	0		
		EB	170	0	295	465	34.2	C	0.0	A	8.8	A	18.1	B			649	84	198	0			649	33	72
	TH 120 at 7th (Signal)	NB	55	450	10	515	27.0	C	17.4	B	15.1	B	18.3	B	32.6	C	3436	110	288	175	21	64	0		
		SB	15	620	145	780	42.1	D	42.8	D	37.6	D	41.8	D			683	333	635	175	8	69	0		
		EB	230	65	60	355	40.7	D	39.3	D	15.3	B	36.2	D			1546	152	312	0			175	31	165
		WB	10	40	10	60	25.3	C	22.7	C	10.0	B	21.2	C			612	31	80	0			0		
	TH 120 at CR B (Signal)	NB	110	445	30	585	15.7	B	12.7	B	10.8	B	13.1	B	16.4	B	2568	128	275	300	40	98	0		
		SB	110	480	60	650	19.5	B	22.0	C	18.0	B	21.3	C			3436	178	376	200	54	173	0		
		EB	40	130	120	290	19.4	B	18.7	B	6.1	A	13.3	B			358	68	142	0			300	39	79
		WB	25	85	65	175	22.3	C	19.1	B	6.2	A	14.9	B			2000	53	107	0			300		
	TH 120 at Halloway	NB	170	670	40	880	9.6	A	2.8	A	2.4	A	4.1	A	9.7	A	747			250	46	105	250		7
		SB	30	625	30	685	10.0	B	7.0	A	5.2	A	7.0	A			2568	9	92	200	11	41	0		
		EB	10	35	265	310	37.0	E	36.4	E	29.9	D	30.8	D			1921	49	225	0			200	111	239
		WB	10	5	30	45	27.6	D	24.5	C	10.3	B	16.1	C			1330	11	42	0			200	15	65
	TH 120 at TH 5 (Signal)	NB	0	580	285	865	0.0	A	28.6	C	11.1	B	22.9	C	26.4	C	1558	253	497	0			275	59	219
		SB	415	395	0	810	52.7	D	9.0	A	0.0	A	28.4	C			747	167	549	275	238	348	0		
		WB	215	0	290	505	47.5	D	0.0	A	15.0	B	28.5	C			2553			2553	137	308	2553	98	232
Hadley	Hadley at 55th St/Fleet Farm Ent	NB	20	365	200	585	8.4	A	15.1	C	7.1	A	12.1	B	12.8	B	272	74	168	100	14	35	100	43	108
		SB	131	381	10	522	12.4	B	16.9	C	9.8	A	15.7	C			1131	77	165	500	33	63	150	5	22
		EB	10	5	20	35	6.7	A	8.5	A	5.3	A	6.1	A			413	8	28	0			150	9	24
		WB	214	5	90	309	10.6	B	11.4	B	7.9	A	9.9	A			800	29	58	800	56	132	500		
	WB TH 36 at Hadley	NB	285	420	0	705	10.2	B	12.8	B	0.0	A	11.7	B	10.2	B	818	64	129	300	56	109	0		
		SB	0	320	295	615	0.0	A	12.2	B	8.1	A	10.3	B			272	57	101	0			100	55	104
		EB	165	0	65	230	6.5	A	0.1	A	0.7	A	4.9	A			400			250	33	107	250	7	57
	EB TH 36 at Hadley	NB	75	395	5	475	6.4	A	2.9	A	3.2	A	3.4	A	11.7	B	0			150	18	48	0		
		SB	5	235	150	390	7.1	A	6.3	A	4.9	A	5.8	A			818		4	150	2	20	150	3	47
		EB	310	0	370	680	33.9	D	5.9	A	10.3	B	20.9	C			400	134	207	150			150	119	161
		WB	5	5	5	15	16.8	C	22.6	C	6.9	A	14.3	B			2000	5	25	150	4	25	300		

TH 120 Between TH 5 and Hadley/Joy	Length(mile)	Speed (MPH)	Delay (min/veh)	Travel time (min)	Pct of FFS	LOS
Northbound	2.65	27	1.5	5.9	77%	B
Southbound		26	1.9	6.2	74%	B

SimTraffic MOE Table

Appendix 5A
TH 36 at TH 120/Hadley
AM Peak Hour - 2040 Build Conditions (One Interchange_Frontage Road)

Arterial	Intersection	Approach	Demand Volumes				Delay (s/veh)						LOS By Approach		LOS By Intersection		Queing Information (feet)								
																	Through			Left Turn			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Link Length	Avg.	Max	Storage	Avg.	Max	Storage	Avg.	Max
TH 120	TH 120 at Joy/Hadley (Signal)	NB	15	565	10	590	11.0	B	9.6	A	7.3	A	9.6	A	11.8	B	582	73	160	200	8	42	200		
		SB	143	390	45	578	13.7	B	7.7	A	1.3	A	8.7	A			1289	71	184	250	43	89	1289	9	33
		EB	110	15	15	140	31.6	C	28.2	C	5.7	A	28.6	C			1170	12	38	175	65	143	0		
		WB	15	25	212	252	38.6	D	31.8	C	10.5	B	14.2	B			1489	79	174	200	12	47	0		
	TH 120 at 17th (Signal)	NB	90	470	141	701	17.1	B	15.0	B	3.4	A	12.9	B	20.1	C	746	136	225	150	43	102	150	33	150
		SB	10	340	80	430	17.7	B	21.8	C	14.8	B	20.4	C			1760	157	347	150	7	30	0		
		EB	60	30	95	185	28.7	C	42.1	D	12.9	B	22.9	C			1231	29	73	300	37	84	150	39	79
		WB	265	30	10	305	35.2	D	37.9	D	13.2	B	34.8	C			1180	25	90	350	150	304	0		
	WB TH 36 at TH 120 (Signal)	NB	255	444	0	699	11.3	B	2.4	A	0.0	A	5.6	A	7.0	A	204	18	107	300	59	146	0		
		SB	0	307	338	645	0.0	A	4.3	A	1.9	A	3.2	A			232	28	130	0			150	7	52
		WB	100	0	77	177	40.9	D	0.0	A	12.3	B	28.4	C			746	52	121	0			746	31	72
	EB TH 36 at TH 120 (Signal)	NB	0	505	50	555	0.0	A	4.2	A	0.6	A	3.9	A	11.1	B	297	36	177	0			150		2
		SB	162	235	0	397	16.6	B	5.5	A	0.0	A	9.8	A			204	31	101	300	51	128	0		
		EB	194	0	170	364	38.4	D	0.0	A	7.8	A	24.2	C			649	103	232	0			649	27	54
	TH 120 at 7th (Signal)	NB	60	495	5	560	13.8	B	11.1	B	8.5	A	11.4	B	14.3	B	3436	66	194	175	14	64	0		
		SB	10	310	110	430	9.2	A	8.5	A	4.9	A	7.5	A			683	57	206	175	2	16	0		
		EB	80	20	20	120	45.7	D	38.6	D	6.0	A	37.8	D			1546	59	138	0			175	12	34
		WB	10	70	5	85	35.5	D	33.7	C	12.7	B	33.2	C			612	47	117	0			0		
	TH 120 at CR B (Signal)	NB	135	345	15	495	13.3	B	10.1	B	5.8	A	10.8	B	13.6	B	2568	72	164	300	46	99	0		
		SB	35	350	35	420	13.6	B	15.8	B	12.4	B	15.3	B			3436	110	214	200	17	53	0		
		EB	60	40	90	190	22.7	C	20.4	C	4.1	A	13.5	B			358	52	112	0			300	31	68
		WB	45	165	90	300	22.1	C	20.1	C	6.2	A	16.2	B			2000	84	165	0			300		
	TH 120 at Halloway	NB	235	450	5	690	8.1	A	1.9	A	2.4	A	4.0	A	6.8	A	747		3	250	42	107	250		
		SB	10	440	45	495	7.4	A	5.4	A	4.3	A	5.3	A			2568	1	12	200	3	25	0		
		EB	30	15	180	225	28.4	D	23.5	C	10.2	B	13.6	B			1921	31	74	0			200	56	109
		WB	25	30	35	90	29.6	D	22.2	C	10.2	B	19.8	C			1330	34	88	0			200	17	50
	TH 120 at TH 5 (Signal)	NB	0	250	140	390	0.0	A	16.6	B	6.3	A	13.0	B	12.5	B	1558	89	197	0			275	34	66
		SB	240	370	0	610	13.6	B	7.6	A	0.0	A	9.8	A			747	81	173	275	80	156	0		
		WB	240	0	290	530	25.6	C	0.0	A	6.9	A	15.4	B			2553			2553	114	225	2553	59	178
Hadley	Hadley at 55th St/Frontage Rd/Fleet Farm Ent	NB	188	349	30	567	13.8	B	16.6	C	11.4	B	15.4	C	11.7	B	1060	71	145	100	40	74	100	21	71
		SB	52	135	62	249	10.4	B	11.7	B	8.5	A	10.7	B			1132	37	82	150	23	45	150	20	42
		EB	57	73	74	204	7.2	A	8.6	A	3.9	A	6.5	A			412	36	92	0			150	22	60
		WB	30	50	74	154	11.1	B	8.5	A	4.8	A	7.2	A			2000	31	71	150	18	51	300		

TH 120 Between TH 5 and Hadley/Joy	Length(mile)	Speed (MPH)	Delay (min/veh)	Travel time (min)	Pct of FFS	LOS
Northbound	2.65	28	1.4	5.8	80%	B
Southbound		28	1.3	5.7	80%	B

SimTraffic MOE Table

Appendix 5B
TH 36 at TH 120/Hadley
PM Peak Hour - 2040 Build Conditions (One Interchange_Frontage Road)

Arterial	Intersection	Approach	Demand Volumes				Delay (s/veh)						LOS By Approach		LOS By Intersection		Queing Information (feet)								
																	Through			Left Turn			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Link Length	Avg.	Max	Storage	Avg.	Max	Storage	Avg.	Max
TH 120	TH 120 at Joy/Hadley (Signal)	NB	45	555	20	620	14.6	B	15.3	B	11.9	B	15.1	B	16.9	B	582	89	184	200	23	58	200		
		SB	304	475	130	909	19.3	B	13.7	B	3.9	A	14.0	B			1289	115	278	250	85	221	1289	27	73
		EB	110	80	35	225	30.9	C	25.4	C	11.6	B	26.1	C			1170	51	131	175	63	152	0		
		WB	10	60	234	304	37.1	D	36.8	D	17.2	B	22.0	C			1489	119	292	200	11	46	0		
	TH 120 at 17th (Signal)	NB	95	465	333	893	19.1	B	11.8	B	3.1	A	9.2	A	19.4	B	746	110	236	150	47	177	150	40	136
		SB	10	495	50	555	23.1	C	28.6	C	23.3	C	28.0	C			1750	239	445	150	10	162	0		
		EB	30	30	115	175	28.3	C	35.5	D	17.9	B	22.4	C			1231	24	76	300	24	61	150	50	120
		WB	302	25	10	337	30.8	C	25.6	C	8.8	A	29.8	C			1180	17	56	350	148	261	150	5	24
	WB TH 36 at TH 120 (Signal)	NB	245	687	0	932	16.3	B	3.5	A	0.0	A	6.9	A	8.6	A	204	42	182	300	77	192	0		
		SB	0	425	372	797	0.0	A	7.7	A	2.9	A	5.7	A			232	71	218	0			150	22	190
		WB	133	0	138	271	33.9	C	0.0	A	15.8	B	24.6	C			746	60	137	0			746	47	128
	EB TH 36 at TH 120 (Signal)	NB	0	490	90	580	0.0	A	10.1	B	1.6	A	8.9	A	17.0	B	297	85	246	0			150	3	59
		SB	160	385	0	545	25.8	C	10.5	B	0.0	A	14.9	B			204	78	192	300	65	158	0		
		EB	442	0	295	737	36.9	D	0.0	A	9.7	A	26.0	C			649	223	483	0			649	49	334
	TH 120 at 7th (Signal)	NB	55	450	10	515	27.9	C	17.1	B	18.0	B	18.3	B	28.9	C	3436	107	258	175	22	64	0		
		SB	15	620	145	780	26.7	C	34.8	C	30.6	C	33.8	C			683	290	559	175	8	130	0		
		EB	230	65	60	355	40.1	D	40.1	D	15.9	B	35.6	D			1546	150	296	0			175	33	159
		WB	10	40	10	60	26.4	C	23.4	C	11.0	B	22.0	C			612	29	79	0			0		
	TH 120 at CR B (Signal)	NB	110	445	30	585	14.9	B	12.2	B	11.0	B	12.6	B	15.6	B	2568	127	265	300	41	106	0		
		SB	110	480	60	650	19.4	B	20.4	C	16.4	B	19.9	B			3436	165	345	200	46	198	0		
		EB	40	130	120	290	21.5	C	19.9	B	5.9	A	14.3	B			358	75	135	0			300	40	94
		WB	25	85	65	175	21.0	C	17.7	B	5.8	A	13.8	B			2000	49	107	0			300		
	TH 120 at Halloway	NB	170	670	40	880	8.8	A	2.9	A	2.4	A	4.0	A	7.9	A	747		9	250	42	110	250		7
		SB	30	625	30	685	9.9	A	6.0	A	5.0	A	6.1	A			2568	1	10	200	10	38	0		
		EB	10	35	265	310	28.7	D	29.0	D	20.0	C	21.3	C			1921	33	78	0			200	95	206
		WB	10	5	30	45	32.0	D	24.1	C	10.8	B	16.8	C			1330	11	46	0			200	14	41
	TH 120 at TH 5 (Signal)	NB	0	580	285	865	0.0	A	45.5	D	17.8	B	36.4	D	27.1	C	1558	382	952	0			275	117	375
		SB	415	395	0	810	29.8	C	6.5	A	0.0	A	17.3	B			747	91	336	275	183	353	0		
		WB	215	0	290	505	49.1	D	0.0	A	14.2	B	28.5	C			2553			2553	134	290	2553	100	220
Hadley	Hadley at 55th St/Frontage Rd/Fleet Farm Ent	NB	129	234	60	423	16.8	C	19.0	C	11.7	B	17.3	C	17.4	C	1060	64	144	100	39	75	100	27	58
		SB	131	324	148	603	18.0	C	27.1	D	14.9	B	22.2	C			1132	99	281	150	45	143	150	43	144
		EB	157	145	161	463	10.9	B	16.2	C	11.8	B	12.8	B			412	74	186	150	44	136	0		
		WB	60	159	90	309	13.9	B	16.7	C	11.2	B	14.6	B			2000	66	154	150	26	52	300		

TH 120 Between TH 5 and Hadley/Joy	Length(mile)	Speed (MPH)	Delay (min/veh)	Travel time (min)	Pct of FFS	LOS
Northbound	2.65	25	2.1	6.6	71%	B
Southbound		25	2.2	6.5	71%	B

Appendix 6
TH 36_TH 120 Intersection Peak Hour Operations Analysis Results (Roundabouts, VISSIM 2040 AM)

Intersection	Approach	Demand Volumes				Delay (S/Veh)			LOS			LOS By Approach		LOS By Intersection		Queue (feet) Left Turn		Queue (feet) Through		Queue (feet) Right Turn	
		L	T	R	Total	L	T	R	L	T	R	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Max	Ave	Max	Ave	Max	Ave
TH 120 at 17th Ave/7th St	SB	10	340	80	430	2	6	7	A	A	A	6	A	4	A	190	5	190	5	190	5
	NB	90	470	10	570	2	3	1	A	A	A	3	A			76	1	76	1	76	1
	EB	60	10	95	165	4	2	3	A	A	A	3	A			94	1	94	1	94	1
	WB	15	10	10	35	5	5	5	A	A	A	5	A			65	1	65	1	65	1
TH 120 at TH 36 Westbound Ramps	SB		275	120	395		3	3		A	A	3	A	2	A			126	2	126	2
	NB	255	340		595	2	1		A			1	A			35	0	35	0		
	WB	90	0	60	150	5	0	3	A		A	4	A			73	2	73	2	73	2
TH 120 at TH 36 Eastbound Ramps	SB	130	235		365	2	2		A	A		2	A	2	A	53	0	53	0		
	NB		505	50	555		2	2		A	A	2	A					71	1	71	1
	EB	90	0	170	260	2	0	2	A		A	2	A			79	1	79	1	79	1

TH 36_TH 120 Intersection Peak Hour Operations Analysis Results (Roundabouts, VISSIM 2040 PM)

Intersection	Approach	Demand Volumes				Delay (S/Veh)			LOS			LOS By Approach		LOS By Intersection		Queue (feet) Left Turn		Queue (feet) Through		Queue (feet) Right Turn	
		L	T	R	Total	L	T	R	L	T	R	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Max	Ave	Max	Ave	Max	Ave
TH 120 at 17th Ave/7th St	SB	10	495	50	555	3	12	12	A	B	B	12	B	7	A	372	19	372	19	372	19
	NB	95	465	15	575	3	3	2	A	A	A	3	A			105	1	105	1	105	1
	EB	30	10	115	155	7	6	7	A	A	A	7	A			100	3	100	3	100	3
	WB	25	5	10	40	6	6	6	A	A	A	6	A			65	1	65	1	65	1
TH 120 at TH 36 Westbound Ramps	SB		380	140	520		5	5		A	A	5	A	4	A			200	7	200	7
	NB	245	415		660	3	1		A			2	A			29	0	29	0		
	WB	120	0	105	225	6	0	5	A		A	6	A			101	4	101	4	101	4
TH 120 at TH 36 Eastbound Ramps	SB	115	385		500	2	2		A	A		2	A	4	A	57	0	57	0		
	NB		490	90	580		3	3		A	A	3	A					110	1	110	1
	EB	170	0	295	465	6	0	6	A		A	6	A			175	6	175	6	175	6

Tech Memo Appendix: Cost Estimates

LWD COST ESTIMATE WORKSHEET

ESTIMATE COMPLETED BY :		SP		DISTRICT	METRO
NAME: Scott Hotchkin		TH	36	LENGTH	x.xx MILES
Estimate's Completion Date:	10/18/13	MSD #	xxxx	ID #	XXXXX
Project Location:		LETTING YEAR:	2015		

LOCATED ON TH 36 At TH 120 (TH 36 Under TH 120) with Traditional Intersections

Project Description:

GRADING, SURFACING, DRAINAGE, UTILITIES, NOISE WALLS, RETAINING WALLS, TMC,AND BRIDGE NO'S. _.

PROJECT ROADWAY COST CALCULATIONS

IN INCHES

ROADWAY	LOCATION (FROM/TO)	AREA (square feet)	DEPTH (inch)	LWD FACTOR	LWD COST MULTIPLIER	CONST. COST
EB TH 36 Pavement		103,110	8.0	13.01	$100,000	$1,301,000
EB TH 36 Right Shoulder		23,905	8.0	3.01	$100,000	$301,000
EB TH 36 Left Shoulder		22,578	8.0	2.85	$100,000	$285,000
WB TH 36 Pavement		91,533	8.0	11.55	$100,000	$1,155,000
WB TH 36 Right Shoulder		22,689	8.0	2.86	$100,000	$286,000
WB TH 36 Left Shoulder		18,377	8.0	2.32	$100,000	$232,000
EB TH 36 Exit Ramp to TH 120 Pavement		16,628	7.0	1.83	$100,000	$183,000
EB TH 36 Exit Ramp to TH 120 Shoulder		2,712	7.0	0.29	$100,000	$29,000
TH 120 to EB TH 36 Entrance Ramp Pavement		11,189	7.0	1.23	$100,000	$123,000
TH 120 to EB TH 36 Entrance Ramp Shoulder			7.0	0.00	$100,000	$0
TH 120 to WB TH 36 Entrance Ramp Pavement		17,281	7.0	1.90	$100,000	$190,000
TH 120 to WB TH 36 Entrance Ramp Shoulder			7.0	0.00	$100,000	$0
WB TH 36 Exit Ramp to TH 120 Pavement		15,929	7.0	1.75	$100,000	$175,000
WB TH 36 Exit Ramp to TH 120 Shoulder		2,884	7.0	0.31	$100,000	$31,000
WB Ramp to Margaret Pavement		13,234	7.0	1.46	$100,000	$146,000
WB Ramp to Margaret Shoulder			7.0	0.00	$100,000	$0
TH 120 Pavement		143,770	7.0	15.88	$100,000	$1,588,000
TH 120 Shoulder		6,359	7.0	0.70	$100,000	$70,000
Local Streets		18,664	4.0	1.17	$100,000	$117,000
				0.00	$100,000	$0
		530,842		62.12		$6,212,000

PROJECT BRIDGE COST CALCULATIONS

LOCATION	BRIDGE NUMBER	LENGTH (FEET)	WIDTH (FEET)	SQUARE FEET	$ / SQ FT	COST
TH 120 over TH 36				15,717	$150	$2,357,550
					BRIDGE COST TOTALS	$2,357,550

PROJECT COST TOTALS

CONSTRUCTION SUB-ITEM	PROJECT RISK DETAILS				% OF RISK	CONST. COST	CONST + RISK
ROADWAY COST **(PAVEMENT)**	Lake Street Access				20%	$6,212,000	$7,454,400
BRIDGE COST	Lake Street Access				20%	$2,357,550	$2,829,060
DRAINAGE COSTS ABOVE NORMAL PROJECT NEE	RISK FOR / NEED #:				20%		$0
ROADWAY LIGHTING COST	0.7 mile * $200,000/ mile + 1 interchanges * $$200,000/interchange)				20%	$340,000	$408,000
SIGNAL SYSTEM COST	3 Signals at $250,000/signal @ TH 120 Ramp Terminals and 7th Ave.		3	250000	20%	$750,000	$900,000
NOISE WALL COST	(3900 LF * 20 LF * $20.00/SF)	20	3900	20	20%	$1,560,000	$1,872,000
RETAINING WALL COST	EB TH 36 Right from TH 120 Bridge West (532 LF * 16 LF * $85.00/SF)	16	532	85	20%	$723,520	$868,224
RETAINING WALL COST	EB TH 36 Right from TH 120 Bridge East (20 LF * 12 LF * $85.00/SF)	12	20	85	20%	$20,400	$24,480
RETAINING WALL COST	WB TH 36 Right from TH 120 Bridge West (20 LF * 12 LF * $85.00/SF)	12	20	85	20%	$20,400	$24,480
RETAINING WALL COST	WB TH 36 Right from TH 120 Bridge East (558 LF * 15 LF * $85.00/SF)	15	558	85	20%	$711,450	$853,740
TMS - TRAFFIC MANAGEMENT SYSTEM	TMS Special ILCS ($1,500,000/mile * 0.7 Miles)		0.7	1500000	20%	$1,050,000	$1,260,000
TMS - TRAFFIC MANAGEMENT SYSTEM	TMS Regular ($300,000/mile *0.7 miles)		0.7	300000	20%	$210,000	$252,000
Median Barrier	At TH 120 (2379 LF. * $69.00/LF)		2379	69	20%	$164,151	$196,981
Guardrail	At TH 120 (1466 LF. * $20.00/LF)		1466	20	20%	$29,320	$35,184
Intersection ADA	24 corners * $4,000.00/corner Need #3628 Child Need to Need #3617		24	4000	20%	$96,000	$115,200
4" Sidewalk	TH 120 Right Side (8018 SF * $3.50/SF) Need #3647 Child Need to Need #3617		8018	3.5	20%	$28,063	$33,676
4" Sidewalk	TH 120 Left Side (14860 SF * $3.50/SF) Need #3647 Child Need to Need #3617		14860	3.5	20%	$52,010	$62,412
					20%	$0	$0
NEED MORE LINES? ADD ADDITIONAL ROWS HERE (HIGHLIGHT THIS LINE, RIGHT CLICK, SELECT INSERT)						$0	$0
							$17,189,837
					ESTIMATED CONSTRUCTION COST (MnDOT)	$14,324,864	$17,189,837

PVMT. $ / SQ FT	$11.70
PVMT. $ / SQ FT (RISK)	$14.04
LWD PORTION COST	OTHER COSTS
#REF!	#REF!

ROADWAY ONLY	PVMT. $ / MILE	$2,823,636
	$ / LANE MILE	$470,606
TOTAL PROJECT	PROJ. $ / MILE	$7,813,562
	$ / LANE MILE	$1,302,260

TOTAL PROJECT MILES	2.2
TOTAL PROJECT LANE MILES	13.2
TOTAL PROJECT AUX. LANE MILES	0.5

PROJECT ENGINEERING COSTS	
Pre-Letting 12% of Construction Cost	$2,062,780
Construction 8% of Construction Cost	$1,375,187
Engineering Total 20% of Construction	$3,437,967

SUB-TOTAL (CONSTRUCTION + RISK) >>>			$17,189,837
OVERALL PROJECT RISK	20.00%	PROJECT RISK DOLLARS	$2,864,973
RIGHT-OF-WAY COST (2.9 Acres Impacted)	0%		$0
RAILROAD AGREEMENT COST	0%	$0	$0
MAJOR UTILITY RELOCATION COST	0%	$0	$0
TRAFFIC MANAGEMENT PLAN (5% OF TOTAL CONSTRUCTION COST)	10%	$859,492	$945,441
ESTIMATED PROJECT LANDSCAPE COST	0%	$0	$0
(LANDSCAPING NOT INCLUDED IN TOTAL COST BUT IS A REMINDER FOR FUTURE PROGRAMMING NEEDS)			
TOTAL COST OF CONSTRUCTION, R-O-W, RAILROAD AGREEMENTS AND UTILITIES	>>>	$18,049,329	
CURRENT PROJECT COST TOTAL (CONSTRUCTION + RISK + OTHER EXTERNAL COSTS) >>>			$18,135,278
CURRENT PROJECT COST TOTAL (CONSTRUCTION + RISK + ENGINEERING COSTS) >>>			$21,573,245

LWD COST ESTIMATE WORKSHEET

ESTIMATE COMPLETED BY :		SP		DISTRICT	METRO
NAME: Scott Hotchkin		TH	36	LENGTH	x.xx MILES
Estimate's Completion Date:	10/18/13	MSD #	xxxx	ID #	XXXXX
Project Location:		LETTING YEAR:	2015		

LOCATED ON TH 36 At TH 120 (TH 36 Under TH 120) with Roundabout Intersections

Project Description:

GRADING, SURFACING, DRAINAGE, UTILITIES, NOISE WALLS, RETAINING WALLS, TMC,AND BRIDGE NO'S. _.

PROJECT ROADWAY COST CALCULATIONS

IN INCHES

ROADWAY	LOCATION (FROM/TO)	AREA (square feet)	DEPTH (inch)	LWD FACTOR	LWD COST MULTIPLIER	CONST. COST
EB TH 36 Pavement		103,100	8.0	13.01	$100,000	$1,301,000
EB TH 36 Right Shoulder		23,905	8.0	3.01	$100,000	$301,000
EB TH 36 Left Shoulder		22,578	8.0	2.85	$100,000	$285,000
WB TH 36 Pavement		91,533	8.0	11.55	$100,000	$1,155,000
WB TH 36 Right Shoulder		22,689	8.0	2.86	$100,000	$286,000
WB TH 36 Left Shoulder		18,377	8.0	2.32	$100,000	$232,000
EB TH 36 Exit Ramp to TH 120 Pavement		10,383	7.0	1.14	$100,000	$114,000
EB TH 36 Exit Ramp to TH 120 Shoulder		2,476	7.0	0.27	$100,000	$27,000
TH 120 to EB TH 36 Entrance Ramp Pavement		11,994	7.0	1.32	$100,000	$132,000
TH 120 to EB TH 36 Entrance Ramp Shoulder		1,639	7.0	0.18	$100,000	$18,000
TH 120 to WB TH 36 Entrance Ramp Pavement		18,280	7.0	2.01	$100,000	$201,000
TH 120 to WB TH 36 Entrance Ramp Shoulder			7.0	0.00	$100,000	$0
WB TH 36 Exit Ramp to TH 120 Pavement		9,322	7.0	1.02	$100,000	$102,000
WB TH 36 Exit Ramp to TH 120 Shoulder		2,531	7.0	0.27	$100,000	$27,000
WB Ramp to Margaret Pavement		12,447	7.0	1.37	$100,000	$137,000
WB Ramp to Margaret Shoulder			7.0	0.00	$100,000	$0
TH 120 Pavement		118,428	7.0	13.08	$100,000	$1,308,000
TH 120 Shoulder		9,644	7.0	1.06	$100,000	$106,000
Local Streets		12,065	4.0	0.76	$100,000	$76,000
				0.00	$100,000	$0
		491,391		58.08		$5,808,000

PROJECT BRIDGE COST CALCULATIONS

LOCATION	BRIDGE NUMBER	LENGTH (FEET)	WIDTH (FEET)	SQUARE FEET	$ / SQ FT	COST
TH 120 over TH 36				12,376	$150	$1,856,400
					BRIDGE COST TOTALS	$1,856,400

PROJECT COST TOTALS

CONSTRUCTION SUB-ITEM	PROJECT RISK DETAILS				% OF RISK	CONST. COST	CONST + RISK
ROADWAY COST **(PAVEMENT)**	Lake Street Access				20%	$5,808,000	$6,969,600
BRIDGE COST	Lake Street Access				20%	$1,856,400	$2,227,680
DRAINAGE COSTS ABOVE NORMAL PROJECT NEE	RISK FOR / NEED #:				20%		$0
ROADWAY LIGHTING COST	0.7 mile * $200,000/ mile + 1 interchanges * $$200,000/interchange)				20%	$340,000	$408,000
Roundabout LIGHTING COST			4	50000	20%	$200,000	$240,000
Roundabout Landscaping COST			4	30000	20%	$120,000	$144,000
SIGNAL SYSTEM COST	2 Signals at $250,000/signal @ TH 120 Ramp Terminals			250000	20%	$0	$0
NOISE WALL COST	(3900 LF * 20 LF * $20.00/SF)	20	3900	20	20%	$1,560,000	$1,872,000
RETAINING WALL COST	EB TH 36 Right from TH 120 Bridge West (545 LF * 16 LF * $85.00/SF)	16	545	85	20%	$741,200	$889,440
RETAINING WALL COST	EB TH 36 Right from TH 120 Bridge East (454 LF * 12 LF * $85.00/SF)	12	200	85	20%	$204,000	$244,800
RETAINING WALL COST	WB TH 36 Right from TH 120 Bridge West (20 LF * 12 LF * $85.00/SF)	12		85	20%	$0	$0
RETAINING WALL COST	WB TH 36 Right from TH 120 Bridge East (561 LF * 15 LF * $85.00/SF)	15	561	85	20%	$715,275	$858,330
TMS - TRAFFIC MANAGEMENT SYSTEM	TMS Special ILCS ($1,500,000/mile * 0.7 Miles)		0.7	1500000	20%	$1,050,000	$1,260,000
TMS - TRAFFIC MANAGEMENT SYSTEM	TMS Regular ($300,000/mile *0.7 miles)		0.7	300000	20%	$210,000	$252,000
Median Barrier	At TH 120 (2379 LF. * $69.00/LF)		2379	69	20%	$164,151	$196,981
Guardrail	At TH 120 (1466 LF. * $20.00/LF)		1466	20	20%	$29,320	$35,184
Intersection ADA	52 corners * $4,000.00/corner Need #3628 Child Need to Need #3617		52	4000	20%	$208,000	$249,600
4" Sidewalk	TH 120 Right Side (11259 SF * $3.50/SF) Need #3647 Child Need to Need #3617		11259	3.5	20%	$39,407	$47,288
4" Sidewalk	TH 120 Left Side (21680 SF * $3.50/SF) Need #3647 Child Need to Need #3617		21680	3.5	20%	$75,880	$91,056
					20%	$0	$0
NEED MORE LINES? ADD ADDITIONAL ROWS HERE (HIGHLIGHT THIS LINE, RIGHT CLICK, SELECT INSERT)						$0	$0
							$15,985,959
					ESTIMATED CONSTRUCTION COST (MnDOT)	$13,321,633	$15,985,959

PVMT. $ / SQ FT	$11.82
PVMT. $ / SQ FT (RISK)	$14.18
LWD PORTION COST	OTHER COSTS
#REF!	#REF!

ROADWAY ONLY	PVMT. $ / MILE	$2,640,000
	$ / LANE MILE	$440,000
TOTAL PROJECT	PROJ. $ / MILE	$7,266,345
	$ / LANE MILE	$1,211,058

TOTAL PROJECT MILES	2.2
TOTAL PROJECT LANE MILES	13.2
TOTAL PROJECT AUX. LANE MILES	0.5

PROJECT ENGINEERING COSTS	
Pre-Letting 12% of Construction Cost	$1,918,315
Construction 8% of Construction Cost	$1,278,877
Engineering Total 20% of Construction	$3,197,192

SUB-TOTAL (CONSTRUCTION + RISK) >>>			$15,985,959
OVERALL PROJECT RISK	20.00%	PROJECT RISK DOLLARS	$2,664,327
RIGHT-OF-WAY COST (2.9 Acres Impacted)	0%		$0
RAILROAD AGREEMENT COST	0%	$0	$0
MAJOR UTILITY RELOCATION COST	0%	$0	$0
TRAFFIC MANAGEMENT PLAN (5% OF TOTAL CONSTRUCTION COST)	10%	$799,298	$879,228
ESTIMATED PROJECT LANDSCAPE COST	0%	$0	$0
(LANDSCAPING NOT INCLUDED IN TOTAL COST BUT IS A REMINDER FOR FUTURE PROGRAMMING NEEDS)			
TOTAL COST OF CONSTRUCTION, R-O-W, RAILROAD AGREEMENTS AND UTILITIES	>>>	$16,785,257	
CURRENT PROJECT COST TOTAL (CONSTRUCTION + RISK + OTHER EXTERNAL COSTS) >>>			$16,865,187
CURRENT PROJECT COST TOTAL (CONSTRUCTION + RISK + ENGINEERING COSTS) >>>			$20,062,379

LWD COST ESTIMATE WORKSHEET

ESTIMATE COMPLETED BY :		SP		DISTRICT	METRO
NAME: Scott Hotchkin		TH	36	LENGTH	x.xx MILES
Estimate's Completion Date:	10/18/13	MSD #	xxxx	ID #	XXXXX
Project Location:		LETTING YEAR:	2015		

LOCATED ON TH 36 At Hadley (Interchange) with Traditional Intersections

Project Description:

GRADING, SURFACING, DRAINAGE, UTILITIES, NOISE WALLS, RETAINING WALLS, TMC,AND BRIDGE NO'S. _.

PROJECT ROADWAY COST CALCULATIONS

IN INCHES

ROADWAY	LOCATION (FROM/TO)	AREA (square feet)	DEPTH (inch)	LWD FACTOR	LWD COST MULTIPLIER	CONST. COST
EB TH 36 Pavement		27,740	8.0	3.50	$100,000	$350,000
EB TH 36 Right Shoulder		13,502	8.0	1.70	$100,000	$170,000
EB TH 36 Left Shoulder		2,925	8.0	0.36	$100,000	$36,000
WB TH 36 Pavement		29,534	8.0	3.72	$100,000	$372,000
WB TH 36 Right Shoulder		16,851	8.0	2.12	$100,000	$212,000
WB TH 36 Left Shoulder		2,644	8.0	0.33	$100,000	$33,000
EB TH 36 Exit Ramp to Hadley Pavement		15,717	7.0	1.73	$100,000	$173,000
EB TH 36 Exit Ramp to Hadley Shoulder			7.0	0.00	$100,000	$0
Hadley to EB TH 36 Entrance Ramp Pavement		9,979	7.0	1.10	$100,000	$110,000
Hadley to EB TH 36 Entrance Ramp Shoulder			7.0	0.00	$100,000	$0
Hadley to WB TH 36 Entrance Ramp Pavement		13,609	7.0	1.50	$100,000	$150,000
Hadley to WB TH 36 Entrance Ramp Shoulder			7.0	0.00	$100,000	$0
WB TH 36 Exit Ramp to Hadley Pavement		10,757	7.0	1.18	$100,000	$118,000
WB TH 36 Exit Ramp to Hadley Shoulder			7.0	0.00	$100,000	$0
Hadley Pavement		98,563	7.0	10.88	$100,000	$1,088,000
Hadley Shoulder		16,948	7.0	1.87	$100,000	$187,000
North Frontage Pavement		40,368	7.0	4.45	$100,000	$445,000
North Frontage Shoulder			7.0	0.00	$100,000	$0
Fleet Farm Pavement		9,292	7.0	1.02	$100,000	$102,000
Fleet Farm Shoulder			7.0	0.00	$100,000	$0
South Frontage Pavement		29,440	7.0	3.25	$100,000	$325,000
South Frontage Shoulder		17,335	7.0	1.91	$100,000	$191,000
			7.0	0.00	$100,000	$0
		355,204		40.62		$4,062,000

PROJECT BRIDGE COST CALCULATIONS

LOCATION	BRIDGE NUMBER	LENGTH (FEET)	WIDTH (FEET)	SQUARE FEET	$ / SQ FT	COST
Hadley over TH 36				16,687	$150	$2,503,050
					BRIDGE COST TOTALS	$2,503,050

PROJECT COST TOTALS

CONSTRUCTION SUB-ITEM	PROJECT RISK DETAILS			% OF RISK	CONST. COST	CONST + RISK
ROADWAY COST **(PAVEMENT)**	Lake Street Access			20%	$4,062,000	$4,874,400
BRIDGE COST	Lake Street Access			20%	$2,503,050	$3,003,660
DRAINAGE COSTS ABOVE NORMAL PROJECT NEE	RISK FOR / NEED #:			20%		$0
ROADWAY LIGHTING COST	0.7 mile * $200,000/ mile + 1 interchanges * $$200,000/interchange)			20%	$340,000	$408,000
SIGNAL SYSTEM COST	2 Signals at $250,000/signal @ Hadley Ramp Terminals	0	250000	20%	$0	$0
NOISE WALL COST	XXXXXX (354 LF * 20 LF * $20.00/SF)	20	20	20%	$0	$0
TMS - TRAFFIC MANAGEMENT SYSTEM	TMS Special ILCS ($1,500,000/mile * 0.7 Miles)	0.7	1500000	20%	$1,050,000	$1,260,000
TMS - TRAFFIC MANAGEMENT SYSTEM	TMS Regular ($300,000/mile *0.7 miles)	0.7	300000	20%	$210,000	$252,000
Median Barrier	At TH 120 (2379 LF. * $69.00/LF)		69	20%	$0	$0
Intersection ADA	10 corners * $4,000.00/corner Need #3628 Child Need to Need #3617	10	4000	20%	$40,000	$48,000
4" Sidewalk	Hadley Right Side (8711 SF * $3.50/SF) Need #3647 Child Need to Need #3617	8711	3.5	20%	$30,489	$36,586
4" Sidewalk	Hadley Left Side (7764 SF * $3.50/SF) Need #3647 Child Need to Need #3617	7764	3.5	20%	$27,174	$32,609
				20%	$0	$0
NEED MORE LINES? ADD ADDITIONAL ROWS HERE (HIGHLIGHT THIS LINE, RIGHT CLICK, SELECT INSERT)					$0	$0
						$9,915,255
				ESTIMATED CONSTRUCTION COST (MnDOT)	$8,262,713	$9,915,255

PVMT. $ / SQ FT	$11.44
PVMT. $ / SQ FT (RISK)	$13.72
LWD PORTION COST	OTHER COSTS
#REF!	#REF!

ROADWAY ONLY	PVMT. $ / MILE	$1,846,364
	$ / LANE MILE	$307,727
TOTAL PROJECT	PROJ. $ / MILE	$4,506,934
	$ / LANE MILE	$751,156

TOTAL PROJECT MILES	2.2
TOTAL PROJECT LANE MILES	13.2
TOTAL PROJECT AUX. LANE MILES	0.5

PROJECT ENGINEERING COSTS	
Pre-Letting 12% of Construction Cost	$1,189,831
Construction 8% of Construction Cost	$793,220
Engineering Total 20% of Construction	$1,983,051

SUB-TOTAL (CONSTRUCTION + RISK) >>>			$9,915,255
OVERALL PROJECT RISK	20.00%	PROJECT RISK DOLLARS	$1,652,543
RIGHT-OF-WAY COST (15.2 Acres Impacted)	0%		$0
RAILROAD AGREEMENT COST	0%	$0	$0
MAJOR UTILITY RELOCATION COST	0%	$0	$0
TRAFFIC MANAGEMENT PLAN (5% OF TOTAL CONSTRUCTION COST)	10%	$495,763	$545,339
ESTIMATED PROJECT LANDSCAPE COST	0%	$0	$0

(LANDSCAPING NOT INCLUDED IN TOTAL COST BUT IS A REMINDER FOR FUTURE PROGRAMMING NEEDS)

TOTAL COST OF CONSTRUCTION, R-O-W, RAILROAD AGREEMENTS AND UTILITIES >>> $10,411,018

CURRENT PROJECT COST TOTAL (CONSTRUCTION + RISK + OTHER EXTERNAL COSTS) >>>	$10,460,594
CURRENT PROJECT COST TOTAL (CONSTRUCTION + RISK + ENGINEERING COSTS) >>>	$12,443,645

LWD COST ESTIMATE WORKSHEET

ESTIMATE COMPLETED BY :		SP		DISTRICT	METRO
NAME: Scott Hotchkin		TH	36	LENGTH	x.xx MILES
Estimate's Completion Date:	10/18/13	MSD #	xxxx	ID #	XXXXX
Project Location:		LETTING YEAR:	2015		

LOCATED ON TH 36 At Hadley (Interchange) with Roundabout Intersections

Project Description:

GRADING, SURFACING, DRAINAGE, UTILITIES, NOISE WALLS, RETAINING WALLS, TMC,AND BRIDGE NO'S. _.

PROJECT ROADWAY COST CALCULATIONS

IN INCHES

ROADWAY	LOCATION (FROM/TO)	AREA (square feet)	DEPTH (inch)	LWD FACTOR	LWD COST MULTIPLIER	CONST. COST
EB TH 36 Pavement		27,678	8.0	3.49	$100,000	$349,000
EB TH 36 Right Shoulder		13,502	8.0	1.70	$100,000	$170,000
EB TH 36 Left Shoulder		2,925	8.0	0.36	$100,000	$36,000
WB TH 36 Pavement		30,588	8.0	3.86	$100,000	$386,000
WB TH 36 Right Shoulder		16,851	8.0	2.12	$100,000	$212,000
WB TH 36 Left Shoulder		2,644	8.0	0.33	$100,000	$33,000
EB TH 36 Exit Ramp to Hadley Pavement		11,830	7.0	1.30	$100,000	$130,000
EB TH 36 Exit Ramp to Hadley Shoulder			7.0	0.00	$100,000	$0
Hadley to EB TH 36 Entrance Ramp Pavement		8,708	7.0	0.96	$100,000	$96,000
Hadley to EB TH 36 Entrance Ramp Shoulder			7.0	0.00	$100,000	$0
Hadley to WB TH 36 Entrance Ramp Pavement		12,168	7.0	1.34	$100,000	$134,000
Hadley to WB TH 36 Entrance Ramp Shoulder			7.0	0.00	$100,000	$0
WB TH 36 Exit Ramp to Hadley Pavement		8,405	7.0	0.92	$100,000	$92,000
WB TH 36 Exit Ramp to Hadley Shoulder			7.0	0.00	$100,000	$0
Hadley Pavement		81,517	7.0	9.00	$100,000	$900,000
Hadley Shoulder		20,876	7.0	2.30	$100,000	$230,000
North Frontage Pavement		35,760	7.0	3.95	$100,000	$395,000
North Frontage Shoulder			7.0	0.00	$100,000	$0
Fleet Farm Pavement		15,006	7.0	1.65	$100,000	$165,000
Fleet Farm Shoulder		5,929	7.0	0.65	$100,000	$65,000
South Frontage Pavement		21,253	7.0	2.34	$100,000	$234,000
South Frontage Shoulder		15,318	7.0	1.69	$100,000	$169,000
			7.0	0.00	$100,000	$0
		330,958		37.96		$3,796,000

PROJECT BRIDGE COST CALCULATIONS

LOCATION	BRIDGE NUMBER	LENGTH (FEET)	WIDTH (FEET)	SQUARE FEET	$ / SQ FT	COST
Hadley over TH 36				13,095	$150	$1,964,250
					BRIDGE COST TOTALS	$1,964,250

PROJECT COST TOTALS

CONSTRUCTION SUB-ITEM	PROJECT RISK DETAILS			% OF RISK	CONST. COST	CONST + RISK
ROADWAY COST **(PAVEMENT)**	Lake Street Access			20%	$3,796,000	$4,555,200
BRIDGE COST	Lake Street Access			20%	$1,964,250	$2,357,100
DRAINAGE COSTS ABOVE NORMAL PROJECT NEE	RISK FOR / NEED #:			20%		$0
ROADWAY LIGHTING COST	0.7 mile * $200,000/ mile + 1 interchanges * $$200,000/interchange)			20%	$340,000	$408,000
Roundabout LIGHTING COST		3	50000	20%	$150,000	$180,000
Roundabout Landscaping COST		3	30000	20%	$90,000	$108,000
SIGNAL SYSTEM COST	2 Signals at $250,000/signal @ Hadley Ramp Terminals	0	250000	20%	$0	$0
NOISE WALL COST	XXXXXX (354 LF * 20 LF * $20.00/SF)	20	20	20%	$0	$0
TMS - TRAFFIC MANAGEMENT SYSTEM	TMS Special ILCS ($1,500,000/mile * 0.7 Miles)	0.7	1500000	20%	$1,050,000	$1,260,000
TMS - TRAFFIC MANAGEMENT SYSTEM	TMS Regular ($300,000/mile *0.7 miles)	0.7	300000	20%	$210,000	$252,000
Median Barrier	At TH 120 (2379 LF. * $69.00/LF)		69	20%	$0	$0
Intersection ADA	44 corners * $4,000.00/corner Need #3628 Child Need to Need #3617	44	4000	20%	$176,000	$211,200
4" Sidewalk	Hadley Right Side (8711 SF * $3.50/SF) Need #3647 Child Need to Need #3617	8750	3.5	20%	$30,625	$36,750
4" Sidewalk	Hadley Left Side (7764 SF * $3.50/SF) Need #3647 Child Need to Need #3617	19477	3.5	20%	$68,170	$81,803
				20%	$0	$0
NEED MORE LINES? ADD ADDITIONAL ROWS HERE (HIGHLIGHT THIS LINE, RIGHT CLICK, SELECT INSERT)					$0	$0
						$9,450,053
				ESTIMATED CONSTRUCTION COST (MnDOT)	$7,875,045	$9,450,053

PVMT. $ / SQ FT	$11.47
PVMT. $ / SQ FT (RISK)	$13.76
LWD PORTION COST	OTHER COSTS
#REF!	#REF!

ROADWAY ONLY	PVMT. $ / MILE	$1,725,455
	$ / LANE MILE	$287,576
TOTAL PROJECT	PROJ. $ / MILE	$4,295,479
	$ / LANE MILE	$715,913

TOTAL PROJECT MILES	2.2
TOTAL PROJECT LANE MILES	13.2
TOTAL PROJECT AUX. LANE MILES	0.5

PROJECT ENGINEERING COSTS	
Pre-Letting 12% of Construction Cost	$1,134,006
Construction 8% of Construction Cost	$756,004
Engineering Total 20% of Construction	$1,890,011

SUB-TOTAL (CONSTRUCTION + RISK) >>>			$9,450,053
OVERALL PROJECT RISK	20.00%	PROJECT RISK DOLLARS	$1,575,009
RIGHT-OF-WAY COST (15.2 Acres Impacted)	0%		$0
RAILROAD AGREEMENT COST	0%	$0	$0
MAJOR UTILITY RELOCATION COST	0%	$0	$0
TRAFFIC MANAGEMENT PLAN (5% OF TOTAL CONSTRUCTION COST)	10%	$472,503	$519,753
ESTIMATED PROJECT LANDSCAPE COST	0%	$0	$0

(LANDSCAPING NOT INCLUDED IN TOTAL COST BUT IS A REMINDER FOR FUTURE PROGRAMMING NEEDS)

TOTAL COST OF CONSTRUCTION, R-O-W, RAILROAD AGREEMENTS AND UTILITIES >>> $9,922,556

CURRENT PROJECT COST TOTAL (CONSTRUCTION + RISK + OTHER EXTERNAL COSTS) >>>	$9,969,806
CURRENT PROJECT COST TOTAL (CONSTRUCTION + RISK + ENGINEERING COSTS) >>>	$11,859,817

Existing hadley over tunnel

Item Description	Units	Unit Cost	Quantity	Total
PAVING AND GRADING (P & G) COSTS				
Bituminous Pavement (1)	ton	$70.00	1,523	$ 106,624
4" Concrete Walk	sq ft	$4.00	6,751	$ 27,004
Concrete Pavement	sq yd	$60.00	0	$ -
Structural Concrete	cu yd	$70.00	0	$ -
Class 5 Aggregate Base (1)	cu yd	$20.00	725	$ 14,505
Subgrade Excavation (1)	cu yd	$6.00	2,568	$ 15,405
Common Excavation	cu yd	$10.00	1,789	$ 17,895
Common Borrow	cu yd	$7.00	7,289	$ 51,026
Select Granular Borrow	cu yd	$12.00		$ -
Mill Pavement	sq yd	$5.00	0	$ -
Curb and Gutter Design B624	lin ft	$14.00	676	$ 9,464
(a) Subtotal Paving and Grading				**$ 241,923**
UTILITIES, REMOVALS, DRAINAGE, ETC.				
Removals/Clear and Grub		5.0%		$ 12,100
Minor City Utilities		5.0%		$ 12,100
Signing, Striping, Traffic Control		5.0%		$ 12,100
Erosion Control and Turf Establishment		5.0%		$ 12,100
(b) Subtotal Utilities, Removals, Drainage, Etc.				**$ 48,400**
DRAINAGE				
Storm Sewer		15.0%		$ 36,300
(c) Subtotal Drainage				**$ 36,300**
STRUCTURES/SIGNALS/MISC. COST				
Bridges				$ -
	sqft	$240		$ -
TMS	lump sum	$1,260,000		$ -
Retaining Wall	lump sum	$1,475,770		$ -
Median Barrier	lin ft	$70		$ -
NoiseWall	sqft	$20		$ -
Lighting	lump sum	$340,000		$ -
Signals	each	$250,000		$ -
(d) Subtotal Structural				**$ -**
(a+b+c+d) Subtotal Construction				**$ 326,623**
Risk & Contingency		20.0%		$ 65,300
Mobilization		4.0%		$ 13,100
(e) Subtotal Miscellaneous				**$ 78,400**
(a+b+c+d+e) Total Construction				**$ 405,023**
Administrative & Engineering		20.0%		$ 81,005
RW Cost				
Permanent RW	acre	$2,000,000		$ -
Temporary Easement	acre	$100,000		$ -
Total RW				**$ -**

Total Estimated Cost	**$ 486,027**

Notes:

(1) Assumed Pavement and Subcut Depths:

TH 36 Mainline Pavement:	8	
	6	Class 5
	24	Subcut
TH 36 Bit Shoulder:	8	
	6	Class 5
	24	Subcut
Ramps Bit Pavement:	7	SP
	6	Class 5
	24	Subcut
Local Mainline Pavement:	7	SP
	6	Class 5
	24	Subcut
Local Shoulder:	7	
	6	Class 5
	24	Subcut
Trail	2.5	MV
	4	Class 5

LWD Construction Items and Additional Project Items

Major Work Item features that are typically included in the cost multiplier for the roadway portion of an LWD estimate:

1)	**Mobilization:**	Just a projects mobilization cost.
2)	**Removals/ Salvage:**	field offices, clear and grubbing, sawing pavement, abandon and seal well and other various removals and salvage. NOT INCLUDED under this major item group are Bridge Removals or Building Removals.
3)	**Grading:**	common, sub-grade, and muck excavation, granular and topsoil borrow.
4)	**Aggregates:**	aggregate base and aggregate shoulder.
5)	**Paving B:**	bituminous paving (base, binder, wear and tack),
6)	**Paving C:**	concrete paving (standard and irregular), structural concrete, expansion joints, dowels, reinforcing bars, and bridge approach panels.
7)	**Concrete Items:**	concrete walks and curb and gutter, bituminous walks & curb and gutter, permanent median barrier, and concrete median noses.
8)	**Traffic Control:**	traffic control lump sum, portable changeable message board, temporary pavement marker, lane stripping, pavement messages, traffic barriers, guard- rail, install/relocate median barrier, and impact attenuaters.
9)	**Turf / Erosion:**	bale checks, silt/curtain fence, seeding sodding, mulch, disc anchoring, fertilizer, and erosion control (various).
10)	**Miscellaneous:**	lighting, fencing, signing, mailbox supports, loop detectors replacement, and minor signal system upgrades.

It is each Project Managers responsibility to contact Offices listed below to assure that item costs are current.

Additional cost items include (This list is not all-inclusive)

1) **Bridges and Box Culverts**
2) **Drainage:**
3) **Signal Systems**
4) **Retaining Walls**
5) **Noise Walls**
6) **Traffic incedent Management Systems**
7) **Trail Systems**
8) **Large Overhead Sigh Bridges**
9) **Poly Pre-formed Stripping**
10) **Bridge or House Removals**
11) **Additional Cost Drainage**
12) **Additional Cost Items**
13) **Railroad Agreements**
14) **Utilities Relocation**
15) **Right-of-Way Costs**

INFLATION ADJUSTMENTS

PROJECT COSTS - 2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
FY 2014-2017 STIP	0.04	0.04	0.05	0.05						
FY 2018-2023					0.04	0.04	0.04	0.04	0.04	0.04
CUMULATIVE	1.0400	1.0816	1.1357	1.1925	1.2402	1.2898	1.3414	1.395	1.4508	1.5088
	1.04	1.08	1.14	1.19	1.24	1.29	1.34	1.40	1.45	1.51

10/17/2012

APPENDIX D – HIGHWAY 36 CORRIDOR STUDY REPORT

Assessment of Gateway Trail Crossing at Hadley Avenue Technical Memorandum (December 10, 2013)

TECHNICAL MEMORANDUM

TO: Karen Scheffing
MnDOT Project Manager

FROM: Mark Benson, P.E.
Bob Rogers, AICP

DATE: December 10, 2013

RE: Assessment of Gateway Trail Crossing at Hadley Avenue

This technical memorandum summarizes the assessment of possible future Gateway Trail crossing options being considered at Hadley Avenue as part of the Highway 36 Corridor Study.

Gateway Trail crossing at Hadley Ave. (looking west)

Background

The Minnesota Department of Natural Resources (MNDNR) owns and operates the Gateway State Trail. The multi-use trail parallels the southern right-of-way line of Highway 36 through much of the study area. The trail is heavily used by cycle commuters and for recreational enjoyment (walking, biking, and rollerblading). Within the study area the Gateway State Trail crosses Hadley Avenue at-grade; however, this location recently received fiscal year 2015 funding through the Surface Transportation Program (STP) for the construction of a grade separated crossing. The MNDNR has not yet begun detailed plans for the future grade separated crossing. The MNDNR is working cooperatively with MnDOT and the City of Oakdale on the future improvements to the trail.

Grade separating Highway 36 and Hadley Avenue was recommended as part of the Highway 36 Corridor Study since MnDOT's long term vision for Highway 36 is to remove all at-grade intersections and access points west of the I-694 beltway. The Highway 36 Corridor Study further recommended a future folded diamond interchange concept be planned at Hadley Avenue in order to maintain regional mobility and provide access to surrounding commercial, industrial, and residential land uses.

Recognizing the interaction between the proposed grade separation improvements of the Gateway Trail and the future interchange at Highway 36/Hadley Avenue, MnDOT, in cooperation with the project partners, identified the need for a more detailed assessment of trail crossing options and ongoing coordination with the MNDNR.

Therefore, the scope of this trail crossing assessment is to consider a range of crossing alternatives that takes into consideration the potential future roadway profile of Hadley Avenue (since Hadley Ave. is proposed to go up and over Highway 36 and the distance the trail crossing should be setback from Highway 36 in order to accommodate a potential future interchange configuration. A high level evaluation of the crossing alternatives was conducted in an effort to provide an assessment of feasibility/constructability and potential impacts from construction (i.e. right-of-way, wetlands, groundwater, costs, etc.).

Alternatives Considered

Three primary crossing alternatives were considered for grade separating the Gateway Trail where it intersects with Hadley Avenue. The conceptual alternatives are described below and depicted in Appendix A:

Existing Gateway Trail underpass at Washington County Road 12

- *Option 1: Underpass (Tunnel)* – this alternative would grade separate the trail corridor from Hadley Avenue by means of an underpass structure. As shown on Figures1 and 2, found in Appendix A, the underpass (tunnel) would be constructed approximately 260-feet south of the existing trail crossing in order to accommodate a future folded diamond interchange configuration for Highway 36/Hadley Avenue. Furthermore, the underpass would consist of a box culvert style structure and would be approximately 12 feet high by 14 feet wide and 107 feet in length. The profile of Hadley Avenue would be raised approximately 7 feet above the existing elevation. Portions of the Gateway Trail on both the east and west sides of Hadley Avenue would also need to be relocated to the south in order to reconnect the underpass to the existing trail corridor.

- *Option 2: Overpass (Bridge)* – this option would grade separate the trail corridor from Hadley Avenue with the construction of a bridge structure. It has been assumed that a similar bridge type to the recently constructed trail bridge overpass at Highway 120/Century Avenue would be constructed at Hadley Avenue. Figure 3, found in Appendix A, the bridge overpass would be constructed approximately260-feet south of the existing trail crossing in order to accommodate the future folded diamond interchange configuration for Highway 36/Hadley Avenue. The bridge overpass would be approximately 278 feet in length. The trail bridge height will be placed at an elevation above the existing ground level that will accommodate the future improvements to Hadley Avenue associated with the folded diamond interchange. Portions of the Gateway Trail on both the east and west sides of Hadley Avenue would also need to be relocated to the south in order to reconnect the overpass to the existing trail corridor.

Existing Gateway Trail Bridge at Highway 120/Century Avenue

- *Option 3: Overpass (Bridge) at Existing Crossing to be Relocated in the Future* – this option would grade separate the trail corridor from Hadley Avenue with the construction of a bridge structure. Figure 4, located in Appendix A, the bridge overpass would be constructed as close to

the existing crossing as possible. However, a minor shift to the south is expected (approximately 40 feet) to accommodate the construction of retaining walls while still allowing the existing trail to remain open during construction. This minor alignment shift requires approximately 0.63 acres of new right-of-way from two parcels. The bridge structure would be approximately 278 feet in length and constructed in a manner that would allow for large portions of the overpass structure to be relocated to the south at the time the Highway 36/Hadley Avenue interchange is constructed. Segments of the existing trail on both the east and west sides (approximately 550 on both sides) of Hadley Avenue would also need to be reconstructed in order to reconnect the overpass at the existing crossing location to the existing trail corridor.

It should also be noted that a local trail connection between the underpass and overpass alternatives to the city trail that runs along the west side of Hadley Avenue will need to be identified as part of the more detailed design phase of project development. Possible local trail connection options are included on the figures presented in Appendix A.

Evaluation

The first step in the evaluation of grade separated crossings of the Gateway Trail at Hadley Avenue is to determine the feasibility and/or constructability of the three options. As part of this process it was determined that the area is characterized by very high seasonal groundwater elevations. MnDOT conducted some preliminary testing in the area and determined that the groundwater elevation is at approximately 955. As a result, the underpass alternatives assumed the base of the structure would be three feet above the groundwater or at elevation 958. Figures 1 and 2, located in Appendix A, depict the underpass alternative and the proposed profiles of Hadley Avenue over the trail underpass.

Other items considered in the feasibility evaluation were whether or not the trail options would be compatible with the long term vision for Highway 36 that includes a potential folded diamond interchange at Hadley Avenue and could the roadway and trail improvements be constructed to meet all current design standards, including American's with Disabilities Act (ADA) requirements. The trail options were designed with a maximum 5 percent trail grade/profile, but the MNDNR indicated that they prefer to build their trail profiles with a maximum 4.6 to 4.8 percent grade.

The grade separated trail crossing options have been refined to the extent practical at this stage of design to ensure each alternative is feasible to construct. The next step in the evaluation process was to consider potential impacts from construction. The three trail options were evaluated based on a set of comparison criteria that considered project effects and commitments associated with social and environmental impacts and financial costs. The trail options comparison matrix, see Table 1 on the following page, provides a comparative evaluation of the grade separated trail crossing concept alternatives.

Findings

The options for grade separating the Gateway Trail at Hadley Avenue and the findings presented in this technical memorandum were discussed by the project partners. A single trail crossing option was not identified. However, based on the evaluation of the conceptual options and input received during this study process it appears that the underpass option could be constructed at the lowest cost while having equally comparable impacts as the other option considered. Construction of an underpass could be completed in the near term and designed in a manner that would not hinder the construction or require additional costs if an interchange were constructed at Highway 36/Hadley Avenue in the future. It should be noted that additional design considerations and further discussions within the MNDNR need to occur before a final option can be identified.

Table 1 – Gateway Trail Crossing at Hadley Avenue Options Comparison Matrix

Gateway Trail Crossing Options	Evaluation Criteria						
	Right-of-Way Impacts	Wetland Impacts	Groundwater	Meets All Trail Design Standards	Meets All Roadway Design Standards	Connection to City Trail along Hadley Avenue	Estimated Construction Costs[2]
Option 1: Underpass/Tunnel	5.59 acres; total acquisition of 2 parcels and partial acquisition of 1 parcel. R/W consistent with future interchange.	None	None Underpass would be placed 3 feet above ground water	Yes	If the underpass were constructed prior to the interchange, the profile for Hadley Avenue over the tunnel would have a 30 mph design speed. (Sags=30mph; Crest=35mph)	Easy since trail is at-grade	$913,000 underpass and trail improvements only. An additional $486,027 along Hadley Avenue would be required if the underpass were built prior to the interchange.
Option 2: Overpass (Bridge)	5.59 acres; total acquisition of 2 parcels and partial acquisition of 1 parcel. R/W consistent with future interchange.	None	None	Yes	Yes	Difficult due to elevation changes and limited R/W	$2,239,718 overpass and trail improvements.
Option 3: Overpass (Bridge) at Existing Crossing to be Relocated in the Future[1]	0.52 acres; partial acquisition from 2 parcels.	0.19-acres of impact 1 wetland basin impacted	None	Yes	Yes	Easy at existing site, but difficult upon relocation.	$1,621,152 overpass/trail improvements at existing location. An additional $1,270,886 needed to relocated the bridge structure in the future when an interchange is constructed at Hwy 36 and Hadley Avenue.

Table Notes: [1] Impacts for Alternative 3: Overpass (Bridge) Option at Existing Crossing to be Relocated in the Future are considered interim effects because the long-term vision for the highway corridor includes a folded diamond interchange at Hadley Avenue, which would require the trail overpass bridge to be moved to the south resulting in additional impacts similar to those identified for Alternative 2.

[2] Right-of-way costs not estimated. A more detailed breakdown of the cost estimates are included in Appendix B.

Tech Memo: Appendix A

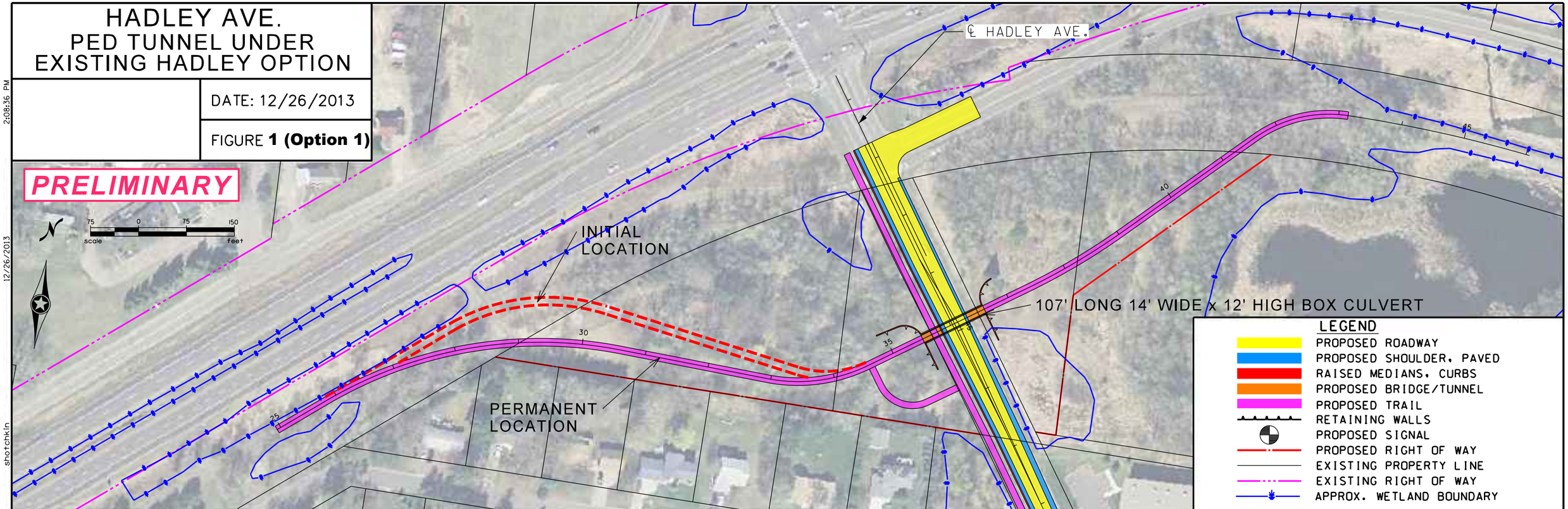
Gateway Trail Crossing at Hadley Avenue – Concept Alternatives

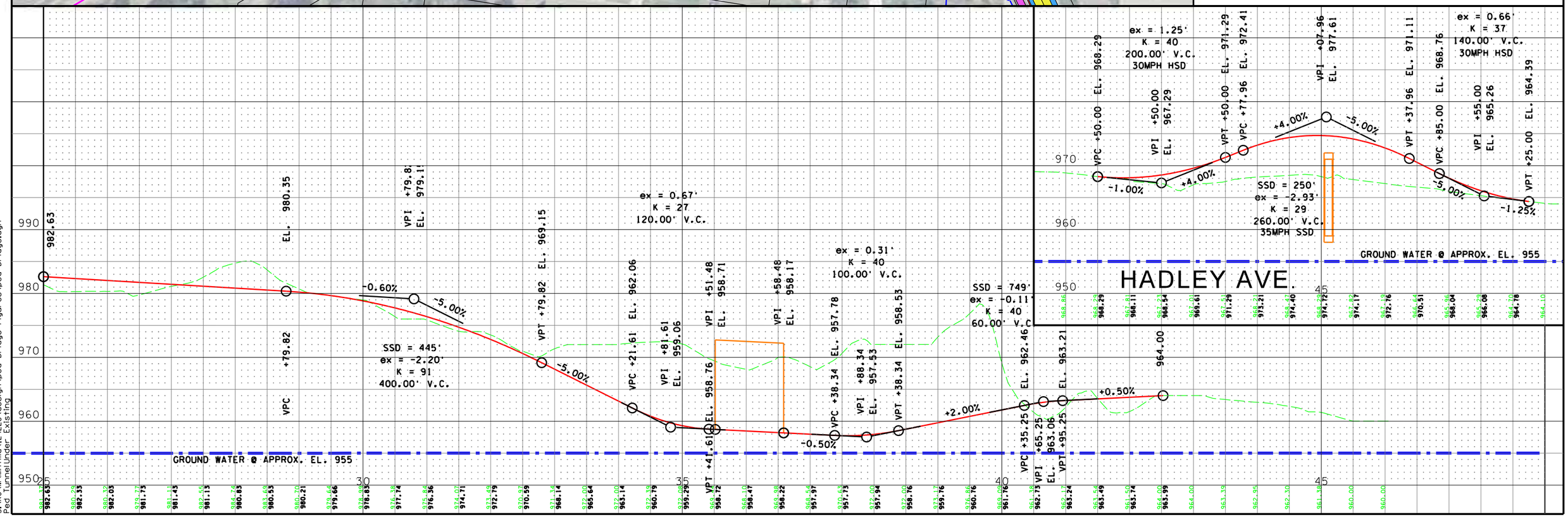
HADLEY AVE.
PED TUNNEL UNDER EXISTING HADLEY OPTION

DATE: 12/26/2013

FIGURE **1 (Option 1)**

PRELIMINARY





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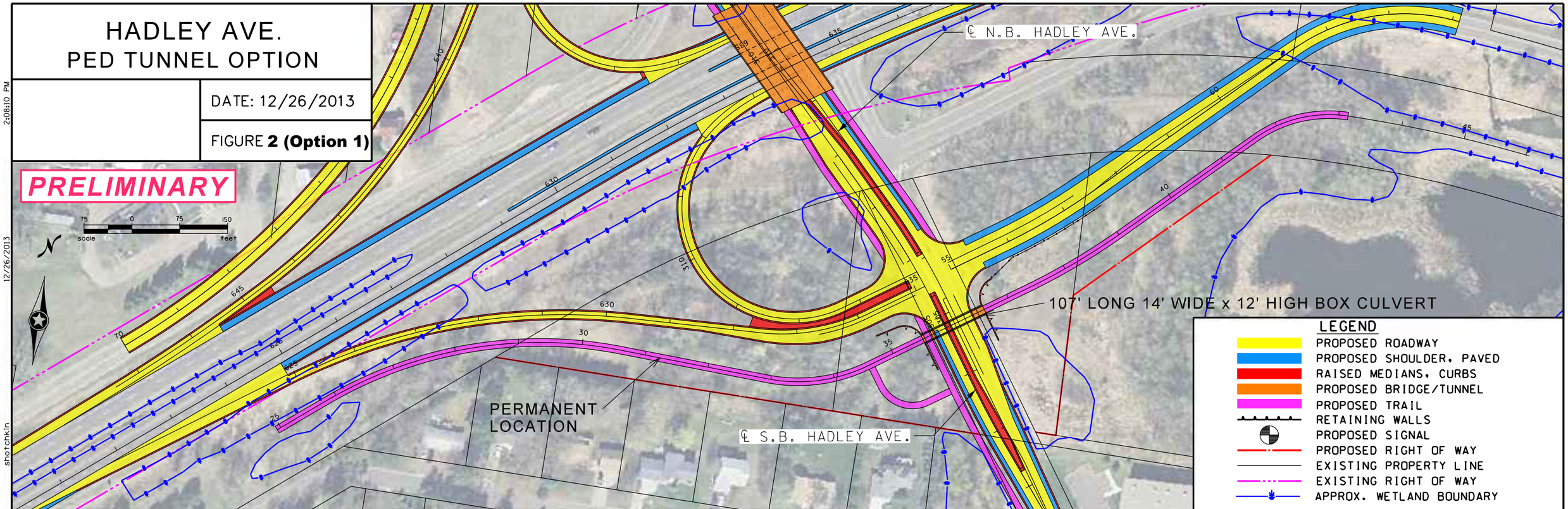
Ped Tunnel Under Existing

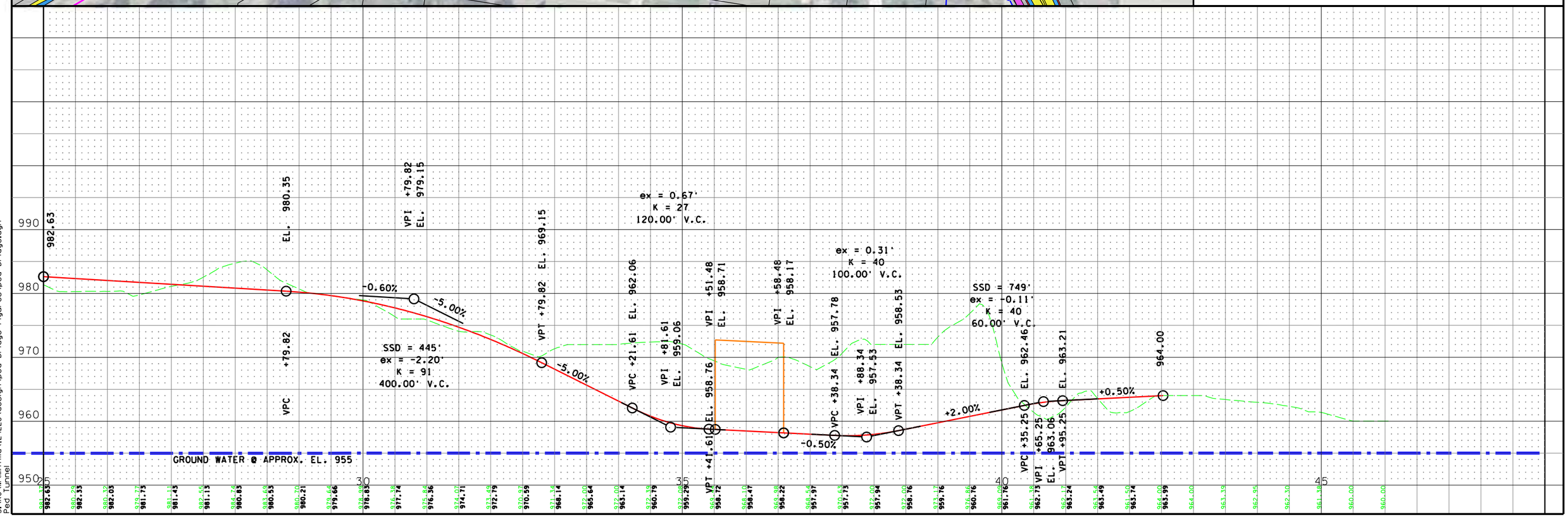
HADLEY AVE.
PED TUNNEL OPTION

DATE: 12/26/2013

FIGURE **2 (Option 1)**

PRELIMINARY





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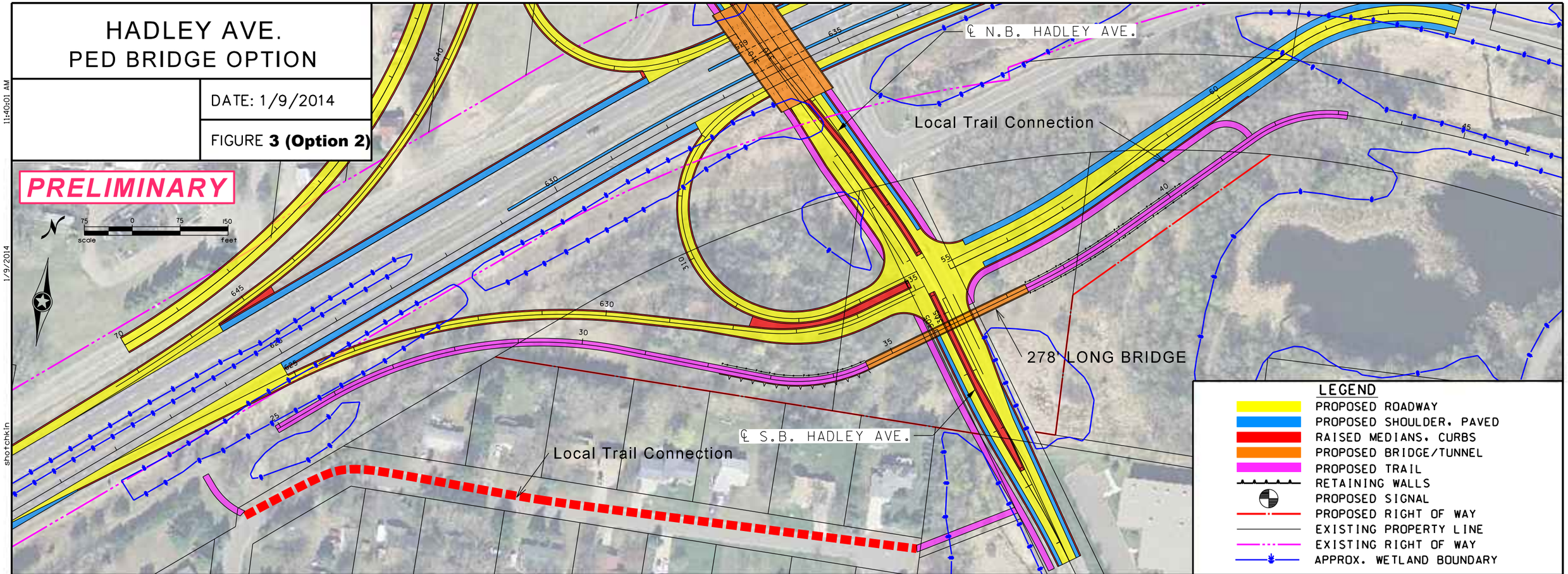
Ped Tunnel

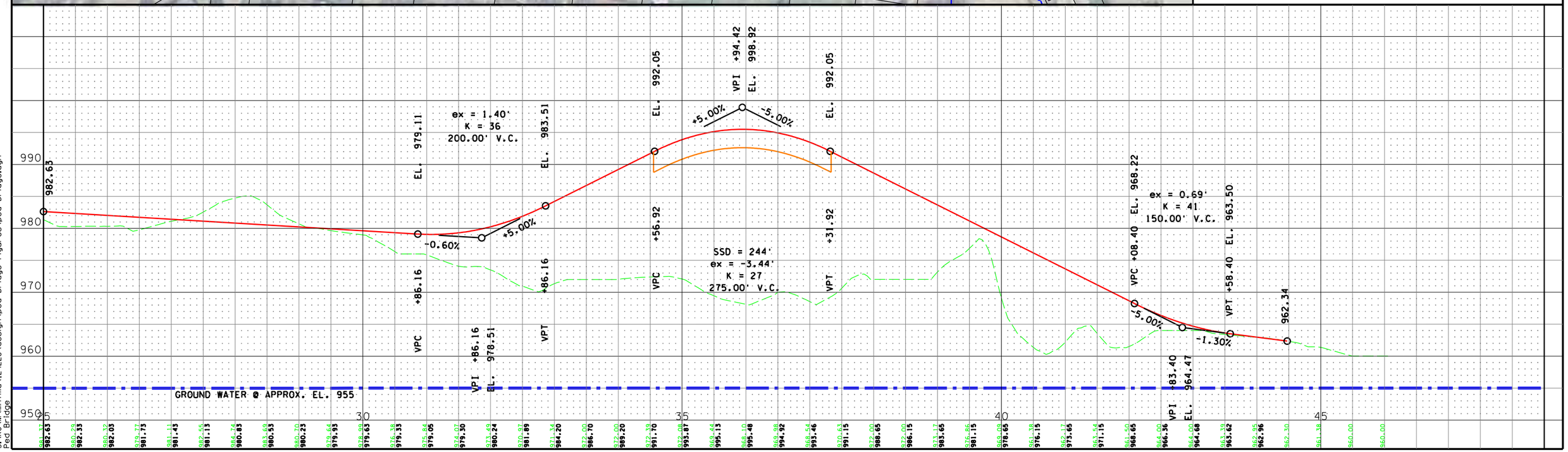
HADLEY AVE.
PED BRIDGE OPTION

DATE: 1/9/2014

FIGURE **3 (Option 2)**

PRELIMINARY





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Ped Bridge

Tech Memo: Appendix B

Gateway Trail Crossing at Hadley Avenue – Cost Estimate

LWD COST ESTIMATE WORKSHEET

ESTIMATE COMPLETED BY :		**SP**		**DISTRICT**	**METRO**
NAME: Scott Hotchkin		**TH**	**36**	**LENGTH**	**x.xx MILES**
Estimate's Completion Date:	10/18/13	**MSD #**	**xxxx**	**ID #**	**XXXXX**
Project Location:		**LETTING YEAR:**	**2015**		

LOCATED ON Hadley Ave. (Trail Overpass)

Project Description:

GRADING, SURFACING, DRAINAGE, UTILITIES, NOISE WALLS, RETAINING WALLS, TMC,AND BRIDGE NO'S. _.

PROJECT ROADWAY COST CALCULATIONS — IN INCHES

ROADWAY	LOCATION (FROM/TO)	AREA (square feet)	DEPTH (inch)	LWD FACTOR	LWD COST MULTIPLIER	CONST. COST
Trail Pavement		26,511	7.0	2.92	$100,000	$292,000
			8.0	0.00	$100,000	$0
			8.0	0.00	$100,000	$0
		26,511		**2.92**		**$292,000**

PROJECT BRIDGE COST CALCULATIONS

LOCATION	BRIDGE NUMBER	LENGTH (FEET)	WIDTH (FEET)	SQUARE FEET	$ / SQ FT	COST
Trail over Hadley (Bridge Relocation with Pier/Abutment removal and construction)		278.0	15.0	4,170	$240	$1,000,800
					BRIDGE COST TOTALS	**$1,000,800**

PROJECT COST TOTALS

CONSTRUCTION SUB-ITEM	PROJECT RISK DETAILS				% OF RISK	CONST. COST	CONST + RISK
ROADWAY COST **(PAVEMENT)**					**20%**	$292,000	$350,400
BRIDGE COST					**20%**	$1,000,800	$1,200,960
DRAINAGE COSTS ABOVE NORMAL PROJECT NEE	RISK FOR / NEED #:				**20%**		$0
ROADWAY LIGHTING COST					**20%**	$0	$0
SIGNAL SYSTEM COST					**20%**	$0	$0
NOISE WALL COST					**20%**	$0	$0
RETAINING WALL COST	Right side from Trail Bridge West (241 LF * 12 LF * $85.00/SF)	12	241	85	**20%**	$245,820	$294,984
TMS - TRAFFIC MANAGEMENT SYSTEM					**20%**	$0	$0
TMS - TRAFFIC MANAGEMENT SYSTEM					**20%**	$0	$0
Median Barrier					**20%**	$0	$0
Guardrail	At Trail Bridge (837 LF. * $20.00/LF)		837	20	**20%**	$16,740	$20,088
Intersection ADA					**20%**	$0	$0
4" Sidewalk					**20%**	$0	$0
4" Sidewalk					**20%**	$0	$0
					20%	$0	$0
NEED MORE LINES? ADD ADDITIONAL ROWS HERE (HIGHLIGHT THIS LINE, RIGHT CLICK, SELECT INSERT)						$0	$0
							$1,866,432
				ESTIMATED CONSTRUCTION COST (MnDOT)		**$1,555,360**	**$1,866,432**

PVMT. $ / SQ FT	$11.01
PVMT. $ / SQ FT (RISK)	$13.22
LWD PORTION COST	**OTHER** COSTS
#REF!	#REF!

ROADWAY ONLY	PVMT. $ / MILE	$132,727
	$ / LANE MILE	$22,121
TOTAL PROJECT	PROJ. $ / MILE	$848,378
	$ / LANE MILE	$141,396

TOTAL PROJECT MILES	2.2
TOTAL PROJECT LANE MILES	13.2
TOTAL PROJECT AUX. LANE MILES	0.5

PROJECT ENGINEERING COSTS	
Pre-Letting 12% of Construction Cost	**$223,972**
Construction 8% of Construction Cost	**$149,315**
Engineering Total 20% of Construction	**$373,286**

SUB-TOTAL (CONSTRUCTION + RISK) >>> **$1,866,432**

OVERALL PROJECT RISK 20.00% **PROJECT RISK DOLLARS** $311,072

RIGHT-OF-WAY COST	**0%**	**TBD**	TBD
RAILROAD AGREEMENT COST	**0%**	**NA**	NA
MAJOR UTILITY RELOCATION COST	**0%**	**$0**	$0
TRAFFIC MANAGEMENT PLAN (5% OF TOTAL CONSTRUCTION COST)	**10%**	**$0**	$0
ESTIMATED PROJECT LANDSCAPE COST	**0%**	**$0**	$0

(LANDSCAPING NOT INCLUDED IN TOTAL COST BUT IS A REMINDER FOR FUTURE PROGRAMMING NEEDS)

TOTAL COST OF CONSTRUCTION >>> $1,866,432

CURRENT PROJECT COST TOTAL (CONSTRUCTION + RISK + OTHER EXTERNAL COSTS) >>> **$1,866,432**

CURRENT PROJECT COST TOTAL (CONSTRUCTION + RISK + ENGINEERING COSTS) >>> **$2,239,718**

LWD COST ESTIMATE WORKSHEET

ESTIMATE COMPLETED BY :		SP		DISTRICT	METRO
NAME: Scott Hotchkin		TH	36	LENGTH	x.xx MILES
Estimate's Completion Date:	10/18/13	MSD #	xxxx	ID #	XXXXX
Project Location:		LETTING YEAR:	2015		

LOCATED ON Hadley Ave. (Trail Underpass)

Project Description:

GRADING, SURFACING, DRAINAGE, UTILITIES, NOISE WALLS, RETAINING WALLS, TMC,AND BRIDGE NO'S. _.

PROJECT ROADWAY COST CALCULATIONS IN INCHES

ROADWAY	LOCATION (FROM/TO)	AREA (square feet)	DEPTH (inch)	LWD FACTOR	LWD COST MULTIPLIER	CONST. COST
Trail Pavement		22,136	7.0	2.44	$100,000	$244,000
			8.0	0.00	$100,000	$0
			8.0	0.00	$100,000	$0
		22,136		2.44		$244,000

PROJECT BRIDGE COST CALCULATIONS

LOCATION	BRIDGE NUMBER	LENGTH (FEET)	WIDTH (FEET)	SQUARE FEET	$ / LIN FT	COST
Trail Under Hadley		108.0			$1,200	$129,600
					BRIDGE COST TOTALS	$129,600

PROJECT COST TOTALS

CONSTRUCTION SUB-ITEM	PROJECT RISK DETAILS				% OF RISK	CONST. COST	CONST + RISK
ROADWAY COST **(PAVEMENT)**					20%	$244,000	$292,800
BRIDGE COST					20%	$129,600	$155,520
DRAINAGE COSTS ABOVE NORMAL PROJECT NEE	RISK FOR / NEED #:				20%		$0
ROADWAY LIGHTING COST					20%	$0	$0
SIGNAL SYSTEM COST					20%	$0	$0
NOISE WALL COST					20%	$0	$0
RETAINING WALL COST	Left Side from Trail Bridge West (100 LF * 12 LF * $85.00/SF)	12	100	85	20%	$102,000	$122,400
RETAINING WALL COST	Right side from Trail Bridge West (50 LF * 12 LF * $85.00/SF)	12	50	85	20%	$51,000	$61,200
RETAINING WALL COST	Left side from Trail Bridge East (50 LF * 12 LF * $85.00/SF)	12	50	85	20%	$51,000	$61,200
RETAINING WALL COST	Right side from Trail Bridge East (50 LF * 12 LF * $85.00/SF)	12	50	85	20%	$51,000	$61,200
TMS - TRAFFIC MANAGEMENT SYSTEM					20%	$0	$0
TMS - TRAFFIC MANAGEMENT SYSTEM					20%	$0	$0
Median Barrier					20%	$0	$0
Guardrail	At Trail Bridge (300 LF. * $20.00/LF)		300	20	20%	$6,000	$7,200
Intersection ADA					20%	$0	$0
4" Sidewalk					20%	$0	$0
4" Sidewalk					20%	$0	$0
					20%	$0	$0
NEED MORE LINES? ADD ADDITIONAL ROWS HERE (HIGHLIGHT THIS LINE, RIGHT CLICK, SELECT INSERT)						$0	$0
							$761,520
				ESTIMATED CONSTRUCTION COST (MnDOT)		$634,600	$761,520

PVMT. $ / SQ FT	$11.02
PVMT. $ / SQ FT (RISK)	$13.23
LWD PORTION COST	OTHER COSTS
#REF!	#REF!

ROADWAY ONLY	PVMT. $ / MILE	$110,909
	$ / LANE MILE	$18,485
TOTAL PROJECT	PROJ. $ / MILE	$346,145
	$ / LANE MILE	$57,691

TOTAL PROJECT MILES	2.2
TOTAL PROJECT LANE MILES	13.2
TOTAL PROJECT AUX. LANE MILES	0.5

PROJECT ENGINEERING COSTS	
Pre-Letting 12% of Construction Cost	$91,382
Construction 8% of Construction Cost	$60,922
Engineering Total 20% of Construction	$152,304

SUB-TOTAL (CONSTRUCTION + RISK) >>>			$761,520
OVERALL PROJECT RISK	20.00%	PROJECT RISK DOLLARS	$126,920
RIGHT-OF-WAY COST	0%	TBD	TBD
RAILROAD AGREEMENT COST	0%	NA	NA
MAJOR UTILITY RELOCATION COST	0%	$0	$0
TRAFFIC MANAGEMENT PLAN (5% OF TOTAL CONSTRUCTION COST)	10%	$0	$0
ESTIMATED PROJECT LANDSCAPE COST	0%	$0	$0
(LANDSCAPING NOT INCLUDED IN TOTAL COST BUT IS A REMINDER FOR FUTURE PROGRAMMING NEEDS)			
TOTAL COST OF CONSTRUCTION	>>>	$761,520	

CURRENT PROJECT COST TOTAL (CONSTRUCTION + RISK + OTHER EXTERNAL COSTS) >>>	$761,520
CURRENT PROJECT COST TOTAL (CONSTRUCTION + RISK + ENGINEERING COSTS) >>>	$913,824

LWD COST ESTIMATE WORKSHEET

ESTIMATE COMPLETED BY :		**SP**		**DISTRICT**	**METRO**
NAME: Scott Hotchkin		**TH**	**36**	**LENGTH**	**x.xx MILES**
Estimate's Completion Date:	10/18/13	**MSD #**	**xxxx**	**ID #**	**XXXXX**
Project Location:		**LETTING YEAR:**	**2015**		

LOCATED ON Hadley Ave. (New Trail Overpass at Existing Crossing Location)

Project Description:

GRADING, SURFACING, DRAINAGE, UTILITIES, NOISE WALLS, RETAINING WALLS, TMC,AND BRIDGE NO'S. _.

PROJECT ROADWAY COST CALCULATIONS — IN INCHES

ROADWAY	LOCATION (FROM/TO)	AREA (square feet)	DEPTH (inch)	LWD FACTOR	LWD COST MULTIPLIER	CONST. COST
Trail Pavement		9,837	7.0	1.08	$100,000	$108,000
			8.0	0.00	$100,000	$0
			8.0	0.00	$100,000	$0
		9,837		**1.08**		**$108,000**

PROJECT BRIDGE COST CALCULATIONS

LOCATION	BRIDGE NUMBER	LENGTH (FEET)	WIDTH (FEET)	SQUARE FEET	$ / SQ FT	COST
Trail over Hadley		278.0	15.0	4,170	$240	$1,000,800
					BRIDGE COST TOTALS	**$1,000,800**

PROJECT COST TOTALS

CONSTRUCTION SUB-ITEM	PROJECT RISK DETAILS			% OF RISK	CONST. COST	CONST + RISK
ROADWAY COST **(PAVEMENT)**				**20%**	$108,000	$129,600
BRIDGE COST				**20%**	$1,000,800	$1,200,960
DRAINAGE COSTS ABOVE NORMAL PROJECT NEE	RISK FOR / NEED #:			**20%**		$0
ROADWAY LIGHTING COST				**20%**	$0	$0
SIGNAL SYSTEM COST				**20%**	$0	$0
NOISE WALL COST				**20%**	$0	$0
RETAINING WALL COST				**20%**	$0	$0
TMS - TRAFFIC MANAGEMENT SYSTEM				**20%**	$0	$0
TMS - TRAFFIC MANAGEMENT SYSTEM				**20%**	$0	$0
Median Barrier				**20%**	$0	$0
Guardrail	At Trail Bridge (850 LF. * $20.00/LF)	850	20	**20%**	$17,000	$20,400
Intersection ADA				**20%**	$0	$0
4" Sidewalk				**20%**	$0	$0
4" Sidewalk				**20%**	$0	$0
				20%	$0	$0
NEED MORE LINES? ADD ADDITIONAL ROWS HERE (HIGHLIGHT THIS LINE, RIGHT CLICK, SELECT INSERT)					$0	$0
						$1,350,960
			ESTIMATED CONSTRUCTION COST (MnDOT)		**$1,125,800**	**$1,350,960**

PVMT. $ / SQ FT	$10.98
PVMT. $ / SQ FT (RISK)	$13.17
LWD PORTION COST	**OTHER** COSTS
#REF!	#REF!

ROADWAY ONLY	PVMT. $ / MILE	$49,091
	$ / LANE MILE	$8,182
TOTAL PROJECT	PROJ. $ / MILE	$614,073
	$ / LANE MILE	$102,345

TOTAL PROJECT MILES	2.2
TOTAL PROJECT LANE MILES	13.2
TOTAL PROJECT AUX. LANE MILES	0.5

PROJECT ENGINEERING COSTS	
Pre-Letting 12% of Construction Cost	**$162,115**
Construction 8% of Construction Cost	**$108,077**
Engineering Total 20% of Construction	**$270,192**

SUB-TOTAL (CONSTRUCTION + RISK) >>>			**$1,350,960**
OVERALL PROJECT RISK 20.00%	**PROJECT RISK DOLLARS**	$225,160	
RIGHT-OF-WAY COST	**0%**	**TBD**	TBD
RAILROAD AGREEMENT COST	**0%**	**NA**	NA
MAJOR UTILITY RELOCATION COST	**0%**	**$0**	$0
TRAFFIC MANAGEMENT PLAN (5% OF TOTAL CONSTRUCTION COST)	**10%**	**$0**	$0
ESTIMATED PROJECT LANDSCAPE COST	**0%**	**$0**	$0

(LANDSCAPING NOT INCLUDED IN TOTAL COST BUT IS A REMINDER FOR FUTURE PROGRAMMING NEEDS)

TOTAL COST OF CONSTRUCTION >>> $1,350,960

CURRENT PROJECT COST TOTAL (CONSTRUCTION + RISK + OTHER EXTERNAL COSTS) >>>	**$1,350,960**
CURRENT PROJECT COST TOTAL (CONSTRUCTION + RISK + ENGINEERING COSTS) >>>	**$1,621,152**

LWD COST ESTIMATE WORKSHEET

ESTIMATE COMPLETED BY :		**SP**		**DISTRICT**	**METRO**
NAME: Scott Hotchkin		**TH**	**36**	**LENGTH**	**x.xx MILES**
Estimate's Completion Date:	10/18/13	**MSD #**	**xxxx**	**ID #**	**XXXXX**
Project Location:		**LETTING YEAR:**	**2015**		

LOCATED ON Hadley Ave. (Relocated Trail Overpass)

Project Description:

GRADING, SURFACING, DRAINAGE, UTILITIES, NOISE WALLS, RETAINING WALLS, TMC,AND BRIDGE NO'S. _.

PROJECT ROADWAY COST CALCULATIONS — IN INCHES

ROADWAY	LOCATION (FROM/TO)	AREA (square feet)	DEPTH (inch)	LWD FACTOR	LWD COST MULTIPLIER	CONST. COST
Trail Pavement		18,446	7.0	2.03	$100,000	$203,000
			8.0	0.00	$100,000	$0
			8.0	0.00	$100,000	$0
		18,446		**2.03**		**$203,000**

PROJECT BRIDGE COST CALCULATIONS

LOCATION	BRIDGE NUMBER	LENGTH (FEET)	WIDTH (FEET)	SQUARE FEET	$ / SQ FT	COST
Trail over Hadley (Bridge Relocation with Pier/Abutment removal and construction)		278.0	15.0	4,170	$100	$417,000
					BRIDGE COST TOTALS	**$417,000**

PROJECT COST TOTALS

CONSTRUCTION SUB-ITEM	PROJECT RISK DETAILS				% OF RISK	CONST. COST	CONST + RISK
ROADWAY COST **(PAVEMENT)**					**20%**	$203,000	$243,600
BRIDGE COST					**20%**	$417,000	$500,400
DRAINAGE COSTS ABOVE NORMAL PROJECT NEE	RISK FOR / NEED #:				**20%**		$0
ROADWAY LIGHTING COST	0.7 mile * $200,000/ mile + 1 interchanges * $$200,000/interchange)				**20%**	$0	$0
SIGNAL SYSTEM COST					**20%**	$0	$0
NOISE WALL COST					**20%**	$0	$0
RETAINING WALL COST	Right side from Trail Bridge West (241 LF * 12 LF * $85.00/SF)	12	241	85	**20%**	$245,820	$294,984
TMS - TRAFFIC MANAGEMENT SYSTEM					**20%**	$0	$0
TMS - TRAFFIC MANAGEMENT SYSTEM					**20%**	$0	$0
Median Barrier					**20%**	$0	$0
Guardrail	At Trail Bridge (837 LF. * $20.00/LF)		837	20	**20%**	$16,740	$20,088
Intersection ADA					**20%**	$0	$0
4" Sidewalk					**20%**	$0	$0
4" Sidewalk					**20%**	$0	$0
					20%	$0	$0
NEED MORE LINES? ADD ADDITIONAL ROWS HERE (HIGHLIGHT THIS LINE, RIGHT CLICK, SELECT INSERT)						$0	$0
							$1,059,072
				ESTIMATED CONSTRUCTION COST (MnDOT)		**$882,560**	**$1,059,072**

PVMT. $ / SQ FT	$11.01
PVMT. $ / SQ FT (RISK)	$13.21
LWD PORTION COST	**OTHER** COSTS
#REF!	#REF!

ROADWAY ONLY	PVMT. $ / MILE	$92,273
	$ / LANE MILE	$15,379
TOTAL PROJECT	PROJ. $ / MILE	$481,396
	$ / LANE MILE	$80,233

TOTAL PROJECT MILES	2.2
TOTAL PROJECT LANE MILES	13.2
TOTAL PROJECT AUX. LANE MILES	0.5

PROJECT ENGINEERING COSTS	
Pre-Letting 12% of Construction Cost	**$127,089**
Construction 8% of Construction Cost	**$84,726**
Engineering Total 20% of Construction	**$211,814**

SUB-TOTAL (CONSTRUCTION + RISK) >>> **$1,059,072**

OVERALL PROJECT RISK 20.00% **PROJECT RISK DOLLARS** $176,512

RIGHT-OF-WAY COST	**0%**	**TBD**	TBD
RAILROAD AGREEMENT COST	**0%**	**NA**	NA
MAJOR UTILITY RELOCATION COST	**0%**	**$0**	$0
TRAFFIC MANAGEMENT PLAN (5% OF TOTAL CONSTRUCTION COST)	**10%**	**$0**	$0
ESTIMATED PROJECT LANDSCAPE COST	**0%**	**$0**	$0

(LANDSCAPING NOT INCLUDED IN TOTAL COST BUT IS A REMINDER FOR FUTURE PROGRAMMING NEEDS)

TOTAL COST OF CONSTRUCTION >>> $1,059,072

CURRENT PROJECT COST TOTAL (CONSTRUCTION + RISK + OTHER EXTERNAL COSTS) >>> **$1,059,072**

CURRENT PROJECT COST TOTAL (CONSTRUCTION + RISK + ENGINEERING COSTS) >>> **$1,270,886**

Existing hadley over tunnel - Option 1

Item Description	Units	Unit Cost	Quantity	Total
PAVING AND GRADING (P & G) COSTS				
Bituminous Pavement (1)	ton	$70.00	1,523	$ 106,624
4" Concrete Walk	sq ft	$4.00	6,751	$ 27,004
Concrete Pavement	sq yd	$60.00	0	$ -
Structural Concrete	cu yd	$70.00	0	$ -
Class 5 Aggregate Base (1)	cu yd	$20.00	725	$ 14,505
Subgrade Excavation (1)	cu yd	$6.00	2,568	$ 15,405
Common Excavation	cu yd	$10.00	1,789	$ 17,895
Common Borrow	cu yd	$7.00	7,289	$ 51,026
Select Granular Borrow	cu yd	$12.00		$ -
Mill Pavement	sq yd	$5.00	0	$ -
Curb and Gutter Design B624	lin ft	$14.00	676	$ 9,464
(a) Subtotal Paving and Grading				**$ 241,923**
UTILITIES, REMOVALS, DRAINAGE, ETC.				
Removals/Clear and Grub		5.0%		$ 12,100
Minor City Utilities		5.0%		$ 12,100
Signing, Striping, Traffic Control		5.0%		$ 12,100
Erosion Control and Turf Establishment		5.0%		$ 12,100
(b) Subtotal Utilities, Removals, Drainage, Etc.				**$ 48,400**
DRAINAGE				
Storm Sewer		15.0%		$ 36,300
(c) Subtotal Drainage				**$ 36,300**
STRUCTURES/SIGNALS/MISC. COST				
Bridges				$ -
	sqft	$240		$ -
TMS	lump sum	$1,260,000		$ -
Retaining Wall	lump sum	$1,475,770		$ -
Median Barrier	lin ft	$70		$ -
NoiseWall	sqft	$20		$ -
Lighting	lump sum	$340,000		$ -
Signals	each	$250,000		$ -
(d) Subtotal Structural				**$ -**
(a+b+c+d) Subtotal Construction				**$ 326,623**
Risk & Contingency		20.0%		$ 65,300
Mobilization		4.0%		$ 13,100
(e) Subtotal Miscellaneous				**$ 78,400**
(a+b+c+d+e) Total Construction				**$ 405,023**
Administrative & Engineering		20.0%		$ 81,005
RW Cost				
Permanent RW	acre	$2,000,000		$ -
Temporary Easement	acre	$100,000		$ -
Total RW				**$ -**

Total Estimated Cost	**$ 486,027**

Notes:

(1) Assumed Pavement and Subcut Depths:

TH 36 Mainline Pavement:	8	
	6	Class 5
	24	Subcut
TH 36 Bit Shoulder:	8	
	6	Class 5
	24	Subcut
Ramps Bit Pavement:	7	SP
	6	Class 5
	24	Subcut
Local Mainline Pavement:	7	SP
	6	Class 5
	24	Subcut
Local Shoulder:	7	
	6	Class 5
	24	Subcut
Trail	2.5	MV
	4	Class 5