TH 169/TH 282/CR 9 Interchange Concept Study

CITY OF JORDAN, SCOTT COUNTY, AND MnDOT

NOVEMBER 2018

Prepared By:

Kimley»Horn

This concept study was completed in cooperation between the City of Jordan, MnDOT and Scott County.

City of Jordan

MnDOT

Scott County

Contents

INTRODUCTION

The City of Jordan has been working with Scott County and MnDOT for over 20 years to develop proposed solutions for the TH 169/TH 282/CR 9 intersection area. Improvements are needed to address safety and operational concerns in the area, and the challenges are complex. A long-term solution is needed for the area, and the consent of the City of Jordan, Scott County, MnDOT, and the Jordan business community must be obtained for any proposed solution.

On April 17, 2018, the Jordan City Council approved a consultant contract with Kimley-Horn and Associates, Inc. for Concept Design and Consensus Building for the TH 169/TH 282/CR 9 intersection area. Our scope included traffic engineering, conceptual design, and stakeholder engagement services to develop a preliminary layout that demonstrates the ultimate vision for the corridor. We considered past work completed for the project area and also explored new alternatives to develop a vision for the TH 169/TH 282/CR 9 area that the City, County, and MnDOT can move forward to implementation.

Funding is not currently available to allow the improvements to proceed to construction. The goal of this study was to establish an agency supported design concept and estimated cost for the improvements to allow the City, County, and MnDOT to move forward with additional planning and the pursuit of project funding. Additional environmental review will also be required as a part of the future planning efforts to comply with National Environmental Policy Act (NEPA) requirements.

A Technical Advisory Committee (TAC) consisting of staff from the City of Jordan, Scott County, and MnDOT as well as three Jordan City Council members met several times and worked cooperatively to advance this study. The purpose of the TAC was to understand individual agency perspectives and to gain insight relative to key issues or perceived impacts, discuss potential mitigation strategies to minimize negative impacts, and identify considerations that could influence the study outcome.

This report summarizes the findings and direction of the TAC, identifies the concept alternatives considered, details the scope and estimated cost for the proposed agency supported interchange concept, and provides a potential phasing plan for the proposed improvements.

A project location map is provided in **Appendix A**.

STAKEHOLDER ENGAGEMENT SUMMARY

Stakeholder engagement was an essential element of this study as agency coordination was critical, considering that the roadways in the study area are under the jurisdiction of the City, Scott County, and MnDOT. The following is a summary of the stakeholder engagement activities that occurred:

Technical Advisory Committee (TAC) Meetings

A TAC was formed at the beginning of the study to assist in making decisions and advancing the study. The committee included the following members:

- Tanya Velishek, Jordan Mayor
- Jeff Will, Jordan City Council Member
- Mike Franklin, Jordan City Council Member
- Tom Nikunen, Jordan City Administrator
- Mike Waltman, Jordan City Engineer
- Jon Solberg, MnDOT
- Almin Ramic, MnDOT
- Lisa Freese, Scott County
- Tony Winiecki, Scott County

- Craig Jenson, Scott County
- Mark Callahan, Scott County
- Jon Horn, Kimley-Horn
- Brandon Bourdon, Kimley-Horn

Over the course of the study, TAC meetings were held on the following dates:

- May 22, 2018
- June 26, 2018
- July 24, 2018
- August 28, 2018
- September 25, 2018
- October 23, 2018

Minutes from the TAC meetings are included in **Appendix B**.

Jordan City Council Meetings

Updates were provided to the Jordan City Council on the following dates:

- August 20, 2018 (work session)
- November 19, 2018 (work session)
- December 3, 2018 (regular meeting)

The City Council was asked to adopt an agency supported concept at its meeting on December 3, 2018.

Public Open House

A public open house was held on October 29, 2018 to present the initial findings of the study and gather input from stakeholders. More than 25 people attended the open house meeting. The open house meeting materials were also made available on the City's website for those that were not able to attend the meeting. Written comments were received from 7 people in response to the materials shared at the open house and on the City's website.

The public open house materials are included in **Appendix C**.

Local Business Meetings

Individual property owner meetings were held with Wolf Motors and Radermacher's at their request to discuss the interchange concepts and review specific impacts to their properties.

CONCEPT DEVELOPMENT AND TRAFFIC ANALYSIS

This study utilized a collaborative process where concepts were developed over time with input from stakeholders. A traffic analysis was completed as an initial task to understand traffic forecasting, operations, and safety issues in the project area. The following intersections were included within the study area.

- CR 9/190th Street West
- CR 9/Union Pacific Railroad Crossing
- CR 9/Syndicate Street
- TH 169/TH 282/CR 9
- TH 169/Creek Lane
- TH 282/Triangle Lane
- TH 282/Business Access (Radermacher's)
- TH 282/Creek Lane
- Triangle Lane/Creek Lane

A memorandum summarizing the results of the traffic forecasting, safety, and operations analysis is provided in **Appendix E**.

The following is a summary of the key issues discussed as a part of the TAC meetings that helped support the development of a vision for corridor.

TAC Meeting #1

An overview of the scope of work for the interchange concept study was presented and feedback was received. There was discussion regarding the history of prior planning efforts for this project and preliminary design considerations that should be used to evaluate any proposed interchange alternatives.

TAC Meeting #2

The draft existing traffic operations and safety findings were presented. The traffic analysis showed that there is already a relatively high right-turn volume from Creek Lane to northbound TH 169 during the AM peak period. This shows that many drivers are avoiding the signalized intersection at TH 169/TH 282/CR 9. Overall, the intersections in the study area were found to operate acceptably but there are some turning movements that are experiencing an undesirable level-of-service (LOS) and delay. The intersections of TH 169/TH 282/CR 9 and TH 282/Triangle Lane both are experiencing crash issues due to those intersections being closely spaced full movement intersections.

Using the input provide during the first TAC meeting, a draft interchange concept evaluation matrix was reviewed, and input was obtained on the evaluation and scoring approach. Eight schematic interchange concepts were presented and discussed.

TAC Meeting #3

The traffic analysis, evaluation matrix, and schematic design concepts were the focus of the discussion. Key discussion items were as follows:

- There were some differences in the 2040 forecasts identified as part of the traffic forecasting process. The City and Scott County Comprehensive Plans showed 2040 traffic forecasts that did not consider much development potential north of TH 169, although those forecasts followed the required comprehensive planning process. The 190th Street & CSAH 9 Traffic Study completed by the City showed considerable growth potential north of TH 169. A set of forecasts that assumed some of the growth potential documented in the 190th Street & CSAH 9 Traffic Study would occur north of TH 169 was presented to the TAC. The TAC agreed the forecasted traffic volumes presented were acceptable for the future conditions traffic analyses.
- An updated interchange evaluation matrix was presented that incorporated comments from the prior TAC meeting. The TAC agreed this version of the evaluation matrix should be used to evaluate the concepts.
- The TAC selected three concepts to move forward to more detailed concept development. The concepts included a roundabout/split diamond option with CR 9/TH 282 bridged over TH 169, a folded diamond/tight diamond with CR 9/TH 282 bridged over TH 169 and modified to include the split diamond configuration for northbound TH 169 access, and an option that included TH 169 bridged over CR 9/TH 282.

TAC Meeting #4

The meeting focused on the review of the three detailed concepts that were selected at TAC Meeting #3 as follows:

- It was discussed that the railroad crossing volumes are relatively low, but there was also discussion that rail crossings could increase in the future and seasonally.
- A roundabout/split diamond option was presented that did not include grade separation of the CR 9/railroad crossing. It was discussed that a railroad crossing could be added later; however, significant reconstruction costs would be incurred to address the differences in roadway profiles.

The TAC requested that a concept be developed that includes a roundabout/split diamond configuration with grade separation at the railroad crossing.

- Concerns were expressed regarding a higher frequency of wrong way incidents with folded diamonds.
- It was discussed that TH 169 being bridged over TH 282/CR 9 will result in TH 169 mainline reconstruction which would be challenging from a construction phasing/staging perspective. This option would be more conducive to allowing an additional vehicle and pedestrian connection under TH 169 at Creek Lane. The TAC requested that a concept be developed that includes grade separation at Creek Lane and TH 169.

TAC Meeting #5

The following topics were discussed:

- Draft future 2040 traffic analysis intersection LOS results were presented for no-action and all five interchange concepts. No action operates unacceptably at many intersections with significant delays and vehicle queuing. These results support the need for improvements. All the proposed concepts operate at acceptable overall intersection LOS under future conditions.
- Based on input from TAC Meeting #4, the following five concepts were reviewed and discussed:
    - Concept 1 - Roundabout/Split Diamond
    - Concept 1A - Roundabout/Split Diamond with Railroad Grade Separation
    - Concept 2 - Folded Diamond/Tight Diamond
    - Concept 3 - TH 169 over CR 9/TH 282
    - Concept 3A - TH 169 over CR 9/TH 282 and Creek Lane
- The interchange evaluation matrix was presented and discussed.
- Considering all factors (with costs being important) a majority of the TAC preferred Option 1 with some interest in adding the railroad grade separation shown in Option 1A if funding becomes available. There was also some support for Option 3 due to traffic routing concerns along Creek Lane and business visibility.

TAC Meeting #6

The following topics were discussed:

- Potential phasing plans for the concepts were reviewed with the TAC.
- Potential construction impacts for the concepts were discussed including that Concept 3 and 3A would likely result in the need to close portions of TH 169 during construction.
- Preparations for the October 29, 2018 public open house meeting were discussed.
- Feedback from recent property owner discussions was reviewed.
- A majority of the TAC continued to support Concepts 1 and 1A.

The five interchange concept layouts (1, 1A, 2, 3, 3A) developed during the study and the final evaluation matrix are provided in **Appendix D**.

Preliminary estimated costs for the five interchange concept layouts are summarized below. The costs include estimated construction, right-of-way acquisition, and indirect costs, and assume 2019 construction dollars.

- Concept 1 $27 Million
- Concept 1A $32 Million
- Concept 2 $36 Million
- Concept 3 $33 Million
- Concept 3A $40 Million

Detailed preliminary cost estimates for each of the concepts are provided in **Appendix F**.

IMPLEMENTATION PLAN

Concepts 1 and 1A were recommended by the TAC as the agency supported vision for the project area. As mentioned above, funding is not currently available to allow the improvements to proceed to construction. The goal of this study was to establish an agency supported design concept and estimated cost for the interchange to allow the City, County, and MnDOT to move forward with additional planning and the pursuit of project funding.

Potential funding sources that could be pursued for the interchange improvements include the following:

- Metropolitan Council Regional Solicitation (Federal Funding)
- MnDOT Corridors of Commerce Program (State Funding)
- MnDOT Freight Investment Plan (State Funding)
- FHWA TIGER Program (Federal Funding)
- Transportation Economic Development (TED) Program (State Funding)
- Bonding Bill Funds (State Funding)
- Other Federal and State Programs (LRIP, HSIP)
- Scott County Funds
- City of Jordan Funds (MnDOT State Aid or other City Funds)

The consensus and support of the jurisdictional agencies (MnDOT, Scott County, and the City of Jordan) will be important as potential funding sources are pursued.

The possibility of phasing the interchange improvements was investigated as a part of this study. The ability to implement the improvements in phases over time would provide some additional flexibility in how the project moves forward. The City has already secured LRIP funding for the construction of a roundabout at the TH 282/Creek Lane intersection that could serve as the first phase of the proposed interchange improvements. An implementation plan concept is provided in **Appendix G** that illustrates a possible phasing plan for the improvements. Implementing the project in phases could help mitigate construction impacts to the businesses in the project area and allow some improvements to proceed as funding is secured rather than waiting until all of the necessary funding is obtained for the complete interchange project.

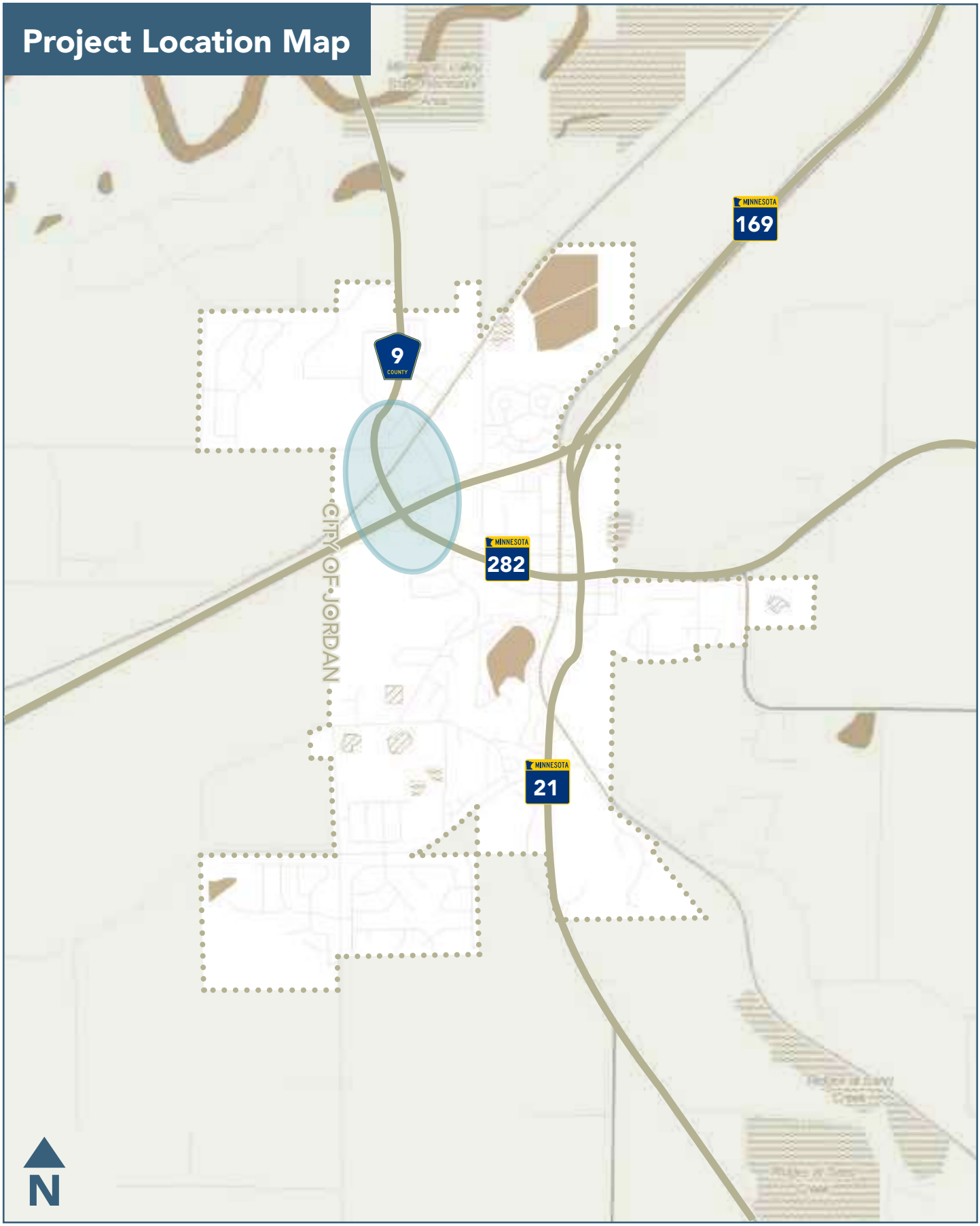
A November 14, 2018 letter from MnDOT to the City of Jordan clarifying their interests and expressing support for improvements at the TH 169/TH 282/CR 9 intersection is provided in **Appendix H**.

A December 18, 2018 letter from Scott County to the City of Jordan stating their support for the interchange planning work and outlining their suggested next steps is provided in **Appendix I.**

APPENDICES

APPENDIX A – PROJECT LOCATION MAP

Project Location Map



APPENDIX B – TAC MEETING MINUTES

Minutes

Technical Advisory Committee (TAC) Meeting #1

May 22, 2018

Attendees

Tanya Velishek, Jordan Mayor
Jeff Will, Jordan City Council Member
Mike Franklin, Jordan City Council Member
Tom Nikunen, Jordan City Administrator
Jon Solberg, MnDOT (by phone)
Lisa Freese, Scott County
Tony Winiecki, Scott County
Craig Jenson, Scott County
Mike Waltman, Bolton & Menk
Jon Horn, Kimley-Horn
Brandon Bourdon, Kimley-Horn

Meeting notes identified in *Italics* below. Action items are highlighted in **Bold**.

1. INTRODUCTIONS

2. REVIEW SCOPE OF WORK

A. Stakeholder Engagement
B. Traffic Analysis
C. Interchange Alternative Concept Development and Evaluation
D. Determine Preferred Design Concept
E. Cost Estimates and Funding Plan

After introductions, a brief review of the scope of work was provided.

3. BACKGROUND INFORMATION

A. History/Past Work
B. Design Considerations
C. Agency Comments/Concerns

A brief history of past work for this project was provided and the group reviewed/discussed a list of preliminary design considerations (attached) that would be used to evaluate various interchange alternatives. A summary of these discussions is provided below.

- *Right-of-way impacts – partial versus total property takes should be considered since partial takes are generally more desirable that total takes.*

- *Travel distances and times between businesses and TH 169 may be good way to present information if comparable distances and travel times are provided using different routes.*
- *Need to consider oversize truck access to businesses.*
- *The Renaissance Festival has a lease thru 2019 at their current location. Scott County is waiting for the Renaissance Festival to provide anticipated traffic information including an event traffic management plan for the proposed relocation site. The last meeting between the Renaissance Festival and Scott County occurred before Christmas 2017. Given an EIS is required it may take longer than 2019 before the potential relocation occurs.*
- *A roundabout layout has been developed for the intersection of TH 282 and Creek Lane. The City is currently looking for funding for the improvements. The City supports this as an initial phase of the project and it is included in the City's CIP for 2019.* **Bolton & Menk will provided the proposed roundabout layout to Kimley-Horn.**
- *Emergency access is particularly important given the police department is located on the northeast quadrant of the TH 169 / TH 282 / CR 9 intersection.*
- *There has been prior discussion of raising the TH 169 overpass over Sand Creek due to floodplain issues. If that were to occur, it could also serve as a potential pedestrian crossing of TH 169.*
- *County policy is to have bike and pedestrian facilities on both sides of a roadway. MnDOT only contributes to providing pedestrian facilities on one side of the roadway.*
- *Snowmobiles travel from the trail along the Minnesota River to/from the Holiday Station. Scott County mentioned that snowmobile access through interchanges can cause challenges but snowmobile crossings have been accommodated at other interchanges.*
- *It was clarified that total project costs need to be considered including construction, engineering, administrative, and right-of-way costs.*
- *The City mentioned that Section 4f issues should not be a problem at Lions Park; however, this should be confirmed. Lions Park also serves as a small park-n-ride lot (informal – not operated by a transit authority).*
- *There are no transit or park-n-ride plans anticipated in the project area. We should consider options for a small park-n-ride lot if space is available.*
- *Future environmental review for any proposed improvements needs to be considered as a part of the concept design process. Our scope of work does not include any NEPA or formal environmental review. We need to make sure that the concept design process provides flexibility for any future environmental review process.*
- *It is desirable to minimize impacts to the Valley Green neighborhood (social justice concerns).*
- *It was discussed whether an on-ramp to northbound TH 169 could be provided from Creek Lane rather than TH 282 / CR 9. This could be an option but the grades in the area need to be reviewed.*
- *TH 282 may be a future jurisdictional transfer candidate from MnDOT to the County.*
- *The need to maintain business visibility was discussed further. Belle Plaine was cited as an example where an interchange has impacted businesses. There was some discussion*

regarding the importance of visibility and how that varies by the type of customer a particular business attracts.

- *Creek Lane likely will need to be reconstructed and it is anticipated to be more than a two-lane roadway.*
- *There was some discussion on what the impacts may be to TH 282 access east of the Sand Creek bridge and if there will be adequate gaps for traffic to access TH 282 between Sand Creek and TH 21.*

4. PROJECT SCHEDULE

A. Future TAC Meeting Dates/Times

The group decided that future meetings should occur the fourth Tuesday of each month from 7:00 AM - 8:30 AM at Jordan City Hall. **Kimley-Horn will send out a schedule invite for the future meetings.**

5. NEXT STEPS

A. Gather Background Information
B. Begin Traffic Analysis
C. Begin Concept Development
D. Develop Draft Evaluation Matrix

Kimley-Horn to begin traffic analysis work.

Kimley-Horn to prepare draft evaluation matrix for review/discussion at the next TAC meeting.

Kimley-Horn to prepare initial interchange alternative concepts for review/discussion at the next TAC meeting.

6. QUESTIONS/OTHER DISCUSSION

Design Considerations - Draft

May 22, 2018

1. RIGHT-OF-WAY AND BUSINESS IMPACTS

A. Right-of-way impacts (# of parcels and area)
B. Maintain existing businesses and business access
C. Provide for future development potential
D. Maintain business visibility

2. TRAFFIC

A. Safety
B. Capacity
C. Ability to serve seasonal events (Renaissance Festival and Scott County Fair)

3. ROADWAY DESIGN

A. Meets intersection access spacing guidelines
B. Number of access restrictions
C. Allows for phased implementation
D. Construction staging flexibility
E. UP Railroad impacts/coordination
F. Utility impacts

4. ENVIRONMENTAL IMPACTS

A. Wetland impacts (area)
B. Sand Creek impacts
C. Park impacts
D. Tree impacts
E. Floodplain/floodway impacts

5. MULTI-MODAL CONSIDERATIONS

A. Bicycle and pedestrian accommodations
B. Transit compatibility

6. COST

A. Total Project Costs
B. Maintenance Costs

7. OTHERS?

A. _____
B. _____
C. _____

Minutes

Technical Advisory Committee (TAC) Meeting #2

June 26, 2018

Attendees

Tanya Velishek, Jordan Mayor (by phone)
Jeff Will, Jordan City Council Member
Mike Franklin, Jordan City Council Member
Tom Nikunen, Jordan City Administrator
Jon Solberg, MnDOT
Tony Winiecki, Scott County
Craig Jenson, Scott County
Mike Waltman, Bolton & Menk
Jon Horn, Kimley-Horn
Brandon Bourdon, Kimley-Horn

Meeting notes identified in *Italics* below. Action items are highlighted in **Bold**.

1. TRAFFIC ANALYSIS UPDATE

A. Existing Operations

- *Existing turning movement count and AADT exhibit was reviewed.*
  - *The relatively high right-turn volume from Creek Lane to northbound TH 169 during the AM peak was noted.*
- *Existing level-of-service and delay exhibit was reviewed.*
  - *Eastbound and westbound left-turns from TH 169 operate at LOS E during the AM and PM peak hours.*
  - *Westbound left from the Frontage Road to CR 9 operates at LOS E during the PM peak period. This operations issue has also been identified by Jordan Police.*
  - *The northbound to eastbound right from Creek Lane to TH 169 operates at LOS E in the PM peak period. Tony Winiecki questioned whether the AM and PM LOS for that movement may have been flipped.*

Kimley-Horn to review delays and LOS at the Creek Lane / TH 169 intersection.

B. Existing Safety

- *Crash rate exhibit, based on 2010-2015 MnCMAT data was presented.*
  - *TH 169 / TH 282 / CR 9 and TH 282 / Triangle Lane intersections both have a critical index over 1.0. This indicates that a crash issue exists at these two intersections.*
  - *Crash rates at TH 282 / Triangle Lane are due in part to close intersection spacing and sight-line challenges due to traffic congestion at TH 169 / TH 282 / CR 9.*
  - *The TAC questioned the types of accidents that are occurring at these intersections.*

Kimley-Horn to review crash types in more detail at the intersections of TH 169 / TH 282 / CR 9 and TH 282 / Triangle Lane.

C. Discuss Traffic Forecasting

- *Existing and forecast ADT exhibit was presented*
  - *It was noted that there is a considerable difference in 2040 forecasts from the Scott County Comprehensive Plan and the Jordan 190th Street Study. Discussion occurred about concerns over the differences, and those differences needed to be resolved prior to additional traffic analysis. The City noted that some additional grown is likely by 2040 in this area as the Comprehensive Plan assumed virtually no growth on the north side of TH 169 and there was also some housing that was not included in the Comprehensive Plan forecasts that was later approved.*

  Kimley-Horn to coordinate with the City, County, and MnDOT to develop traffic forecasts that all parties can accept.

- *Jeff Will asked about the volumes south of TH 41 on TH 169. Craig Jenson said existing volumes were around 29,000 vehicles per day (vpd). Kimley-Horn has checked the 2040 forecasts along TH 169, and they are 45,000 vpd just north of TH 41, 36,000 vpd just south of CR 14 (150th Street), 33,000 vpd just north of Jordan, and 28,000 vpd south of Jordan.*

2. DISCUSS INTERCHANGE EVALUATION CRITERIA

A. Review Draft Evaluation Matrix

- *The following comments were provided on the draft alternative evaluation matrix:*
  - *Change "Minimize Impacts to TH 169 Operations" to "Improves TH 169 Operations"*
  - *Add a category for "Improves Safety"*
  - *Add a category for "Reasonable to Maintain"*
  - *Network travel times were discussed and they will be part of the "Minimize Impacts to Business Access" category*
  - *Add a category for "Serves Freight"*

B. Discuss Evaluation/Scoring Approach

- *The group discussed ways to evaluate each alternative ranging from trying to score each category with a number (say 1-10) or using red, yellow, and green color codes (bad, fair, good). The group agreed that we should use the color code approach.*

  Kimley-Horn to update the evaluation matrix based on comments from the TAC.

3. REVIEW ALTERNATIVE INTERCHANGE CONCEPTS

- *8 alternative concepts were presented and discussed. Comments are summarized below.*
  - *For options that show a new connection between the Frontage Road/Syndicate Street to Valley View Drive, the inplace Creek Lane alignment should be used to provide the connection to Valley View Road rather than a new alignment.*
  - *Concept 1 can be removed since Concept 2 is identical on the north side of TH 169.*
  - *Concepts 2, 3, 6 and 8 should be carried forward for further evaluation.*
  - *Either Concept 4 or 5 can be removed since the only difference is the intersection control at the south TH 169 / TH 282 ramp terminal (roundabout versus signal).*
  - *Concept 7 can be removed since it is identical to Concept 2, 4 and 5 on the south side.*

- *It was requested that a concept showing TH 169 going up and over TH 282 / CR 9 be developed.*
- *It was requested that a concept be developed that shows a TH 282 / CR 9 bridge over TH 169 with right-in/right-out access at the Creek Lane location.*
- *Tony Winiecki asked about planning level ADTs for a single lane roundabout. Kimley-Horn has reviewed NCHRP 672, and the lower volume thresholds range from 15,000 to 18,000 vpd, although more typical volumes served are from 23,000 to 27,000 vpd (the vpd represent the total volume of traffic on both roads at the intersection).*
- *Once the traffic forecasting issue is resolved, additional analysis can be completed to determine appropriate intersection design.*

- *An access scenario exhibit for the area along TH 282 between TH 169 and Creek Lane was discussed. A new ¾ mid-point access scenario was shown that replaced the current Triangle Lane access. Jon Solberg mentioned that this mid-point access could be critical because MnDOT was not confident that grades at Triangle Lane would work with a new interchange at TH 169. It was discussed that Kimley-Horn should look at this area in greater detail and determine potential local roadway reconfigurations with a new mid-point ¾ access.*

Kimley-Horn to update interchange concepts for review/discussion at the next TAC meeting.

4. PROJECT SCHEDULE

5. NEXT STEPS

A. Continued Interchange Concept Development and Refinement
B. Traffic Analysis
C. Refine Evaluation Matrix

6. QUESTIONS/OTHER DISCUSSION

Minutes

Technical Advisory Committee (TAC) Meeting #3

July 24, 2018

Attendees

Tanya Velishek, Jordan Mayor
Mike Franklin, Jordan City Council Member
Tom Nikunen, Jordan City Administrator
Jon Solberg, MnDOT
Tony Winiecki, Scott County
Craig Jenson, Scott County
Mike Waltman, Bolton & Menk
Jon Horn, Kimley-Horn
Brandon Bourdon, Kimley-Horn

Meeting notes identified in *Italics* below. Action items are highlighted in **Bold**.

1. TRAFFIC ANALYSIS UPDATE

A. Creek Lane / TH 169 Operations
- *The results previously presented at northbound TH 169 / Creek Lane showed better operations during the AM as opposed to the PM peak periods for the right turn movement from Creek Lane. That seemed odd given the higher side-street traffic volumes during the AM peak. This was reviewed and it was determined that there was a coding error and revised delay output was presented.*

B. Crash Type Details
- *Additional crash detail was reviewed. The crash trends showed quite a few rear-end crashes as are common at a traffic signal. Several of the crashes were consistent with the close intersection spacing between TH 169 / TH 282 and TH 282 / Triangle Lane.*

C. Traffic Forecasting Updates
- *A revised table of 2040 traffic forecasts was presented with traffic volumes that were developed taking into consideration some of the growth anticipated to occur as part of the City's 190th Street Study. The group agreed that proceeding with these traffic volumes was reasonable at this point for the analysis of interchange concepts.*

2. INTERCHANGE EVALUATION MATRIX

A. Review Updated Evaluation Matrix
- *An updated evaluation matrix was presented and discussed. No additional changes were identified. The matrix will be used to compare the 3 selected interchange concepts.*

3. REVIEW UPDATED INTERCHANGE CONCEPTS

- *7 alternative concepts were presented and discussed as follows:*
  - *The five concepts carried forward from TAC Meeting #2 with minor updates were: Concept 1 – Diamond / Split Diamond, Concept 2 – Roundabout / Tight Diamond, Concept 3 – Roundabout / Split Diamond, Concept 4 – Folded Diamond / Tight Diamond, Concept 5 – Offset Single Point Urban Interchange. The most notable change was on Concepts 1 & 5, where the inplace Creek Lane alignment was used to provide the connection to Valley View Road from the frontage road/Syndicate Street.*
  - *Concept 6, a new Quadrant Interchange concept as identified at TAC Meeting #2 was presented.*
  - *Concept 7, a new concept identified at TAC Meeting #2 that showed TH 169 going over TH 282 / CR 9 was presented.*
  - *The CR 9 railroad crossing was discussed. Several indicated they did not recall this being a very active at-grade crossing*. **Kimley-Horn to review rail crossing data and report back to the TAC on findings.**
  - *Additional access scenarios were reviewed along TH 282. A three-quarter access at a slightly relocated shared driveway between Wolf Motors and Radermacher's and a right-in/right-out at Triangle Lane was identified as the preferred design.* **Kimley-Horn to review access along TH 282 in more detail and develop a proposed design that includes a right-in/right-out at Triangle Lane and a three-quarter access for Wolf Motors/Rademacher's.**
  - *The TAC selected the following three concepts to move forward for further development:*
    - *Concept 3 – Roundabout / Split Diamond*
    - *Concept 4 – Folded Diamond / Tight Diamond modified to include the split diamond configuration for northbound TH 169 access.*
    - *Concept 7 - TH 169 going over TH 282 / CR 9*

    Kimley-Horn to develop more detailed concept designs and begin the evaluation process for the 3 selected concepts (Roundabout / Split Diamond, Folded Diamond / Tight Diamond, and TH 169 going over TH 282 / CR 9).

4. PROJECT SCHEDULE

5. NEXT STEPS

A. Preparation of Detailed Interchange Concepts
B. Traffic Operations Analysis
C. Evaluation of Interchange Concepts including Cost Estimates

6. QUESTIONS/OTHER DISCUSSION

Minutes

Technical Advisory Committee (TAC) Meeting #4

August 28, 2018

Attendees

Tanya Velishek, Jordan Mayor
Mike Franklin, Jordan City Council Member
Jeff Will, Jordan City Council Member
Tom Nikunen, Jordan City Administrator
Jon Solberg, MnDOT
Almin Ramic, MnDOT Traffic
Mike Waltman, Bolton & Menk
Tony Winiecki, Scott County
Craig Jensen, Scott County
Mark Callahan, Scott County
Jon Horn, Kimley-Horn
Beth Engum, Kimley-Horn

Meeting notes identified in *italics* below. Action items are highlighted in **bold**.

1. TRAFFIC ANALYSIS UPDATE

A. Rail Crossing Data
   - *MnDOT's data states there are 5 trains per day crossing CR 9. Kimley-Horn counted 4 trains per day on May 16, 2018 and observed a gate closure duration of around 2 minutes per train. It was discussed that there could be the potential for more trains in the fall for grain hauling and in the future if frac sand hauling increases.*

B. Traffic Forecasting Updates
   - *Traffic forecasting and analysis updates will be presented in more detail at the next TAC meeting; however, all three alternatives generally function at acceptable levels of service. Traffic operations and safety criteria are not a differentiator among the alternatives.*
   - *It was discussed that travel time comparison by alternative will be important for businesses.*

2. REVIEW INTERCHANGE CONCEPT DESIGNS

- *A design speed of 35 mph has been used for CR 9/TH 282 and a design speed of 65 mph has been used for TH 169.*
- *A large tractor trailer (WB-63) was used for the design of all roundabouts.*
- ***Kimley-Horn to obtain truck dimension information from area truckers/haulers to verify that navigation through roundabouts can be accommodated.***
- *MnDOT commented that the roundabouts are too large for current traffic volumes. When a locally preferred alternative is determined, the roundabout designs should be reviewed such*

that initial construction is based on near-term volumes with the ability to expand capacity as traffic grows.

A. Roundabout/Split Diamond
   - *Adding a railroad overpass on CR 9 in the future would require reconstruction of a significant portion of the adjacent roundabout.*
   - ***Kimley-Horn will develop a layout for Concept 1A to include a railroad overpass. Concept 1A will be added to the matrix and an estimated cost increase compared to Concept 1 will be determined.***

B. Folded Diamond/Tight Diamond
   - *A 5% maximum profile grade was used and the loop ramp was designed with the minimum radius allowed to avoid impacting the railroad.*
   - *MnDOT commented that a disadvantage of this concept was the potential for drivers traveling the wrong direction on the southbound 169 exit ramp.*
   - *A concern was raised for both Concepts 1 and 2 regarding the ability for trucks to enter TH 169 NB from Creek Lane.*
   - ***Kimley-Horn will add information on the layouts for Concept 1 and Concept 2 detailing the modifications needed on the TH 169 NB Sand Creek Bridge as well as a profile of the northbound acceleration lane.***
   - *MnDOT mentioned the need to check sight lines at the NB TH 169 off-ramp looking west on CR 9/TH 282 over the bridge. This will need to be verified during detailed design.*

C. TH 169 going over TH 282/CR 9
   - *This option includes about 4,000 feet of TH 169 reconstruction.*
   - *The detour route for this option was discussed since it would likely require the full closure of TH 169 during construction. It was discussed that there is no good detour option in the area.*
   - *It was discussed whether this option could also include TH 169 going over Creek Lake to provide improved local access for vehicles and pedestrians/bikes.*
   - ***Kimley-Horn will develop Concept 3A to include TH 169 also going over Creek Lane which will result in more TH 169 reconstruction. Concept 3A will be added to the matrix and an estimated cost increase compared to Concept 3 will be determined.***

3. INTERCHANGE EVALUATION MATRIX

A. Review Draft Evaluation Matrix
   - *A draft evaluation matrix was handed out and discussed.*
   - ***Kimley-Horn to change "Minimize Railroad Impacts" criteria to "Improves Railroad Crossing Safety" and change colors (from top to bottom) to yellow, yellow, green, red.***

4. PROJECT SCHEDULE

- *A current project schedule was distributed.*

5. NEXT STEPS

A. Refine Interchange Concept Designs
B. Refine Evaluation Matrix
C. Preparation of Corridor Study Report

6. QUESTIONS/OTHER DISCUSSION

- *Comments were gathered from the TAC members regarding the three concept alternatives as follows:*

  Tanya – Wants to see the project done safely and with the least cost. Prefers Concept 1.

  Jeff – Prefers Concept 3 but understands that costs could be an issue. When evaluating Concept 3A, we need to recognize that a Creek Lane underpass and new TH 169 bridge over Sand Creek have value.

  Jon S. – Not a fan of Concept 2. Is leaning toward Concept 1, especially when considering budget. Concerned about Concept 3 since MnDOT recently replaced the TH 169 pavement in the project area.

  Tony – Given that traffic operations, environmental considerations, and right-of-way impacts do not differentiate, the cost factor will be important. Prefers Concept 1.

  Craig – Prefers Concept 1 but wants to understand the cost of Concept 1A with the railroad overpass.

  Mike W. – Same thoughts as Tony/Craig. Prefers Concept 1.

  Mike F. – Leaning toward Concept 1. Likes Concept 3 design, but not if cost prohibitive.

  Mark – Prefers Concept 1.

  Almin – Prefers Concept 1. Concept 3 is difficult given cost and regional construction impacts.

  Tom – Likes Concept 1. Likes the flexibility in phasing the construction of this option.

Minutes

Technical Advisory Committee (TAC) Meeting #5

September 25, 2018

Attendees

Tanya Velishek, Jordan Mayor
Mike Franklin, Jordan City Council Member
Jeff Will, Jordan City Council Member
Tom Nikunen, Jordan City Administrator
Jon Solberg, MnDOT
Tony Winiecki, Scott County
Mark Callahan, Scott County
Mike Waltman, Bolton & Menk
Jon Horn, Kimley-Horn
Brandon Bourdon, Kimley-Horn

Meeting notes identified in *Italics* below. Action items are highlighted in **Bold**.

1. TRAFFIC ANALYSIS UPDATE

A. Review Traffic Operations Analysis

Kimley-Horn reviewed the traffic analysis. The future forecasts that were used to develop the peak hour turning movement counts were the same as previously presented. Overall intersection level-of-service (LOS) diagrams were presented for existing, 2040 no action, and 2040 conditions for the three alternatives developed (Concepts 1, 2 and 3). No action operates unacceptably at many locations supporting the need for improvements. All the proposed concepts operate at acceptable overall intersection LOS under future conditions, although the westbound ramp intersection at TH 169 and TH 282 under the Concept 2 alternative operates worse than Concepts 1 and 3. ***Kimley-Horn will provide a draft report summarizing the results of the traffic analysis in advance of our next TAC meeting.***

2. REVIEW UPDATED INTERCHANGE CONCEPTS

The five concepts were reviewed and discussed as follows:

- *Jeff Will suggested that we look at a tight diamond on the north side of TH 169 for Concept 3 (as opposed to roundabout).*
- *Jon Solberg said he still wanted to get additional input from others at MnDOT regarding the slip ramp concept shown in Concepts 1, 1A, and 2.* ***Kimley-Horn to provide a more detailed Creek Lane slip ramp layout to Jon Solberg so that it can be shared with others at MnDOT for review and comment.***

- *MnDOT and Scott County do not want to select a concept that rules out the possibility of future grade separation at the railroad crossing. Alternatives 3 and 3A would rule out future grade separation since the grades would not allow you to get from below TH 169 to up and over the railroad given the distance between the proposed westbound ramps and the railroad crossing.*
- *Jon Solberg was asked the degree to which railroad grade separation may be beneficial in terms of pursuing freight funding.* ***Jon Solberg to seek input from others at MnDOT regarding the advantages of CR 9 railroad grade separation for the pursuit of freight funding.***
- *Tom Nikunen said that meetings were being scheduled with the local businesses and that the goal is to meet with the most impacted businesses prior to having a general public open house meeting. An open house is being planned for October 29th. It was discussed that we could then present the information to the City Council at a work session on either November 5th or 19th.*

3. INTERCHANGE EVALUATION MATRIX

A. Review Updated Evaluation Matrix

An updated evaluation matrix was reviewed and there were no significant comments. Members of the TAC provided input on their preferences among the options. Considering all factors (with costs being important) a majority of the TAC preferred Option 1 with some interest in adding the railroad grade separation (Option 1A) if additional funding can be obtained for the railroad bridge. There was also some support for Option 3 due to concerns associated with the routing of all northbound TH 169 traffic to Creek Lane and business visibility.

4. PROJECT SCHEDULE

5. NEXT STEPS

A. City Council Update on October 1st

It was discussed that the City Council update would be delayed until after the October 29th open house meeting.

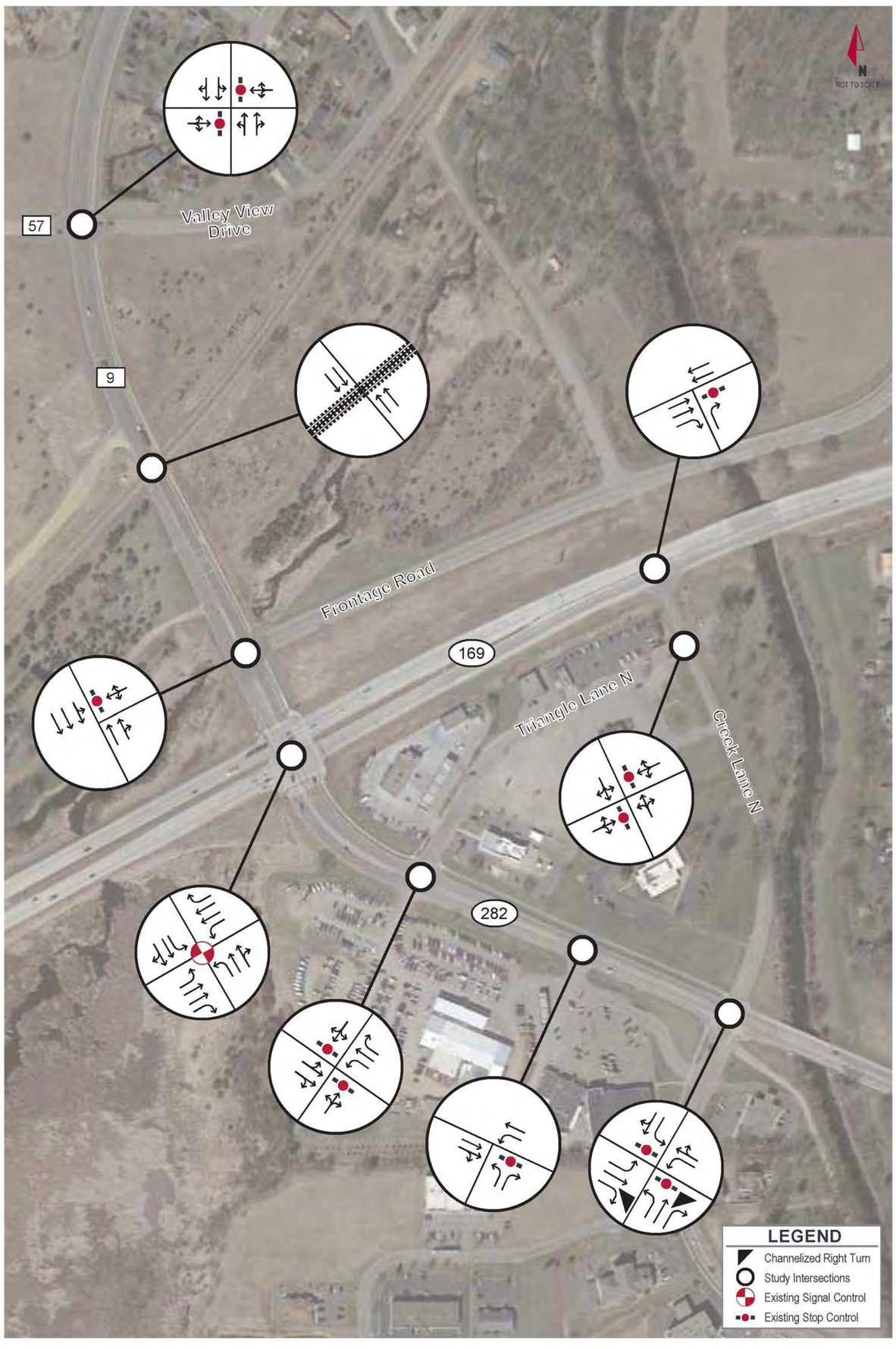
B. Refine Locally Preferred Concept
C. Prepare Corridor Study Report
D. Develop Implementation and Funding Plan

6. QUESTIONS/OTHER DISCUSSION

APPENDIX C – PUBLIC OPEN HOUSE MATERIALS

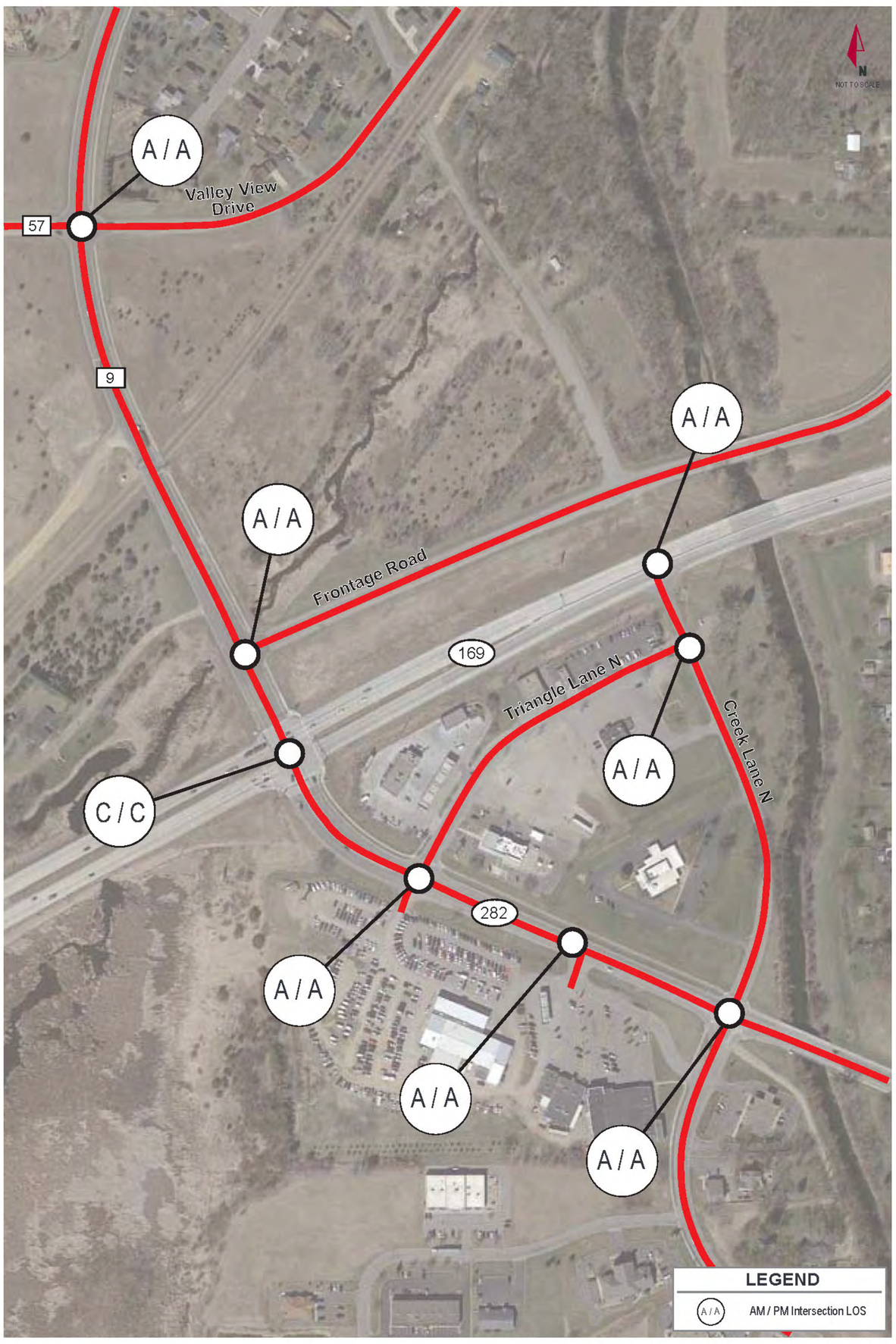
Scope of Study

- Traffic Analysis
- Interchange Alternative Concept Development and Evaluation
- Cost Estimates and Implementation Plan
- Determine Locally Preferred Interchange Concept
- Schedule May – December 2018



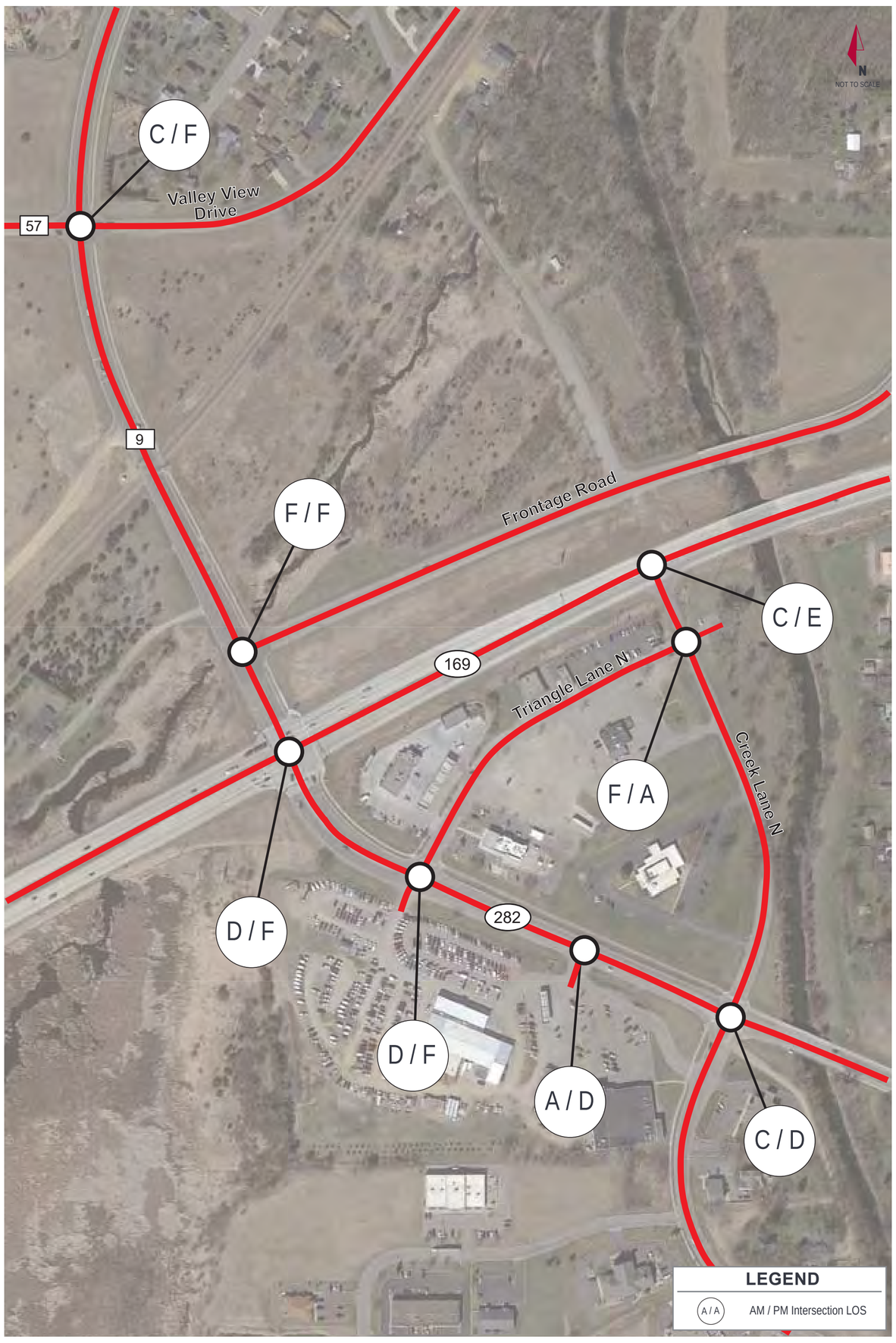
EXISTING INTERSECTION CONTROL AND GEOMETRY
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

CRASH RATES (2011-2015)
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

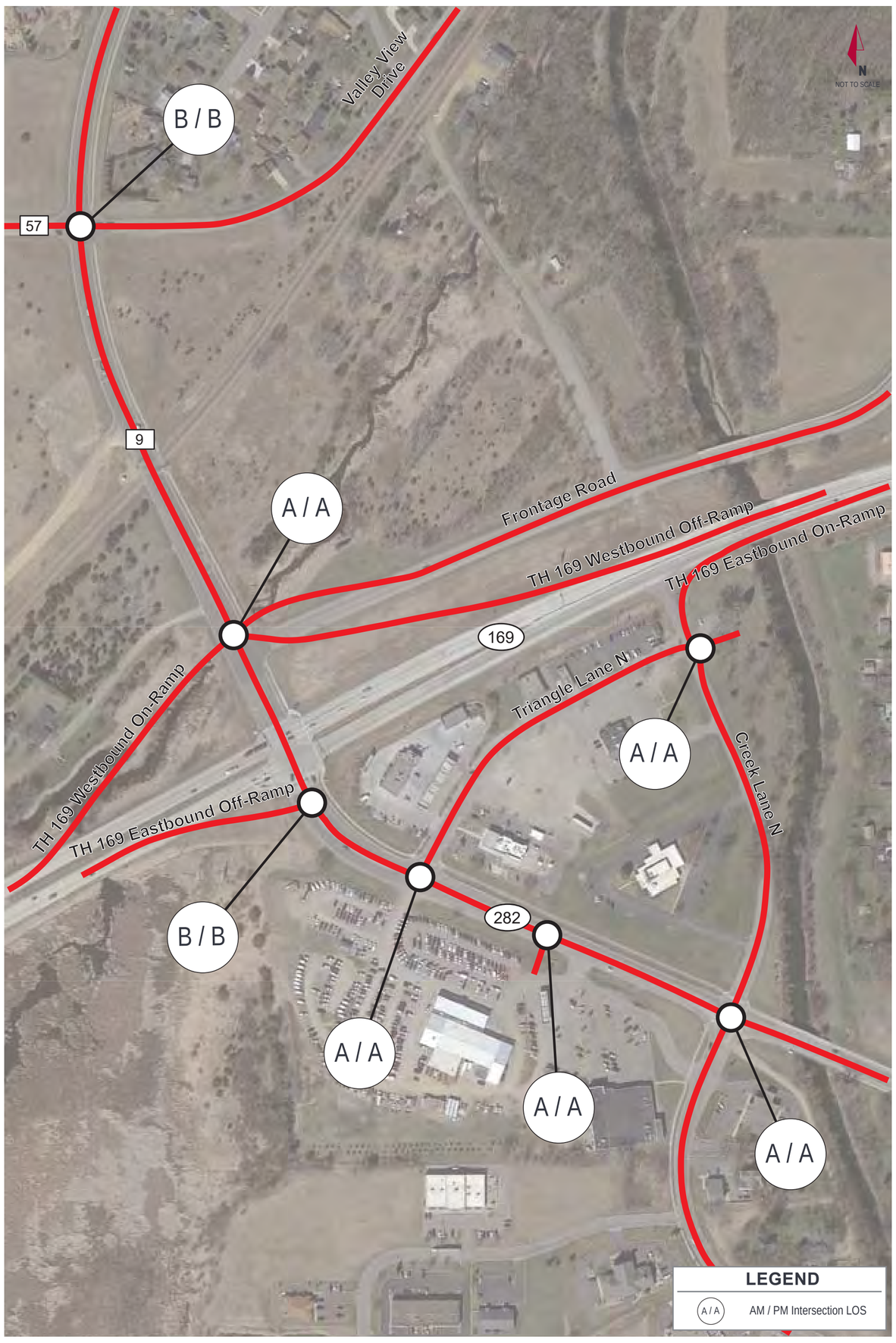


EXISTING LOS
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

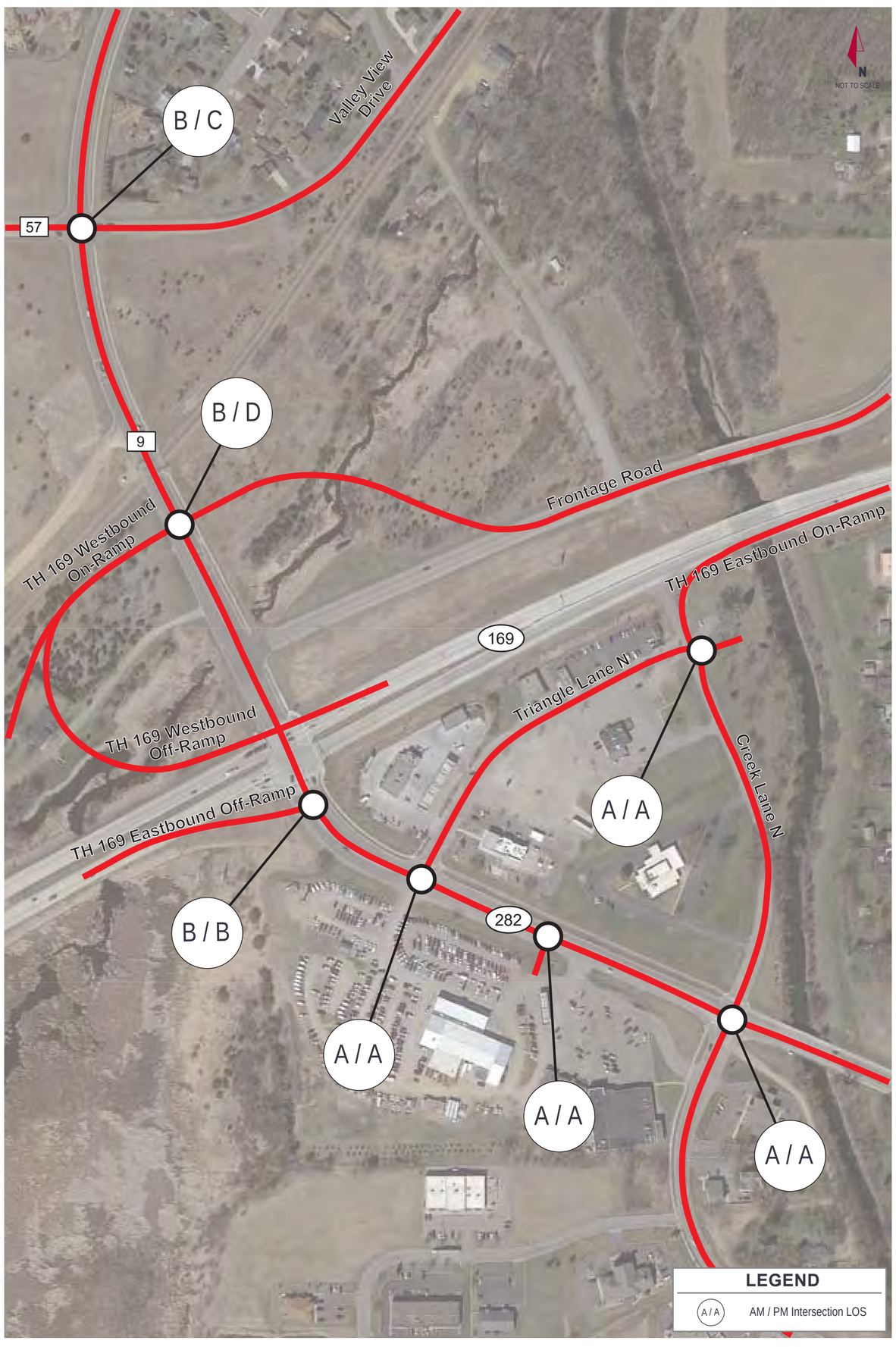
FUTURE VOLUME FORECASTING
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN



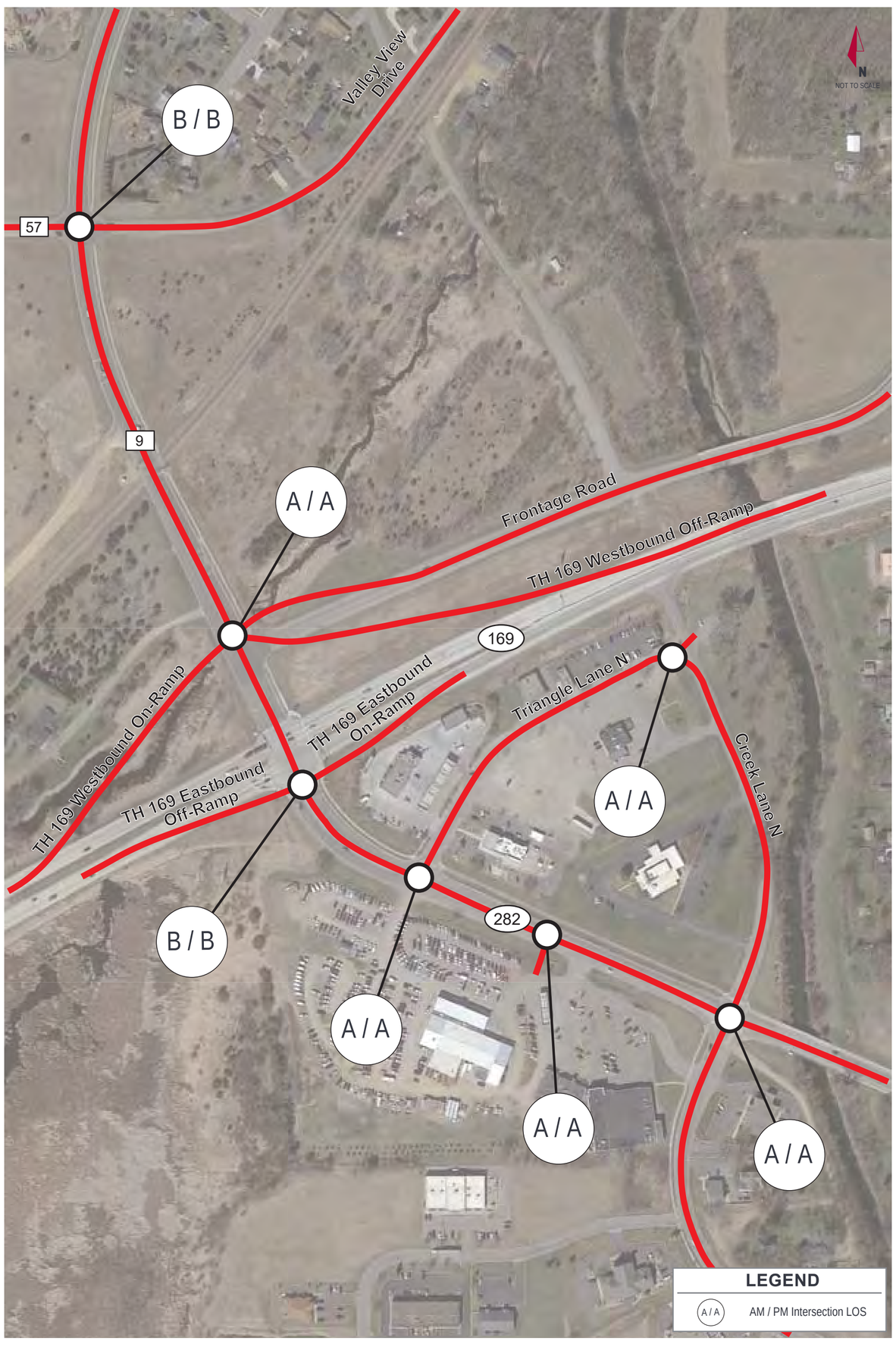
NO-ACTION LOS
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN



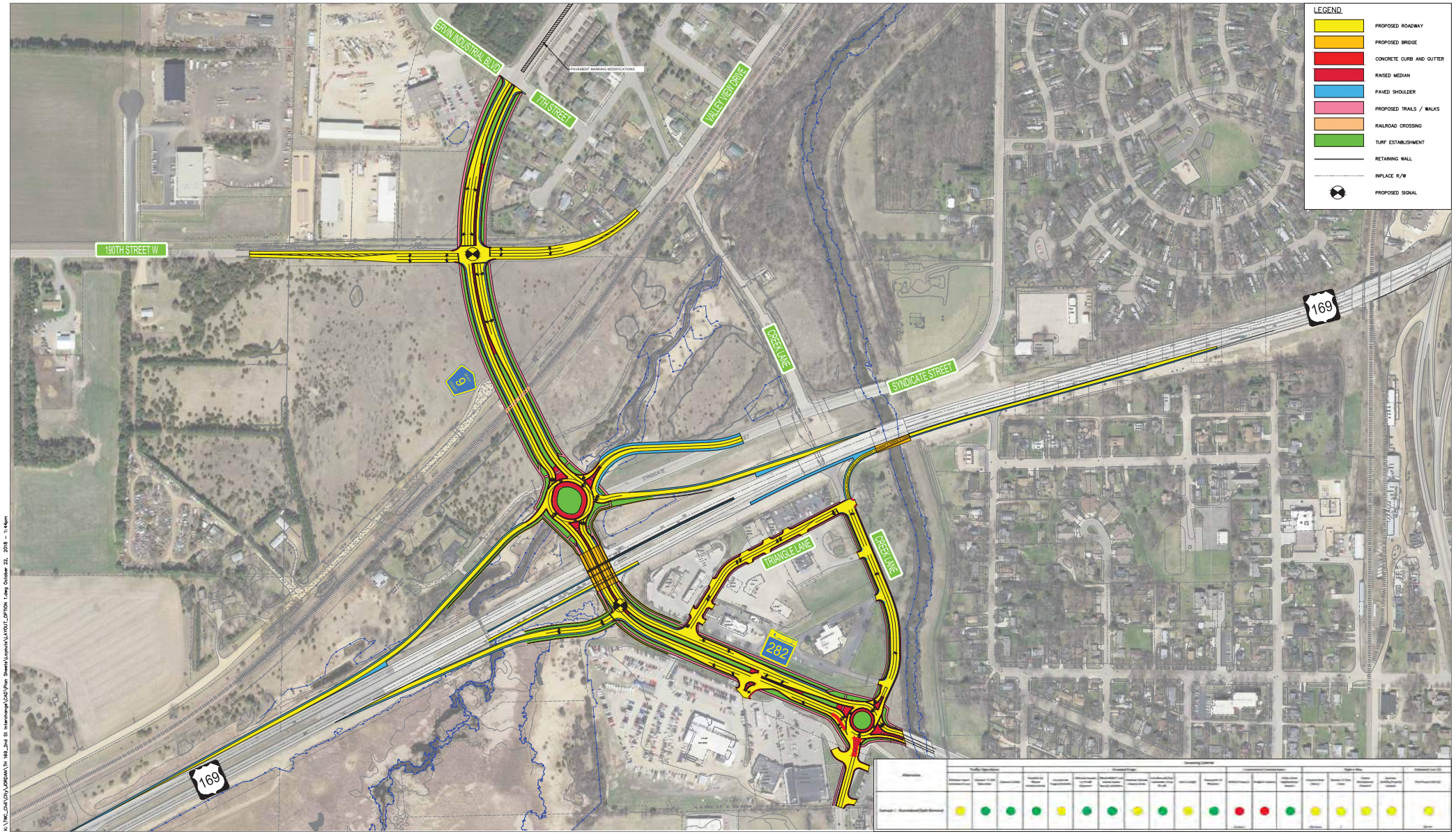
CONCEPT 1 - LOS
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN



CONCEPT 2 - LOS
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN



CONCEPT 3 - LOS
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN



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Kimley»Horn

Scott

DEPARTMENT OF TRANSPORTATION

TH 169 / TH 282 / CR 9

CONCEPT 1 - ROUNDABOUT / SPLIT DIAMOND

10/22/2018

NORTH

0 100 200

HORIZONTAL SCALE IN FEET

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Kimley»Horn

Scott

TH 169 / TH 282 / CR 9

CONCEPT 1A - ROUNDABOUT / SPLIT DIAMOND / OVER RAILROAD

10/22/2018

NORTH

0 100 200

HORIZONTAL SCALE IN FEET

Kimley»Horn

Scott

DEPARTMENT OF TRANSPORTATION

TH 169 / TH 282 / CR 9

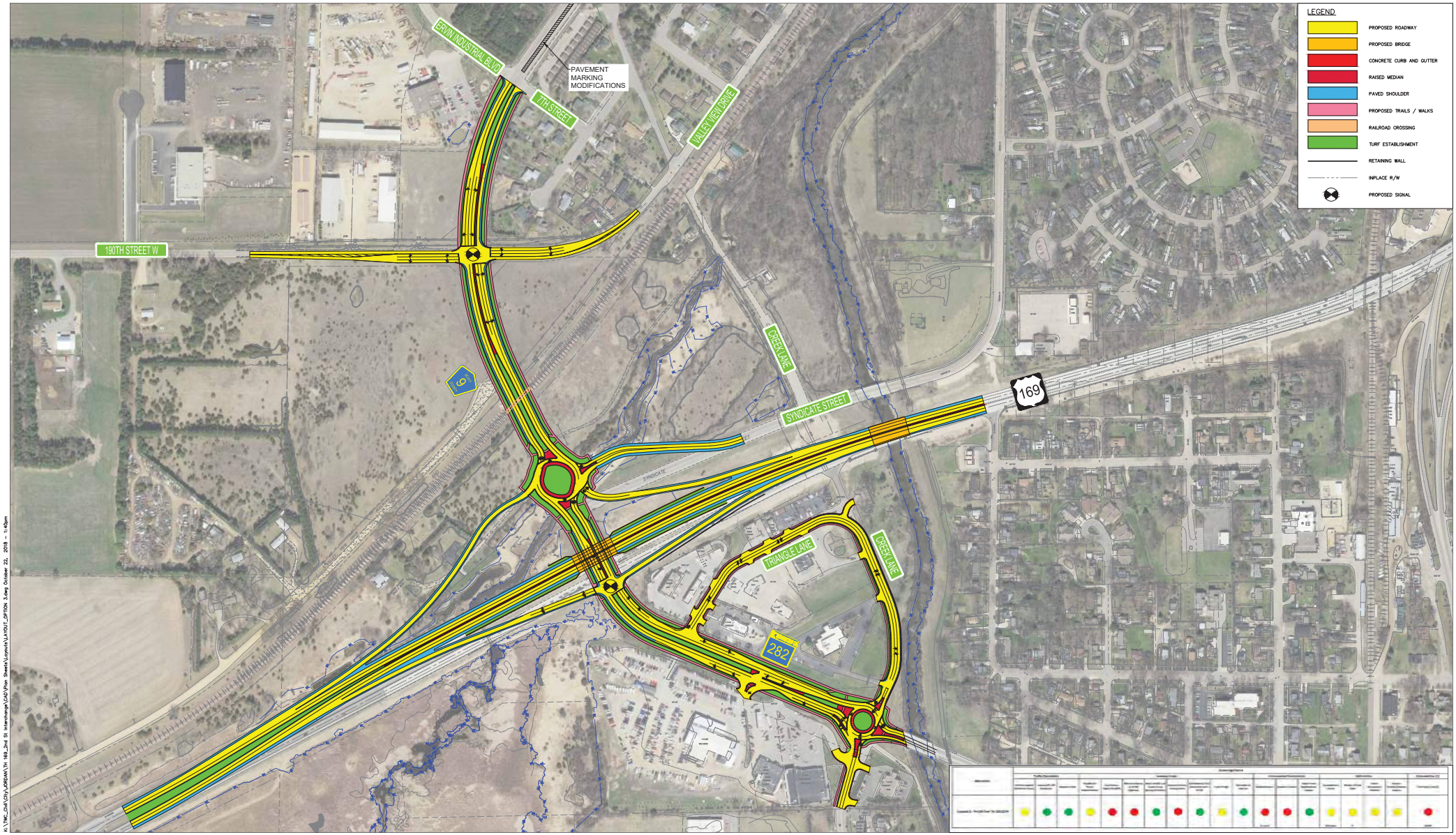
CONCEPT 2 - FOLDED DIAMOND / SPLIT DIAMOND

10/22/2018

NORTH

0 100 200

HORIZONTAL SCALE IN FEET



Kimley»Horn

Scott

TH 169 / TH 282 / CR 9

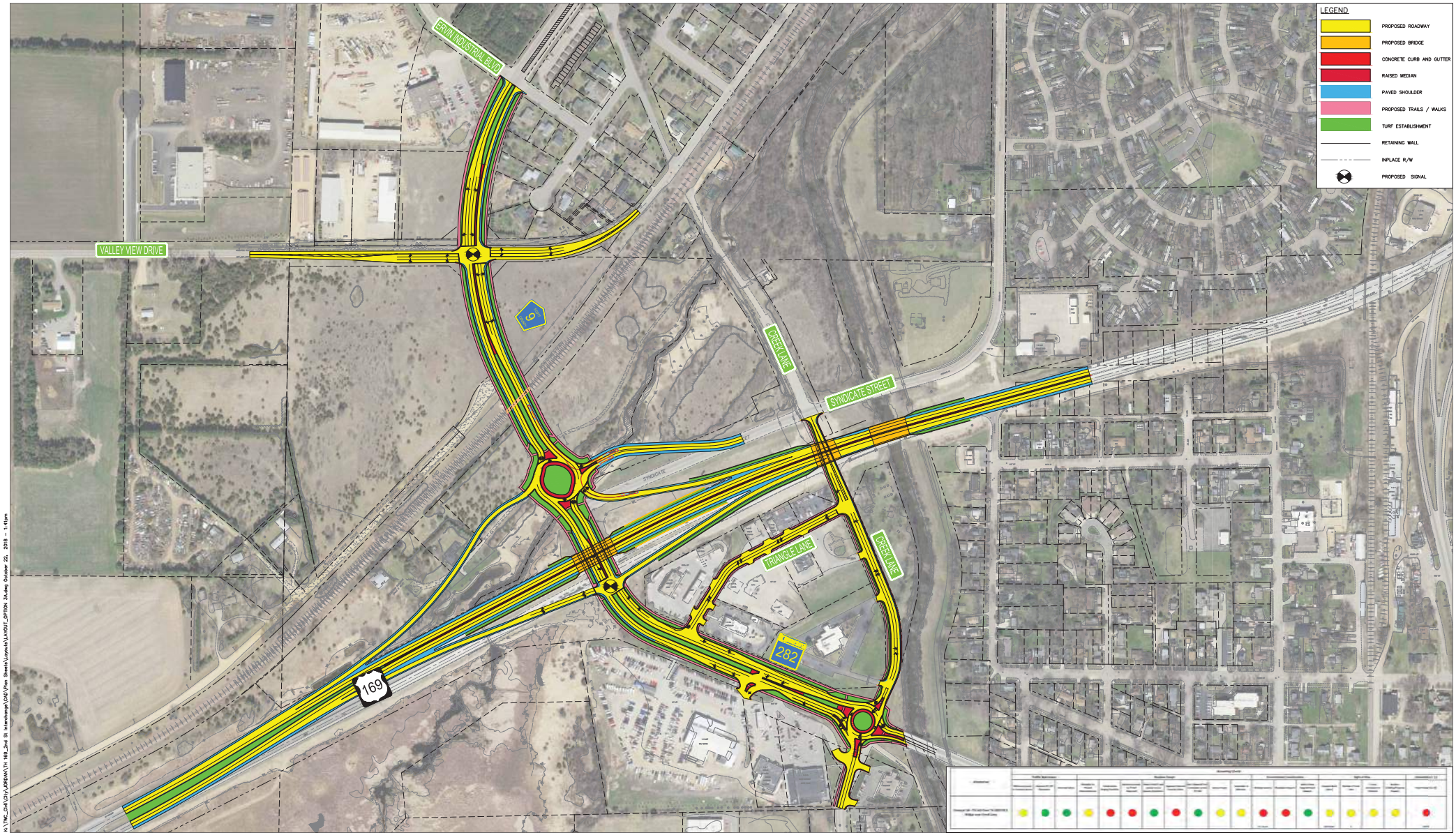
CONCEPT 3 - TH 169 OVER TH 282 & CR 9

10/22/2018

NORTH

0 100 200

HORIZONTAL SCALE IN FEET



TH 169 / TH 282 / CR 9
CONCEPT 3 A - TH 169 BRIDGE OVER CREEK LANE
10/22/2018

NORTH

0 100 200
HORIZONTAL SCALE IN FEET

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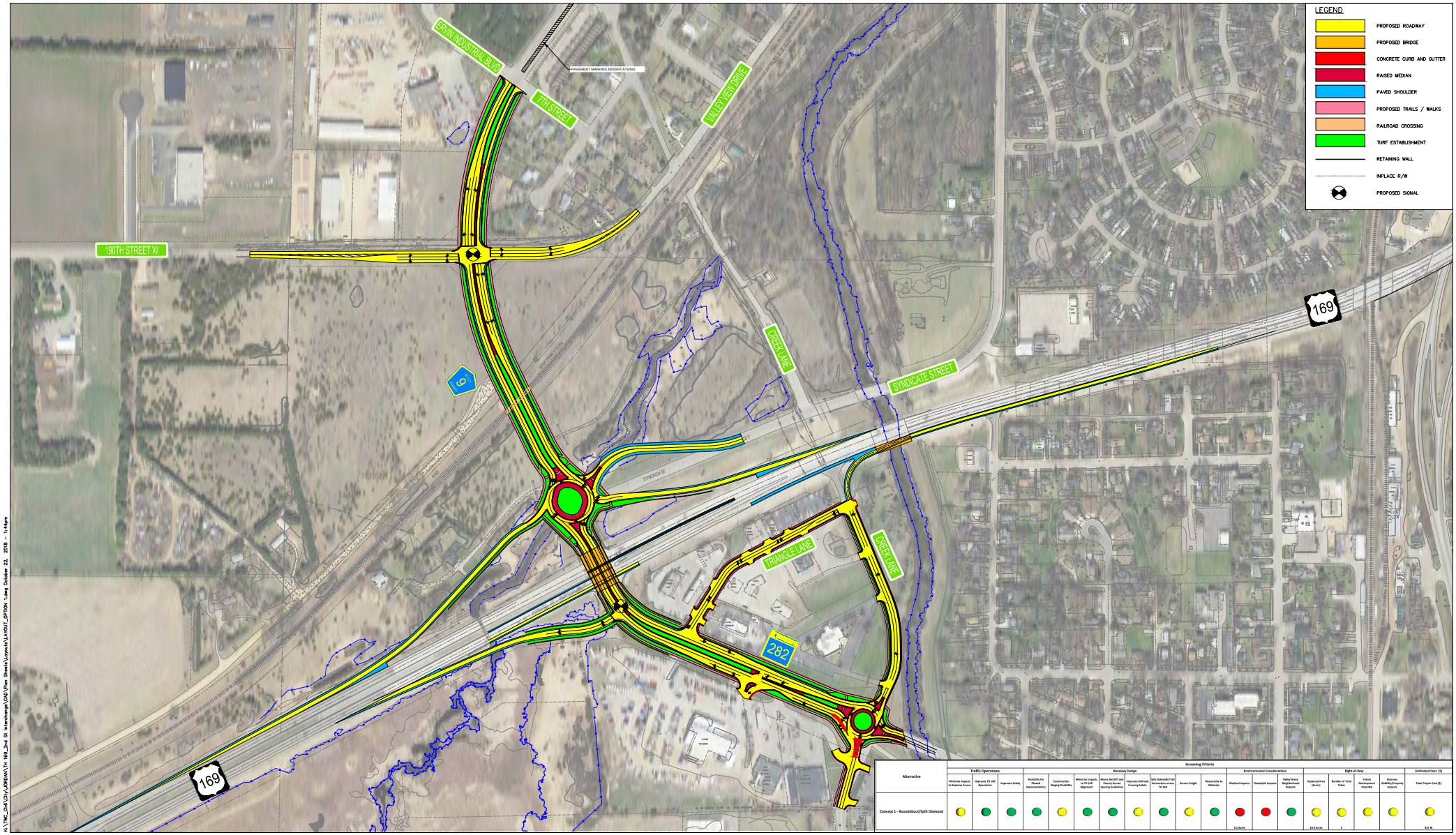
APPENDIX D – PRELIMINARY CONCEPTS AND EVALUATION MATRIX



Alternative	Screening Criteria																					
	Traffic Operations			Roadway Design								Environmental Considerations			Right-of-Way				Estimated Cost (1)	
	Minimize Impacts to Business Access	Improves TH 169 Operations	Improves Safety	Flexibility for Phased Implementation	Construction Staging Flexibility	Minimize Impacts to TH 169 Alignment	Meets MnDOT and County Access Spacing Guidelines	Improves Railroad Crossing Safety	Safe Sidewalk/Trail Connection across TH 169	Serves Freight	Reasonable to Maintain	Wetland Impacts	Floodplain Impacts	Valley Green Neighborhood Impacts	Impacted Area (Acres)	Number of Total Takes	Future Development Potential	Business Building/Property Impacts	Total Project Cost ($)
Concept 1 - Roundabout/Split Diamond												8.2 Acres			19.0 Acres	3			$37 M

Kimley»Horn

Scott

MINNESOTA DEPARTMENT OF TRANSPORTATION

TH 169 / TH 282 / CR 9

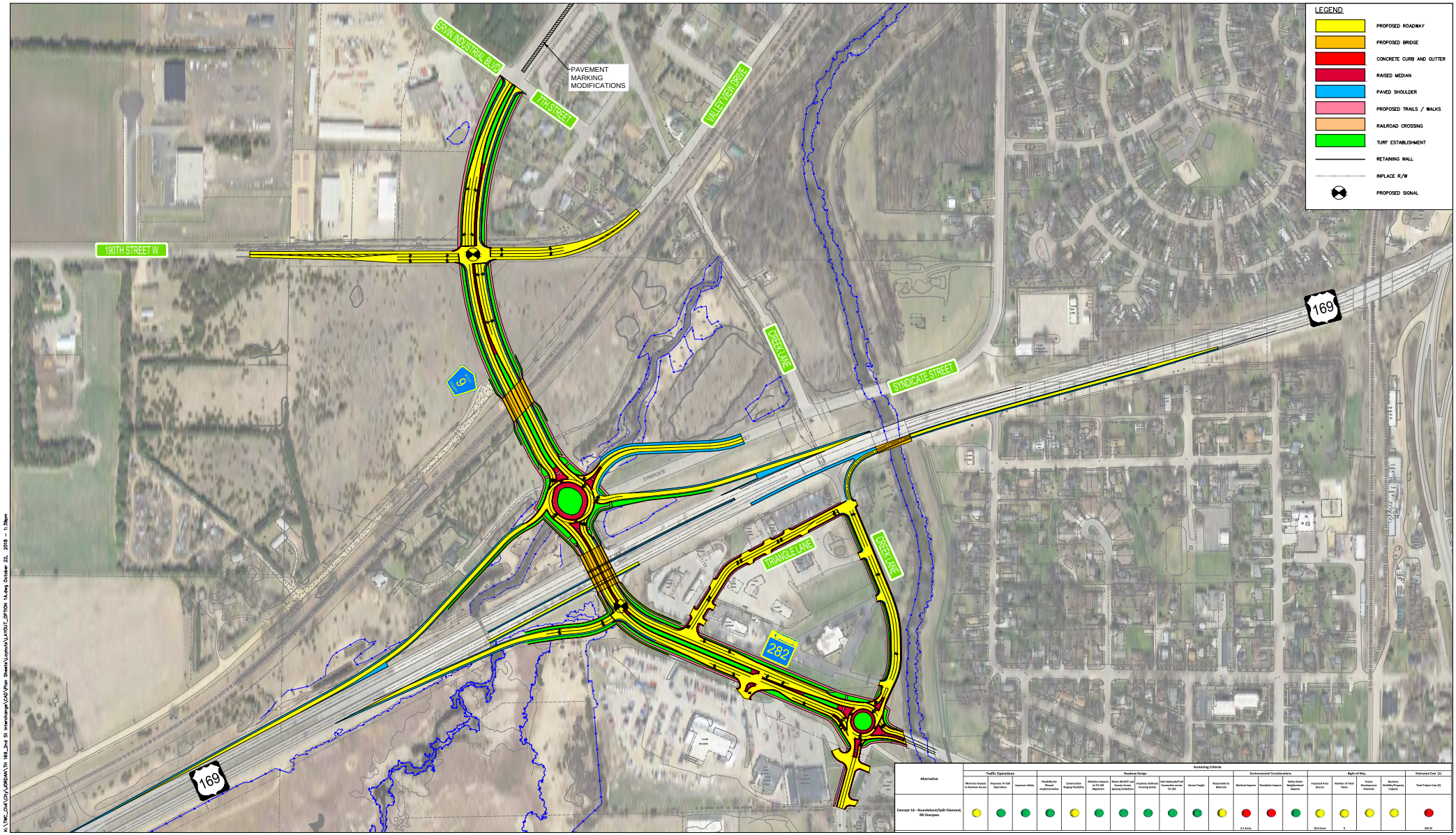
CONCEPT 1 - ROUNDABOUT / SPLIT DIAMOND

10/22/2018

NORTH

0 100 200

HORIZONTAL SCALE IN FEET

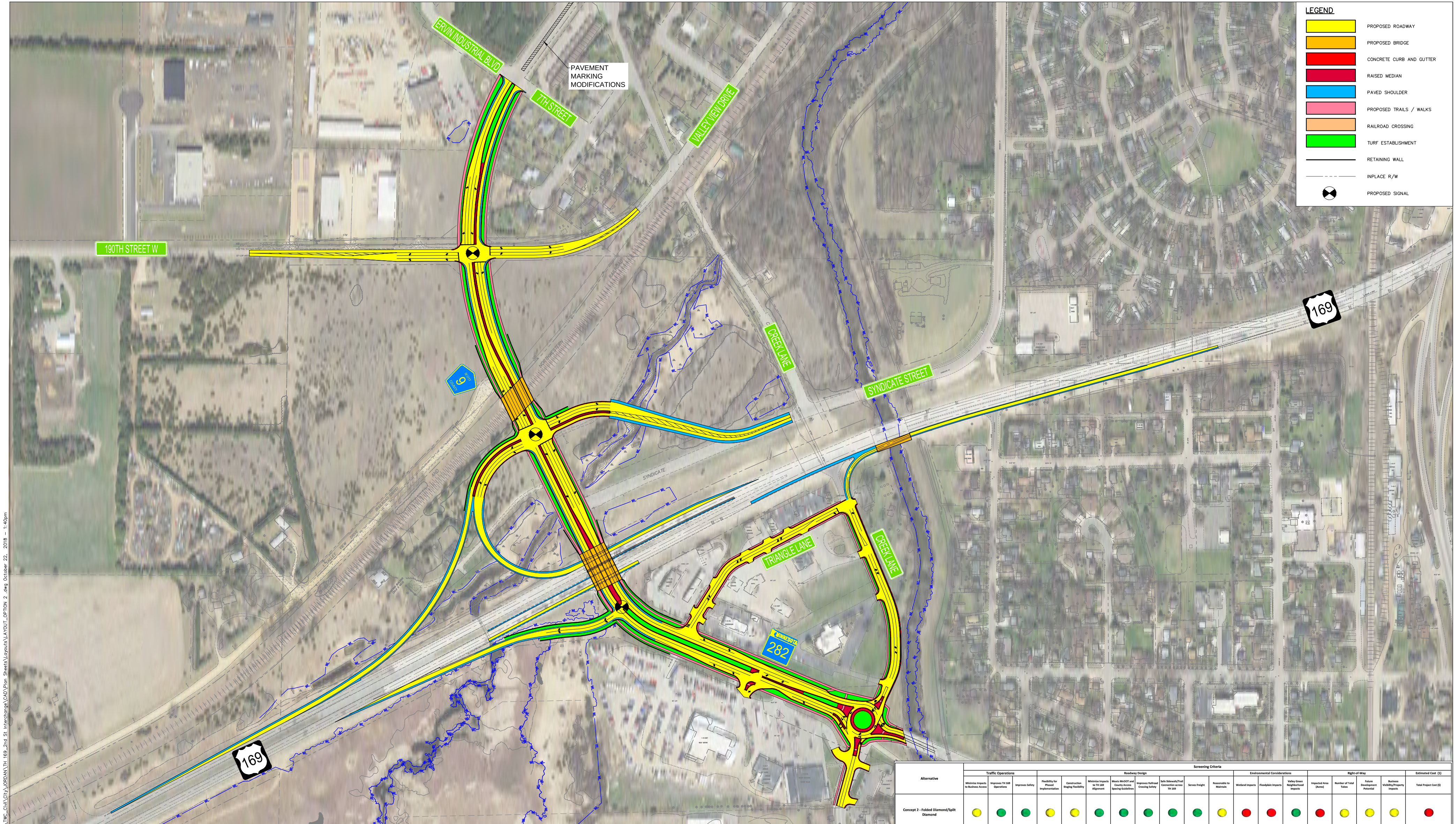


Alternative	Screening Criteria																						
	Traffic Operations			Roadway Design								Environmental Considerations			Right-of-Way				Estimated Cost (1)			
	Minimize Impacts to Business Access	Improve TH 169 Operations	Improves Safety	Flexibility for Phased Implementation	Construction Staging Flexibility	Minimize Impacts to TH 169 Alignment	Meets MnDOT and County Access Spacing Guidelines	Improves Railroad Crossing Safety	50% Sidewalk/Trail Connection across TH 169	Serves Freight	Reasonable to Maintain	Wetland Impacts	Floodplain Impacts	Valley Green Neighborhood Impacts	Impacted Area (Acres)	Number of Total Takes	Future Development Impacts	Business Visibility/Property Impacts	Total Project Cost ($)			
Concept 1A - Roundabout/Split Diamond, RR Overpass												3.3 Acres			19.4 Acres	3			$40 M			

TH 169 / TH 282 / CR 9
CONCEPT 1A - ROUNDABOUT / SPLIT DIAMOND / OVER RAILROAD
10/22/2018

NORTH

0 100 200
HORIZONTAL SCALE IN FEET



Alternative	Screening Criteria																		
	Traffic Operations			Roadway Design								Environmental Considerations			Right-of-Way				Estimated Cost (1)
	Minimize Impacts to Business Access	Improves TH 169 Operations	Improves Safety	Flexibility for Phased Implementation	Construction Staging Flexibility	Minimize Impacts to TH 169 Alignment	Meets MnDOT and County Access Spacing Guidelines	Improves Railroad Crossing Safety	Safe Sidewalk/Trail Connection across TH 169	Serves Freight	Reasonable to Maintain	Wetland Impacts	Floodplain Impacts	Valley Green Neighborhood Impacts	Impacted Area (Acres)	Number of Total Takes	Future Development Potential	Business Visibility/Property Impacts	Total Project Cost ($)
Concept 2 - Folded Diamond/Split Diamond	🟡	🟢	🟢	🟡	🟡	🟢	🟢	🟢	🟢	🟢	🟡	🔴 3.6 Acres	🔴	🟢	🔴 19.8 Acres	🟡 3	🟡	🟡	🔴 $36 M

Kimley»Horn

TH 169 / TH 282 / CR 9
CONCEPT 2 - FOLDED DIAMOND / SPLIT DIAMOND
10/22/2018

NORTH

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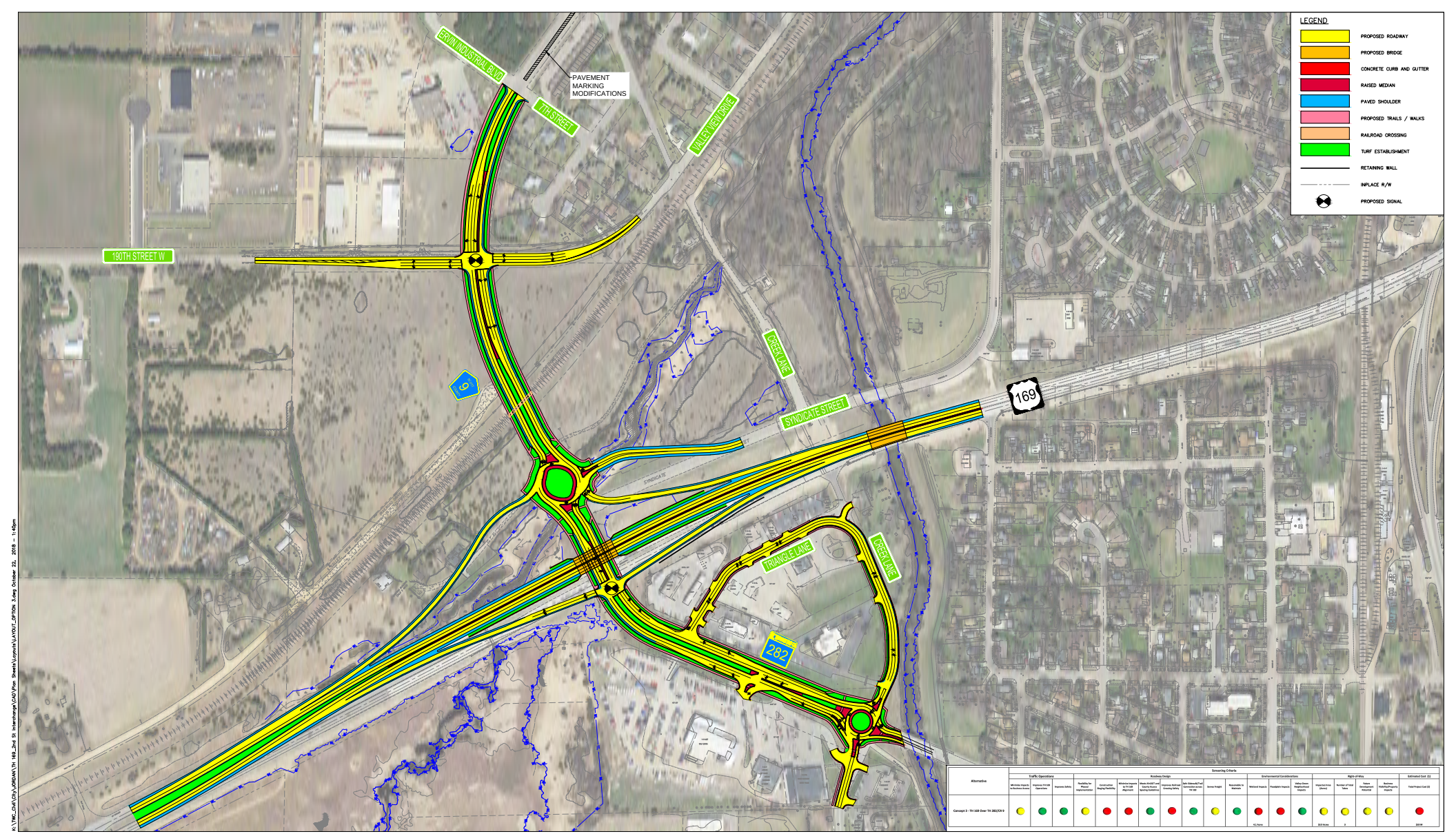
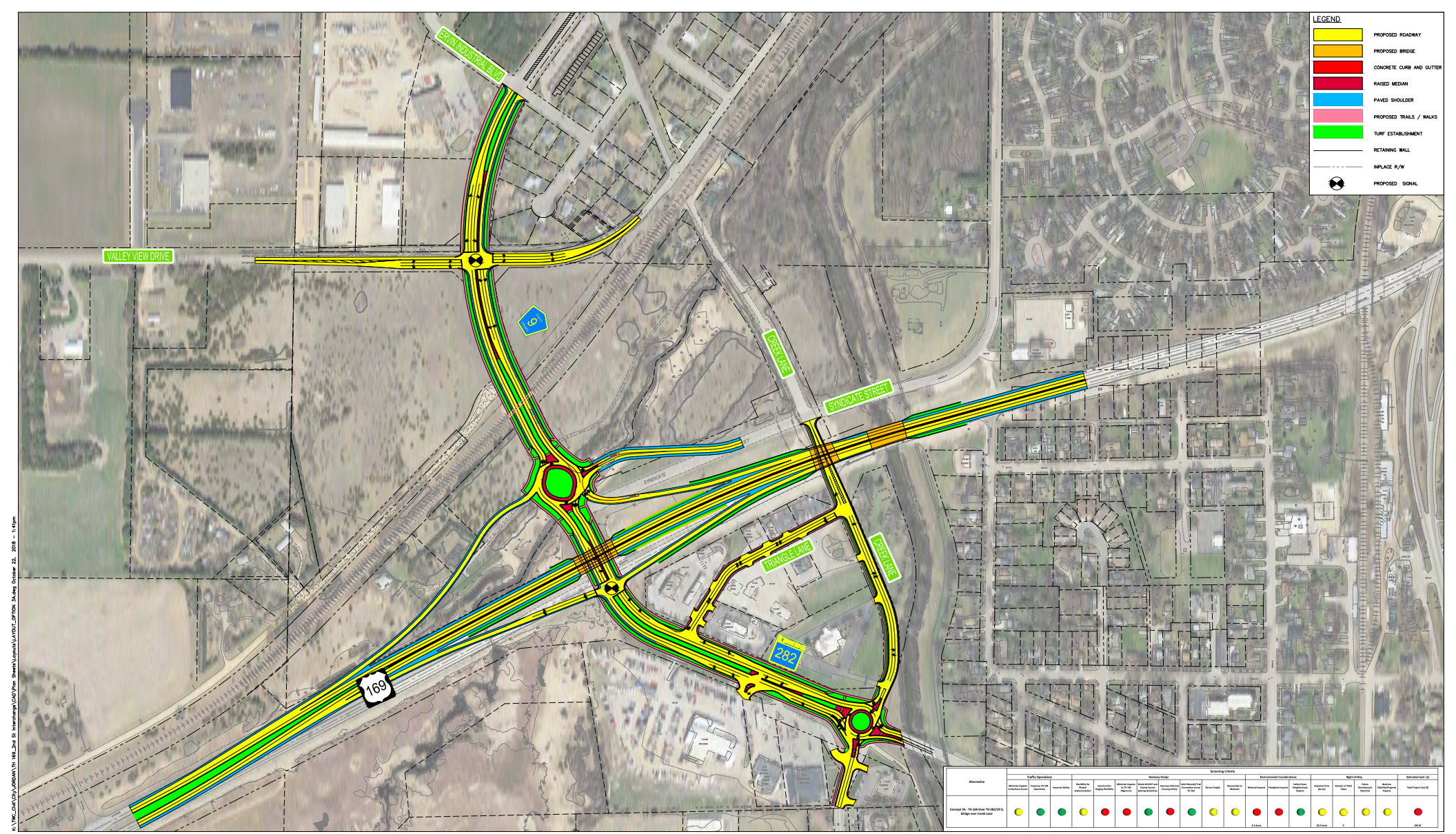
HORIZONTAL
SCALE IN FEET


LEGEND
PROPOSED ROADWAY
PROPOSED BRIDGE
CONCRETE CURB AND GUTTER
RAISED MEDIAN
PAVED SHOULDER
PROPOSED TRAILS / WALKS
RAILROAD CROSSING
TURF ESTABLISHMENT
RETAINING WALL
INPLACE R/W
PROPOSED SIGNAL
ERVIN INDUSTRIAL BLVD
7TH STREET
PAVEMENT MARKING MODIFICATIONS
VALLEY VIEW DRIVE
190TH STREET W
GREEN LANE
SYNDICATE STREET
169
9
TRIANGLE LANE
GREEN LANE
282
Alternative
Screening Criteria
Traffic Operations
Roadway Design
Environmental Considerations
Right-of-Way
Estimated Cost (1)
Concept 3 - TH 169 Over TH 282/CR 9



TH 169 / TH 282 / CR 9
CONCEPT 3 A - TH 169 BRIDGE OVER CREEK LANE
10/22/2018

NORTH
0 100 200
HORIZONTAL SCALE IN FEET

TH 169/TH 282/CR 9 Interchange Concept Design
Alternative Evaluation Matrix

OCTOBER 23, 2018

Alternative	Screening Criteria																		
	Traffic Operations			Roadway Design								Environmental Considerations			Right-of-Way				Estimated Cost (1)
	Minimize Impacts to Business Access	Improves TH 169 Operations	Improves Safety	Flexibility for Phased Implementation	Construction Staging Flexibility	Minimize Impacts to TH 169 Alignment	Meets MnDOT and County Access Spacing Guidelines	Improves Railroad Crossing Safety	Safe Sidewalk/Trail Connection across TH 169	Serves Freight	Reasonable to Maintain	Wetland Impacts	Floodplain Impacts	Valley Green Neighborhood Impacts	Impacted Area (Acres)	Number of Total Takes	Future Development Potential	Business Visibility/Property Impacts	Total Project Cost ($)
No Build	+	-	-	N/A	N/A	N/A	-	NEUTRAL	-	NEUTRAL	NEUTRAL	+ 0 Acres	+	+	+ 0 Acres	+ 0	NEUTRAL	+	+ $0
Concept 1 - Roundabout/Split Diamond	NEUTRAL	+	+	+	NEUTRAL	+	+	NEUTRAL	+	NEUTRAL	+	- 3.1 Acres	-	+	NEUTRAL 19.0 Acres	NEUTRAL 3	NEUTRAL	NEUTRAL	NEUTRAL $27 M
Concept 1A - Roundabout/Split Diamond, RR Overpass	NEUTRAL	+	+	+	NEUTRAL	+	+	+	+	+	NEUTRAL	- 3.1 Acres	-	+	NEUTRAL 19.0 Acres	NEUTRAL 3	NEUTRAL	NEUTRAL	- $32 M
Concept 2 - Folded Diamond/Split Diamond	NEUTRAL	+	+	NEUTRAL	NEUTRAL	+	+	+	+	+	NEUTRAL	- 3.6 Acres	-	+	- 19.8 Acres	NEUTRAL 3	NEUTRAL	NEUTRAL	- $36 M
Concept 3 - TH 169 Over TH 282/CR 9	NEUTRAL	+	+	NEUTRAL	-	-	+	-	+	NEUTRAL	+	- 4.1 Acres	-	+	NEUTRAL 18.9 Acres	NEUTRAL 3	NEUTRAL	NEUTRAL	- $33 M
Concept 3A - TH 169 Over TH 282/CR 9, Bridge over Creek Lane	NEUTRAL	+	+	NEUTRAL	-	-	+	-	+	NEUTRAL	NEUTRAL	- 4.1 Acres	-	+	NEUTRAL 18.9 Acres	NEUTRAL 3	NEUTRAL	NEUTRAL	- $40 M

LEGEND

+

NEUTRAL

-

NOTES:

1) Includes estimated construction (with 20% contingency), right-of-way acquisition, and 20% administrative/engineering costs.

APPENDIX E – TRAFFIC FORECASTING, SAFETY, AND OPERATIONS ANALYSIS

MEMORANDUM

To: Tom Nikunen, ICMA-CM
City Administrator
City of Jordan

Tony Winiecki, P.E.
County Engineer
Scott County Highway Department

Jon Solberg
South Area Manager
Minnesota Department of Transportation

From: Brandon Bourdon, P.E.
Kimley-Horn and Associates, Inc

Date: November 28, 2018

Re: TH 169 / TH 282 / CR 9 Interchange
Forecasting, Safety and Operations Analysis

Introduction

Kimley-Horn has been hired by the City of Jordan, as part of a joint project between the City, Scott County and MnDOT, to provide traffic engineering, concept design, and stakeholder engagement services for the TH 169 / TH 282 / CR 9 interchange area. As part of the traffic engineering services, an operations analysis was performed at critical intersections within the study area to support interchange concept development and determine the most appropriate intersection control and geometry to accommodate existing and future traffic.

This memorandum provides a summary of historic crash data along the study corridor, intersection capacity analysis for Existing and Design Year conditions, and a discussion on potential roadway and intersection improvement alternatives.

Existing Conditions Analysis

The traffic study was centered around potential interchange improvements at TH 169 / CR 9 / TH 282. From that intersection, the study area extended north on CR 9 to 190th Street West/Valley View Drive and south on TH 282 to Creek Lane North. The study area also included the section of TH 169 from TH 282 to Creek Lane, Creek Lane North from TH 169 to TH 282 and Triangle Lane North from TH 282 to Creek Lane. The following provides a description of the roadways that were included within the study area:

- TH 169 is a northeast-southwest roadway that runs through the northwest edge of Scott County just south of the Minnesota River. Within the study area, TH 169 is four-lane divided roadway and has a posted speed limit of 55 mph. TH 169 is classified as a Principal Arterial by MnDOT.
- CR 9 is a north-south roadway that runs between the County Line (to the north where it changes to Carver County Road 11) to TH 169 (to the south where it becomes TH 282), and is one of the only major north-south roadways in the area that offers a river crossing over the Minnesota River. CR 9 is a two-lane undivided roadway between the Minnesota River and 9th Street; a four-lane undivided roadway between 9th Street and Frontage Road; and a four-lane divided roadway just north of the Frontage Road to TH 169. The roadway has a posted speed limit of 50 mph between the Minnesota River and Jennifer Lane (the north intersection) and 40 mph between Jennifer Lane and TH 169. CR 9 is classified as a Minor Arterial by Scott County.
- TH 282 is an east-west roadway that connects TH 169 (to the west) to TH 21 (Broadway Street). Within the study area, TH 282 is four-lane divided near TH 169 and two-lane undivided east of Triangle Lane. The roadway has a posted speed limit of 30 mph and is classified as a Minor Arterial.
- 190th Street West/Valley View Drive is a northeast-southwest roadway that connects 173rd Street W (to the northeast) to TH 169 (to the southwest) between the Minnesota River (to the north) and TH 169 (to the south). The roadway is two-lane undivided with a posted speed limit of 30 mph east of CR 9 and 45 mph west of CR 9.
- Triangle Lane North is a short local road that runs parallel to TH 169 that connects Creek Lane (to the east) to TH 282 (to the west).
- Creek Lane North is a local roadway that connects to TH 169 (to the north) and Sunset Drive (to the south). The roadway is two-lane undivided with a posted speed limit of 30 mph. This roadway is one of the primary roads used to reach Jordan Elementary, Middle, and High Schools.
- Frontage Road is a local roadway that runs parallel to TH 169 and to the east of CR 9 that connects Syndicate Street (to the east) to CR 9 (to the west). The roadway is two-lane undivided with a posted speed limit of 30 mph. This roadway is the primary access to the Jordan Police Department.
- CR 9 Railroad Crossing is an at-grade railroad crossing located between TH 169 and 190th Street West/Valley View Drive along CR 9. Based on a review of MnDOT's Twin Cities Area Freight Railroad Map, this railroad is operated by Union Pacific. It has a maximum operating speed of 49 MPH and there are six trains per day at this crossing. The actual rail-crossing train volume was counted on May 16, 2018 and there were four trains that crossed CR 9 during a 24-hour period. The duration of the train crossings were between 1:15 and 2:15 minutes and traffic queues on CR 9 dissipated within 45 seconds after the gate arms raised.

Exhibit 1 provides the existing lane geometry and intersection control for the study area. The study intersections included the following:

- CR 9 & 190th Street West/Valley View Drive
- CR 9 & Frontage Road
- TH 169 / CR 9 / TH 282
- TH 169 & Creek Lane North
- TH 282 & Triangle Lane North
- TH 282 & Business Access
- TH 282 & Creek Lane North
- Triangle Lane North & Creek Lane North

Existing Traffic Volumes

Intersection traffic count data for most the intersections was provided to Kimley-Horn by the City of Jordan because they were collected recently (November 2016). New traffic counts were collected at the intersections of TH 169 & Creek Lane North, Triangle Lane North & Creek Lane North, and TH 282 & Business Access (May 2018). Daily roadway volumes, reported as Average Annual Daily Traffic (AADT), was provided by the Minnesota Department of Transportation's Traffic Mapping Application.

Exhibit 2 provides a summary of the roadway AADT information as well as the AM and PM peak hour turning movement volumes.

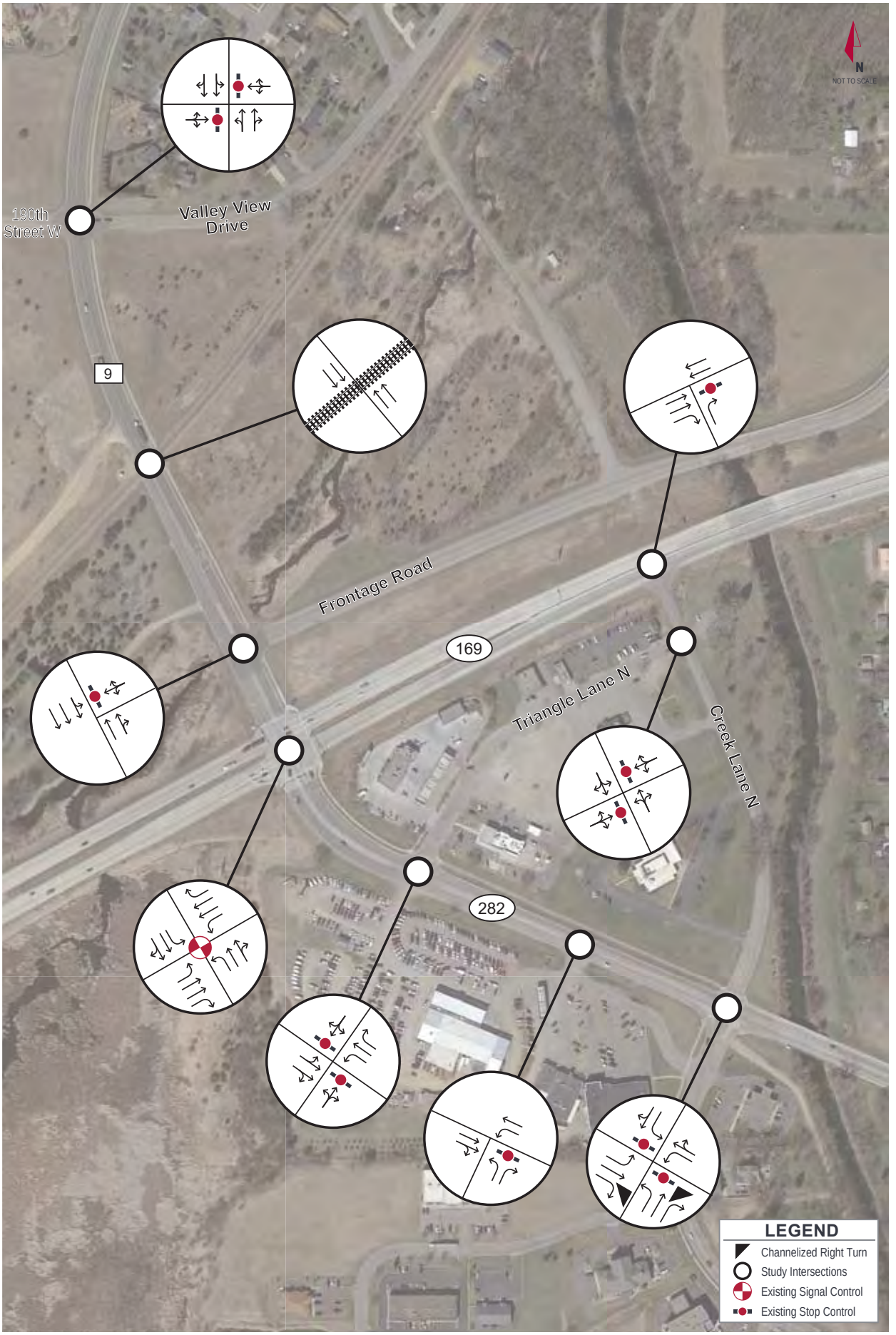
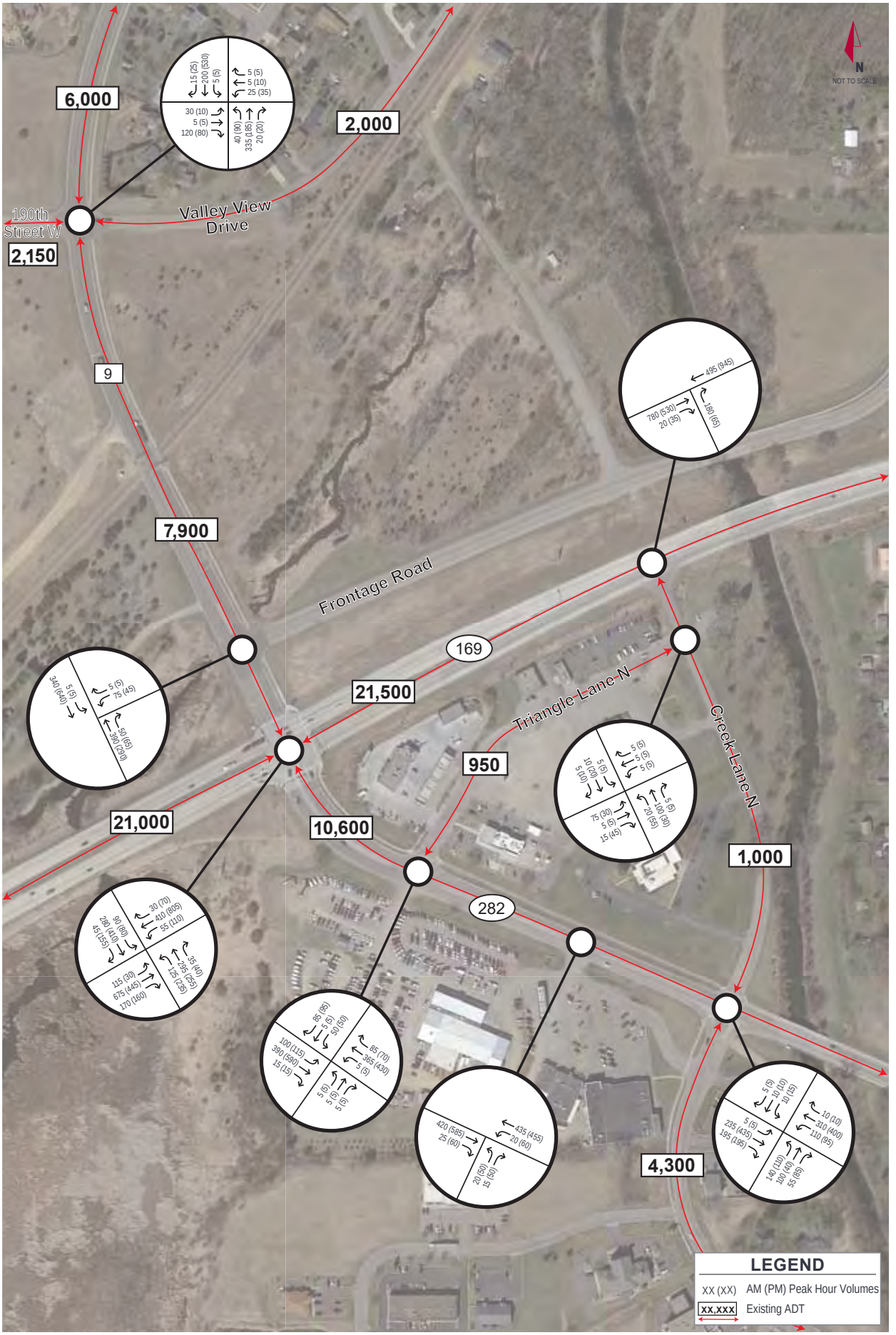


EXHIBIT 1

EXISTING INTERSECTION CONTROL AND GEOMETRY
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN



CITY OF JORDAN · Scott County · DEPARTMENT OF TRANSPORTATION · Kimley»Horn

EXHIBIT 2

EXISTING TRAFFIC VOLUMES
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

Existing Intersection Operations

An intersection capacity analysis was performed at the study intersections using the weekday AM and PM peak hour turning movement volumes that were provided in Exhibit 2. The capacity analysis was performed using Synchro/SimTraffic software to determine the baseline Level of Service (LOS), delay, and queueing at the study intersections.

The LOS boundaries, as documented in the *Highway Capacity Manual* for signalized and unsignalized intersections, are shown in Table 1. For this study, LOS A through LOS D are considered to be acceptable levels of operation for both signalized and unsignalized intersections.

Table 1: Level of Service Boundaries

Level of Service	Average Control Delay per Vehicle (sec/veh)		Description
	Signalized	Unsignalized	
A and B	≤ 10 (A) > 10 and ≤ 20 (B)	≤ 10 (A) > 10 and ≤ 15 (B)	No delays at intersections with continuous flow traffic. Uncongested operations; high frequency of long gaps available for all left and right-turning traffic; no observable queues.
C	> 20 and ≤ 35	> 15 and ≤ 25	Moderate delays at intersections with satisfactory to good traffic flow. Light congestion; infrequent backups on critical approaches.
D	> 35 and ≤ 55	> 25 and ≤ 35	Increased probability of delays along every approach. Significant congestion on critical approaches, but intersection functional. No long standing lines formed.
E	> 55 and ≤ 80	> 35 and ≤ 50	Heavy traffic flow condition. Heavy delays probable. No available gaps for cross-street traffic or main street turning traffic. Limit of stable flow.
F	> 80	> 50	Unstable traffic flow. Heavy congestion. Traffic moves in forced flow condition. Average delays greater than one minute highly probable. Total breakdown.

Table 2 provides a summary of the delay (seconds per vehicle) and LOS for each individual movement of the study intersections. The LOS information is also summarized by movement in Exhibit 3. Based on the Existing Conditions (2017) capacity analysis, all intersections are currently operating at an acceptable LOS during the weekday AM and PM peak hours. Additionally, all individual movements are operating at LOS D or better for both the AM and PM peak hours except for the eastbound and westbound lefts at TH 169 and TH 282, which are operating at LOS E during the AM and PM peak hours. Although TH 282 and Creek Lane operate at acceptable LOS during the peak hour, there are periods of congestion and complaints regarding traffic at this intersection in part due to traffic traveling to and from the Jordan schools. The SimTraffic reports are included in the Appendix.

Table 2: Existing Year (2017) Peak Hour Delay and Level of Service Results

Intersection			AM PEAK HOUR								PM PEAK HOUR							
			Left		Through		Right		Overall		Left		Through		Right		Overall	
			Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS
CR 9 (Quaker Avenue) & 190th Street W/Valley View Drive	Stop Controlled	EB Approach	9.3	A	12.1	B	4.2	A	2.3	A	8.7	A	13.6	B	4.9	A	2.3	A
		WB Approach	8.9	A	11.2	B	3.9	A			11.3	B	12.3	B	6.5	A		
		NB Approach	3.6	A	1.3	A	1.6	A			6.7	A	1.3	A	1.1	A		
		SB Approach	1.2	A	0.4	A	0.2	A			1.6	A	0.6	A	0.3	A		
CR 9 (Quaker Avenue) & Frontage Rd	Stop Controlled	WB Approach	10.8	B	-	-	4.7	A	2.4	A	22.6	C	-	-	4.2	A	5.4	A
		NB Approach	-	-	1.8	A	1.5	A			-	-	1.7	A	1.7	A		
		SB Approach	2.8	A	1.3	A	-	-			3.5	A	6.4	A	-	-		
TH 169 & CR 9 (Quaker Avenue)/TH 282 (2nd Street W)	Signalized	EB Approach	58.9	E	27.0	C	6.4	A	30.2	C	73.1	E	38.6	D	7.8	A	34.7	C
		WB Approach	57.7	E	28.9	C	3.1	A			64.4	E	34.0	C	4.4	A		
		NB Approach	26.0	C	33.7	C	22.0	C			34.5	C	29.4	C	15.7	B		
		SB Approach	29.1	C	39.5	D	25.2	C			27.7	C	44.3	D	32.9	C		
TH 282 (2nd Street W) & Triangle Lane N	Stop Controlled	EB Approach	6.8	A	2.9	A	1.9	A	3.5	A	9.4	A	4.6	A	2.4	A	5.0	A
		WB Approach	4.4	A	0.4	A	0.4	A			4.5	A	0.6	A	0.5	A		
		NB Approach	17.9	C	17.9	C	3.2	A			16.1	C	24.2	C	8.3	A		
		SB Approach	17.3	C	17.0	C	8.6	A			24.3	C	22.1	C	13.8	B		
TH 282 (2nd Street W) & Business Access	Stop Controlled	EB Approach	-	-	0.7	A	0.6	A	1.0	A	-	-	1.2	A	0.6	A	2.1	A
		WB Approach	3.7	A	0.6	A	-	-			7.2	A	0.6	A	-	-		
		NB Approach	10.8	B	-	-	3.5	A			19.1	C	-	-	4.2	A		
TH 282 (2nd Street W) & Creek Lane	Stop Controlled	EB Approach	2.9	A	0.4	A	2.6	A	3.7	A	3.3	A	0.7	A	2.4	A	3.5	A
		WB Approach	2.8	A	0.6	A	0.2	A			4.8	A	0.7	A	0.2	A		
		NB Approach	12.7	B	11.2	B	1.7	A			20.4	C	13.5	B	1.7	A		
		SB Approach	9.5	A	10.3	B	5.6	A			14.9	B	16.4	C	5.5	A		
Creek Ln N & Triangle Lane N	Stop Controlled	EB Approach	6.7	A	6.2	A	4.7	A	3.1	A	5.0	A	6.5	A	2.9	A	2.2	A
		WB Approach	3.4	A	4.4	A	5.0	A			3.9	A	4.8	A	2.5	A		
		NB Approach	1.9	A	1.0	A	0.3	A			2.0	A	0.5	A	0.2	A		
		SB Approach	1.2	A	0.1	A	0.1	A			1.0	A	0.2	A	0.1	A		
TH 169 & Creek Ln N	Stop Controlled	WB Approach	-	-	-	-	-	-	8.4	A	-	-	-	-	-	-	4.6	A
		NB Approach	-	-	-	-	15.5	C			-	-	-	-	7.9	A		

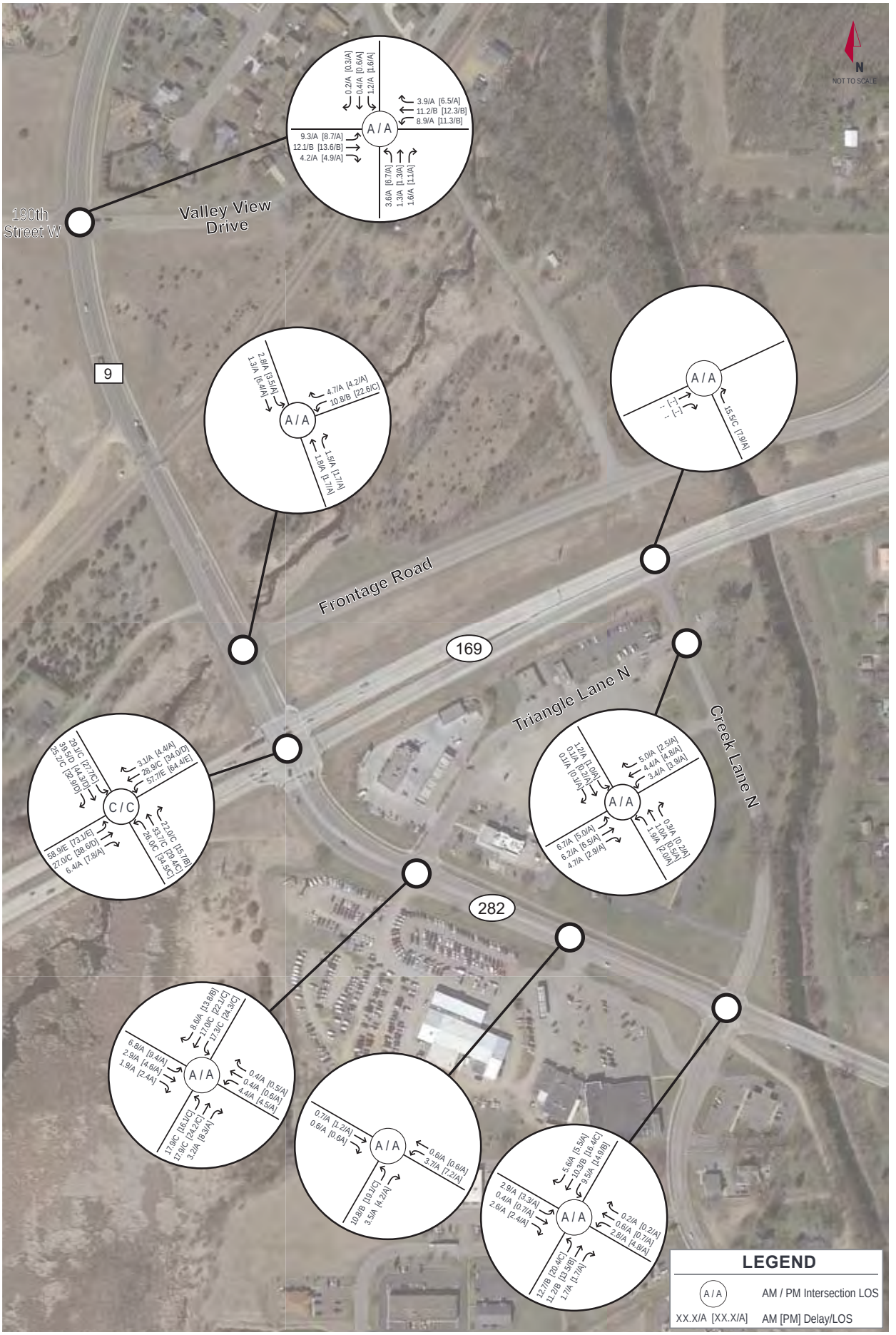


EXHIBIT 3

EXISTING DELAY AND LOS
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

In addition to intersection LOS and delay, the existing turn lane queue lengths were reviewed based on the SimTraffic analysis. Table 3 provides the existing 95th percentile queue lengths for turning movements at the study intersection turn lanes for both the AM and PM peak hours. The existing storage lengths were based on a review of aerial photography. Based on the review of the 95th percentile queues, the existing turn lanes are anticipated to accommodate the queues except for the northbound left-turn at the intersections of TH 169 / CR 9 / TH 282 and TH 282 & Creek Lane North. The existing southbound through queue at the intersection of TH 169 / CR 9 / TH 282 extends through the intersection of CR 9 & Frontage Road during the PM peak hour. In addition, the southbound approach at TH 282 & Triangle Lane North and northbound right and left-turn lanes at TH 282 & Business Access have queue lengths that extend beyond the southern Holiday and McDonald's access points and into the existing Radermacher's parking lot, respectively.

Table 3: Existing Year (2017) 95th Percentile Queue Summary

Intersection	Lane	Storage Length (ft)	AM Peak	PM Peak
CR 9 (Quaker Avenue) & 190th Street W/Valley View Drive	EB	>500	72	60
	WB	>500	49	58
	NB Left	>500	33	79
	SB Left	>500	5	8
TH 169 & CR 9 (Quaker Avenue)/TH 282 (2nd Street W)	EB Left	260	162	70
	EB Right	300	66	74
	WB Left	550	94	165
	WB Right	350	31	51
	NB Left	90	115	199
	SB Left	125	88	90
TH 282 (2nd Street W) & Triangle Lane N	WB Left	150	15	11
	WB Right	85	11	9
	NB	55	36	35
	SB	65	94	123
TH 282 (2nd Street W) & Business Access	WB Left	100	28	57
	NB Left	40	42	60
	NB Right	40	35	53
TH 282 (2nd Street W) & Creek Lane	EB Left	100	12	9
	EB Right	300	80	55
	WB Left	200	46	60
	NB Left	85	87	96
	NB Right	85	0	24
	SB Left	85	35	41
TH 169 & Creek Ln N	NB Right	120	114	43
Queue lengths are the 95th Percentile Queue as calculated in SimTraffic.				

Crash Analysis

Historical crash data was obtained for the previous five (5) year period (2011 – 2015) using MnDOT's Crash Mapping Analysis Tool (MnCMAT). A review of the crash data showed that there was a total of 100 crashes at study intersections. Of the 100 crashes, there were 2 fatalities, 0 incapacitating injuries, 4 non-incapacitating injuries, 19 possible injuries, and 75 property damage only crashes.

Table 4 provides a summary of the intersection crash analysis, and includes the number and type of crashes, observed crash rate, statewide average and critical crash rates, and the critical index. Crash rates

provide an indication of the number of crashes that can be expected per entering vehicle over a given analysis period. Using MnDOT's 2015 "Green Sheets," intersection crash rates were calculated and compared against statewide average values to develop a critical index value. This value is used to determine if an intersection is operating outside of the expected normal range, where a critical index value over 1.0 means the intersection is outside of the normal range.

The review of the crash analysis shows that the intersections of TH 169 / CR 9 / TH 282 and TH 282 & Triangle Lane North have a critical index of greater than 1.0, meaning that these two intersections are operating outside of the normal, expected range (i.e. there is a crash issue at these intersections today). At the intersection of TH 169 / CR 9 / TH 282, the most common crash type was rear-end collisions (39 total over the five-year period). A fatal crash also occurred at TH 169 / CR 9 / TH 282. The most common crash types at the intersection of TH 282 & Triangle Lane North were rear-end crashes (5) and sideswipe crashes (3). The crash data indicates that two contributing factors are having a traffic signal on a high-speed, high-volume facility (TH 169) and the queuing from this signal and the associated impacts due to the inadequate intersection spacing between Triangle Lane N and TH 169. The number of crashes, crash rate, critical crash rate, and critical index information is summarized in Exhibit 4.

Table 4: Crash Summary

Intersection	Total Number of Crashes	Crash Type					Observed Crash Rate	State-wide Average	Critical Crash Rate	Critical Index
		PD	C	B	A	K				
CR 9 (Quaker Avenue) & 190th Street West/Valley View Drive	3	2	0	0	0	1	0.20	0.25	0.62	0.32
CR 9 (Quaker Avenue) & Frontage Road	2	0	1	1	0	0	0.13	0.25	0.62	0.21
TH 169 & CR 9 (Quaker Avenue)/ TH 282 (2nd Street West)	62	47	13	1	0	1	1.11	0.45	0.69	1.61
TH 282 (2nd Street West) & Triangle Lane	15	12	2	1	0	0	0.76	0.25	0.57	1.33
TH 282 (2nd Street West) & Creek Lane North	8	6	2	0	0	0	0.33	0.25	0.54	0.61
TH 169 & Creek Lane North	10	8	1	1	0	0	0.25	0.25	0.47	0.53

EXHIBIT 4

CRASH RATES (2011-2015)
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

Design Year (2040) No-Action Intersection Analysis

A capacity analysis was performed at the study intersections for the Design Year (2040) to get an idea of operating conditions along the corridor in the future and use that information to determine necessary roadway and intersection improvements to provide acceptable LOS through the Design Year (2040). Below is a summary of the Design Year (2040) volume development and anticipated operating conditions during the AM and PM peak hours at the study intersections.

Design Year (2040) Volume Forecast

Existing turning movement volumes and AADTs identified previously along with prior planning efforts were used to development Design Year (2040) traffic forecasts. There were two sets of future ADT forecasts available that were used including:

- 2040 Scott County Transportation Plan Update
- 190th Street & CSAH 9 Traffic Study

The Scott County traffic forecasts were developed as a part of the regional planning process that begins with Metropolitan Council growth projections and requires a travel demand model update based on the Metropolitan Council projections. There was also forecasting completed by the City of Jordan that considered the full development potential of three land use scenarios on the north side of TH 169 as documented in the 190th Street & CSAH 9 Traffic Study, completed in 2017, which involved growth anticipated by the City beyond the Metropolitan Council forecasts. The concern by the City was that very little growth was assumed on the north side of TH 169 as a part of the Metropolitan Council forecasts. Scott County and MnDOT had concerns that concepts may be overdesigned if the forecasts were too aggressive and deviated significantly from the comprehensive planning process. There was dialog between the parties and the following process was used to develop the 2040 traffic forecasts:

- One-half of the ultimate development potential north of TH 169 as documented in the 190th Street & CSAH 9 Traffic Study is to occur by 2040. The traffic generated east of Fairview Lane will generally travel to CR 9 to get to the regional roadway network. Conversely, traffic generated west of Fairview Lane will travel to Delaware Avenue to gain access to the regional roadway network.
- We assumed that background growth on 190th Street West shown in the 2040 Scott County Forecasts was due to development assumed in the 190th Street & CR 9 Traffic Study (i.e. some of the growth in the study did get included in the forecasts previously presented).
- We assumed that land uses with seasonal events will be handled through event traffic management plans rather than designing the transportation system to accommodate these events (Renaissance Festival, Scott-Carver Threshers, Scott County Fairgrounds). Therefore, we did not include those event trips in the forecasts.

- This resulted in the 2040 Scott County Plan ADTs being adjusted to include an additional 9,500 trips that were distributed onto the roadway network (1/2 of 22,000 minus 1,500 that was already accounted for in the Scott County model).

The forecasts developed as a part of this study along with the existing AADTs and Scott County 2040 and 190th Street Growth Area full build forecasts are shown on Exhibit 5.

The developed 2040 ADT forecasts, existing traffic counts, and future forecasts documented in the 190th Street & CR 9 Traffic Study were all used in combination to develop 2040 turning movement counts shown in Exhibit 6.

Design Year (2040) No-Action Intersection Capacity Analysis

Using the forecasted Design Year (2040) AM and PM peak hour turning movement volumes, a capacity analysis was performed at the study intersections to determine baseline operating conditions in 2040. Existing intersection control and geometries were assumed for this No-Action analysis, except for the intersections of CR 9 & 190th Street West/Valley View Drive and TH 282 & Creek Lane North, where traffic signal control was assumed.

Table 5 provides a summary of the delay (seconds/vehicle) and LOS at the study intersections. Exhibit 7 also provides a summary of the delay and LOS for each individual movement at the study intersections. Based on the analysis, there are a significant number of intersections that are anticipated to operate at overall LOS E or LOS F during the AM and PM peak hours. These intersections include the following:

- CR 9 & 190th Street West/Valley View Drive (PM peak hour)
- CR 9 & Frontage Road (AM and PM peak hours)
- TH 169 / CR 9 / TH 282 (PM peak hour)
- TH 282 & Triangle Lane North (PM peak hour)
- Creek Lane North & Triangle Lane North (AM peak hour)
- TH 169 & Creek Lane North (PM peak hour)

Due to a significant number of intersection that are anticipated to operate below the acceptable LOS for Design Year (2040) No-Action conditions, improvements along the study corridor will be necessary to provide acceptable LOS into the future. The continued deterioration of LOS between today and future conditions is anticipated to result in additional crash concerns along the corridor.

EXHIBIT 5

FUTURE VOLUME FORECASTING
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

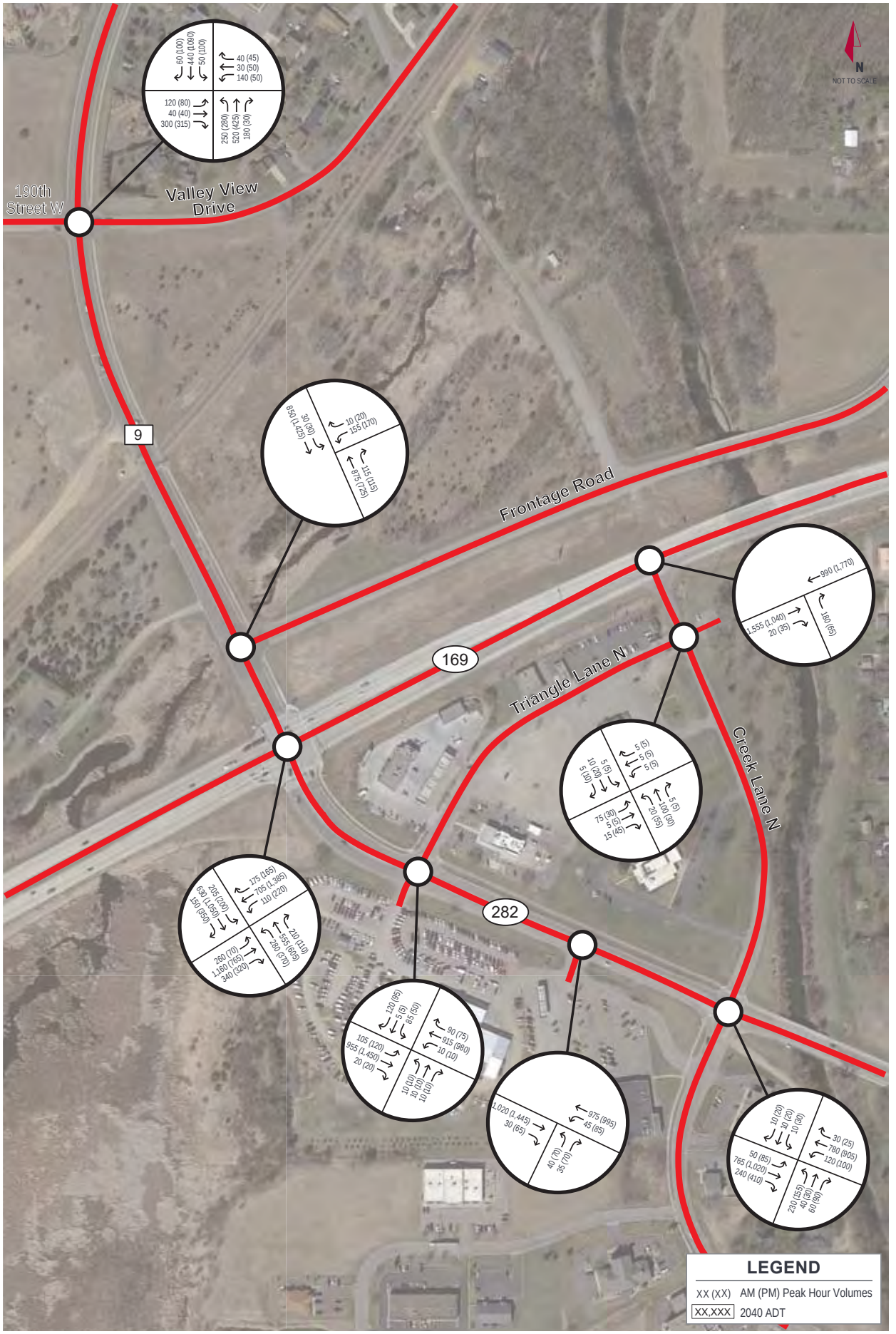


EXHIBIT 6

DESIGN YEAR (2040) NO-ACTION TRAFFIC VOLUMES
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

Table 5: Design Year (2040) No-Action Capacity Analysis Summary

Intersection			AM PEAK HOUR								PM PEAK HOUR							
			Left		Through		Right		Overall		Left		Through		Right		Overall	
			Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS
CR 9 (Quaker Avenue) & 190th Street W/Valley View Drive	Signalized	EB Approach	56.6	E	59.3	E	44.9	D	31.2	C	*	F	*	F	*	F	91.4	F
		WB Approach	39.8	D	39.5	D	32.4	C			54.5	D	50.6	D	35.7	D		
		NB Approach	36.3	D	23.3	C	17.2	B			84.6	F	14.9	B	14.5	B		
		SB Approach	44.6	D	23.6	C	6.1	A			*	F	*	F	*	F		
CR 9 (Quaker Avenue) & Frontage Rd	Stop Controlled	WB Approach	*	F	-	-	*	F	94.9	F	*	F	-	-	*	F	*	F
		NB Approach	-	-	1.9	A	2.0	A			-	-	1.8	A	1.9	A		
		SB Approach	42.3	E	60.0	F	-	-			*	F	*	F	-	-		
TH 169 & CR 9 (Quaker Avenue)/TH 282 (2nd Street W)	Signalized	EB Approach	75.3	E	58.8	E	21.8	C	52.0	D	*	F	60.4	E	26.7	C	87.1	F
		WB Approach	77.5	E	43.9	D	8.9	A			*	F	*	F	62.4	E		
		NB Approach	58.7	E	41.0	D	40.5	D			*	F	46.1	D	42.1	D		
		SB Approach	60.4	E	72.2	E	57.2	E			55.8	E	65.5	E	50.3	D		
TH 282 (2nd Street W) & Triangle Lane N	Stop Controlled	EB Approach	28.9	D	13.1	B	5.7	A	32.2	D	40.0	E	20.1	C	7.3	A	57.4	F
		WB Approach	10.5	B	1.5	A	1.0	A			20.5	C	31.3	D	14.7	B		
		NB Approach	*	F	*	F	93.9	F			*	F	*	F	*	F		
		SB Approach	*	F	*	F	*	F			*	F	*	F	*	F		
TH 282 (2nd Street W) & Business Access	Stop Controlled	EB Approach	-	-	4.7	A	0.8	A	4.8	A	-	-	5.9	A	0.7	A	30.5	D
		WB Approach	12.0	B	2.1	A	-	-			26.2	D	18.3	C	-	-		
		NB Approach	56.1	F	-	-	15.4	C			*	F	-	-	52.6	F		
TH 282 (2nd Street W) & Creek Lane	Signalized	EB Approach	52.3	D	19.6	B	2.1	A	22.7	C	94.2	F	16.1	B	2.0	A	40.9	D
		WB Approach	50.4	D	23.3	C	17.4	B			59.8	E	40.9	D	35.5	D		
		NB Approach	34.3	C	25.7	C	2.3	A			*	F	79.0	E	39.9	D		
		SB Approach	22.8	C	27.0	C	17.7	B			39.8	D	59.1	E	51.3	D		
Creek Ln N & Triangle Lane N	Stop Controlled	EB Approach	*	F	*	F	*	F	*	F	5.3	A	6.0	A	2.9	A	2.3	A
		WB Approach	35.8	E	86.2	F	*	F			3.0	A	4.9	A	2.2	A		
		NB Approach	74.4	F	94.5	F	85.0	F			1.9	A	0.7	A	0.3	A		
		SB Approach	1.1	A	0.1	A	0.1	A			0.9	A	0.2	A	0.1	A		
TH 169 & Creek Ln N	Stop Controlled	WB Approach	-	-	0.9	A	-	-	16.0	C	-	-	67.0	F	-	-	47.4	E
		NB Approach	-	-	-	-	91.6	F			-	-	-	-	17.0	C		

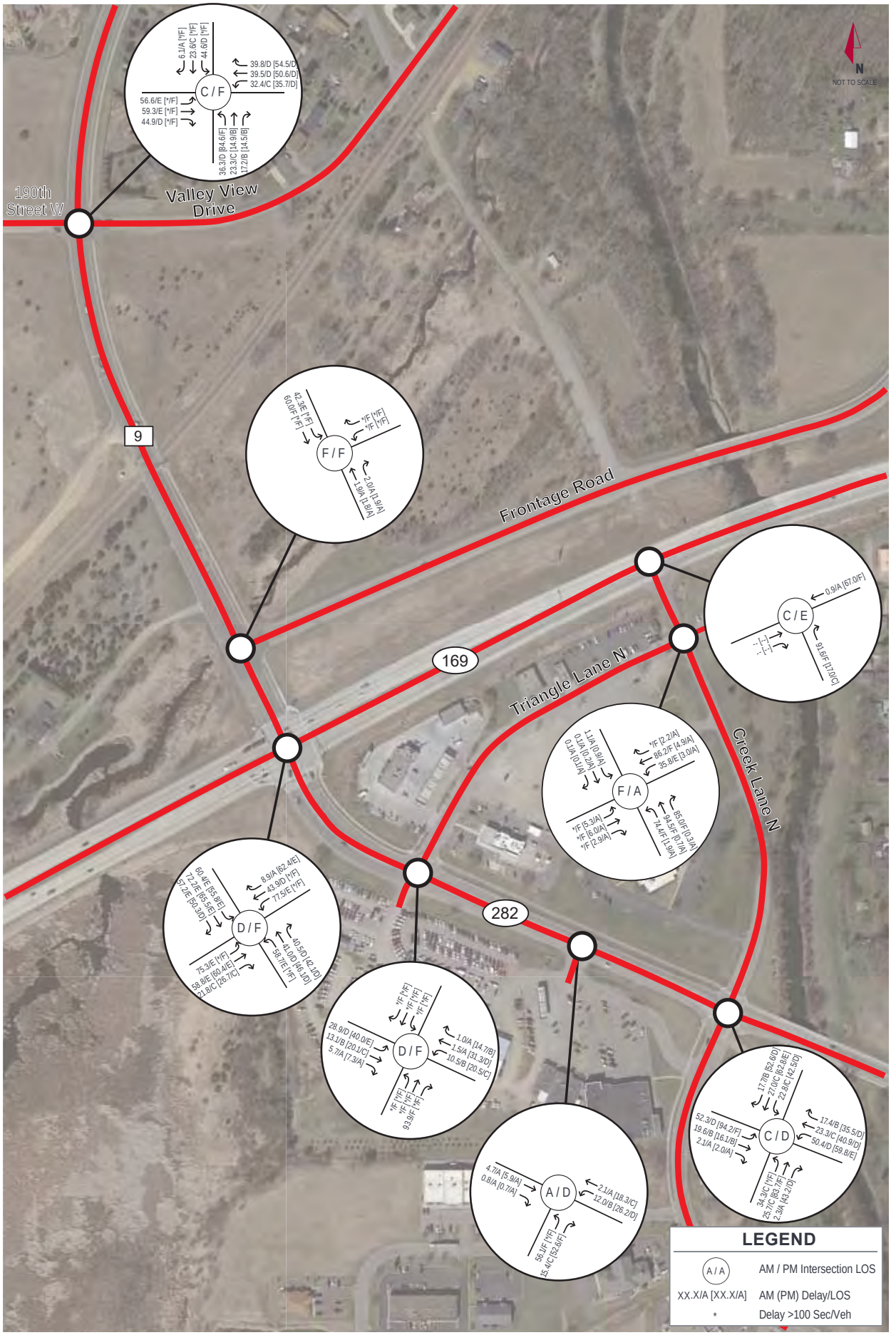


EXHIBIT 7

NO-ACTION (2040) DELAY AND LOS
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

Design Year (2040) Roadway and Intersection Conditions

To improve operating conditions along the corridor, improve safety, and provide sufficient capacity for future growth in traffic volumes, several interchange, roadway and intersection improvements were considered within the project study area. Several concepts were considered through the planning process, and based on input from the City, County and MnDOT three (3) preferred concepts were considered for further review and consideration as part of the traffic analysis. The following section provides a description of each of the three (3) preferred concepts.

Concept 1

With Concept 1, CR 9 / TH 282 is proposed to be reconstructed as a four-lane divided roadway from 190th Street West/Valley View Drive to Creek Lane North. In conjunction with the widening, a split diamond interchange is proposed at the intersection of TH 169 / CR 9 / TH 282. The following provides a description of proposed improvements at the study intersections in the project's study area:

- CR 9 & 190th Street West/Valley View Drive – The intersection is proposed to be expanded to provide three (3) lanes (one through lane and dedicated left and right-turn lanes) for the northbound, eastbound and westbound approaches and four (4) lanes (two through lanes and dedicated left and right-turn lanes) for the southbound approach. The intersection is proposed to be signal controlled. Although additional analysis would be required, a roundabout could also be considered at this intersection.

- CR 9 & TH 169 Westbound Ramps – The intersection is proposed to be a five-legged intersection and serve the existing frontage road traffic in addition to the TH 169 westbound ramps. The northbound and southbound approaches will provide two (2) lanes (shared through-left and shared through-right). The westbound off-ramp approach will provide two (2) lanes (shared left-through-right and shared right/u-turn). The frontage road approach will provide one (1) shared lane. The intersection is proposed to be a roundabout.

- TH 282 & TH 169 Eastbound Ramps – The intersection is proposed to be a three-legged intersection to serve the TH 169 eastbound off-ramp. The northbound and southbound approaches will provide two (2) through lanes, and the eastbound approach will provide two (2) lanes (dedicated left and right-turn lanes). The intersection is proposed to be signal controlled.

- TH 282 & Triangle Lane North – Due to existing crash concerns and access spacing requirements, the intersection is proposed to be a three-legged intersection that serves TH 282 and Triangle Lane North. The Wolf Motors access to the south is proposed to be combined with the Radermacher's access located to the east. Access for Triangle Lane North will be restricted to right-in and right-out. The westbound approach will provide three (3) lanes (two through lanes and dedicated right-turn lane) and the eastbound approach will provide two (2) through lanes. The southbound approach will provide a single right-turn lane. The intersection is proposed to be side-street stop controlled.

- TH 282 & Business Access – The intersection is proposed to be a three-legged three-quarter movement intersection that serves TH 282 and businesses along the south side of TH 282. Access for eastbound movements to/from the business access will be restricted to right-in and right-out

movements only. The westbound approach will provide three (3) lanes (two through lanes and dedicated left-turn lane) and the eastbound approach will provide three (3) lanes (two through lanes and dedicated right-turn lane). The northbound approach will provide a single right-turn lane. The intersection is proposed to be side-street stop controlled.

- TH 282 & Creek Lane North – The intersection is proposed to be improved to provide two (2) lanes for the westbound and three (3) lanes for the eastbound approaches, with the westbound approach having a shared through-left and shared through-right lane and the eastbound approach having a dedicated left-turn, through and right-turn lane. Both the northbound and southbound approaches will provide one (1) shared lane. The intersection is proposed to be a roundabout. The roundabout will provide improved access for travelers accessing the local businesses due to the access restrictions at TH 282 & Triangle Lane North and TH 282 & Business access intersections.

  The concept shows the roundabout configuration that would be required if the 2040 traffic forecasts materialize. MnDOT has stated this roundabout will need to be phased so that the initial roundabout is not oversized opening day. This will require that an interim configuration be constructed for both the initial roundabout and potentially adjacent segments of TH 282. The ultimate interim configuration required at and adjacent to this intersection will need to be determined considering both interim traffic operations and construction phasing impacts.

- Creek Lane North & Triangle Lane North – The intersection is proposed to provide direct access to TH 169 eastbound. The northbound approach will provide two (2) lanes with a dedicated left-turn and shared through-right lane. The eastbound approach will provide two (2) lanes with a dedicated left-turn lane and a shared through-right lane. The westbound approach will provide a one (1) lane approach. The intersection is proposed to be side-street stop controlled.

Exhibit 8 provides the proposed roadway layout as well as intersection control and geometry for Concept 1.

Using the Design Year (2040) No-Action turning movement volumes as a base, traffic volumes were developed for Concept 1 to take into consideration the change in access at the study intersections. The following provides more detail about the traffic volume adjustments that were made:

- Traffic traveling eastbound on TH 169 from CR 9 and TH 282 (i.e. northbound right-turn and southbound left-turn movements at the intersection of TH 169 / CR 9 / TH 282) were redistributed to Creek Lane North.
- Traffic traveling to/from Wolf Motors that access TH 282 (northbound approach) at the intersection of TH 282 & Triangle Lane North were redistributed to the TH 282 and Business Access.
- Traffic traveling southbound on TH 282 from Triangle Lane North (southbound left-turn movement) were redistributed to Creek Lane North.

Exhibit 9 provides the Design Year (2040) AM and PM peak hour traffic volumes for Concept 1.

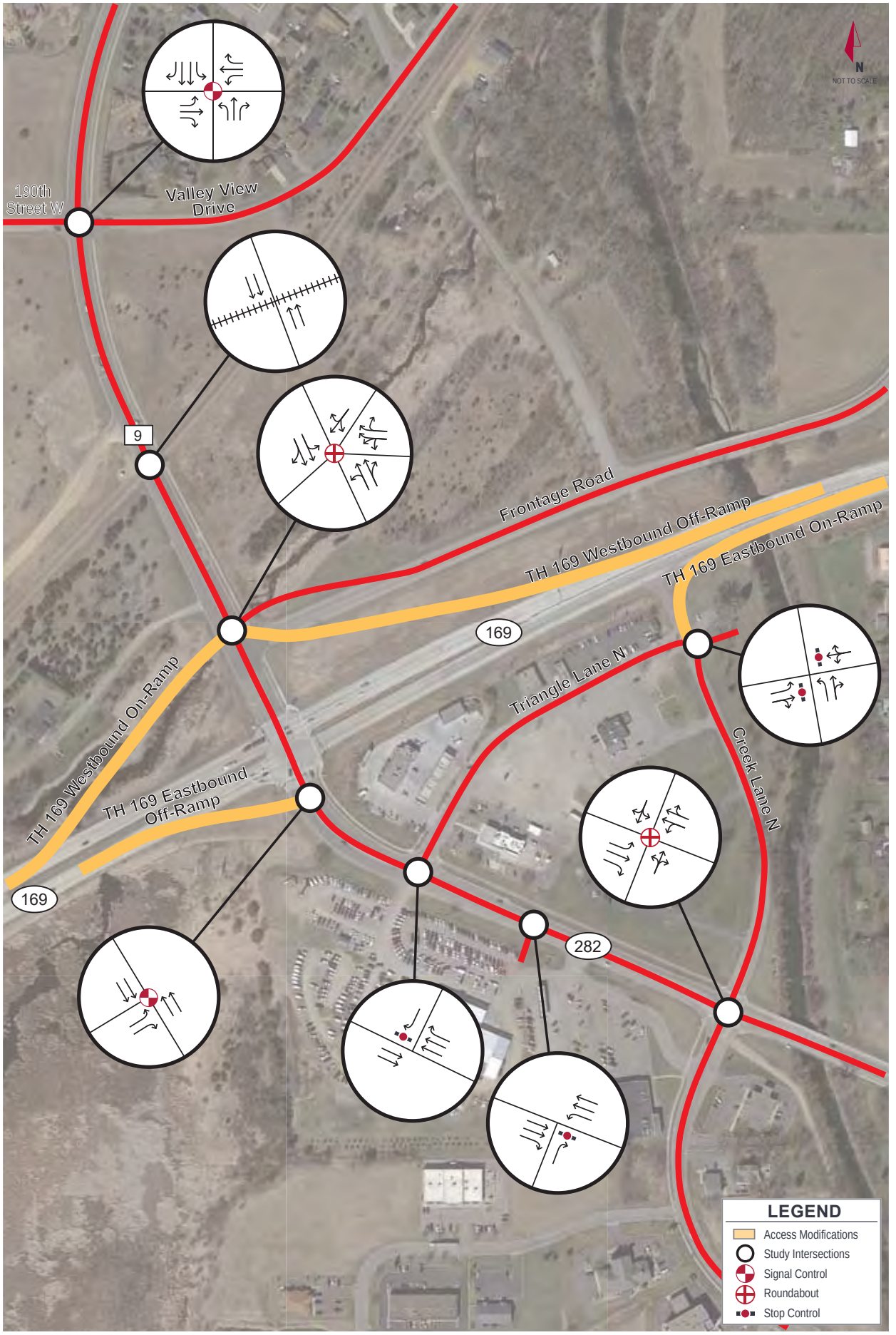


EXHIBIT 8

CONCEPT 1 INTERSECTION CONTROL AND GEOMETRICS
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

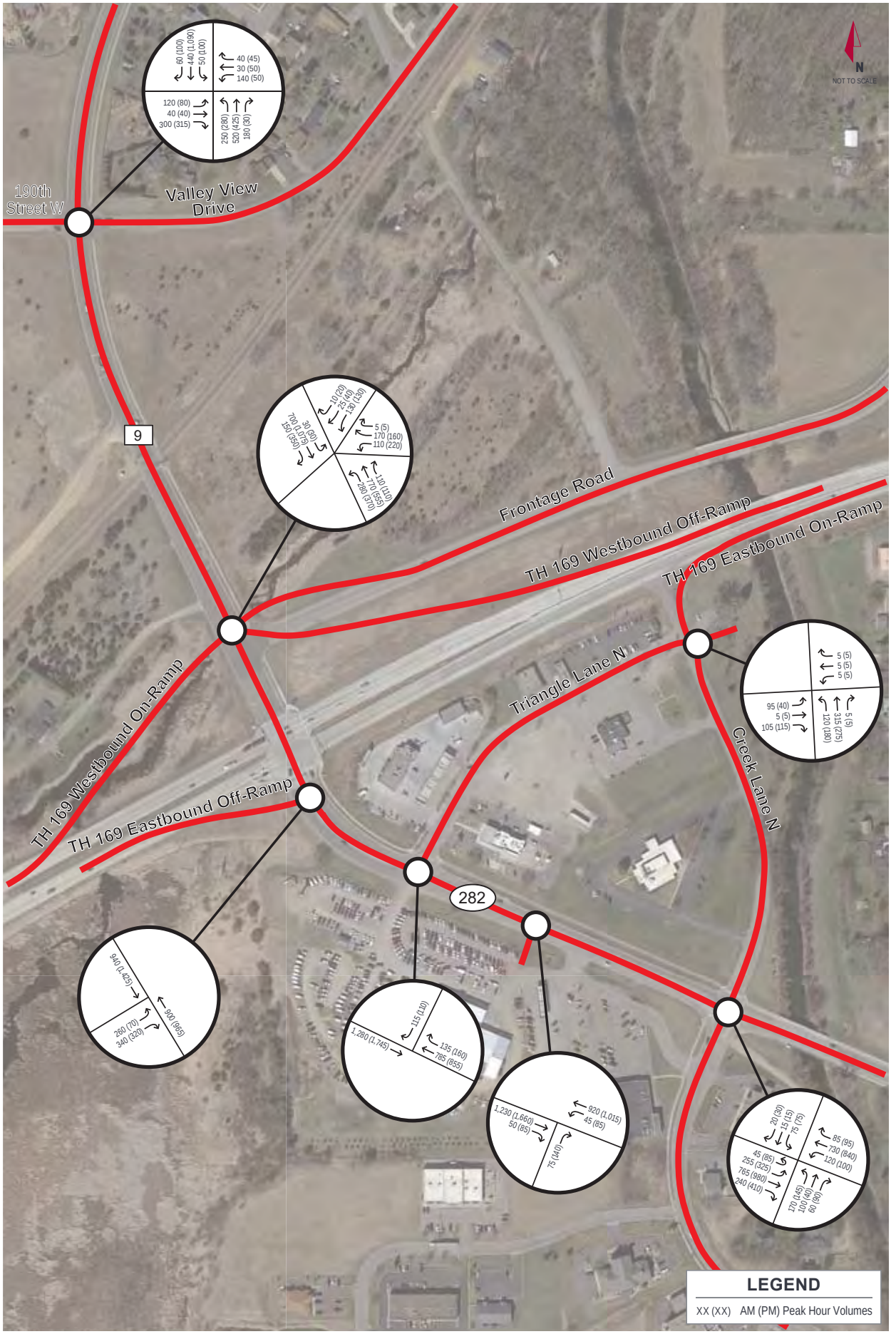


EXHIBIT 9

CONCEPT 1 - DESIGN YEAR (2040) TRAFFIC VOLUMES
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

Concept 2

With Concept 2, CR 9 / TH 282 is proposed to be reconstructed as a four-lane divided roadway from 190th Street West/Valley View Drive to Creek Lane North. In conjunction with the widening, a folded diamond/split diamond interchange is proposed at the intersection of TH 169 / CR 9 / TH 282. The following provides a description of proposed improvements at the study intersections in the project's study area:

- CR 9 & 190th Street West/Valley View Drive – The intersection geometry and control type is proposed to be the same as Concept 1.
- CR 9 & TH 169 Westbound Ramps – The intersection is proposed to be expanded to provide four (4) lanes (two through lanes and dedicated left and right-turn lanes) for the northbound and southbound approaches and three (3) lanes (one through lane and dedicated left and right-turn lanes) for the eastbound and westbound approaches. The intersection is proposed to be signal controlled.
- TH 282 & TH 169 Eastbound Ramps– The intersection geometry and control type is proposed to be the same as Concept 1.
- TH 282 & Triangle Lane North – The intersection geometry and control type is proposed to be the same as Concept 1.
- TH 282 & Business Access – The intersection geometry and control type is proposed to be the same as Concept 1.
- TH 282 & Creek Lane North – The intersection geometry and control type is proposed to be the same as Concept 1.
- Creek Lane North & Triangle Lane North – The intersection geometry and control type is proposed to be the same as Concept 1.

Exhibit 10 provides the proposed roadway layout as well as intersection control and geometry for Concept 2.

Using the Design Year (2040) No-Build turning movement volumes as a base, traffic volumes were developed for Concept 2 to take into consideration the change in access at the study intersections. The following provides more detail about the traffic volume adjustments that were made:

- Traffic traveling eastbound on TH 169 from CR 9 and TH 282 (northbound right-turn and southbound left-turn movements at the intersection of TH 169 / CR 9 / TH 282) were redistributed to Creek Lane North.
- Traffic traveling to/from Wolf Motors that access TH 282 (northbound approach) at the intersection of TH 282 & Triangle Lane North were redistributed to the TH 282 & Business Access.
- Traffic traveling southbound on TH 282 from Triangle Lane North (southbound left-turn movement) were redistributed to Creek Lane North.

Exhibit 11 provides the Design Year (2040) AM and PM peak hour traffic volumes for Concept 2.

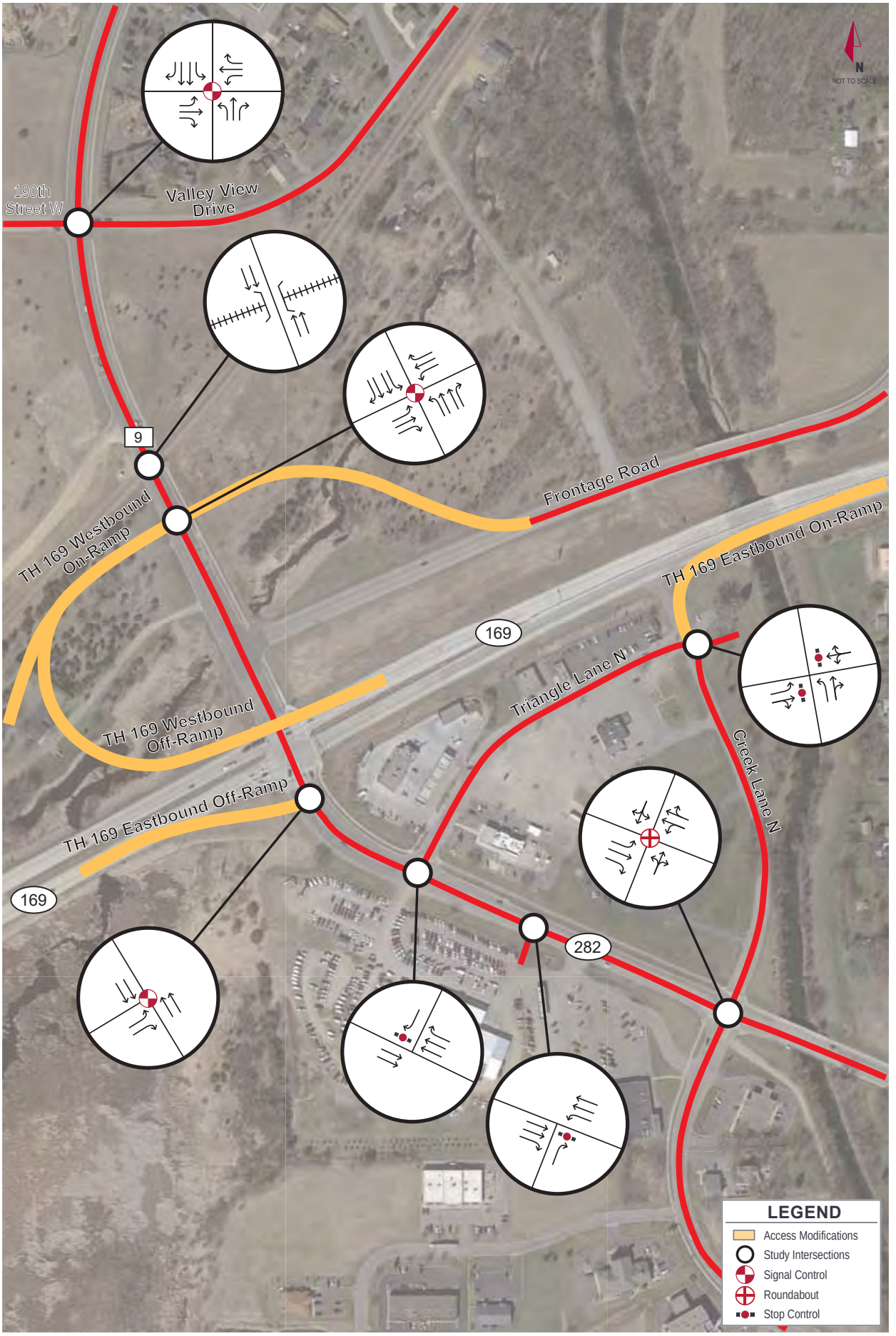


EXHIBIT 10

CONCEPT 2 INTERSECTION CONTROL AND GEOMETRICS
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

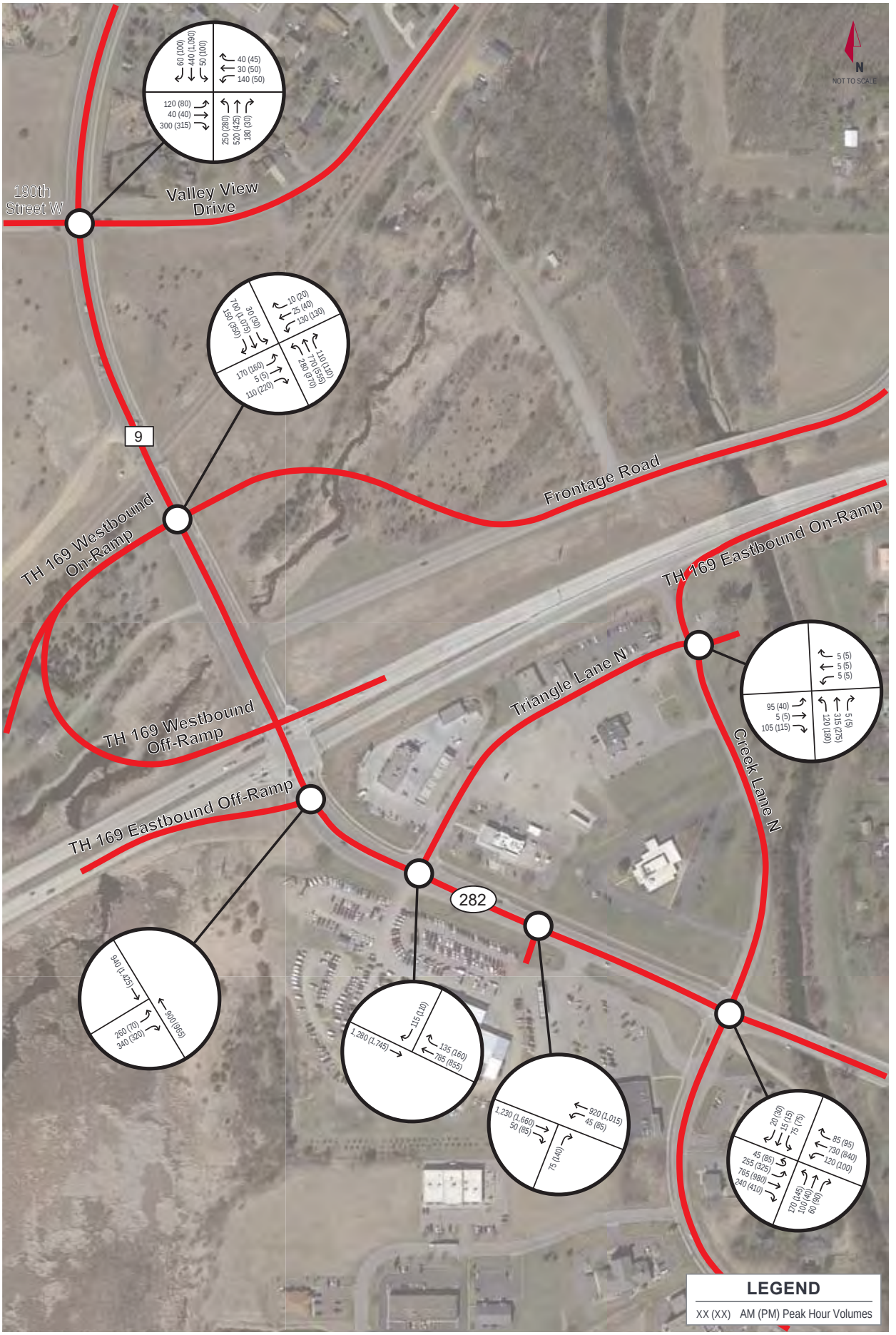


EXHIBIT 11

CONCEPT 2 - DESIGN YEAR (2040) TRAFFIC VOLUMES
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

Concept 3

With Concept 3, CR 9 / TH 282 is proposed to be reconstructed as a four-lane divided roadway from 190th Street West/Valley View Drive to Creek Lane North. In conjunction with the widening, a traditional diamond interchange is proposed at the intersection of TH 169 / CR 9 / TH 282 and TH 169 is proposed to be reconstructed so it goes over CR 9 / TH 282. The following provides a description of proposed improvements at the study intersections in the project's study area:

- CR 9 & 190th Street West/Valley View Drive – The intersection geometry and control type is proposed to be the same as Concepts 1 and 2.
- CR 9 & TH 169 Westbound Ramps – The intersection geometry and control type is proposed to be the same as Concept 1.
- TH 282 & TH 169 Eastbound Ramps – The intersection is proposed to be expanded to a four-legged intersection to serve the TH 169 eastbound ramps. The northbound approach will provide three (3) lanes (two through lanes and a dedicated right-turn lane) and the southbound approach will provide three (3) lanes (two through lanes and a dedicated left-turn lane). The eastbound approach will provide two (2) lanes (shared left-through and a dedicated right-turn lane). The intersection is proposed to be signal controlled.
- TH 282 & Triangle Lane North – The intersection geometry and control type is proposed to be the same as Concepts 1 and 2.
- TH 282 & Business Access – The intersection geometry and control type is proposed to be the same as Concepts 1 and 2.
- TH 282 & Creek Lane North – The intersection geometry and control type is proposed to be the same as Concepts 1 and 2.
- Creek Lane North & Triangle Lane North – The intersection is proposed to eliminate access to/from TH 169 eastbound. The southeast bound approach will provide two (2) lanes with a dedicated left-turn and shared through-right lane. The northwest bound approach will provide a shared through-right lane. The westbound approach will provide a one (1) lane approach. The intersection is proposed to be side-street stop controlled.

Exhibit 12 provides the proposed roadway layout, intersection control and geometry for Concept 3.

Using the Design Year (2040) No-Build turning movement volumes as a base, traffic volumes were developed for Concept 3 to take into consideration the change in access at some of the study intersections. The following provides more detail about the traffic diversion that was assumed:

- Traffic traveling to/from Wolf Motors that access TH 282 (northbound approach) at the intersection of TH 282 & Triangle Lane North were redistributed to the intersection of TH 282 and Business Access.
- Traffic traveling southbound on TH 282 from Triangle Lane North (southbound left-turn movement) were redistributed to Creek Lane.

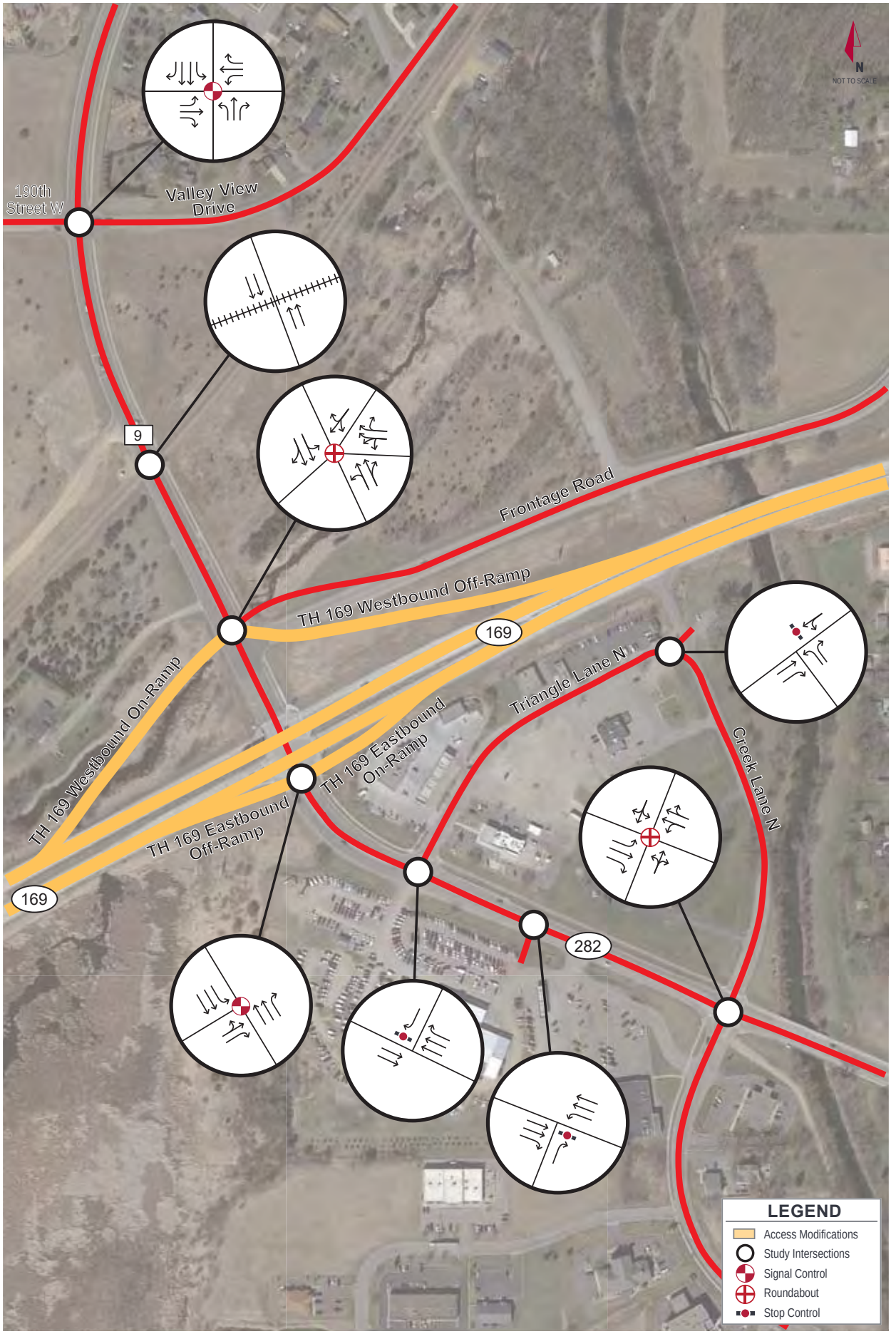


EXHIBIT 12

CONCEPT 3 INTERSECTION CONTROL AND GEOMETRICS
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

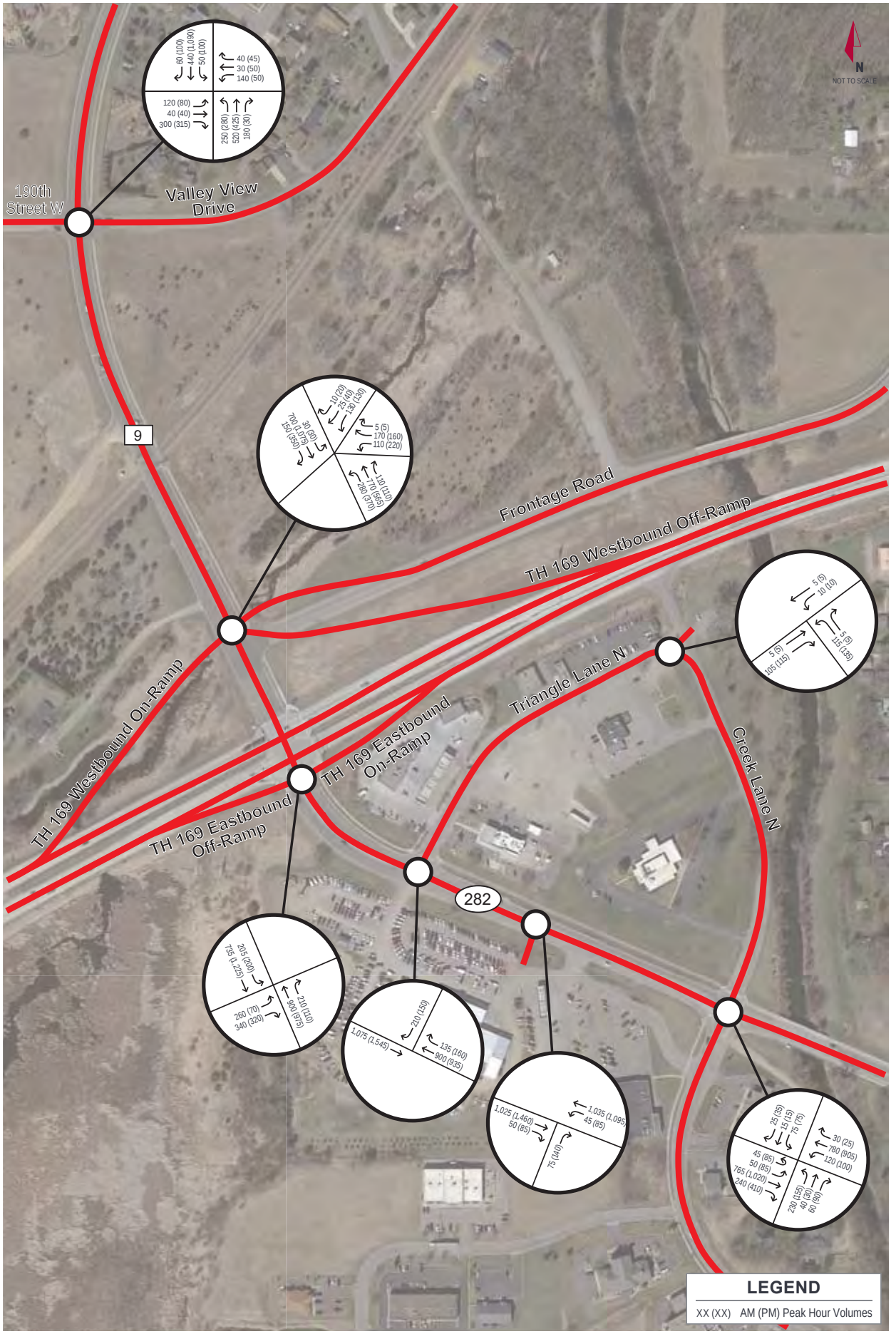


EXHIBIT 13

CONCEPT 3 - DESIGN YEAR (2040) TRAFFIC VOLUMES
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

- Traffic traveling to TH 169 eastbound via Creek Lane North were redistributed to the TH 169 / TH 282 / CR 9 eastbound ramp terminals.

Exhibit 13 provides the Design Year (2040) AM and PM peak hour traffic volumes for Concept 3.

Design Year (2040) Build Intersection Alternatives Analysis

Intersection operating conditions at the study intersections were analyzed using Synchro/SimTraffic during the AM and PM peak hours for all three concepts listed in the previous section. The proposed intersection control and geometries provided in Exhibit 8 (Concept 1), Exhibit 10 (Concept 2), and Exhibit 12 (Concept 3) were assumed for the Design Year (2040) Build analysis. Forecasted traffic volumes for the three Concepts provided in Exhibit 9 (Concept 1), Exhibit 11 (Concept 2), and Exhibit 13 (Concept 3) were used for the intersection capacity analysis. The following provides a summary of intersection operating conditions for the Design Year (2040) Build AM and PM peak hours, including intersection LOS, delay, and queues.

Design Year (2040) Build Capacity Analysis

Table 6 provides a summary of vehicle delay and LOS at the study intersections for Concept 1. Based on the analysis, all intersections are anticipated to operate at LOS B or better during the AM and PM peak hours with the proposed improvements. Additionally, all movements are anticipated to operate at LOS D or better during the AM and PM peak hours.

Exhibit 14 provides a summary of the intersection delay and LOS at the study intersections for Concept 1. The SimTraffic and RODEL reports for Concept 1 are provided in the Appendix.

Table 7 provides a summary of vehicle delay and LOS at the study intersections for Concept 2. Based on the analysis, all intersections are anticipated to operate at an acceptable LOS. Additionally, all individual movements are anticipated to operate at an acceptable LOS (LOS D or better) except for the following:

- Northbound left-turn and southbound through movements at the intersection of CR 9 & TH 169 Westbound Ramp during the PM peak hour.
- Westbound left-turn movement at the intersection of TH 282 & Business Access during the PM peak hour.

Exhibit 15 provides a summary of the intersection delay and LOS at the study intersections for Concept 2. The SimTraffic and RODEL reports for Concept 2 are provided in the Appendix.

Table 8 provides a summary of vehicle delay and LOS at the study intersections for Concept 3. Based on the analysis, all intersections are anticipated to operate at LOS B or better during the AM and PM peak hours with the proposed improvements. Additionally, all movements are anticipated to operate at LOS D or better during the AM and PM peak hours.

Exhibit 16 provides a summary of the intersection delay and LOS at the study intersections for Concept 3. The SimTraffic and RODEL reports for Concept 3 are provided in the Appendix.

Table 6: Design Year (2040) Capacity Analysis Summary (Concept 1)

Intersection			AM PEAK HOUR								PM PEAK HOUR							
			Left		Through		Right		Overall		Left		Through		Right		Overall	
			Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS
CR 9 (Quaker Avenue) & 190th Street W/Valley View Drive	Signalized	EB Approach	22.8	C	33.1	C	7.5	A	13.6	B	37.8	D	44.2	D	15.6	B	19.5	B
		WB Approach	21.3	C	25.7	C	8.7	A			39.5	D	40.2	D	6.8	A		
		NB Approach	13.5	B	12.5	B	3.4	A			23.4	C	8.7	A	2.3	A		
		SB Approach	15.3	B	16.4	B	4.7	A			13.8	B	22.0	C	7.4	A		
CR 9 (Quaker Avenue) & TH 169 Westbound On/Off Ramp/Frontage Rd	Roundabout	NW Approach	4.6	A	4.6	A	4.6	A	4.3	A	5.0	A	5.0	A	5.0	A	8.8	A
		SW Approach	5.6	A	5.6	A	5.6	A			5.8	A	5.8	A	5.8	A		
		NB Approach	4.2	A	4.2	A	4.2	A			4.5	A	4.5	A	4.5	A		
		SB Approach	4.0	A	4.0	A	4.0	A			13.4	B	13.4	B	13.4	B		
CR 9 (Quaker Avenue)/TH 282 (2nd Street W) & TH 169 Eastbound Off Ramp	Signalized	EB Approach	45.1	D	-	-	17.2	B	10.9	B	50.2	D	-	-	21.5	C	10.5	B
		NB Approach	-	-	4.2	A	-	-			-	-	3.8	A	-	-		
		SB Approach	-	-	5.7	A	-	-			-	-	10.7	B	-	-		
TH 282 (2nd Street W) & Triangle Lane N	Stop Controlled	EB Approach	-	-	0.8	A	-	-	1.8	A	-	-	1.3	A	-	-	1.6	A
		WB Approach	-	-	1.3	A	1.4	A			-	-	1.1	A	1.2	A		
		SB Approach	-	-	-	-	16.4	C			-	-	-	-	13.1	B		
TH 282 (2nd Street W) & Business Access	Stop Controlled	EB Approach	-	-	0.5	A	0.4	A	2.6	A	-	-	1.2	A	0.9	A	3.8	A
		WB Approach	18.8	C	4.0	A	-	-			34.7	D	3.5	A	-	-		
		NB Approach	-	-	-	-	8.9	A			-	-	-	-	20.9	C		
TH 282 (2nd Street W) & Creek Lane	Roundabout	EB Approach	4.9	A	4.9	A	4.9	A	5.6	A	7.1	A	7.1	A	7.1	A	7.1	A
		WB Approach	5.3	A	5.3	A	5.3	A			6.2	A	6.2	A	6.2	A		
		NB Approach	9.0	A	9.0	A	9.0	A			10.9	B	10.9	B	10.9	B		
		SB Approach	5.5	A	5.5	A	5.5	A			6.0	A	6.0	A	6.0	A		
Creek Ln N/Th 169 Eastbound On Ramp & Triangle Lane N	Stop Controlled	EB Approach	8.9	A	7.6	A	3.1	A	2.9	A	8.5	A	8.6	A	3.3	A	2.6	A
		WB Approach	6.2	A	6.6	A	4.7	A			10.7	B	5.6	A	4.9	A		
		NB Approach	2.2	A	0.9	A	0.3	A			2.5	A	1.1	A	0.6	A		

Table 7: Design Year (2040) Capacity Analysis Summary (Concept 2)

Intersection			AM PEAK HOUR								PM PEAK HOUR							
			Left		Through		Right		Overall		Left		Through		Right		Overall	
			Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS
CR 9 (Quaker Avenue) & 190th Street W/Valley View Drive	Signalized	EB Approach	21.2	C	29.0	C	7.5	A	13.2	B	46.3	D	40.6	D	23.0	C	21.0	C
		WB Approach	21.6	C	29.9	C	9.8	A			43.2	D	41.7	D	7.1	A		
		NB Approach	13.8	B	12.4	B	3.7	A			26.0	C	9.9	A	1.8	A		
		SB Approach	13.7	B	15.9	B	4.3	A			12.9	B	22.0	C	7.9	A		
CR 9 (Quaker Avenue) & TH 169 Westbound On/Off Ramp/Frontage Rd	Signalized	EB Approach	21.9	C	22.3	C	8.6	A	16.9	B	33.7	C	32.5	C	18.5	B	43.8	D
		WB Approach	22.1	C	30.0	C	8.0	A			37.6	D	45.2	D	7.4	A		
		NB Approach	24.4	C	12.6	B	2.3	A			83.9	F	23.2	C	4.8	A		
		SB Approach	18.0	B	19.2	B	6.7	A			33.4	C	58.4	E	26.8	C		
CR 9 (Quaker Avenue)/TH 282 (2nd Street W) & TH 169 Eastbound Off Ramp	Signalized	EB Approach	44.3	D	-	-	15.4	B	12.1	B	49.7	D	-	-	28.6	C	13.3	B
		NB Approach	-	-	3.9	A	-	-			-	-	6.5	A	-	-		
		SB Approach	-	-	9.9	A	-	-			-	-	12.4	B	-	-		
TH 282 (2nd Street W) & Triangle Lane N	Stop Controlled	EB Approach	-	-	1.0	A	-	-	1.4	A	-	-	1.8	A	-	-	2.7	A
		WB Approach	-	-	0.9	A	0.8	A			-	-	2.4	A	1.1	A		
		SB Approach	-	-	-	-	10.1	B			-	-	-	-	22.3	C		
TH 282 (2nd Street W) & Business Access	Stop Controlled	EB Approach	-	-	0.5	A	0.4	A	2.1	A	-	-	1.3	A	1.0	A	4.1	A
		WB Approach	18.4	C	2.9	A	-	-			40.3	E	3.4	A	-	-		
		NB Approach	-	-	-	-	10.2	B			-	-	-	-	22.8	C		
TH 282 (2nd Street W) & Creek Lane	Roundabout	EB Approach	4.9	A	4.9	A	4.9	A	5.6	A	7.1	A	7.1	A	7.1	A	7.1	A
		WB Approach	5.3	A	5.3	A	5.3	A			6.2	A	6.2	A	6.2	A		
		NB Approach	9.0	A	9.0	A	9.0	A			10.9	B	10.9	B	10.9	B		
		SB Approach	5.5	A	5.5	A	5.5	A			6.0	A	6.0	A	6.0	A		
Creek Ln N/Th 169 Eastbound On Ramp & Triangle Lane N	Stop Controlled	EB Approach	9.7	A	8.8	A	3.0	A	3.0	A	8.9	A	7.4	A	3.6	A	2.8	A
		WB Approach	8.7	A	10.6	B	5.0	A			7.6	A	8.7	A	3.7	A		
		NB Approach	2.2	A	1.0	A	0.2	A			2.6	A	1.3	A	0.6	A		

Table 8: Design Year (2040) Capacity Analysis Summary (Concept 3)

Intersection			AM PEAK HOUR								PM PEAK HOUR							
			Left		Through		Right		Overall		Left		Through		Right		Overall	
			Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS	Delya	LOS
CR 9 (Quaker Avenue) & 190th Street W/Valley View Drive	Signalized	EB Approach	22.4	C	29.3	C	8.0	A	14.0	B	42.7	D	43.0	D	17.6	B	19.5	B
		WB Approach	22.0	C	30.5	C	8.8	A			36.5	D	39.5	D	6.7	A		
		NB Approach	15.7	B	12.9	B	3.7	A			25.5	C	8.5	A	3.0	A		
		SB Approach	15.3	B	16.0	B	4.3	A			14.0	B	21.0	C	7.2	A		
CR 9 (Quaker Avenue) & TH 169 Westbound On/Off Ramp/Frontage Rd	Roundabout	NW Approach	4.6	A	4.6	A	4.6	A	4.3	A	5.0	A	5.0	A	5.0	A	8.8	A
		SW Approach	5.6	A	5.6	A	5.6	A			5.8	A	5.8	A	5.8	A		
		NB Approach	4.2	A	4.2	A	4.2	A			4.5	A	4.5	A	4.5	A		
		SB Approach	4.0	A	4.0	A	4.0	A			13.4	B	13.4	B	13.4	B		
CR 9 (Quaker Avenue)/TH 282 (2nd Street W) & TH 169 Eastbound On/Off Ramp	Signalized	EB Approach	48.8	D	-	-	15.5	B	17.9	B	50.4	D	-	-	25.9	C	12.3	B
		NB Approach	-	-	16.6	B	4.7	A			-	-	10.6	B	2.7	A		
		SB Approach	28.9	C	10.1	B	-	-			25.6	C	6.9	A	-	-		
TH 282 (2nd Street W) & Triangle Lane N	Stop Controlled	EB Approach	-	-	1.0	A	-	-	3.3	A	-	-	1.1	A	-	-	3.2	A
		WB Approach	-	-	3.8	A	1.3	A			-	-	3.4	A	2.3	A		
		SB Approach	-	-	-	-	14.3	B			-	-	-	-	25.7	D		
TH 282 (2nd Street W) & Business Access	Stop Controlled	EB Approach	-	-	0.5	A	0.4	A	1.8	A	-	-	1.2	A	0.9	A	3.4	A
		WB Approach	11.0	B	2.5	A	-	-			22.4	C	3.4	A	-	-		
		NB Approach	-	-	-	-	7.9	A			-	-	-	-	18.6	C		
TH 282 (2nd Street W) & Creek Lane	Roundabout	EB Approach	3.7	A	3.7	A	3.7	A	4.5	A	5.1	A	5.1	A	5.1	A	5.2	A
		WB Approach	4.1	A	4.1	A	4.1	A			4.4	A	4.4	A	4.4	A		
		NB Approach	7.5	A	7.5	A	7.5	A			8.9	A	8.9	A	8.9	A		
		SB Approach	5.9	A	5.9	A	5.9	A			6.3	A	6.3	A	6.3	A		
Creek Ln N & Triangle Lane N	Stop Controlled	EB Approach	-	-	-	-	-	-	1.0	A	-	-	-	-	-	-	0.7	A
		WB Approach	9.6	A	9.6	A	9.6	A			9.0	-	9.0	A	9.0	A		
		NB Approach	-	-	-	-	-	-			-	-	-	-	-	-		

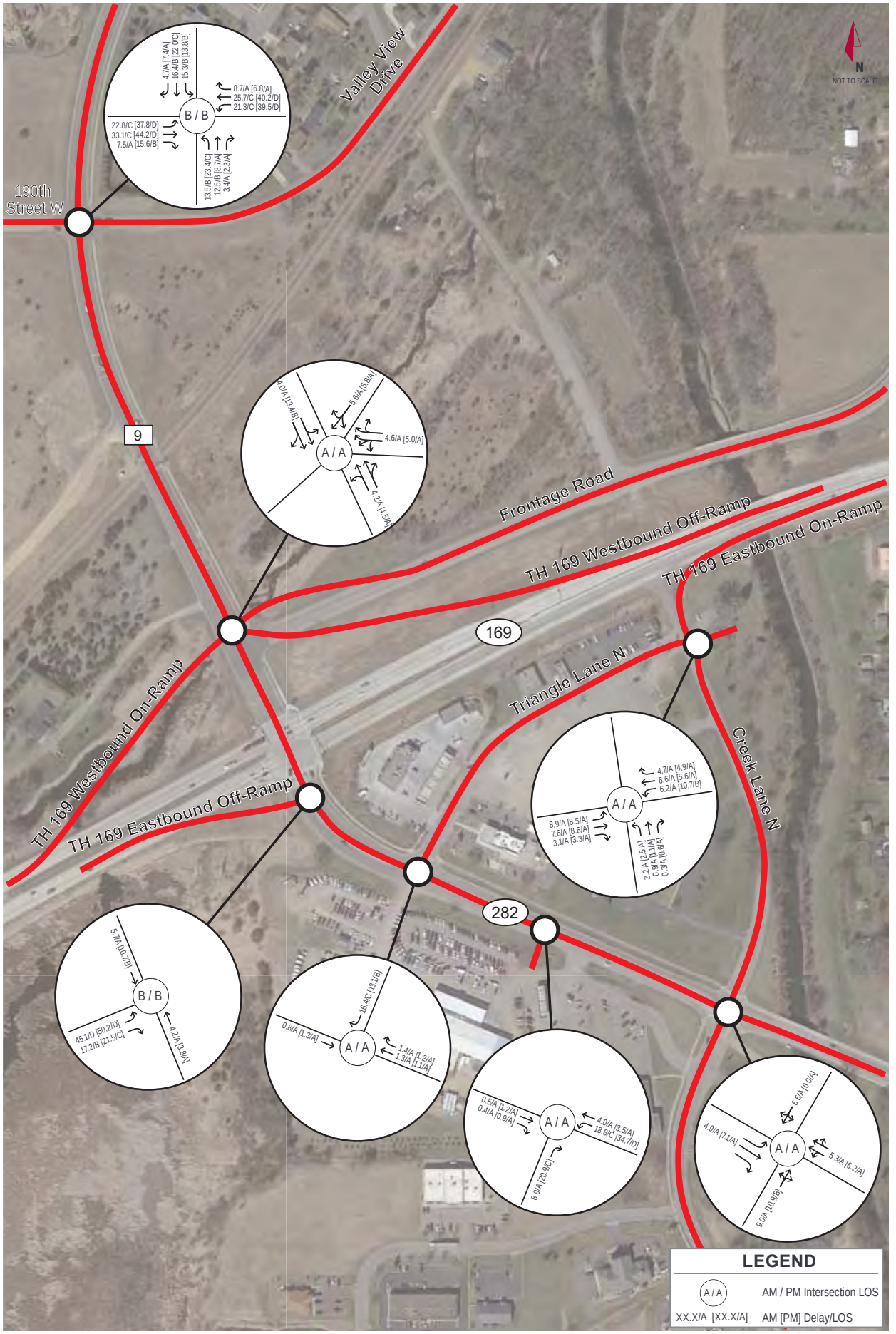


EXHIBIT 14

CONCEPT 1 - DESIGN YEAR (2040) DELAY AND LOS
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

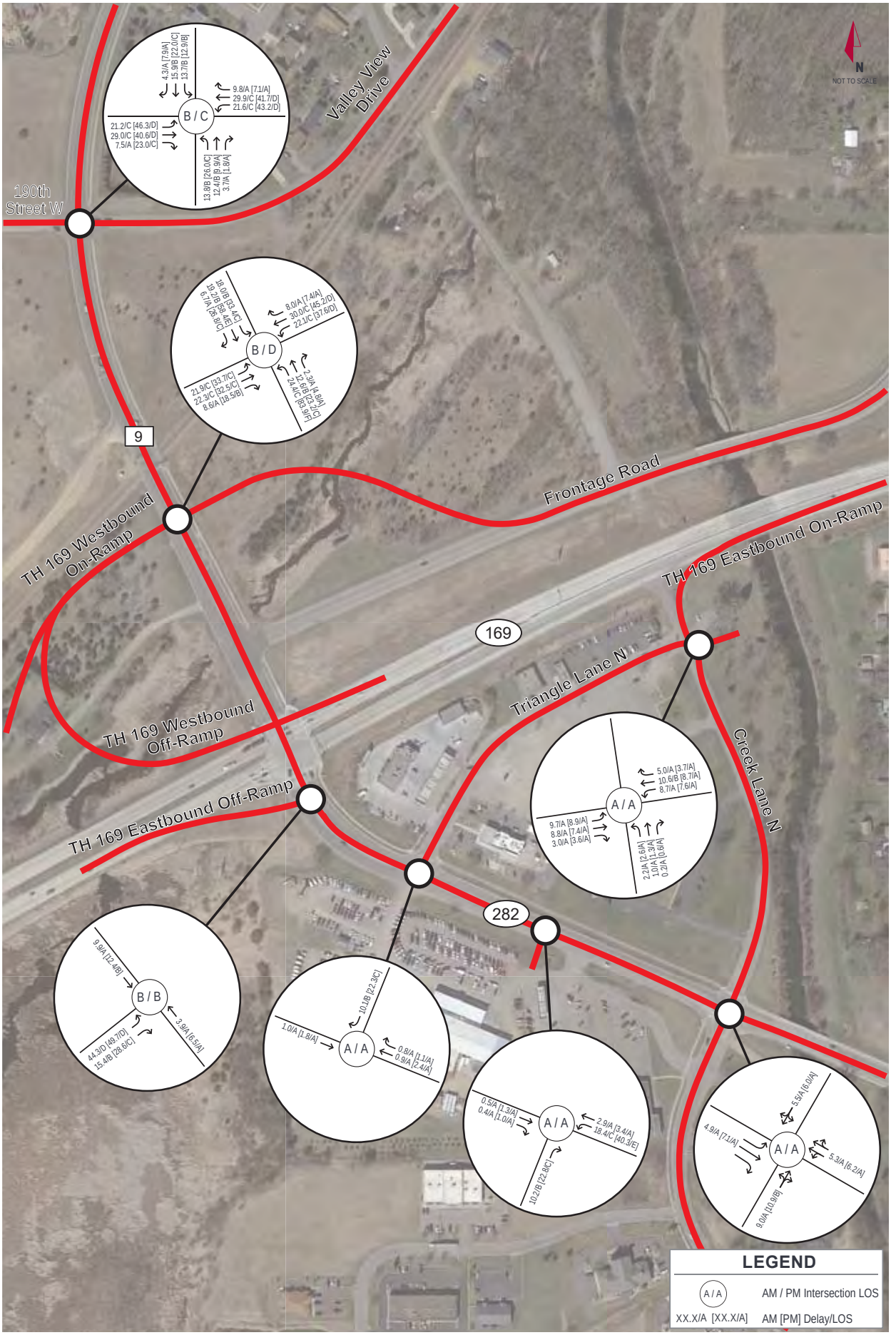


EXHIBIT 15

CONCEPT 2 - DESIGN YEAR (2040) DELAY AND LOS
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

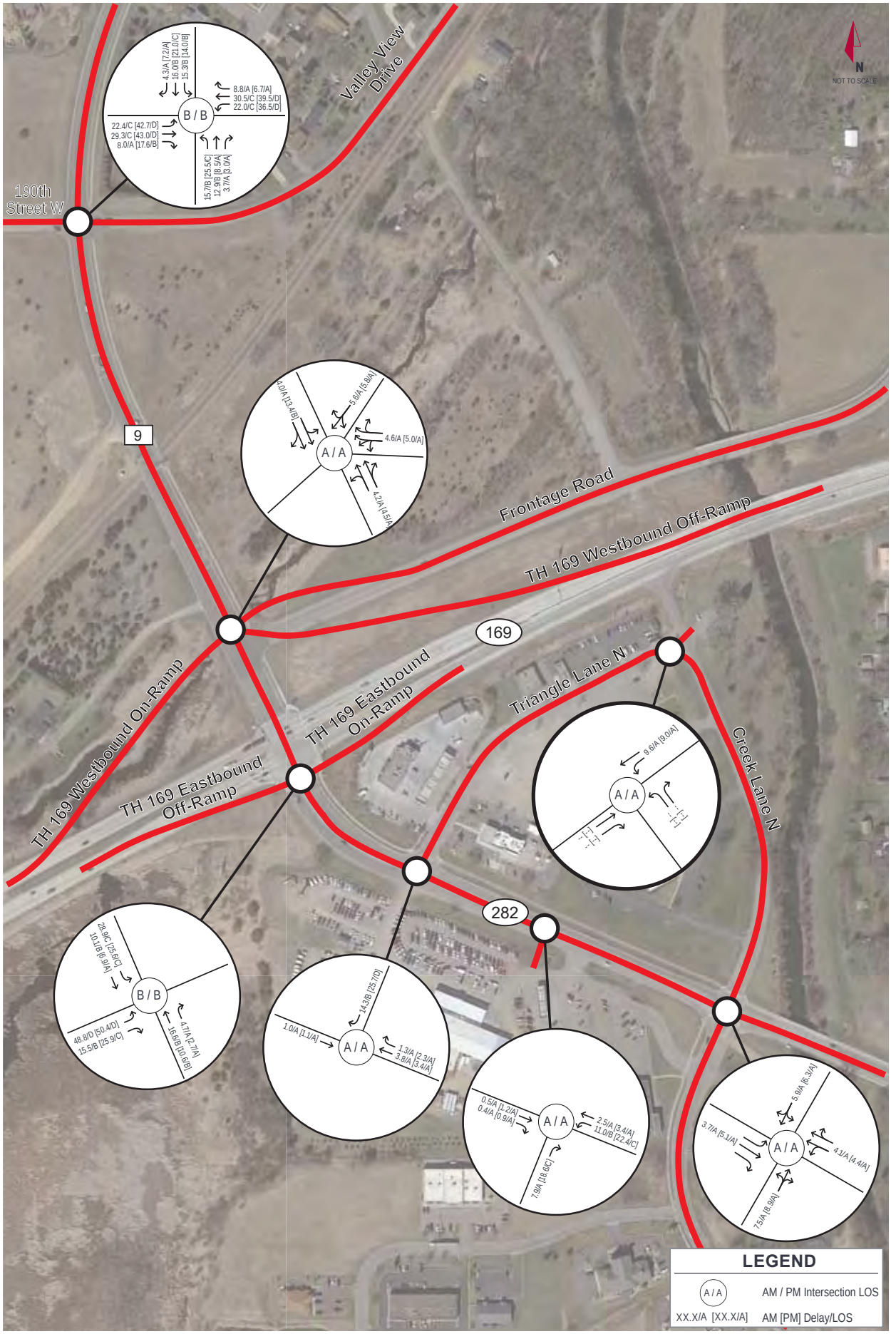


EXHIBIT 16

CONCEPT 3 - DESIGN YEAR (2040) DELAY AND LOS
TH 169 / TH 282 / CR 9
INTERCHANGE CONCEPT DESIGN

Design Year (2040) Build Queue Analysis

Design Year (2040) Build conditions vehicle queuing was reviewed based on the SimTraffic and RODEL analysis for all three concepts. Queue lengths are the 95th Percentile Queue as calculated in SimTraffic and RODEL. SimTraffic reports the queue in feet where as RODEL reports queue in number of vehicles (25 feet per vehicle was assumed).

Table 9 provides a summary of Design Year (2040) Build AM and PM peak hour queue lengths based on the Synchro/SimTraffic and RODEL analysis for Concept 1. Based on the analysis, the southbound right turn at TH 282 & Triangle Lane North and northbound right from the TH 282 & Business Access have queue lengths that extend beyond the southern Holiday and McDonald's access points and into the existing Radermacher's parking lot, respectively. The access to McDonald's and Holiday is experiencing impacts under existing conditions and since the McDonald's access is a one-way entry access and Holiday has two access points no major impacts are anticipated at TH 282 & Triangle Lane North. The northbound queue extending into Radermacher's is experienced under existing conditions. Even though it is an existing condition, as part of the conversion to a ¾ intersection, modifications within the parking lot should be considered to improve operations near this access. The southbound through movement at the CR 9 & TH 169 Westbound Ramps is operating at an acceptable level of service and will result in a moving queue so no major concerns occur at this location except that long-term queuing over the railroad tracks for a Concept 1 scenario that is not grade separated long term is a potential long-term safety concern.

Table 10 provides a summary of Design Year (2040) Build AM and PM peak hour queue lengths based on the Synchro/SimTraffic and RODEL analysis for Concept 2. Based on the analysis, all turn lanes are anticipated to accommodate the 95th percentile queue except for the northbound left-turn lane and southbound right-turn lane at the intersection of CR 9 & TH 169 Westbound Ramps. The northbound and southbound storage lengths at this intersection have room to be extended to accommodate the queue so that modification will be made to Concept 2 if it is the locally preferred alternative. Based on the analysis, the southbound right turn at TH 282 & Triangle Lane North and northbound right from the TH 282 & Business Access have queue lengths that extend beyond the southern Holiday and McDonald's access points and into the existing Radermacher's parking lot, respectively. The access to McDonald's and Holiday is experiencing impacts under existing conditions and since the McDonald's access is a one-way entry access and Holiday has two access points no major impacts are anticipated at TH 282 & Triangle Lane North. The northbound queue extending into Radermacher's is experienced under existing conditions. Even though it is an existing condition, as part of the conversion to a ¾ intersection, modifications within the parking lot should be considered to improve operations near this access.

Table 9: Design Year (2040) 95th Percentile Queue Summary (Concept 1)

Intersection	Lane	Storage Length (ft)	AM Peak	PM Peak
CR 9 (Quaker Avenue) & 190th Street W/Valley View Drive	EB Left	250	111	111
	EB Right	250	108	161
	WB Left	300	147	144
	WB Right	300	45	37
	NB Left	300	129	203
	NB Right	>500	71	47
	SB Left	280	58	63
	SB Right	275	31	86
CR 9 (Quaker Avenue) & TH 169 Westbound On/Off Ramp/Frontage Rd	NW	120	29	42
	SW	>500	21	25
	NB	360	108	100
	SB	>500	79	554
CR 9 (Quaker Avenue)/TH 282 (2nd Street W) & TH 169 Eastbound Off Ramp	EB Left	280	258	112
	EB Right	280	213	209
TH 282 (2nd Street W) & Triangle Lane N	WB Right	150	20	6
	SB Right	50	99	87
TH 282 (2nd Street W) & Business Access	EB Right	135	16	10
	WB Left	120	74	118
	NB Right	50	59	123
TH 282 (2nd Street W) & Creek Lane	EB	330	116	233
	WB	>500	120	161
	NB	85	73	78
	SB	90	14	16
Creek Ln N/Th 169 Eastbound On Ramp & Triangle Lane N	EB Left	100	64	46
	NB Left	160	7	33
Queue lengths are the 95th Percentile Queue as calculated in SimTraffic and RODEL. SimTraffic reports the queue in feet where as RODEL reports queue in number of vehicles (25 feet per vehicle is assumed).				

Table 10: Design Year (2040) 95th Percentile Queue Summary (Concept 2)

Intersection	Lane	Storage Length (ft)	AM Peak	PM Peak
CR 9 (Quaker Avenue) & 190th Street W/Valley View Drive	EB Left	250	101	125
	EB Right	250	123	229
	WB Left	300	108	66
	WB Right	300	44	41
	NB Left	300	129	199
	NB Right	>500	58	14
	SB Left	280	51	103
	SB Right	275	34	96
CR 9 (Quaker Avenue) & TH 169 Westbound On/Off Ramp/Frontage Rd	EB Left	280	147	164
	EB Right	280	70	152
	WB Left	265	114	154
	WB Right	265	30	38
	NB Left	290	199	385
	NB Right	290	27	32
	SB Left	225	46	154
	SB Right	280	61	417
CR 9 (Quaker Avenue)/TH 282 (2nd Street W) & TH 169 Eastbound Off Ramp	EB Left	280	270	145
	EB Right	280	181	246
TH 282 (2nd Street W) & Triangle Lane N	WB Right	150	4	26
	SB Right	50	85	126
TH 282 (2nd Street W) & Business Access	EB Right	135	11	29
	WB Left	120	60	118
	NB Right	50	65	135
TH 282 (2nd Street W) & Creek Lane	EB	330	116	233
	WB	>500	120	161
	NB	85	73	78
	SB	90	14	16
Creek Ln N/Th 169 Eastbound On Ramp & Triangle Lane N	EB Left	100	67	48
	NB Left	160	4	7
Queue lengths are the 95th Percentile Queue as calculated in SimTraffic and RODEL. SimTraffic reports the queue in feet where as RODEL reports queue in number of vehicles (25 feet per vehicle is assumed).				

Table 11 provides a summary of Design Year (2040) Build AM and PM peak hour queue lengths based on the Synchro/SimTraffic and RODEL analysis for Concept 3. Based on the analysis, all turn lanes are anticipated to accommodate the 95th percentile queue except for the southbound approach at the intersection of CR 9 & TH 169 Westbound Ramps and the southbound left-turn lane, eastbound left-turn lane, and northbound right-turn lane at the intersection of CR 9 & TH 169 Eastbound Ramps. The southbound left-turn lane, eastbound left-turn lane, and northbound right-turn lane at this intersection have room to be extended to accommodate the queue so that modification will be made to Concept 3 if

it is the locally preferred alternative. The southbound through movement at the CR 9 & TH 169 Westbound Ramps is operating at an acceptable level of service and will result in a moving queue so no major concerns occur at this location except that long-term queuing over the railroad tracks is anticipated and given that the railroad crossing cannot be grade separated in the future due to the close spacing between the roundabout at the Westbound TH 169 Ramps and railroad tracks results in a potential long-term safety concern. Based on the analysis, the southbound right turn at TH 282 & Triangle Lane North and northbound right from the TH 282 & Business Access have queue lengths that extend beyond the southern Holiday and McDonald's access points and into the existing Radermacher's parking lot, respectively. The access to McDonald's and Holiday is experiencing impacts under existing conditions and since the McDonald's access is a one-way entry access and Holiday has two access points no major impacts are anticipated at TH 282 & Triangle Lane North. The northbound queue extending into Radermacher's is experienced under existing conditions. Even though it is an existing condition, as part of the conversion to a ¾ intersection, modifications within the parking lot should be considered to improve operations near this access.

Table 11: Design Year (2040) 95th Percentile Queue Summary (Concept 3)

Intersection	Lane	Storage Length (ft)	AM Peak	PM Peak
CR 9 (Quaker Avenue) & 190th Street W/Valley View Drive	EB Left	250	104	129
	EB Right	250	114	177
	WB Left	300	151	131
	WB Right	300	40	40
	NB Left	300	147	205
	NB Right	>500	68	57
	SB Left	280	51	55
	SB Right	275	32	98
CR 9 (Quaker Avenue) & TH 169 Westbound On/Off Ramp/Frontage Rd	NW	120	29	42
	SW	>500	21	25
	NB	360	108	100
	SB	>500	79	554
CR 9 (Quaker Avenue)/TH 282 (2nd Street W) & TH 169 Eastbound On/Off Ramp	EB Left	280	313	107
	EB Right	280	195	227
	NB Right	160	177	118
	SB Left	155	186	198
TH 282 (2nd Street W) & Triangle Lane N	WB Right	150	38	68
	SB Right	50	120	135
TH 282 (2nd Street W) & Business Access	EB Right	135	4	18
	WB Left	110	54	92
	NB Right	50	59	123
TH 282 (2nd Street W) & Creek Lane	EB	330	62	127
	WB	>500	88	105
	NB	85	58	60
	SB	90	16	18
Creek Ln N & Triangle Lane N	WB	50	31	31

Queue lengths are the 95th Percentile Queue as calculated in SimTraffic and RODEL. SimTraffic reports the queue in feet where as RODEL reports queue in number of vehicles (25 feet per vehicle is assumed).

Conclusions and Recommendations

This traffic analysis was completed as part of a joint project between the City, Scott County and MnDOT, and included traffic engineering, concept design, and stakeholder engagement services for the TH 169 / TH 282 / CR 9 interchange area. As part of the traffic engineering services, an operations analysis was performed at critical intersections within the study area to support interchange concept development and determine the most appropriate intersection control and geometry to accommodate existing and future traffic. The traffic analysis included a summary of historic crash data along the study corridor, intersection capacity analysis for Existing and Design Year conditions, and a discussion on potential roadway and intersection improvement alternatives.

The conclusions of the analysis are summarized below:

- Analysis of existing traffic operations show that all intersections are currently operating at an acceptable LOS during the weekday AM and PM peak hours. Additionally, all individual movements are operating at LOS D or better for both the AM and PM peak hours except for the eastbound and westbound lefts at TH 169 and TH 282, which are operating at LOS E during the AM and PM peak hours.
- The review of the existing crash data shows that the intersections of TH 169 / CR 9 / TH 282 and TH 282 & Triangle Lane North have a critical index of greater than 1.0, meaning that these two intersections are worse than the normal, expected range (i.e. there is a crash issue at these intersections today). The crash data indicates that two contributing factors are having a traffic signal on a high-speed, high-volume facility (TH 169) and the queuing from this signal and the associated impacts due to the inadequate intersection spacing between Triangle Lane North and TH 169.
- An analysis of forecast 2040 No-Action conditions shows the following intersections are anticipated to operate at an overall LOS E or LOS F during the AM and PM peak hours:
    - CR 9 & 190th Street West/Valley View Drive (PM peak hour)
    - CR 9 & Frontage Road (AM and PM peak hours)
    - TH 169 / CR 9 / TH 282 (PM peak hour)
    - TH 282 & Triangle Lane North (PM peak hour)
    - Creek Lane North & Triangle Lane North (AM peak hour)
    - TH 169 & Creek Lane North (PM peak hour)

  Due the significant number of intersection that are anticipated to operate below the acceptable LOS for Design Year (2040) No-Action conditions, improvements along the study corridor will be necessary to provide acceptable LOS into the future. The continued deterioration of LOS between today and future conditions is also anticipated to result in additional crash concerns along the corridor.
- Several interchange and roadway concepts were considered through the planning process, and based on input from the City, County and MnDOT, the following three (3) preferred concepts were considered as part of the traffic analysis:
    - Concept 1 – Roundabout / Split Diamond
    - Concept 2 – Folded Diamond / Split Diamond

    - Concept 3 – Diamond Interchange with TH 169 over TH 282 & CR 9
- There were no significant differences between the three concepts from a traffic operations perspective.
- All concepts will reasonably serve 2040 traffic from operations and safety perspective. Other screening criteria will need to be used to decide on the locally preferred interchange alternative.

Appendix

1. Existing Year (2017) SimTraffic Reports
2. Design Year (2040) No-Action SimTraffic Reports
3. Design Year (2040) Concept 1 SimTraffic Reports
4. Design Year (2040) Concept 1 RODEL Reports
5. Design Year (2040) Concept 2 SimTraffic Reports
6. Design Year (2040) Concept 2 RODEL Reports
7. Design Year (2040) Concept 3 SimTraffic Reports
8. Design Year (2040) Concept 3 RODEL Reports

1. EXISTING YEAR (2017) SIMTRAFFIC REPORTS

1: TH 282/CR 9 & TH 169 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	2.4	0.3	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	58.9	27.0	6.4	57.7	28.9	3.1	26.0	33.7	22.0	29.1	39.5	25.2

1: TH 282/CR 9 & TH 169 Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	30.2

2: Driveway/Triangle Lane & TH 282 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2
Total Del/Veh (s)	6.8	2.9	1.9	4.4	0.4	0.4	17.9	17.9	3.2	17.3	17.0	8.6

2: Driveway/Triangle Lane & TH 282 Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	3.5

3: Rademachers Driveway & TH 282 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	0.7	0.6	3.7	0.6	10.8	3.5	1.0

4: Creek Lane & TH 282 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.5	0.5	0.3	3.7	0.7	3.6	4.2	0.2	0.1
Total Del/Veh (s)	2.9	0.4	2.6	2.8	0.6	0.2	12.7	11.2	1.7	9.5	10.3	5.6

4: Creek Lane & TH 282 Performance by movement

Movement	All
Denied Del/Veh (s)	1.2
Total Del/Veh (s)	3.7

5: Creek Lane & Triangle Lane/Park Entrance Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.0	0.0	0.0
Total Del/Veh (s)	6.7	6.2	4.7	3.4	4.4	5.0	1.9	1.0	0.3	1.2	0.1	0.1

5: Creek Lane & Triangle Lane/Park Entrance Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	3.1

6: Creek Lane & TH 169 Performance by movement

Movement	EBT	EBR	WBT	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.1	0.1	0.0	0.0	0.0
Total Del/Veh (s)	12.0	5.4	0.5	1.2	15.5	8.4

7: CR 9 & Frontage Road Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.2	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	10.8	4.7	1.8	1.5	2.8	1.3	2.4

8: CR 9 & CR 57/Valley View Drive Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.2	0.1	0.2	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	9.3	12.1	4.2	8.9	11.2	3.9	3.6	1.3	1.6	1.2	0.4	0.2

8: CR 9 & CR 57/Valley View Drive Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	2.3

9: CR 9 & Ervin Industrial Boulevard Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.2	0.1	0.1
Total Del/Veh (s)	7.3	8.3	3.1	8.3	8.0	2.9	3.0	0.8	0.6	3.2	0.2	0.1

9: CR 9 & Ervin Industrial Boulevard Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	1.1

Total Network Performance

Denied Del/Veh (s)	0.8
Total Del/Veh (s)	34.1

Intersection: 1: TH 282/CR 9 & TH 169

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	L	T	TR	L
Maximum Queue (ft)	190	264	265	94	116	202	209	37	142	179	206	117
Average Queue (ft)	92	151	143	36	42	110	102	9	60	81	99	43
95th Queue (ft)	162	236	234	66	94	172	169	31	115	149	183	88
Link Distance (ft)		2157	2157			924	924			362	362	174
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	300			300	550			350	150			
Storage Blk Time (%)		0	0						0	1		
Queuing Penalty (veh)		0	0						0	1		

Intersection: 1: TH 282/CR 9 & TH 169

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	170	174
Average Queue (ft)	97	99
95th Queue (ft)	157	166
Link Distance (ft)	174	174
Upstream Blk Time (%)	0	1
Queuing Penalty (veh)	1	1
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Driveway/Triangle Lane & TH 282

Movement	EB	EB	WB	WB	WB	NB	SB
Directions Served	LT	TR	L	T	R	LTR	LTR
Maximum Queue (ft)	137	41	27	4	23	41	128
Average Queue (ft)	41	2	2	0	1	12	47
95th Queue (ft)	97	27	15	3	11	36	94
Link Distance (ft)	362	362		383		241	315
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			200		100		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 3: Rademachers Driveway & TH 282

Movement	EB	EB	WB	NB	NB
Directions Served	T	TR	L	L	R
Maximum Queue (ft)	8	4	36	43	30
Average Queue (ft)	0	0	6	15	12
95th Queue (ft)	6	3	28	42	35
Link Distance (ft)	383	383		256	256
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 4: Creek Lane & TH 282

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	TR	L	T	L	TR
Maximum Queue (ft)	18	4	106	52	4	113	88	38	31
Average Queue (ft)	1	0	23	17	0	50	42	11	13
95th Queue (ft)	12	4	80	46	4	87	68	35	37
Link Distance (ft)		322	322		566		403		358
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	100			200		100		100	
Storage Blk Time (%)						1	0		
Queuing Penalty (veh)						2	0		

Intersection: 5: Creek Lane & Triangle Lane/Park Entrance

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	71	35	34	6
Average Queue (ft)	32	13	2	1
95th Queue (ft)	58	37	18	8
Link Distance (ft)	359	92	336	111
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Creek Lane & TH 169

Movement	EB	EB	NB
Directions Served	T	T	R
Maximum Queue (ft)	43	54	120
Average Queue (ft)	2	4	62
95th Queue (ft)	17	29	114
Link Distance (ft)	924	924	111
Upstream Blk Time (%)			2
Queuing Penalty (veh)			4
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: CR 9 & Frontage Road

Movement	WB	NB	SB	SB	SB
Directions Served	LR	TR	LT	T	T
Maximum Queue (ft)	70	7	28	10	18
Average Queue (ft)	36	0	2	0	1
95th Queue (ft)	61	5	13	5	13
Link Distance (ft)	766	174		1086	1086
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 8: CR 9 & CR 57/Valley View Drive

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	95	54	50	11	9	3
Average Queue (ft)	44	24	8	0	0	0
95th Queue (ft)	72	49	33	8	5	2
Link Distance (ft)	796	393	1086	1086	657	657
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 9: CR 9 & Ervin Industrial Boulevard

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	44	40	45	18	16	4
Average Queue (ft)	17	14	5	1	1	0
95th Queue (ft)	43	36	27	10	10	3
Link Distance (ft)	404	462	657	657	421	421
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 9

1: TH 282/CR 9 & TH 169 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	2.9	0.2	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	73.1	38.6	7.8	64.4	34.0	4.4	34.5	29.4	15.7	27.7	44.3	32.9

1: TH 282/CR 9 & TH 169 Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	34.7

2: Driveway/Triangle Lane & TH 282 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2
Total Del/Veh (s)	9.4	4.6	2.4	4.5	0.6	0.5	16.1	24.2	8.3	24.3	22.1	13.8

2: Driveway/Triangle Lane & TH 282 Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	5.0

3: Rademachers Driveway & TH 282 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	1.2	0.6	7.2	0.6	19.1	4.2	2.1

4: Creek Lane & TH 282 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.4	0.6	0.7	3.8	0.6	3.8	4.1	0.1	0.2
Total Del/Veh (s)	3.3	0.7	2.4	4.8	0.7	0.2	20.4	13.5	1.7	14.9	16.4	5.5

4: Creek Lane & TH 282 Performance by movement

Movement	All
Denied Del/Veh (s)	1.0
Total Del/Veh (s)	3.5

5: Creek Lane & Triangle Lane/Park Entrance Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0
Total Del/Veh (s)	5.0	6.5	2.9	3.9	4.8	2.5	2.0	0.5	0.2	1.0	0.2	0.1

5: Creek Lane & Triangle Lane/Park Entrance Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	2.2

6: Creek Lane & TH 169 Performance by movement

Movement	EBT	EBR	WBT	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.0	0.0	0.1
Total Del/Veh (s)	10.8	4.5	0.9	0.2	7.9	4.6

7: CR 9 & Frontage Road Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	22.6	4.2	1.7	1.7	3.5	6.4	5.4

8: CR 9 & CR 57/Valley View Drive Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	8.7	13.6	4.9	11.3	12.3	6.5	6.7	1.3	1.1	1.6	0.6	0.3

8: CR 9 & CR 57/Valley View Drive Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	2.3

9: CR 9 & Ervin Industrial Boulevard Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1
Total Del/Veh (s)	6.4	11.4	3.6	7.7	8.5	2.8	3.8	0.5	0.4	0.9	0.3	0.0

9: CR 9 & Ervin Industrial Boulevard Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	0.8

Total Network Performance

Denied Del/Veh (s)	0.7
Total Del/Veh (s)	38.4

Intersection: 1: TH 282/CR 9 & TH 169

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	L	T	TR	L
Maximum Queue (ft)	96	240	236	98	200	349	362	60	199	286	214	107
Average Queue (ft)	27	135	124	38	90	207	201	23	121	81	81	43
95th Queue (ft)	70	209	206	74	165	310	312	51	199	198	158	90
Link Distance (ft)		2157	2157			924	924			362	362	174
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	300			300	550			350	150			
Storage Blk Time (%)		0					0		7	1		
Queuing Penalty (veh)		0					0		9	1		

Intersection: 1: TH 282/CR 9 & TH 169

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	200	195
Average Queue (ft)	159	158
95th Queue (ft)	215	211
Link Distance (ft)	174	174
Upstream Blk Time (%)	16	15
Queuing Penalty (veh)	36	35
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Driveway/Triangle Lane & TH 282

Movement	EB	EB	WB	WB	WB	NB	SB
Directions Served	LT	TR	L	T	R	LTR	LTR
Maximum Queue (ft)	210	130	22	4	17	37	176
Average Queue (ft)	68	7	1	0	1	12	58
95th Queue (ft)	160	58	11	0	9	35	123
Link Distance (ft)	362	362		383		241	315
Upstream Blk Time (%)							0
Queuing Penalty (veh)							0
Storage Bay Dist (ft)			200		100		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 3: Rademachers Driveway & TH 282

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	68	66	65
Average Queue (ft)	25	32	28
95th Queue (ft)	57	60	53
Link Distance (ft)		256	256
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	100		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Creek Lane & TH 282

Movement	EB	EB	WB	NB	NB	NB	SB	SB
Directions Served	L	R	L	L	T	R	L	TR
Maximum Queue (ft)	24	99	74	125	57	52	42	36
Average Queue (ft)	1	12	27	54	26	3	15	13
95th Queue (ft)	9	55	60	96	53	24	41	39
Link Distance (ft)		322			403			358
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	100		200	100		100	100	
Storage Blk Time (%)				3		0		
Queuing Penalty (veh)				3		0		

Intersection: 5: Creek Lane & Triangle Lane/Park Entrance

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	65	30	23	6
Average Queue (ft)	30	11	2	0
95th Queue (ft)	52	35	12	4
Link Distance (ft)	359	92	336	111
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Creek Lane & TH 169

Movement	EB	EB	NB
Directions Served	T	T	R
Maximum Queue (ft)	18	6	56
Average Queue (ft)	1	0	22
95th Queue (ft)	8	4	43
Link Distance (ft)	924	924	111
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: CR 9 & Frontage Road

Movement	WB	SB	SB	SB
Directions Served	LR	LT	T	T
Maximum Queue (ft)	79	17	169	178
Average Queue (ft)	31	1	41	47
95th Queue (ft)	64	9	126	139
Link Distance (ft)	766		1086	1086
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		100		
Storage Blk Time (%)			3	
Queuing Penalty (veh)			6	

Intersection: 8: CR 9 & CR 57/Valley View Drive

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	78	69	101	10	24	9
Average Queue (ft)	35	29	35	0	1	0
95th Queue (ft)	60	58	79	0	8	4
Link Distance (ft)	796	393	1086	1086	657	657
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 9: CR 9 & Ervin Industrial Boulevard

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LT	LT
Maximum Queue (ft)	57	31	40	6
Average Queue (ft)	27	11	4	0
95th Queue (ft)	49	32	22	4
Link Distance (ft)	404	462	657	421
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 91

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2. DESIGN YEAR (2040) NO-ACTION SIMTRAFFIC REPORTS

1: TH 282/CR 9 & TH 169 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	1.9	0.6	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	75.3	58.8	21.8	77.5	43.9	8.9	58.7	41.0	40.5	60.4	72.2	57.2

1: TH 282/CR 9 & TH 169 Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	52.0

2: Driveway/Triangle Lane & TH 282 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	883.1	938.7	928.8
Total Del/Veh (s)	28.9	13.1	5.7	10.5	1.5	1.0	148.4	143.1	93.9	444.2	429.3	378.5

2: Driveway/Triangle Lane & TH 282 Performance by movement

Movement	All
Denied Del/Veh (s)	93.3
Total Del/Veh (s)	32.2

3: Rademachers Driveway & TH 282 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	4.7	0.8	12.0	2.1	56.1	15.4	4.8

4: Creek Lane & TH 282 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.6	2.0	2.0	3.7	1.0	3.5	4.1	0.1	0.1
Total Del/Veh (s)	52.3	19.6	2.1	50.4	23.3	17.4	34.3	25.7	2.3	22.8	27.0	17.7

4: Creek Lane & TH 282 Performance by movement

Movement	All
Denied Del/Veh (s)	1.4
Total Del/Veh (s)	22.7

5: Creek Lane & Triangle Lane/Park Entrance Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	196.8	134.8	205.3	0.1	9.7	0.1	4.0	5.8	7.6	0.0	0.0	0.0
Total Del/Veh (s)	411.3	285.0	409.3	35.8	86.2	191.9	74.4	94.5	85.0	1.1	0.1	0.1

5: Creek Lane & Triangle Lane/Park Entrance Performance by movement

Movement	All
Denied Del/Veh (s)	78.6
Total Del/Veh (s)	195.8

6: Creek Lane & TH 169 Performance by movement

Movement	EBT	EBR	WBT	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.0	0.3	0.1
Total Del/Veh (s)	17.5	8.9	0.9	24.9	91.6	16.0

7: CR 9 & Frontage Road Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	1499.8	1729.9	0.0	0.0	0.0	0.0	126.3
Total Del/Veh (s)	2439.1	2201.0	1.9	2.0	42.3	60.0	94.9

8: CR 9 & CR 57/Valley View Drive Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.4	0.4	0.4	0.2	0.2	0.2	0.0	0.0	0.0	0.4	0.3	0.2
Total Del/Veh (s)	56.6	59.3	44.9	39.8	39.5	32.4	36.3	23.3	17.2	44.6	23.6	6.1

8: CR 9 & CR 57/Valley View Drive Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	31.2

Total Network Performance

Denied Del/Veh (s)	80.4
Total Del/Veh (s)	122.0

Intersection: 1: TH 282/CR 9 & TH 169

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	L	T	TR	L
Maximum Queue (ft)	398	697	675	400	224	341	337	124	200	356	349	181
Average Queue (ft)	248	400	397	179	96	215	213	48	165	216	233	134
95th Queue (ft)	432	668	666	423	187	307	310	88	231	355	338	205
Link Distance (ft)		2157	2157			924	924			362	362	174
Upstream Blk Time (%)										0	0	12
Queuing Penalty (veh)										2	1	41
Storage Bay Dist (ft)	300			300	550			350	150			
Storage Blk Time (%)	3	21	20				0		23	13		
Queuing Penalty (veh)	19	56	70				1		62	38		

Intersection: 1: TH 282/CR 9 & TH 169

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	217	204
Average Queue (ft)	184	181
95th Queue (ft)	203	196
Link Distance (ft)	174	174
Upstream Blk Time (%)	67	59
Queuing Penalty (veh)	223	198
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Driveway/Triangle Lane & TH 282

Movement	EB	EB	WB	WB	WB	NB	SB
Directions Served	LT	TR	L	T	R	LTR	LTR
Maximum Queue (ft)	373	360	28	74	66	101	345
Average Queue (ft)	192	107	6	5	4	37	324
95th Queue (ft)	374	317	23	45	34	89	363
Link Distance (ft)	362	362		383		241	315
Upstream Blk Time (%)	1	1					94
Queuing Penalty (veh)	4	4					0
Storage Bay Dist (ft)			200		100		
Storage Blk Time (%)				0			
Queuing Penalty (veh)				0			

Intersection: 3: Rademachers Driveway & TH 282

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	TR	L	T	L	R
Maximum Queue (ft)	292	126	64	27	103	68
Average Queue (ft)	72	4	22	0	37	25
95th Queue (ft)	214	55	54	0	79	57
Link Distance (ft)	383	383		322	256	256
Upstream Blk Time (%)	0					
Queuing Penalty (veh)	0					
Storage Bay Dist (ft)			100			
Storage Blk Time (%)				0		
Queuing Penalty (veh)				0		

Intersection: 4: Creek Lane & TH 282

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	TR	L	T	R	L	TR
Maximum Queue (ft)	199	340	84	300	585	198	280	63	38	60
Average Queue (ft)	54	265	10	122	348	120	52	4	7	13
95th Queue (ft)	140	419	51	268	566	199	173	30	28	42
Link Distance (ft)		322	322		566		403			358
Upstream Blk Time (%)		7			3					
Queuing Penalty (veh)		34			0					
Storage Bay Dist (ft)	100			200		100		100	100	
Storage Blk Time (%)	0	24		0	20	19	0	0		
Queuing Penalty (veh)	2	12		1	24	19	1	0		

Intersection: 5: Creek Lane & Triangle Lane/Park Entrance

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	360	78	276	6
Average Queue (ft)	260	21	116	0
95th Queue (ft)	473	65	273	4
Link Distance (ft)	359	92	336	111
Upstream Blk Time (%)	48	5	6	
Queuing Penalty (veh)	0	0	0	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Creek Lane & TH 169

Movement	EB	EB	NB
Directions Served	T	T	R
Maximum Queue (ft)	79	112	128
Average Queue (ft)	27	33	113
95th Queue (ft)	63	84	131
Link Distance (ft)	924	924	111
Upstream Blk Time (%)			69
Queuing Penalty (veh)			124
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: CR 9 & Frontage Road

Movement	WB	NB	SB	SB	SB
Directions Served	LR	TR	LT	T	T
Maximum Queue (ft)	785	28	200	621	559
Average Queue (ft)	765	1	122	289	252
95th Queue (ft)	797	12	265	582	509
Link Distance (ft)	766	174		1086	1086
Upstream Blk Time (%)	83				
Queuing Penalty (veh)	0				
Storage Bay Dist (ft)			100		
Storage Blk Time (%)			4	55	
Queuing Penalty (veh)			12	171	

Intersection: 8: CR 9 & CR 57/Valley View Drive

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	560	233	399	368	300	255
Average Queue (ft)	294	127	225	209	162	94
95th Queue (ft)	508	206	360	340	279	210
Link Distance (ft)	796	392	1086	1086	295	295
Upstream Blk Time (%)	0				1	0
Queuing Penalty (veh)	0				0	0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 1120

1: TH 282/CR 9 & TH 169 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	2.2	0.3	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.4
Total Del/Veh (s)	113.6	60.4	26.7	201.7	127.8	62.4	124.8	46.1	42.1	55.8	65.5	50.3

1: TH 282/CR 9 & TH 169 Performance by movement

Movement	All
Denied Del/Veh (s)	0.3
Total Del/Veh (s)	87.1

2: Driveway/Triangle Lane & TH 282 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	55.9	149.3	111.1	1619.7	1271.0	1641.3
Total Del/Veh (s)	40.0	20.1	7.3	20.5	31.3	14.7	661.9	546.0	458.1	1573.3	1870.7	1507.1

2: Driveway/Triangle Lane & TH 282 Performance by movement

Movement	All
Denied Del/Veh (s)	123.2
Total Del/Veh (s)	57.4

3: Rademachers Driveway & TH 282 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	751.1	732.9	45.7
Total Del/Veh (s)	5.9	0.7	26.2	18.3	1021.6	52.6	30.5

4: Creek Lane & TH 282 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	59.4	61.1	56.9	86.0	124.8	76.2	4.0	0.3	0.2
Total Del/Veh (s)	94.2	16.1	2.0	59.8	40.9	35.5	163.7	83.7	43.2	42.5	62.8	52.6

4: Creek Lane & TH 282 Performance by movement

Movement	All
Denied Del/Veh (s)	36.6
Total Del/Veh (s)	40.9

5: Creek Lane & Triangle Lane/Park Entrance Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0
Total Del/Veh (s)	5.3	6.0	2.9	3.0	4.9	2.2	1.9	0.7	0.3	0.9	0.2	0.1

5: Creek Lane & Triangle Lane/Park Entrance Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	2.3

6: Creek Lane & TH 169 Performance by movement

Movement	EBT	EBR	WBT	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	4.1	0.0	0.0	2.6
Total Del/Veh (s)	15.1	7.8	67.0	1.0	17.0	47.4

7: CR 9 & Frontage Road Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	1879.8	1978.0	0.0	0.0	0.0	3.3	212.4
Total Del/Veh (s)	3396.9	3066.1	1.8	1.9	273.5	295.5	234.4

8: CR 9 & CR 57/Valley View Drive Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	99.0	124.9	107.1	0.2	0.2	0.2	0.0	0.0	0.0	984.8	941.7	983.6
Total Del/Veh (s)	110.2	116.7	124.6	54.5	50.6	35.7	84.6	14.9	14.5	142.1	132.8	108.8

8: CR 9 & CR 57/Valley View Drive Performance by movement

Movement	All
Denied Del/Veh (s)	510.0
Total Del/Veh (s)	91.4

Total Network Performance

Denied Del/Veh (s)	313.2
Total Del/Veh (s)	234.3

Intersection: 1: TH 282/CR 9 & TH 169

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	L	T	TR	L
Maximum Queue (ft)	336	509	476	366	650	952	960	450	200	398	400	174
Average Queue (ft)	103	293	282	129	518	835	836	302	199	371	282	91
95th Queue (ft)	237	463	453	286	838	1105	1103	616	202	405	459	160
Link Distance (ft)		2157	2157			924	924			362	362	174
Upstream Blk Time (%)						19	18			40	2	1
Queuing Penalty (veh)						168	164			219	11	8
Storage Bay Dist (ft)	300			300	550			350	150			
Storage Blk Time (%)	0	8	7	0	11	45	56		78	11		
Queuing Penalty (veh)	0	6	22	2	78	98	92		235	40		

Intersection: 1: TH 282/CR 9 & TH 169

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	201	205
Average Queue (ft)	181	181
95th Queue (ft)	193	195
Link Distance (ft)	174	174
Upstream Blk Time (%)	72	68
Queuing Penalty (veh)	380	361
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Driveway/Triangle Lane & TH 282

Movement	EB	EB	WB	WB	WB	NB	SB
Directions Served	LT	TR	L	T	R	LTR	LTR
Maximum Queue (ft)	388	410	245	399	200	218	342
Average Queue (ft)	264	203	25	349	39	122	318
95th Queue (ft)	478	473	145	519	168	259	337
Link Distance (ft)	362	362		383		241	315
Upstream Blk Time (%)	8	6		22		18	100
Queuing Penalty (veh)	63	45		231		0	0
Storage Bay Dist (ft)			200		100		
Storage Blk Time (%)				42			
Queuing Penalty (veh)				36			

Intersection: 3: Rademachers Driveway & TH 282

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	TR	L	T	L	R
Maximum Queue (ft)	345	195	200	339	270	228
Average Queue (ft)	81	11	73	233	227	94
95th Queue (ft)	277	108	185	454	315	276
Link Distance (ft)	383	383		322	256	256
Upstream Blk Time (%)	0	0		13	70	27
Queuing Penalty (veh)	4	0		144	0	0
Storage Bay Dist (ft)			100			
Storage Blk Time (%)			2	28		
Queuing Penalty (veh)			17	24		

Intersection: 4: Creek Lane & TH 282

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	TR	L	T	R	L	TR
Maximum Queue (ft)	199	336	67	300	607	200	392	144	69	134
Average Queue (ft)	70	259	6	138	496	153	181	29	24	52
95th Queue (ft)	165	400	38	320	713	238	481	103	60	112
Link Distance (ft)		322	322		566		403			358
Upstream Blk Time (%)		6			25		25			
Queuing Penalty (veh)		42			0		0			
Storage Bay Dist (ft)	100			200		100		100	100	
Storage Blk Time (%)	10	22		0	35	57	0	3		6
Queuing Penalty (veh)	121	18		0	35	69	0	6		2

Intersection: 5: Creek Lane & Triangle Lane/Park Entrance

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	70	35	22	10
Average Queue (ft)	31	13	1	0
95th Queue (ft)	52	38	10	5
Link Distance (ft)	359	92	336	111
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Creek Lane & TH 169

Movement	EB	EB	WB	WB	NB
Directions Served	T	T	T	T	R
Maximum Queue (ft)	64	72	1101	1077	90
Average Queue (ft)	8	10	495	479	30
95th Queue (ft)	40	42	1428	1393	65
Link Distance (ft)	924	924	1667	1667	111
Upstream Blk Time (%)			5	5	0
Queuing Penalty (veh)			0	0	0
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 7: CR 9 & Frontage Road

Movement	WB	NB	SB	SB	SB
Directions Served	LR	TR	LT	T	T
Maximum Queue (ft)	782	21	200	1130	1134
Average Queue (ft)	772	1	147	1100	1100
95th Queue (ft)	783	13	285	1119	1119
Link Distance (ft)	766	174		1086	1086
Upstream Blk Time (%)	100			33	32
Queuing Penalty (veh)	0			240	236
Storage Bay Dist (ft)			100		
Storage Blk Time (%)			0	78	
Queuing Penalty (veh)			2	394	

Intersection: 8: CR 9 & CR 57/Valley View Drive

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	701	244	401	352	347	361
Average Queue (ft)	462	103	216	121	329	331
95th Queue (ft)	830	203	427	282	339	348
Link Distance (ft)	796	393	1086	1086	312	312
Upstream Blk Time (%)	17				91	77
Queuing Penalty (veh)	0				0	0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 3615

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3. DESIGN YEAR (2040) CONCEPT 1 SIMTRAFFIC REPORTS

1: Site Access & TH 282 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.1	0.1	0.0
Total Del/Veh (s)	0.5	0.4	18.8	4.0	8.9	2.6

5: Creek Ln N & Triangle Ln N Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	8.9	7.6	3.1	6.2	6.6	4.7	2.2	0.9	0.3	2.9

8: CR 9 & CR 57/Valley View Drive Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.5	1.1	3.5	3.7	0.7	3.7	0.0	0.0	0.0	3.2	0.2	3.3
Total Del/Veh (s)	22.8	33.1	7.5	21.3	25.7	8.7	13.5	12.5	3.4	15.3	16.4	4.7

8: CR 9 & CR 57/Valley View Drive Performance by movement

Movement	All
Denied Del/Veh (s)	1.3
Total Del/Veh (s)	13.6

9: TH 282 & Triangle Ln N Performance by movement

Movement	EBT	WBT	WBR	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.8	1.3	1.4	0.4	16.4	1.8

29: TH 169 EB Off-Ramp & CR 9 Performance by movement

Movement	EBL	EBR	NBT	SBT	All
Denied Del/Veh (s)	3.3	1.0	0.0	0.0	0.5
Total Del/Veh (s)	45.1	17.2	4.2	5.7	10.9

Total Zone Performance

Denied Del/Veh (s)	2.0
Total Del/Veh (s)	21.3

Intersection: 1: Site Access & TH 282

Movement	EB	EB	EB	WB	WB	NB
Directions Served	T	T	R	L	T	R
Maximum Queue (ft)	9	4	35	103	10	74
Average Queue (ft)	0	0	2	32	0	33
95th Queue (ft)	3	3	16	74	8	59
Link Distance (ft)	239	239			452	195
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			135	200		
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 5: Creek Ln N & Triangle Ln N

Movement	EB	EB	WB	NB
Directions Served	L	TR	LTR	L
Maximum Queue (ft)	84	56	31	10
Average Queue (ft)	35	32	12	1
95th Queue (ft)	64	51	36	7
Link Distance (ft)	808	808	174	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				100
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: CR 9 & CR 57/Valley View Drive

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	R	L	T	T
Maximum Queue (ft)	132	69	146	176	69	58	191	338	84	76	152	148
Average Queue (ft)	61	20	61	86	21	19	74	133	34	26	71	64
95th Queue (ft)	111	50	108	147	53	45	129	250	71	58	123	118
Link Distance (ft)		783			903			1152	1152		1263	1263
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	250		250	300		300	300			275		
Storage Blk Time (%)								0				
Queuing Penalty (veh)								1				

Intersection: 8: CR 9 & CR 57/Valley View Drive

Movement	SB
Directions Served	R
Maximum Queue (ft)	40
Average Queue (ft)	13
95th Queue (ft)	31
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	275
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 9: TH 282 & Triangle Ln N

Movement	WB	WB	SB
Directions Served	T	T	R
Maximum Queue (ft)	17	44	141
Average Queue (ft)	1	2	48
95th Queue (ft)	12	20	99
Link Distance (ft)	239	239	808
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)		0	
Queuing Penalty (veh)		0	

Intersection: 29: TH 169 EB Off-Ramp & CR 9

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	T	T	T	T
Maximum Queue (ft)	283	302	109	223	206	224
Average Queue (ft)	165	113	26	81	64	69
95th Queue (ft)	258	213	76	170	154	157
Link Distance (ft)		845	212	212	303	303
Upstream Blk Time (%)			0	0		
Queuing Penalty (veh)			0	2		
Storage Bay Dist (ft)	300					
Storage Blk Time (%)	0	0				
Queuing Penalty (veh)	1	0				

Zone Summary

Zone wide Queuing Penalty: 3

1: Site Access & TH 282 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.4	0.1	0.2	0.1
Total Del/Veh (s)	1.2	0.9	34.7	3.5	20.9	3.8

5: Creek Ln N & Triangle Ln N Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.1	0.2	0.0	0.0	0.0	0.0
Total Del/Veh (s)	8.5	8.6	3.3	10.7	5.6	4.9	2.5	1.1	0.6	2.6

8: CR 9 & CR 57/Valley View Drive Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.5	1.0	3.5	3.8	0.5	3.8	0.0	0.0	0.0	2.4	0.4	2.5
Total Del/Veh (s)	37.8	44.2	15.6	39.5	40.2	6.8	23.4	8.7	2.3	13.8	22.0	7.4

8: CR 9 & CR 57/Valley View Drive Performance by movement

Movement	All
Denied Del/Veh (s)	1.1
Total Del/Veh (s)	19.5

9: TH 282 & Triangle Ln N Performance by movement

Movement	EBT	WBT	WBR	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	1.3	1.1	1.2	0.3	13.1	1.6

29: TH 169 EB Off Ramp & CR 9 Performance by movement

Movement	EBL	EBR	NBT	SBT	All
Denied Del/Veh (s)	3.5	0.5	0.0	0.0	0.1
Total Del/Veh (s)	50.2	21.5	3.8	10.7	10.5

Total Zone Performance

Denied Del/Veh (s)	1.4
Total Del/Veh (s)	25.9

Intersection: 1: Site Access & TH 282

Movement	EB	EB	EB	WB	WB	NB
Directions Served	T	T	R	L	T	R
Maximum Queue (ft)	88	98	18	141	5	163
Average Queue (ft)	6	5	1	58	0	64
95th Queue (ft)	44	41	10	118	4	123
Link Distance (ft)	239	239			452	195
Upstream Blk Time (%)		0				0
Queuing Penalty (veh)		0				0
Storage Bay Dist (ft)			135	200		
Storage Blk Time (%)		0		0		
Queuing Penalty (veh)		0		0		

Intersection: 5: Creek Ln N & Triangle Ln N

Movement	EB	EB	WB
Directions Served	L	TR	LTR
Maximum Queue (ft)	52	72	35
Average Queue (ft)	23	34	10
95th Queue (ft)	46	56	33
Link Distance (ft)	808	808	120
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 8: CR 9 & CR 57/Valley View Drive

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	R	L	T	T
Maximum Queue (ft)	135	96	210	173	85	44	260	264	60	95	339	338
Average Queue (ft)	57	31	90	78	32	15	117	97	18	23	177	187
95th Queue (ft)	111	70	161	144	70	37	203	202	47	63	283	296
Link Distance (ft)		783			903			1153	1153		1263	1263
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	250		250	300		300	300			275		
Storage Blk Time (%)			0				0	0			1	1
Queuing Penalty (veh)			0				0	0			1	1

Intersection: 8: CR 9 & CR 57/Valley View Drive

Movement	SB
Directions Served	R
Maximum Queue (ft)	244
Average Queue (ft)	26
95th Queue (ft)	86
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	275
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 9: TH 282 & Triangle Ln N

Movement	WB	SB
Directions Served	T	R
Maximum Queue (ft)	12	114
Average Queue (ft)	0	44
95th Queue (ft)	6	87
Link Distance (ft)	239	808
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 29: TH 169 EB Off Ramp & CR 9

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	T	T	T	T
Maximum Queue (ft)	150	237	160	178	320	323
Average Queue (ft)	53	123	45	63	181	181
95th Queue (ft)	112	209	119	136	350	354
Link Distance (ft)		845	212	212	303	303
Upstream Blk Time (%)				0	2	1
Queuing Penalty (veh)				0	12	10
Storage Bay Dist (ft)	300					
Storage Blk Time (%)		0				
Queuing Penalty (veh)		0				

Zone Summary

Zone wide Queuing Penalty: 25

4. DESIGN YEAR (2040) CONCEPT 1 RODEL REPORTS

Scheme Summary

Control Data

Control Data and Model Parameters

TH 169 & 2nd St Interchange	2040 PHF Flow Profile (veh)
2nd St/Creek Ln 2040 AM peak hour	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
AM Peak Hour	Peak 60/15 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	50% Confidence Level

Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	Yes
Bypass Calibration	No
Global Results	Yes

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle ?
1	2nd St SB	0	0	24.00	2	28.00	2	164.00	66.00	30.00
2	Creek Ln EB	90	0	12.00	1	14.00	1	164.00	66.00	30.00
3	2nd St NB	180	0	24.00	2	28.00	2	164.00	66.00	30.00
4	Creek Ln WB	270	0	12.00	1	14.00	1	164.00	66.00	30.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	2nd St SB	164.00	15.00	1	28.00	2	24.00	2
2	Creek Ln EB	164.00	30.00	2	14.00	1	12.00	1
3	2nd St NB	164.00	15.00	1	14.00	1	12.00	1
4	Creek Ln WB	164.00	30.00	2	14.00	1	12.00	1

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	2nd St SB	0	1.000	0	1.000	24.00	3584	0	24.00	3584	0
2	Creek Ln EB	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
3	2nd St NB	0	1.000	0	1.000	20.00	3584	0	12.00	1792	0
4	Creek Ln WB	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0

Bypass Geometry

Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
1	2nd St SB	Yield	240	24	2	12	1	24	2

Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
1	2nd St SB	12	1	0	130	66.00005914	30	2	Creek Ln EB	1	2

Bypass Entry Capacity Modifiers and Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Calibration	
		Capacity + or -	Cross Walk Factor	Intercept + or -	Slope Factor
1	2nd St SB	0	1.000	0	1.000

Traffic Flow Data (veh/hr)

2040 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	2nd St SB	45	255	765	0	240	5.0	1.00	0.9
2	Creek Ln EB	0	170	100	60	0	5.0	1.00	0.9
3	2nd St NB	0	120	730	85	0	5.0	1.00	0.9
4	Creek Ln WB	0	75	15	20	0	5.0	1.00	0.9

Operational Results

2040 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	2nd St SB	Yield	1065	240	210	210	964	1985	952	0.5449	0.2561
2	Creek Ln EB	None	330		1140		375	693		0.4905	
3	2nd St NB	None	935		570		900	1632		0.5839	
4	Creek Ln WB	None	110		1064		440	720		0.1561	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	2nd St SB	Yield	4.88	5.00	4.90	4.64	1.03	A	A	A
2	Creek Ln EB	None	9.01		9.01	2.91		A		A
3	2nd St NB	None	5.31		5.31	4.79		A		A
4	Creek Ln WB	None	5.51		5.51	0.54		A		A

2040 AM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	2nd St SB	Yield	1183	267	233	233	1069	1963	941	0.6093	0.2865
2	Creek Ln EB	None	367		1265		416	649		0.5763	
3	2nd St NB	None	1039		631		998	1571		0.6690	
4	Creek Ln WB	None	122		1180		488	679		0.1821	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	2nd St SB	Yield	5.20	5.03	5.17	4.64	1.03	A	A	A
2	Creek Ln EB	None	10.04		10.04	2.91		B		B
3	2nd St NB	None	5.98		5.98	4.79		A		A
4	Creek Ln WB	None	5.68		5.68	0.54		A		A

Approach Flow Profile

2040 AM Peak - Approach Flows (Veh / Hour)

Time Slice	2nd St SB	Creek Ln EB	2nd St NB	Creek Ln WB
0.0 - 7.5	157.08	39.72	112.55	13.24
7.5 - 15.0	157.08	39.72	112.55	13.24
15.0 - 22.5	157.08	39.72	112.55	13.24
22.5 - 30.0	181.25	45.83	129.86	15.28
30.0 - 37.5	181.25	45.83	129.86	15.28
37.5 - 45.0	157.08	39.72	112.55	13.24
45.0 - 52.5	157.08	39.72	112.55	13.24
52.5 - 60.0	157.08	39.72	112.55	13.24
Peak 15 min	181.25	45.83	129.86	15.28
Peak 60 min	163.12	41.25	116.88	13.75

Exit Flow Profile

2040 AM Peak - Exit Flows (Veh / Hour)

Time Slice	2nd St SB	Creek Ln EB	2nd St NB	Creek Ln WB
0.0 - 7.5	115.96	45.06	108.19	52.88
7.5 - 15.0	116.15	45.14	108.33	52.96
15.0 - 22.5	116.16	45.14	108.33	52.96
22.5 - 30.0	133.30	51.92	124.55	60.82
30.0 - 37.5	134.00	52.08	124.99	61.10
37.5 - 45.0	116.52	45.25	108.56	53.11
45.0 - 52.5	116.17	45.14	108.34	52.97
52.5 - 60.0	116.16	45.14	108.33	52.96
0-60	964	375	900	440
%Trucks	5.00	5.00	5.00	5.00

Economics

Economic Input Data

2040 - Vehicle Delay Parameters

Peaks	Peak / Day	Days / Year	Delay Cost ($ / hour)
AM Peak	1	325	15.00
OFF Peak	14	325	15.00
PM Peak	1	325	15.00

2040 - Accident Severity Proportions and Costs

Accident Type	Proportion (%)	Cost ($)
Fatal Vehicle Accident	0.3	0
Incapacitating Vehicle Accident	17.7	0
Non-incapacitating Vehicle Accident	82	0
Damage Only Vehicle Accident	100	0
Pedestrian Injury Accident	100	0

Economics - Results Data

2040 Delay and Accident Costs

Delay Costs			Accident Costs			Total Costs	
Peak	Delays Veh.hrs	Costs ($)	Accident Types	Annual Accidents	Accident Costs	Cost Type	Costs ($/year)
AM	1348.31	20225	Vehicles Injury	0.00	0	Vehicle Delay Cost	20225
OFF	0.00	0	Vehicles DO	0.00	0	Vehicle Injury Acc Cost	0
PM	0.00	0	Pedestrians	0.00	0	Vehicle DO Acc Cost	0
						Pedestrian Accident Cost	0
						Total Accident Cost	0
Total	1348.31	20225	Totals	0.00	0	TOTAL COST	20225

Global Results

Performance and Accidents

2040 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	2440	240	2680
Capacity	veh/hr	5031	952	5983
Average Delay	sec/veh	5.63	5.00	5.57
L.O.S. (Signal)	A – F	A	A	A
L.O.S. (Unsig)	A – F	A	A	A
Total Delay	veh.hrs	3.82	0.33	4.15

Scheme Summary

Control Data

Control Data and Model Parameters

TH 169 & 2nd St Interchange	2040 PHF Flow Profile (veh)
2nd St/Creek Ln 2040 PM peak hour	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
PM Peak Hour	Peak 60/15 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	50% Confidence Level

Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	Yes
Bypass Calibration	No
Global Results	Yes

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle ?
1	2nd St SB	0	0	24.00	2	28.00	2	164.00	66.00	30.00
2	Creek Ln EB	90	0	12.00	1	14.00	1	164.00	66.00	30.00
3	2nd St NB	180	0	24.00	2	28.00	2	164.00	66.00	30.00
4	Creek Ln WB	270	0	12.00	1	14.00	1	164.00	66.00	30.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	2nd St SB	164.00	15.00	1	28.00	2	24.00	2
2	Creek Ln EB	164.00	30.00	2	14.00	1	12.00	1
3	2nd St NB	164.00	15.00	1	14.00	1	12.00	1
4	Creek Ln WB	164.00	30.00	2	14.00	1	12.00	1

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	2nd St SB	0	1.000	0	1.000	24.00	3584	0	24.00	3584	0
2	Creek Ln EB	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
3	2nd St NB	0	1.000	0	1.000	20.00	3584	0	12.00	1792	0
4	Creek Ln WB	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0

Bypass Geometry

Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
1	2nd St SB	Yield	410	24	2	12	1	24	2

Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
1	2nd St SB	12	1	0	130	66.0000887	30	2	Creek Ln EB	1	2

Bypass Entry Capacity Modifiers and Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Calibration	
		Capacity + or -	Cross Walk Factor	Intercept + or -	Slope Factor
1	2nd St SB	0	1.000	0	1.000

Traffic Flow Data (veh/hr)

2040 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	2nd St SB	85	325	980	0	410	5.0	1.00	0.9
2	Creek Ln EB	0	145	40	90	0	5.0	1.00	0.9
3	2nd St NB	0	100	840	95	0	5.0	1.00	0.9
4	Creek Ln WB	0	75	15	30	0	5.0	1.00	0.9

Operational Results

2040 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	2nd St SB	Yield	1390	410	190	190	1100	2005	962	0.7075	0.4343
2	Creek Ln EB	None	275		1465		525	578		0.4946	
3	2nd St NB	None	1035		595		1145	1607		0.6576	
4	Creek Ln WB	None	120		1170		460	683		0.1800	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	2nd St SB	Yield	7.13	6.44	6.97	9.31	2.33	A	A	A
2	Creek Ln EB	None	10.90		10.90	3.11		B		B
3	2nd St NB	None	6.17		6.17	6.44		A		A
4	Creek Ln WB	None	5.97		5.97	0.65		A		A

2040 PM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	2nd St SB	Yield	1544	456	211	211	1217	1985	952	0.7907	0.4852
2	Creek Ln EB	None	306		1622		582	522		0.5996	
3	2nd St NB	None	1150		658		1267	1545		0.7548	
4	Creek Ln WB	None	133		1295		509	638		0.2116	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	2nd St SB	Yield	8.10	6.69	7.78	9.31	2.33	A	A	A
2	Creek Ln EB	None	12.62		12.62	3.11		B		B
3	2nd St NB	None	7.22		7.22	6.44		A		A
4	Creek Ln WB	None	6.21		6.21	0.65		A		A

Approach Flow Profile

2040 PM Peak - Approach Flows (Veh / Hour)

Time Slice	2nd St SB	Creek Ln EB	2nd St NB	Creek Ln WB
0.0 - 7.5	216.67	33.10	124.58	14.44
7.5 - 15.0	216.67	33.10	124.58	14.44
15.0 - 22.5	216.67	33.10	124.58	14.44
22.5 - 30.0	250.00	38.19	143.75	16.67
30.0 - 37.5	250.00	38.19	143.75	16.67
37.5 - 45.0	216.67	33.10	124.58	14.44
45.0 - 52.5	216.67	33.10	124.58	14.44
52.5 - 60.0	216.67	33.10	124.58	14.44
Peak 15 min	250.00	38.19	143.75	16.67
Peak 60 min	225.00	34.38	129.38	15.00

Exit Flow Profile

2040 PM Peak - Exit Flows (Veh / Hour)

Time Slice	2nd St SB	Creek Ln EB	2nd St NB	Creek Ln WB
0.0 - 7.5	132.13	63.03	137.53	55.25
7.5 - 15.0	132.39	63.19	137.81	55.36
15.0 - 22.5	132.40	63.19	137.82	55.37
22.5 - 30.0	151.62	72.61	157.88	63.41
30.0 - 37.5	152.72	72.90	158.97	63.87
37.5 - 45.0	133.58	63.50	138.97	55.85
45.0 - 52.5	132.43	63.20	137.84	55.38
52.5 - 60.0	132.41	63.20	137.83	55.37
0-60	1100	525	1145	460
%Trucks	5.00	5.00	5.00	5.00

Economics

Economic Input Data

2040 - Vehicle Delay Parameters

Peaks	Peak / Day	Days / Year	Delay Cost ($ / hour)
AM Peak	1	325	15.00
OFF Peak	14	325	15.00
PM Peak	1	325	15.00

2040 - Accident Severity Proportions and Costs

Accident Type	Proportion (%)	Cost ($)
Fatal Vehicle Accident	0.3	0
Incapacitating Vehicle Accident	17.7	0
Non-incapacitating Vehicle Accident	82	0
Damage Only Vehicle Accident	100	0
Pedestrian Injury Accident	100	0

Economics - Results Data

2040 Delay and Accident Costs

Delay Costs			Accident Costs			Total Costs	
Peak	Delays Veh.hrs	Costs ($)	Accident Types	Annual Accidents	Accident Costs	Cost Type	Costs ($/year)
AM	0.00	0	Vehicles Injury	0.00	0	Vehicle Delay Cost	30666
OFF	0.00	0	Vehicles DO	0.00	0	Vehicle Injury Acc Cost	0
PM	2044.40	30666	Pedestrians	0.00	0	Vehicle DO Acc Cost	0
						Pedestrian Accident Cost	0
						Total Accident Cost	0
Total	2044.40	30666	Totals	0.00	0	TOTAL COST	30666

Global Results

Performance and Accidents

2040 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	2820	410	3230
Capacity	veh/hr	4873	962	5835
Average Delay	sec/veh	7.09	6.44	7.01
L.O.S. (Signal)	A – F	A	A	A
L.O.S. (Unsig)	A – F	A	A	A
Total Delay	veh.hrs	5.56	0.73	6.29

Scheme Summary

Control Data

Control Data and Model Parameters

TH 169 & 2nd St Interchange	2040 PHF Flow Profile (veh)
WB ramps/2nd St/Frontage Rd 2040 AM Peak	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
AM Peak Hour	Peak 60/15 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	50% Confidence Level

Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	No
Bypass Calibration	No
Global Results	Yes

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle ?
1	2nd St SB	0	0	24.00	2	28.00	2	131.00	66.00	30.00
2	WB on ramp	90	0	12.00	1	14.00	1	131.00	66.00	30.00
3	2nd St NB	180	0	24.00	2	28.00	2	131.00	66.00	30.00
4	WB off ramp	270	0	24.00	2	28.00	2	131.00	66.00	30.00
5	Frontage SWB	315	0	12.00	1	14.00	1	131.00	66.00	30.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	2nd St SB	230.00	30.00	2	14.00	1	12.00	1
2	WB on ramp	230.00	30.00	2	14.00	1	12.00	1
3	2nd St NB	230.00	15.00	1	28.00	2	24.00	2
4	WB off ramp	230.00	30.00	2	14.00	1	12.00	1
5	Frontage SWB	230.00	30.00	2	14.00	1	12.00	1

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	2nd St SB	0	1.000	0	1.000	24.00	3584	0	12.00	1792	0
2	WB on ramp	0	1.000	0	1.000	24.00	1792	0	12.00	1792	0
3	2nd St NB	0	1.000	0	1.000	24.00	3584	0	24.00	3584	0
4	WB off ramp	0	1.000	0	1.000	24.00	3584	0	12.00	1792	0
5	Frontage SWB	0	1.000	0	1.000	24.00	1792	0	12.00	1792	0

Traffic Flow Data (veh/hr)

2040 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows						Flow Modifiers		
		U-Turn	Exit-4	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	2nd St SB	0	30	0	700	150	0	5.0	1.00	0.9
2	WB on ramp	0	0	0	0	1	0	5.0	1.00	0.9
3	2nd St NB	0	280	770	110	0	0	5.0	1.00	0.9
4	WB off ramp	0	110	0	170	5	0	5.0	1.00	0.9
5	Frontage SWB	0	0	130	25	10	0	5.0	1.00	0.9

Operational Results

2040 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	2nd St SB	None	880		545		950	1869		0.4776	
2	WB on ramp	None	1		970		455	812		0.0013	
3	2nd St NB	None	1160		30		941	2165		0.5430	
4	WB off ramp	None	285		1190		0	1490		0.1950	
5	Frontage SWB	None	165		1330		145	759		0.2222	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	2nd St SB	None	3.98		3.98	3.14		A		A
2	WB on ramp	None	0.00		0.00	0.00		A		A
3	2nd St NB	None	4.22		4.22	4.30		A		A
4	WB off ramp	None	4.55		4.55	1.15		A		A
5	Frontage SWB	None	5.64		5.64	0.84		A		A

2040 AM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	2nd St SB	None	978		605		1055	1834		0.5378	
2	WB on ramp	None	1		1077		505	780		0.0014	
3	2nd St NB	None	1289		33		1045	2162		0.6015	
4	WB off ramp	None	317		1321		0	1413		0.2264	
5	Frontage SWB	None	183		1477		161	715		0.2597	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	2nd St SB	None	4.21		4.21	3.14		A		A
2	WB on ramp	None	0.00		0.00	0.00		A		A
3	2nd St NB	None	4.44		4.44	4.30		A		A
4	WB off ramp	None	4.70		4.70	1.15		A		A
5	Frontage SWB	None	5.88		5.88	0.84		A		A

Approach Flow Profile

2040 AM Peak - Approach Flows (Veh / Hour)

Time Slice	2nd St SB	WB on ramp	2nd St NB	WB off ramp	Frontage SWB
0.0 - 7.5	105.93	0.12	139.63	34.31	19.86
7.5 - 15.0	105.93	0.12	139.63	34.31	19.86
15.0 - 22.5	105.93	0.12	139.63	34.31	19.86
22.5 - 30.0	122.22	0.14	161.11	39.58	22.92
30.0 - 37.5	122.22	0.14	161.11	39.58	22.92
37.5 - 45.0	105.93	0.12	139.63	34.31	19.86
45.0 - 52.5	105.93	0.12	139.63	34.31	19.86
52.5 - 60.0	105.93	0.12	139.63	34.31	19.86
Peak 15 min	122.22	0.14	161.11	39.58	22.92
Peak 60 min	110.00	0.12	145.00	35.63	20.63

Exit Flow Profile

2040 AM Peak - Exit Flows (Veh / Hour)

Time Slice	2nd St SB	WB on ramp	2nd St NB	WB off ramp	Frontage SWB
0.0 - 7.5	114.24	54.71	113.15	0.00	17.44
7.5 - 15.0	114.35	54.77	113.26	0.00	17.45
15.0 - 22.5	114.35	54.77	113.27	0.00	17.45
22.5 - 30.0	131.77	63.11	130.52	0.00	20.11
30.0 - 37.5	131.94	63.19	130.69	0.00	20.14
37.5 - 45.0	114.52	54.85	113.44	0.00	17.48
45.0 - 52.5	114.36	54.77	113.27	0.00	17.45
52.5 - 60.0	114.35	54.77	113.27	0.00	17.45
0-60	950	455	941	0	145
%Trucks	5.00	5.00	5.00	0.00	5.00

Economics

Economic Input Data

2040 - Vehicle Delay Parameters

Peaks	Peak / Day	Days / Year	Delay Cost ($ / hour)
AM Peak	1	325	15.00
OFF Peak	14	325	15.00
PM Peak	1	325	15.00

2040 - Accident Severity Proportions and Costs

Accident Type	Proportion (%)	Cost ($)
Fatal Vehicle Accident	0.3	0
Incapacitating Vehicle Accident	17.7	0
Non-incapacitating Vehicle Accident	82	0
Damage Only Vehicle Accident	100	0
Pedestrian Injury Accident	100	0

Economics - Results Data

2040 Delay and Accident Costs

Delay Costs			Accident Costs			Total Costs	
Peak	Delays Veh.hrs	Costs ($)	Accident Types	Annual Accidents	Accident Costs	Cost Type	Costs ($/year)
AM	958.87	14383	Vehicles Injury	0.00	0	Vehicle Delay Cost	14383
OFF	0.00	0	Vehicles DO	0.00	0	Vehicle Injury Acc Cost	0
PM	0.00	0	Pedestrians	0.00	0	Vehicle DO Acc Cost	0
						Pedestrian Accident Cost	0
						Total Accident Cost	0
Total	958.87	14383	Totals	0.00	0	TOTAL COST	14383

Global Results

Performance and Accidents

2040 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	2491		2491
Capacity	veh/hr	7095		7095
Average Delay	sec/veh	4.26		4.26
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	2.95		2.95

Scheme Summary

Control Data

Control Data and Model Parameters

TH 169 & 2nd St Interchange	2040 PHF Flow Profile (veh)
WB ramps/2nd St/Frontage Rd 2040 PM Peak	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
PM Peak Hour	Peak 60/15 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	50% Confidence Level

Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	No
Bypass Calibration	No
Global Results	Yes

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle ?
1	2nd St SB	0	0	24.00	2	28.00	2	131.00	66.00	30.00
2	WB on ramp	90	0	12.00	1	14.00	1	131.00	66.00	30.00
3	2nd St NB	180	0	24.00	2	28.00	2	131.00	66.00	30.00
4	WB off ramp	270	0	24.00	2	28.00	2	131.00	66.00	30.00
5	Frontage SWB	315	0	12.00	1	14.00	1	131.00	66.00	30.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	2nd St SB	230.00	30.00	2	28.00	2	24.00	2
2	WB on ramp	230.00	30.00	2	14.00	1	12.00	1
3	2nd St NB	230.00	15.00	1	28.00	2	24.00	2
4	WB off ramp	230.00	30.00	2	14.00	1	12.00	1
5	Frontage SWB	230.00	30.00	2	14.00	1	12.00	1

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	2nd St SB	0	1.000	0	1.000	24.00	3584	0	24.00	3584	0
2	WB on ramp	0	1.000	0	1.000	24.00	1792	0	12.00	1792	0
3	2nd St NB	0	1.000	0	1.000	24.00	3584	0	24.00	3584	0
4	WB off ramp	0	1.000	0	1.000	24.00	3584	0	12.00	1792	0
5	Frontage SWB	0	1.000	0	1.000	24.00	1792	0	12.00	1792	0

Traffic Flow Data (veh/hr)

2040 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows						Flow Modifiers		
		U-Turn	Exit-4	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	2nd St SB	0	30	0	1075	350	0	5.0	1.00	0.9
2	WB on ramp	0	0	0	0	1	0	5.0	1.00	0.9
3	2nd St NB	0	370	555	110	0	0	5.0	1.00	0.9
4	WB off ramp	0	220	0	160	5	0	5.0	1.00	0.9
5	Frontage SWB	0	0	130	40	20	0	5.0	1.00	0.9

Operational Results

2040 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	2nd St SB	None	1455		760		735	1743		0.8649	
2	WB on ramp	None	1		1454		760	669		0.0015	
3	2nd St NB	None	1035		30		1426	2165		0.4847	
4	WB off ramp	None	385		1065		0	1563		0.2510	
5	Frontage SWB	None	190		1305		145	767		0.2533	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	2nd St SB	None	13.37		13.37	22.16		B		B
2	WB on ramp	None	0.00		0.00	0.00		A		A
3	2nd St NB	None	4.48		4.48	3.99		A		A
4	WB off ramp	None	4.95		4.95	1.68		A		A
5	Frontage SWB	None	5.79		5.79	1.00		A		A

2040 PM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	2nd St SB	None	1617		843		816	1694		0.9852	
2	WB on ramp	None	1		1599		838	626		0.0018	
3	2nd St NB	None	1150		33		1567	2163		0.5368	
4	WB off ramp	None	428		1181		0	1495		0.2892	
5	Frontage SWB	None	211		1448		160	723		0.2955	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	2nd St SB	None	18.01		18.01	22.16		C		C
2	WB on ramp	None	0.00		0.00	0.00		A		A
3	2nd St NB	None	4.63		4.63	3.99		A		A
4	WB off ramp	None	5.12		5.12	1.68		A		A
5	Frontage SWB	None	6.06		6.06	1.00		A		A

Approach Flow Profile

2040 PM Peak - Approach Flows (Veh / Hour)

Time Slice	2nd St SB	WB on ramp	2nd St NB	WB off ramp	Frontage SWB
0.0 - 7.5	175.14	0.12	124.58	46.34	22.87
7.5 - 15.0	175.14	0.12	124.58	46.34	22.87
15.0 - 22.5	175.14	0.12	124.58	46.34	22.87
22.5 - 30.0	202.08	0.14	143.75	53.47	26.39
30.0 - 37.5	202.08	0.14	143.75	53.47	26.39
37.5 - 45.0	175.14	0.12	124.58	46.34	22.87
45.0 - 52.5	175.14	0.12	124.58	46.34	22.87
52.5 - 60.0	175.14	0.12	124.58	46.34	22.87
Peak 15 min	202.08	0.14	143.75	53.47	26.39
Peak 60 min	181.88	0.12	129.38	48.13	23.75

Exit Flow Profile

2040 PM Peak - Exit Flows (Veh / Hour)

Time Slice	2nd St SB	WB on ramp	2nd St NB	WB off ramp	Frontage SWB
0.0 - 7.5	88.38	91.24	171.02	0.00	17.42
7.5 - 15.0	88.47	91.46	171.59	0.00	17.45
15.0 - 22.5	88.47	91.47	171.63	0.00	17.45
22.5 - 30.0	101.82	104.21	194.21	0.00	20.00
30.0 - 37.5	102.08	105.39	197.55	0.00	20.12
37.5 - 45.0	88.73	93.03	176.10	0.00	17.61
45.0 - 52.5	88.48	91.51	171.72	0.00	17.46
52.5 - 60.0	88.47	91.49	171.67	0.00	17.45
0-60	735	760	1426	0	145
%Trucks	5.00	5.00	5.00	0.00	5.00

Economics

Economic Input Data

2040 - Vehicle Delay Parameters

Peaks	Peak / Day	Days / Year	Delay Cost ($ / hour)
AM Peak	1	325	15.00
OFF Peak	14	325	15.00
PM Peak	1	325	15.00

2040 - Accident Severity Proportions and Costs

Accident Type	Proportion (%)	Cost ($)
Fatal Vehicle Accident	0.3	0
Incapacitating Vehicle Accident	17.7	0
Non-incapacitating Vehicle Accident	82	0
Damage Only Vehicle Accident	100	0
Pedestrian Injury Accident	100	0

Economics - Results Data

2040 Delay and Accident Costs

Delay Costs			Accident Costs			Total Costs	
Peak	Delays Veh.hrs	Costs ($)	Accident Types	Annual Accidents	Accident Costs	Cost Type	Costs ($/year)
AM	0.00	0	Vehicles Injury	0.00	0	Vehicle Delay Cost	36683
OFF	0.00	0	Vehicles DO	0.00	0	Vehicle Injury Acc Cost	0
PM	2445.53	36683	Pedestrians	0.00	0	Vehicle DO Acc Cost	0
						Pedestrian Accident Cost	0
						Total Accident Cost	0
Total	2445.53	36683	Totals	0.00	0	TOTAL COST	36683

Global Results

Performance and Accidents

2040 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	3066		3066
Capacity	veh/hr	6908		6908
Average Delay	sec/veh	8.84		8.84
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	7.52		7.52

Kimley»Horn

5. DESIGN YEAR (2040) CONCEPT 2 SIMTRAFFIC REPORTS

1: Site Access & TH 282 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.0	0.1	0.0
Total Del/Veh (s)	0.5	0.4	18.4	2.9	10.2	2.1

5: Creek Ln N & Triangle Ln N Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	9.7	8.8	3.0	8.7	10.6	5.0	2.2	1.0	0.2	3.0

8: CR 9 & CR 57/Valley View Drive Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.5	1.0	3.5	3.8	0.5	3.7	0.0	0.0	0.0	3.1	0.2	3.2
Total Del/Veh (s)	21.2	29.0	7.5	21.6	29.9	9.8	13.8	12.4	3.7	13.7	15.9	4.3

8: CR 9 & CR 57/Valley View Drive Performance by movement

Movement	All
Denied Del/Veh (s)	1.2
Total Del/Veh (s)	13.2

9: TH 282 & Triangle Ln N Performance by movement

Movement	EBT	WBT	WBR	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	1.0	0.9	0.8	0.4	10.1	1.4

17: CR 9 & TH 169 WB On/Off Ramp/Frontage Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.3	0.5	3.4	3.5	0.4	3.3	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	21.9	22.3	8.6	22.1	30.0	8.0	24.4	12.6	2.3	18.0	19.2	6.7

17: CR 9 & TH 169 WB On/Off Ramp/Frontage Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.6
Total Del/Veh (s)	16.1

29: TH 282/CR 9 & TH 169 EB Off Ramp Performance by movement

Movement	EBL	EBR	NBT	SBT	All
Denied Del/Veh (s)	3.3	1.0	0.0	0.0	0.5
Total Del/Veh (s)	44.3	15.4	3.9	9.9	12.1

Total Zone Performance

Denied Del/Veh (s)	2.2
Total Del/Veh (s)	30.9

Intersection: 1: Site Access & TH 282

Movement	EB	EB	WB	NB
Directions Served	T	R	L	R
Maximum Queue (ft)	4	18	70	77
Average Queue (ft)	0	1	26	35
95th Queue (ft)	3	11	60	65
Link Distance (ft)	239			195
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		135	200	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Creek Ln N & Triangle Ln N

Movement	EB	EB	WB	NB
Directions Served	L	TR	LTR	L
Maximum Queue (ft)	88	65	40	5
Average Queue (ft)	37	33	15	0
95th Queue (ft)	67	51	41	4
Link Distance (ft)	808	808	263	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				100
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: CR 9 & CR 57/Valley View Drive

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	R	L	T	T
Maximum Queue (ft)	127	79	166	121	66	58	153	367	78	58	141	133
Average Queue (ft)	59	26	66	60	21	18	71	126	27	25	73	62
95th Queue (ft)	101	62	123	108	54	44	129	268	58	51	126	113
Link Distance (ft)		784			908			652	652		1263	1263
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	250		250	300		300	300			275		
Storage Blk Time (%)			0					0				
Queuing Penalty (veh)			0					0				

Intersection: 8: CR 9 & CR 57/Valley View Drive

Movement	SB
Directions Served	R
Maximum Queue (ft)	44
Average Queue (ft)	15
95th Queue (ft)	34
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	275
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 9: TH 282 & Triangle Ln N

Movement	WB	SB
Directions Served	T	R
Maximum Queue (ft)	5	101
Average Queue (ft)	0	46
95th Queue (ft)	4	85
Link Distance (ft)	239	808
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 17: CR 9 & TH 169 WB On/Off Ramp/Frontage Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	190	29	80	146	51	33	246	322	210	40	55	192
Average Queue (ft)	80	3	41	64	22	9	102	133	50	8	20	102
95th Queue (ft)	147	17	70	114	49	30	199	264	144	27	46	167
Link Distance (ft)		1068			1045			745	745			652
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	275		275	250		250	300			300	275	
Storage Blk Time (%)	0							1	0			
Queuing Penalty (veh)	0							3	0			

Intersection: 17: CR 9 & TH 169 WB On/Off Ramp/Frontage Rd

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	192	76
Average Queue (ft)	111	29
95th Queue (ft)	169	61
Link Distance (ft)	652	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		275
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 29: TH 282/CR 9 & TH 169 EB Off Ramp

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	T	T	T	T
Maximum Queue (ft)	298	218	177	146	212	226
Average Queue (ft)	173	105	64	40	96	108
95th Queue (ft)	270	181	133	98	177	192
Link Distance (ft)		839	210	210	745	745
Upstream Blk Time (%)				0		
Queuing Penalty (veh)				0		
Storage Bay Dist (ft)	300					
Storage Blk Time (%)	0					
Queuing Penalty (veh)	1					

Zone Summary

Zone wide Queuing Penalty: 5

1: Site Access & TH 282 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.3	0.1	0.2	0.1
Total Del/Veh (s)	1.3	1.0	40.3	3.4	22.8	4.1

5: Creek Ln N & Triangle Ln N Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	8.9	7.4	3.6	7.6	8.7	3.7	2.6	1.3	0.6	2.8

8: CR 9 & CR 57/Valley View Drive Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.5	1.0	3.6	3.9	0.4	3.9	0.0	0.0	0.0	2.3	0.4	2.4
Total Del/Veh (s)	46.3	40.6	23.0	43.2	41.7	7.1	26.0	9.9	1.8	12.9	22.0	7.9

8: CR 9 & CR 57/Valley View Drive Performance by movement

Movement	All
Denied Del/Veh (s)	1.1
Total Del/Veh (s)	21.0

9: TH 282 & Triangle Ln N Performance by movement

Movement	EBT	WBT	WBR	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	1.8	2.4	1.1	0.3	22.3	2.7

17: CR 9 & TH 169 WB On/Off Ramp/Frontage Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.3	0.9	3.2	3.5	0.5	3.3	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	33.7	32.5	18.5	37.6	45.2	7.4	83.9	23.2	4.8	33.4	58.4	26.8

17: CR 9 & TH 169 WB On/Off Ramp/Frontage Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.6
Total Del/Veh (s)	43.8

29: TH 282/CR 9 & TH 169 EB Off Ramp Performance by movement

Movement	EBL	EBR	NBT	SBT	All
Denied Del/Veh (s)	3.5	0.5	0.0	0.0	0.1
Total Del/Veh (s)	49.7	28.6	6.5	12.4	13.3

Total Zone Performance

Denied Del/Veh (s)	1.6
Total Del/Veh (s)	58.2

Intersection: 1: Site Access & TH 282

Movement	EB	EB	EB	WB	WB	WB	NB
Directions Served	T	T	R	L	T	T	R
Maximum Queue (ft)	32	75	59	141	44	54	158
Average Queue (ft)	2	5	4	62	2	2	72
95th Queue (ft)	14	38	29	118	35	34	135
Link Distance (ft)	239	239			452	452	195
Upstream Blk Time (%)							0
Queuing Penalty (veh)							0
Storage Bay Dist (ft)			135	200			
Storage Blk Time (%)		0	0	0	0		
Queuing Penalty (veh)		0	0	0	0		

Intersection: 5: Creek Ln N & Triangle Ln N

Movement	EB	EB	WB	NB
Directions Served	L	TR	LTR	L
Maximum Queue (ft)	64	64	44	10
Average Queue (ft)	24	35	13	1
95th Queue (ft)	48	56	40	7
Link Distance (ft)	808	808	161	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				100
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: CR 9 & CR 57/Valley View Drive

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	R	L	T	T
Maximum Queue (ft)	163	244	278	83	83	57	233	256	27	142	364	394
Average Queue (ft)	63	39	121	33	36	19	114	94	3	38	178	192
95th Queue (ft)	125	138	229	66	73	41	199	211	14	103	315	347
Link Distance (ft)		784			908			652	652		1263	1263
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	250		250	300		300	300			275		
Storage Blk Time (%)		0	2								2	2
Queuing Penalty (veh)		0	2								2	3

Intersection: 8: CR 9 & CR 57/Valley View Drive

Movement	SB
Directions Served	R
Maximum Queue (ft)	203
Average Queue (ft)	25
95th Queue (ft)	96
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	275
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 9: TH 282 & Triangle Ln N

Movement	EB	WB	WB	WB	SB
Directions Served	T	T	T	R	R
Maximum Queue (ft)	6	140	121	25	144
Average Queue (ft)	0	20	10	2	55
95th Queue (ft)	5	107	80	26	126
Link Distance (ft)	210	239	239		808
Upstream Blk Time (%)		0	0		
Queuing Penalty (veh)		2	0		
Storage Bay Dist (ft)				100	
Storage Blk Time (%)			0		
Queuing Penalty (veh)			0		

Intersection: 17: CR 9 & TH 169 WB On/Off Ramp/Frontage Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	199	37	186	175	84	42	325	660	573	51	222	631
Average Queue (ft)	90	3	92	86	33	14	248	345	194	10	33	379
95th Queue (ft)	164	19	152	154	70	38	385	803	645	32	154	630
Link Distance (ft)		1068			1045			745	745			652
Upstream Blk Time (%)								4	1			2
Queuing Penalty (veh)								23	3			12
Storage Bay Dist (ft)	300		300	260		260	300			300	300	
Storage Blk Time (%)				0			23	0				20
Queuing Penalty (veh)				0			65	0				6

Intersection: 17: CR 9 & TH 169 WB On/Off Ramp/Frontage Rd

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	641	325
Average Queue (ft)	392	221
95th Queue (ft)	645	417
Link Distance (ft)	652	
Upstream Blk Time (%)	2	
Queuing Penalty (veh)	17	
Storage Bay Dist (ft)		300
Storage Blk Time (%)	20	0
Queuing Penalty (veh)	70	1

Intersection: 29: TH 282/CR 9 & TH 169 EB Off Ramp

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	T	T	T	T
Maximum Queue (ft)	208	282	200	194	427	438
Average Queue (ft)	61	148	98	52	145	157
95th Queue (ft)	145	246	223	169	343	360
Link Distance (ft)		839	210	210	745	745
Upstream Blk Time (%)			4	1		
Queuing Penalty (veh)			20	5		
Storage Bay Dist (ft)	300					
Storage Blk Time (%)		1				
Queuing Penalty (veh)		0				

Zone Summary

Zone wide Queuing Penalty: 234

Kimley»Horn

6. DESIGN YEAR (2040) CONCEPT 2 RODEL REPORTS

Scheme Summary

Control Data

Control Data and Model Parameters

TH 169 & 2nd St Interchange	2040 PHF Flow Profile (veh)
2nd St/Creek Ln 2040 AM peak hour	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
AM Peak Hour	Peak 60/15 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	50% Confidence Level

Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	Yes
Bypass Calibration	No
Global Results	Yes

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle ?
1	2nd St SB	0	0	24.00	2	28.00	2	164.00	66.00	30.00
2	Creek Ln EB	90	0	12.00	1	14.00	1	164.00	66.00	30.00
3	2nd St NB	180	0	24.00	2	28.00	2	164.00	66.00	30.00
4	Creek Ln WB	270	0	12.00	1	14.00	1	164.00	66.00	30.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	2nd St SB	164.00	15.00	1	28.00	2	24.00	2
2	Creek Ln EB	164.00	30.00	2	14.00	1	12.00	1
3	2nd St NB	164.00	15.00	1	14.00	1	12.00	1
4	Creek Ln WB	164.00	30.00	2	14.00	1	12.00	1

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	2nd St SB	0	1.000	0	1.000	24.00	3584	0	24.00	3584	0
2	Creek Ln EB	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
3	2nd St NB	0	1.000	0	1.000	20.00	3584	0	12.00	1792	0
4	Creek Ln WB	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0

Bypass Geometry

Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
1	2nd St SB	Yield	240	24	2	12	1	24	2

Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
1	2nd St SB	12	1	0	130	66.00005914	30	2	Creek Ln EB	1	2

Bypass Entry Capacity Modifiers and Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Calibration	
		Capacity + or -	Cross Walk Factor	Intercept + or -	Slope Factor
1	2nd St SB	0	1.000	0	1.000

Traffic Flow Data (veh/hr)

2040 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	2nd St SB	45	255	765	0	240	5.0	1.00	0.9
2	Creek Ln EB	0	170	100	60	0	5.0	1.00	0.9
3	2nd St NB	0	120	730	85	0	5.0	1.00	0.9
4	Creek Ln WB	0	75	15	20	0	5.0	1.00	0.9

Operational Results

2040 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	2nd St SB	Yield	1065	240	210	210	964	1985	952	0.5449	0.2561
2	Creek Ln EB	None	330		1140		375	693		0.4905	
3	2nd St NB	None	935		570		900	1632		0.5839	
4	Creek Ln WB	None	110		1064		440	720		0.1561	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	2nd St SB	Yield	4.88	5.00	4.90	4.64	1.03	A	A	A
2	Creek Ln EB	None	9.01		9.01	2.91		A		A
3	2nd St NB	None	5.31		5.31	4.79		A		A
4	Creek Ln WB	None	5.51		5.51	0.54		A		A

2040 AM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	2nd St SB	Yield	1183	267	233	233	1069	1963	941	0.6093	0.2865
2	Creek Ln EB	None	367		1265		416	649		0.5763	
3	2nd St NB	None	1039		631		998	1571		0.6690	
4	Creek Ln WB	None	122		1180		488	679		0.1821	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	2nd St SB	Yield	5.20	5.03	5.17	4.64	1.03	A	A	A
2	Creek Ln EB	None	10.04		10.04	2.91		B		B
3	2nd St NB	None	5.98		5.98	4.79		A		A
4	Creek Ln WB	None	5.68		5.68	0.54		A		A

Approach Flow Profile

2040 AM Peak - Approach Flows (Veh / Hour)

Time Slice	2nd St SB	Creek Ln EB	2nd St NB	Creek Ln WB
0.0 - 7.5	157.08	39.72	112.55	13.24
7.5 - 15.0	157.08	39.72	112.55	13.24
15.0 - 22.5	157.08	39.72	112.55	13.24
22.5 - 30.0	181.25	45.83	129.86	15.28
30.0 - 37.5	181.25	45.83	129.86	15.28
37.5 - 45.0	157.08	39.72	112.55	13.24
45.0 - 52.5	157.08	39.72	112.55	13.24
52.5 - 60.0	157.08	39.72	112.55	13.24
Peak 15 min	181.25	45.83	129.86	15.28
Peak 60 min	163.12	41.25	116.88	13.75

Exit Flow Profile

2040 AM Peak - Exit Flows (Veh / Hour)

Time Slice	2nd St SB	Creek Ln EB	2nd St NB	Creek Ln WB
0.0 - 7.5	115.96	45.06	108.19	52.88
7.5 - 15.0	116.15	45.14	108.33	52.96
15.0 - 22.5	116.16	45.14	108.33	52.96
22.5 - 30.0	133.30	51.92	124.55	60.82
30.0 - 37.5	134.00	52.08	124.99	61.10
37.5 - 45.0	116.52	45.25	108.56	53.11
45.0 - 52.5	116.17	45.14	108.34	52.97
52.5 - 60.0	116.16	45.14	108.33	52.96
0-60	964	375	900	440
%Trucks	5.00	5.00	5.00	5.00

Economics

Economic Input Data

2040 - Vehicle Delay Parameters

Peaks	Peak / Day	Days / Year	Delay Cost ($ / hour)
AM Peak	1	325	15.00
OFF Peak	14	325	15.00
PM Peak	1	325	15.00

2040 - Accident Severity Proportions and Costs

Accident Type	Proportion (%)	Cost ($)
Fatal Vehicle Accident	0.3	0
Incapacitating Vehicle Accident	17.7	0
Non-incapacitating Vehicle Accident	82	0
Damage Only Vehicle Accident	100	0
Pedestrian Injury Accident	100	0

Economics - Results Data

2040 Delay and Accident Costs

Delay Costs			Accident Costs			Total Costs	
Peak	Delays Veh.hrs	Costs ($)	Accident Types	Annual Accidents	Accident Costs	Cost Type	Costs ($/year)
AM	1348.31	20225	Vehicles Injury	0.00	0	Vehicle Delay Cost	20225
OFF	0.00	0	Vehicles DO	0.00	0	Vehicle Injury Acc Cost	0
PM	0.00	0	Pedestrians	0.00	0	Vehicle DO Acc Cost	0
						Pedestrian Accident Cost	0
						Total Accident Cost	0
Total	1348.31	20225	Totals	0.00	0	TOTAL COST	20225

Global Results

Performance and Accidents

2040 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	2440	240	2680
Capacity	veh/hr	5031	952	5983
Average Delay	sec/veh	5.63	5.00	5.57
L.O.S. (Signal)	A – F	A	A	A
L.O.S. (Unsig)	A – F	A	A	A
Total Delay	veh.hrs	3.82	0.33	4.15

Scheme Summary

Control Data

Control Data and Model Parameters

TH 169 & 2nd St Interchange	2040 PHF Flow Profile (veh)
2nd St/Creek Ln 2040 PM peak hour	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
PM Peak Hour	Peak 60/15 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	50% Confidence Level

Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	Yes
Bypass Calibration	No
Global Results	Yes

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle ?
1	2nd St SB	0	0	24.00	2	28.00	2	164.00	66.00	30.00
2	Creek Ln EB	90	0	12.00	1	14.00	1	164.00	66.00	30.00
3	2nd St NB	180	0	24.00	2	28.00	2	164.00	66.00	30.00
4	Creek Ln WB	270	0	12.00	1	14.00	1	164.00	66.00	30.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	2nd St SB	164.00	15.00	1	28.00	2	24.00	2
2	Creek Ln EB	164.00	30.00	2	14.00	1	12.00	1
3	2nd St NB	164.00	15.00	1	14.00	1	12.00	1
4	Creek Ln WB	164.00	30.00	2	14.00	1	12.00	1

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	2nd St SB	0	1.000	0	1.000	24.00	3584	0	24.00	3584	0
2	Creek Ln EB	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
3	2nd St NB	0	1.000	0	1.000	20.00	3584	0	12.00	1792	0
4	Creek Ln WB	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0

Bypass Geometry

Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
1	2nd St SB	Yield	410	24	2	12	1	24	2

Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
1	2nd St SB	12	1	0	130	66.0000887	30	2	Creek Ln EB	1	2

Bypass Entry Capacity Modifiers and Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Calibration	
		Capacity + or -	Cross Walk Factor	Intercept + or -	Slope Factor
1	2nd St SB	0	1.000	0	1.000

Traffic Flow Data (veh/hr)

2040 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	2nd St SB	85	325	980	0	410	5.0	1.00	0.9
2	Creek Ln EB	0	145	40	90	0	5.0	1.00	0.9
3	2nd St NB	0	100	840	95	0	5.0	1.00	0.9
4	Creek Ln WB	0	75	15	30	0	5.0	1.00	0.9

Operational Results

2040 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	2nd St SB	Yield	1390	410	190	190	1100	2005	962	0.7075	0.4343
2	Creek Ln EB	None	275		1465		525	578		0.4946	
3	2nd St NB	None	1035		595		1145	1607		0.6576	
4	Creek Ln WB	None	120		1170		460	683		0.1800	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	2nd St SB	Yield	7.13	6.44	6.97	9.31	2.33	A	A	A
2	Creek Ln EB	None	10.90		10.90	3.11		B		B
3	2nd St NB	None	6.17		6.17	6.44		A		A
4	Creek Ln WB	None	5.97		5.97	0.65		A		A

2040 PM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	2nd St SB	Yield	1544	456	211	211	1217	1985	952	0.7907	0.4852
2	Creek Ln EB	None	306		1622		582	522		0.5996	
3	2nd St NB	None	1150		658		1267	1545		0.7548	
4	Creek Ln WB	None	133		1295		509	638		0.2116	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	2nd St SB	Yield	8.10	6.69	7.78	9.31	2.33	A	A	A
2	Creek Ln EB	None	12.62		12.62	3.11		B		B
3	2nd St NB	None	7.22		7.22	6.44		A		A
4	Creek Ln WB	None	6.21		6.21	0.65		A		A

Approach Flow Profile

2040 PM Peak - Approach Flows (Veh / Hour)

Time Slice	2nd St SB	Creek Ln EB	2nd St NB	Creek Ln WB
0.0 - 7.5	216.67	33.10	124.58	14.44
7.5 - 15.0	216.67	33.10	124.58	14.44
15.0 - 22.5	216.67	33.10	124.58	14.44
22.5 - 30.0	250.00	38.19	143.75	16.67
30.0 - 37.5	250.00	38.19	143.75	16.67
37.5 - 45.0	216.67	33.10	124.58	14.44
45.0 - 52.5	216.67	33.10	124.58	14.44
52.5 - 60.0	216.67	33.10	124.58	14.44
Peak 15 min	250.00	38.19	143.75	16.67
Peak 60 min	225.00	34.38	129.38	15.00

Exit Flow Profile

2040 PM Peak - Exit Flows (Veh / Hour)

Time Slice	2nd St SB	Creek Ln EB	2nd St NB	Creek Ln WB
0.0 - 7.5	132.13	63.03	137.53	55.25
7.5 - 15.0	132.39	63.19	137.81	55.36
15.0 - 22.5	132.40	63.19	137.82	55.37
22.5 - 30.0	151.62	72.61	157.88	63.41
30.0 - 37.5	152.72	72.90	158.97	63.87
37.5 - 45.0	133.58	63.50	138.97	55.85
45.0 - 52.5	132.43	63.20	137.84	55.38
52.5 - 60.0	132.41	63.20	137.83	55.37
0-60	1100	525	1145	460
%Trucks	5.00	5.00	5.00	5.00

Economics

Economic Input Data

2040 - Vehicle Delay Parameters

Peaks	Peak / Day	Days / Year	Delay Cost ($ / hour)
AM Peak	1	325	15.00
OFF Peak	14	325	15.00
PM Peak	1	325	15.00

2040 - Accident Severity Proportions and Costs

Accident Type	Proportion (%)	Cost ($)
Fatal Vehicle Accident	0.3	0
Incapacitating Vehicle Accident	17.7	0
Non-incapacitating Vehicle Accident	82	0
Damage Only Vehicle Accident	100	0
Pedestrian Injury Accident	100	0

Economics - Results Data

2040 Delay and Accident Costs

Delay Costs			Accident Costs			Total Costs	
Peak	Delays Veh.hrs	Costs ($)	Accident Types	Annual Accidents	Accident Costs	Cost Type	Costs ($/year)
AM	0.00	0	Vehicles Injury	0.00	0	Vehicle Delay Cost	30666
OFF	0.00	0	Vehicles DO	0.00	0	Vehicle Injury Acc Cost	0
PM	2044.40	30666	Pedestrians	0.00	0	Vehicle DO Acc Cost	0
						Pedestrian Accident Cost	0
						Total Accident Cost	0
Total	2044.40	30666	Totals	0.00	0	TOTAL COST	30666

Global Results

Performance and Accidents

2040 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	2820	410	3230
Capacity	veh/hr	4873	962	5835
Average Delay	sec/veh	7.09	6.44	7.01
L.O.S. (Signal)	A – F	A	A	A
L.O.S. (Unsig)	A – F	A	A	A
Total Delay	veh.hrs	5.56	0.73	6.29

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7. DESIGN YEAR (2040) CONCEPT 3 SIMTRAFFIC REPORTS

1: Site Access & TH 282 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.1	0.0
Total Del/Veh (s)	0.5	0.4	11.0	2.5	7.9	1.8

5: Creek Ln N & Triangle Ln N Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	1.1	3.4	4.7	6.2	0.2	0.0	0.1	1.8

8: CR 9 & CR 57/Valley View Drive Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.5	1.1	3.5	3.7	0.7	3.8	0.0	0.0	0.0	3.1	0.2	3.1
Total Del/Veh (s)	22.4	29.3	8.0	22.0	30.5	8.8	15.7	12.9	3.7	15.3	16.0	4.3

8: CR 9 & CR 57/Valley View Drive Performance by movement

Movement	All
Denied Del/Veh (s)	1.3
Total Del/Veh (s)	14.0

9: TH 282 & Triangle Ln N Performance by movement

Movement	EBT	WBT	WBR	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	1.0	3.8	1.3	14.3	3.3

29: TH 282/CR 9 & TH 169 EB Off Ramp/TH 169 EB On Ramp Performance by movement

Movement	EBL	EBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.3	0.3	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	48.8	15.5	16.6	4.7	28.9	10.1	17.9

Total Zone Performance

Denied Del/Veh (s)	1.5
Total Del/Veh (s)	27.4

Intersection: 1: Site Access & TH 282

Movement	EB	WB	WB	WB	NB
Directions Served	R	L	T	T	R
Maximum Queue (ft)	17	73	6	6	75
Average Queue (ft)	0	20	0	0	33
95th Queue (ft)	4	54	5	4	59
Link Distance (ft)			452	452	195
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	135	200			
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: Creek Ln N & Triangle Ln N

Movement	EB	EB	WB	WB
Directions Served	T	R	L	T
Maximum Queue (ft)	31	55	39	30
Average Queue (ft)	5	33	8	4
95th Queue (ft)	24	50	31	21
Link Distance (ft)	807		147	147
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		150		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: CR 9 & CR 57/Valley View Drive

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	R	L	T	T
Maximum Queue (ft)	122	50	146	177	63	57	207	282	94	63	134	126
Average Queue (ft)	58	19	63	86	18	15	76	129	33	22	75	59
95th Queue (ft)	104	45	114	151	46	40	147	245	68	51	124	110
Link Distance (ft)		783			905			1153	1153		1263	1263
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	250		250	200		200	300			275		
Storage Blk Time (%)				0				0				
Queuing Penalty (veh)				0				0				

Intersection: 8: CR 9 & CR 57/Valley View Drive

Movement	SB
Directions Served	R
Maximum Queue (ft)	43
Average Queue (ft)	13
95th Queue (ft)	32
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	275
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 9: TH 282 & Triangle Ln N

Movement	EB	WB	WB	WB	SB
Directions Served	T	T	T	R	R
Maximum Queue (ft)	10	202	199	50	143
Average Queue (ft)	0	56	29	4	66
95th Queue (ft)	7	160	121	38	120
Link Distance (ft)	186	251	251		807
Upstream Blk Time (%)		0	0		
Queuing Penalty (veh)		1	0		
Storage Bay Dist (ft)				100	
Storage Blk Time (%)			1	0	
Queuing Penalty (veh)			1	0	

Intersection: 29: TH 282/CR 9 & TH 169 EB Off Ramp/TH 169 EB On Ramp

Movement	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	T	T	R	L	T	T
Maximum Queue (ft)	382	244	220	230	186	215	276	265
Average Queue (ft)	185	101	166	138	71	110	94	108
95th Queue (ft)	313	195	258	251	177	186	209	222
Link Distance (ft)	840	840	186	186			304	304
Upstream Blk Time (%)			13	5	0		0	0
Queuing Penalty (veh)			71	26	0		0	0
Storage Bay Dist (ft)					150	180		
Storage Blk Time (%)				7	0	1	1	
Queuing Penalty (veh)				15	1	5	3	

Zone Summary

Zone wide Queuing Penalty: 124

1: Site Access & TH 282 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.3	0.1	0.2	0.1
Total Del/Veh (s)	1.2	0.9	22.4	3.4	18.6	3.4

5: Creek Ln N & Triangle Ln N Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.0		0.0	0.0
Total Del/Veh (s)	0.7	3.4	3.9	5.1	4.8		2.5	3.6

8: CR 9 & CR 57/Valley View Drive Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.5	0.9	3.6	3.8	0.5	3.8	0.0	0.0	0.0	2.4	0.4	2.4
Total Del/Veh (s)	42.7	43.0	17.6	36.5	39.5	6.7	25.5	8.5	3.0	14.0	21.0	7.2

8: CR 9 & CR 57/Valley View Drive Performance by movement

Movement	All
Denied Del/Veh (s)	1.1
Total Del/Veh (s)	19.5

9: TH 282 & Triangle Ln N Performance by movement

Movement	EBT	WBT	WBR	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	1.1	3.4	2.3	25.7	3.2

29: TH 282/CR 9 & TH 169 EB Off Ramp/TH 169 EB On Ramp Performance by movement

Movement	EBL	EBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.2	0.3	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	50.4	25.9	10.6	2.7	25.6	6.9	12.3

Total Zone Performance

Denied Del/Veh (s)	1.2
Total Del/Veh (s)	27.8

Intersection: 1: Site Access & TH 282

Movement	EB	EB	EB	WB	WB	WB	NB
Directions Served	T	T	R	L	T	T	R
Maximum Queue (ft)	67	80	32	136	34	117	146
Average Queue (ft)	6	8	3	45	1	6	62
95th Queue (ft)	44	53	18	92	25	51	123
Link Distance (ft)	251	251			452	452	195
Upstream Blk Time (%)							0
Queuing Penalty (veh)							0
Storage Bay Dist (ft)			135	200			
Storage Blk Time (%)		0					
Queuing Penalty (veh)		0					

Intersection: 5: Creek Ln N & Triangle Ln N

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	R	L	T	L	R
Maximum Queue (ft)	31	67	30	30	70	21
Average Queue (ft)	4	36	9	5	34	3
95th Queue (ft)	20	55	31	23	60	15
Link Distance (ft)	807		147	147	413	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		150				150
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 8: CR 9 & CR 57/Valley View Drive

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	R	L	T	T
Maximum Queue (ft)	170	91	218	160	89	50	264	216	74	66	300	333
Average Queue (ft)	63	28	96	72	31	18	118	91	23	24	177	184
95th Queue (ft)	129	70	177	131	70	40	205	187	57	55	274	286
Link Distance (ft)		783			902			1152	1152		1263	1263
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	250		250	300		300	300			275		
Storage Blk Time (%)	0		0				0				1	1
Queuing Penalty (veh)	0		0				0				0	1

Intersection: 8: CR 9 & CR 57/Valley View Drive

Movement	SB
Directions Served	R
Maximum Queue (ft)	153
Average Queue (ft)	27
95th Queue (ft)	98
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	275
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 9: TH 282 & Triangle Ln N

Movement	WB	WB	WB	SB
Directions Served	T	T	R	R
Maximum Queue (ft)	192	259	124	170
Average Queue (ft)	23	48	11	69
95th Queue (ft)	117	173	68	135
Link Distance (ft)	251	251		807
Upstream Blk Time (%)	0	1		
Queuing Penalty (veh)	0	3		
Storage Bay Dist (ft)			100	
Storage Blk Time (%)		3	0	
Queuing Penalty (veh)		5	0	

Intersection: 29: TH 282/CR 9 & TH 169 EB Off Ramp/TH 169 EB On Ramp

Movement	EB	EB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	T	T	R	L	T	T
Maximum Queue (ft)	126	264	210	227	186	229	309	313
Average Queue (ft)	54	133	101	141	33	99	94	105
95th Queue (ft)	107	227	216	249	118	198	255	276
Link Distance (ft)	840	840	186	186			304	304
Upstream Blk Time (%)			4	7	0		0	1
Queuing Penalty (veh)			21	36	0		3	4
Storage Bay Dist (ft)					150	180		
Storage Blk Time (%)				10		2	3	
Queuing Penalty (veh)				11		10	5	

Zone Summary

Zone wide Queuing Penalty: 101

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8. DESIGN YEAR (2040) CONCEPT 3 RODEL REPORTS

Scheme Summary

Control Data

Control Data and Model Parameters

TH 169 & 2nd St Interchange	2040 PHF Flow Profile (veh)
2nd St/Creek Ln 2040 AM peak hour	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
AM Peak Hour	Peak 60/15 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	50% Confidence Level

Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	Yes
Bypass Calibration	No
Global Results	Yes

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle ?
1	2nd St SB	0	0	24.00	2	28.00	2	164.00	66.00	30.00
2	Creek Ln EB	90	0	12.00	1	14.00	1	164.00	66.00	30.00
3	2nd St NB	180	0	24.00	2	28.00	2	164.00	66.00	30.00
4	Creek Ln WB	270	0	12.00	1	14.00	1	164.00	66.00	30.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	2nd St SB	164.00	15.00	1	28.00	2	24.00	2
2	Creek Ln EB	164.00	30.00	2	14.00	1	12.00	1
3	2nd St NB	164.00	15.00	1	14.00	1	12.00	1
4	Creek Ln WB	164.00	30.00	2	14.00	1	12.00	1

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	2nd St SB	0	1.000	0	1.000	24.00	3584	0	24.00	3584	0
2	Creek Ln EB	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
3	2nd St NB	0	1.000	0	1.000	20.00	3584	0	12.00	1792	0
4	Creek Ln WB	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0

Bypass Geometry

Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
1	2nd St SB	Yield	240	24	2	12	1	24	2

Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
1	2nd St SB	12	1	0	130	66.00005914	30	2	Creek Ln EB	1	2

Bypass Entry Capacity Modifiers and Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Calibration	
		Capacity + or -	Cross Walk Factor	Intercept + or -	Slope Factor
1	2nd St SB	0	1.000	0	1.000

Traffic Flow Data (veh/hr)

2040 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	2nd St SB	45	50	765	0	240	5.0	1.00	0.9
2	Creek Ln EB	0	230	40	60	0	5.0	1.00	0.9
3	2nd St NB	0	120	780	30	0	5.0	1.00	0.9
4	Creek Ln WB	0	75	15	25	0	5.0	1.00	0.9

Operational Results

2040 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	2nd St SB	Yield	860	240	210	210	1080	1985	952	0.4385	0.2561
2	Creek Ln EB	None	330		935		375	766		0.4417	
3	2nd St NB	None	930		365		900	1833		0.5150	
4	Creek Ln WB	None	115		1175		120	681		0.1730	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	2nd St SB	Yield	3.27	5.00	3.65	2.48	1.03	A	A	A
2	Creek Ln EB	None	7.53		7.53	2.32		A		A
3	2nd St NB	None	4.13		4.13	3.50		A		A
4	Creek Ln WB	None	5.94		5.94	0.62		A		A

2040 AM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	2nd St SB	Yield	956	267	233	233	1199	1963	941	0.4903	0.2865
2	Creek Ln EB	None	367		1038		416	729		0.5111	
3	2nd St NB	None	1033		405		999	1794		0.5813	
4	Creek Ln WB	None	128		1304		133	635		0.2038	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	2nd St SB	Yield	3.40	5.03	3.76	2.48	1.03	A	A	A
2	Creek Ln EB	None	8.12		8.12	2.32		A		A
3	2nd St NB	None	4.43		4.43	3.50		A		A
4	Creek Ln WB	None	6.19		6.19	0.62		A		A

Approach Flow Profile

2040 AM Peak - Approach Flows (Veh / Hour)

Time Slice	2nd St SB	Creek Ln EB	2nd St NB	Creek Ln WB
0.0 - 7.5	132.41	39.72	111.94	13.84
7.5 - 15.0	132.41	39.72	111.94	13.84
15.0 - 22.5	132.41	39.72	111.94	13.84
22.5 - 30.0	152.78	45.83	129.17	15.97
30.0 - 37.5	152.78	45.83	129.17	15.97
37.5 - 45.0	132.41	39.72	111.94	13.84
45.0 - 52.5	132.41	39.72	111.94	13.84
52.5 - 60.0	132.41	39.72	111.94	13.84
Peak 15 min	152.78	45.83	129.17	15.97
Peak 60 min	137.50	41.25	116.25	14.38

Exit Flow Profile

2040 AM Peak - Exit Flows (Veh / Hour)

Time Slice	2nd St SB	Creek Ln EB	2nd St NB	Creek Ln WB
0.0 - 7.5	129.84	45.07	108.24	14.43
7.5 - 15.0	129.99	45.14	108.33	14.44
15.0 - 22.5	130.00	45.14	108.33	14.44
22.5 - 30.0	149.74	51.98	124.86	16.64
30.0 - 37.5	149.99	52.08	124.99	16.67
37.5 - 45.0	130.26	45.24	108.47	14.47
45.0 - 52.5	130.01	45.14	108.34	14.45
52.5 - 60.0	130.00	45.14	108.33	14.44
0-60	1080	375	900	120
%Trucks	5.00	5.00	5.00	5.00

Economics

Economic Input Data

2040 - Vehicle Delay Parameters

Peaks	Peak / Day	Days / Year	Delay Cost ($ / hour)
AM Peak	1	325	15.00
OFF Peak	14	325	15.00
PM Peak	1	325	15.00

2040 - Accident Severity Proportions and Costs

Accident Type	Proportion (%)	Cost ($)
Fatal Vehicle Accident	0.3	0
Incapacitating Vehicle Accident	17.7	0
Non-incapacitating Vehicle Accident	82	0
Damage Only Vehicle Accident	100	0
Pedestrian Injury Accident	100	0

Economics - Results Data

2040 Delay and Accident Costs

Delay Costs			Accident Costs			Total Costs	
Peak	Delays Veh.hrs	Costs ($)	Accident Types	Annual Accidents	Accident Costs	Cost Type	Costs ($/year)
AM	994.94	14924	Vehicles Injury	0.00	0	Vehicle Delay Cost	14924
OFF	0.00	0	Vehicles DO	0.00	0	Vehicle Injury Acc Cost	0
PM	0.00	0	Pedestrians	0.00	0	Vehicle DO Acc Cost	0
						Pedestrian Accident Cost	0
						Total Accident Cost	0
Total	994.94	14924	Totals	0.00	0	TOTAL COST	14924

Global Results

Performance and Accidents

2040 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	2235	240	2475
Capacity	veh/hr	5265	952	6217
Average Delay	sec/veh	4.39	5.00	4.45
L.O.S. (Signal)	A – F	A	A	A
L.O.S. (Unsig)	A – F	A	A	A
Total Delay	veh.hrs	2.73	0.33	3.06

Scheme Summary

Control Data

Control Data and Model Parameters

TH 169 & 2nd St Interchange	2040 PHF Flow Profile (veh)
2nd St/Creek Ln 2040 PM peak hour	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
PM Peak Hour	Peak 60/15 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	50% Confidence Level

Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	Yes
Bypass Calibration	No
Global Results	Yes

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle ?
1	2nd St SB	0	0	24.00	2	28.00	2	164.00	66.00	30.00
2	Creek Ln EB	90	0	12.00	1	14.00	1	164.00	66.00	30.00
3	2nd St NB	180	0	24.00	2	28.00	2	164.00	66.00	30.00
4	Creek Ln WB	270	0	12.00	1	14.00	1	164.00	66.00	30.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	2nd St SB	164.00	15.00	1	28.00	2	24.00	2
2	Creek Ln EB	164.00	30.00	2	14.00	1	12.00	1
3	2nd St NB	164.00	15.00	1	14.00	1	12.00	1
4	Creek Ln WB	164.00	30.00	2	14.00	1	12.00	1

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	2nd St SB	0	1.000	0	1.000	24.00	3584	0	24.00	3584	0
2	Creek Ln EB	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0
3	2nd St NB	0	1.000	0	1.000	20.00	3584	0	12.00	1792	0
4	Creek Ln WB	0	1.000	0	1.000	20.00	1792	0	12.00	1792	0

Bypass Geometry

Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
1	2nd St SB	Yield	410	24	2	12	1	24	2

Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
1	2nd St SB	12	1	0	130	66.00005491	30	2	Creek Ln EB	1	2

Bypass Entry Capacity Modifiers and Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Calibration	
		Capacity + or -	Cross Walk Factor	Intercept + or -	Slope Factor
1	2nd St SB	0	1.000	0	1.000

Traffic Flow Data (veh/hr)

2040 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows					Flow Modifiers		
		U-Turn	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	2nd St SB	85	85	1030	0	410	5.0	1.00	0.9
2	Creek Ln EB	0	155	30	90	0	5.0	1.00	0.9
3	2nd St NB	0	100	905	25	0	5.0	1.00	0.9
4	Creek Ln WB	0	75	15	35	0	5.0	1.00	0.9

Operational Results

2040 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	2nd St SB	Yield	1200	410	190	190	1180	2005	962	0.6075	0.4343
2	Creek Ln EB	None	275		1275		525	645		0.4398	
3	2nd St NB	None	1030		355		1195	1843		0.5676	
4	Creek Ln WB	None	125		1245		140	656		0.1955	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	2nd St SB	Yield	4.61	6.44	5.07	5.08	2.33	A	A	A
2	Creek Ln EB	None	8.91		8.91	2.40		A		A
3	2nd St NB	None	4.38		4.38	4.19		A		A
4	Creek Ln WB	None	6.33		6.33	0.72		A		A

2040 PM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	2nd St SB	Yield	1333	456	211	211	1310	1984	952	0.6788	0.4853
2	Creek Ln EB	None	306		1415		582	596		0.5233	
3	2nd St NB	None	1144		394		1326	1805		0.6403	
4	Creek Ln WB	None	139		1382		155	607		0.2318	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	2nd St SB	Yield	5.03	6.69	5.45	5.08	2.33	A	A	A
2	Creek Ln EB	None	9.93		9.93	2.40		A		A
3	2nd St NB	None	4.79		4.79	4.19		A		A
4	Creek Ln WB	None	6.65		6.65	0.72		A		A

Approach Flow Profile

2040 PM Peak - Approach Flows (Veh / Hour)

Time Slice	2nd St SB	Creek Ln EB	2nd St NB	Creek Ln WB
0.0 - 7.5	193.80	33.10	123.98	15.05
7.5 - 15.0	193.80	33.10	123.98	15.05
15.0 - 22.5	193.80	33.10	123.98	15.05
22.5 - 30.0	223.61	38.19	143.06	17.36
30.0 - 37.5	223.61	38.19	143.06	17.36
37.5 - 45.0	193.80	33.10	123.98	15.05
45.0 - 52.5	193.80	33.10	123.98	15.05
52.5 - 60.0	193.80	33.10	123.98	15.05
Peak 15 min	223.61	38.19	143.06	17.36
Peak 60 min	201.25	34.38	128.75	15.62

Exit Flow Profile

2040 PM Peak - Exit Flows (Veh / Hour)

Time Slice	2nd St SB	Creek Ln EB	2nd St NB	Creek Ln WB
0.0 - 7.5	141.84	63.03	143.65	16.83
7.5 - 15.0	142.03	63.19	143.83	16.85
15.0 - 22.5	142.04	63.19	143.84	16.85
22.5 - 30.0	163.55	72.68	165.64	19.40
30.0 - 37.5	163.87	72.90	165.95	19.44
37.5 - 45.0	142.37	63.42	144.17	16.90
45.0 - 52.5	142.05	63.20	143.85	16.85
52.5 - 60.0	142.04	63.20	143.84	16.85
0-60	1180	525	1195	140
%Trucks	5.00	5.00	5.00	5.00

Economics

Economic Input Data

2040 - Vehicle Delay Parameters

Peaks	Peak / Day	Days / Year	Delay Cost ($ / hour)
AM Peak	1	325	15.00
OFF Peak	14	325	15.00
PM Peak	1	325	15.00

2040 - Accident Severity Proportions and Costs

Accident Type	Proportion (%)	Cost ($)
Fatal Vehicle Accident	0.3	0
Incapacitating Vehicle Accident	17.7	0
Non-incapacitating Vehicle Accident	82	0
Damage Only Vehicle Accident	100	0
Pedestrian Injury Accident	100	0

Economics - Results Data

2040 Delay and Accident Costs

Delay Costs			Accident Costs			Total Costs	
Peak	Delays Veh.hrs	Costs ($)	Accident Types	Annual Accidents	Accident Costs	Cost Type	Costs ($/year)
AM	0.00	0	Vehicles Injury	0.00	0	Vehicle Delay Cost	21569
OFF	0.00	0	Vehicles DO	0.00	0	Vehicle Injury Acc Cost	0
PM	1437.96	21569	Pedestrians	0.00	0	Vehicle DO Acc Cost	0
						Pedestrian Accident Cost	0
						Total Accident Cost	0
Total	1437.96	21569	Totals	0.00	0	TOTAL COST	21569

Global Results

Performance and Accidents

2040 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	2630	410	3040
Capacity	veh/hr	5149	962	6111
Average Delay	sec/veh	5.05	6.44	5.24
L.O.S. (Signal)	A – F	A	A	A
L.O.S. (Unsig)	A – F	A	A	A
Total Delay	veh.hrs	3.69	0.73	4.42

Scheme Summary

Control Data

Control Data and Model Parameters

TH 169 & 2nd St Interchange	2040 PHF Flow Profile (veh)
WB ramps/2nd St/Frontage Rd 2040 AM Peak	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
AM Peak Hour	Peak 60/15 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	50% Confidence Level

Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	No
Bypass Calibration	No
Global Results	Yes

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle ?
1	2nd St SB	0	0	24.00	2	28.00	2	131.00	66.00	30.00
2	WB on ramp	90	0	12.00	1	14.00	1	131.00	66.00	30.00
3	2nd St NB	180	0	24.00	2	28.00	2	131.00	66.00	30.00
4	WB off ramp	270	0	24.00	2	28.00	2	131.00	66.00	30.00
5	Frontage SWB	315	0	12.00	1	14.00	1	131.00	66.00	30.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	2nd St SB	230.00	30.00	2	14.00	1	12.00	1
2	WB on ramp	230.00	30.00	2	14.00	1	12.00	1
3	2nd St NB	230.00	15.00	1	28.00	2	24.00	2
4	WB off ramp	230.00	30.00	2	14.00	1	12.00	1
5	Frontage SWB	230.00	30.00	2	14.00	1	12.00	1

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	2nd St SB	0	1.000	0	1.000	24.00	3584	0	12.00	1792	0
2	WB on ramp	0	1.000	0	1.000	24.00	1792	0	12.00	1792	0
3	2nd St NB	0	1.000	0	1.000	24.00	3584	0	24.00	3584	0
4	WB off ramp	0	1.000	0	1.000	24.00	3584	0	12.00	1792	0
5	Frontage SWB	0	1.000	0	1.000	24.00	1792	0	12.00	1792	0

Traffic Flow Data (veh/hr)

2040 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows						Flow Modifiers		
		U-Turn	Exit-4	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	2nd St SB	0	30	0	700	150	0	5.0	1.00	0.9
2	WB on ramp	0	0	0	0	1	0	5.0	1.00	0.9
3	2nd St NB	0	280	770	110	0	0	5.0	1.00	0.9
4	WB off ramp	0	110	0	170	5	0	5.0	1.00	0.9
5	Frontage SWB	0	0	130	25	10	0	5.0	1.00	0.9

Operational Results

2040 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	2nd St SB	None	880		545		950	1869		0.4776	
2	WB on ramp	None	1		970		455	812		0.0013	
3	2nd St NB	None	1160		30		941	2165		0.5430	
4	WB off ramp	None	285		1190		0	1490		0.1950	
5	Frontage SWB	None	165		1330		145	759		0.2222	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	2nd St SB	None	3.98		3.98	3.14		A		A
2	WB on ramp	None	0.00		0.00	0.00		A		A
3	2nd St NB	None	4.22		4.22	4.30		A		A
4	WB off ramp	None	4.55		4.55	1.15		A		A
5	Frontage SWB	None	5.64		5.64	0.84		A		A

2040 AM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	2nd St SB	None	978		605		1055	1834		0.5378	
2	WB on ramp	None	1		1077		505	780		0.0014	
3	2nd St NB	None	1289		33		1045	2162		0.6015	
4	WB off ramp	None	317		1321		0	1413		0.2264	
5	Frontage SWB	None	183		1477		161	715		0.2597	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	2nd St SB	None	4.21		4.21	3.14		A		A
2	WB on ramp	None	0.00		0.00	0.00		A		A
3	2nd St NB	None	4.44		4.44	4.30		A		A
4	WB off ramp	None	4.70		4.70	1.15		A		A
5	Frontage SWB	None	5.88		5.88	0.84		A		A

Approach Flow Profile

2040 AM Peak - Approach Flows (Veh / Hour)

Time Slice	2nd St SB	WB on ramp	2nd St NB	WB off ramp	Frontage SWB
0.0 - 7.5	105.93	0.12	139.63	34.31	19.86
7.5 - 15.0	105.93	0.12	139.63	34.31	19.86
15.0 - 22.5	105.93	0.12	139.63	34.31	19.86
22.5 - 30.0	122.22	0.14	161.11	39.58	22.92
30.0 - 37.5	122.22	0.14	161.11	39.58	22.92
37.5 - 45.0	105.93	0.12	139.63	34.31	19.86
45.0 - 52.5	105.93	0.12	139.63	34.31	19.86
52.5 - 60.0	105.93	0.12	139.63	34.31	19.86
Peak 15 min	122.22	0.14	161.11	39.58	22.92
Peak 60 min	110.00	0.12	145.00	35.63	20.63

Exit Flow Profile

2040 AM Peak - Exit Flows (Veh / Hour)

Time Slice	2nd St SB	WB on ramp	2nd St NB	WB off ramp	Frontage SWB
0.0 - 7.5	114.24	54.71	113.15	0.00	17.44
7.5 - 15.0	114.35	54.77	113.26	0.00	17.45
15.0 - 22.5	114.35	54.77	113.27	0.00	17.45
22.5 - 30.0	131.77	63.11	130.52	0.00	20.11
30.0 - 37.5	131.94	63.19	130.69	0.00	20.14
37.5 - 45.0	114.52	54.85	113.44	0.00	17.48
45.0 - 52.5	114.36	54.77	113.27	0.00	17.45
52.5 - 60.0	114.35	54.77	113.27	0.00	17.45
0-60	950	455	941	0	145
%Trucks	5.00	5.00	5.00	0.00	5.00

Economics

Economic Input Data

2040 - Vehicle Delay Parameters

Peaks	Peak / Day	Days / Year	Delay Cost ($ / hour)
AM Peak	1	325	15.00
OFF Peak	14	325	15.00
PM Peak	1	325	15.00

2040 - Accident Severity Proportions and Costs

Accident Type	Proportion (%)	Cost ($)
Fatal Vehicle Accident	0.3	0
Incapacitating Vehicle Accident	17.7	0
Non-incapacitating Vehicle Accident	82	0
Damage Only Vehicle Accident	100	0
Pedestrian Injury Accident	100	0

Economics - Results Data

2040 Delay and Accident Costs

Delay Costs			Accident Costs			Total Costs	
Peak	Delays Veh.hrs	Costs ($)	Accident Types	Annual Accidents	Accident Costs	Cost Type	Costs ($/year)
AM	958.87	14383	Vehicles Injury	0.00	0	Vehicle Delay Cost	14383
OFF	0.00	0	Vehicles DO	0.00	0	Vehicle Injury Acc Cost	0
PM	0.00	0	Pedestrians	0.00	0	Vehicle DO Acc Cost	0
						Pedestrian Accident Cost	0
						Total Accident Cost	0
Total	958.87	14383	Totals	0.00	0	TOTAL COST	14383

Global Results

Performance and Accidents

2040 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	2491		2491
Capacity	veh/hr	7095		7095
Average Delay	sec/veh	4.26		4.26
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	2.95		2.95

Scheme Summary

Control Data

Control Data and Model Parameters

TH 169 & 2nd St Interchange	2040 PHF Flow Profile (veh)
WB ramps/2nd St/Frontage Rd 2040 PM Peak	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
PM Peak Hour	Peak 60/15 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	50% Confidence Level

Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	No
Bypass Calibration	No
Global Results	Yes

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle ?
1	2nd St SB	0	0	24.00	2	28.00	2	131.00	66.00	30.00
2	WB on ramp	90	0	12.00	1	14.00	1	131.00	66.00	30.00
3	2nd St NB	180	0	24.00	2	28.00	2	131.00	66.00	30.00
4	WB off ramp	270	0	24.00	2	28.00	2	131.00	66.00	30.00
5	Frontage SWB	315	0	12.00	1	14.00	1	131.00	66.00	30.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	2nd St SB	230.00	30.00	2	28.00	2	24.00	2
2	WB on ramp	230.00	30.00	2	14.00	1	12.00	1
3	2nd St NB	230.00	15.00	1	28.00	2	24.00	2
4	WB off ramp	230.00	30.00	2	14.00	1	12.00	1
5	Frontage SWB	230.00	30.00	2	14.00	1	12.00	1

Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	2nd St SB	0	1.000	0	1.000	24.00	3584	0	24.00	3584	0
2	WB on ramp	0	1.000	0	1.000	24.00	1792	0	12.00	1792	0
3	2nd St NB	0	1.000	0	1.000	24.00	3584	0	24.00	3584	0
4	WB off ramp	0	1.000	0	1.000	24.00	3584	0	12.00	1792	0
5	Frontage SWB	0	1.000	0	1.000	24.00	1792	0	12.00	1792	0

Traffic Flow Data (veh/hr)

2040 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows						Flow Modifiers		
		U-Turn	Exit-4	Exit-3	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor	Peak Hour Factor
1	2nd St SB	0	30	0	1075	350	0	5.0	1.00	0.9
2	WB on ramp	0	0	0	0	1	0	5.0	1.00	0.9
3	2nd St NB	0	370	555	110	0	0	5.0	1.00	0.9
4	WB off ramp	0	220	0	160	5	0	5.0	1.00	0.9
5	Frontage SWB	0	0	130	40	20	0	5.0	1.00	0.9

Operational Results

2040 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	2nd St SB	None	1455		760		735	1743		0.8649	
2	WB on ramp	None	1		1454		760	669		0.0015	
3	2nd St NB	None	1035		30		1426	2165		0.4847	
4	WB off ramp	None	385		1065		0	1563		0.2510	
5	Frontage SWB	None	190		1305		145	767		0.2533	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	2nd St SB	None	13.37		13.37	22.16		B		B
2	WB on ramp	None	0.00		0.00	0.00		A		A
3	2nd St NB	None	4.48		4.48	3.99		A		A
4	WB off ramp	None	4.95		4.95	1.68		A		A
5	Frontage SWB	None	5.79		5.79	1.00		A		A

2040 PM Peak - 15 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	2nd St SB	None	1617		843		816	1694		0.9852	
2	WB on ramp	None	1		1599		838	626		0.0018	
3	2nd St NB	None	1150		33		1567	2163		0.5368	
4	WB off ramp	None	428		1181		0	1495		0.2892	
5	Frontage SWB	None	211		1448		160	723		0.2955	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	2nd St SB	None	18.01		18.01	22.16		C		C
2	WB on ramp	None	0.00		0.00	0.00		A		A
3	2nd St NB	None	4.63		4.63	3.99		A		A
4	WB off ramp	None	5.12		5.12	1.68		A		A
5	Frontage SWB	None	6.06		6.06	1.00		A		A

Approach Flow Profile

2040 PM Peak - Approach Flows (Veh / Hour)

Time Slice	2nd St SB	WB on ramp	2nd St NB	WB off ramp	Frontage SWB
0.0 - 7.5	175.14	0.12	124.58	46.34	22.87
7.5 - 15.0	175.14	0.12	124.58	46.34	22.87
15.0 - 22.5	175.14	0.12	124.58	46.34	22.87
22.5 - 30.0	202.08	0.14	143.75	53.47	26.39
30.0 - 37.5	202.08	0.14	143.75	53.47	26.39
37.5 - 45.0	175.14	0.12	124.58	46.34	22.87
45.0 - 52.5	175.14	0.12	124.58	46.34	22.87
52.5 - 60.0	175.14	0.12	124.58	46.34	22.87
Peak 15 min	202.08	0.14	143.75	53.47	26.39
Peak 60 min	181.88	0.12	129.38	48.13	23.75

Exit Flow Profile

2040 PM Peak - Exit Flows (Veh / Hour)

Time Slice	2nd St SB	WB on ramp	2nd St NB	WB off ramp	Frontage SWB
0.0 - 7.5	88.38	91.24	171.02	0.00	17.42
7.5 - 15.0	88.47	91.46	171.59	0.00	17.45
15.0 - 22.5	88.47	91.47	171.63	0.00	17.45
22.5 - 30.0	101.82	104.21	194.21	0.00	20.00
30.0 - 37.5	102.08	105.39	197.55	0.00	20.12
37.5 - 45.0	88.73	93.03	176.10	0.00	17.61
45.0 - 52.5	88.48	91.51	171.72	0.00	17.46
52.5 - 60.0	88.47	91.49	171.67	0.00	17.45
0-60	735	760	1426	0	145
%Trucks	5.00	5.00	5.00	0.00	5.00

Economics

Economic Input Data

2040 - Vehicle Delay Parameters

Peaks	Peak / Day	Days / Year	Delay Cost ($ / hour)
AM Peak	1	325	15.00
OFF Peak	14	325	15.00
PM Peak	1	325	15.00

2040 - Accident Severity Proportions and Costs

Accident Type	Proportion (%)	Cost ($)
Fatal Vehicle Accident	0.3	0
Incapacitating Vehicle Accident	17.7	0
Non-incapacitating Vehicle Accident	82	0
Damage Only Vehicle Accident	100	0
Pedestrian Injury Accident	100	0

Economics - Results Data

2040 Delay and Accident Costs

Delay Costs			Accident Costs			Total Costs	
Peak	Delays Veh.hrs	Costs ($)	Accident Types	Annual Accidents	Accident Costs	Cost Type	Costs ($/year)
AM	0.00	0	Vehicles Injury	0.00	0	Vehicle Delay Cost	36683
OFF	0.00	0	Vehicles DO	0.00	0	Vehicle Injury Acc Cost	0
PM	2445.53	36683	Pedestrians	0.00	0	Vehicle DO Acc Cost	0
						Pedestrian Accident Cost	0
						Total Accident Cost	0
Total	2445.53	36683	Totals	0.00	0	TOTAL COST	36683

Global Results

Performance and Accidents

2040 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	3066		3066
Capacity	veh/hr	6908		6908
Average Delay	sec/veh	8.84		8.84
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	7.52		7.52

APPENDIX F – PRELIMINARY COST ESTIMATES

PRELIMINARY COST ESTIMATE - OPTION 1 (ROUNDABOUT/SPLIT DIAMOND)

Project: TH 169/TH 282/CR 9 INTERCHANGE CONCEPT DESIGN
Owner: CITY OF JORDAN
Date: OCTOBER 2018

Item No.	Item Description	Unit	Quantity	Unit Price	Amount
1	MOBILIZATION	LUMP SUM	1	$ 830,000	$ 830,000
2	CLEARING	ACRE	10	$ 3,000	$ 30,000
3	GRUBBING	ACRE	10	$ 2,500	$ 25,000
4	MISCELLANEOUS REMOVALS	LUMP SUM	1	$ 150,000	$ 150,000
5	REMOVE DOUBLE BOX CULVERT	LUMP SUM	1	$ 30,000	$ 30,000
6	SAWING BIT PAVEMENT (FULL DEPTH)	LIN FT	7700	$ 5	$ 38,500
7	REMOVE CURB & GUTTER	LIN FT	10000	$ 3	$ 30,000
8	REMOVE CONCRETE WALK	SQ YD	2800	$ 6	$ 16,800
9	REMOVE BITUMINOUS PAVEMENT	SQ YD	41600	$ 3	$ 124,800
10	REMOVE TRAFFIC SIGNAL	EACH	1	$ 15,000	$ 15,000
11	SELECT GRANULAR BORROW (CV)	CU YD	36200	$ 15	$ 543,000
12	EXCAVATION - COMMON	CU YD	18200	$ 6	$ 109,200
13	COMMON EMBANKMENT (CV)	CU YD	118300	$ 6	$ 709,800
14	AGGREGATE BASE (CV) CLASS 5	CU YD	22100	$ 22	$ 486,200
15	CONCRETE PAVEMENT 9"	SQ YD	1150	$ 60	$ 69,000
16	BITUMINOUS TRAIL	SQ FT	68500	$ 2	$ 137,000
17	BITUMINOUS NON WEAR COURSE MIX (ROADWAY)	TON	9900	$ 60	$ 594,000
18	BITUMINOUS WEARING COURSE MIX (ROADWAY)	TON	12700	$ 65	$ 825,500
19	BRIDGE	SQ FT	16600	$ 225	$ 3,735,000
20	SAND CREEK BRIDGE WIDENING	LUMP SUM	1	$ 945,000	$ 945,000
21	MODULAR BLOCK RETAINING WALL	SQ FT	12000	$ 45	$ 540,000
22	MSE RETAINING WALL	SQ FT	34000	$ 70	$ 2,380,000
23	10'X8' PRECAST CONCRETE DOUBLE BOX CULVERT	LIN FT	560	$ 2,500	$ 1,400,000
24	EXTEND 12'X8' CONCRETE BOX CULVERT	LIN FT	60	$ 5,000	$ 300,000
25	DRAINAGE/STORMWATER	LUMP SUM	1	$ 700,000	$ 700,000
26	6" CONCRETE WALK	SQ FT	2700	$ 5	$ 13,500
27	CONCRETE CURB & GUTTER DESIGN B618	LIN FT	15300	$ 15	$ 229,500
28	CONCRETE CURB & GUTTER DESIGN B424	LIN FT	3700	$ 20	$ 74,000
29	48" CHAIN LINK FENCE	LIN FT	1600	$ 20	$ 32,000
30	RAILROAD CROSSING REPLACEMENT	LUMP SUM	1	$ 850,000	$ 850,000
31	TRAFFIC CONTROL	LUMP SUM	1	$ 150,000	$ 150,000
32	EROSION CONTROL	LUMP SUM	1	$ 200,000	$ 200,000
33	TURF ESTABLISHMENT	ACRE	10	$ 6,000	$ 60,000
34	TRAFFIC SIGNAL SYSTEM	EACH	2	$ 300,000	$ 600,000
35	SIGNING/STRIPING	LUMP SUM	1	$ 100,000	$ 100,000
36	LIGHTING	LUMP SUM	1	$ 300,000	$ 300,000
				SUBTOTAL	$ 17,400,000
				20% CONTINGENCY	$ 3,480,000
				TOTAL ESTIMATED CONSTRUCTION	$ 20,880,000
				20% INDIRECT COSTS	$ 4,176,000
				ESTIMATED RIGHT-OF-WAY/EASEMENT ACQUISITION	$ 1,000,000
				WETLAND REPLACEMENT COST	$ 850,000
				TOTAL ESTIMATED PROJECT COST	**$ 26,910,000**

NOTES:

1. NO WATERMAIN OR SANITARY SEWER IMPROVEMENTS INCLUDED.
2. INCLUDES NO SOIL CORRECTION COSTS. NO GEOTECHNICAL EXPLORATION WAS COMPLETED FOR THE CONCEPTUAL DESIGN.
3. WETLAND IMPACTS BASED ON NWI. WETLAND MITIGATION RATIO 2.5:1. ASSUMED PURCHASE OF BANK CREDITS REQUIRED AT $2.50/SF.
4. PAVEMENT SECTION FOR TRIANGLE LANE INCLUDES 2" BITUMINOUS WEAR, 2" NON-WEAR, AND 12" CLASS 5 AGGREGATE BASE.
5. PAVEMENT SECTION FOR CREEK LANE INCLUDES 2" BIT. WEAR, 2.5" NON-WEAR, 10" CLASS 5, AND 12" SELECT GRANULAR.
6. TH 282, CR 9 & RAMP PAVEMENT SECTION INCLUDES 4" BIT. WEAR, 3" NON-WEAR, 12" CLASS 5, AND 24" SELECT GRANULAR.
7. ASSUMES THAT FLOODPLAIN LOSS CAN BE MITIGATED ON-SITE.

PRELIMINARY COST ESTIMATE - OPTION 1A (OPTION 1 PLUS RR OVERPASS)

Project: TH 169/TH 282/CR 9 INTERCHANGE CONCEPT DESIGN
Owner: CITY OF JORDAN
Date: OCTOBER 2018

Item No.	Item Description	Unit	Quantity	Unit Price	Amount
1	MOBILIZATION	LUMP SUM	1	$ 990,000	$ 990,000
2	CLEARING	ACRE	11	$ 3,000	$ 33,000
3	GRUBBING	ACRE	11	$ 2,500	$ 27,500
4	MISCELLANEOUS REMOVALS	LUMP SUM	1	$ 150,000	$ 150,000
5	REMOVE DOUBLE BOX CULVERT	LUMP SUM	1	$ 30,000	$ 30,000
6	SAWING BIT PAVEMENT (FULL DEPTH)	LIN FT	7700	$ 5	$ 38,500
7	REMOVE CURB & GUTTER	LIN FT	10000	$ 3	$ 30,000
8	REMOVE CONCRETE WALK	SQ YD	2800	$ 6	$ 16,800
9	REMOVE BITUMINOUS PAVEMENT	SQ YD	41600	$ 3	$ 124,800
10	REMOVE TRAFFIC SIGNAL	EACH	1	$ 15,000	$ 15,000
11	SELECT GRANULAR BORROW (CV)	CU YD	36200	$ 15	$ 543,000
12	EXCAVATION - COMMON	CU YD	20400	$ 6	$ 122,400
13	COMMON EMBANKMENT (CV)	CU YD	262800	$ 6	$ 1,576,800
14	AGGREGATE BASE (CV) CLASS 5	CU YD	22100	$ 22	$ 486,200
15	CONCRETE PAVEMENT 9"	SQ YD	1150	$ 60	$ 69,000
16	BITUMINOUS TRAIL	SQ FT	68500	$ 2	$ 137,000
17	BITUMINOUS NON WEAR COURSE MIX (ROADWAY)	TON	9900	$ 60	$ 594,000
18	BITUMINOUS WEARING COURSE MIX (ROADWAY)	TON	12700	$ 65	$ 825,500
19	BRIDGE	SQ FT	28600	$ 225	$ 6,435,000
20	SAND CREEK BRIDGE WIDENING	LS	1	$ 945,000	$ 945,000
21	MODULAR BLOCK RETAINING WALL	SQ FT	13000	$ 45	$ 585,000
22	MSE RETAINING WALL	SQ FT	40000	$ 70	$ 2,800,000
23	10'X8' PRECAST CONCRETE DOUBLE BOX CULVERT	LIN FT	560	$ 2,500	$ 1,400,000
24	EXTEND 12'X8' CONCRETE BOX CULVERT	LIN FT	60	$ 5,000	$ 300,000
25	DRAINAGE/STORMWATER	LS	1	$ 700,000	$ 700,000
26	6" CONCRETE WALK	SQ FT	2700	$ 5	$ 13,500
27	CONCRETE CURB & GUTTER DESIGN B618	LIN FT	15300	$ 15	$ 229,500
28	CONCRETE CURB & GUTTER DESIGN B424	LIN FT	3700	$ 20	$ 74,000
29	48" CHAIN LINK FENCE	LIN FT	1600	$ 20	$ 32,000
30	TRAFFIC CONTROL	LUMP SUM	1	$ 150,000	$ 150,000
31	EROSION CONTROL	LUMP SUM	1	$ 200,000	$ 200,000
32	TURF ESTABLISHMENT	ACRE	11.0	$ 6,000	$ 66,000
33	TRAFFIC SIGNAL SYSTEM	EACH	2	$ 300,000	$ 600,000
34	SIGNING/STRIPING	LUMP SUM	1	$ 100,000	$ 100,000
35	LIGHTING	LUMP SUM	1	$ 300,000	$ 300,000
			SUBTOTAL		$ 20,800,000
			20% CONTINGENCY		$ 4,160,000
			TOTAL ESTIMATED CONSTRUCTION		$ 24,960,000
			20% INDIRECT COSTS		$ 4,992,000
			ESTIMATED RIGHT-OF-WAY/EASEMENT ACQUISITION		$ 1,000,000
			WETLAND REPLACEMENT COST		$ 850,000
			TOTAL ESTIMATED PROJECT COST		**$ 31,810,000**

NOTES:

1. NO WATERMAIN OR SANITARY SEWER IMPROVEMENTS INCLUDED.
2. INCLUDES NO SOIL CORRECTION COSTS. NO GEOTECHNICAL EXPLORATION WAS COMPLETED FOR THE CONCEPTUAL DESIGN.
3. WETLAND IMPACTS BASED ON NWI. WETLAND MITIGATION RATIO 2.5:1. ASSUMED PURCHASE OF BANK CREDITS REQUIRED AT $2.50/SF.
4. PAVEMENT SECTION FOR TRIANGLE LANE INCLUDES 2" BITUMINOUS WEAR, 2" NON-WEAR, AND 12" CLASS 5 AGGREGATE BASE.
5. PAVEMENT SECTION FOR CREEK LANE INCLUDES 2" BIT. WEAR, 2.5" NON-WEAR, 10" CLASS 5, AND 12" SELECT GRANULAR.
6. TH 282, CR 9 & RAMP PAVEMENT SECTION INCLUDES 4" BIT. WEAR, 3" NON-WEAR, 12" CLASS 5, AND 24" SELECT GRANULAR.
7. ASSUMES THAT FLOODPLAIN LOSS CAN BE MITIGATED ON-SITE.

PRELIMINARY COST ESTIMATE - OPTION 2 (ROUNDABOUT/SPLIT DIAMOND)

Project: TH 169/TH 282/CR 9 INTERCHANGE CONCEPT DESIGN
Owner: CITY OF JORDAN
Date: OCTOBER 2018

Item No.	Item Description	Unit	Quantity	Unit Price	Amount
1	MOBILIZATION	LUMP SUM	1	$ 1,130,000	$ 1,130,000
2	CLEARING	ACRE	11	$ 3,000	$ 33,000
3	GRUBBING	ACRE	11	$ 2,500	$ 27,500
4	MISCELLANEOUS REMOVALS	LUMP SUM	1	$ 150,000	$ 150,000
5	REMOVE DOUBLE BOX CULVERT	LS	1	$ 30,000	$ 30,000
6	SAWING BIT PAVEMENT (FULL DEPTH)	LIN FT	9100	$ 5	$ 45,500
7	REMOVE CURB & GUTTER	LIN FT	10000	$ 3	$ 30,000
8	REMOVE CONCRETE WALK	SQ YD	2800	$ 6	$ 16,800
9	REMOVE BITUMINOUS PAVEMENT	SQ YD	41600	$ 3	$ 124,800
10	REMOVE TRAFFIC SIGNAL	EACH	1	$ 15,000	$ 15,000
11	SELECT GRANULAR BORROW (CV)	CU YD	37700	$ 15	$ 565,500
12	EXCAVATION - COMMON	CU YD	17000	$ 6	$ 102,000
13	COMMON EMBANKMENT (CV)	CU YD	453200	$ 6	$ 2,719,200
14	AGGREGATE BASE (CV) CLASS 5	CU YD	22700	$ 22	$ 499,400
15	CONCRETE PAVEMENT 9"	SQ YD	290	$ 60	$ 17,400
16	BITUMINOUS TRAIL	SQ FT	64000	$ 2	$ 128,000
17	BITUMINOUS NON WEAR COURSE MIX (ROADWAY)	TON	10300	$ 60	$ 618,000
18	BITUMINOUS WEARING COURSE MIX (ROADWAY)	TON	13300	$ 65	$ 864,500
19	BRIDGE	SQ FT	31700	$ 225	$ 7,132,500
20	SAND CREEK BRIDGE WIDENING	LS	1	$ 945,000	$ 945,000
21	MODULAR BLOCK RETAINING WALL	SQ FT	5000	$ 45	$ 225,000
22	MSE RETAINING WALL	SQ FT	36000	$ 70	$ 2,520,000
23	10'X8' PRECAST CONCRETE DOUBLE BOX CULVERT	LIN FT	980	$ 2,500	$ 2,450,000
24	EXTEND 12'X8' CONCRETE BOX CULVERT	LIN FT	60	$ 5,000	$ 300,000
25	DRAINAGE/STORMWATER	LS	1	$ 800,000	$ 800,000
26	6" CONCRETE WALK	SQ FT	2300	$ 5	$ 11,500
27	CONCRETE CURB & GUTTER DESIGN B618	LIN FT	16900	$ 15	$ 253,500
28	CONCRETE CURB & GUTTER DESIGN B424	LIN FT	3700	$ 20	$ 74,000
29	48" CHAIN LINK FENCE	LIN FT	1200	$ 20	$ 24,000
30	TRAFFIC CONTROL	LUMP SUM	1	$ 150,000	$ 150,000
31	EROSION CONTROL	LUMP SUM	1	$ 200,000	$ 200,000
32	TURF ESTABLISHMENT	ACRE	11.0	$ 6,000	$ 66,000
33	TRAFFIC SIGNAL SYSTEM	EACH	3	$ 300,000	$ 900,000
34	SIGNING/STRIPING	LUMP SUM	1	$ 100,000	$ 100,000
35	LIGHTING	LS	1	$ 300,000	$ 300,000
				SUBTOTAL	$ 23,600,000
				20% CONTINGENCY	$ 4,720,000
				TOTAL ESTIMATED CONSTRUCTION	$ 28,320,000
				20% INDIRECT COSTS	$ 5,664,000
				ESTIMATED RIGHT-OF-WAY/EASEMENT ACQUISITION	$ 1,000,000
				WETLAND REPLACEMENT COST	$ 850,000
				TOTAL ESTIMATED PROJECT COST	**$ 35,840,000**

NOTES:

1. NO WATERMAIN OR SANITARY SEWER IMPROVEMENTS INCLUDED.
2. INCLUDES NO SOIL CORRECTION COSTS. NO GEOTECHNICAL EXPLORATION WAS COMPLETED FOR THE CONCEPTUAL DESIGN.
3. WETLAND IMPACTS BASED ON NWI. WETLAND MITIGATION RATIO 2.5:1. ASSUMED PURCHASE OF BANK CREDITS REQUIRED AT $2.50/SF.
4. PAVEMENT SECTION FOR TRIANGLE LANE INCLUDES 2" BITUMINOUS WEAR, 2" NON-WEAR, AND 12" CLASS 5 AGGREGATE BASE.
5. PAVEMENT SECTION FOR CREEK LANE INCLUDES 2" BIT. WEAR, 2.5" NON-WEAR, 10" CLASS 5, AND 12" SELECT GRANULAR.
6. TH 282, CR 9 & RAMP PAVEMENT SECTION INCLUDES 4" BIT. WEAR, 3" NON-WEAR, 12" CLASS 5, AND 24" SELECT GRANULAR.
7. ASSUMES THAT FLOODPLAIN LOSS CAN BE MITIGATED ON-SITE.

PRELIMINARY COST ESTIMATE - OPTION 3 (ROUNDABOUT/SPLIT DIAMOND)

Project: TH 169/TH 282/CR 9 INTERCHANGE CONCEPT DESIGN
Owner: CITY OF JORDAN
Date: OCTOBER 2018

Item No.	Item Description	Unit	Quantity	Unit Price	Amount
1	MOBILIZATION	LUMP SUM	1	$ 1,010,000	$ 1,010,000
2	CLEARING	ACRE	10	$ 3,000	$ 30,000
3	GRUBBING	ACRE	10	$ 2,500	$ 25,000
4	MISCELLANEOUS REMOVALS	LUMP SUM	1	$ 150,000	$ 150,000
5	REMOVE DOUBLE BOX CULVERT	LS	1	$ 30,000	$ 30,000
6	SAWING BIT PAVEMENT (FULL DEPTH)	LIN FT	1900	$ 5	$ 9,500
7	REMOVE CURB & GUTTER	LIN FT	10000	$ 3	$ 30,000
8	REMOVE CONCRETE WALK	SQ YD	2800	$ 6	$ 16,800
9	REMOVE BITUMINOUS PAVEMENT	SQ YD	52000	$ 3	$ 156,000
10	REMOVE CONCRETE PAVEMENT	SQ YD	25000	$ 4	$ 100,000
11	REMOVE TRAFFIC SIGNAL	EACH	1	$ 15,000	$ 15,000
12	SELECT GRANULAR BORROW (CV)	CU YD	55000	$ 15	$ 825,000
13	EXCAVATION - COMMON	CU YD	44400	$ 6	$ 266,400
14	COMMON EMBANKMENT (CV)	CU YD	208100	$ 6	$ 1,248,600
15	AGGREGATE BASE (CV) CLASS 5	CU YD	30000	$ 22	$ 660,000
16	CONCRETE PAVEMENT 9"	SQ YD	24700	$ 60	$ 1,482,000
17	BITUMINOUS TRAIL	SQ FT	68800	$ 2	$ 137,600
18	BITUMINOUS NON WEAR COURSE MIX (ROADWAY)	TON	13700	$ 60	$ 822,000
19	BITUMINOUS WEARING COURSE MIX (ROADWAY)	TON	17800	$ 65	$ 1,157,000
20	BRIDGE	SQ FT	25300	$ 225	$ 5,692,500
21	MODULAR BLOCK RETAINING WALL	SQ FT	8000	$ 45	$ 360,000
22	MSE RETAINING WALL	SQ FT	26000	$ 70	$ 1,820,000
23	10'X8' PRECAST CONCRETE DOUBLE BOX CULVERT	LIN FT	560	$ 2,500	$ 1,400,000
24	EXTEND 12'X8' CONCRETE BOX CULVERT	LIN FT	50	$ 5,000	$ 250,000
25	DRAINAGE/STORMWATER	LS	1	$ 800,000	$ 800,000
26	6" CONCRETE WALK	SQ FT	3800	$ 5	$ 19,000
27	CONCRETE CURB & GUTTER DESIGN B618	LIN FT	15800	$ 15	$ 237,000
28	CONCRETE CURB & GUTTER DESIGN B424	LIN FT	4200	$ 20	$ 84,000
29	48" CHAIN LINK FENCE	LIN FT	0	$ 20	$ -
30	RAILROAD CROSSING REPLACEMENT	LS	1	$ 850,000	$ 850,000
31	TRAFFIC CONTROL	LUMP SUM	1	$ 250,000	$ 250,000
32	EROSION CONTROL	LUMP SUM	1	$ 200,000	$ 200,000
33	TURF ESTABLISHMENT	ACRE	10.0	$ 6,000	$ 60,000
34	TREES	LUMP SUM	1	$ 50,000	$ 50,000
35	TRAFFIC SIGNAL SYSTEM	EACH	2	$ 300,000	$ 600,000
36	SIGNING/STRIPING	LUMP SUM	1	$ 200,000	$ 200,000
37	STREET LIGHTING (AT INTERSECTIONS)	EACH	4	$ 40,000	$ 160,000
				SUBTOTAL	$ 21,300,000
				20% CONTINGENCY	$ 4,260,000
				TOTAL ESTIMATED CONSTRUCTION	$ 25,560,000
				20% INDIRECTS	$ 5,112,000
				ESTIMATED RIGHT-OF-WAY/EASEMENT ACQUISITION	$ 1,000,000
				WETLAND REPLACEMENT COST	$ 1,120,000
				TOTAL ESTIMATED PROJECT COST	**$ 32,800,000**

NOTES:

1. NO WATERMAIN OR SANITARY SEWER IMPROVEMENTS INCLUDED.
2. INCLUDES NO SOIL CORRECTION COSTS. NO GEOTECHNICAL EXPLORATION WAS COMPLETED FOR THE CONCEPTUAL DESIGN.
3. WETLAND IMPACTS BASED ON NWI. WETLAND MITIGATION RATIO 2.5:1. ASSUMED PURCHASE OF BANK CREDITS REQUIRED AT $2.50/SF.
4. PAVEMENT SECTION FOR TRIANGLE LANE INCLUDES 2" BITUMINOUS WEAR, 2" NON-WEAR, AND 12" CLASS 5 AGGREGATE BASE.
5. PAVEMENT SECTION FOR CREEK LANE INCLUDES 2" BIT. WEAR, 2.5" NON-WEAR, 10" CLASS 5, AND 12" SELECT GRANULAR.
6. TH 282, CR 9 & RAMP PAVEMENT SECTION INCLUDES 4" BIT. WEAR, 3" NON-WEAR, 12" CLASS 5, AND 24" SELECT GRANULAR.
7. ASSUMES THAT FLOODPLAIN LOSS CAN BE MITIGATED ON-SITE.

PRELIMINARY COST ESTIMATE - OPTION 3A (OPTION 3 PLUS BRIDGE AT CREEK LANE)

Project: TH 169/TH 282/CR 9 INTERCHANGE CONCEPT DESIGN
Owner: CITY OF JORDAN
Date: OCTOBER 2018

Item No.	Item Description	Unit	Quantity	Unit Price	Amount
1	MOBILIZATION	LUMP SUM	1	$ 1,240,000	$ 1,240,000
2	CLEARING	ACRE	10.5	$ 3,000	$ 31,500
3	GRUBBING	ACRE	10.5	$ 2,500	$ 26,250
4	MISCELLANEOUS REMOVALS	LUMP SUM	1	$ 150,000	$ 150,000
5	REMOVE DOUBLE BOX CULVERT	LS	1	$ 30,000	$ 30,000
6	SAWING BIT PAVEMENT (FULL DEPTH)	LIN FT	1900	$ 5	$ 9,500
7	REMOVE CURB & GUTTER	LIN FT	10000	$ 3	$ 30,000
8	REMOVE CONCRETE WALK	SQ YD	2800	$ 6	$ 16,800
9	REMOVE BITUMINOUS PAVEMENT	SQ YD	52000	$ 3	$ 156,000
10	REMOVE CONCRETE PAVEMENT	SQ YD	29100	$ 4	$ 116,400
11	REMOVE TRAFFIC SIGNAL	EACH	1	$ 15,000	$ 15,000
12	SELECT GRANULAR BORROW (CV)	CU YD	55000	$ 15	$ 825,000
13	EXCAVATION - COMMON	CU YD	47800	$ 6	$ 286,800
14	COMMON EMBANKMENT (CV)	CU YD	303400	$ 6	$ 1,820,400
15	AGGREGATE BASE (CV) CLASS 5	CU YD	30100	$ 22	$ 662,200
16	CONCRETE PAVEMENT 9"	SQ YD	28100	$ 60	$ 1,686,000
17	BITUMINOUS TRAIL	SQ FT	68800	$ 2	$ 137,600
18	BITUMINOUS NON WEAR COURSE MIX (ROADWAY)	TON	13700	$ 60	$ 822,000
19	BITUMINOUS WEARING COURSE MIX (ROADWAY)	TON	17600	$ 65	$ 1,144,000
20	BRIDGE	SQ FT	34500	$ 225	$ 7,762,500
21	MODULAR BLOCK RETAINING WALL	SQ FT	12000	$ 45	$ 540,000
22	MSE RETAINING WALL	SQ FT	49000	$ 70	$ 3,430,000
23	10'X8' PRECAST CONCRETE DOUBLE BOX CULVERT	LIN FT	560	$ 2,500	$ 1,400,000
24	EXTEND 12'X8' CONCRETE BOX CULVERT	LIN FT	50	$ 5,000	$ 250,000
25	DRAINAGE/STORMWATER	LS	1	$ 719,000	$ 719,000
26	6" CONCRETE WALK	SQ FT	4100	$ 5	$ 20,500
27	CONCRETE CURB & GUTTER DESIGN B618	LIN FT	14200	$ 15	$ 213,000
28	CONCRETE CURB & GUTTER DESIGN B424	LIN FT	6300	$ 20	$ 126,000
29	48" CHAIN LINK FENCE	LIN FT	0	$ 20	$ -
30	RAILROAD CROSSING REPLACEMENT	LS	1	$ 850,000	$ 850,000
31	TRAFFIC CONTROL	LUMP SUM	1	$ 250,000	$ 250,000
32	EROSION CONTROL	LUMP SUM	1	$ 200,000	$ 200,000
33	TURF ESTABLISHMENT	ACRE	10.5	$ 6,000	$ 63,000
34	TREES	LUMP SUM	1	$ 50,000	$ 50,000
35	TRAFFIC SIGNAL SYSTEM	EACH	2	$ 300,000	$ 600,000
36	SIGNING/STRIPING	LUMP SUM	1	$ 200,000	$ 200,000
37	STREET LIGHTING (AT INTERSECTIONS)	EACH	4	$ 40,000	$ 160,000
				SUBTOTAL	$ 26,100,000
				20% CONTINGENCY	$ 5,220,000
				TOTAL ESTIMATED CONSTRUCTION	$ 31,320,000
				20% INDIRECTS	$ 6,264,000
				ESTIMATED RIGHT-OF-WAY/EASEMENT ACQUISITION	$ 1,000,000
				WETLAND REPLACEMENT COST	$ 1,120,000
				TOTAL ESTIMATED PROJECT COST	**$ 39,704,000**

NOTES:

1. NO WATERMAIN OR SANITARY SEWER IMPROVEMENTS INCLUDED.
2. INCLUDES NO SOIL CORRECTION COSTS. NO GEOTECHNICAL EXPLORATION WAS COMPLETED FOR THE CONCEPTUAL DESIGN.
3. WETLAND IMPACTS BASED ON NWI. WETLAND MITIGATION RATIO 2.5:1. ASSUMED PURCHASE OF BANK CREDITS REQUIRED AT $2.50/SF.
4. PAVEMENT SECTION FOR TRIANGLE LANE INCLUDES 2" BITUMINOUS WEAR, 2" NON-WEAR, AND 12" CLASS 5 AGGREGATE BASE.
5. PAVEMENT SECTION FOR CREEK LANE INCLUDES 2" BIT. WEAR, 2.5" NON-WEAR, 10" CLASS 5, AND 12" SELECT GRANULAR.
6. TH 282, CR 9 & RAMP PAVEMENT SECTION INCLUDES 4" BIT. WEAR, 3" NON-WEAR, 12" CLASS 5, AND 24" SELECT GRANULAR.
7. ASSUMES THAT FLOODPLAIN LOSS CAN BE MITIGATED ON-SITE.

APPENDIX G – IMPLEMENTATION PLAN CONCEPT

TH 169 / TH 282 / CR 9
CONCEPT 1 - ROUNDABOUT / SPLIT DIAMOND
CONSTRUCTION PHASING
10/17/2018

APPENDIX H – NOVEMBER 14, 2018 MnDOT LETTER

DEPARTMENT OF TRANSPORTATION

Minnesota Department of Transportation-Metro District
1500 County Rd B-2
Roseville, MN 55113

November 14, 2018

Mr. Tom Nikunen
Jordan City Administrator
210 East First Street
Jordan, MN 55352

Dear Mr. Nikunen,

The Minnesota Department of Transportation (MnDOT) appreciates the opportunity to work with the City of Jordan and Scott County on a concept study to address the need for a future interchange at Hwy 169/282/CSAH 9 in Jordan. We support grade-separating this intersection by removing the existing signal and constructing an interchange that meets both transportation and community needs. We understand that this interchange will increase safety and mobility and help the City of Jordan sustain local businesses and plan for future development. After months of environmental screening, traffic study and stakeholder involvement, several concepts have been developed to carry forward into an environmental document. MnDOT is in support of many of these concepts, but we also have some concerns about others. This letter is to clarify MnDOT's interests so that these can be factored into decisions about next steps.

As you know, MnDOT has had several large Hwy 169 paving projects near this intersection in recent years. In 2015, we reconstructed the highway from just south of Hwy 282/CSAH 9 to about a half mile north of Hwy 21, including Hwy 169 bridge repairs. In 2018, we constructed a concrete overlay from just south of Hwy 282/CSAH 9 (where the 2015 project ended) all the way to the Metro District border at Hwy 19. These were major pavement investments and the expected service life is 25-30 years. For this reason, MnDOT is not in support of concepts that realign or raise Hwy 169. It would not be responsible or prudent to consider concepts that would render the new pavement work in the intersection area as throw away. In addition, CSAH 9 is a roadway leading to an important Minnesota River crossing. Currently, there is an at-grade RR crossing on CSAH 9 just to the north of Hwy 169. The number of trains using that track currently is minimal. This could change in the future. MnDOT supports options that would leave us the opportunity to grade separate that RR crossing should the need arise. Constructing an interchange that brings Hwy 169 over Hwy 282/CSAH 9 precludes that from occurring. Only the options raising Hwy 282/CSAH 9 over Hwy 169 would make that feasible.

Now that the study is narrowing down the interchange concepts and looking for future regional funding, it's important to complete the Metropolitan Council's Appendix F Preliminary Interchange Approval Process. Its purpose is to demonstrate that the proposed project is consistent with the region's long-range plans and that its location is suitable for an interchange based on general transportation planning principles.

More information can be found at the following link: https://metrocouncil.org/Transportation/Planning-2/Key-Transportation-Planning-Documents/Transportation-Policy-Plan/tpp-update/2018-TPP-Update-Appendices/Appendix-F-Preliminary-Interchange-Appropriation.aspx

MnDOT appreciates the transportation partnership that we've established with the City of Jordan and Scott County. The current Hwy 169/282/CSAH 9 interchange concept study is one more example of us collaborating effectively. We look forward to continuing our work together to get one step closer to making the future Hwy 169/282/CSAH 9 interchange a reality.

Please let me know if you have any questions or if you'd like to discuss this further.

Sincerely,

Amber L. Blanchard
Acting South Area Manager

CC: Lisa Freese, Scott County
Toni Winiecki, Scott County
Almin Ramic, MnDOT Traffic
Michael Corbett, MnDOT Planning

Equal Opportunity Employer

APPENDIX I – DECEMBER 18, 2018 SCOTT COUNTY LETTER

SCOTT COUNTY BOARD OF COMMISSIONERS

200 FOURTH AVENUE WEST · SHAKOPEE, MN 55379-1220
(952)496-8100 · Fax (952)496-8180 · www.scottcountymn.gov

BARB WECKMAN BREKKE, DISTRICT 1
TOM WOLF, DISTRICT 2
MICHAEL BEARD, DISTRICT 3
DAVE BEER, DISTRICT 4
JON ULRICH, DISTRICT 5

December 18, 2018

Mayor Tanya Velishek
210 East First Street
Jordan, MN 55352

Dear Mayor Velishek:

The County would like to take this opportunity to thank the City leaders and staff for their efforts in coming to a general consensus with MnDOT on an interchange vision.

At a recent County Board workshop, the Board members reviewed with County staff the interchange options that were developed through the City's effort. The County supports the planning work done to remove the signal on TH 169. The Board did not make a recommendation on an option since it is too early in the process; however, they support an option that allows grade separation at the Union Pacific Railroad crossing on County Highway 9.

Having recently completed three interchanges, the Board is aware that additional design analysis and environmental work is needed to bring this project to approval. The Board directed an additional $850,000 of sales tax funds be set aside in 2019 and 2020 to begin this preliminary design work. This will allow the City, County, and MnDOT to get to an approved layout. Since federal funding will likely be needed to accomplish this project, it is imperative to gain Federal Highway Administration support through detailed engineering and environmental analysis to flesh out all the issues not identified in the recently completed planning study.

The County had previously committed to fund an at-grade separation study at TH 169 and CH 59 with a study in 2019. We would like to discuss performing this work in conjunction with the preliminary design for TH 169/282/CH 9, to ensure that the impacts and traffic analysis are looked at comprehensively. In doing so, it will help to coordinate the overall vision for the TH169 corridor and remain consistent with the regional interchange requirements in the Metropolitan Council's Transportation Policy Plan. Completing this work by mid-2020 may provide an opportunity to apply for Federal funds through the Met Council process.

Please continue to work with Lisa Freese, Transportation Services Director, and her staff on these next steps.

Respectfully,

Thomas J. Wolf
Chair and Commissioner, District 2

Barb Weckman Brekke
Vice-Chair and Commissioner, District 1

CC. Thomas Nikunen, City of Jordan, City Administrator
Amber Blanchard, MnDOT Acting South Area Manager
Lisa Freese, Transportation Services Director