TH 169 Corridor Study

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Prepared for:

Sand Creek Township

Prepared by:

Angie Bolstad, PE
Pat McGraw, PE

Sign-off Sheet

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Prepared by _____

(signature)

Angie Bolstad, PE

Reviewed by _____

(signature)

Wendy Van Duyne, AICP

Approved by _____

(signature)

Pat McGraw, PE

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Executive Summary

As the only north-south principal arterial on the west side of Scott County, TH 169 is an essential roadway to the quality of life of residents and businesses living and working in Sand Creek Township. Sand Creek Township is located within the Metropolitan Council of Governments (MET Council) community designation of rural residential, which means many residents commute to the greater Twin Cities Metro Area by utilizing TH 169. This vital roadway segment is characterized by many at-grade accesses, minimal or no acceleration, deceleration or dedicated turn-lanes, and increasing safety and mobility concerns due to increasing development, escalating traffic volumes, and the completion of a full interchange and frontage road system north of the project corridor in 2020.

Sand Creek Township has been aware of the issues noted above for some time, and for years has been proactively discussing opportunities for improvement with stakeholders. In 2017, the Township prepared, and shared a map indicating issues and opportunities along the study corridor, which laid the ground work for this study. This study is intended is to examine the feasibility of improvements which address the issues with input provided by residents, property owners, business owners, the Minnesota Department of Transportation (MnDOT), Scott County, City of Jordan and Louisville Township.

The existing conditions of the roadway were evaluated in terms of traffic, safety, access management, connectivity, and economic development. Based on the existing conditions, three concepts were developed to best address the issues. These concepts are summarized below:

- **Concept 1:** At-grade solutions consisting of four RCUTS and various additions of acceleration/deceleration lanes, left turn lanes, right turn lanes, median closures, and access closures. Proposed roadways include connecting Berkshire Avenue to Bluff Drive and realigning Jordan Avenue to 173rd Street.
- **Concept 2:** Overpass of local roadways over TH 169. Jordan Avenue on the west would connect with Berkshire Avenue on the east side, creating an overpass. The overpass would be coupled with the addition of acceleration/deceleration lanes, one right turn lane, median closures, and access closures. Proposed roadways include connecting Berkshire Avenue to Bluff Drive and realigning Jordan Avenue to 173rd Street.
- **Concept 3:** Underpass of local roadways under TH 169 at Bluff Drive. The west and east sides of Bluff Drive would be connected under TH 169, creating an underpass. The underpass would be coupled with on/off ramp system, addition of acceleration/deceleration lanes, median closures, and access closures. Proposed roadways include connecting Berkshire Avenue to Bluff Drive and realigning Jordan Avenue to 173rd Street.

Each concept was evaluated in terms of traffic, safety, access management, right of way impacts, environmental impacts, project cost, and miscellaneous considerations (topography, business/residence relocation potential, businesses ability to conduct business, pedestrian crossing, preliminary agency support, and sense of place). Concept 2 was ultimately determined to be the apparent preferred alternative. Concept 2 best addresses the overall project purpose by providing a cost feasible, long-term solution to existing traffic deficiencies with a substantial improvement to the overall safety of the corridor. Through supplemental communication with MnDOT staff, Concept 1 was identified as a suitable interim solution.

1.0 STUDY PURPOSE

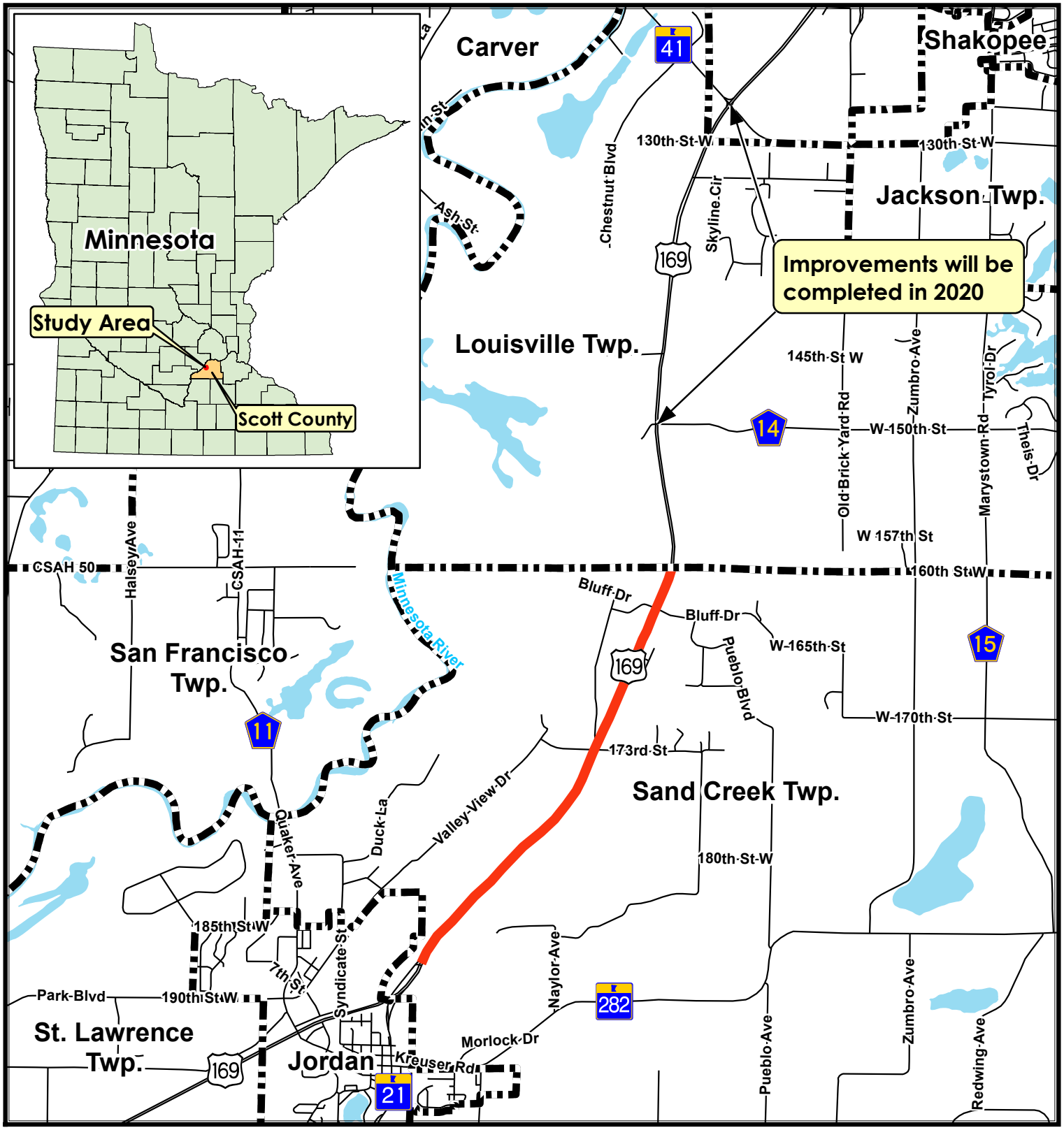
Currently, Trunk Highway (TH) 169 is a full freeway type facility north of TH 41 (approximately 4 miles north of Sand Creek Township) to Brooklyn Park, MN. Construction is underway to convert the TH 41/TH 169 intersection into a diverging diamond interchange. Work is also underway to convert the CSAH 14 intersection (approximately 1 mile north of Sand Creek Township) to a limited accesses interchange with a combination of an overpass and only right-in/right-out access to TH 169 remaining. These efforts are expected to be completed in the year 2020. This project will effectively extend the freeway-type facility of TH 169 from Brooklyn Park, MN to CSAH 14, leaving TH 169 through Sand Creek Township as the next segment of highway containing full at-grade accesses. Many of these at-grade intersections have minimal or no acceleration, deceleration or dedicated turn-lanes, creating uncontrolled access points which present safety and mobility concerns. Opportunities for safe and efficient access at these intersections are diminishing with continually increasing traffic flow. The removal of the traffic signal-controlled condition at TH 41 may further exacerbate these concerns.

Sand Creek Township is studying the feasibility of access improvements to enhance safety and mobility, and to accommodate future development with input provided by residents, property owners, business owners, the Minnesota Department of Transportation (MnDOT), Federal Highway Association (FHWA), Scott County, and Louisville Township. Furthermore, the purpose of this study is to gather information, define issues, and discuss improvement strategies for TH 169 within Sand Creek Township. Improvement options will consider safety, mobility, accessibility, connectivity, public input, and environmental considerations. A map illustrating the study boundaries is provided in Figure 1.

1.1 ROADWAY OVERVIEW

TH 169 through Sand Creek Township is a north-south, non-freeway principal arterial roadway. This means it carries high volumes of traffic, at high speeds, for long trips, and discourages direct access to the abutting land uses. As the jurisdictional owner, MnDOT conducted an Inter-Regional Corridor (IRC) Study in 2002 identifying TH 169, from Belle Plaine to the north, as a future freeway. Other relevant area studies include the Scott County 2030 Comprehensive Plan, Scott County 2040 Comprehensive Plan (Draft), TH 169 Frontage Road Alignment Study, TH 169 Corridor Belle Plaine Area Plan, and US 169 from South of County Road 14 through Jordan Access Management Plan (not adopted).

As previously noted, Scott County is currently in the process of constructing a diverging diamond interchange at TH 41/TH 169 and a right-in/right-out, limited access, interchange at CSAH 14. These projects are important to the study because they not only have the potential to exacerbate downstream issues, but also provide an opportunity to create a northern frontage road system connecting CSAH 14 to Bluff Drive and other adjacent roadways within the Township. Sand Creek Township will continue to work with Louisville Township if/when frontage road connections are feasible. A project location map is shown below in Figure 1.



Project Location Map

TH 169 Corridor Study
Sand Creek Township, Minnesota

Figure 1

TH 169 Study Segment
Municipal Boundary
Open Water

N

0 5,000 10,000 Feet

November 9, 2018

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2.0 PROJECT NEEDS

A full understanding of a project's needs and impacts should be initiated by a review of existing conditions. The needs and existing conditions discussed in the following sections include traffic, safety, access management, connectivity, and economic development. Categories do not encompass all the needs of the corridor; however, they do address the main concerns of agency, business, and public stakeholders.

2.1 EXISTING TRAFFIC CONDITIONS

High traffic volumes, fast speeds, heavy truck traffic, and inadequate spacing to make turning movements has been a major concern of residents, business owners, township and county staff, and public safety officers. These concerns have been growing as traffic volumes have continued to increase. With the removal of existing traffic signal control at the TH 41 intersection, these issues could be exacerbated within the study corridor. The most problematic movements to make in the corridor are those that involve crossing one, or both, directions of TH 169 (NB/SB left, EB/WB left and through). These movements are even more difficult for heavy vehicles that accelerate slower than a passenger vehicle. During the time when turning movement counts were taken the percentage of heavy vehicles making the difficult crossings were as follows:

- Bluff Drive:
  - SB to EB left: 8.75 - 9.26%
  - NB to WB left: 21.23 - 24.83%
  - EB to NB left: 39.19 - 40.73%
  - WB to SB left: 0.0 - 2.86%
  - EB through: 16.7-22.22%
  - WB through: 0.0-7.69%

- 166th Street:
  - SB to EB left: 38.37 - 42.19%
  - NB to WB left: 8.33 - 17.24%
  - EB to NB left: 22.73 - 42.11%
  - WB to SB left: 26.9 - 28.77%
  - EB through: 51.72 - 69.44%
  - WB through: 61.54 - 63.33%

- 173rd Street:
  - SB to EB left: 3.06 - 1.89%
  - NB to WB left: 2.17 - 6.96%

2.1.1 Current Traffic Operations

Traffic counts were taken on Thursday, May 17 and Friday, May 18, 2018, at the main intersections located along the corridor which include; TH 169 and Bluff Drive, TH 169 and 166th Street, TH 169 and Jordan Avenue, and TH 169 and 173rd Street. The dates for the data collection were identified with input from local businesses as to which days would be most representative of their operations. These traffic counts were entered into the traffic simulation software Synchro/SimTraffic and calibrated to correlate the existing conditions of the corridor. The models were calibrated through observations of existing conditions from videos that were used to collect turning movement counts. Volumes

were balanced in the model where needed by increasing the counts on some movements to be conservative in the analysis. Figure 2 shows the AM and PM traffic counts used for the simulation.

Intersection capacity analysis was evaluated in terms of delay and level of service (LOS). LOS describes the operational performance of transportation elements by measuring the average delay experienced per vehicle. Overall intersection LOS was not considered in the analysis, as the concerns related to the project stem from ability to make individual movements. Table 1 lists the ranges of LOS for unsignalized intersections as described in the Highway Capacity Manual (HCM).

LOS A represents minimal delay and efficient operations while LOS F represents a complete breakdown of traffic operations and long delays. For two-way stop-controlled intersections, LOS C or better is considered acceptable. However, it is recommended that each approach should be designed to have the maximum practical LOS. The median along TH 169 allows vehicles to make partial movements by crossing one direction of the highway, entering the median, waiting for a gap, and crossing the second direction. The analysis reflects this by showing the average delay experienced in each part of the movement. LOS is based on the total delay of both movements together. The LOS results for the existing conditions is shown in Figure 3. Turning movement counts, Synchro/SimTraffic output, and detailed tables showing que length, delay per vehicle, and LOS are shown in Appendix A Traffic Analysis.

Table 1 - LOS Ranking based on Control Delay per Vehicle

Level of Service (LOS)	Control Delay per Vehicle (Seconds)
A	≤ 10
B	> 10 and ≥ 15
C	> 15 and ≥ 25
D	> 25 and ≥ 35
E	> 35 and ≥ 50
F	> 50

2.1.2 Traffic Analysis

Intersection capacity analyses were performed for AM and PM peak hour conditions for each two-way stop-controlled intersection within the project limits. Minor street through and left-turn movements showed increased delay and queuing as a result of insufficient gaps in mainline traffic. Operational trends for each intersection are summarized below:

- TH 169 & Bluff Drive
  The eastbound through operates at a LOS of D in the AM peak hour. The eastbound left and through movements both operated LOS D during the existing PM peak hour. Whereas, the westbound left and through movements operated at LOS D and E, respectively, during the PM peak. Operations for LOS D would be characterized by increased queue lengths and delay. LOS E suggests significant queuing and delay on the minor approach.

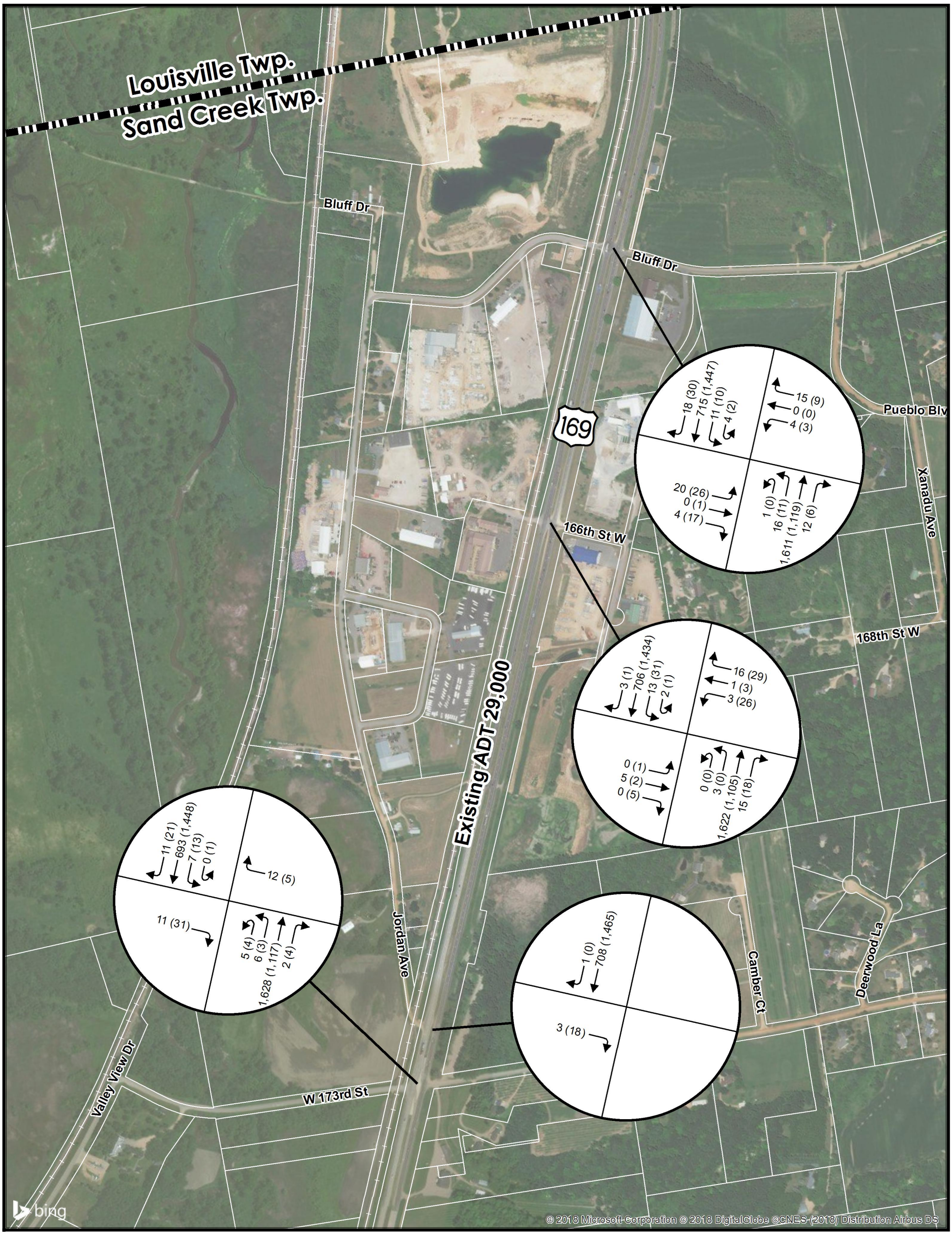
- TH 169 & 166th Street
  The eastbound left and through movements operated at LOS D during the existing AM peak hour. The westbound left and through movements operated at LOS E during the AM peak and D during the PM peak.

Operations for LOS D would be characterized by increased queue lengths, while LOS E would result in significant queuing.

- TH 169 & Jordan Avenue
  This intersection operates as a right-in, right-out intersection with minimal delay. The intersection is located within the southbound deceleration/right-turn lane for the junction at TH 169 and 173rd.

- TH 169 & 173rd Street
  The northbound left-turn operates at an acceptable LOS C. The rest of the movements operate at LOS B or better. Through movements and left-turns, from the minor street, are physically restricted resulting in vehicles making U-turns at median openings to the north and south of the intersection.

The results in Figure 2 and Figure 3 match the feedback provided by the local community. The majority of EB/WB left and through movements at the Bluff Drive and 166th Street intersections are experiencing LOS D or E during the AM and PM peaks. During the AM peak, vehicles have the most trouble when crossing the NB lanes of TH 169. Whereas, during the PM peak, vehicles have the most trouble crossing the SB lanes of TH 169. Traffic analysis summary tables are shown in Appendix A Traffic Analysis.



Existing AM and PM Peak Hour Turning Movements

TH 169 Corridor Study
Sand Creek Township, Minnesota

Figure 2

123 AM Peak Hour Turning Movements
(123) PM Peak Hour Turning Movements
Municipal Boundary

N
0 600 1,200 Feet

November 9, 2018

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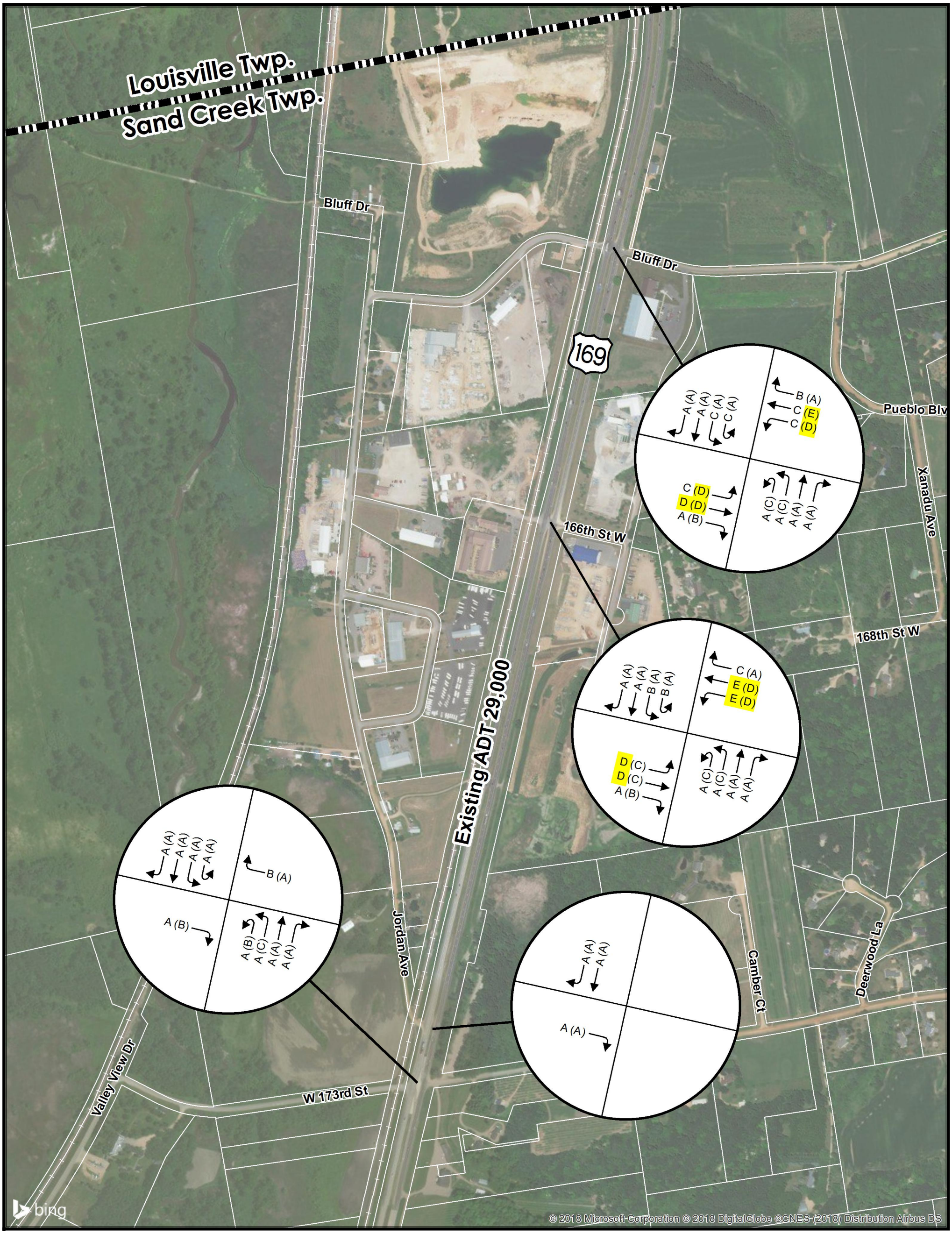

Existing AM and PM Peak Hour Level of Service (LOS)

TH 169 Corridor Study
Sand Creek Township, Minnesota

Figure 3

A AM LOS
(A) PM LOS

Municipal Boundary

N

0 600 1,200 Feet

December 10, 2018

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2.5

2.2 EXISTING SAFETY

Safety considerations along TH 169 include growing traffic volumes, large proportions of heavy vehicles, high average speeds, and numerous access densities. A safety analysis of the existing conditions was completed using the Minnesota Crash Mapping Analysis Tool (MnCMAT). The full safety technical memorandum is included in Appendix B Safety Analysis. Crash data was obtained for the period of January 1, 2011 through December 31, 2015 and is mapped by severity in Figure 4.

2.2.1 Overall Crash Trends

A total of eighty-four (84) crashes were recorded within the analysis period, with the predominant crash type being ran off road crashes (37%), followed by rear end collisions (36%). During the analysis period, there was a steady increase in the number of crashes per year, as illustrated in Table 2. Fifty-four percent (54%) of crashes occurring along the corridor were intersection-related. Twenty-four (24%) percent of collisions occurred at night-time, and thirty-nine (39%) percent of collisions involved slippery conditions. The number of crashes by type are listed in Table 3.

Table 2 – Number of Crashes by Year

Location/Facility	Number of Crashes by Year					
	2011	2012	2013	2014	2015	Total
TH169 Segment (3.6-mi) *	13	9	20	16	26	84
TH169 Segment (3.6-mi)	10	4	7	7	11	39
TH 169 @ Bluff Dr.	1	2	6	2	5	16
TH 169 @ W 166th St.	0	0	1	1	2	4
TH 169 @ 173rd St.	1	2	3	3	4	13
TH 169 @ Broadway St.	1	1	3	3	4	12

*Including Intersection Crashes

Table 3 – Crashes by Type (2011-2015)

Location/Facility	Number of Crashes by Type								
	Rear-End	Sideswipe	Left-Turn	Ran Off Road	Right-Angle	Right-Turn	Head-On	Other	Total
TH169 Segment (3.6-mi) *	30	6	2	31	4	3	2	6	84
TH169 Segment (3.6-mi)	17	1	0	15	1	0	1	4	39
TH 169 @ Bluff Dr.	3	2	2	7	1	1	0	0	16
TH 169 @ W 166th St.	3	0	0	1	0	0	0	0	4
TH 169 @ 173rd St.	2	2	0	5	1	1	1	1	13
TH 169 @ Broadway St.	5	1	0	3	1	1	0	1	12

*Including Intersection Crashes

In terms of severity, one 'fatal' crash, twelve 'non-incapacitating' injuries, twenty-one 'possible' injuries and fifty 'property damage only' crashes were recorded as shown in Table 4. More than half of injury crashes occurred at an intersection. The intersection of TH 169 and 173rd Street had the highest severity with one fatal crash and three non-incapacitating crashes occurring in a five-year period. The angled fatal collision, which occurred in 2014, involved a sport utility vehicle which attempted to make a prohibited left-turn from eastbound 173rd Street and failing to yield

right-of-way to a southbound semi-truck. Left-turns from 173rd Street onto TH 169 are not allowed due to the reduced conflict intersection layout. Overall, the intersection of TH 169 at 173rd Street accounted for 78% of crash costs along the study corridor due in large part to one fatal crash in the five-year period. Crashes by severity are mapped in Figure 4.

Table 4 – Crashes by Severity (2011-2015)

Location/Facility	Number of Crashes by Severity					
	Fatal**	Incapacitating Injury	Non-Incapacitating Injury	Possible Injury	Property Damage Only	Crash Costs*** ($)
TH169 Segment (3.6-mi)	1	0	12	21	50	15,257,000
TH169 Segment (3.6-mi)	0	0	6	10	27	2,100,600
TH 169 @ Bluff Dr.	0	0	2	4	10	727,000
TH 169 @ W 166th St.	0	0	0	1	3	110,400
TH 169 @ 173rd St.	1	0	3	4	5	11,897,000
TH 169 @ Broadway St.	0	0	1	2	9	414,200

*Including Intersection Crashes

**An additional fatal crash involving a motorcycle occurred at TH 169 and 150th Street in July 2017; however, this crash was outside of the study period and not accounted for in the analysis

***Based on MnDOT 2016 Crash Costs

In addition to the numerical analysis of crash data, a systemic safety analysis was performed to identify at-risk locations for crashes along the corridor. Due to the rural nature of the study area, the following systemic criteria were used: skewed approach, on or near curve, ADT ratio between 0.2 and 0.8, proximity to rail crossing, proximity to last stop sign (>5 miles) on minor approaches, and commercial development in quadrant. Results of the systemic analysis, summarized in Table 5, show that the intersection of TH 169 at 173rd Street West met the most systemic risk factors for crashes with five total risk factors. The intersection of TH 169 at Bluff Drive met four risk factors. These intersections are considered priorities for future safety improvements along the corridor.

Table 5 – Systemic Risk Factors for Rural Intersections

Intersection	Geometric Risk Factor		Volume	Proximity		Commercial in Quadrant	Total Risk Factors
	Skew	Near Curve	ADT Ratio	Previous STOP	RR-Xing		
TH 169 @ Bluff Dr.		x		x	x	x	4
TH 169 @ W 166th St.					x	x	2
TH 169 @ 173rd St.	x	x		x	x	x	5
TH 169 @ Jordan Ave	x	x					2

2.2.2 Crash Analysis

Frequency, rate, and severity performance measures were compared to statewide/critical averages to determine areas of concern. Critical rates are statistically adjusted crash rates calculated at similar facility and area types. Critical rates account for facility type, intersection control, traffic volumes, and the random nature of crashes. Locations are identified as hazardous if their crash rate is larger than the critical rate. Severity rates are crash rates which weigh the number of crashes at a location by the severity of crashes. A location with the same number of high

severity crashes may have a larger rate than a location with the same number of crashes at a lower severity. The crash rate for TH 169 and Bluff Drive exceeded state average, but not the critical crash rate. TH 169 and 173rd Street exceeded the statewide severity crash rate but not the critical rate. Results of the screening, in Table 6 below, show that critical crash rates were not exceeded at any location along the corridor.

Table 6 – Crash Screening (2011-2015)

Location/Facility	Crash Rate			Severity Rate		
	Calculated	State Avg.	Critical	Calculated	State Avg.	Critical
TH169 Segment (3.6-mi) *	0.60	0.87	1.05	0.53	1.78	3.30
TH 169 @ Bluff Dr.	0.33	0.25	0.44	0.00	1.05	3.86
TH 169 @ W 166th St.	0.08	0.25	0.44	0.00	1.05	3.86
TH 169 @ 173rd St.	0.25	0.25	0.44	1.93	1.05	3.86
TH 169 @ Broadway St.	0.21	0.25	0.44	0.00	1.05	3.86

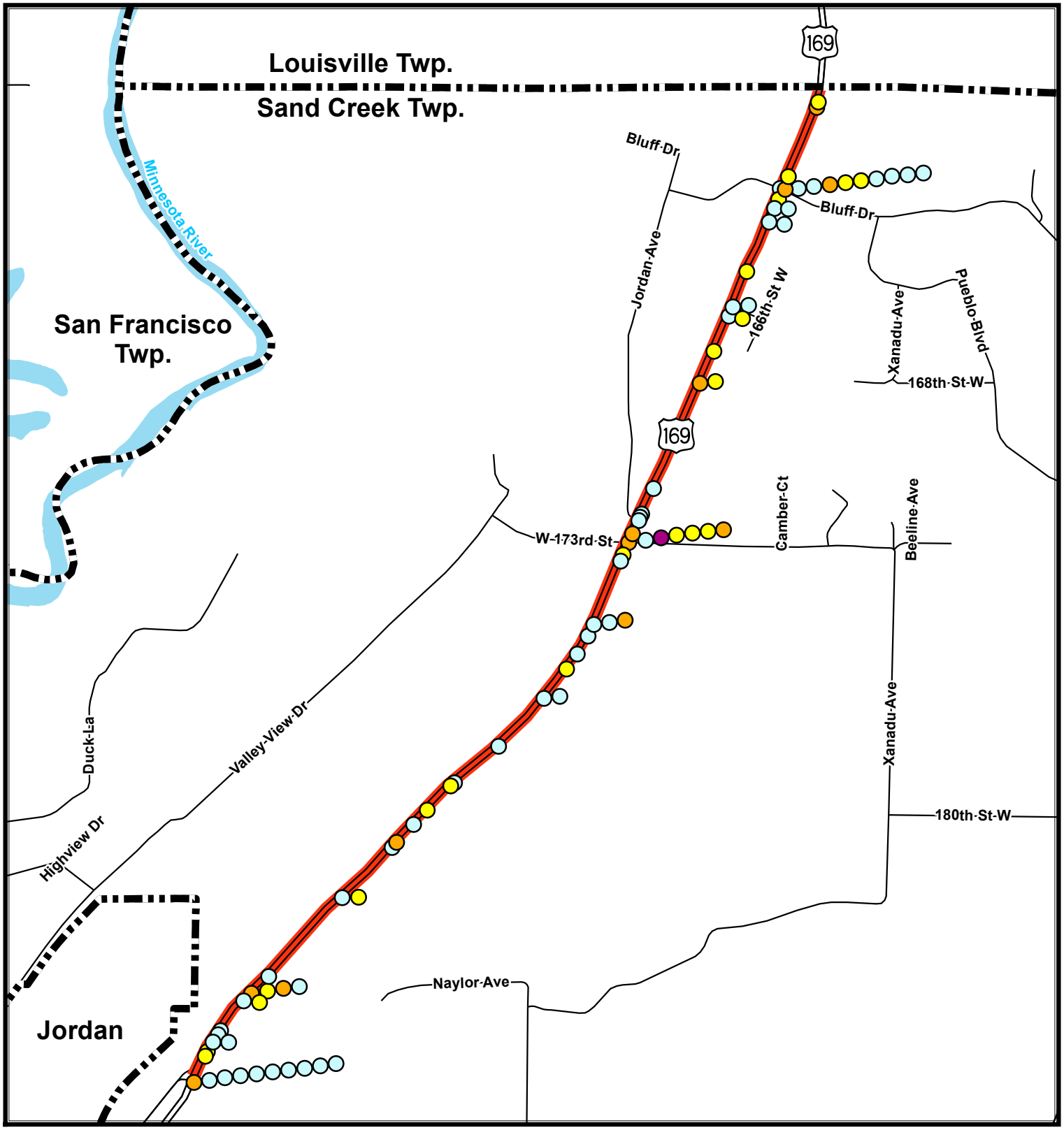
*Including Intersection Crashes

Overall, the corridor performed below statewide and critical rates, but showed an overall increase in the frequency of crashes within the 5-year period analyzed. Contributing factors to predominant rear-end and ran-off-road crashes obtained from crash reports included ‘slippery pavement’, ‘high speeds’, ‘distracted driving’, and ‘following too closely’. Contributing factors and recommended safety studies to confirm issues in the field are summarized in Table 7.

Table 7 – Contributing Factors & Future Safety Studies

Crash Pattern	Contributing Factors	Future Safety Studies	Potential Countermeasures
Rear-End	• Following too closely • Distracted driving • Failure to yield right-of-way	• Spot Speed Study • Pavement Skid Resistance Study • Highway Lighting Study • Gap Study	• Improve warning signs • Pavement Overlay • Prohibit minor left-turns/crossing movements • Improve roadway lighting
Ran-Off-Road	• Illegal Speed • Improper Lane • Slippery Pavement • Over-correcting	• Spot Speed Study • Pavement Skid Resistance Study • Sign Inventory • Sight Distance Study • Check Drainage	• Pavement overlays • Rumble strips • Refresh pavement markings • Improve lighting • Upgrade shoulders

Rear-end crashes were concentrated at intersection and private driveways approaches, which could indicate insufficient gaps for minor street movements. Ran-off-road collisions were also clustered near intersections which could indicate excessive speed, inadequate pavement, poor visibility, and inadequate shoulders. Since most crashes occurred at intersections, access management strategies eliminating at-grade crossings, relocating driveways to frontage roads, or restricting access to right-in, right-out have the greatest potential to improve safety. Possible short to midterm countermeasures to reduce crashes include; installing rumble strips, improving warning signs, pavement overlays, dynamic mainline warning signs, and improved lighting.



Crash Locations by Severity 2011 - 2015

TH 169 Corridor Study
Sand Creek Township, Minnesota

Figure 4

Crash Severity:

- Fatal
- Non-incapacitating Injury
- Possible Injury
- Property Damage

- Municipal Boundary
- TH 169 Study Segment
- Open Water

November 9, 2018

Stantec

N 0 2,000 4,000 Feet

2.3 ACCESS MANAGEMENT

Access management is the planning, design, and implementation of land use and transportation strategies to maintain a safe flow of traffic while accommodating the access needs of adjacent development. Most importantly, it reduces congestion and crashes, preserves road capacity, improves travel times, eases movement between destinations, and supports local economic development. Successful access management practices require state department of transportations, counties, cities, and townships to work together as development occurs.

Along the 3.6-mile-long project corridor, there are 17 access points on both sides of the roadway (excluding field drives) and 9 openings for median crossing. Table 8 lists access points along the west side of the roadway, Table 9 lists the access points along the east side of the roadway, and Table 10 contains the median crossing locations.

Table 8 – TH169 West Side Access Points

Type of Access	Access Description
Intersection	Bluff Drive
Intersection	166th Street
Private Drive	16931 Jordan Avenue
Side Street	Jordan Avenue
Intersection	173rd Street
Private Drive	17930 Johnson Memorial Drive

*1.7 accesses per mile

Table 9 – TH169 East Side Access Points

Type of Access	Access Description
Intersection	Bluff Drive
Intersection	166th Street
Intersection	173rd Street
Business Drive	Wagner's Apples
Private Drive	17471 Johnson Memorial Drive
Private Drive	17655 Johnson Memorial Drive
Business Drive	Automobile Nation/18025 Johnson Memorial Drive
Private Drive	18101 Johnson Memorial Drive
Private Drive	18101 Johnson Memorial Drive (Access #2)
Private Drive	18455 Johnson Memorial Drive
Private Drive	18635 Johnson Memorial Drive

*3.1 accesses per mile

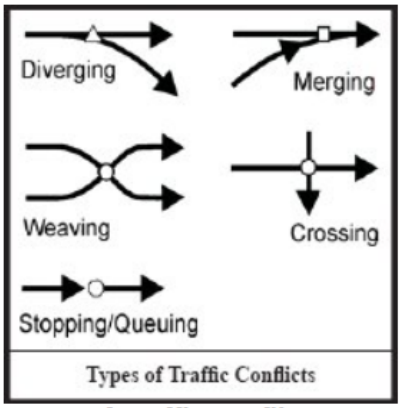
Table 10 – TH169 Median Crossing Locations

Median Crossing Number	Description of Accesses Utilizing Median Crossing
1	Bluff Drive
2	166th Street
3	16931 Jordan Ave
4	173rd Street
5	17471 Johnson Memorial Drive
6	17655 Johnson Memorial Drive
7	Automobile Nation, 18101 Johnson Memorial Drive, 17930 Johnson Memorial Drive
8	18455 Johnson Memorial Drive
9	18635 Johnson Memorial Drive

*2.5 median crossings per mile

Eliminating unnecessary accesses can make a considerable difference to overall driver safety and general roadway functionality. This is due to eliminating potential conflicts between through traffic and those using an access. Each conflict is a potential crash. Figure 5 shows various types of traffic conflict points given by the Federal Highway Administration (FHWA). The existing roadway within the study area has 263 conflict points when considering side accesses and median crossing movements. The existing number of conflict points is compared to the number remaining for each of the concepts in Section 7.3 Access Management, Table 27 – Conflict Point Concept Comparison.

Figure 5 – Types of Traffic Conflict Points



Types of Traffic Conflicts

Source: FHWA: https://ops.fhwa.dot.gov/publications/amprimer/access_mgmt_primer.htm

2.3.1 MnDOT Access Management

Roadways on the state trunk highway system are classified using MnDOT's Access Category System which consists of seven primary categories and five subcategories. Primary categories are based on the functional classification of the highway, and its strategic importance within the statewide highway system. The subcategories address the

highway facility types and differing land use patterns surrounding the specific highway segment[1]. According to the Access Management Category Assignments for the Metro District, the segment of TH 169 within Sand Creek Township is considered a category 1AF or a non-interstate freeway. Descriptions of these categories are provided below, along with a summary of recommended street spacing for Interregional Corridors (IRCs) in Table 11, and driveway allowance in Table 12.

Category 1 – High-Priority Interregional Corridors

This access category is intended for High-Priority Interregional Corridors which connect Primary Regional Trade Centers in Minnesota and adjacent states to the Twin Cities metropolitan area. According to the Interregional Corridor System Plan, these highways serve as key corridors for both interstate and intrastate travel. Performance measures are based on an average corridor peak hour travel speed of 60 mph. Access is managed along these corridors to strongly emphasize mobility. All High-Priority Interregional Corridors are functionally classified as either Interstate Highways or Principal Arterials.

Subcategory AF – Non-Interstate Freeway

This subcategory is intended for all other trunk highway segments that are planned as fully grade separated facilities, regardless of the surrounding land use. In some cases, highways designated as Non-Interstate Freeway may not yet be fully grade-separated, leaving these segments with a mix of at-grade and grade-separated intersections. During this transition period, new and existing at-grade access continue to exist on an interim basis.

Table 11 – Summary of Recommended Street Spacing for High Priority IRC, MnDOT

Category	Area of Facility Type	Typical Functional Class	Public Street Spacing	
			Primary Full-Movement Intersection	Secondary Intersection
1	High Priority Interregional Corridors & Interstate System (IRC)			
1F	Interstate Freeway	Principal Arterials	Interchange Access Only	
1AF	Non-Interstate Freeway		Interchange Access Only (see note below for interim spacing*)	
1A	Rural		1 mile	1/2 mile
1B	Urban/Urbanizing		1/2 mile	1/4 mile
1C	Urban Core		300-660 feet dependent upon block length	

*Interim Spacing: All at-grade intersections should be considered interim. The desirable spacing between an at-grade intersection and the merge point of the closest ramp should be a minimum of one-half mile. If one-half mile cannot be attained, a shorter spacing may be considered if analysis shows that the shorter distance would not create unacceptable weaving operations. The spacing between two at-grade, full-movement intersection spacing on an AF Highway should be one mile.

[1] Mn/DOT Access Management Manual – January 2, 2018
https://www.dot.state.mn.us/accessmanagement/docs/pdf/manualchapters/chapter2.pdf

Table 12 – Summary of Driveway Allowance, MnDOT

Category	Area or Facility Type	Driveway Allowance
1F	Interstate Freeways	No private driveways are allowed
1AF, 2AF, 3AF & 4AF	Non-Interstate Freeways & High-Priority IRCs	On facilities transitioning to full access control, driveways should not be permitted if reasonably convenient and suitable alternative access is available. Where reasonably convenient and suitable alternative access is not available, an interim driveway may be permitted, and if possible, it should be designed so that traffic can be redirected to another road when the facility becomes fully access-controlled.
1A, 2A, 3A, 4A & 5A	Rural (Not planned for full access control)	If a property retains access rights, but no reasonably convenient and suitable alternative access is available, a driveway is permitted. The driveway should be located and designed to minimize the impact on the safety and operations of the highway. All driveways (Types 1, 2, and 3) should be spaced in accordance with Figure 3.27.
1B, 2B, 3B, 4B & 5B	Urban/ Urbanizing	If a property retains access rights, but no reasonably convenient and suitable alternative access is available, a driveway is permitted. It is Mn/DOT's preference to permit public street connections rather than driveways in Urban/Urbanizing areas. Where possible, Mn/DOT should work with local agencies to encourage the development of a supporting road system to serve the property. High-volume (Type 3) driveways should be spaced in accordance with Figure 3.27. Driveways should be permitted as interim where a future supporting street system is anticipated.
1C, 2C, 3C, 4C & 5C	Urban Core	If a property retains access rights, but no reasonably convenient and suitable alternative access is available, a driveway is permitted. The spacing of driveways will vary based on reasonableness of use and driver expectancy.
6A, 6B & 6C	All Collectors	If a property retains access rights and no reasonably convenient and suitable alternative access is available, a driveway is permitted. The spacing of driveways will vary based on reasonableness of use and driver expectancy.
7	Specific Access Plan	The adopted Category 7 Plan should address the allowance and spacing of driveways.

According to MnDOT access management guidelines, this portion of TH 169 has too many access points given the classification of the roadway. For a non-interstate freeway facility, MnDOT's guidelines state there should be no at-grade accesses except for an interim period of time. Spacing between two interim access points for full-movement intersections is one mile. The project corridor has two full-movement intersections (Bluff Drive and 166th Street) which are only spaced only 0.36 miles apart. 173rd Street is not considered a full-movement intersection because vehicles

are not currently able to cross or make left turns at the intersection. Driveways on non-interstate freeways should also be avoided where possible. MnDOT has mentioned the desire to pull back on the previous recommendation from the 2002 Inter-Regional Corridor (IRC) Study, identifying this segment of TH 169 as a future freeway. Still, existing intersection spacing is inconsistent with MnDOT's recommended spacing for principal arterials, not anticipated to be converted to freeways, in urban/urbanizing areas.

2.3.2 Scott County Access Management

Due to the absence of a high-mobility freeway system in all areas of the county, the draft 2040 Scott County Comprehensive Plan lists access management as a key challenge. Consequently, the county highway system must both adequately serve long range mobility needs and balance the need for access to adjacent land uses. Table 13 provides the minimum access spacing guidelines outlined in the draft 2040 plan. TH 169 is classified as a principal arterial.

Table 13 – Minimum Scott County Access Spacing Guidelines

Type of Access Being Requested	Type of County Highway Function Affected by Access			
	Principal Arterial	**Minor Arterial A and B Minor**	**Collector**	**Local**
Private Residential (3 or less shared driveways)	Not Permitted	Not Permitted 1/4 mile in Agricultural & Transition Area	1/8 Mile	Determination based on other criteria
Commercial Driveways, Or Private Streets	Not Permitted	Not Permitted	Full access at 1/4 Mile Limited access at 1/8 Mile	Determination based on other criteria
Local Streets	Not Permitted	Full access at 1/4 Mile Limited access at 1/8 Mile	1/8 Mile	1/8 Mile
Collector Streets	1 Mile Full Access (rural) Limited access at 1/2 Mile (urban)	Full access at 1/4 Mile Limited access at 1/8 Mile	1/4 Mile	1/4 Mile
Minor Arterial	1 Mile full Access (urban) 1 Mile Full (rural)	1/2 to 1 Mile (urban) 1/2 Mile to 1 Mile (rural)	1/4 to 1 Mile (urban) 1/2 to 1 Mile (rural)	1/4 to 1 Mile (urban) 1/2 to 1 Mile (rural)

Similar to MnDOT, Scott County guidelines restrict the use of accesses along principal arterial roadways. None of the intersecting streets are considered collector, or minor arterials, thus none of the accesses presently along TH 169 would be permitted according to existing county guidelines. Consequently, proper access management techniques should be a high priority along the roadway.

2.4 CONNECTIVITY

TH 169 is an essential transportation connection to the entire southwest region of Minnesota. The study corridor specifically provides connectivity between the communities of Jordan and Belle Plaine to the Twin Cities metropolitan area where many rural residents commute for work. It serves as a channel for the movement of commercial,

agricultural, and manufacturing goods and provides access to various recreational facilities and activities including trails, hunting, fishing, horseback riding, bicycling, snowmobiling, birding etc. Many of these activities are accessed via the Minnesota River, Minnesota River Bluffs, and Minnesota Valley National Wildlife Refuge.

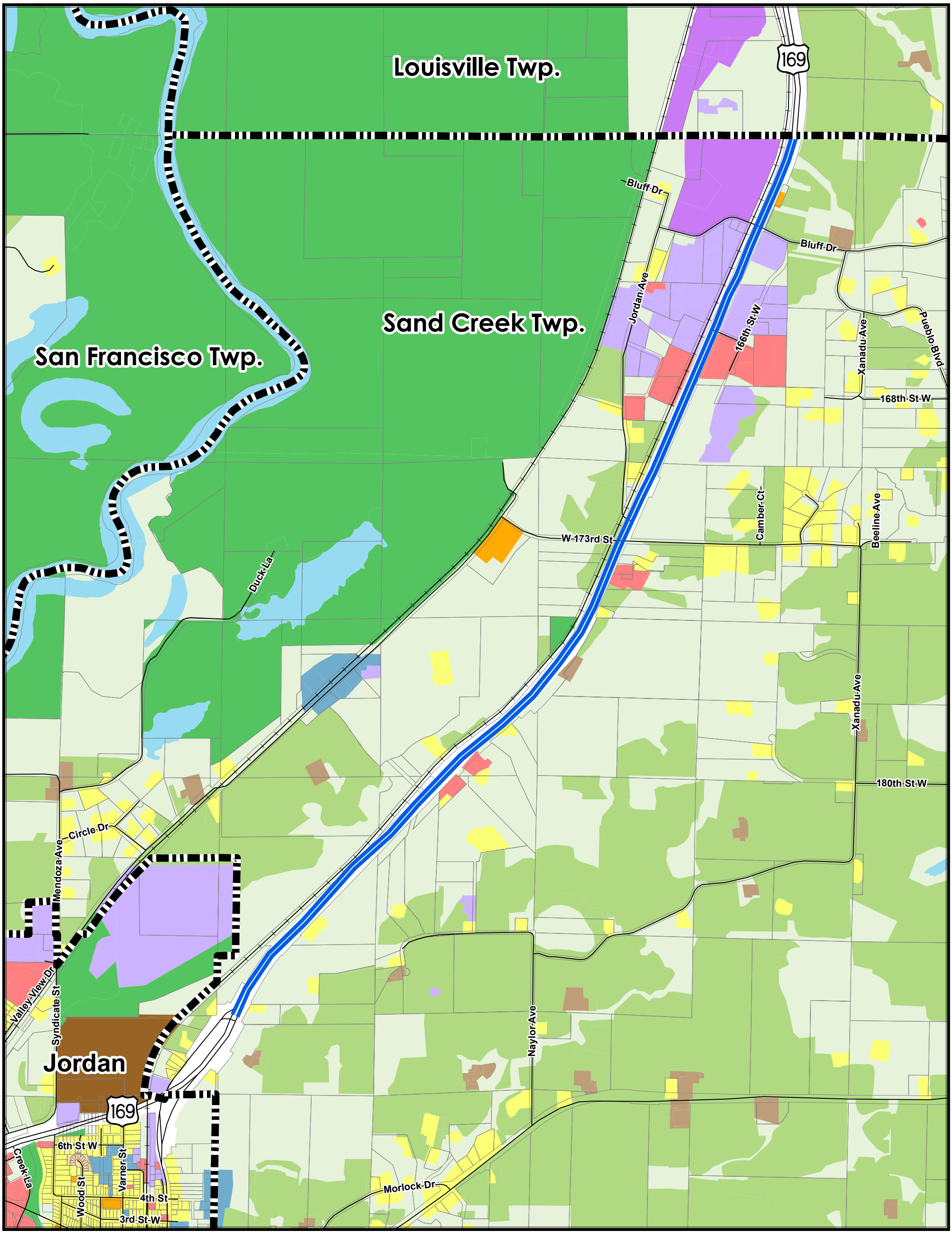
2.5 ECONOMIC DEVELOPMENT

2.5.1 Land Use and Zoning

Existing land use along the project corridor is mainly comprised of industrial and utility, undeveloped, and agricultural land. Less prevalent adjacent land uses include extractive, retail and other commercial, and residential (farmstead and single family detached). Existing zoning districts correlate closely with the existing land use and consist of rural industrial, urban business reserve, urban expansion reserve, and general commercial districts. Figure 6 and Figure 7 map the 2016 Generalized Existing Land Use and 2018 Zoning Districts respectively.

The 2040 Planned Land Use is shown in Figure 8 and includes industrial, commercial, rural businesses reserve, transition area, and urban business reserve land uses. These categories closely relate to the existing land use except for rural business reserve, transition area, and urban business reserve categories. These categories are explained below based on definitions from the Draft Scott County 2040 Comprehensive Plan.

- Rural Business Reserve - Reserved land for future rural commercial and/or industrial development served with on-site utilities and appropriate road access. The land will be limited to residential development at a very low density until frontage or backage roads and suitable on-site well and septic utilities can be provided.
- Transition Area – Reserved areas for future urban development beyond the 2040 planning horizon when planned regional sanitary sewer service capacity is increased to serve western and central Scott County. The boundaries of the Transition Area reflect the potential Long-Term Service Area for the future regional wastewater treatment plant.
- Urban Business Reserve – Reserved land for future commercial and/or industrial development with urban services. The land will be limited to residential development at very low density until urban services are provided.



2016 Generalized Existing Land Use

TH 169 Corridor Study
Sand Creek Township, Minnesota

Figure 6

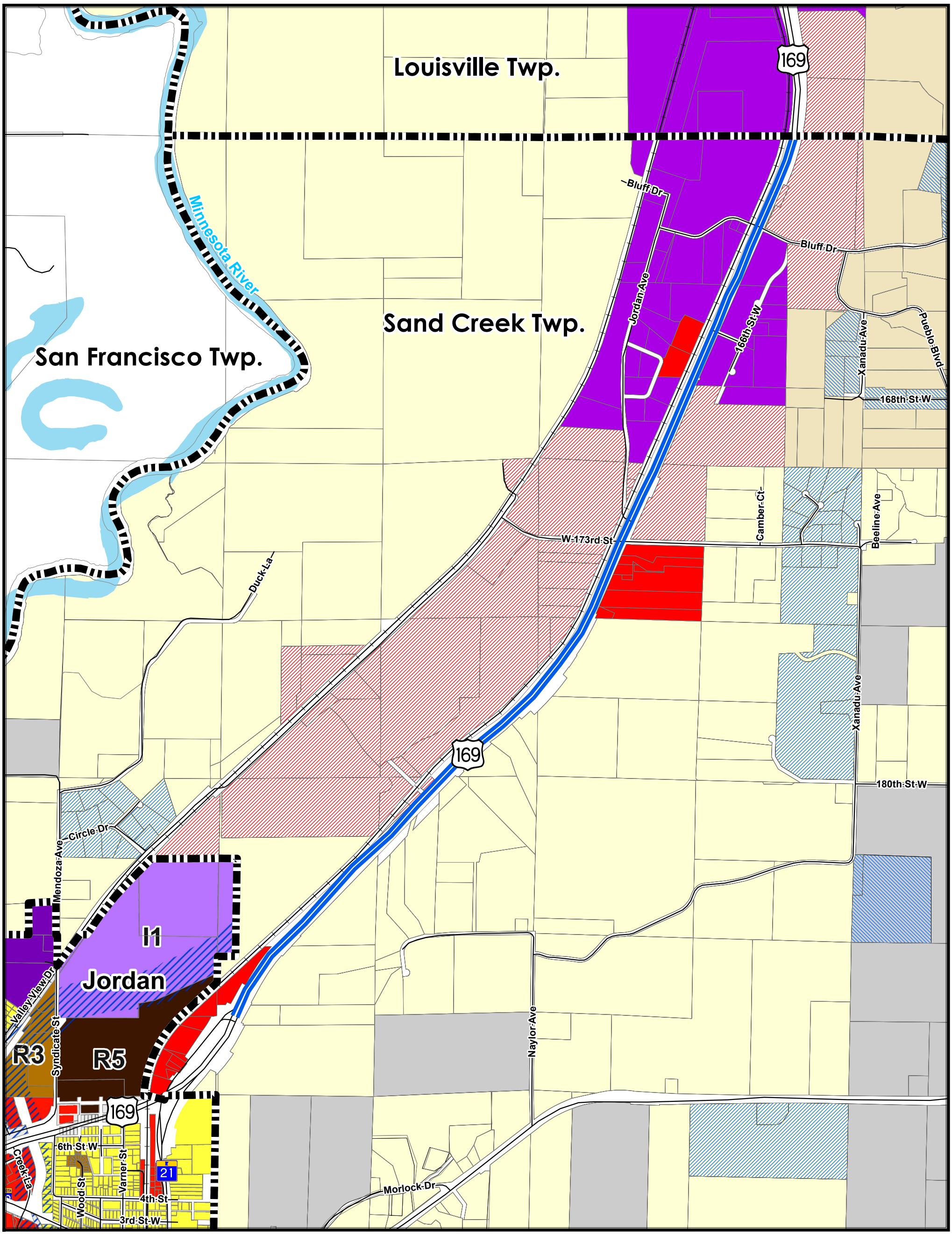
- TH 169 Study Segment
- Railroad
- Municipal Boundary
- Farmstead
- Single Family Detached
- Single Family Attached
- Multifamily
- Manufactured Housing Park
- Retail and Other Commercial
- Industrial and Utility
- Extractive
- Institutional
- Park, Recreational or Preserve
- Agricultural
- Undeveloped
- Open Water

N

0 1,500 3,000 Feet

April 13, 2018

Stantec



2018 Zoning Districts

TH 169 Corridor Study
Sand Creek Township, Minnesota

Figure 7

Municipal Boundary
TH 169 Study Segment

Scott County Zoning as of April 2018:

- A-1 Agricultural Preservation District
- A-3 Agricultural Preservation Density District
- C-1 General Commercial District
- I-1 Rural Industrial District
- UBR Urban Business Reserve District
- UER Urban Expansion Reserve District
- UERC Urban Expansion Reserve Cluster District
- UTR Urban Transition Reserve District
- UTR-C Urban Transition Reserve Cluster District

City of Jordan Zoning as of April 2018:

- R-2 Single and Two Family Residential
- R-3 Townhouse and Multiple Family Residential
- R-5 Mobile Home District
- C-3 Highway Commercial
- I-1 Light Industrial
- I-2 General Industrial
- Shoreland Overlay District

N

0 1,500 3,000 Feet

November 9, 2018

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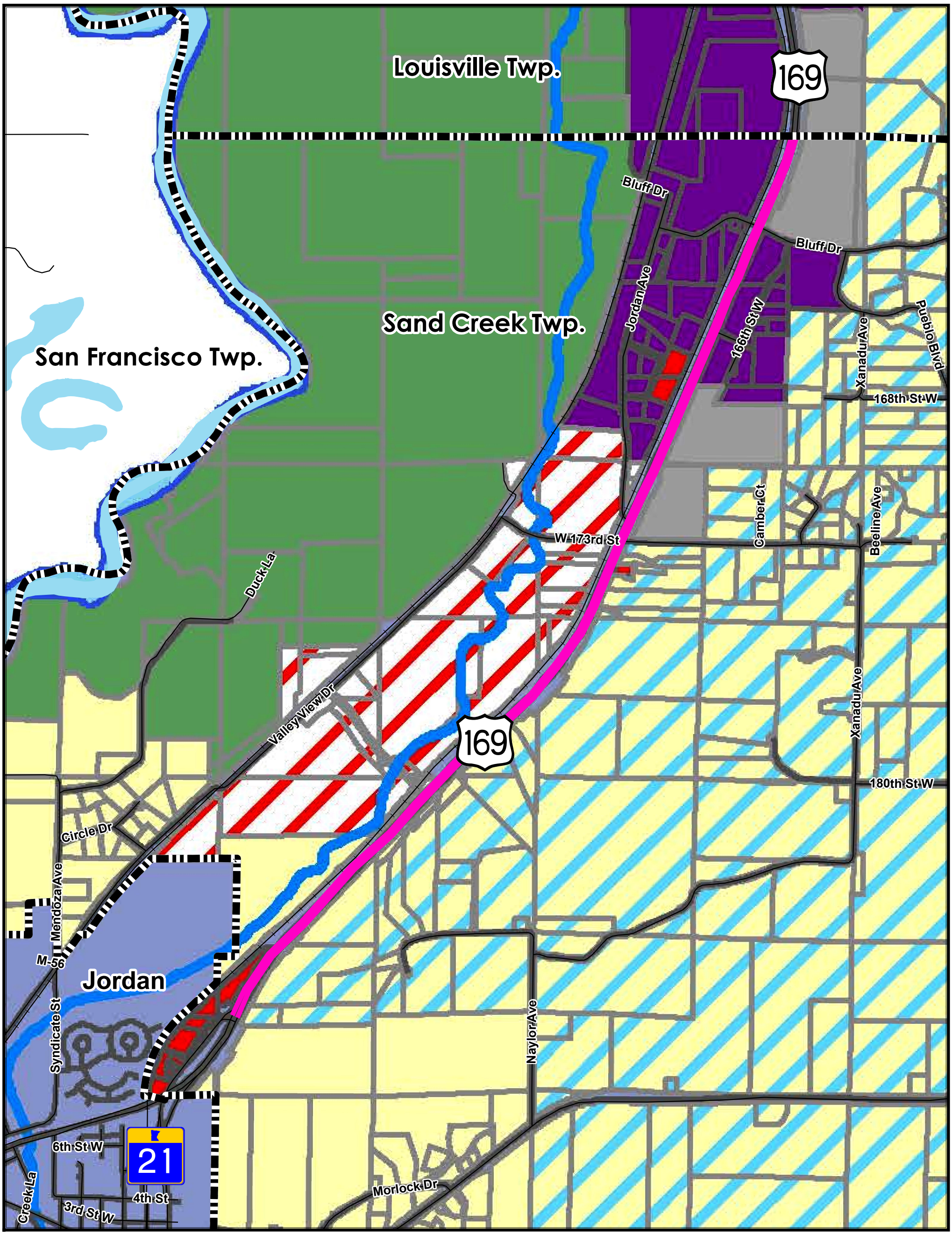


Scott County Proposed 2040 Future Land Use

TH 169 Corridor Study
Sand Creek Township, Minnesota

Figure 8

- Urban Expansion (1 per 40)
- Transition Area (1 per 10 cluster)
- Park/Open Space
- Commercial
- Industrial
- Rural Business Reserve
- Urban Business Reserve
- (Not Under County Planning Authority)
- TH 169 Study Segment
- Municipal Boundary

N

0 1,500 3,000 Feet

April 13, 2018

Stantec

2.18

2.5.2 Development

Development along the study corridor is primarily located on the north along the Sand Creek Township and Louisville Township boarder. Business and commercial development is the densest between Bluff Drive and 173rd Street. Existing business include; By the Yard, Interlock Concrete Products, Cemstone Products, Herman's Landscape Supplies, Sport Wheels, Mullin Trucking, Continental Lift Truck, Noble RV, Jerry's Frame, and Thread Logic.

Through project related discussions, businesses have expressed viability concerns given their safety challenges regarding access to/from TH 169. They feel development has been hindered due to common knowledge that the area is not functionally adequate, which has hindered reinvestment until a solution and timeline can be prioritized. Future development options include property north of Bluff Drive, recently purchased by the Shakopee Mdewakanton Sioux Community, and the existing aggregate pit, northwest of the Bluff Drive intersection, which is anticipated to be done with mining operations in the near future. Table 14 lists the recent land sales for the townships within Scott County between 2007 and 2016. This data is from the draft Scott County 2040 Comprehensive Plan and shows Sand Creek township has the third highest number of land sales in the county.

Table 14 – Recent Land Sales, 2007 to 2016

Township	Number of Land Sales	Average Price/Acre
Belle Plaine	14	$16,328
Blakeley	9	$7,513
Cedar Lake	25	$29,844
Credit River	23	$76,575
Helena	11	$18,135
Jackson	5	$49,748
Louisville	4	$57,817
New Market	14	$24,591
Sand Creek	16	$27,118
St. Lawrence	5	$15,928
Spring Lake	13	$22,898

Source: Scott County Taxation Department, 2017

3.0 NEEDS FOR FURTHER STUDY

This portion of TH 169 is a complex corridor given its importance to the community, regional significance, and environmentally impactful surrounding. Stakeholders mentioned four additional areas they felt should be studied further including; hydrology/hydraulics, 166th Street connection, frontage/backage road alignments, and rails to trails.

3.1 HYDROLOGY/HYDRAULICS

The hydrology/hydraulics of the area can be complicated due to the large contributing drainage areas, located above the bluff and flowing into ditches and streams, adjacent to the corridor. This water flows under TH 169, the railroad, and ultimately to the wetlands and/or Minnesota River. A comprehensive drainage study was outside of this project's scope but will likely be necessary to advance any new construction projects. In the event that future roadway construction required drainage ponds, it is possible that the township could be required to commit to some level of pond maintenance.

3.2 166TH STREET CONNECTION

The westside access at 166th Street serves a few land-locked businesses. While this access has been noted as problematic by users, political will to expend resources to improve this access is minimal, at best. Determination of a suitable backage road connection should be prioritized, so this access to TH 169 may be removed.

3.3 FRONTAGE/BACKAGE ROAD ALIGNMENTS

Preliminary development proposals have been received from property owners along the east side of TH 169 south of 173rd Street. MnDOT has responded to these requests stating that they will limit TH 169 access to right-in right-out access and prefers to see a frontage road connection to 173rd Street rather than access on TH 169. Sand Creek township decided to make an initial evaluation of the feasibility of such a connection. The discussion below speaks to the overall feasibility of a frontage road alignment south of 173rd Street and east of TH 169.

Frontage road feasibility was addressed through the use of existing topographic information and evaluation of cross-sections at key points. To provide a basis for evaluation, a simple two-lane roadway was drawn, approximately fifty feet from the TH 169 right-of-way (to centerline of frontage road), a frontage road profile was developed, and cross-sections were cut along the sample frontage road.

The sample frontage road was segmented into nine distinct areas. These areas, along with their feasibility of construction, and station labels, are shown in Figure 9 through Figure 11 and discussed in detail below. CAD-drafted preliminary frontage road profiles and cross sections are included in Appendix C Frontage Road Feasibility. Right-of-way needs, unique environmental impacts and construction costs are discussed in general terms but have not been quantified in any detail so as not to imply a greater level of precision than is feasible at this stage of project development.

- Area 1: Area 1 encompasses the area commonly known as Wagner's Apple Farm. The area extends from 173rd Street to the south approximately 1,100 feet. This area would likely not be considered bluff per Scott County Ordinances. It does appear to be possible to fit a roadway through this area without impacts to existing

structures. The stream would need to be crossed and protected but should not pose an absolute hinderance. However, there is some potential for associated permitting agency requirements, which could prove challenging or costly. With these issues noted, it does appear a roadway through this area may be feasible.

- Area 2: Area 2 encompasses the area around the dwelling at sample frontage road station 1036+00. This area could be considered as laying within the bluff toe or face. If deemed to be within the bluff face, land disturbance would be prohibited. The sample alignment runs through the primary structure on the property. With cooperation from MnDOT, the frontage road could be moved closer to TH 169 and into the bluff toe where disturbance may be allowed. Retaining walls would be required if the existing residential unit is to be maintained. In summary, the economic and permitting oriented viability of passing a frontage road through this area can't be ruled out at this time but is questionable.

- Area 3: Area 3 extends from station 1030+00 to 1035+00. The northern portion of this area could be considered as laying within the bluff toe or face. If deemed to be within the bluff face, land disturbance would be prohibited. The southern portions (south of station 1031+00) are increasingly likely to be considered within the bluff face. The 30% or steeper slopes persist down to the TH 169 ditch. Therefore, the option to move the frontage road down closer to TH 169, to place it in the bluff toe, is not available in the southern portion. If construction were allowed, it is highly likely that extensive retaining walls (up to ~12' high and extending hundreds of feet) would be required. The economic and permitting oriented viability of passing a frontage road through the area south of station 1031+00 is unlikely.

- Area 4: Area 4 extends from station 1027+00 to 1030+00. This area could be deemed to be bluff face. Therefore, land disturbance would likely be prohibited. If construction were allowed, it is highly likely that extensive retaining walls (up to ~12' high and extending hundreds of feet) would be required. The economic and permitting oriented viability of passing a frontage road through the area south of station 1031+00 is very unlikely.

- Area 5: Area 5 extends from station 1023+00 to 1027+00. This area crosses a ravine or valley in the bluff. A bridge, possibly greater than 300' long, or roadbed fill depths of greater than thirty feet would be required to span this area. It is worth noting that if the frontage road were to terminate in the valley, a considerable portion of these costs could be reduced. However, the slopes down into the valley from the north will be a challenge. Furthermore, it may be possible to meander into this area to address profile grades to some degree. However, doing so would increase bluff area impacts. The economic and permitting oriented viability of passing a frontage road through this area is very unlikely.

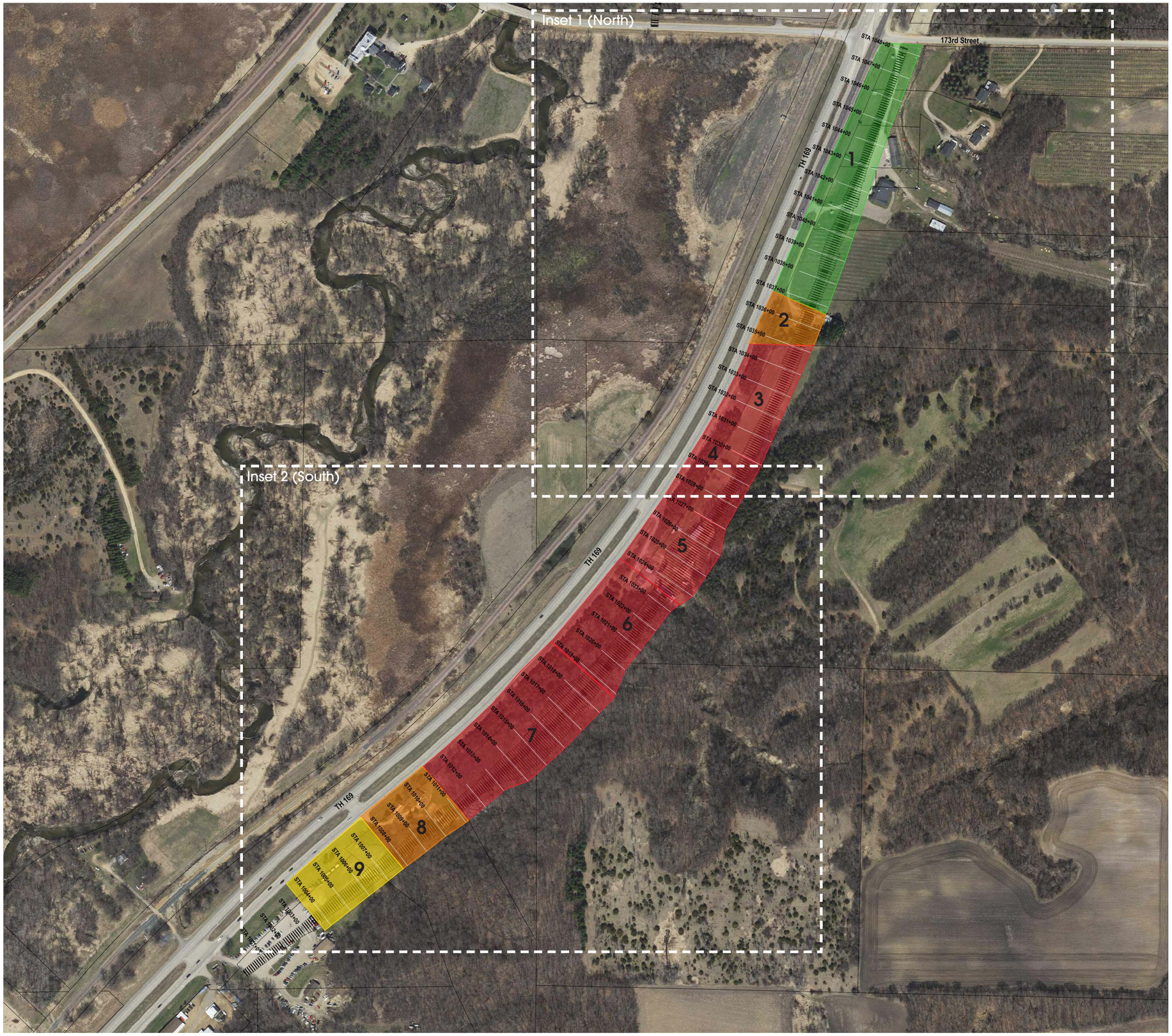
- Area 6: Area 6 extends from station 1019+00 to 1023+00. This area could be deemed to be bluff face. Therefore, land disturbance would likely be prohibited. If construction were allowed, it is highly likely that extensive retaining walls (more than ~12' high and extending hundreds of feet) would be required. The economic and permitting oriented viability of passing a frontage road through the area is very unlikely.

- Area 7: Area 7 extends from station 1012+00 to 1019+00. This area could be deemed to be bluff face. Therefore, land disturbance would likely be prohibited. If construction were allowed, it is highly likely that extensive retaining walls (more than ~12' high and extending hundreds of feet) would be required. The economic and permitting oriented viability of passing a frontage road through the area is very unlikely.

- Area 8: Area 8 extends from station 1008+00 to 1011+00. This area could be deemed to be bluff toe or face. If deemed to be within the bluff face, land disturbance would be prohibited. If construction were allowed, it is likely that some segments could require as much as 20' of fill. The upper structure on the property would need to be removed. Access of the frontage road from the remaining structures may not be feasible due to grades and bluff impacts. The economic and permitting oriented viability of passing a frontage road through the area is unlikely.

- Area 9: Area 9 extends from station 1004+00 to 1008+00. This area could be deemed to be bluff toe or face. If deemed to be within the bluff face, land disturbance would be prohibited. If construction were allowed, it is likely that some segments could require retaining walls as tall as 16'. The economic and permitting oriented viability of passing a frontage road through this area is questionable.

After reviewing the frontage road concept, as it relates to the existing project purpose and need, it doesn't significantly address the project purpose or needs. This is due to the following; low number of vehicle trips associated with few properties served, the public concern for visual or environmental impacts to the bluff area, the extraordinarily high costs anticipated to construct and maintain a roadway which would have a minor classification, and the full set of needs already required to be addressed in the Township's budget. All but the northern most 1,100 feet to 1,300 feet of this frontage road may be considered reasonably non-viable.



Sample Frontage Road General Layout

LEGEND:

- Green - Frontage Road Possible
- Yellow - Frontage Road Feasibility Questionable
- Orange - Frontage Road Feasibility Unlikely
- Red - Frontage Road Feasibility Very Unlikely
- Insets - See Subsequent Pages

Figure 9

TH 169 Corridor Study

SAND CREEK TOWNSHIP, MINNESOTA

November 2018

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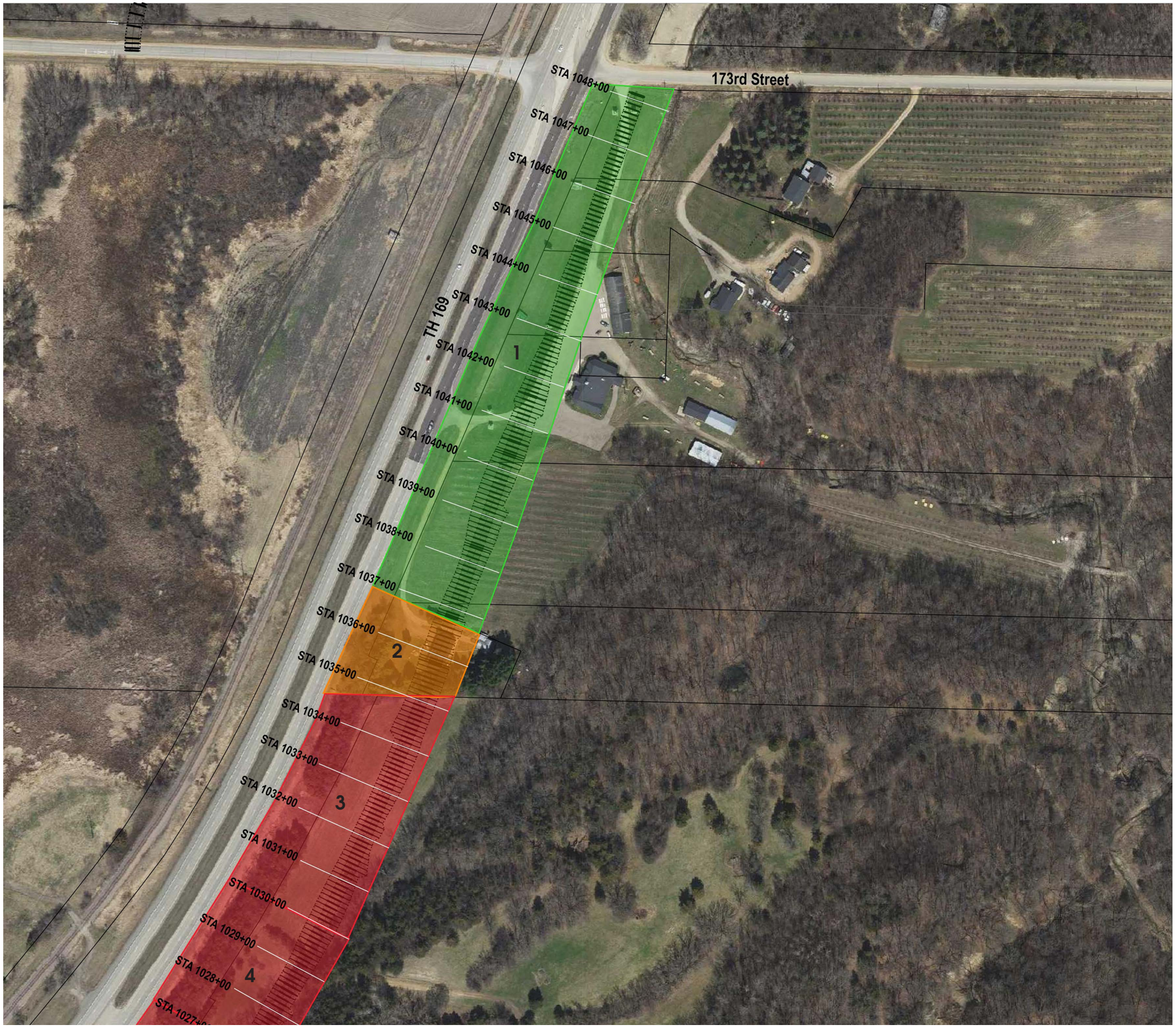

Sample Frontage Road Inset 1 (North)

LEGEND:

- Green - Frontage Road Possible
- Yellow - Frontage Road Feasibility Questionable
- Orange - Frontage Road Feasibility Unlikely
- Red - Frontage Road Feasibility Very Unlikely

Figure 10

TH 169 Corridor Study

SAND CREEK TOWNSHIP, MINNESOTA

November 2018

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Sample Frontage Road Inset 1 (South)

LEGEND:

- Green - Frontage Road Possible
- Yellow - Frontage Road Feasibility Questionable
- Orange - Frontage Road Feasibility Unlikely
- Red - Frontage Road Feasibility Very Unlikely

Figure 11

TH 169 Corridor Study

SAND CREEK TOWNSHIP, MINNESOTA

November 2018

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3.4 RAILS TO TRAILS

North of the corridor study, in Louisville Township, the existing railroad line splits into two. One line runs along the wildlife refuge, presenting no conflicts with the roadways in the study. The second line, runs immediately adjacent to the west side of TH 169, presenting at-grade crossings at Bluff Drive, 166th Street, Jordan Avenue and 173rd Street. A consideration for this project is to move the split of the two lines further south, near the City of Jordan water treatment facility.

Moving the railroad split would effectively eliminate the at-grade crossings adjacent to TH 169. This change would enhance safety, open additional roadway improvement options, and create the potential to turn the old railroad line into a trail connection. A proposed trail would make a highly valued connection to the existing and proposed facilities both to the north and to the south. The Township should work with the County, the Rails-to-Trails Conservancy, the Railroad ownership, and others to investigate the feasibility of this option.

4.0 PUBLIC INVOLVEMENT

Public involvement is an integral part of a project's successful decision-making process. It serves to inform, educate, and gain input from stakeholders on decisions that affect them. Public involvement for the study included the following formats; two formal open houses, the project website, and township board meetings. The Township noted that they have been receiving comments regarding traffic and safety for years regarding this corridor. These comments and discussions were reenergized by the Scott County TH 41 project to the north and set the precedent for Sand Creek to compete this study.

4.1 OPEN HOUSES

4.1.1 Business and Property Owner Open House

Businesses make up the majority ownership directly adjacent to the corridor. Business stakeholders provide a different viewpoint from the public on the functionality and usability of a road as it pertains to doing business. Approximately 50 business and property owners were mailed a direct invite to the open house which took place on June 6, 2018 from 4-7pm at the Scott County Association for Leadership and Efficiency (SCALE) Regional Training Facility in Jordan, MN.

Staff from MnDOT, Scott County, Sand Creek Township, and Stantec were available at the meeting to assist in facilitating discussion, answering questions, and collecting input. Seven business/property owners and one representative from Louisville Township attended the open house. Due to under-representation of local business owners, Stantec directly called all business owners along the corridor to invite them to attend the public open house which was held one week later.

Meeting materials and exhibits provided include:

- An informational PowerPoint cycling through slides for individuals to sit and view as they desired. No formal presentation was given.
- Large layout drawings with an aerial image for individuals to write issues, ideas, or future development plans on.
- Boards with the project location, existing conditions, project schedule, and contact information were located around the room.
- Handout and board with contact information for submitting comments.
- Comment forms for individuals to express comments and/or ideas. Comment forms could be submitted at the meeting or mailed in. Comment forms were also mailed with the meeting invitations.

A detailed meeting summary containing copies of the meeting material and exhibits, sign-in sheet, and received comments is provided in Appendix D Meeting Summaries.

4.1.2 Public Open House

TH 169 is a principal arterial and acts as the main gateway into the Twin-Cities Metro Area for residents living on the west side of Scott County. In addition, rural residents utilize this section of TH 169 in Sand Creek Township to visit cities south of the metro including Jordan and Belle Plaine, MN. Local residents provided valuable feedback on travel

patterns, comfort level of driving, community concerns, important destinations, areas for pedestrian access improvements etc.

The public open house was held on June 13, 2018 at the SCALE Regional Training Facility in Jordan, MN from 4-7pm. An advertisement and legal notice for the meeting was published in the June 7, 2018 edition of the Jordan Independent and cycled through the newspapers local guide for a week. Staff from MnDOT, Scott County, Sand Creek Township, and Stantec were available at the meeting to facilitate discussion, answer questions, and collect input. Seven residents or business owners and one representative from Louisville Township attended the open house to discuss the project.

Meeting materials and exhibits provided include:

- An informational PowerPoint cycling through slides for individuals to sit and view as they desired. No formal presentation was given.
- Large layout drawings with an aerial image for individuals to write issues, ideas, or future development plans on.
- Boards with the project location, existing conditions, project schedule, and contact information were located around the room.
- Handout and board with contact information for submitting comments.
- Comment forms for individuals to express comments and/or ideas.

A detailed meeting summary containing copies of the meeting material and exhibits, sign-in sheet, and received comments is provided in Appendix D Meeting Summaries.

4.2 PROJECT WEBSITE

Scott County hosted the project on their website under the “Future Projects & Studies” section. The website included pertinent project information such as the project description, public input opportunities, project purpose & justification, contact information, and links to project documents.

4.3 TOWNSHIP BOARD MEETINGS

The Sand Creek Township board has regularly scheduled meetings on the first Thursday of every month where citizens are welcome to attend. Stantec provided updates at the board meetings during project completion. Copies of the meeting minutes from the board meetings can be found on the township’s website. Follow-up calls were made directly to residents voicing particular questions or concerns.

5.0 AGENCY INVOLVEMENT SUMMARY

Due to the inter-regional importance of TH 169 this study was largely focused on multi-agency involvement through a series of meetings including a kick-off meeting, multiple concept development workshops, and a final check-in meeting. Agency stakeholders included Sand Creek Township, Scott County, MnDOT, and Louisville Township.

5.1 KICK-OFF MEETING

On May 9, 2018 a kick-off meeting was held at the Scott County Government Center in Shakopee, MN. In attendance were representatives from MnDOT, Scott County, Sand Creek Township, Louisville Township, and Stantec. The meeting purpose was to establish agency contacts, present the project scope, goals, and objectives, collect additional input and/or information form representatives, review the project schedule, and inform the group of up-coming meetings. Meeting notes from the meeting are included in Appendix D Meeting Summaries.

5.2 CONCEPT DEVELOPMENT WORKSHOPS

As part of the on-going agency involvement process, two separate concept development workshops were held with Scott County and MnDOT. Ahead of the workshop, ten conceptual alternatives were developed to be discussed, analyzed, and reviewed. The ultimate purpose of the workshops was to move forward with three concepts that best fit the needs of the corridor and study purpose. The ten developed conceptual alternatives and three final concepts to be analyzed in greater detail are discussed below in Section 6.0 Conceptual Layouts.

The workshop with Scott County was held on August 1, 2018 at the Scott County Highway Department. The MnDOT workshop followed on August 6, 2018 at the MnDOT Waters Edge Building. Both workshops followed the same agenda and sought the same outcome. MnDOT concurred with the three final alternatives Scott County determined in workshop discussions prior. A meeting summary for the Scott County workshop is included in Appendix D Meeting Summaries. Since the workshop with MnDOT followed the same agenda and had similar discussion, a separate meeting summary was not created.

5.3 FINAL CONCEPT REVIEW MEETING

On September 13, 2018 at the Scott County Highway Department, representatives from Scott County and Sand Creek Township met again to receive a progress update on the final three alternatives, review the next project steps, and talk about relevant funding opportunities. Funding sources consisted of county sales tax, MnDOT Corporative Agreements, Local Roads Improvement Program (LRIP), Federal Freight, Highway Safety Improvement Program (HSIP), Federal BUILD Grants, and local property owners if they were inclined to donate land to advance area improvements. The meeting summary is included in Appendix D Meeting Summaries and additional discussion of funding opportunities is in Section 8.2 Potential Funding Sources.

6.0 CONCEPTUAL LAYOUTS

6.1 CONCEPT DEVELOPMENT

Ten conceptual alternatives based on five principle options were developed prior to agency development workshops with Scott County and MnDOT. All five options provide a varying degree of feasibility and offer both long and short-term solutions. Layouts of each alternative are included in Appendix E Preliminary Conceptual Alternatives. Each concept is described below with additional discussion points highlighting why or why not the concept was carried forward.

- **Concept 1: Reduced Conflict Intersections (RCI)**
  - **Description:** Provides various access closures coupled with restricted crossing U-turn (RCUT) intersections throughout the project corridor.
  - **Discussion:** Not anticipated to be a long-term solution but could potentially be used as an interim fix and/or as a complement to an overpass or underpass option. Heavy vehicles being able to make these turns was a major concern. RCUT locations, need for signalization, and layout for truck accommodation would need to be further analyzed.
  - **Decision:** Move forward as part of a final at-grade concept using a mixture of RCUTs and acceleration lanes.
- **Concept 2: Controlled access with local roads over TH 169 (overpasses)**
  - **Description:** Three various concepts (2, 2A, 2B) utilizing a combination of overpasses over TH169 coupled with right-in/right-out (RIRO) accesses. The concepts vary in their means of providing access, primarily on the south end of the project corridor.
  - **Discussion:** The cost of three bridges, right-of-way, and business impacts were not justified in light of the project needs. Participating agencies stated the concept would not receive the necessary political and economic support to advance.
  - **Decision:** Reduce the number of bridges to one and move forward as a final overpass concept.
- **Concept 3: Controlled access with TH 169 over local roads (underpasses)**
  - **Description:** Provides a combination of underpasses under TH 169 coupled with right-in/right-out (RIRO) accesses.
  - **Discussion:** The cost of three underpasses is beyond funding resources and would have trouble receiving the necessary political and economic support to advance.
  - **Decision:** Reduce the number of underpasses to one and move forward as a final underpass concept.
- **Concept 4: Acceleration Lanes**
  - **Description:** Adds acceleration/deceleration and right turn lanes to various areas of the corridor coupled with access closures where plausible.
  - **Discussion:** Not anticipated to be a long-term solution but can be used as an interim fix and/or as a complement to other concepts. This concept should be coupled with additional access improvements to adequately address the existing issues of the corridor.
  - **Decision:** Combine this concept with concept 1 (RCUT). Do not move forward with an acceleration/deceleration lane only alternative as it does not address the safety issues sufficiently.
- **Concept 5: Diverging Diamond Interchange (DDI)**
  - **Description:** Four versions (5, 5A, 5B, 5C) of DDI concepts dependent on assumptions regarding the existing railroad and potential to realign TH 169. These concepts were developed to see if under any conditions, an interchange could be constructed.
  - **Discussion:** The existing railroad possesses a huge obstacle for the construction of an interchange and does not make it possible without extensive costs in construction, right-of-way, and business takings. The reality of relocating or abandoning the existing railroad line is unachievable at this time. Furthermore, any

additional improvements in regard to the project purpose and needs were too minor compared to the significant increase in assumed costs compared to other alternatives.

- **Decision:** Do not move forward with this alternative.

6.2 FINAL THREE CONCEPTS

As described above, three of the five principal options were decided to be carried forward as final alternatives for detailed consideration. Concept 1 consists of at-grade solutions and is described in Table 15 and shown in Figure 12. Concept 2 is a singular overpass over TH 169 connecting Jordan and Berkshire Avenue and is described in Table 16 and shown in Figure 15. Concept 3 is a singular underpass at Bluff Drive and is described in Table 17 and shown in Figure 18. If one of the grade separation concepts were moved forward for construction, it would need to go through MnDOT's interchange review committee to qualify for Met Council regional solicitation funding eligibility.

Table 15 – Concept 1 Description

Roadway Structure Additions	RCUT Intersections*	Proposed Roadways	Acceleration Lanes	Left Turn Lanes	Right Turn Lanes	Median Closures	Access Closures
None	RCUT 1: SB to NB between Quincunx Mining & Bluff Drive**	Connect Berkshire Avenue to Bluff Drive	South of Great Plains Sand Access	For RCUT between Quincunx Mining & Bluff Drive	North of W 166th Street	Great Plains Sand & 15555 Private Residence Access	East Side of W 166th Street
	RCUT 2: NB to SB between Quincunx Mining & Bluff Drive	Realign Jordan Avenue to 173rd Street	South of Quincunx Mining Access	For RCUT between Quincunx Mining & Bluff Drive		Quincunx Mining & Field Access	16931 Private Residence (south of W 166th Street)
	RCUT 3: NB to SB north of 173rd Street**		North of Bluff Drive	For RCUT north of 173rd Street		Bluff Drive Intersection	Field Access (south of W 166th Street)
	RCUT 4: SB to NB south of 173rd Street		South of Bluff Drive	For RCUT south of 173rd Street		W 166th Street Intersection	Jordan Avenue
			South of W 166th Street			16931 Private Residence & Field Access	
			North of 173rd Street			17471 Private Residence & Field Access	
			South of 173rd Street			17655 Private Residence Access	
						18025 (Automobile Nation), 18101, 17930 Residential Accesses	

*RCUT intersections will need to be designed to accommodate heavy/large vehicles
**RCUT facilitates a relatively small number of users and could be considered optional

Plot Date: $$...plottingdate....$$
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Model: $MODELNAME$

Figure 12

CONCEPT 1 GENERAL LAYOUT

SAND CREEK TOWNSHIP

TH 169

DATE: 12/10/2018 PROJ. NO.: 193804245

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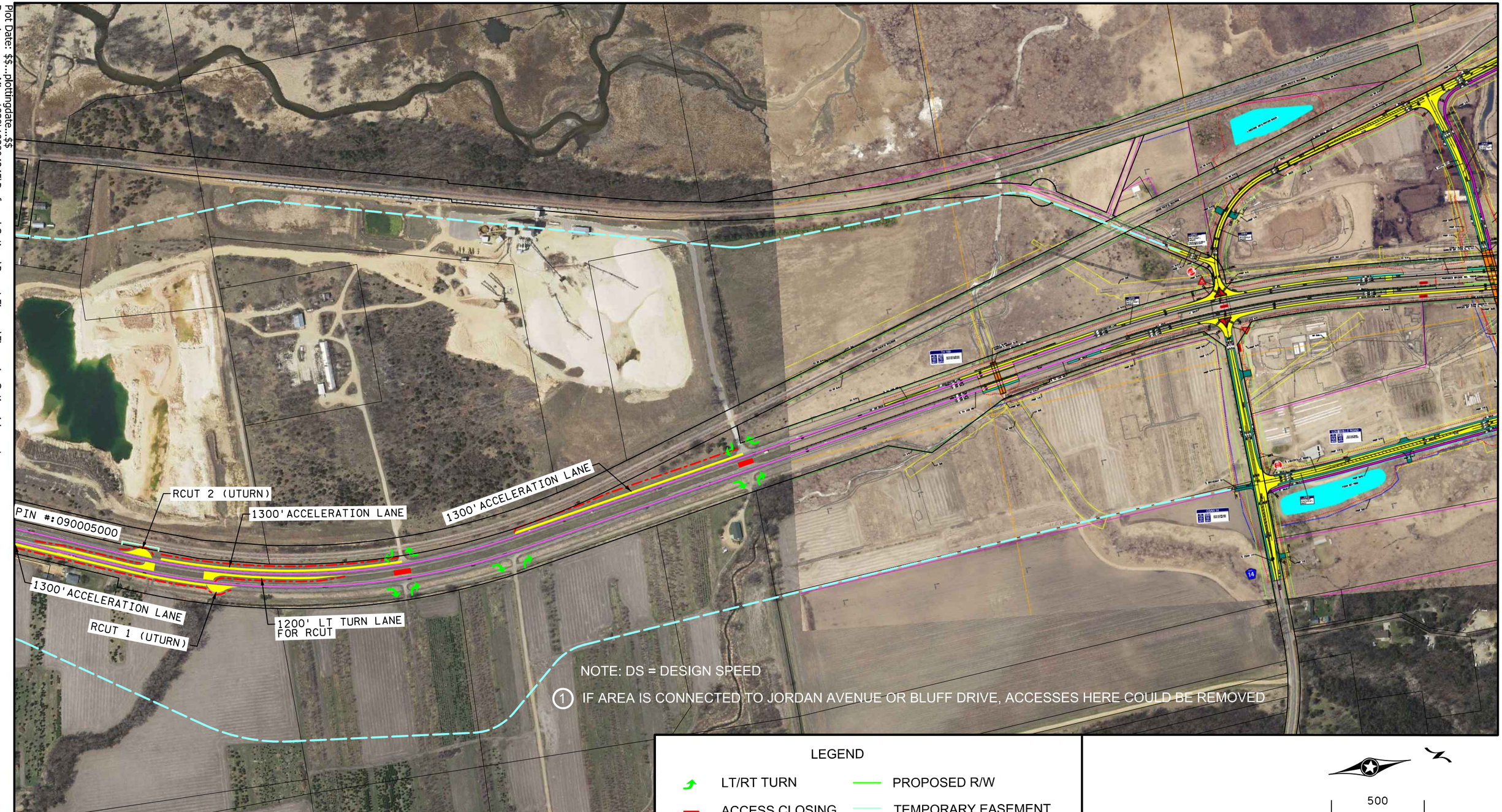

Figure 13

CONCEPT 1 INSET 1

SAND CREEK TOWNSHIP

TH 169

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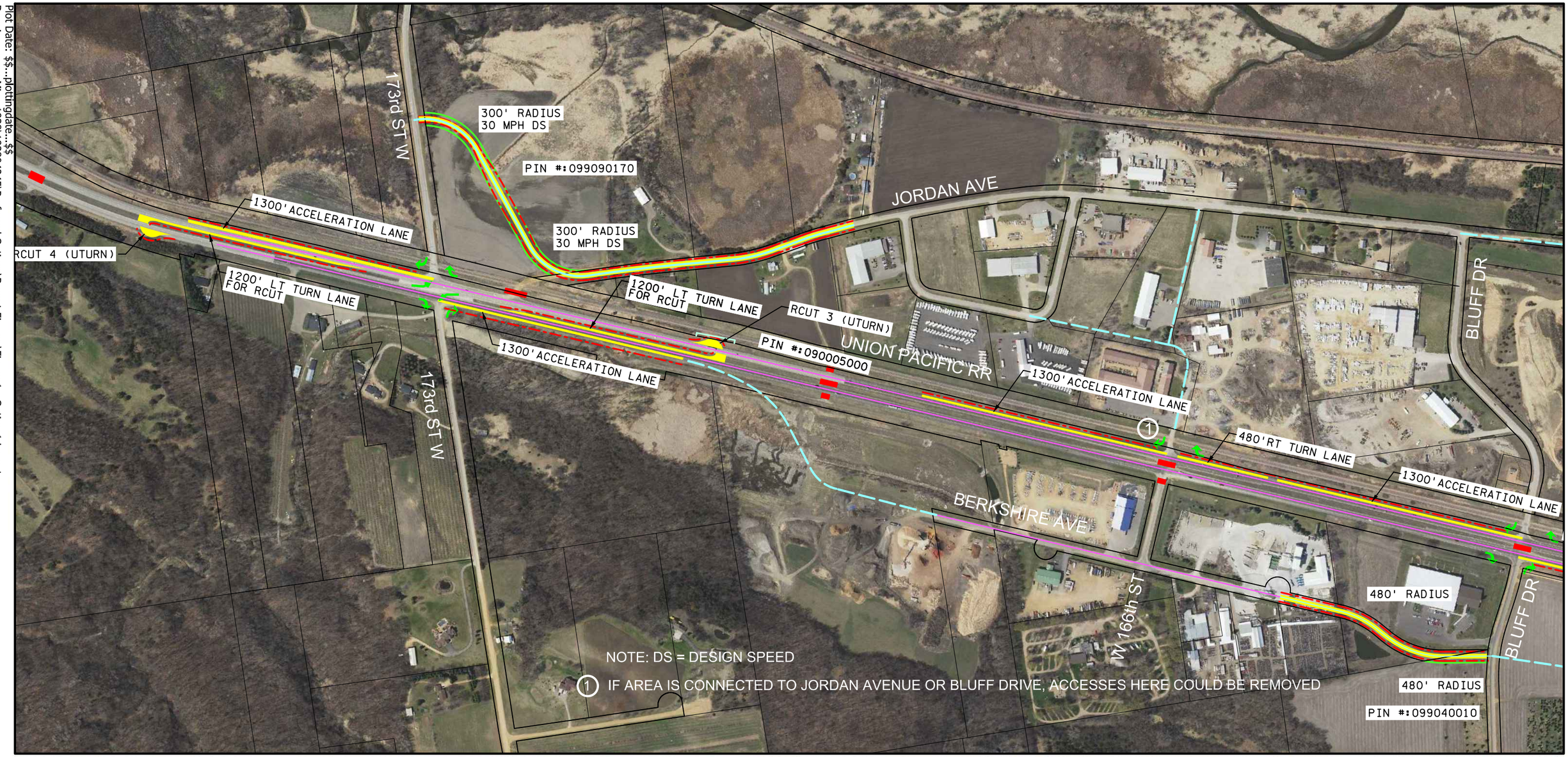

LEGEND

- LT/RT TURN
- ACCESS CLOSING
- PROPOSED ROAD
- FUTURE ROAD
- PROPOSED R/W
- TEMPORARY EASEMENT
- CONSTRUCTION LIMITS

500
SCALE IN FEET

Figure 14
CONCEPT 1 INSET 2

SAND CREEK TOWNSHIP
TH 169

DATE: 12/10/2018 PROJ. NO.: 193804245

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Table 16 – Concept 2 Description

Roadway Structure Additions	RCUT Intersections	Proposed Roadways	Acceleration Lanes	Left Turn Lanes	Right Turn Lanes	Median Closures	Access Closures
Overpass of local roads over TH 169 connecting Jordan Avenue and Berkshire Avenue	None	Connect Berkshire Avenue to Bluff Drive	South of Great Plains Sand Access	None	North of W 166th Street	Great Plains Sand & 15555 Private Residence Access	East Side of W 166th Street
		Connect Berkshire Avenue to Jordan Avenue	South of Quincunx Mining Access			Quincunx Mining & Field Access	16931 Private Residence (south of W 166th Street)
		Realign Jordan Avenue to 173rd Street	North of Bluff Drive			Bluff Drive Intersection	Field Access (south of W 166th Street)
			South of W 166th Street			W 166th Street Intersection	Jordan Avenue
			North of 173rd Street			16931 Private Residence & Field Access	
			South of 173rd Street			17471 Private Residence & Field Access	
						17655 Private Residence Access	
						18025 (Automobile Nation), 18101, 17930 Residential Accesses	

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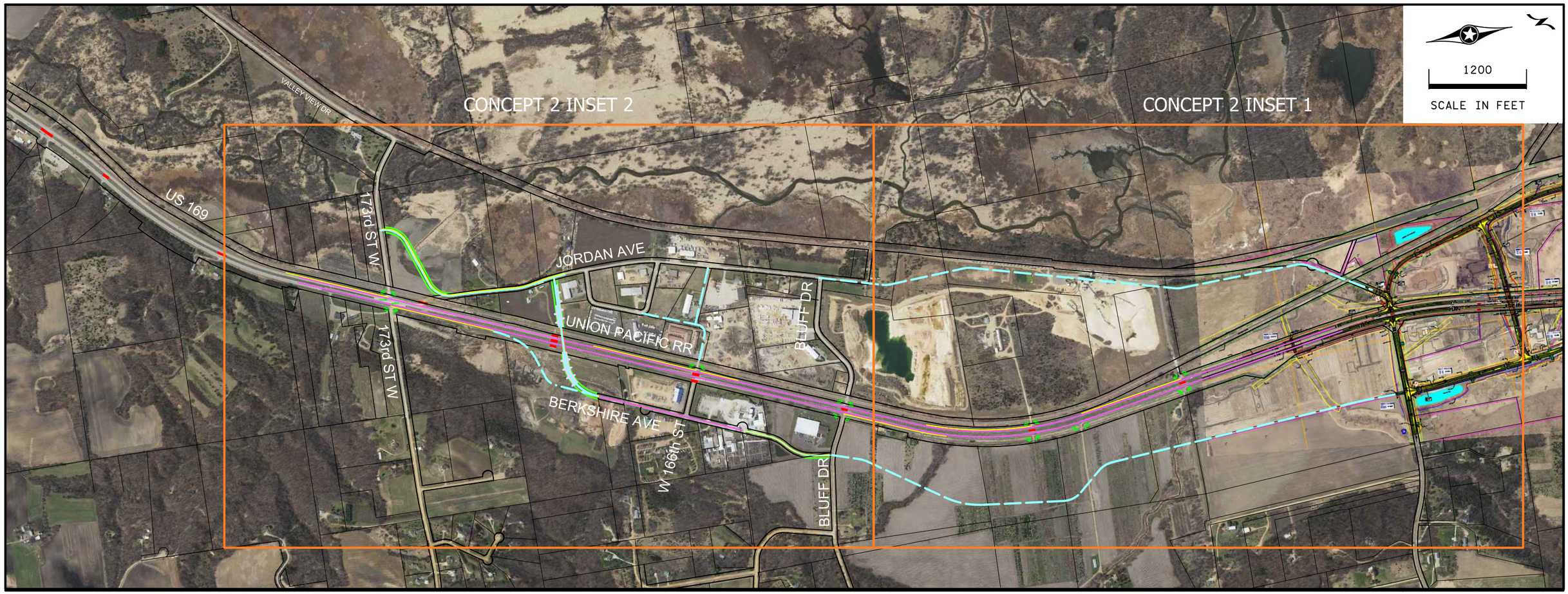

LEGEND
- LT/RT TURN
- ACCESS CLOSING
- PROPOSED ROAD
- FUTURE ROAD

Figure 15
CONCEPT 2 GENERAL LAYOUT

SAND CREEK TOWNSHIP

TH 169

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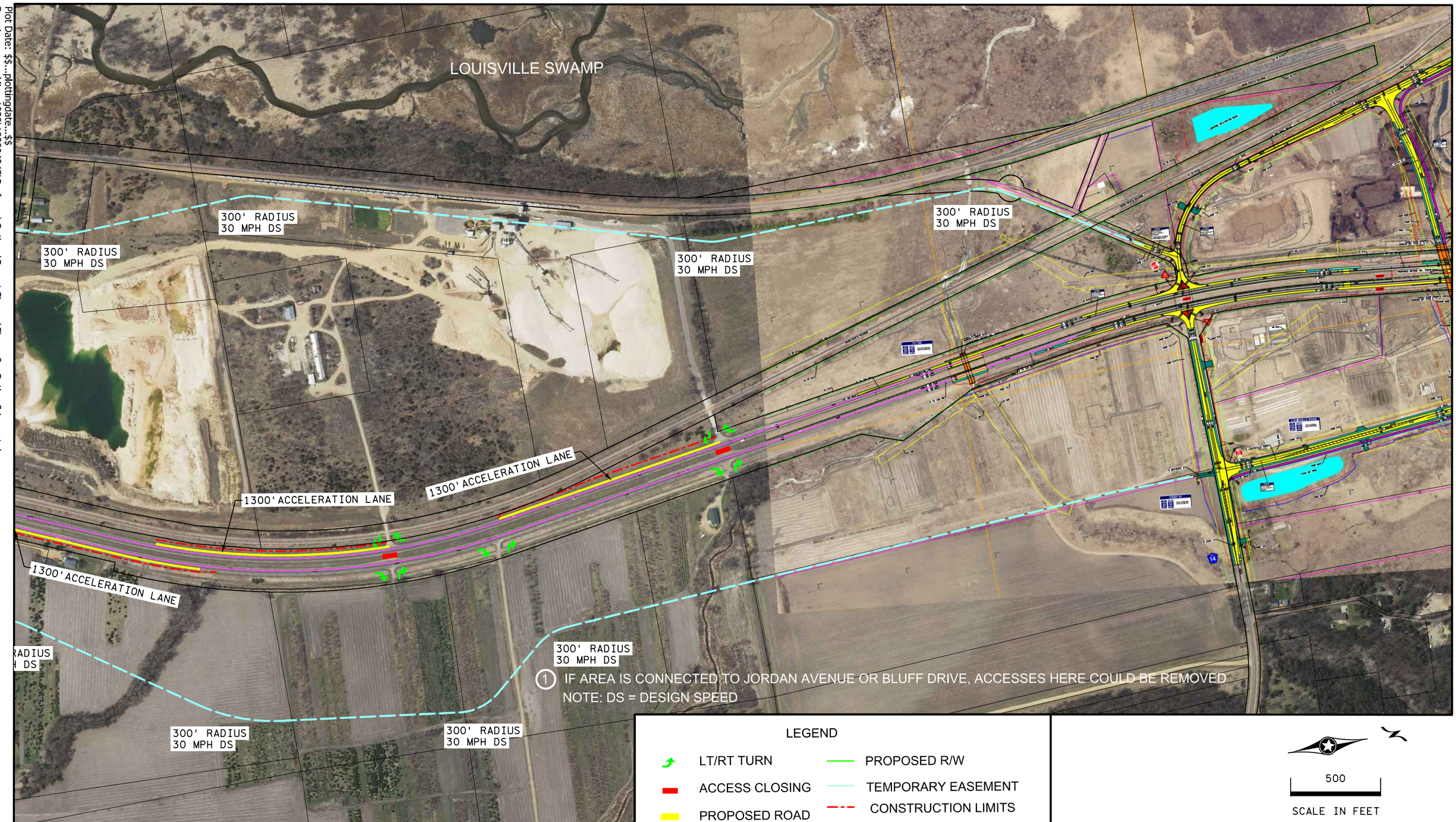

CONCEPT 2 INSET 1 **Figure 16**

SAND CREEK TOWNSHIP

TH 169

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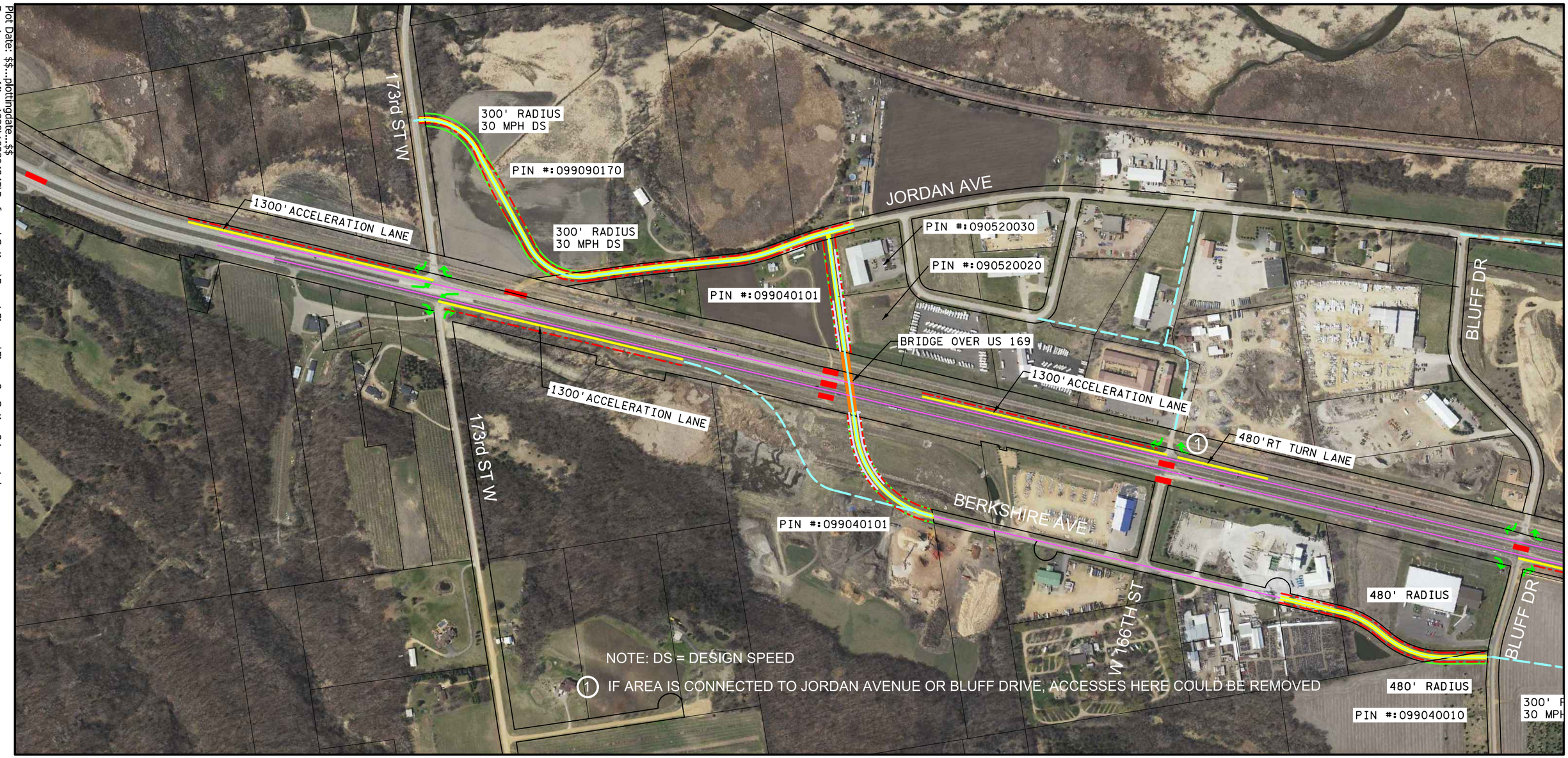

LEGEND

LT/RT TURN	PROPOSED R/W
ACCESS CLOSING	TEMPORARY EASEMENT
PROPOSED ROAD	RETAINING WALL
FUTURE ROAD	CONSTRUCTION LIMITS

500
SCALE IN FEET

Figure 17
CONCEPT 2 INSET 2

SAND CREEK TOWNSHIP
TH 169

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Table 17 – Concept 3 Description

Roadway Structure Additions	RCUT Intersections	Proposed Roadways	Acceleration Lanes	Left Turn Lanes	Right Turn Lanes	Median Closures	Access Closures
Underpass of local roads under TH 169 at Bluff Drive	None	Off Ramp from TH 169 to Bluff Drive	Deceleration Lane north of Bluff Drive for off ramp	None	None	Great Plains Sand & 15555 Private Residence Access	East Side of W 166th Street
		On Ramp from Bluff Drive to TH 169	Acceleration Lane north of Bluff Drive for on ramp			Quincunx Mining & Field Access	16931 Private Residence (south of W 166th Street)
		Connect Berkshire Avenue to Bluff Drive	South of W 166th Street			Bluff Drive Intersection	Field Access (south of W 166th Street)
		Off Ramp from TH 169 to Berkshire Avenue	North of 173rd Street			W 166th Street Intersection	Jordan Avenue
		Realign Jordan Avenue to 173rd Street	South of 173rd Street			16931 Private Residence & Field Access	
			Deceleration lane for off-ramp to Berkshire Avenue			17471 Private Residence & Field Access	
						17655 Private Residence Access	
						18025 (Automobile Nation), 18101, 17930 Residential Accesses	

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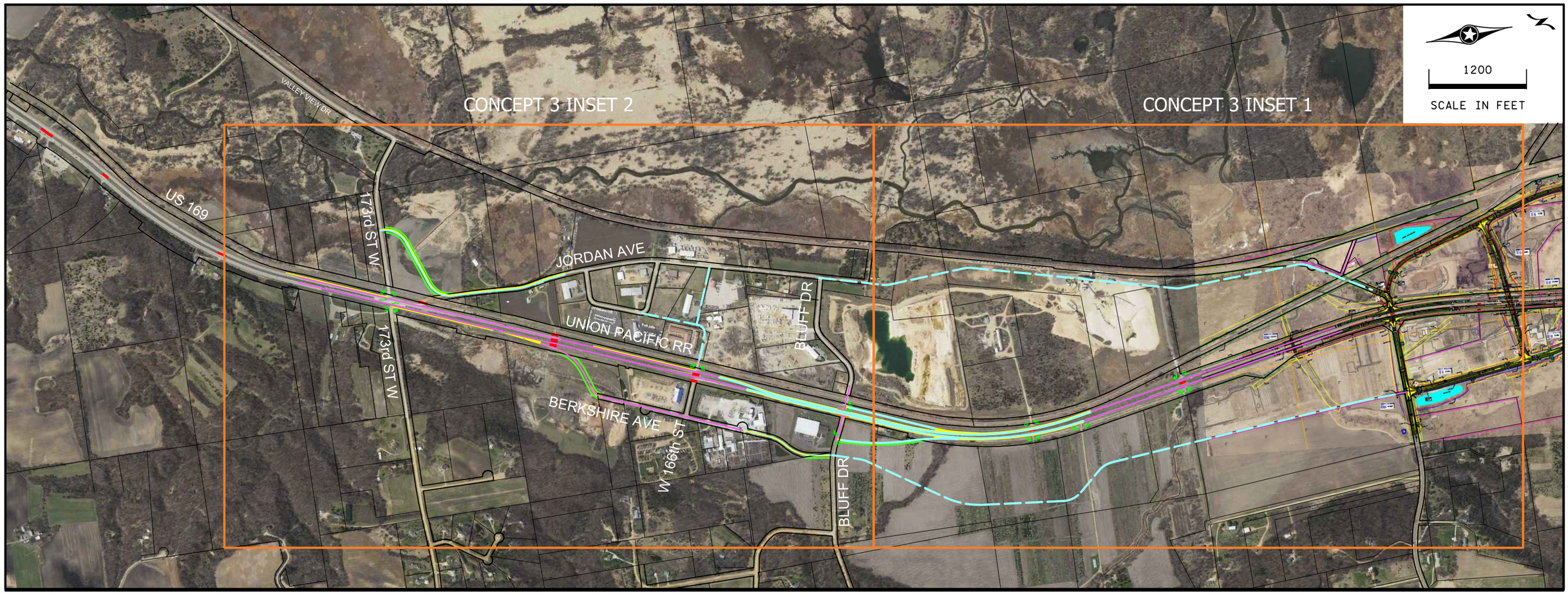

LEGEND
- LT/RT TURN
- ACCESS CLOSING
- PROPOSED ROAD
- FUTURE ROAD

Figure 18
CONCEPT 3 GENERAL LAYOUT

SAND CREEK TOWNSHIP

TH 169

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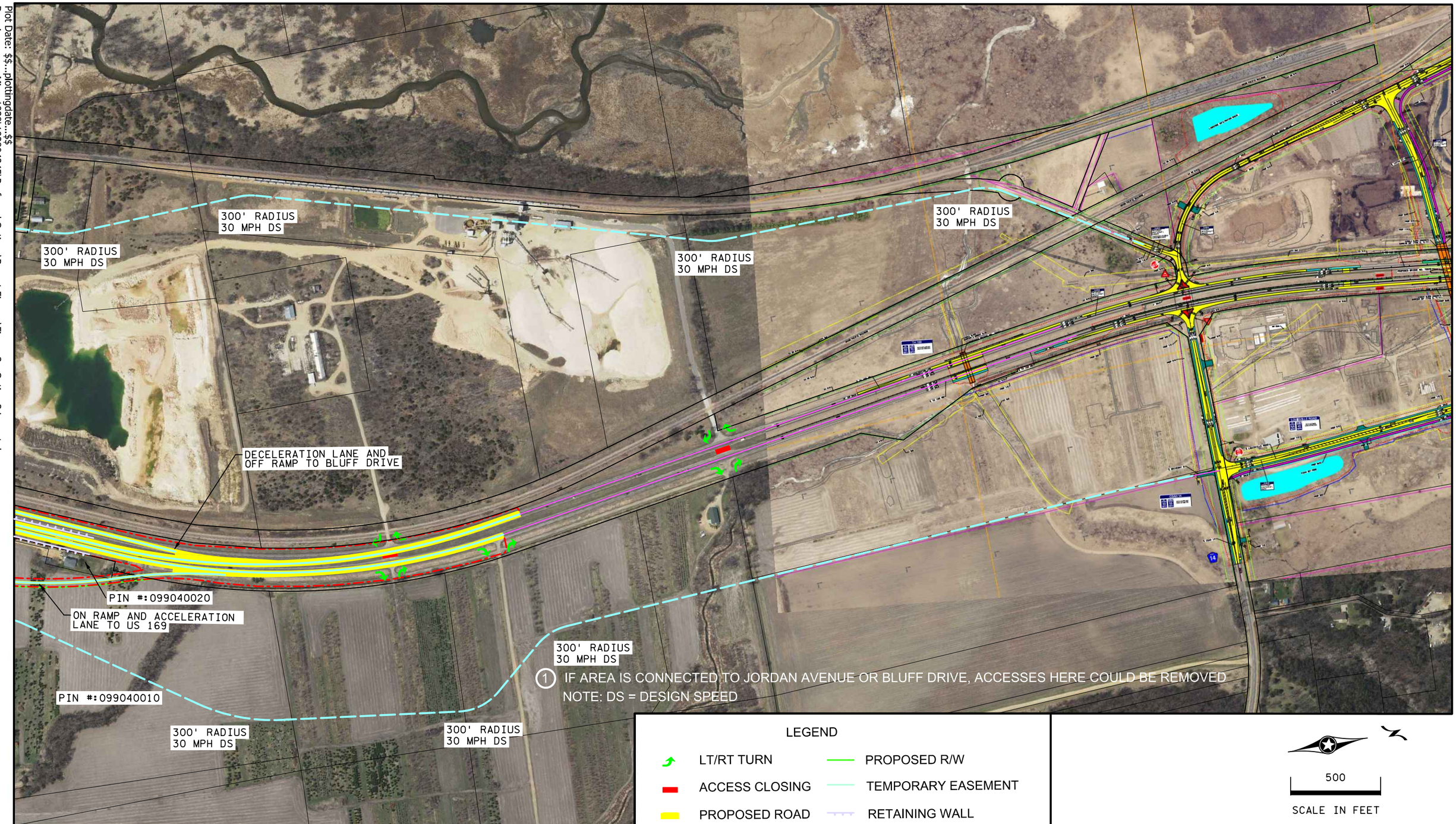

CONCEPT 3 INSET 1 **Figure 19**

SAND CREEK TOWNSHIP

TH 169

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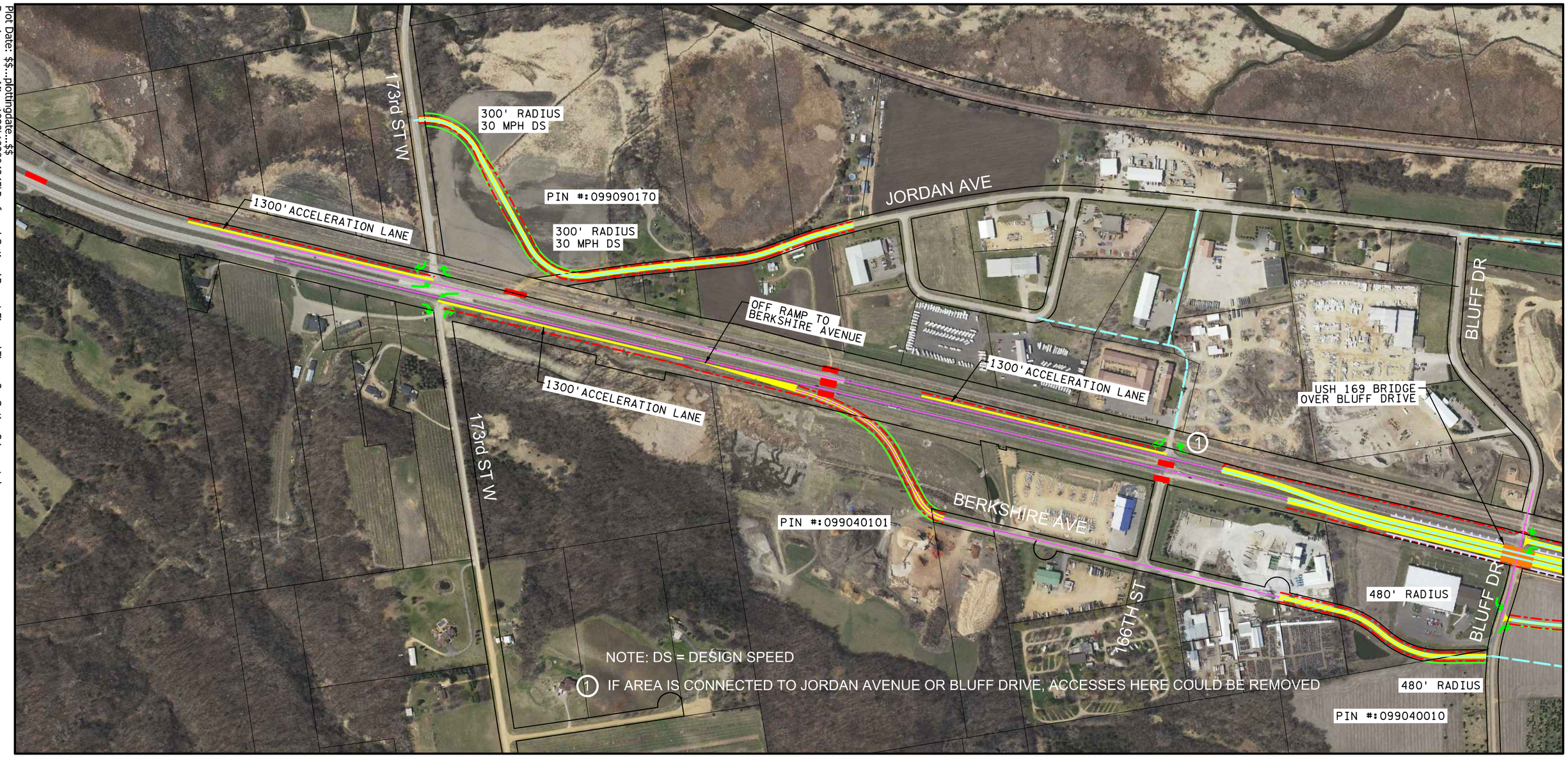

LEGEND

LT/RT TURN	PROPOSED R/W
ACCESS CLOSING	TEMPORARY EASEMENT
PROPOSED ROAD	RETAINING WALL
FUTURE ROAD	CONSTRUCTION LIMITS

500
SCALE IN FEET

Figure 20
CONCEPT 3 INSET 2

SAND CREEK TOWNSHIP
TH 169

DATE: 12/10/2018 PROJ. NO.: 193804245

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7.0 EVALUATION OF FINAL THREE CONCEPTS

7.1 TRAFFIC

The three final concepts were evaluated using Synchro/SimTraffic under existing and forecasted conditions. The no build scenario was also evaluated under forecast conditions. Forecasted conditions were estimated for the year 2038, using the Scott County 20-year growth factor of 1.2. This factor was applied to all movements in the model and was obtained from the MnDOT State Aid County Projection Factors table.

7.1.1 Analysis of Alternatives

The traffic analysis included the following scenarios:

- No-Build Forecast Conditions (2038)
- Option 1: At-Grade Solutions Existing Conditions
- Option 1: At-Grade Solutions Forecast Conditions (2038)
- Option 2: Overpass at Jordan Avenue Existing Conditions
- Option 2: Overpass at Jordan Avenue Forecast Conditions (2038)
- Option 3: Underpass at Bluff Drive Existing Conditions
- Option 3: Underpass at Bluff Drive Forecast Conditions (2038)

The no build scenario was analyzed for forecasted conditions as a means of comparison to the differing concepts. It demonstrates how the corridor will perform if no future roadway improvements happened and the traffic volumes grew to the numbers expected in 2038. In the build scenarios, if a vehicle used turning movements that were eliminated from the geometrics, it was rerouted through the system based on engineering judgement. When multiple reroutes were available to a vehicle, consideration was given to likely time of travel, ease of movement and assumed driver preference. Figure 21 through Figure 23 show the number of vehicles routed through each turning movement for the three concepts.

The LOS for the forecasted no build scenario, and for both existing and forecasted conditions for each concept, are shown in Figure 24 through Figure 27. Tables for each of the scenarios showing que length, delay per vehicle, and LOS broken out by intersection, direction, and movement are available in Appendix A Traffic Analysis.

7.1.2 Summary of Analysis

Table 18 compares the underperforming traffic movements (LOS D and lower) for each scenario in the AM peak and Table 19 compares the PM peak. Many of the failing movements in the existing 2018 and no build 2038 scenarios are eliminated in the various options and are therefore marked with a dash. As noted in Section 7.1.1 above, movements that were eliminated were rerouted through the system.

As expected, the No Build scenario shows conditions similar to or worse than those of the existing conditions. The EB/WB left and through movements from the side streets are expected to experience increased delays. Unacceptable delays are also seen for some of the SB left turns in the AM peak, and NB left turns in the PM peak. The EB queue lengths at all the intersections with TH 169 are shown to reach the railroad tracks during both of the

peak hours. Signage is currently at all the intersections alerting drivers of the crossing, but no crossing arms are present.

Option 1 under existing conditions is expected to operate acceptably with the exception of RCUT 4, which has a LOS D during the AM peak. The EB queue lengths at all intersections with TH 169 are shown to reach the railroad tracks during one or both of the peak hours, but there are no other queueing issues in the model. Under forecast conditions, all the RCUT, except RCUT 3, experience an unacceptable delay during either the AM or PM peak. RCUT 4 had a LOS F and a queue of 159 feet in the model. MnDOT noted during project conversations, that the option to signalize RCUT intersections could be considered if future traffic volumes started to create issues as the model shows. Therefore, Option 1 may be seen as a viable interim solution.

Under existing conditions for Option 2, all movements experienced a LOS C or better for both peak hours. The EB queue lengths at all the intersections with TH 169 are shown to reach the railroad tracks during both of the peak hours, but there are no other queueing issues in the model. Under forecast conditions the NB left turn at 173rd Street experiences a LOS D. No other issues of delay or queueing were present in the model.

Under existing conditions for Option 3, all movements experienced a LOS C or better for both peak hours. The EB queue lengths at the 173rd intersections with TH 169 are shown to reach the railroad tracks during both of the peak hours, but there are no other queueing issues in the model. Under forecast conditions the SB left-turn at 173rd Street experiences a LOS E/D, respectively. No other issues of delay or queueing were present in the model.

Table 18 – LOS Comparison for Failing Movements in AM Peak

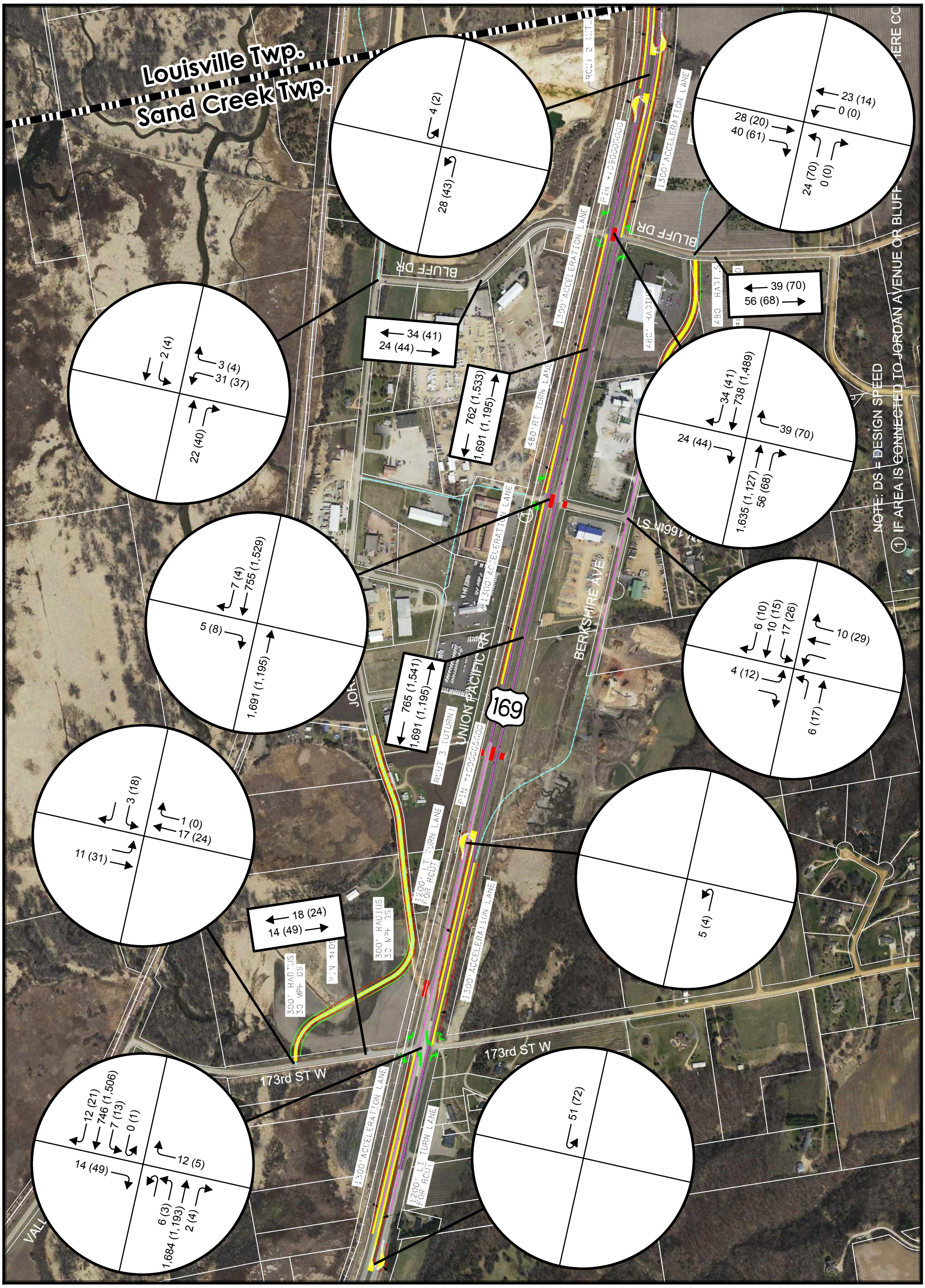
Intersection	Direction	Movement	Traffic Scenarios							
			Existing 2018	No Build 2038	Option 1 Existing	Option 1 Forecast	Option 2 Existing	Option 2 Forecast	Option 3 Existing	Option 3 Forecast
RCUT 1	SB	U-Turn	-	-	B	D	-	-	-	-
TH 169 & Bluff DR	EB	Left	C	D	-	-	-	-	-	-
		Thru	D	E	-	-	-	-	-	-
	WB	Left	C	F	-	-	-	-	-	-
		Thru	C	F	-	-	-	-	-	-
		Right	B	D	A	A	A	A	-	-
TH 169 & W 166th St	EB	Left	D	E	-	-	-	-	-	-
		Thru	D	F	-	-	-	-	-	-
	WB	Left	E	E	-	-	-	-	-	-
		Thru	E	E	-	-	-	-	-	-
		Right	C	E	-	-	-	-	-	-
	SB	Left	B	D	-	-	-	-	-	-
TH 169 & 173rd St	SB	U-Turn	-	-	-	-	-	-	C	D
		Left	A	D	C	D	C	C	C	E
RCUT 4	SB	U-Turn	-	-	D	F	-	-	-	-

This table only shows the failing movements from the traffic simulation. Failing movements include any movement with a LOS D or lower.

Table 19 – LOS Comparison for Failing Movements in PM Peak

Intersection	Direction	Movement	Traffic Scenarios							
			Existing 2018	No Build 2038	Option 1 Existing	Option 1 Forecast	Option 2 Existing	Option 2 Forecast	Option 3 Existing	Option 3 Forecast
RCUT 2	NB	U-Turn	-	-	B	E	-	-	-	-
TH 169 & Bluff DR	EB	Left	D	E	-	-	-	-	-	-
		Thru	D	E	-	-	-	-	-	-
	WB	Left	D	E	-	-	-	-	-	-
		Thru	E	E	-	-	-	-	-	-
	NB	Left	C	D	-	-	-	-	-	-
TH 169 & W 166th St	EB	Left	C	E	-	-	-	-	-	-
		Thru	C	F	-	-	-	-	-	-
	WB	Left	D	D	-	-	-	-	-	-
		Thru	D	E	-	-	-	-	-	-
TH 169 & 173rd St	NB	Left	C	C	-	D	B	D	A	C

This table only shows the failing movements from the traffic simulation. Failing movements include any movement with a LOS D or lower.



Concept 1 Forecasted Peak Hour Turning Movements (2038)

TH 169 Corridor Study
Sand Creek Township, Minnesota

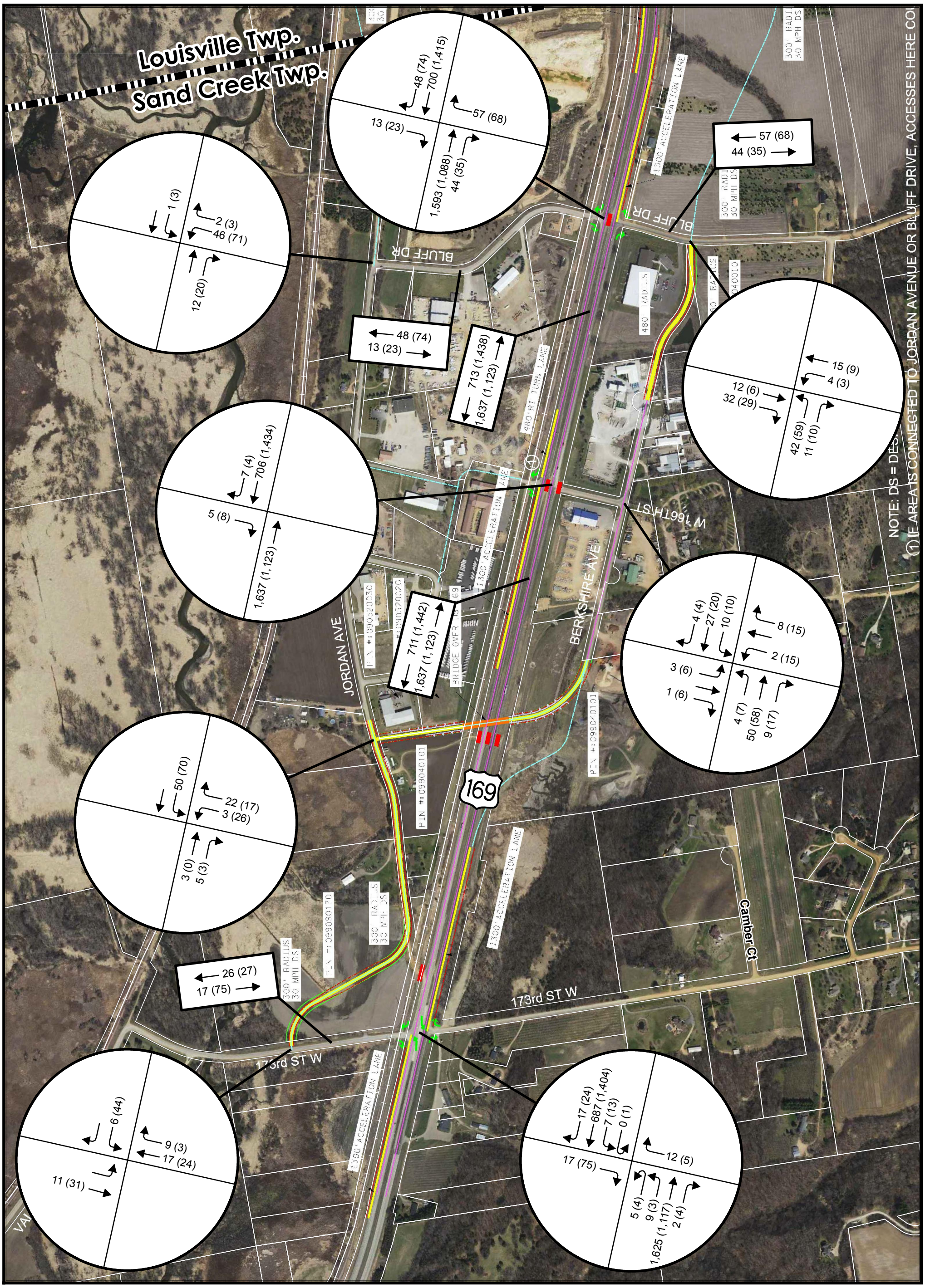
Figure 21

A Forcasted AM Peak Hour Turning Movements
(A) Forcasted PM Peak Hour Turning Movements
Municipal Boundary

N
0 600 1,200 Feet

December 10, 2018

Stantec



Concept 2 Forecasted Peak Hour Turning Movements (2038)

TH 169 Corridor Study
Sand Creek Township, Minnesota

Figure 22

N

0 600 1,200 Feet

A Forcasted AM Peak Hour Turning Movements

(A) Forcasted PM Peak Hour Turning Movements

Municipal Boundary

December 10, 2018

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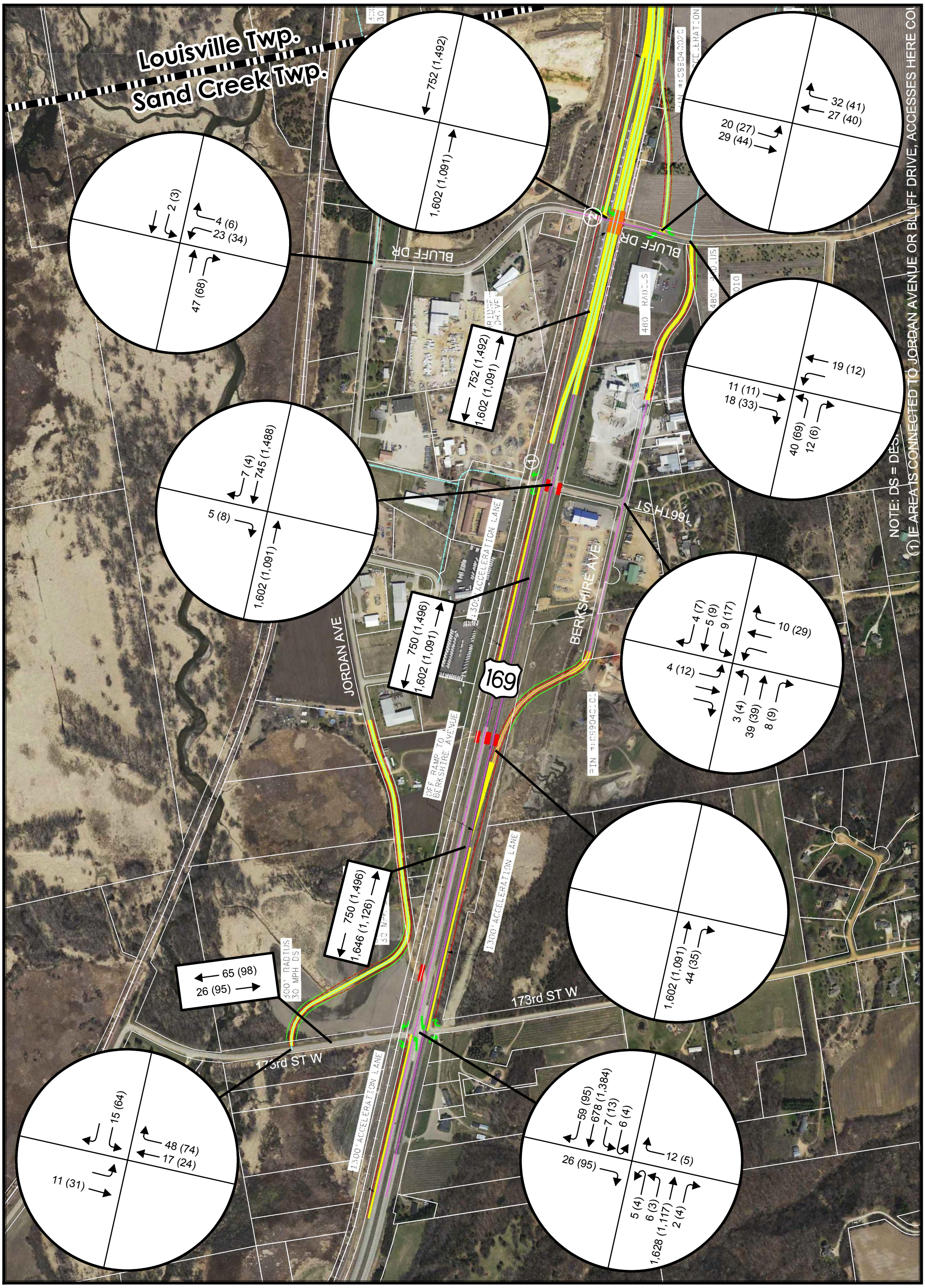


Concept 3 Forecasted Peak Hour Turning Movements (2038)

TH 169 Corridor Study
Sand Creek Township, Minnesota

Figure 23

N

0 600 1,200 Feet

(2) The concept of a SB exit ramp was added after the modeling was completed and is not included in the analysis. The addition of the ramp is not anticipated tohave a significant impact on the results.

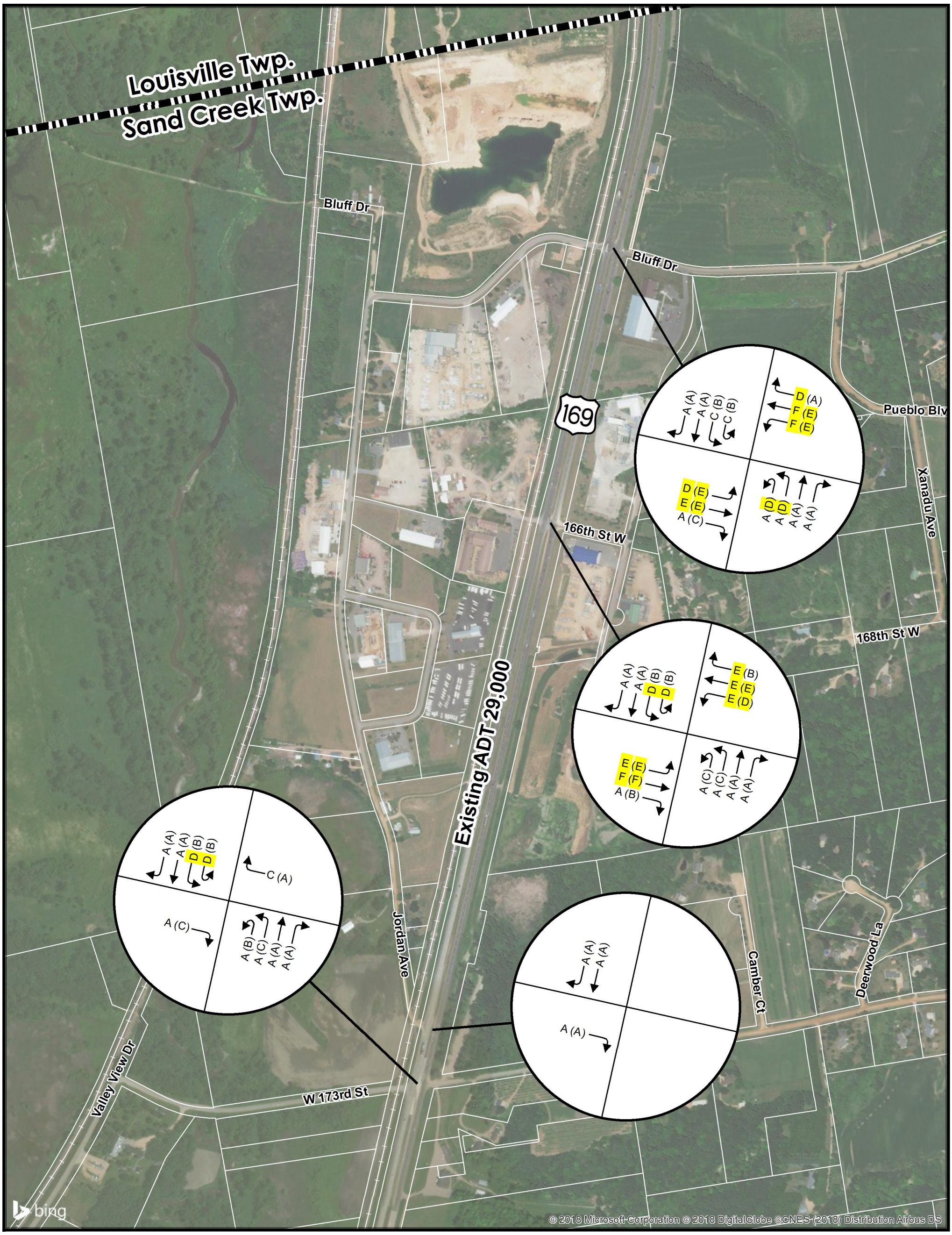
A Forcasted AM Peak Hour Turning Movements

(A) Forcasted PM Peak Hour Turning Movements

Municipal Boundary

December 10, 2018

Stantec



LOS for No Build Forecasted Conditions (2038)

TH 169 Corridor Study
Sand Creek Township, Minnesota

Figure 24

A AM LOS
(A) PM LOS

Municipal Boundary

N

0 600 1,200 Feet

December 10, 2018

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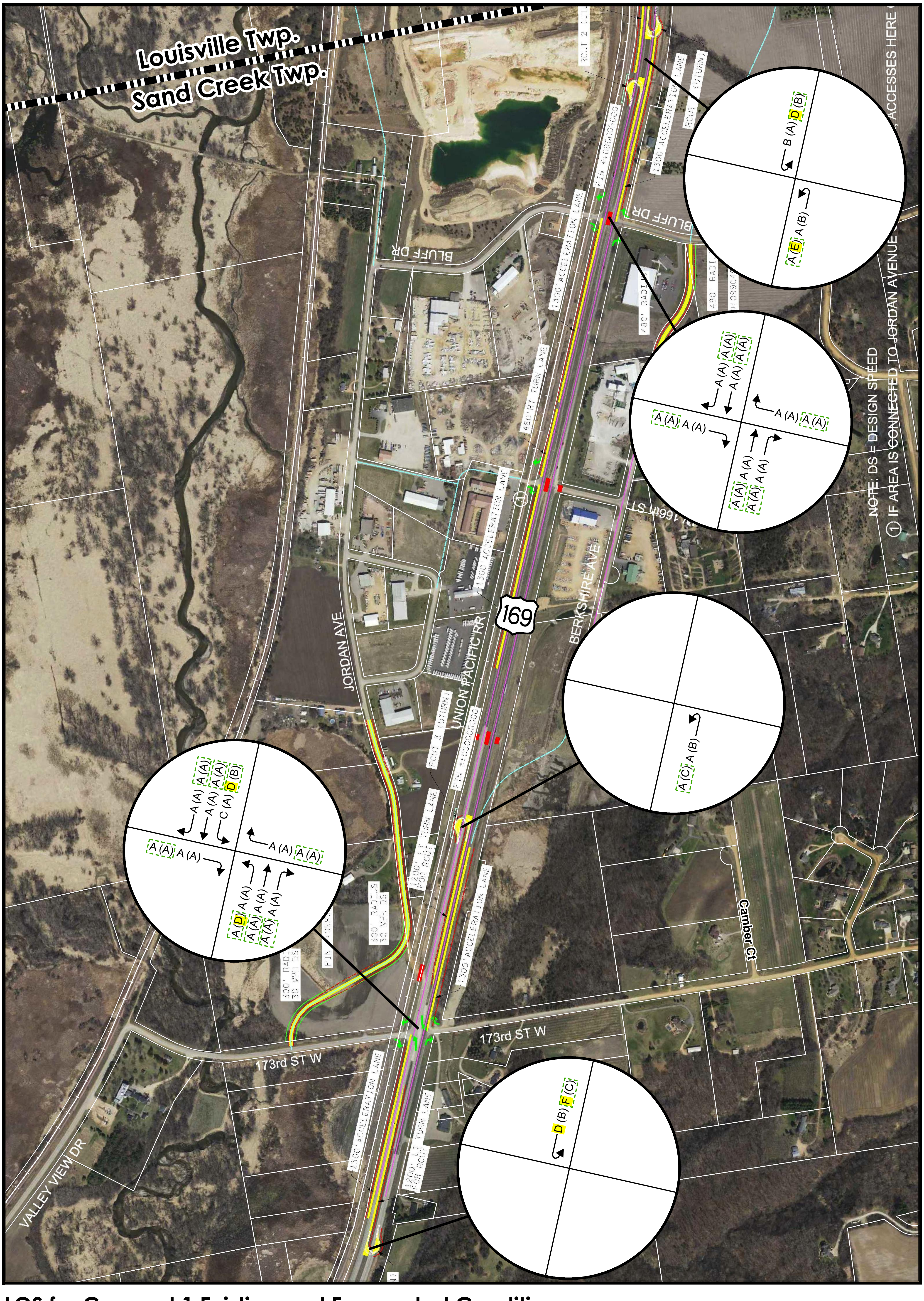

LOS for Concept 1 Existing and Forecasted Conditions

TH 169 Corridor Study
Sand Creek Township, Minnesota

Figure 25

A Existing AM LOS
(A) Existing PM LOS
A Forcasted AM LOS
(A) Forcasted PM LOS
Municipal Boundary

0 600 1,200 Feet

December 10, 2018

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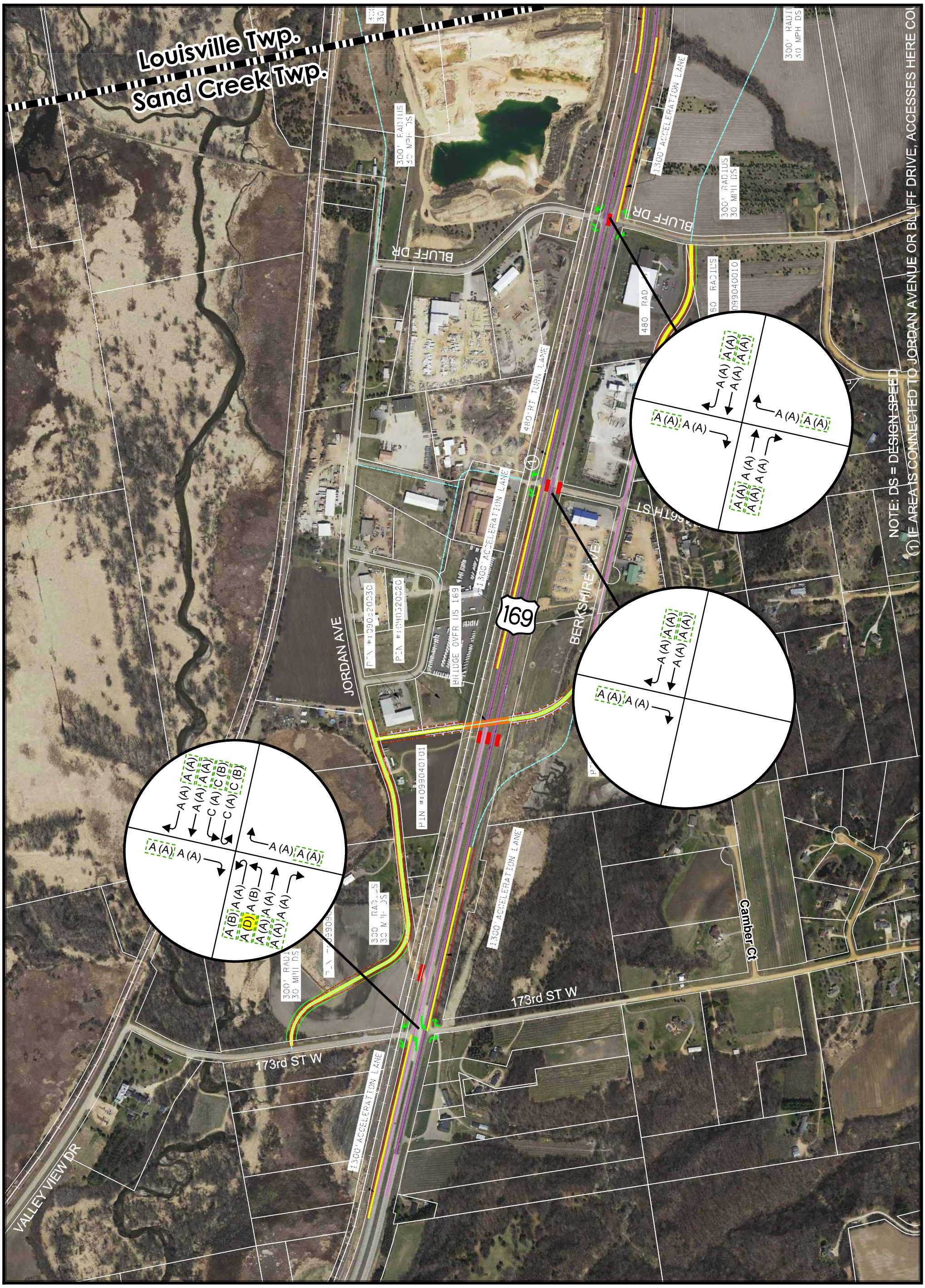
7.8



LOS for Concept 2 Existing and Forecasted Conditions

TH 169 Corridor Study
Sand Creek Township, Minnesota

Figure 26

N

0 600 1,200 Feet

A Existing AM LOS
(A) Existing PM LOS
A Forcasted AM LOS
(A) Forcasted PM LOS
Municipal Boundary

December 10, 2018

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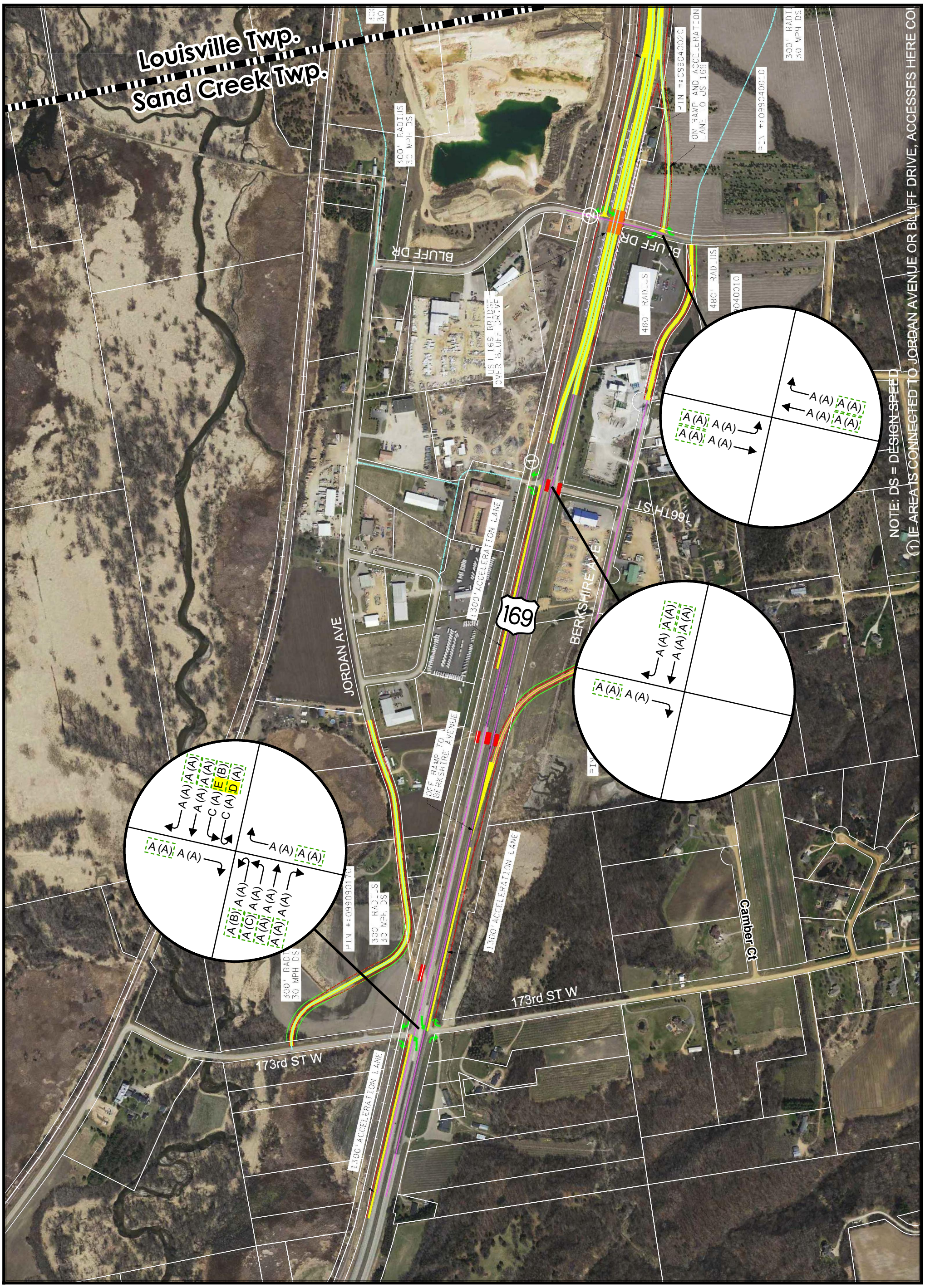

LOS for Concept 3 Existing and Forecasted Conditions

TH 169 Corridor Study
Sand Creek Township, Minnesota

Figure 27

N

0 600 1,200 Feet

A Existing AM LOS
(A) Existing PM LOS
A Forcasted AM LOS
(A) Forcasted PM LOS
Municipal Boundary

(2) The concept of a SB exit ramp was added after the modeling was completed and is not included in the analysis. The addition of the ramp is not anticipated to have a significant impact on the results.

December 10, 2018

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7.2 SAFETY

Safety benefits for each concept were evaluated using FHWA's Interactive Highway Safety Design Model (IHSDM). IHSDM is an analysis tool that estimates the expected safety performance of existing and proposed design or operational changes according to the procedures outlined in AASHTO's Highway Safety Manual (HSM). The HSM presents a variety of methods for quantitively estimating crash frequency or severity at a variety of locations. Once determined, these expected crash averages were compared to a no-build scenario, effectively quantifying the potential safety benefits.

For analysis, the TH169 corridor was segmented into several rural multi-lane highway site types as outlined in the HSM. Input data for each alternative included proposed geometric design, traffic control features, and 20-year forecasted traffic volume. For each site type, a crash modification factor (CMF) for geometric design and traffic control features was applied as outlined in Appendix B Safety Analysis.

7.2.1 Analysis of Alternatives

Proposed alternatives were analyzed using IHSDMs Crash Prediction Model then compared to a base alternative to determine how the number of crashes along the corridor would be impacted. A summary of the data inputs and expected crash outputs for each model can be found in Appendix B Safety Analysis. Below is an analysis of each alternative modeled.

- No-Build
  Existing conditions along the corridor.

- Concept 1 (At-Grade Solutions)
  Concept 1 involves the implementation of RCUTS, addition of acceleration lanes, consolidation of median access points, and elimination of some at-grade crossings. According to MnDOT's Reduced Conflict Intersection webpage[2] studies show a 70% reduction in fatalities and a 42% reduction in injury crashes where RCI's have been used. Furthermore, a recent study of Minnesota's constructed RCIs[3] shows the following; 100% reduction of fatal and serious injury right-angle crashes, 77% reduction of all severity right-angle crashes, and a 50% reduction of injury crashes. Additionally, an evaluation of the impact of RCI's on truck and large agricultural vehicle crashes[4] did not show that the frequency of truck crash increased after the installation of an RCI. The installation of the RCI appears to have shifted crash patterns from the more severe right-angle crash to a less severe rear-end and side-swipe crash. Evaluation of truck crash patterns before and after installation of RCIs did not suggest increases in the type of crashes which would have appeared to result from increased truck exposure in the on-coming lanes as trucks completed a U-turn. Currently, there are no crash modification factors (CMFs) for quantification of the safety benefit of right turn acceleration lane treatments.

- Concept 2 (TH 169 overpass between Jordan Avenue and Berkshire Avenue)
  Involves the development of the local roadway network through the construction of an overpass of TH 169 via Berkshire Avenue. Jordan Avenue is extended to intersect with 173rd Street W away from TH 169. It also includes the consolidation of median access points, elimination of at-grade crossings, and installation of acceleration lanes along US 169 at the same locations as outlined in Concept 1. While Concept 2 is expected to result in a marked increase in safety, due to the elimination of crossings, it increases travel time for a considerable portion of users.

[2] http://www.dot.state.mn.us/roadwork/rci
[3] http://www.dot.state.mn.us/roadwork/rci/docs/trafficsafetyatrcistudy.pdf
[4] http://www.dot.state.mn.us/roadwork/rci/docs/rci-study.pdf

- Concept 3 (Underpass of TH 169 at Bluff Drive)
  Involves the construction of an underpass of TH 169 at Bluff Drive with ramps to access TH 169, construction of an off-ramp to access an improved Berkshire Avenue, and the extension of Jordan Avenue to intersect with 173rd Street. In addition, it includes the consolidation of median access points, elimination of at-grade crossings, and installation of acceleration lanes along TH 169. The conversion of the existing at-grade intersection at Bluff Drive to a grade separated interchange is expected to reduce the total number of crashes by 42% and fatal and injury crashes by 57%.

7.2.2 Summary and Analysis of Model Output

The results of the analysis are summarized in Table 20. Each explored concept resulted in a reduction in crash frequency and severity along the corridor. Concept 1 lead to the largest reduction in total and fatal/injury crashes compared to the No-Build scenario.

Table 20 – IHSDM Summary

Alternative	Total Crashes	Fatal and Injury Crashes	Fatal and Serious Injury Crashes	Property Damage Only Crashes
No-Build - Existing Conditions	731.82	312.22	150.52	419.60
Concept 1 – At-Grade Intersection Solutions	454.96	206.72	83.37	248.24
Concept 2 – Jordan Avenue Overpass	579.11	252.49	113.67	326.61
Concept 3 – Grade Separated Interchange at Bluff	519.19	229.32	100.33	289.87

As outlined in the existing conditions crash analysis, the Bluff Drive intersection exceeded the statewide average crash rate while 173rd Street exceeded the state average severity rate (1.93 vs 1.05) based on 5-year crash data (2011-2015). Similarly, the IHSDM predicted crash rate per million entering vehicles for the TH 169 segment of 0.58 was close to the 0.60 calculated for the existing analysis. The projected crash rates from the IHSDM no-build scenario were close to the existing crash rates as shown in Table 21, which gives a breakdown of how crash rate per MEV vary between alternatives.

Table 21 – Existing vs IHSDM Intersection Crash Rates

Intersection	Existing Crash Rate (crashes/MEV)	IHSDM Crash Rate by Alternative (crashes/MEV)			
		No-Build	Concept 1	Concept 2	Concept 3
TH 169 @ Bluff	0.33	0.35	0.12	-	0.11
TH 169 @ 173rd	0.25	0.37	0.09	0.37	0.37
TH 169 @ 166th	0.08	0.34	-	-	-

Concept 1 resulted in a marked reduction in crash rates at Bluff Drive and 173rd Street. This was mainly due to the elimination of minor roadway through movements in the proposed Restricted Crossing U-Turns (RCUTs). In addition, RCUTs maintain current traffic operations while reducing the frequency and severity of crashes at the existing at-grade crossings. The construction cost of Concept 1 was estimated to be significantly less than the other concepts, resulting in a benefit-cost ratio of 5.32. Estimated construction costs are shown in Table 30 – Opinion of Probable Cost Summary. This suggests that Concept 1 would be feasible based solely on safety benefits compared to the No-Build scenario.

Concept 2 eliminated at-grade crossings along TH 169, except for 173rd Street, while focusing improvements on the local roadway network. Since there were no improvements at 173rd Street, the overall crash rate remained equal to the No-Build scenario. However, Concept 2 would result in less angled collisions and rear-end collisions due to a lower number of turning movements and conflict points along mainline TH 169. Concept 2 had a benefit-cost ratio of 1.75, suggesting that it would also be a viable alternative based solely on safety.

Concept 3 resulted in a marked reduction in the crash rate at 173rd Street, due to the addition a grade separated interchange. Concept 3 had an incremental safety benefit greater than 1, suggesting that it could be a viable alternative based solely on safety.

Table 22 – IHSDM Segment and Intersection Analysis

Site Type	IHSDM Segment and Intersection Crashes by Alternative			
	No-Build	Concept 1	Concept 2	Concept 3
Segment	403.01	403.01	403.01	403.01
Intersection	328.81	51.95	176.1	116.18
Total	731.82	454.96	579.11	519.19

Overall, Concept 1 resulted in the greatest decrease in intersection crashes, as shown in Table 22. There were no proposed roadway segment improvements along mainline TH 169. A summary of present value of crash costs, net safety benefit, and benefit-cost ratio are shown in Table 23.

Table 23 – Net Safety Benefit

Alternative	Present Value of Crash Costs ($)				Total	Incremental Safety Benefit*($)	Incremental Benefit-Cost Ratio**
	US 169 Mainline	US 169 @ Bluff Drive	US 169 @ 166th Street	US 169 @ 173rd Street			
No-Build	52,102,017.45	8,412,099.52	7,901,252.78	9,141,417.34	77,556,787.09	-	-
Concept 1 - At-Grade Interim Solutions	52,102,017.45	2,338,679.58	-	2,475,363.80	56,916,060.83	20,640,726.26	5.32
Concept 2 - Overpass of US 169	52,102,017.45	-	-	9,141,417.34	61,243,434.79	16,313,352.30	1.75
Concept 3 - Grade Separated Interchange at Bluff Drive	52,102,017.45	1,981,978.94	-	9,141,417.34	63,225,413.73	14,331,373.36	1.08

* Net Safety Benefit based on change in expected average crash frequency using the predictive methodology of the HSM

** Based on Preliminary Cost Estimate for Implementation of Each Concept

7.3 ACCESS MANAGEMENT

Due to the importance of access management, all three concepts significantly reduce the number accesses along the corridor. Table 24 and Table 25 show the side accesses closures anticipated for each concept and Table 26 shows the median access closures. The only median access which is not closed is at 173rd Street. This intersection is not presently a full-movement intersection, meaning motorists are not permitted to cross TH 169 or turn left onto TH 169 from the side street. In addition, it should be noted that the medians are anticipated to be closed for the properties located at 18455 and 18635 Johnson Memorial Drive even though these accesses are not within the view frame of the concept layouts provided in Section 6.2 Final Three Concepts; however, they are within the study limits and would be recommended to be closed.

Concept 1 identifies closing three side accesses (one private and two street accesses). Although the street accesses are closing, these movements will be moved to RCUTS, creating a different kind of access type and introducing new challenges. Concept 2 closes the same accesses as Concept 1 but reroutes the movements to the overpass and frontage road system. Concept 3 has the added benefit of eliminating the Bluff Drive direct access by turning this roadway into an underpass.

In addition to looking at the number of access closures, the number of conflict points being reduced is a key metric indicating how important proper access management is to safety. As discussed in Section 2.3 Access Management, a conflict point represents a potential crash location. The existing number of conflict points along this segment is 263. Comparatively, Option 1 has 86 conflict points, Option 2 has 42 conflict points, and Option 3 has 49 conflict points. Therefore; Concept 2 is the most desirable in terms of access management.

Table 24 – TH169 West Side Access Points Closed

Type of Access	Access Description	Concept 1	Concept 2	Concept 3
Intersection	Bluff Drive			X
Intersection	166th Street			
Private Drive	16931 Jordan Avenue	X	X	X
Side Street	Jordan Avenue	X	X	X
Intersection	173rd Street			
Private Drive	17930 Johnson Memorial Drive			

*1.7 accesses per mile

Table 25 – TH169 East Side Access Points Closed

Type of Access	Access Description	Concept 1	Concept 2	Concept 3
Intersection	Bluff Drive			X
Intersection	166th Street	X	X	X
Intersection	173rd Street			
Business Drive	Wagner's Apples			
Private Drive	17471 Johnson Memorial Drive			
Private Drive	17655 Johnson Memorial Drive			
Business Drive	Automobile Nation/18025 Johnson Memorial Drive			
Private Drive	18101 Johnson Memorial Drive			
Private Drive	18101 Johnson Memorial Drive (Access #2)			
Private Drive	18455 Johnson Memorial Drive			
Private Drive	18635 Johnson Memorial Drive			

*3.1 accesses per mile

Table 26 – TH169 Median Crossing Closure Locations

Median Crossing Number	Description of Accesses Utilizing Median Crossing	Concept 1	Concept 2	Concept 3
1	Bluff Drive	X	X	X
2	166th Street	X	X	X
3	16931 Jordan Ave	X	X	X
4	173rd Street			
5	17471 Johnson Memorial Drive	X	X	X
6	17655 Johnson Memorial Drive	X	X	X
7	Automobile Nation, 18101 Johnson Memorial Drive, 17930 Johnson Memorial Drive	X	X	X
8	18455 Johnson Memorial Drive	X	X	X
9	18635 Johnson Memorial Drive	X	X	X

*2.5 median crossings per mile

Table 27 – Conflict Point Concept Comparison

Location	Existing	Concept 1	Concept 2	Concept 3
TH 169 & Bluff Drive	30	18	4	10
TH 169 & 166th Street	30	2	2	2
TH 169 @ Jordan Avenue	2	0	0	0
TH 169 @ 173rd Street W	12	26	12	12
"Other" – Private Driveways and Accesses	189	40	24	25
Total	263	86	42	49

7.4 RIGHT OF WAY

Both permanent and temporary right of way impacts were evaluated for each option. Areas where preliminary construction limits crossed into the railroad right of way, but did not warrant a permanent easement, were called out as a temporary easement. This situation only occurred in concept 1 with RCUT 2 and RCUT 3. Table 28 below lists right of way impacts by parcel number for each concept. Parcel numbers can be viewed in the concept layout figures in Figure 12 through Figure 20 in Section 6.2 Final Three Concepts.

As expected, right of way impacts increase as the three concepts become more complex. Concept 1 which is generally considered the least complex, has approximately 50% less right of way impacts than concept 2 and 70% less impacts than concept 3. Concept 2 also has about half of the right of ways impacts of concept 3. The difference between concept 1 and 2 and concept 3, in terms of right of way takings, is largely due to the on-ramp system needed to access TH169 from Bluff Drive.

Table 28 – Right of Way Impacts by Parcel Number

Easement Type	Parcel Number	Option 1 (Acres)	Option 2 (Acres)	Option 3 (Acres)
Permanent	99090170	1.69	1.69	1.69
Permanent	99040010	0.28	0.28	0.28
Permanent	90520030	-	0.23	-
Permanent	90520020	-	0.22	-
Permanent	99040110	-	0.44	-
Permanent	99040101	-	1.08	0.98
Permanent	99040010	-	-	3.41
Permanent	99040020	-	-	1.02
Temporary	90005000	0.07	-	-
Temporary	90005000	0.07	-	-
	Total Permanent	1.97	3.94	7.38
	Total Temporary	0.14	0	0
	Total Right of Way Impact	**2.11**	**3.94**	**7.38**

7.5 ENVIRONMENTAL

This project is situated along the Minnesota River and contains a variety of water, agricultural, and other natural resources around it. The environment plays an important role in shaping the quality life, local economy, and environmental health of the surrounding communities. Environmental sources reviewed include:

- National Wetland Inventory (NWI)
- Fish and Wildlife Properties and Interests
- Federal Emergency Management Agency (FEMA) Floodplains
- State Historic Preservation Office (SHPO) Cultural Sites
- Department of National Resources (DNR) Sensitive Waters
- Minnesota Department of National Resources (MnDNR) Regionally Significant Ecological Areas
- MnDNR Sites of Biodiversity Significance
- Minnesota Pollution Control Agency (MPCA) Contaminated Sites
- 6f Protected Properties identified in the Land and Water Conservation Fund Act
- Scott County Bluff Overlay

If present in the project corridor, environmental areas were mapped in Figure 28 and Figure 29.

7.5.1 Analysis of Alternatives

Using Computer Aided Design (CAD) software, preliminary estimates of environmental impacts were recorded in Table 29. There were no impacts or sites present for the following sources:

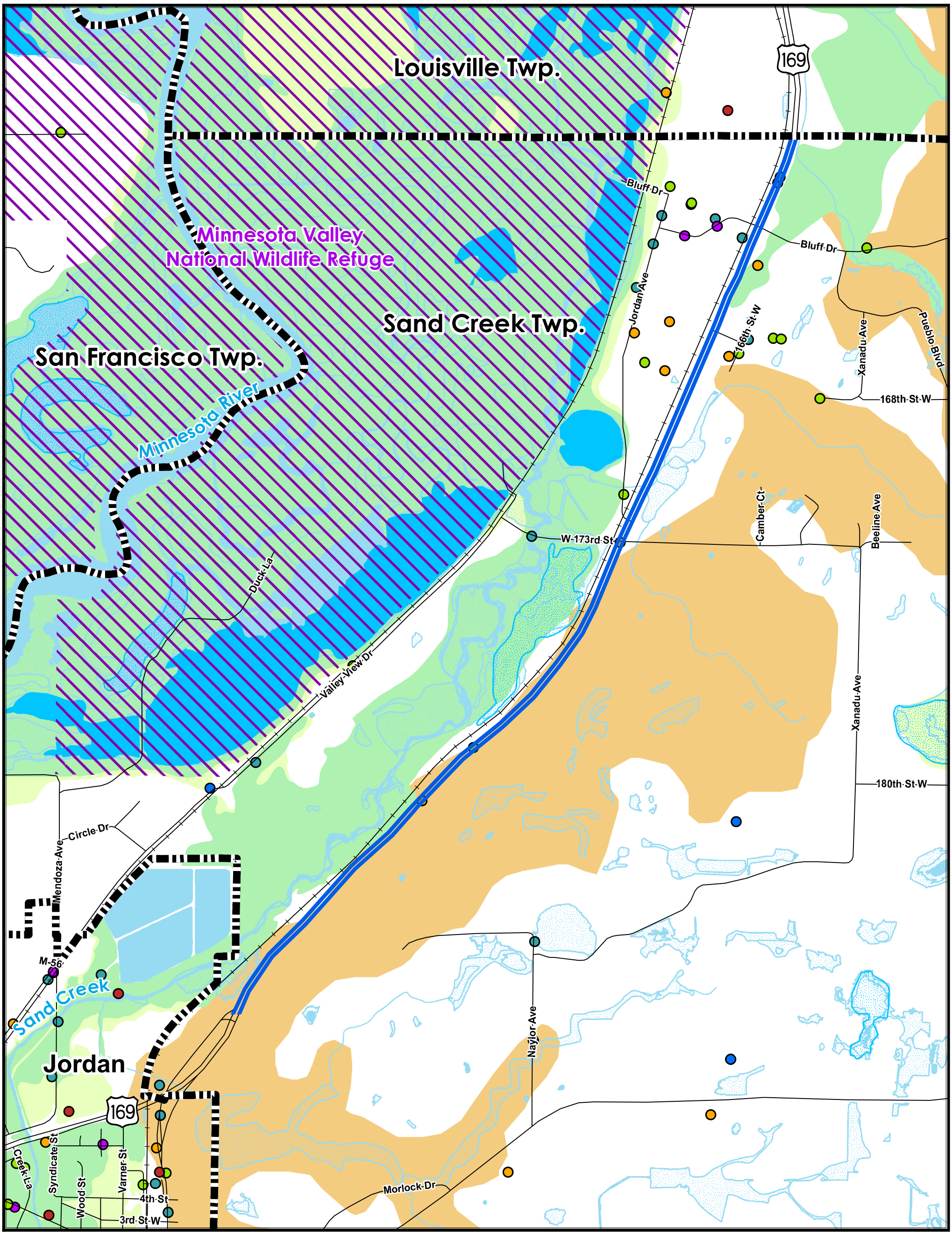
- Fish and Wildlife Properties and Interests
- SHPO Cultural Sites
- DNR Sensitive Waters
- MnDNR Sites of Biodiversity Significance
- 6f Protected Properties

Table 29 – Environmental Impacts Summary

	Option 1: At Grade Solutions	Option 2: Overpass	Option 3: Underpass	Unit
NWI Wetlands				
Open Water	4,870	73,870	241,060	SF
NWI Wetland	6,950	17,115	10,985	SF
FEMA Floodplains				
100-Year Floodplain	139,425	140,190	378,800	SF
500-Year Floodplain	1,960	1,960	1,960	SF
MnDNR Regionally Significant Ecological Areas				
Score 3	12,480	12,480	12,480	SF
Score 2	-	-	-	SF
Score 1	-	-	-	SF
MPCA Contaminated Sites				
Feedlots	-	-	-	Each
Hazardous Waste	1	1	1	Each
Investigation and Cleanup	-	-	-	Each
Multiple programs	3	3	3	Each
Stormwater	1	1	1	Each
Tanks	-	-	-	Each
Water Quality	-	-	-	Each
Scott County Bluff Overlay				
Bluff Overlay	185,815	33,730	33,730	SF

The largest differences between the options are for NWI wetlands, FEMA floodplains, and Scott County Bluff Overlay categories. Concept 1 and 2 have the largest differences for NWI wetland impacts due to the proposed alignments crossing the wetland, located east of TH 169 between 166th and 173rd Street. The 100-year flood plain differences between concepts 1 and 2 and concept 3 are due to the on-ramp, north of Bluff Drive, proposed in concept 3. This ramp system presently goes straight through the existing 100-year flood plain. If one of these concepts were carried forward to a detailed engineering design phase, alignment shifts to minimize wetland and floodplain disturbances would be considered.

In addition, the Scott County bluff overlay is impacted the most in concept 1 compared to the other two alternatives due to the addition of the turn lane and RCUT 4 south of 173rd Street. However, for this purpose, the bluff overlay is only being used for general mapping uses and doesn't account for the roadway footprint already established by TH 169. Most of the impacts shown are within the existing TH 169 MnDOT right-of-way and are not anticipated to significantly increase or decrease excavation quantities in this location.



Hydrology, Bluffs, Wildlife Refuge and Contaminated Sites

TH 169 Corridor Study
Sand Creek Township, Minnesota

Figure 28

MPCA My Neighborhood Sites

- Feedlots
- Hazardous Waste
- Investigation and Cleanup
- Multiple Programs
- Stormwater
- Tanks
- Water Quality
- TH 169 Study Segment

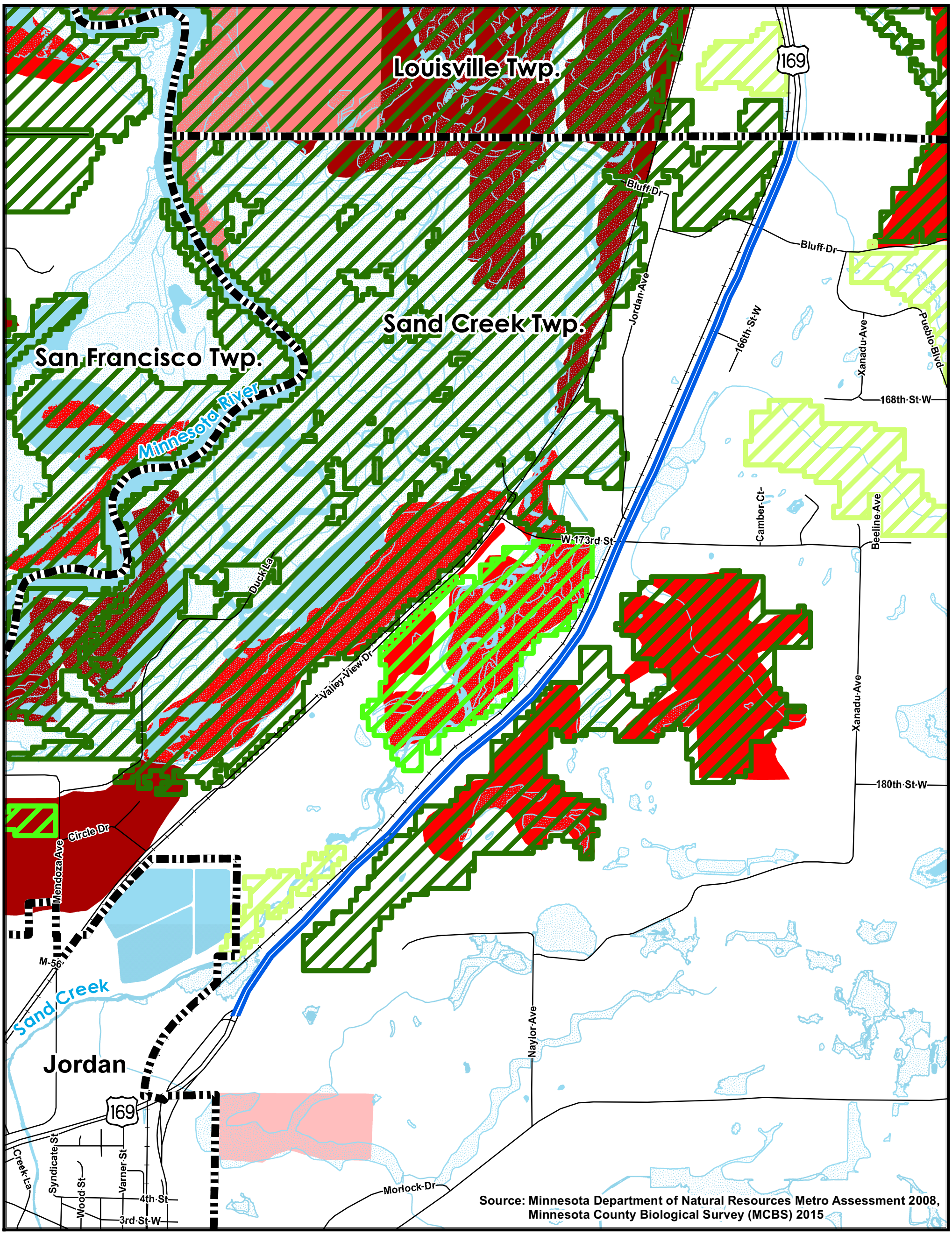
- Municipal Boundary
- National Fish and Wildlife Areas
- 100-Year Floodplain
- 500-Year Floodplain
- Scott County Bluff Overlay
- Public Water Basin
- Public Water Wetland
- Open Water
- NWI Wetland

N

0 1,500 3,000 Feet

April 13, 2018

Stantec



Significant Biodiversity and Ecological Areas

TH 169 Corridor Study
Sand Creek Township, Minnesota

Figure 29

- TH 169 Study Segment
- Municipal Boundary
- MCBS site with high biodiversity significance
- MCBS site with moderate biodiversity significance
- MCBS site with outstanding biodiversity significance
- MCBS site below minimum biodiversity significance threshold
- Regionally Significant Ecological Areas - Score 3
- Regionally Significant Ecological Areas - Score 2
- Regionally Significant Ecological Areas - Score 1
- Open Water
- NWI Wetland

April 13, 2018

N 0 1,500 3,000 Feet

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7.20

7.6 COST

Since funding can be limited, a project's cost can significantly influence whether or not a project is constructed. Therefore, it is important to pick a project concept that both addresses technical issues and is also economically feasible. A detailed preliminary opinion of probable cost was calculated for each of the three concepts using lidar survey data for earthwork quantities. The opinion of probable cost was established using basic horizontal and vertical geometry guidelines, recent average bid prices, historical plan examples, and engineering judgement.

Table 30 compares the opinion of probable cost for each final alternative. The table shows a pronounced increase in costs between the three options. Concept 1, the lowest cost option, is 140% less than concept 2 and 338% less than concept 3. Concept 2, on the other hand, is 58% more expensive than concept 1 but 82% less expensive than concept 3. The full opinion of probable for each alternative can be found in Appendix F Opinion of Probable Cost for Final Three Options.

Table 30 – Opinion of Probable Cost Summary

Concept 1 – At-Grade Solutions	Concept 2 – Overpass at Jordan Avenue	Concept 3 – Underpass at Bluff Drive
$3,877,223.00	$9,320,462.00	$16,966,553.00

7.7 MISCELLANEOUS CONSIDERATIONS

Every roadway has a unique character and history all its own. TH 169 within Sand Creek Township is no different, especially with the natural beauty of the Minnesota River Valley surrounding it. When considering which concept best fits the existing needs, miscellaneous categories such as topography, impacts to businesses (physical relocation and the ability to continue conducting business), pedestrian crossing needs, preliminary agency support, and impacts to the sense of place should all be considered. Table 31 compares these categories with a short description and label indicating if the concept has no impacts, minor impacts, some impacts, or major impacts to a category.

Depending on the category, "no impact" doesn't necessarily mean it is the best alternative. For example, the category of "Businesses Ability to Conduct Business" would be the best served by a label of major impact. This indicates the concept is addressing an issue brought up by business owners during the public engagement process. Each concept was further ranked 1 to 3 within each category, depending on how it addressed the issue. A ranking of 1 was the most desirable and 3 was the least desirable. Each sub-category ranking was added to determine an overall miscellaneous category ranking which will be used in Section 7.8 Apparent Preferred Alternative.

Table 31 – Miscellaneous Considerations Comparison of Final Three Concepts

Category	Concept 1	Concept 2	Concept 3
Topography	No Impacts – All work takes place in the existing roadway right of way and consist of at grade solutions. Ranking: 1	Some Impacts – Work items will affect the topography north of 173rd Street and south of Bluff Drive; however, stay out of the adjacent bluff areas. Ranking: 2	Some Impacts – Work items will affect the topography north of 173rd Street, south of Bluff Drive, and in the developed area around Bluff Drive; however, work will stay out of the adjacent bluff areas. Ranking: 2
Business/ Residence Relocation Potential	No Impacts – All work takes place in the existing roadway right of way and consist of at grade solutions. Ranking: 1	Minor Impacts – Work could potentially require a business or residence to require relocation; however, with one proposed bridge and no on/off ramps the impacts are reduced. The use of retaining walls could eliminate the need for relocation but partial property takings would be needed. Ranking: 2	Some Impacts – Work will require a business or residence to require relocation due to proposed on/off ramps. The use of retaining walls would assist in minimizing relocation potential; however, the property north of Bluff Drive and East of TH 169 would still be impacted. Ranking: 3
Businesses Ability to Conduct Business	Minor Impacts – The acceleration and deceleration lanes increase safety of the users; however, the improvements are partial and interim. Ranking: 3	Some Impacts – This concept improves safety and traffic issues at the majority of business owners' properties; however, it does not address the businesses south of 173rd Street except for removing left turns. Ranking: 2	Some Impacts – This concept improves safety and traffic issues at the majority of business owners' properties; however, it does not address the businesses south of 173rd Street except for removing left turns. The ramp accesses at Bluff provide a somewhat safer, more streamlined access than the right-in, right-out in concept 2. Ranking: 1
Pedestrian Crossing	No Impacts – This concept does not give a place for pedestrians to cross TH 169 to access the recreational opportunities on both sides of the highway. Ranking: 3	Some Impacts – If desired, the bridge provided by this concept gives a place for pedestrians to cross the highway. Ranking: 2	Some Impacts – If desired, the bridge provided by this concept gives a place for pedestrians to cross the highway. In addition, this concept allows users to continue directly on Bluff Drive as opposed to following the circuitous route with concept 2. Ranking: 1
Preliminary Agency Support	Minor Impacts – Agency stakeholders do not all agree that RCUTs are an acceptable solution to this problem. Ranking: 3	Some Impacts – Concept meets the project purpose and needs, removes accesses as desired, likely requires no full property or business takings, and calls for minimal modifications to TH 169 (for example acceleration lanes). Ranking: 1	Some Impacts - Concept meets the project purpose and needs, removes accesses as desired, and likely requires some property or business takings. Major work is required on to TH 169 compared to concept 2. Ranking: 2
Sense of Place	No Impacts – The surrounding area will be largely unaffected. Ranking: 1	Some Impacts – The surrounding area will have some impacts due to the addition of a bridge potentially obstructing views of the bluff and river valley. Ranking: 3	Some Impacts – The surrounding area will have some impacts due to the addition of a bridge; however, since TH 169 will be raised to go over the local roadway, this could create enhanced views for roadways users while having minimal impacts to views from primarily commercial properties around Bluff Drive. Ranking: 2
Ranking Total	12	12	11
Average Ranking	2	2	1.8

7.8 APPARENT PREFERRED ALTERNATIVE

The apparent preferred alternative will be the concept that best addresses the project purpose and needs, remains environmentally conscious, and is financially attainable given limited resources. To assist in developing a preferred alternative, a comparison matrix was created in Table 32 with the seven main areas evaluated; traffic, safety, access management, right of way, environmental, cost, and miscellaneous. Under each of these areas each concept was rated 1 to 3, where 1 was the best and 3 was the least desirable option under that category.

Table 32 – Concept Evaluation Matrix

Evaluated Category	Concept 1	Concept 2	Concept 3
Traffic	3	1	2
Safety*	3	2	1
Access Management	3	1	2
Right of Way	1	2	3
Environmental	1	2	3
Cost	1	2	3
Miscellaneous	2	2	1
Average	2.0	1.7	2.1

*Due to limitations of the IHDSM, the full improvements to be expected from concepts 2 & 3 are not captured. Concept 1 receives credit for RCUT conversions while concepts 2 & 3 do not. However, both concept 2 and 3 provide for all the movement eliminations or accommodations of concept 1, in addition to the through and left movements at Bluff Drive. There is not a clear way to model that the left turns from 173rd are still accommodated through a series of right turns and overpasses or underpasses. In general, it would be reasonable to expect concepts 2 & 3 to have incremental safety benefits equal to or slightly greater than concept 1.

Utilizing this method indicates concept 2 as the slightly preferred alternative over concept 1 and concept 3. This method does not take into account the long-term benefits of one particular concept over another. Ultimately, the apparent preferred alternative needs to address the project purpose and need, which is to improve existing traffic and safety deficiencies along the corridor.

In terms of safety, all three concepts show a significant decrease in crashes. This means any of the three concepts would be a better solution than doing nothing when considering safety benefits alone. Table 18 – LOS Comparison for Failing Movements in AM Peak and Table 19 – LOS Comparison for Failing Movements in PM Peak in Section 7.1 Traffic, show that the corridor will need some level of improvements to accommodate future traffic volumes projected for 2038 without having delays. Concept 1 addresses the problem areas at the intersections of TH 169 & Bluff Drive and TH 169 & W 166th Street; however, doesn't solve the issue at TH 169 & 173rd Street and creates delays at RCUT 1 & 4 during the morning peak hour and RCUT 2 during the evening peak hour in the forecast (2038) scenario. Both options 2 and 3 address the majority of the failing movements with minor delays in the forecasted model scenarios. Between the two, concept 2 performs better. It should be noted that both concepts 2 and 3 will cause increases in travel time because vehicles are not permitted to turn left directly onto TH 169 and must rely on frontage roads and ramp or right turn accesses instead.

In conclusion, according to a ranking of 1 to 3 in the categories of safety, traffic, right of way, cost, environment, access management, and miscellaneous considerations all the concepts perform similarly. The largest issue of the corridor from a safety and traffic standpoint, is crossing and turning left at Bluff Drive. These movements can't be eliminated without an RCUT, overpass, or underpass. When reviewing forecasted traffic volumes for the year 2038, the RUCTs in concept 1 fail and do not effectively eliminate these movements. In order to accommodate future traffic volumes and development the longer-term solutions of concept 2 and 3 are preferable. Due to the cost difference between concept 2 and 3, with negligible differences in projected traffic and safety performance, concept 2 is the apparent preferred alternative. However, given the volume of cars utilizing the RCUTs in concept 1, combined with the possibility of signalizing these RCUTs in the future, concept 1 is a viable, lower cost, interim solution to concept 2. Therefore, if funding was not available to fully fund concept 2 as the full-build preferred alternative, concept 1 provides significant short-term benefits to the overall corridor.

8.0 NEXT STEPS

This section provides a reasoned outline of suggested project sequencing for two different scenarios. The first scenario is constructing concept 1 as an interim solution to the overall preferred alternative of concept 2. The second, is constructing concept 2 in its entirety without constructing the interim RCUT solutions. The second scenario would be preferred if adequate funding became available. This is because in order to eliminate eastbound and westbound left and through movements at Bluff Drive, Jordan Avenue and West 166th Street either the frontage roads and bridge needs to be completed or RCUTS utilized. As shown in Section 7.1 Traffic, RCUT 2 begins to breakdown at some point between the current year and the design year of 2038, and RCUT 4 would be at LOS D with current conditions and LOS F in the design year. Therefore, RCUTS are not recommended as an ultimate solution. However, MnDOT has stated support for allowing the signalization of RCUTS if an issue arises and can thus be considered as an interim solution.

8.1 PROPOSED SEQUENCING

8.1.1 Interim Solution Scenario

As noted, concept 1 is a viable interim solution to concept 2 but does not meet the overall project purpose and need long term. The following sequencing lays out the potential order of projects to be completed if full funding for the preferred alternative is not available and RCUTS need to be utilized in the short term to address the existing safety and traffic concerns of the corridor.

1. Project 1
   *Consider safety studies and countermeasures outlined in Table 7 for immediate action
   a. Extend Berkshire Avenue north to Bluff Drive
   b. Construct outside acceleration lane for right turning vehicles to TH 169 northbound at Bluff Drive
   c. Construct outside acceleration lane for right turning vehicles to TH 169 southbound at Bluff Drive
   d. Close east leg access and median access to TH 169 at West 166th Street
   e. Construct RCUT 2 north of Bluff Drive
   f. Construct RCUT 4 south of 173rd Street West
   g. Close median access at Bluff Drive
   h. Construct RCUT 1*

*RCUT 1 could be considered optional, but if the access at Quincunx Mining was closed as shown, vehicles would have a longer than desirable distance to travel to RCUT 4 to go northbound on TH169 or would require keeping the median access open, which would not sufficiently address existing safety issues with multiple at grade accesses.

2. Project 2
   a. Connect Jordan Avenue to 173rd Street West & close Jordan Avenue access to TH 169
   b. Construct outside acceleration lane for right turning vehicles to TH 169 northbound at 173rd Street
   c. Construct outside acceleration lane for right turning vehicles to TH 169 southbound at 173rd Street
   d. Construct RCUT 3**

   **RCUT 3 could be considered optional but would create a longer than desirable distance for those who are traveling westbound on 173rd Street and want to go southbound on TH169 by forcing them to drive to RCUT 2.
3. Project 3
   a. Construct bridge over TH 169
   b. Close remaining TH 169 median accesses, with exception of left turns from TH 169 at 173rd Street.
   c. Construct outside acceleration lane for right turning vehicles to TH 169 southbound at 173rd Street.
4. Project 4
   a. Connect west side leg of West 166th Street to local road network and remove access to TH 169. This work can and should be completed sooner. However, until the bridge and Berkshire Avenue connections are complete the left turning movements would just be relocated to other access points rather than eliminated from the corridor as desired. While other improvements are not dependent upon completion of this task, and therefore it can theoretically be last to be completed, removal of this increasingly dangerous access to TH 169 should be accomplished as soon as feasible.

8.1.2 Full-Build Scenario

If funding was available, the full-build scenario is the preferred construction option for this project corridor. This scenario consists of building concept 2 in its entirety without constructing RCUTS as an interim, partial fix to the existing safety and traffic concerns. The greatest safety and traffic accommodation concerns are attributed to the access points along the corridor, especially at Bluff Drive and W 166th Street. The most problematic crossing and left turning movements from the minor roads are not eliminated until project task 2.a below, which is why funding of the project through task 2.b or beyond should be the first option.

The following project component sequencing is developed to meet the primary project needs as early in the process as feasible, while also being compartmentalized into projects which may be more readily fundable utilizing smaller value funding sources.

5. Project 1

   *Consider safety studies and countermeasures outlined in Table 7 for immediate action
   a. Extend Berkshire Avenue north to Bluff Drive
   b. Construct outside acceleration lane for right turning vehicles to TH 169 northbound at Bluff Drive
   c. Close east leg access to TH 169 at West 166th Street
   d. Potential Temporary Improvement - Construct Inside Acceleration Lanes at Bluff Drive: Left turning movements to TH 169 from Bluff Drive have been identified as some of the most problematic. These movements cannot be eliminated until after the overpass has been constructed. As the project progresses and traffic is reallocated from Jordan Avenue and West 166th Street, the problems with these movements may be exacerbated. Unless there is reasonable certainty the overpass can be constructed in short order, these improvements are recommended. In addition to the acceleration lanes other mitigating improvements such as active “vehicle entering or approaching” system should also be considered.
   e. Connect Jordan Avenue to 173rd Street West & close Jordan Avenue access to TH 169

   f. Construct outside acceleration lane for right turning vehicles to TH 169 northbound at 173rd Street
6. Project 2
   a. Construct bridge over TH 169
   b. Close remaining TH 169 median accesses, with exception of left turns from TH 169 at 173rd Street.
   c. Construct outside acceleration lane for right turning vehicles to TH 169 southbound at 173rd Street.
7. Project 3
   a. Connect west side leg of West 166th Street to local road network and remove access to TH 169. This work can and should be completed sooner. However, until the bridge and Berkshire Avenue connections are complete the left turning movements would just be relocated to other access points rather than eliminated from the corridor as desired. While other improvements are not dependent upon completion of this task, and therefore it can theoretically be last to be completed, removal of this increasingly dangerous access to TH 169 should be accomplished as soon as feasible.

8.2 POTENTIAL FUNDING SOURCES

Potential funding sources for the project are listed below. Recommended funding pursuits include Corridors of Commerce, Capital Bonding Bill, TED and TEDI which are programs that have larger funding thresholds and could provide the higher needed grant amount. They can be sought after concurrently (some of the deadlines overlap) and as the requisite amount of state funds are secured, any open applications could be withdrawn. Most of these funding sources require a local match contribution. The percentage of the local match contribution varies per program.

1. Corridors of Commerce (MNDOT)
   a. Description: This funding program is intended to be used for the construction, reconstruction, and improvement of trunk highways for projects not already in the State Transportation Improvement Program. The two major goals of this program are to provide additional highway capacity on segments with current bottlenecks in the system, and to improve the movement of freight and reduce barriers to commerce.
   b. Eligibility: Funding could potentially be used for Right of Way purchases, environmental work, design engineering, and construction.
   c. Requirements:
      i. Project must be consistent with the statewide multimodal transportation plan
      ii. Project must be able to begin within four years of award funding
      iii. Project must be on the Interregional Corridor Network in Greater Minnesota or any state highway in the eight-county MnDOT Metropolitan District.
      iv. Project must either develop additional system capacity or demonstrate improvement for freight movement (reduce bottlenecks).
      v. The amount of corridors of commerce funding needed to construct the project (including construction cost, right-of-way, & engineering) cannot exceed the amount of funding available. Recently selected projects include TH 14 expansion to four-lanes, Owatonna to Dodge Center ($160 million); TH 23 elimination of two gaps in 4-lane roadway from Willmar to St. Cloud ($105 million)
      vi. Projects will be selected based on total points from various categories of scoring criteria. Criteria include Return on Investment, Economic Impact, Freight Efficiency, Safety Improvements, Regional Connections, Policy Objectives, and Community Consensus.
   d. Schedule:
      i. Public Recommendation Period: January-February
      ii. Project Evaluation and Scoring: February-March
      iii. Project Award/Announcement: April
   e. Key Contacts:
      i. Website: http://www.dot.state.mn.us/corridorsofcommerce/
      ii. Patrick Weidemann

1. (651) 366-3758
2. pat.weidemann@state.mn.us

2. Minnesota Capital Bonding Bill (Minnesota Legislature)
   a. Items funded in capital budgets often include land acquisition, repair, renovation and construction of state facilities; acquisition, construction and repair of state parks, trails, interpretive centers, campground facilities, forests, wildlife management areas, dams and flood control structures, and roads and bridges.
   b. Eligibility: Must be publicly owned and have regional or state significance.
   c. Schedule: Next "typical" bonding bill year is 2020 and requests will be due in June of 2019. Legislative committee tours of requested project areas happen between August – October 2019. Final passage isn't expected until May 2020.
   d. Maximum Award Amount: Generally, will pay up to 50% of capital costs
   e. Required for Submittal: No prescribed documentation; however, easy to understand maps, and a one-page compelling story are critical. Also critical is the support of the area's state senator and representative.

3. Transportation Economic Development Program (TED) (MNDOT)
   a. Description: Provides competitive grants to construction projects on state highways that provide measurable economic benefits such as new businesses locating to the area or existing businesses expanding.
   b. Eligibility: Specifically targets transportation improvements that will lead to measurable economic benefits. For a project to be eligible, it must contribute to job creation or retention or another measurable economic benefit. Eligible applicants are any governmental entity as defined by state law.
   c. Schedule: Next round is anticipated summer 2019
   d. Maximum Award Amount: The TED program will provide funding for up to 70 percent of the total transportation infrastructure cost of the project or the state's maximum allowable share as determined by MnDOT's cost participation policy or MN State Statute 174.12 Subd. 7, whichever is less.
   e. Required for Submittal: Guidance to be provided with next grant round solicitation
   f. Key Contacts:
      i. Website: http://www.dot.state.mn.us/funding/ted/index.html
      ii. Ken Buckeye
         1. (651) 366-3737
         2. Kenneth.buckeye@state.mn.us
      iii. Philip Schaffner
         1. (651) 366-3743
         2. Philip.schaffner@state.mn.us

4. Transportation Economic Development Infrastructure Program (TED) (Department of Employment and Economic Development)
   a. Description: A competitive grant program available to communities for road and public infrastructure projects that create jobs and support economic development.
   b. Can be combined with the Minnesota Department of Transportation's (MnDOT), Transportation Economic Development Program (TED). The programs provide a portion of costs for trunk highway and other road and public infrastructure improvements.
   c. Eligibility: Funds appropriated for the program must be used to fund predesign, design, acquisition of land, construction, reconstruction, and infrastructure improvements that will promote economic development, increase employment, and improve transportation systems to accommodate private investment and job creation.
   d. Schedule: Next round is anticipated summer 2019
   e. Maximum Award Amount: Will come out with future guidance. The four projects awarded in 2017 ranged from $650,000 to $1.5 million

f. Required for Submittal: Will come out with future guidance
g. Key Contacts:
    i. Website: https://mn.gov/deed/government/financial-assistance/business-funding/ted/
    ii. Jeremy LaCroix
        1. (651) 259-7457
    iii. jeremy.lacroix@state.mn.us

5. Cooperative Agreement – Metro Municipal Agreement Program (MNDOT):
    a. Description: MMAP provides funding for successful projects that are shown to be a benefit to both the local community and the trunk highway system. The funds are intended for Trunk Highway eligible construction costs of the project, including up to 8% for construction engineering. Right of way acquisition, utility relocation, preliminary and final design are not eligible for funding.
    b. Eligibility: Trunk Highway eligible construction costs and up to 8% construction engineering
    c. Schedule: Prior discussions with MnDOT MMAP funding staff strongly encouraged prior to submittal
        i. Solicitation Letter sent out: April
        ii. Application Deadline: June
        iii. Respond to MnDOT Comments: August
        iv. Selection: September
    d. Maximum Award Amount (2018 Applications): $710,000 (note: the 8% construction engineering comes from this amount)
    e. Required for Submittal
        i. Request Letter
        ii. Geometric Layout or Concept Sketch
        iii. Existing Conditions Drawing
        iv. Cost Estimate
        v. Local Agency Resolution (or 5-yr CIP showing project support)
        vi. Required supporting documents: ROW acquisition needs and excavation limits
        vii. Suggested supporting Documents: traffic study, environmental information/review, compliance with State and Local long-term planning
    f. Key Contacts:
        i. Website: http://www.dot.state.mn.us/metro/stateaid/cooperat.html
        ii. Phil Bergem
            1. (651) 234-7776
            phillip.bergem@state.mn.us

6. Local Road Improvement Program – TH Corridor Projects Account (MNDOT)
    a. Description: This account must be used as a loan or grant to cities, towns, and counties to assist in paying the local share of TH projects that have local costs related to the TH improvement and are not funded or are only partially funded with other state and federal funds.
    b. Eligibility: Trunk Highway eligible construction costs
    c. Schedule: Information on future solicitations are anticipated November 2018
    d. Maximum Award Amount: Will come out with future guidance. There were 52 projects funded in 2018 totaling $34.7 million.
    e. Required for Submittal: Will come out with future guidance, will likely require similar documents to other MnDOT programs
    f. Key Contacts:
        i. Website: http://www.dot.state.mn.us/stateaid/lrip.html
        ii. Patti Loken
            1. (651) 366-3803
    g. Patti.loken@state.mn.us

7. 10-Year Capital Highway Investment Plan (CHIP) (MNDOT)
    a. Description: MnDOT is tentatively planning improvements along this corridor in 2024. Design and construction could be coordinated to match this timing for improved efficiency and reduced impact time. Note: This funding is based on current infrastructure asset needs on the existing system. While safety is included, expansion is not.
    b. MnDOT improvements are listed as: Minor concrete pavement repair and medium bituminous mill and overlay; from MN 21 (Broadway St. N., Jordan MN) to CSAH 15 (Marystown Road, Shakopee MN). Estimated project cost $13,000,000.
    c. Key Contacts:
        i. Website: http://www.dot.state.mn.us/planning/10yearplan/index.html
        ii. Josh Pearson
            1. (651) 366-3773
    d. Josh.pearson@state.mn.us

8. Better Utilizing Investments to Leverage Development (BUILD) Discretionary Grant (USDOT)
    a. Description: This grant was formerly called the Transportation Investment Generating Economic Recovery (TIGER) Grant. The Maximum grant award is $25M; however, through discussions with the County and others this grant is listed as highly competitive (i.e. low percentage chance of award)
    b. Schedule: Deadline to submit for FY2018 was July 19, 2018.
    c. Key Contacts:
        i. Website: https://www.transportation.gov/BUILDgrants
        ii. General Inquiry
            1. 202-366-0301
            2. BUILDgrants@dot.gov

9. Federal Freight Solicitation: MnDOT already conducted the solicitation and awarded projects in October 2017. NHPF funds are planned out through 2022.
    a. No information found
    b. In October 2017 MnDOT conducted the solicitation and awarded projects. All NHPF funds have been awarded through 2022

10. Highway Safety Improvement Program (HSIP) (FHWA)
    a. Show cost/benefit for safety improvement
    b. Must be stand alone project, i.e. not a portion split off of a larger project.
    c. $2-10M annually planned for award 2020-2023
    d. Applications due Nov. 21, 2018. If part of a County Road Safety Plan, only need to fill out form and submit Plan pages.
    e. Key Contacts:
        i. Website: https://www.fhwa.dot.gov/map21/factsheets/hsip.cfm

11. Metropolitan Council Regional Solicitation
    a. Funding for roadway improvement projects that are in line with Thrive MSP 2040 plan.
    b. 2018 Regional Solicitation applications were due July 13, 2018
    c. In 2017, 63 projects were awarded $223M in federal funds.
    d. Key Contacts:
        i. Website: https://metrocouncil.org/Transportation/Planning-2/Transportation-Funding/Regional-Solicitation-NEW.aspx?source=child
        ii. Steven Peterson
        iii. (651) 602-1819
        iv. steven.peterson@metc.state.mn.us

12. Federal Freight (FHWA) (Crossing closures?? See MAT article)
    a. Railway-Highway Crossings Program
    b. No crossings in our area currently listed for improvement/funding
    c. Could work with FHWA rail to review any potential rail crossing improvements or ability for closure.
    d. Key Contacts:
        i. Website: https://www.fhwa.dot.gov/fastact/factsheets/railwayhwycrossingsfst.cfm
        ii. Arlene Kocher
            1. (651) 291-6100
        iii. arlene.kocher@dot.gov

13. Local Support
    a. ROW Acquisition
        i. Dedications should be required for any new/incoming plats and development or re-development in the corridor

14. County Sales Tax
    a. Approximately $6 million raised annually
    b. Used for potential projects identified in an Implementation Plan to improve safety, reduce commute times, and support economic development throughout the County
    c. The county's transportation sales tax will end in the year 2022 and all funding has been committed through this time. This could only be a potential funding source if the sales tax is extended or if currently programmed projects require less funding than programmed.
    d. The county considers programming needs through its Capital Improvement Plan (CIP) process starting in April. If the township would like consideration of a project for sales tax funding, a submittal must be completed.

Appendix A

TRAFFIC ANALYSIS

LOS and Queue Lengths for Existing 2018 Conditions

LOS and Queue Length for No Build Forecast Conditions (2038)

LOS and Queue Lengths for Option 1 Existing Conditions (2018)

LOS and Queue Lengths for Option 1 Forecast Conditions (2038)

LOS and Queue Lengths for Option 2 Existing Conditions (2018)

LOS and Queue Lengths for Option 2 Forecast Conditions (2038)

LOS and Queue Lengths for Option 3 Existing Conditions (2018)

LOS and Queue Lengths for Option 3 Forecast Conditions (2038)

Turning Movement Data from Traffic Data Inc (TDI)

SimTraffic Output Results

LOS and Queue Lengths for Existing 2018 Conditions

Intersection	Direction	Movement	AM					PM				
			95 % Queue	Delay/Vehicle by MVMT (Sec)			LOS	95 % Queue	Delay/Vehicle by MVMT (Sec)			LOS
				1st	2nd	Total			1st	2nd	Total	
TH 169 & Bluff DR	EB	Left	63'	12.1	10.6	22.7	C	73'	22.8	5.8	28.6	D
		Thru	63'	12.1	15.8	27.9	D	73'	22.8	9.1	31.9	D
		Right	63'	8.9	-	8.9	A	73'	11.7	-	11.7	B
	WB	Left	28'	19.6	2.3	21.9	C	26'	17.4	11.2	28.6	D
		Thru	28'	19.6	4.7	24.3	C	26'	17.4	19.3	36.7	E
		Right	28'	13.4	-	13.4	B	26'	6.8	-	6.8	A
	NB	Left	-	1.2	4.7	5.9	A	13'	4.7	19.3	24.0	C
		Right	-	1.8	-	1.8	A	-	1.1	-	1.1	A
	SB	Left	9'	0.8	15.8	16.6	C	-	0.1	9.1	9.2	A
		Right	-	0.0	-	0.0	A	-	0.1	-	0.1	A
TH 169 & W 166th St	EB	Left	47'	18.4	9.3	27.7	D	40'	11.4	8.3	19.7	C
		Thru	47'	18.4	13.9	32.3	D	40'	11.4	7.1	18.5	C
		Right	47'	4.9	-	4.9	A	40'	10.5	-	10.5	B
	WB	Left	78'	34.5	4.9	39.4	E	63'	14.1	12.9	27.0	D
		Thru	78'	34.5	2.7	37.2	E	63'	14.1	20.0	34.1	D
		Right	78'	23.2	-	23.2	C	63'	7.3	-	7.3	A
	NB	Left	3'	3.3	2.7	6.0	A	3'	0.0	20.0	20.0	C
		Right	-	2.9	-	2.9	A	-	2.5	-	2.5	A
	SB	Left	3'	0.5	13.9	14.4	B	25'	1.4	7.1	8.5	A
		Right	-	1.3	-	1.3	A	-	1.0	-	1.0	A
TH 169 & Jordan Ave SE	EB	Right	28'	0.0	-	0.0	A	41'	5.5	-	5.5	A
	SB	Right	-	2.5	-	2.5	A	-	0.0	-	0.0	A
TH 169 & W 173rd St	EB	Right	27'	4.5	-	4.5	A	50'	13.0	-	13.0	B
	WB	Right	34'	11.9	-	11.9	B	18'	4.7	-	4.7	A
	NB	Left	4'	0.6	4.2	4.8	A	-	0.2	15.5	15.7	C
		U-Turn	4'	0.6	3.4	4.0	A	-	0.2	10.3	10.5	B
		Right	-	0.6	-	0.6	A	-	0.3	-	0.3	A
	SB	Left	3'	1.5	22.6	1.5	A	9'	1.4	7.2	8.6	A
		Right	-	0.0	-	0.0	A	-	0.0	-	0.0	A

LOS and Queue Length for No Build Forecast Conditions (2038)

Intersection	Direction	Movement	AM					PM				
			95 % Queue	Delay/Vehicle by MVMT (Sec)			LOS	95 % Queue	Delay/Vehicle by MVMT (Sec)			LOS
				1st	2nd	Total			1st	2nd	Total	
TH 169 & Bluff DR	EB	Left	76'	15.7	18.5	34.2	D	73'	29.9	6.7	36.6	E
		Thru	76'	15.7	23.3	39.0	E	73'	29.9	10.5	40.4	E
		Right	76'	6.1	-	6.1	A	73'	16.3	-	16.3	C
	WB	Left	36'	50.9	4.9	55.8	F	56'	14.3	27.0	41.3	E
		Thru	36'	50.9	6.3	57.2	F	56'	14.3	23.7	38	E
		Right	36'	25.3	-	25.3	D	56'	7.8	-	7.8	A
	NB	Left	6'	1.2	6.3	7.5	A	13'	1.4	23.7	25.1	D
		Right	0'	2.6	-	2.6	A	0'	1.3	-	1.3	A
	SB	Left	11'	1.5	23.3	24.8	C	0'	0.1	14.3	14.4	B
		Right	0'	0.0	-	0.0	A	0'	0.1	-	0.1	A
TH 169 & W 166th St	EB	Left	61'	33.4	15.7	49.1	E	46'	46.8	2.5	49.3	E
		Thru	61'	33.4	26.6	60.0	F	46'	46.8	8.9	57.7	F
		Right	61'	-	-	-	-	46'	15.0	-	15.0	B
	WB	Left	86'	41.2	8.0	49.2	E	72'	18.5	16.0	34.5	D
		Thru	86'	41.2	5.5	46.7	E	72'	18.5	16.7	35.2	E
		Right	86'	38.0	-	38.0	E	72'	11.9	-	11.9	B
	NB	Left	5'	4.2	5.5	9.7	A	0'	0.0	18.5	18.5	C
		Right	0'	5.9	-	5.9	A	0'	3.0	-	3.0	A
	SB	Left	11'	3.9	26.6	30.5	D	17'	1.6	8.9	10.5	B
		Right	0'	0.3	-	0.3	A	0'	0.3	-	0.3	A
TH 169 & Jordan Ave SE	EB	Right	26'	1.8	-	1.8	A	42'	6.3	-	6.3	A
	SB	Right	0'	0.0	-	0.0	A	0'	0.0	-	0.0	A
TH 169 & W 173rd St	EB	Right	39'	5.2	-	5.2	A	57'	15.8	-	15.8	C
	WB	Right	42'	19.7	-	19.7	C	23'	7.2	-	7.2	A
	NB	U-Turn	20'	0.5	2.1	2.6	A	24'	0.4	12.0	12.4	B
		Left	20'	0.5	4.0	4.5	A	24'	0.4	15.7	16.1	C
		Right	0'	0.3	-	0.3	A	0'	0.2	-	0.2	A
	SB	Left	25'	1.3	31.5	32.8	D	28'	0.2	12.4	12.6	B
		Right	0'	0.0	-	0.0	A	0'	0.0	-	0.0	A

LOS and Queue Lengths for Option 1 Existing Conditions (2018)

Intersection	Direction	Movement	AM					PM				
			95 % Queue	Delay/Vehicle by MVMT (Sec)			LOS	95 % Queue	Delay/Vehicle by MVMT (Sec)			LOS
				1st	2nd	Total			1st	2nd	Total	
RCUT 1 & 2	SB	U-Turn	26'	0.2	10.6	10.8	B	6'	0.2	3.0	3.2	A
	NB	U-Turn	59'	1.2	5.0	6.2	A	62'	2.9	11.6	3.0	B
TH 169 & Bluff DR	EB	Right	63'	4.3	-	4.3	A	54'	2.6	-	2.6	A
	WB	Right	60'	3.0	-	3.0	A	60'	3.2	-	3.2	A
	NB	Right	0'	4.1	-	4.1	A	0'	2.1	-	2.1	A
	SB	Right	0'	0.1	-	0.1	A	0'	0.1	-	0.1	A
TH 169 & W 166th St	EB	Right	46'	2.2	-	2.2	A	33'	2.1	-	2.1	A
	SB	Right	0'	0.5	-	0.5	A	0'	0.1	-	0.1	A
RCUT 3	NB	U-Turn	16'	0.1	4.5	4.6	A	17'	0.2	10.2	10.4	B
TH 169 & W 173rd St	EB	Right	36'	2.3	-	2.3	A	40'	2.6	-	2.6	A
	WB	Right	37'	2.3	-	2.3	A	19'	2.3	-	2.3	A
	NB	Left	13'	0.5	3.3	3.8	A	17'	0.2	6.6	6.8	A
		Right	0'	0.6	-	0.6	A	0'	0.3	-	0.3	A
	SB	Left	26'	0.9	15.2	16.1	C	17'	1.0	7.8	7.9	A
		Right	0'	0.5	-	0.5	A	0'	1.3	-	1.3	A
RCUT 4	SB	U-Turn	86'	13.1	21.8	34.9	D	63'	2.6	7.9	10.5	B
Jordan Ave & Bluff Dr	WB	Left	58'	4.2	-	4.2	A	78'	4.3	-	4.3	A
		Right	58'	2.3	-	2.3	A	78'	2.2	-	2.2	A
	NB	Right	0'	0.1	-	0.1	A	0'	0.3	-	0.3	A
	SB	Left	0'	1.5	-	1.5	A	10'	2.7	-	2.7	A
Jordan Ave & 173rd St	WB	Thru	0'	0.4	-	0.4	A	0'	0.1	-	0.1	A
		Right	0'	0.5	-	0.5	A	0'	0.0	-	0.0	A
	SB	Left	14'	4.8	-	4.8	A	43'	4.5	-	4.5	A
Berkshire Ave & Bluff Dr	EB	Thru	0'	0.2	-	0.2	A	0'	0.2	-	0.2	A
		Right	0'	0.0	-	0.0	A	0'	0.1	-	0.1	A
	WB	Thru	0'	0.0	-	0.0	A	0'	0.0	-	0.0	A
	NB	Left	61'	4.3	-	4.3	A	68'	4.6	-	4.6	A
Berkshire Ave & 166th St	EB	Left	30'	4.4	-	4.4	A	60'	4.7	-	4.7	A
	WB	Right	36'	2.8	-	2.8	A	43'	2.8	-	2.8	A
	NB	Thru	0'	0.0	-	0.0	A	0'	0.1	-	0.1	A
	SB	Left	5'	1.8	-	1.8	A	9'	1.9	-	1.9	A
		Thru	5'	0.1	-	0.1	A	9'	0.3	-	0.3	A
		Right	5'	0.0	-	0.0	A	9'	0.1	-	0.1	A

LOS and Queue Lengths for Option 1 Forecast Conditions (2038)

Intersection	Direction	Movement	AM					PM				
			95 % Queue	Delay/Vehicle by MVMT (Sec)			LOS	95 % Queue	Delay/Vehicle by MVMT (Sec)			LOS
				1st	2nd	Total			1st	2nd	Total	
RCUT 1 & 2	SB	U-Turn	24’	3.8	31.2	35.0	D	13’	0.3	12.9	13.2	B
	NB	U-Turn	65’	0.9	5.3	6.2	A	71’	14.1	22.3	36.4	E
TH 169 & Bluff DR	EB	Right	69'	4.7	-	4.7	A	53'	2.5	-	2.5	A
	WB	Right	58'	2.8	-	2.8	A	60'	3.2	-	3.2	A
	NB	Right	0'	5.3	-	5.3	A	0'	2.9	-	2.9	A
	SB	Right	0'	0.1	-	0.1	A	0'	0.2	-	0.2	A
TH 169 & W 166th St	EB	Right	48'	2.2	-	2.2	A	40'	2.3	-	2.3	A
	SB	Right	0'	0.9	-	0.9	A	0'	0.0	-	0.0	A
RCUT 3	NB	U-Turn	20'	0.1	4.3	4.4	A	21'	0.1	21.6	21.7	C
TH 169 & W 173rd St	EB	Right	40'	2.3	-	2.3	A	41'	2.6	-	2.6	A
	WB	Right	35'	2.4	-	2.4	A	19'	2.1	-	2.1	A
	NB	Left	12'	0.5	4.9	5.4	A	13'	0.1	33.2	33.3	D
		Right	0'	0.6	-	0.6	A	0'	0.7	-	0.7	A
	SB	Left	17'	2.8	26.8	29.6	D	27'	2.0	11.8	13.8	B
		Right	0'	0.6	-	0.6	A	0'	1.5	-	1.5	A
RCUT 4	SB	U-Turn	159'	74.1	36.9	111	F	72'	7.6	12.2	19.8	C
Jordan Ave & Bluff Dr	WB	Left	58'	4.0	-	4.0	A	81'	4.3	-	4.3	A
		Right	58'	2.0	-	2.0	A	81'	2.5	-	2.5	A
	NB	Right	0'	0.1	-	0.1	A	0'	0.3	-	0.3	A
	SB	Left	0'	2.3	-	2.3	A	4'	1.8	-	1.8	A
Jordan Ave & 173rd St	WB	Right	0'	0.7	-	0.7	A	0'	0.0	-	0.0	A
	SB	Left	24'	4.3	-	4.3	A	44'	4.3	-	4.3	A
Berkshire Ave & Bluff Dr	EB	Thru	0'	0.2	-	0.2	A	0'	0.2	-	0.2	A
		Right	0'	0.1	-	0.1	A	0'	0.2	-	0.2	A
	WB	Thru	0'	0.1	-	0.1	A	0'	0.0	-	0.0	A
	NB	Left	60'	4.2	-	4.2	A	71'	4.4	-	4.4	A
Berkshire Ave & 166th St	EB	Left	29	4.7	-	4.7	A	63'	5.2	-	5.2	A
	WB	Right	38'	2.7	-	2.7	A	45'	2.7	-	2.7	A
	NB	Thru	0'	0.0	-	0.0	A	0'	0.1	-	0.1	A
	SB	Left	0'	1.8	-	1.8	A	14'	2.0	-	2.0	A
		Thru	0'	0.5	-	0.5	A	14'	0.5	-	0.5	A
		Right	0'	0.0	-	0.0	A	14'	0.3	-	0.3	A

LOS and Queue Lengths for Option 2 Existing Conditions (2018)

Intersection	Direction	Movement	AM					PM				
			95 % Queue	Delay/Vehicle by MVMT (Sec)			LOS	95 % Queue	Delay/Vehicle by MVMT (Sec)			LOS
				1st	2nd	Total			1st	2nd	Total	
TH 169 & Bluff DR	EB	Right	40'	2.4	-	2.4	A	51'	2.4	-	2.4	A
	WB	Right	76'	3.7	-	3.7	A	51'	3.2	-	3.2	A
	NB	Right	0'	3.8	-	3.8	A	0'	2.1	-	2.1	A
	SB	Right	0'	0.0	-	0.0	A	0'	0.1	-	0.1	A
TH 169 & W 166th St	EB	Right	41'	2.2	-	2.2	A	42'	2.1	-	2.1	A
	SB	Right	0'	0.0	-	0.0	A	0'	0.0	-	0.0	A
TH 169 & W 173rd St	EB	Right	46'	2.8	-	2.8	A	61'	3.0	-	3.0	A
	WB	Right	33'	2.1	-	2.1	A	20'	2.0	-	2.0	A
	NB	U-Turn	22'	0.3	2.5	0.3	A	18'	0.2	5.6	5.8	A
		Left	22'	0.3	3.9	4.2	A	18'	0.2	11.2	11.4	B
		Right	0'	0.1	-	0.1	A	0'	0.1	-	0.1	A
	SB	U-Turn	20'	-	-	-	-	21'	1.4	3.9	5.3	A
		Left	20'	2.8	13.4	16.2	C	21'	1.4	6.8	8.2	A
		Right	0'	0.7	-	0.7	A	0'	1.5	-	1.5	A
Jordan Ave & Bluff Dr	WB	Left	58'	4.3	-	4.3	A	76'	4.2	-	4.2	A
		Right	58'	2.2	-	2.2	A	76'	2.7	-	2.7	A
	NB	Right	0'	0	-	0	A	0'	0.2	-	0.2	A
	SB	Left	0'	1.1	-	1.1	A	4'	1.8	-	1.8	A
Jordan Ave & Berkshire Ave	WB	Left	40'	4.9	-	4.9	A	65'	5.3	-	5.3	A
		Right	40'	2.5	-	2.5	A	65'	2.5	-	2.5	A
	NB	Thru	0'	0.1	-	0.1	A	0'	0.0	-	0.0	A
		Right	0'	0.0	-	0	A	0'	0.1	-	0.1	A
	SB	Left	11'	2.2	-	2.2	A	4'	2.2	-	2.2	A
		Thru	11'	0	-	0	A	4'	0.1	-	0.1	A
Jordan Ave & 173rd St	WB	Right	0'	0.6	-	0.6	A	0'	0.3	-	0.3	A
	SB	Left	36'	4.1	-	4.1	A	55'	4.5	-	4.5	A
Berkshire Ave & Bluff Dr	EB	Thru	0'	0.1	-	0.1	A	0'	0.0	-	0.0	A
		Right	0'	0	-	0	A	0'	0.0	-	0.0	A
	WB	Left	0'	1.7	-	1.7	A	0'	2.3	-	2.3	A
		Thru	0'	0.1	-	0.1	A	0'	0.0	-	0.0	A
	NB	Left	87'	4.7	-	4.7	A	64'	4.7	-	4.7	A
		Right	87'	3.1	-	3.1	A	64'	2.7	-	2.7	A
Berkshire Ave & 166th St	EB	Left	40'	4.6	-	4.6	A	51'	5.1	-	5.1	A
		Right	40'	2.8	-	2.8	A	51'	2.4	-	2.4	A
	WB	Left	30'	5	-	5	A	56'	5.2	-	5.2	A
		Right	30'	2.5	-	2.5	A	56'	2.8	-	2.8	A

	NB	Left	0'	2.1	-	2.1	A	0'	2.3	-	2.3	A
		Thru	0'	0.4	-	0.4	A	0'	0.5	-	0.5	A
		Right	0'	0.2	-	0.2	A	0'	0.4	-	0.4	A
	SB	Left	11'	2.2	-	2.2	A	22'	2.3	-	2.3	A
		Thru	11'	0.2	-	0.2	A	22'	0.1	-	0.1	A
		Right	11'	0	-	0	A	22'	0.0	-	0.0	A

LOS and Queue Lengths for Option 2 Forecast Conditions (2038)

Intersection	Direction	Movement	AM					PM				
			95 % Queue	Delay/Vehicle by MVMT (Sec)			LOS	95 % Queue	Delay/Vehicle by MVMT (Sec)			LOS
				1st	2nd	Total			1st	2nd	Total	
TH 169 & Bluff DR	EB	Right	55'	2.4	-	2.4	A	52'	2.4	-	2.4	A
	WB	Right	76'	3.6	-	3.6	A	53'	3.1	-	3.1	A
	NB	Right	0'	5.1	-	5.1	A	0'	3.2	-	3.2	A
	SB	Right	0'	0.1	-	0.1	A	0'	0.2	-	0.2	A
TH 169 & W 166th St	EB	Right	38'	2.2	-	2.2	A	39'	2.3	-	2.3	A
	SB	Right	0'	0.0	-	0.0	A	0'	0.0	-	0.0	A
TH 169 & W 173rd St	EB	Right	48'	2.5	-	2.5	A	47'	3.1	-	3.1	A
	WB	Right	34'	2.2	-	2.2	A	20'	2.4	-	2.4	A
	NB	U-Turn	25'	0.5	3.1	3.6	A	18'	1.9	13.1	15	B
		Left	25'	0.5	4.5	5.0	A	18'	1.9	27.7	29.6	D
		Right	0'	0.6	-	0.6	A	0'	0.2	-	0.2	A
	SB	U-Turn	23'	-	-	-	-	25'	-	-	-	-
		Left	23'	2.2	20.5	22.7	C	25'	3.0	9.1	12.1	B
		Right	0'	0.7	-	0.7	A	0'	2.0	-	2.0	A
Jordan Ave & Bluff Dr	WB	Left	56'	4.2	-	4.2	A	81'	4.4	-	4.4	A
		Right	56'	2.6	-	2.6	A	81'	2.6	-	2.6	A
	NB	Right	0'	0.0	-	0.0	A	0'	0.2	-	0.2	A
	SB	Left	0'	2.2	-	2.2	A	0'	2.1	-	2.1	A
Jordan Ave & Berkshire Ave	WB	Left	45'	6.9	-	6.9	A	63'	5.2	-	5.2	A
		Right	45'	2.4	-	2.4	A	63'	2.6	-	2.6	A
	NB	Thru	0'	0.0	-	0.0	A	0'	0.0	-	0.0	A
		Right	0'	0.2	-	0.2	A	0'	0.1	-	0.1	A
	SB	Left	17'	2.3	-	2.3	A	12'	2.3	-	2.3	A
		Thru	17'	0.6	-	0.6	A	12'	0.3	-	0.3	A
Jordan Ave & 173rd St	WB	Right	0'	0.5	-	0.5	A	0'	0.2	-	0.2	A
	SB	Left	37'	3.7	-	3.7	A	57'	4.6	-	4.6	A
Berkshire Ave & Bluff Dr	EB	Thru	0'	0.1	-	0.1	A	0'	0.1	-	0.1	A
		Right	0'	0.1	-	0.1	A	0'	0.1	-	0.1	A
	WB	Left	4'	1.8	-	1.8	A	7'	2.2	-	2.2	A
		Thru	4'	0.1	-	0.1	A	7'	0.1	-	0.1	A
	NB	Left	91'	5.0	-	5.0	A	62'	4.7	-	4.7	A
		Right	91'	3.0	-	3.0	A	62'	2.8	-	2.8	A
Berkshire Ave & 166th St	EB	Left	45'	4.1	-	4.1	A	63'	4.4	-	4.4	A
		Right	45'	3.4	-	3.4	A	63'	2.9	-	2.9	A
	WB	Left	34'	5.1	-	5.1	A	50'	4.8	-	4.8	A
		Right	34'	2.6	-	2.6	A	50'	2.6	-	2.6	A

	NB	Left	0'	2.3	-	2.3	A	4'	2.5	-	2.5	A
		Thru	0'	0.6	-	0.6	A	4'	0.7	-	0.7	A
		Right	0'	0.6	-	0.6	A	4'	0.5	-	0.5	A
	SB	Left	16'	2.3	-	2.3	A	21'	2.1	-	2.1	A
		Thru	16'	0.4	-	0.4	A	21'	0.2	-	0.2	A
		Right	16'	0.3	-	0.3	A	21'	0.3	-	0.3	A

LOS and Queue Lengths for Option 3 Existing Conditions (2018)

Intersection	Direction	Movement	AM					PM				
			95 % Queue	Delay/Vehicle by MVMT (Sec)			LOS	95 % Queue	Delay/Vehicle by MVMT (Sec)			LOS
				1st	2nd	Total			1st	2nd	Total	
TH 169 & W 166th St	EB	Right	37'	2.4	-	2.4	A	34'	2.5	-	2.5	A
	SB	Right	0'	0.9	-	0.9	A	0'	0.7	-	0.7	A
TH 169 & W 173rd St	EB	Right	57'	3.1	-	3.1	A	58'	3.2	-	3.2	A
	WB	Right	39'	2.4	-	2.4	A	23'	2.3	-	2.3	A
	NB	U-Turn	17'	0.3	2.3	2.6	A	18'	0.1	5.2	5.3	A
		Left	17'	0.3	2.4	2.7	A	18'	0.1	9.2	9.3	A
		Right	0'	0.0	-	0.0	A	0'	0.1	-	0.1	A
	SB	U-Turn	26'	4.2	12.1	16.3	C	27'	2.1	6.4	8.5	A
		Left	26'	4.2	14.9	19.1	C	27'	2.1	6.6	8.7	A
		Right	0'	0.7	-	0.7	A	0'	1.8	-	1.8	A
Jordan Ave & Bluff Dr	WB	Left	52'	4.4	-	4.4	A	71'	4.5	-	4.5	A
		Right	52'	2.6	-	2.6	A	71'	3.2	-	3.2	A
	NB	Right	0'	0.7	-	0.7	A	0'	1.4	-	1.4	A
	SB	Left	4'	2.3	-	2.3	A	10'	3.5	-	3.5	A
Jordan Ave & 173rd St	WB	Right	0'	0.2	-	0.2	A	0'	0.2	-	0.2	A
	SB	Left	56'	4.5	-	4.5	A	67'	4.6	-	4.6	A
NB Entrance Ramp & Bluff Dr	EB	Left	20'	2.2	-	2.2	A	20'	2.3	-	2.3	A
		Thru	20'	0.5	-	0.5	A	20'	0.9	-	0.9	A
	WB	Thru	0'	0.8	-	0.8	A	0'	1.2	-	1.2	A
		Right	0'	0.6	-	0.6	A	0'	0.8	-	0.8	A
Berkshire Ave & Bluff Dr	EB	Thru	0'	0.2	-	0.2	A	0'	0.9	-	0.9	A
		Right	0'	0.1	-	0.1	A	0'	0.5	-	0.5	A
	WB	Thru	0'	0	-	0	A	0'	0.1	-	0.1	A
	NB	Left	61'	4.4	-	4.4	A	76'	4.8	-	4.8	A
		Right	61'	2.5	-	2.5	A	76'	2.7	-	2.7	A
Berkshire Ave & 166th St	EB	Left	42'	4.2	-	4.2	A	55'	4.9	-	4.9	A
	WB	Right	29'	2.4	-	2.4	A	42'	2.6	-	2.6	A
	NB	Left	0'	1.9	-	1.9	A	10'	2.0	-	2.0	A
		Thru	0'	0.2	-	0.2	A	10'	0.2	-	0.2	A
		Right	0'	0.5	-	0.5	A	10'	0.1	-	0.1	A
	SB	Left	5'	1.8	-	1.8	A	14'	2.7	-	2.7	A
		Thru	5'	0.7	-	0.7	A	14'	1.3	-	1.3	A
		Right	5'	0.0	-	0.0	A	14'	0.5	-	0.5	A

Note: The concept of a SB exit ramp was added after the modeling was completed and is not included in the analysis. The addition of the ramp is not anticipated to have a significant impact on the results.

LOS and Queue Lengths for Option 3 Forecast Conditions (2038)

Intersection	Direction	Movement	AM					PM				
			95 % Queue	Delay/Vehicle by MVMT (Sec)			LOS	95 % Queue	Delay/Vehicle by MVMT (Sec)			LOS
				1st	2nd	Total			1st	2nd	Total	
TH 169 & W 166th St	EB	Right	40'	2.5	-	2.5	A	40’	2.3	-	2.3	A
	SB	Right	0'	0.6	-	0.6	A	0’	2.4	-	2.4	A
TH 169 & W 173rd St	EB	Right	59'	2.9	-	2.9	A	59’	3.5	-	3.5	A
	WB	Right	31'	2.5	-	2.5	A	21’	2.4	-	2.4	A
	NB	U-Turn	20'	0.5	3.8	4.3	A	19’	0.2	10.5	10.7	B
		Left	20'	0.5	3.6	4.1	A	19’	0.2	18.5	18.7	C
		Right	0'	0.5	-	0.5	A	0’	0.1	-	0.1	A
	SB	U-Turn	27'	7.9	19.9	27.8	D	27’	2.1	5.0	7.1	A
		Left	27'	7.9	37.5	45.4	E	27’	2.1	9.2	11.3	B
		Right	0'	1.1	-	1.1	A	0’	2.5	-	2.5	A
Jordan Ave & Bluff Dr	WB	Left	50'	4.3	-	4.3	A	74’	4.8	-	4.8	A
		Right	50'	2.5	-	2.5	A	74’	2.7	-	2.7	A
	NB	Right	0'	1.0	-	1.0	A	0’	1.4	-	1.4	A
	SB	Left	5'	1.9	-	1.9	A	4’	1.7	-	1.7	A
Jordan Ave & 173rd St	WB	Right	0'	0.2	-	0.2	A	0’	0.2	-	0.2	A
	SB	Left	51'	4.3	-	4.3	A	72’	5.2	-	5.2	A
NB Entrance Ramp & Bluff Dr	EB	Left	24'	2.6	-	2.6	A	28’	2.7	-	2.7	A
		Thru	24'	0.8	-	0.8	A	28’	0.8	-	0.8	A
	WB	Thru	0'	0.7	-	0.7	A	3’	1.0	-	1.0	A
		Right	0'	0.6	-	0.6	A	3’	0.8	-	0.8	A
Berkshire Ave & Bluff Dr	EB	Thru	0'	0.4	-	0.4	A	0’	0.8	-	0.8	A
		Right	0'	0.3	-	0.3	A	0’	0.5	-	0.5	A
	WB	Thru	0'	0.1	-	0.1	A	0’	0.1	-	0.1	A
	NB	Left	58'	4.6	-	4.6	A	79’	4.7	-	4.7	A
		Right	58'	2.8	-	2.8	A	79’	3.1	-	3.1	A
Berkshire Ave & 166th St	EB	Left	36'	5.5	-	5.5	A	60’	5.0	-	5.0	A
	WB	Right	35'	2.4	-	2.4	A	43’	2.7	-	2.7	A
	NB	Left	0'	2.7	-	2.7	A	8’	2.4	-	2.4	A
		Thru	0'	0.2	-	0.2	A	8’	0.4	-	0.4	A
		Right	0'	0.3	-	0.3	A	8’	0.3	-	0.3	A
	SB	Left	9'	2.5	-	2.5	A	26’	2.4	-	2.4	A
		Thru	9'	0.7	-	0.7	A	26’	1.1	-	1.1	A
		Right	9'	0.1	-	0.1	A	26’	0.8	-	0.8	A

1 - US 169 & Bluff Dr
Sand Creek Township, MN
Thursday, May 17, 2018

Time	Southbound US 169					Westbound Bluff Dr					Northbound US 169					Eastbound Bluff Dr					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
12:00 AM	0	0	42	0	0	0	0	0	1	0	0	0	19	0	0	0	0	0	0	0	**62**
12:15 AM	0	0	38	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	**49**
12:30 AM	0	0	28	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	**42**
12:45 AM	0	0	25	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	**34**
Hourly Total	0	0	133	0	0	0	0	0	1	0	0	0	53	0	0	0	0	0	0	0	**187**
1:00 AM	0	0	23	1	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	**34**
1:15 AM	0	0	25	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	**39**
1:30 AM	0	0	16	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	**30**
1:45 AM	0	0	20	0	0	0	1	0	0	0	0	0	8	0	0	0	0	0	0	0	**29**
Hourly Total	0	0	84	1	0	0	1	0	0	0	0	0	46	0	0	0	0	0	0	0	**132**
2:00 AM	0	0	13	0	0	0	5	0	0	0	0	0	20	1	0	0	0	0	0	0	**39**
2:15 AM	0	0	18	0	0	0	0	0	0	0	1	0	20	0	0	0	0	0	0	0	**39**
2:30 AM	0	0	17	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	**34**
2:45 AM	0	0	16	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	**32**
Hourly Total	0	0	64	0	0	0	5	0	0	0	1	0	73	1	0	0	0	0	0	0	**144**
3:00 AM	0	0	14	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	**34**
3:15 AM	0	0	13	1	0	0	0	0	0	0	0	0	28	0	0	0	0	0	0	0	**42**
3:30 AM	0	0	22	1	0	0	0	0	0	0	0	0	27	0	0	0	0	0	0	0	**50**
3:45 AM	0	0	15	0	0	0	0	0	0	0	0	1	24	0	0	0	0	0	0	0	**40**
Hourly Total	0	0	64	2	0	0	0	0	0	0	0	1	99	0	0	0	0	0	0	0	**166**
4:00 AM	0	0	18	1	0	0	0	0	0	0	0	0	36	0	0	0	2	0	0	0	**57**
4:15 AM	0	0	26	0	0	0	0	0	0	0	0	1	60	1	0	0	2	0	0	0	**90**
4:30 AM	0	0	29	2	0	0	0	0	0	0	0	4	92	0	0	0	0	0	0	0	**127**
4:45 AM	0	1	26	4	0	0	0	0	2	0	0	1	91	0	0	0	4	0	1	0	**130**
Hourly Total	0	1	99	7	0	0	0	0	2	0	0	6	279	1	0	0	8	0	1	0	**404**
5:00 AM	0	1	32	2	0	0	0	0	2	0	0	1	141	0	0	0	5	0	0	0	**184**
5:15 AM	0	0	47	2	0	0	0	0	1	0	0	2	193	1	0	0	1	0	0	0	**247**
5:30 AM	0	0	64	7	0	0	0	0	0	0	0	8	258	1	0	0	0	0	1	0	**339**
5:45 AM	0	2	95	11	0	0	0	1	2	0	0	9	277	1	0	0	5	0	1	0	**404**
Hourly Total	0	3	238	22	0	0	0	1	5	0	0	20	869	3	0	0	11	0	2	0	**1174**
6:00 AM	0	3	99	6	0	0	1	0	3	0	0	3	301	1	0	0	4	0	0	0	**421**
6:15 AM	0	0	159	5	0	0	0	0	0	0	0	2	321	0	0	0	0	0	0	0	**487**
6:30 AM	0	1	128	5	0	0	1	0	1	1	0	3	419	1	0	0	2	0	0	0	**561**
6:45 AM	0	2	160	6	0	0	0	0	1	0	1	3	417	3	0	0	3	0	0	0	**596**
Hourly Total	0	6	546	22	0	0	2	0	5	1	1	11	1458	5	0	0	9	0	0	0	**2065**
7:00 AM	1	2	173	3	0	0	2	0	5	0	0	6	345	2	0	0	3	0	0	0	**542**
7:15 AM	2	3	190	7	0	0	1	0	5	0	0	3	408	4	0	0	6	0	1	0	**630**
7:30 AM	1	4	191	2	0	0	1	0	4	0	0	4	433	3	0	0	8	0	3	0	**654**
7:45 AM	0	2	151	3	0	0	0	0	4	0	2	13	354	2	0	0	4	0	1	0	**536**
Hourly Total	4	11	705	15	0	0	4	0	18	0	2	26	1540	11	0	0	21	0	5	0	**2362**

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Sand Creek Township, MN
Thursday, May 17, 2018

Time	Southbound US 169					Westbound Bluff Dr					Northbound US 169					Eastbound Bluff Dr					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
8:00 AM	0	2	121	7	0	0	3	0	4	0	0	4	328	0	0	0	3	0	2	0	**474**
8:15 AM	0	4	127	7	0	0	0	0	3	0	0	2	275	5	0	0	8	0	3	0	**434**
8:30 AM	0	5	157	7	0	0	0	0	6	0	0	2	267	2	0	0	4	0	2	0	**452**
8:45 AM	0	1	170	4	0	0	3	0	1	0	0	4	230	6	0	0	0	0	0	0	**419**
Hourly Total	0	12	575	25	0	0	6	0	14	0	0	12	1100	13	0	0	15	0	7	0	**1779**
9:00 AM	0	0	140	5	0	0	0	0	3	0	0	3	238	2	0	0	3	1	1	0	**396**
9:15 AM	0	4	150	0	0	0	0	0	2	0	0	1	231	2	0	0	4	0	0	0	**394**
9:30 AM	1	5	219	0	0	0	0	0	1	0	0	6	191	1	0	0	5	0	1	0	**430**
9:45 AM	0	1	184	9	0	0	5	0	2	0	0	2	181	3	0	0	3	0	1	0	**391**
Hourly Total	1	10	693	14	0	0	5	0	8	0	0	12	841	8	0	0	15	1	3	0	**1611**
10:00 AM	0	1	170	10	0	0	0	0	0	0	0	2	194	2	0	0	6	0	1	0	**386**
10:15 AM	1	2	151	3	0	0	1	0	6	0	0	2	156	1	0	0	6	0	1	0	**330**
10:30 AM	0	0	166	5	0	0	3	1	2	0	0	2	185	1	0	0	3	0	2	0	**370**
10:45 AM	0	0	177	10	0	0	5	0	3	0	0	2	174	4	0	0	2	0	4	0	**381**
Hourly Total	1	3	664	28	0	0	9	1	11	0	0	8	709	8	0	0	17	0	8	0	**1467**
11:00 AM	1	3	151	3	0	0	3	0	3	0	0	2	162	2	0	0	6	0	2	0	**338**
11:15 AM	0	5	191	4	0	0	0	0	7	0	1	3	179	2	0	0	9	0	3	0	**404**
11:30 AM	0	0	185	5	0	0	0	0	5	0	0	7	183	0	0	0	7	0	2	0	**394**
11:45 AM	1	2	145	5	0	0	0	0	1	0	0	3	152	2	0	0	8	0	1	0	**320**
Hourly Total	2	10	672	17	0	0	3	0	16	0	1	15	676	6	0	0	30	0	8	0	**1456**
12:00 PM	0	2	209	9	0	0	1	0	2	0	0	1	214	1	0	0	3	0	2	0	**444**
12:15 PM	0	2	182	4	0	0	1	1	3	0	0	3	180	4	0	0	8	1	0	0	**389**
12:30 PM	0	2	177	3	0	0	2	0	4	0	0	3	164	0	0	0	6	1	2	0	**364**
12:45 PM	0	3	194	3	0	0	2	0	3	0	0	2	196	0	0	0	4	0	1	0	**408**
Hourly Total	0	9	762	19	0	0	6	1	12	0	0	9	754	5	0	0	21	2	5	0	**1605**
1:00 PM	1	2	180	4	0	0	5	0	3	0	0	0	202	3	0	0	5	0	0	0	**405**
1:15 PM	0	4	225	9	0	0	2	0	1	0	0	1	165	3	0	0	9	0	1	0	**420**
1:30 PM	0	2	211	9	0	0	2	0	3	0	0	2	213	1	0	0	7	0	2	0	**452**
1:45 PM	0	4	222	4	0	0	1	0	1	0	0	3	200	2	0	0	6	0	1	0	**444**
Hourly Total	1	12	838	26	0	0	10	0	8	0	0	6	780	9	0	0	27	0	4	0	**1721**
2:00 PM	0	3	277	9	0	0	1	0	2	0	3	2	185	0	0	0	1	0	4	0	**487**
2:15 PM	0	2	260	9	0	0	2	0	2	0	0	4	203	2	0	0	7	0	2	0	**493**
2:30 PM	0	1	264	11	0	0	0	0	2	0	0	2	242	1	0	0	7	0	2	0	**532**
2:45 PM	0	4	297	6	0	0	0	0	2	0	0	4	186	2	0	0	9	1	3	0	**514**
Hourly Total	0	10	1098	35	0	0	3	0	8	0	3	12	816	5	0	0	24	1	11	0	**2026**
3:00 PM	0	5	288	7	0	0	2	0	4	0	0	5	206	3	0	0	9	1	2	0	**532**
3:15 PM	0	2	332	6	0	0	2	0	4	0	0	1	233	5	0	0	7	1	3	0	**596**
3:30 PM	0	5	268	10	0	0	4	0	6	0	0	2	259	2	0	0	4	0	2	0	**562**
3:45 PM	0	4	356	10	0	0	1	0	1	0	1	1	218	7	0	0	4	0	2	0	**605**
Hourly Total	0	16	1244	33	0	0	9	0	15	0	1	9	916	17	0	0	24	2	9	0	**2295**

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Sand Creek Township, MN
Thursday, May 17, 2018

Time	Southbound US 169					Westbound Bluff Dr					Northbound US 169					Eastbound Bluff Dr					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
4:00 PM	0	3	347	4	0	0	4	0	5	0	0	3	212	2	0	0	11	0	7	0	**598**
4:15 PM	0	4	376	2	0	0	6	0	1	0	0	0	210	3	0	0	6	0	4	0	**612**
4:30 PM	0	5	359	6	0	0	1	1	2	0	0	1	196	1	0	0	9	0	5	0	**586**
4:45 PM	0	1	363	5	0	0	10	0	3	0	0	1	196	3	0	0	5	0	3	0	**590**
Hourly Total	0	13	1445	17	0	0	21	1	11	0	0	5	814	9	0	0	31	0	19	0	**2386**
5:00 PM	0	5	396	3	0	0	0	0	5	0	0	3	206	2	0	0	8	0	5	0	**633**
5:15 PM	0	6	342	2	0	0	1	0	5	0	0	2	225	1	0	0	3	0	4	0	**591**
5:30 PM	0	4	310	3	0	0	1	0	4	0	0	4	172	4	0	0	4	0	2	0	**508**
5:45 PM	0	4	283	2	0	0	3	0	1	0	0	2	177	1	0	0	7	0	1	0	**481**
Hourly Total	0	19	1331	10	0	0	5	0	15	0	0	11	780	8	0	0	22	0	12	0	**2213**
6:00 PM	0	4	246	3	0	0	2	0	5	0	0	6	186	3	0	0	2	0	3	0	**460**
6:15 PM	0	1	258	1	0	0	2	0	1	0	0	2	167	1	0	0	4	0	1	0	**438**
6:30 PM	0	4	206	2	0	0	0	0	0	0	0	3	144	2	0	0	3	0	1	0	**365**
6:45 PM	0	1	212	0	0	0	3	0	1	0	0	0	150	0	0	0	2	0	2	0	**371**
Hourly Total	0	10	922	6	0	0	7	0	7	0	0	11	647	6	0	0	11	0	7	0	**1634**
7:00 PM	0	1	180	2	0	0	0	0	3	0	0	1	134	2	0	0	0	0	2	0	**325**
7:15 PM	0	0	182	1	0	0	0	0	1	0	0	0	126	2	0	0	0	0	1	0	**313**
7:30 PM	0	1	188	3	0	0	0	0	1	0	0	1	127	1	0	0	1	0	2	0	**325**
7:45 PM	0	3	162	0	0	0	0	0	1	0	1	0	132	0	0	0	0	0	0	0	**299**
Hourly Total	0	5	712	6	0	0	0	0	6	0	1	2	519	5	0	0	1	0	5	0	**1262**
8:00 PM	0	1	153	1	0	0	2	0	2	0	0	0	112	1	0	0	4	0	1	0	**277**
8:15 PM	0	2	174	0	0	0	0	0	0	0	0	0	95	0	0	0	0	0	0	0	**271**
8:30 PM	0	1	143	1	0	0	1	0	1	0	0	0	102	1	0	0	1	0	0	0	**251**
8:45 PM	0	0	148	0	0	0	0	0	3	0	0	1	69	0	0	0	0	0	0	0	**221**
Hourly Total	0	4	618	2	0	0	3	0	6	0	0	1	378	2	0	0	5	0	1	0	**1020**
9:00 PM	0	1	152	0	0	0	0	0	2	0	0	1	95	2	0	0	0	0	2	0	**255**
9:15 PM	0	2	129	0	0	0	1	0	1	0	0	0	77	0	0	0	1	0	0	0	**211**
9:30 PM	0	2	104	0	0	0	0	0	0	0	0	0	100	0	0	0	3	0	0	0	**209**
9:45 PM	0	0	94	0	0	0	1	0	1	0	0	0	94	1	0	0	0	0	0	0	**191**
Hourly Total	0	5	479	0	0	0	2	0	4	0	0	1	366	3	0	0	4	0	2	0	**866**
10:00 PM	0	2	108	0	0	0	2	0	0	0	0	0	58	0	0	0	0	0	0	0	**170**
10:15 PM	0	0	92	0	0	0	1	0	0	0	0	0	56	1	0	0	3	0	0	0	**153**
10:30 PM	0	0	85	0	0	0	0	0	0	0	0	1	42	1	0	0	0	0	0	0	**129**
10:45 PM	0	0	52	1	0	0	0	0	0	0	0	0	49	0	0	0	0	0	0	0	**102**
Hourly Total	0	2	337	1	0	0	3	0	0	0	0	1	205	2	0	0	3	0	0	0	**554**
11:00 PM	0	0	65	0	0	0	1	0	0	0	0	0	50	0	0	0	1	0	0	0	**117**
11:15 PM	0	0	78	0	0	0	0	0	0	0	0	0	34	0	0	0	2	0	0	0	**114**
11:30 PM	0	1	69	1	0	0	0	0	0	0	0	0	35	1	0	0	0	0	1	0	**108**
11:45 PM	0	0	34	0	0	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0	**57**
Hourly Total	0	1	246	1	0	0	1	0	0	0	0	0	142	1	0	0	3	0	1	0	**396**
DAILY TOTAL	**9**	**162**	**14569**	**309**	**0**	**0**	**105**	**4**	**172**	**1**	**10**	**179**	**14860**	**128**	**0**	**0**	**302**	**6**	**110**	**0**	**30925**
Cars	5	147	12880	176	0	0	102	4	156	0	9	141	13364	121	0	0	179	5	71	0	**27360**
Heavy Vehicles	4	15	1689	133	0	0	3	0	16	1	1	38	1496	7	0	0	123	1	39	0	**3565**
Heavy Vehicle %	44.44%	9.26%	11.59%	43.04%	0.00%	0.00%	2.86%	0.00%	9.30%	100.00%	10.00%	21.23%	10.07%	5.47%	0.00%	0.00%	40.73%	16.67%	35.45%	0.00%	**11.53%**

1 - US 169 & Bluff Dr
Sand Creek Township, MN
Thursday, May 17, 2018

AM Peak Hour

Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Peds/ Bicycles	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Peds/ Bicycles	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Peds/ Bicycles	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Peds/ Bicycles	TOTAL
6:45 AM	0	2	160	6	0	0	0	0	1	0	1	3	417	3	0	0	3	0	0	0	**596**
7:00 AM	1	2	173	3	0	0	2	0	5	0	0	6	345	2	0	0	3	0	0	0	**542**
7:15 AM	2	3	190	7	0	0	1	0	5	0	0	3	408	4	0	0	6	0	1	0	**630**
7:30 AM	1	4	191	2	0	0	1	0	4	0	0	4	433	3	0	0	8	0	3	0	**654**
Peak Hour Total	4	11	714	18	0	0	4	0	15	0	1	16	1603	12	0	0	20	0	4	0	**2422**
PHF	0.500	0.688	0.935	0.643	0.000	0.000	0.500	0.000	0.750	0.000	0.250	0.667	0.926	0.750	0.000	0.000	0.625	0.000	0.333	0.000	**0.926**

PM Peak Hour

Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Peds/ Bicycles	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Peds/ Bicycles	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Peds/ Bicycles	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Peds/ Bicycles	TOTAL
4:15 PM	0	4	376	2	0	0	6	0	1	0	0	0	210	3	0	0	6	0	4	0	**612**
4:30 PM	0	5	359	6	0	0	1	1	2	0	0	1	196	1	0	0	9	0	5	0	**586**
4:45 PM	0	1	363	5	0	0	10	0	3	0	0	1	196	3	0	0	5	0	3	0	**590**
5:00 PM	0	5	396	3	0	0	0	0	5	0	0	3	206	2	0	0	8	0	5	0	**633**
Peak Hour Total	0	15	1494	16	0	0	17	1	11	0	0	5	808	9	0	0	28	0	17	0	**2421**
PHF	0.000	0.750	0.943	0.667	0.000	0.000	0.425	0.250	0.550	0.000	0.000	0.417	0.962	0.750	0.000	0.000	0.778	0.000	0.850	0.000	**0.956**

Total Vehicles On Leg 30392

Vehicles Entering Intersection 15049			Vehicles Exiting Intersection 15343	
Southbound				
Cars	176	12880	147	5	0
Heavy	133	1689	15	4	0
Total	**309**	**14569**	**162**	**9**	**0**

Total Vehicles on Leg 910

Vehicles Entering Intersection 418

Vehicles Exiting Intersection 492

Eastbound

Cars	Heavy	Total
0	0	**0**
0	0	**0**
179	123	**302**
5	1	**6**
71	39	**110**

Daily Volumes

Westbound

Cars	Heavy	Total
156	16	**172**
4	0	**4**
102	3	**105**
0	0	**0**
0	1	**1**

Vehicles Entering Intersection 281

Vehicles Exiting Intersection 296

Total Vehicles on Leg 577

Cars	0	9	141	13364	121
Heavy	0	1	38	1496	7
Total	**0**	**10**	**179**	**14860**	**128**
Northbound					
Vehicles Entering Intersection 15177			Vehicles Exiting Intersection 14794		
Total Vehicles On Leg 29971					

2 - US 169 & 166th St
Sand Creek Township, MN
Thursday, May 17, 2018

Time	Southbound US 169					Westbound 166th St					Northbound US 169					Eastbound 166th St					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
12:00 AM	0	0	41	0	0	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	**60**
12:15 AM	0	0	39	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	**50**
12:30 AM	0	0	26	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	**39**
12:45 AM	0	0	26	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	**37**
Hourly Total	0	0	132	0	0	0	0	0	0	0	0	0	54	0	0	0	0	0	0	0	**186**
1:00 AM	0	0	22	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	**32**
1:15 AM	0	0	25	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	**38**
1:30 AM	0	0	16	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	**30**
1:45 AM	0	0	21	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	**29**
Hourly Total	0	0	84	0	0	0	0	0	0	0	0	0	45	0	0	0	0	0	0	0	**129**
2:00 AM	0	0	19	0	0	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	**41**
2:15 AM	0	0	19	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	**39**
2:30 AM	0	0	16	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	**32**
2:45 AM	0	1	16	0	0	0	0	0	1	0	0	0	14	0	0	0	0	0	0	0	**32**
Hourly Total	0	1	70	0	0	0	0	0	1	0	0	0	72	0	0	0	0	0	0	0	**144**
3:00 AM	0	0	14	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	**34**
3:15 AM	0	0	13	0	0	0	0	0	0	0	0	0	29	0	0	0	0	0	0	0	**42**
3:30 AM	0	0	22	0	0	0	0	0	0	0	0	0	29	0	0	0	0	0	0	0	**51**
3:45 AM	0	1	12	1	0	0	0	0	0	0	0	1	24	0	0	0	0	0	0	0	**39**
Hourly Total	0	1	61	1	0	0	0	0	0	0	0	1	102	0	0	0	0	0	0	0	**166**
4:00 AM	0	0	19	0	0	0	0	0	0	0	0	1	35	0	0	0	0	0	0	0	**55**
4:15 AM	0	0	27	0	0	0	0	0	0	0	0	1	72	0	0	0	1	0	0	0	**101**
4:30 AM	0	0	29	0	0	0	0	0	0	0	0	0	98	0	0	0	0	0	0	0	**127**
4:45 AM	0	0	25	0	0	0	0	0	1	0	0	1	102	0	0	0	0	0	0	0	**129**
Hourly Total	0	0	100	0	0	0	0	0	1	0	0	3	307	0	0	0	1	0	0	0	**412**
5:00 AM	0	0	35	0	0	0	0	0	0	0	0	0	142	0	0	0	0	0	0	0	**177**
5:15 AM	0	0	45	0	0	0	0	0	0	0	0	0	209	0	0	0	0	0	0	0	**254**
5:30 AM	0	3	59	0	0	0	0	0	0	0	0	1	278	1	0	0	0	0	0	0	**342**
5:45 AM	0	2	99	0	0	0	0	0	3	0	0	0	288	4	0	0	0	1	1	0	**398**
Hourly Total	0	5	238	0	0	0	0	0	3	0	0	1	917	5	0	0	0	1	1	0	**1171**
6:00 AM	0	3	93	0	0	0	0	0	2	0	0	0	300	1	0	0	0	0	0	0	**399**
6:15 AM	0	3	152	0	0	0	0	0	2	1	0	1	332	4	0	0	0	0	0	0	**494**
6:30 AM	1	3	132	0	0	0	0	0	2	0	0	0	416	4	0	0	1	0	0	0	**559**
6:45 AM	0	1	161	2	0	0	0	0	8	0	0	2	421	3	0	0	0	0	0	0	**598**
Hourly Total	1	10	538	2	0	0	0	0	14	1	0	3	1469	12	0	0	1	0	0	0	**2050**
7:00 AM	0	3	167	0	0	0	0	0	1	0	0	1	358	4	0	0	0	2	0	0	**536**
7:15 AM	0	6	192	1	0	0	2	1	2	0	0	0	406	7	0	0	0	2	0	0	**619**
7:30 AM	2	3	186	0	0	0	1	0	5	0	0	0	437	1	0	0	0	1	0	0	**636**
7:45 AM	0	2	150	4	0	0	1	0	10	0	0	1	385	6	0	0	0	0	0	0	**559**
Hourly Total	2	14	695	5	0	0	4	1	18	0	0	2	1586	18	0	0	0	5	0	0	**2350**

2 - US 169 & 166th St
Sand Creek Township, MN
Thursday, May 17, 2018

Time	Southbound US 169					Westbound 166th St					Northbound US 169					Eastbound 166th St					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
8:00 AM	0	4	126	0	0	0	1	2	5	0	0	1	323	3	0	0	0	0	0	0	**465**
8:15 AM	0	4	121	0	0	0	1	0	3	0	0	0	294	3	0	0	1	0	1	0	**428**
8:30 AM	0	3	155	1	0	0	2	0	6	0	0	0	266	1	0	0	0	3	0	0	**437**
8:45 AM	0	3	166	0	0	0	3	0	4	0	0	0	230	4	0	0	0	1	0	0	**411**
Hourly Total	0	14	568	1	0	0	7	2	18	0	0	1	1113	11	0	0	1	4	1	0	**1741**
9:00 AM	0	5	140	1	0	0	2	0	7	0	2	1	246	4	0	0	0	0	0	0	**408**
9:15 AM	0	5	147	1	0	0	0	1	10	0	0	0	220	1	0	0	0	3	0	0	**388**
9:30 AM	0	8	209	1	0	0	2	0	5	0	0	1	190	3	0	0	0	2	1	0	**422**
9:45 AM	1	4	188	0	0	0	1	0	5	0	0	0	183	3	0	0	0	2	0	0	**387**
Hourly Total	1	22	684	3	0	0	5	1	27	0	2	2	839	11	0	0	0	7	1	0	**1605**
10:00 AM	1	8	161	0	0	0	3	0	6	0	0	0	193	4	0	0	0	0	0	0	**376**
10:15 AM	0	5	154	0	0	0	1	2	8	0	0	2	155	1	0	0	0	3	0	0	**331**
10:30 AM	0	5	163	0	0	0	1	4	8	0	0	0	173	4	0	0	2	1	0	0	**361**
10:45 AM	1	6	180	0	0	0	1	1	5	0	0	0	178	5	0	0	0	2	0	0	**379**
Hourly Total	2	24	658	0	0	0	6	7	27	0	0	2	699	14	0	0	2	6	0	0	**1447**
11:00 AM	0	7	142	0	0	0	2	0	4	0	0	0	166	6	0	0	1	1	0	0	**329**
11:15 AM	0	11	194	0	0	0	1	0	9	0	0	0	184	7	0	0	0	0	0	0	**406**
11:30 AM	0	10	181	0	0	0	9	0	12	0	0	0	176	7	0	0	0	0	0	0	**395**
11:45 AM	0	6	144	0	0	0	4	0	11	0	0	0	147	3	0	0	0	0	0	0	**315**
Hourly Total	0	34	661	0	0	0	16	0	36	0	0	0	673	23	0	0	1	1	0	0	**1445**
12:00 PM	1	12	195	0	0	0	6	0	10	0	0	0	205	3	0	0	1	0	0	0	**433**
12:15 PM	0	7	179	0	0	0	1	0	10	0	0	0	181	0	0	0	0	0	1	0	**379**
12:30 PM	0	5	182	0	0	0	4	0	4	0	0	1	168	9	0	0	1	0	0	0	**374**
12:45 PM	0	9	194	1	0	0	3	1	7	0	0	0	189	3	0	0	0	0	0	0	**407**
Hourly Total	1	33	750	1	0	0	14	1	31	0	0	1	743	15	0	0	2	0	1	0	**1593**
1:00 PM	0	7	176	0	0	0	4	0	10	0	0	0	196	4	0	0	0	1	0	0	**398**
1:15 PM	0	7	222	2	0	0	0	1	11	0	0	0	164	4	0	0	0	0	0	0	**411**
1:30 PM	0	8	204	0	0	0	1	0	7	0	0	0	203	1	0	0	1	1	0	0	**426**
1:45 PM	0	4	229	0	0	0	3	0	9	0	0	0	198	3	0	0	0	0	0	0	**446**
Hourly Total	0	26	831	2	0	0	8	1	37	0	0	0	761	12	0	0	1	2	0	0	**1681**
2:00 PM	0	6	274	0	0	0	2	0	11	0	0	0	192	3	0	0	1	0	0	0	**489**
2:15 PM	0	7	270	0	0	0	5	1	6	0	0	1	205	6	0	0	0	1	1	0	**503**
2:30 PM	1	6	259	0	0	0	2	0	7	0	0	0	239	3	0	0	0	0	0	0	**517**
2:45 PM	1	7	291	0	0	0	3	0	9	0	0	0	180	2	0	0	0	2	1	0	**496**
Hourly Total	2	26	1094	0	0	0	12	1	33	0	0	1	816	14	0	0	1	3	2	0	**2005**
3:00 PM	0	10	291	0	0	0	3	0	5	0	0	1	213	5	0	0	1	0	0	0	**529**
3:15 PM	0	9	334	0	0	0	3	0	12	0	0	0	240	7	0	0	0	0	0	0	**605**
3:30 PM	1	8	266	0	0	0	10	0	6	0	0	0	253	8	0	0	0	0	0	1	**552**
3:45 PM	0	11	356	0	0	0	4	0	5	0	0	2	234	1	0	0	0	0	0	0	**613**
Hourly Total	1	38	1247	0	0	0	20	0	28	0	0	3	940	21	0	0	1	0	0	1	**2299**

2 - US 169 & 166th St
Sand Creek Township, MN
Thursday, May 17, 2018

Time	Southbound US 169					Westbound 166th St					Northbound US 169					Eastbound 166th St					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
4:00 PM	0	3	360	1	0	0	7	2	5	0	0	0	196	2	0	0	1	1	0	0	**578**
4:15 PM	0	2	397	0	0	0	3	0	6	0	0	1	209	3	0	0	2	1	1	0	**625**
4:30 PM	0	3	362	0	0	0	2	0	7	0	0	0	198	6	0	0	0	0	2	0	**580**
4:45 PM	1	5	383	0	0	0	12	0	4	0	0	0	199	3	0	0	0	1	0	0	**608**
Hourly Total	1	13	1502	1	0	0	24	2	22	0	0	1	802	14	0	0	3	3	3	0	**2391**
5:00 PM	0	11	383	0	0	0	7	0	5	0	0	0	206	5	0	0	0	0	2	0	**619**
5:15 PM	0	6	358	1	0	0	4	1	7	0	0	0	217	2	0	0	1	1	2	0	**600**
5:30 PM	0	5	298	1	0	0	2	1	4	0	0	1	192	4	0	0	0	0	1	0	**509**
5:45 PM	0	1	300	0	0	0	6	1	5	0	0	1	177	2	0	0	2	0	0	0	**495**
Hourly Total	0	23	1339	2	0	0	19	3	21	0	0	2	792	13	0	0	3	1	5	0	**2223**
6:00 PM	0	1	246	0	0	0	1	0	5	0	0	0	201	0	0	0	0	0	1	0	**455**
6:15 PM	0	1	266	0	0	0	2	0	1	0	0	0	172	0	0	0	0	0	3	0	**445**
6:30 PM	0	3	211	0	0	0	1	0	0	0	0	0	160	0	0	0	0	0	0	0	**375**
6:45 PM	0	2	224	0	0	0	1	2	1	0	0	0	159	0	0	0	0	0	1	0	**390**
Hourly Total	0	7	947	0	0	0	5	2	7	0	0	0	692	0	0	0	0	0	5	0	**1665**
7:00 PM	0	4	178	0	0	0	2	0	0	0	0	0	141	1	0	0	0	0	1	0	**327**
7:15 PM	0	0	196	0	0	0	2	2	1	0	0	0	137	2	0	0	0	1	2	0	**343**
7:30 PM	0	0	196	0	0	0	0	2	0	0	0	1	131	2	0	0	2	0	1	0	**335**
7:45 PM	0	0	171	0	0	0	0	2	1	0	0	0	127	0	0	0	0	0	0	0	**301**
Hourly Total	0	4	741	0	0	0	4	6	2	0	0	1	536	5	0	0	2	1	4	0	**1306**
8:00 PM	0	0	158	0	0	0	0	0	0	0	0	0	113	3	0	0	2	0	1	0	**277**
8:15 PM	0	1	175	0	0	0	0	0	5	0	0	0	105	0	0	0	0	0	0	0	**286**
8:30 PM	0	0	149	0	0	0	0	0	1	0	0	0	109	1	0	0	0	0	0	0	**260**
8:45 PM	0	0	161	0	0	0	0	2	1	0	0	0	80	1	0	0	0	0	0	0	**245**
Hourly Total	0	1	643	0	0	0	0	2	7	0	0	0	407	5	0	0	2	0	1	0	**1068**
9:00 PM	0	0	158	0	0	0	0	0	0	0	0	0	103	1	0	0	0	0	2	0	**264**
9:15 PM	0	0	149	0	0	0	0	0	0	0	0	0	81	0	0	0	1	1	0	0	**232**
9:30 PM	0	1	109	0	0	0	0	1	1	0	0	0	103	0	0	0	0	0	0	0	**215**
9:45 PM	0	0	109	1	0	0	1	0	1	0	0	0	87	0	0	0	0	1	0	0	**200**
Hourly Total	0	1	525	1	0	0	1	1	2	0	0	0	374	1	0	0	1	2	2	0	**911**
10:00 PM	0	0	111	0	0	0	0	0	1	0	0	0	65	0	0	0	0	0	0	0	**177**
10:15 PM	0	1	100	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0	**161**
10:30 PM	0	0	90	0	0	0	0	0	1	0	0	0	45	0	0	0	0	0	0	0	**136**
10:45 PM	0	0	53	0	0	0	0	0	0	0	0	0	49	0	0	0	0	0	0	0	**102**
Hourly Total	0	1	354	0	0	0	0	0	2	0	0	0	219	0	0	0	0	0	0	0	**576**
11:00 PM	0	1	64	0	0	0	0	0	0	0	0	0	50	0	0	0	0	0	0	0	**115**
11:15 PM	0	0	82	0	0	0	0	0	0	0	0	0	36	0	0	0	0	0	0	0	**118**
11:30 PM	0	0	72	0	0	0	0	0	0	0	0	0	39	0	0	0	0	0	0	0	**111**
11:45 PM	0	2	37	1	0	0	0	0	0	0	0	0	27	0	0	0	0	0	0	0	**67**
Hourly Total	0	3	255	1	0	0	0	0	0	0	0	0	152	0	0	0	0	0	0	0	**411**
DAILY TOTAL	**11**	**301**	**14717**	**20**	**0**	**0**	**145**	**30**	**337**	**1**	**2**	**24**	**15110**	**194**	**0**	**0**	**22**	**36**	**26**	**1**	**30975**
Cars	6	174	13118	14	0	0	106	11	207	0	1	22	13691	148	0	0	17	11	19	0	**27545**
Heavy Vehicles	5	127	1599	6	0	0	39	19	130	1	1	2	1419	46	0	0	5	25	7	1	**3430**
Heavy Vehicle %	45.45%	42.19%	10.86%	30.00%	0.00%	0.00%	26.90%	63.33%	38.58%	100.00%	50.00%	8.33%	9.39%	23.71%	0.00%	0.00%	22.73%	69.44%	26.92%	100.00%	**11.07%**

2 - US 169 & 166th St
Sand Creek Township, MN
Thursday, May 17, 2018

AM Peak Hour

Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Peds/ Bicycles	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Peds/ Bicycles	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Peds/ Bicycles	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Peds/ Bicycles	TOTAL
6:45 AM	0	1	161	2	0	0	0	0	8	0	0	2	421	3	0	0	0	0	0	0	**598**
7:00 AM	0	3	167	0	0	0	0	0	1	0	0	1	358	4	0	0	0	2	0	0	**536**
7:15 AM	0	6	192	1	0	0	2	1	2	0	0	0	406	7	0	0	0	2	0	0	**619**
7:30 AM	2	3	186	0	0	0	1	0	5	0	0	0	437	1	0	0	0	1	0	0	**636**
Peak Hour Total	2	13	706	3	0	0	3	1	16	0	0	3	1622	15	0	0	0	5	0	0	**2389**
PHF	0.250	0.542	0.919	0.375	0.000	0.000	0.375	0.250	0.500	0.000	0.000	0.375	0.928	0.536	0.000	0.000	0.000	0.625	0.000	0.000	**0.939**

PM Peak Hour

Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Peds/ Bicycles	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Peds/ Bicycles	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Peds/ Bicycles	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Peds/ Bicycles	TOTAL
4:15 PM	0	2	397	0	0	0	3	0	6	0	0	1	209	3	0	0	2	1	1	0	**625**
4:30 PM	0	3	362	0	0	0	2	0	7	0	0	0	198	6	0	0	0	0	2	0	**580**
4:45 PM	1	5	383	0	0	0	12	0	4	0	0	0	199	3	0	0	0	1	0	0	**608**
5:00 PM	0	11	383	0	0	0	7	0	5	0	0	0	206	5	0	0	0	0	2	0	**619**
Peak Hour Total	1	21	1525	0	0	0	24	0	22	0	0	1	812	17	0	0	2	2	5	0	**2432**
PHF	0.250	0.477	0.960	0.000	0.000	0.000	0.500	0.000	0.786	0.000	0.000	0.250	0.971	0.708	0.000	0.000	0.250	0.500	0.625	0.000	**0.973**

Total Vehicles On Leg 30529

Vehicles Entering Intersection 15049			Vehicles Exiting Intersection 15480		
Southbound					
Cars	14	13118	174	6	0
Heavy	6	1599	127	5	0
Total	**20**	**14717**	**301**	**11**	**0**

Total Vehicles on Leg 158			Cars	Heavy	Total
	Vehicles Entering Intersection 84	**Eastbound**	0	1	**1**
			0	0	**0**
	Vehicles Exiting Intersection 74		17	5	**22**
			11	25	**36**
			19	7	**26**

Daily Volumes

Cars	Heavy	Total			Total Vehicles on Leg 1043
207	130	**337**	**Westbound**	Vehicles Entering Intersection 512	
11	19	**30**			
106	39	**145**		Vehicles Exiting Intersection 531	
0	0	**0**			
0	1	**1**			

Cars	0	1	22	13691	148
Heavy	0	1	2	1419	46
Total	**0**	**2**	**24**	**15110**	**194**
Northbound					
Vehicles Entering Intersection 15330			Vehicles Exiting Intersection 14890		
Total Vehicles On Leg 30220					

3 - US 169 & Jordan Ave
Sand Creek Township, MN
Thursday, May 17, 2018

Time	Southbound US 169					Westbound --					Northbound US 169					Eastbound Jordan Ave					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
12:00 AM	0	0	38	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	**55**
12:15 AM	0	0	40	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	**52**
12:30 AM	0	0	25	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	**38**
12:45 AM	0	0	22	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	**32**
Hourly Total	0	0	125	0	0	0	0	0	0	0	0	0	52	0	0	0	0	0	0	0	**177**
1:00 AM	0	0	20	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	**30**
1:15 AM	0	0	26	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	**40**
1:30 AM	0	0	18	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	**31**
1:45 AM	0	0	20	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	**27**
Hourly Total	0	0	84	0	0	0	0	0	0	0	0	0	44	0	0	0	0	0	0	0	**128**
2:00 AM	0	0	17	0	0	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0	**40**
2:15 AM	0	0	21	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	**39**
2:30 AM	0	0	15	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	**31**
2:45 AM	0	0	13	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	**27**
Hourly Total	0	0	66	0	0	0	0	0	0	0	0	0	71	0	0	0	0	0	0	0	**137**
3:00 AM	0	0	14	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	**34**
3:15 AM	0	0	13	0	0	0	0	0	0	0	0	0	29	0	0	0	0	0	0	0	**42**
3:30 AM	0	0	24	0	0	0	0	0	0	0	0	0	29	0	0	0	0	0	0	0	**53**
3:45 AM	0	0	12	0	0	0	0	0	0	0	0	0	21	0	0	0	0	0	0	0	**33**
Hourly Total	0	0	63	0	0	0	0	0	0	0	0	0	99	0	0	0	0	0	0	0	**162**
4:00 AM	0	0	20	0	0	0	0	0	0	0	0	0	35	0	0	0	0	0	0	0	**55**
4:15 AM	0	0	25	0	0	0	0	0	0	0	0	0	68	0	0	0	0	0	0	0	**93**
4:30 AM	0	0	27	0	0	0	0	0	0	0	0	0	99	0	0	0	0	0	0	0	**126**
4:45 AM	0	0	27	0	0	0	0	0	0	0	0	0	98	0	0	0	0	0	0	0	**125**
Hourly Total	0	0	99	0	0	0	0	0	0	0	0	0	300	0	0	0	0	0	0	0	**399**
5:00 AM	0	0	25	0	0	0	0	0	0	0	0	0	143	0	0	0	0	0	0	0	**168**
5:15 AM	0	0	55	0	0	0	0	0	0	0	0	0	203	0	0	0	0	0	0	0	**258**
5:30 AM	0	0	58	0	0	0	0	0	0	0	0	0	289	0	0	0	0	0	0	0	**347**
5:45 AM	0	0	101	0	0	0	0	0	0	0	0	0	282	0	0	0	0	0	0	0	**383**
Hourly Total	0	0	239	0	0	0	0	0	0	0	0	0	917	0	0	0	0	0	0	0	**1156**
6:00 AM	0	0	91	0	0	0	0	0	0	0	0	0	311	0	0	0	0	0	2	0	**404**
6:15 AM	0	0	142	0	0	0	0	0	0	1	0	0	329	0	0	0	0	0	0	0	**471**
6:30 AM	0	0	139	0	0	0	0	0	0	0	0	0	414	0	0	0	0	0	0	0	**553**
6:45 AM	0	0	160	0	0	0	0	0	0	0	0	0	414	0	0	0	0	0	1	0	**575**
Hourly Total	0	0	532	0	0	0	0	0	0	1	0	0	1468	0	0	0	0	0	3	0	**2003**
7:00 AM	0	0	167	1	0	0	0	0	0	0	0	0	363	0	0	0	0	0	1	0	**532**
7:15 AM	0	0	164	0	0	0	0	0	0	0	0	0	397	0	0	0	0	0	1	0	**562**
7:30 AM	0	0	202	0	0	0	0	0	0	0	0	0	432	0	0	0	0	0	0	0	**634**
7:45 AM	0	0	152	0	0	0	0	0	0	0	0	0	366	0	0	0	0	0	0	0	**518**
Hourly Total	0	0	685	1	0	0	0	0	0	0	0	0	1558	0	0	0	0	0	2	0	**2246**

3 - US 169 & Jordan Ave
Sand Creek Township, MN
Thursday, May 17, 2018

Time	Southbound US 169					Westbound --					Northbound US 169					Eastbound Jordan Ave					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
8:00 AM	0	0	128	0	0	0	0	0	0	0	0	0	317	0	0	0	0	0	1	0	**446**
8:15 AM	0	0	138	0	0	0	0	0	0	0	0	0	295	0	0	0	0	0	2	0	**435**
8:30 AM	0	0	153	0	0	0	0	0	0	0	0	0	262	0	0	0	0	0	0	0	**415**
8:45 AM	0	0	162	1	0	0	0	0	0	0	0	0	232	0	0	0	0	0	1	0	**396**
Hourly Total	0	0	581	1	0	0	0	0	0	0	0	0	1106	0	0	0	0	0	4	0	**1692**
9:00 AM	0	0	139	0	0	0	0	0	0	0	0	0	249	0	0	0	0	0	2	0	**390**
9:15 AM	0	0	154	0	0	0	0	0	0	0	0	0	223	0	0	0	0	0	0	0	**377**
9:30 AM	0	0	210	0	0	0	0	0	0	0	0	0	188	0	0	0	0	0	0	0	**398**
9:45 AM	0	0	184	0	0	0	0	0	0	0	0	0	182	0	0	0	0	0	1	0	**367**
Hourly Total	0	0	687	0	0	0	0	0	0	0	0	0	842	0	0	0	0	0	3	0	**1532**
10:00 AM	0	0	160	0	0	0	0	0	0	0	0	0	193	0	0	0	0	0	0	0	**353**
10:15 AM	0	0	155	0	0	0	0	0	0	0	0	0	150	0	0	0	0	0	3	0	**308**
10:30 AM	0	0	170	1	0	0	0	0	0	0	0	0	176	0	0	0	0	0	2	0	**349**
10:45 AM	0	0	172	0	0	0	0	0	0	0	0	0	175	0	0	0	0	0	3	0	**350**
Hourly Total	0	0	657	1	0	0	0	0	0	0	0	0	694	0	0	0	0	0	8	0	**1360**
11:00 AM	0	0	158	0	0	0	0	0	0	0	0	0	168	0	0	0	0	0	1	0	**327**
11:15 AM	0	0	187	1	0	0	0	0	0	0	0	0	192	0	0	0	0	0	1	0	**381**
11:30 AM	0	0	185	2	0	0	0	0	0	0	0	0	178	0	0	0	0	0	5	0	**370**
11:45 AM	0	0	149	0	0	0	0	0	0	0	0	0	147	0	0	0	0	0	1	0	**297**
Hourly Total	0	0	679	3	0	0	0	0	0	0	0	0	685	0	0	0	0	0	8	0	**1375**
12:00 PM	0	0	188	1	0	0	0	0	0	0	0	0	202	0	0	0	0	0	5	0	**396**
12:15 PM	0	0	178	0	0	0	0	0	0	0	0	0	182	0	0	0	0	0	2	0	**362**
12:30 PM	0	0	181	0	0	0	0	0	0	0	0	0	172	0	0	0	0	0	1	0	**354**
12:45 PM	0	0	197	2	0	0	0	0	0	0	0	0	195	0	0	0	0	0	1	0	**395**
Hourly Total	0	0	744	3	0	0	0	0	0	0	0	0	751	0	0	0	0	0	9	0	**1507**
1:00 PM	0	0	189	0	0	0	0	0	0	0	0	0	196	0	0	0	0	0	1	0	**386**
1:15 PM	0	0	204	0	0	0	0	0	0	0	0	0	163	0	0	0	0	0	2	0	**369**
1:30 PM	0	0	197	0	0	0	0	0	0	0	0	0	207	0	0	0	0	0	0	0	**404**
1:45 PM	0	0	244	0	0	0	0	0	0	0	0	0	193	0	0	0	0	0	1	0	**438**
Hourly Total	0	0	834	0	0	0	0	0	0	0	0	0	759	0	0	0	0	0	4	0	**1597**
2:00 PM	0	0	258	0	0	0	0	0	0	0	0	0	194	0	0	0	0	0	3	0	**455**
2:15 PM	0	0	281	0	0	0	0	0	0	0	0	0	212	0	0	0	0	0	3	0	**496**
2:30 PM	0	0	258	0	0	0	0	0	0	0	0	0	240	0	0	0	0	0	1	0	**499**
2:45 PM	0	0	293	0	0	0	0	0	0	0	0	0	180	0	0	0	0	0	0	0	**473**
Hourly Total	0	0	1090	0	0	0	0	0	0	0	0	0	826	0	0	0	0	0	7	0	**1923**
3:00 PM	0	0	287	0	0	0	0	0	0	0	0	0	213	0	0	0	0	0	1	0	**501**
3:15 PM	0	0	303	0	0	0	0	0	0	0	0	0	250	0	0	0	0	0	4	0	**557**
3:30 PM	0	0	305	0	0	0	0	0	0	0	0	0	250	0	0	0	0	0	2	0	**557**
3:45 PM	0	0	353	0	0	0	0	0	0	0	0	0	233	0	0	0	0	0	3	1	**589**
Hourly Total	0	0	1248	0	0	0	0	0	0	0	0	0	946	0	0	0	0	0	10	1	**2204**

3 - US 169 & Jordan Ave
Sand Creek Township, MN
Thursday, May 17, 2018

Time	Southbound US 169					Westbound --					Northbound US 169					Eastbound Jordan Ave					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
4:00 PM	0	0	330	1	0	0	0	0	0	0	0	0	212	0	0	0	0	0	8	0	**551**
4:15 PM	0	0	396	0	0	0	0	0	0	0	0	0	205	0	0	0	0	0	2	0	**603**
4:30 PM	0	0	365	0	0	0	0	0	0	0	0	0	205	0	0	0	0	0	3	0	**573**
4:45 PM	0	0	389	0	0	0	0	0	0	0	0	0	199	0	0	0	0	0	5	0	**593**
Hourly Total	0	0	1480	1	0	0	0	0	0	0	0	0	821	0	0	0	0	0	18	0	**2320**
5:00 PM	0	0	351	0	0	0	0	0	0	0	0	0	209	0	0	0	0	0	3	0	**563**
5:15 PM	0	0	343	0	0	0	0	0	0	0	0	0	217	0	0	0	0	0	0	0	**560**
5:30 PM	0	0	298	0	0	0	0	0	0	0	0	0	196	0	0	0	0	0	1	0	**495**
5:45 PM	0	0	314	0	0	0	0	0	0	0	0	0	179	0	0	0	0	0	2	0	**495**
Hourly Total	0	0	1306	0	0	0	0	0	0	0	0	0	801	0	0	0	0	0	6	0	**2113**
6:00 PM	0	0	251	0	0	0	0	0	0	0	0	0	198	0	0	0	0	0	4	0	**453**
6:15 PM	0	0	272	0	0	0	0	0	0	0	0	0	170	0	0	0	0	0	0	0	**442**
6:30 PM	0	0	215	1	0	0	0	0	0	0	0	0	156	0	0	0	0	0	1	0	**373**
6:45 PM	0	0	216	0	0	0	0	0	0	0	0	0	154	0	0	0	0	0	4	0	**374**
Hourly Total	0	0	954	1	0	0	0	0	0	0	0	0	678	0	0	0	0	0	9	0	**1642**
7:00 PM	0	0	172	0	0	0	0	0	0	0	0	0	144	0	0	0	0	0	0	0	**316**
7:15 PM	0	0	193	0	0	0	0	0	0	0	0	0	132	0	0	0	0	0	1	0	**326**
7:30 PM	0	0	207	0	0	0	0	0	0	0	0	0	140	0	0	0	0	0	0	0	**347**
7:45 PM	0	0	160	0	0	0	0	0	0	0	0	0	121	0	0	0	0	0	0	0	**281**
Hourly Total	0	0	732	0	0	0	0	0	0	0	0	0	537	0	0	0	0	0	1	0	**1270**
8:00 PM	0	0	154	0	0	0	0	0	0	0	0	0	116	0	0	0	0	0	1	0	**271**
8:15 PM	0	0	178	0	0	0	0	0	0	0	0	0	104	0	0	0	0	0	1	0	**283**
8:30 PM	0	0	146	0	0	0	0	0	0	0	0	0	106	0	0	0	0	0	0	0	**252**
8:45 PM	0	0	162	0	0	0	0	0	0	0	0	0	81	0	0	0	0	0	0	0	**243**
Hourly Total	0	0	640	0	0	0	0	0	0	0	0	0	407	0	0	0	0	0	2	0	**1049**
9:00 PM	0	0	153	0	0	0	0	0	0	0	0	0	97	0	0	0	0	0	0	0	**250**
9:15 PM	0	0	138	0	0	0	0	0	0	0	0	0	85	0	0	0	0	0	0	0	**223**
9:30 PM	0	0	115	0	0	0	0	0	0	0	0	0	106	0	0	0	0	0	0	0	**221**
9:45 PM	0	0	93	0	0	0	0	0	0	0	0	0	87	0	0	0	0	0	0	0	**180**
Hourly Total	0	0	499	0	0	0	0	0	0	0	0	0	375	0	0	0	0	0	0	0	**874**
10:00 PM	0	0	107	0	0	0	0	0	0	0	0	0	67	0	0	0	0	0	0	0	**174**
10:15 PM	0	0	94	0	0	0	0	0	0	0	0	0	57	0	0	0	0	0	0	0	**151**
10:30 PM	0	0	79	0	0	0	0	0	0	0	0	0	45	0	0	0	0	0	0	0	**124**
10:45 PM	0	0	59	0	0	0	0	0	0	0	0	0	47	0	0	0	0	0	0	0	**106**
Hourly Total	0	0	339	0	0	0	0	0	0	0	0	0	216	0	0	0	0	0	0	0	**555**
11:00 PM	0	0	55	0	0	0	0	0	0	0	0	0	48	0	0	0	0	0	0	0	**103**
11:15 PM	0	0	85	1	0	0	0	0	0	0	0	0	35	0	0	0	0	0	0	0	**121**
11:30 PM	0	0	69	0	0	0	0	0	0	0	0	0	38	0	0	0	0	0	0	0	**107**
11:45 PM	0	0	41	0	0	0	0	0	0	0	0	0	28	0	0	0	0	0	1	0	**70**
Hourly Total	0	0	250	1	0	0	0	0	0	0	0	0	149	0	0	0	0	0	1	0	**401**
DAILY TOTAL	**0**	**0**	**14613**	**12**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**15102**	**0**	**0**	**0**	**0**	**0**	**95**	**1**	**29822**
Cars	0	0	13022	7	0	0	0	0	0	0	0	0	13719	0	0	0	0	0	86	0	**26834**
Heavy Vehicles	0	0	1591	5	0	0	0	0	0	1	0	0	1383	0	0	0	0	0	9	1	**2988**
Heavy Vehicle %	0.00%	0.00%	10.89%	41.67%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	9.16%	0.00%	0.00%	0.00%	0.00%	0.00%	9.47%	100.00%	**10.02%**

3 - US 169 & Jordan Ave
Sand Creek Township, MN
Thursday, May 17, 2018

AM Peak Hour

Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Peds/ Bicycles	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Peds/ Bicycles	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Peds/ Bicycles	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Peds/ Bicycles	TOTAL
6:45 AM	0	0	160	0	0	0	0	0	0	0	0	0	414	0	0	0	0	0	1	0	**575**
7:00 AM	0	0	167	1	0	0	0	0	0	0	0	0	363	0	0	0	0	0	1	0	**532**
7:15 AM	0	0	164	0	0	0	0	0	0	0	0	0	397	0	0	0	0	0	1	0	**562**
7:30 AM	0	0	202	0	0	0	0	0	0	0	0	0	432	0	0	0	0	0	0	0	**634**
Peak Hour Total	0	0	693	1	0	0	0	0	0	0	0	0	1606	0	0	0	0	0	3	0	**2303**
PHF	0.000	0.000	0.858	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.929	0.000	0.000	0.000	0.000	0.000	0.750	0.000	**0.908**

PM Peak Hour

Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Peds/ Bicycles	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Peds/ Bicycles	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Peds/ Bicycles	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Peds/ Bicycles	TOTAL
4:15 PM	0	0	396	0	0	0	0	0	0	0	0	0	205	0	0	0	0	0	2	0	**603**
4:30 PM	0	0	365	0	0	0	0	0	0	0	0	0	205	0	0	0	0	0	3	0	**573**
4:45 PM	0	0	389	0	0	0	0	0	0	0	0	0	199	0	0	0	0	0	5	0	**593**
5:00 PM	0	0	351	0	0	0	0	0	0	0	0	0	209	0	0	0	0	0	3	0	**563**
Peak Hour Total	0	0	1501	0	0	0	0	0	0	0	0	0	818	0	0	0	0	0	13	0	**2332**
PHF	0.000	0.000	0.948	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.978	0.000	0.000	0.000	0.000	0.000	0.650	0.000	**0.967**

Total Vehicles On Leg 29727

Vehicles Entering Intersection 14625			Vehicles Exiting Intersection 15102		
Southbound					
Cars	7	13022	0	0	0
Heavy	5	1591	0	0	0
Total	**12**	**14613**	**0**	**0**	**0**

Total Vehicles on Leg 107

Vehicles Entering Intersection 95	Vehicles Exiting Intersection 12	**Eastbound**	Cars	Heavy	**Total**
			0	1	**1**
			0	0	**0**
			0	0	**0**
			0	0	**0**
			86	9	**95**

Daily Volumes

Cars	Heavy	**Total**	**Westbound**	Vehicles Entering Intersection 0	Vehicles Exiting Intersection 0	Total Vehicles on Leg 0
0	0	**0**				
0	0	**0**				
0	0	**0**				
0	0	**0**				
0	1	**1**				

Cars	0	0	0	13719	0
Heavy	0	0	0	1383	0
Total	**0**	**0**	**0**	**15102**	**0**
Northbound					
Vehicles Entering Intersection 15102			Vehicles Exiting Intersection 14708		
Total Vehicles On Leg 29810					

4 - US 169 & 173rd St
Sand Creek Township, MN
Thursday, May 17, 2018

Time	Southbound US 169					Westbound 173rd St					Northbound US 169					Eastbound 173rd St					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
12:00 AM	0	0	39	0	0	0	1	0	0	0	1	0	15	0	0	0	0	0	1	0	**57**
12:15 AM	0	0	37	1	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	**50**
12:30 AM	0	0	25	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	**39**
12:45 AM	0	0	27	0	0	0	0	0	0	0	1	1	10	0	0	0	0	0	0	0	**39**
Hourly Total	0	0	128	1	0	0	1	0	0	0	2	1	51	0	0	0	0	0	1	0	**185**
1:00 AM	0	1	19	0	0	0	0	0	0	0	1	0	11	0	0	0	0	0	0	0	**32**
1:15 AM	0	0	25	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	**37**
1:30 AM	0	0	18	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	**31**
1:45 AM	0	0	20	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	**27**
Hourly Total	0	1	82	0	0	0	0	0	0	0	1	0	43	0	0	0	0	0	0	0	**127**
2:00 AM	0	0	18	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	**42**
2:15 AM	0	0	20	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	**35**
2:30 AM	0	0	17	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	**32**
2:45 AM	0	0	13	0	0	0	0	0	0	0	1	0	16	0	0	0	0	0	0	0	**30**
Hourly Total	0	0	68	0	0	0	0	0	0	0	1	0	70	0	0	0	0	0	0	0	**139**
3:00 AM	0	0	14	0	0	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	**33**
3:15 AM	0	0	14	0	0	0	0	0	0	0	0	0	28	0	0	0	0	0	0	0	**42**
3:30 AM	0	1	20	1	0	0	0	0	0	0	0	0	29	0	0	0	0	0	0	0	**51**
3:45 AM	0	1	11	0	0	0	0	0	1	0	0	0	20	0	0	0	0	0	0	0	**33**
Hourly Total	0	2	59	1	0	0	0	0	1	0	0	0	96	0	0	0	0	0	0	0	**159**
4:00 AM	0	0	19	1	0	0	0	0	0	0	0	0	37	0	0	0	0	0	0	0	**57**
4:15 AM	0	2	25	0	0	0	0	0	3	0	1	0	71	0	0	0	0	0	0	0	**102**
4:30 AM	0	0	26	0	0	0	0	0	1	0	0	0	101	0	0	0	0	0	0	0	**128**
4:45 AM	0	0	27	0	0	0	0	0	1	0	0	1	98	0	0	0	0	0	0	0	**127**
Hourly Total	0	2	97	1	0	0	0	0	5	0	1	1	307	0	0	0	0	0	0	0	**414**
5:00 AM	0	0	37	1	0	0	0	0	0	0	1	0	155	0	0	0	0	0	0	0	**194**
5:15 AM	0	0	50	1	0	0	0	0	2	0	0	0	193	0	0	0	0	0	0	0	**246**
5:30 AM	0	0	58	0	0	0	0	0	1	0	1	0	293	0	0	0	0	0	0	0	**353**
5:45 AM	0	0	96	3	0	0	0	0	2	0	1	4	279	0	0	0	0	0	0	0	**385**
Hourly Total	0	0	241	5	0	0	0	0	5	0	3	4	920	0	0	0	0	0	0	0	**1178**
6:00 AM	0	2	91	1	1	0	0	0	3	0	0	3	305	0	0	0	0	0	0	0	**405**
6:15 AM	0	1	145	4	0	0	0	0	4	0	0	17	335	0	0	0	0	0	3	0	**509**
6:30 AM	0	0	132	1	0	0	0	0	0	0	1	2	422	1	0	0	0	0	1	0	**560**
6:45 AM	0	1	159	2	1	0	0	0	3	0	1	1	415	1	1	0	0	0	2	0	**585**
Hourly Total	0	4	527	8	2	0	0	0	10	0	2	23	1477	2	1	0	0	0	6	0	**2059**
7:00 AM	0	1	164	3	0	0	0	0	1	0	0	1	376	0	0	0	0	0	3	0	**549**
7:15 AM	0	2	173	3	0	0	0	0	5	0	3	1	384	0	0	0	0	0	5	0	**576**
7:30 AM	0	3	192	3	0	0	0	0	3	0	1	3	444	1	0	0	0	0	1	0	**651**
7:45 AM	0	0	144	12	0	0	0	0	4	0	1	5	366	0	0	0	0	0	5	0	**537**
Hourly Total	0	6	673	21	0	0	0	0	13	0	5	10	1570	1	0	0	0	0	14	0	**2313**

4 - US 169 & 173rd St
Sand Creek Township, MN
Thursday, May 17, 2018

Time	Southbound US 169					Westbound 173rd St					Northbound US 169					Eastbound 173rd St					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
8:00 AM	1	0	124	3	0	0	0	0	5	0	1	3	308	2	0	0	0	0	2	0	**449**
8:15 AM	0	0	134	1	0	0	0	0	2	0	1	0	299	2	0	0	0	0	1	0	**440**
8:30 AM	0	2	157	1	0	0	0	0	1	0	0	3	260	0	0	0	0	0	0	0	**424**
8:45 AM	0	0	157	2	0	0	0	0	1	0	2	4	236	0	0	0	0	0	2	0	**404**
Hourly Total	1	2	572	7	0	0	0	0	9	0	4	10	1103	4	0	0	0	0	5	0	**1717**
9:00 AM	0	0	145	2	0	0	0	0	5	0	1	1	249	3	0	0	0	0	5	0	**411**
9:15 AM	0	0	146	3	0	0	0	0	3	0	0	0	220	1	0	0	0	0	2	0	**375**
9:30 AM	0	1	207	2	0	0	0	0	0	0	1	1	186	0	0	0	0	0	1	0	**399**
9:45 AM	0	1	184	2	0	0	0	0	3	0	0	0	186	0	0	0	0	0	0	0	**376**
Hourly Total	0	2	682	9	0	0	0	0	11	0	2	2	841	4	0	0	0	0	8	0	**1561**
10:00 AM	0	0	162	2	0	0	0	0	1	0	0	0	196	3	0	0	0	0	3	0	**367**
10:15 AM	0	0	148	1	0	0	0	0	1	0	1	2	149	0	0	0	0	0	4	0	**306**
10:30 AM	0	1	165	5	0	0	0	0	2	0	0	1	178	4	0	0	0	0	5	0	**361**
10:45 AM	0	1	173	1	0	0	0	0	1	0	0	1	179	1	0	0	0	0	0	0	**357**
Hourly Total	0	2	648	9	0	0	0	0	5	0	1	4	702	8	0	0	0	0	12	0	**1391**
11:00 AM	0	0	155	3	0	0	0	0	3	0	0	0	161	0	0	0	0	0	2	0	**324**
11:15 AM	0	0	191	2	0	0	0	0	0	0	0	1	191	1	0	0	0	0	2	0	**388**
11:30 AM	0	0	193	1	0	0	0	0	0	0	0	1	185	0	0	0	0	0	4	0	**384**
11:45 AM	0	0	149	2	0	0	0	0	1	0	0	3	143	0	0	0	0	0	2	0	**300**
Hourly Total	0	0	688	8	0	0	0	0	4	0	0	5	680	1	0	0	0	0	10	0	**1396**
12:00 PM	0	1	185	0	0	0	0	1	1	0	1	0	207	1	0	0	0	0	3	0	**400**
12:15 PM	0	1	183	1	0	0	0	0	0	0	0	2	186	1	0	0	0	0	4	0	**378**
12:30 PM	0	3	181	3	0	0	0	0	3	0	0	2	172	2	0	0	0	0	3	0	**369**
12:45 PM	1	0	192	7	0	0	0	0	1	0	0	0	190	0	0	0	0	0	3	0	**394**
Hourly Total	1	5	741	11	0	0	0	1	5	0	1	4	755	4	0	0	0	0	13	0	**1541**
1:00 PM	2	2	180	4	0	0	0	0	0	0	1	2	197	0	0	0	0	0	2	0	**390**
1:15 PM	1	2	199	9	0	0	0	0	0	0	0	3	153	0	0	0	0	0	4	0	**371**
1:30 PM	0	0	198	2	0	0	0	0	1	0	0	2	210	1	0	0	0	0	0	0	**414**
1:45 PM	0	0	241	6	0	0	0	0	0	0	2	6	184	0	0	0	0	0	1	0	**440**
Hourly Total	3	4	818	21	0	0	0	0	1	0	3	13	744	1	0	0	0	0	7	0	**1615**
2:00 PM	1	2	247	6	0	0	0	0	3	0	0	2	201	2	0	0	0	0	10	0	**474**
2:15 PM	0	1	278	9	0	0	0	0	1	0	0	1	205	1	0	0	0	0	7	0	**503**
2:30 PM	0	3	260	6	0	0	0	0	1	0	1	2	229	0	0	0	0	0	1	0	**503**
2:45 PM	0	0	295	0	0	0	0	0	1	0	0	2	186	1	0	0	0	0	1	0	**486**
Hourly Total	1	6	1080	21	0	0	0	0	6	0	1	7	821	4	0	0	0	0	19	0	**1966**
3:00 PM	0	0	292	0	0	0	0	0	3	0	0	0	201	3	0	0	0	0	21	0	**520**
3:15 PM	0	0	311	1	0	0	0	0	2	0	0	4	249	1	0	0	0	0	5	0	**573**
3:30 PM	0	0	293	9	0	0	0	0	1	0	1	3	254	2	0	0	0	0	7	1	**570**
3:45 PM	0	2	352	4	0	0	0	0	0	0	0	0	224	0	0	0	0	0	1	0	**583**
Hourly Total	0	2	1248	14	0	0	0	0	6	0	1	7	928	6	0	0	0	0	34	1	**2246**

4 - US 169 & 173rd St
Sand Creek Township, MN
Thursday, May 17, 2018

Time	Southbound US 169					Westbound 173rd St					Northbound US 169					Eastbound 173rd St					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
4:00 PM	0	1	338	8	0	0	0	0	0	0	0	0	218	0	0	0	0	0	8	0	**573**
4:15 PM	0	6	399	6	0	0	0	0	0	0	0	0	188	2	0	0	0	0	4	0	**605**
4:30 PM	0	6	349	6	0	0	0	0	1	0	2	3	203	1	0	0	0	0	2	0	**573**
4:45 PM	0	6	394	4	0	0	0	0	0	0	1	0	199	2	0	0	0	0	13	0	**619**
Hourly Total	0	19	1480	24	0	0	0	0	1	0	3	3	808	5	0	0	0	0	27	0	**2370**
5:00 PM	0	5	356	4	0	0	0	0	2	0	1	2	200	2	0	0	0	0	12	0	**584**
5:15 PM	0	6	351	4	0	0	0	0	3	0	1	4	215	2	0	0	0	0	4	0	**590**
5:30 PM	0	3	296	0	0	0	0	0	1	0	3	0	194	2	0	0	0	0	2	0	**501**
5:45 PM	0	1	314	6	0	0	0	0	0	0	0	1	184	0	0	0	0	0	0	0	**506**
Hourly Total	0	15	1317	14	0	0	0	0	6	0	5	7	793	6	0	0	0	0	18	0	**2181**
6:00 PM	0	3	241	5	0	0	0	0	0	0	0	1	192	1	0	0	0	0	1	0	**444**
6:15 PM	0	2	274	3	0	0	0	0	0	0	0	0	166	2	0	0	0	0	2	0	**449**
6:30 PM	0	0	202	11	0	0	0	0	0	0	0	1	154	0	0	0	0	0	1	0	**369**
6:45 PM	0	2	224	3	0	0	0	0	1	0	0	4	153	0	0	0	0	0	3	0	**390**
Hourly Total	0	7	941	22	0	0	0	0	1	0	0	6	665	3	0	0	0	0	7	0	**1652**
7:00 PM	0	2	170	2	0	0	0	0	1	0	0	4	186	5	0	0	0	0	0	0	**370**
7:15 PM	0	0	198	1	0	0	0	0	0	0	0	2	132	0	0	0	0	0	1	0	**334**
7:30 PM	0	3	197	4	0	0	0	0	0	0	1	0	141	0	0	0	0	0	2	0	**348**
7:45 PM	0	1	157	2	0	0	0	0	2	0	4	0	115	1	0	0	0	0	0	0	**282**
Hourly Total	0	6	722	9	0	0	0	0	3	0	5	6	574	6	0	0	0	0	3	0	**1334**
8:00 PM	0	3	154	0	0	0	0	0	1	0	1	0	114	2	0	0	0	0	0	0	**275**
8:15 PM	0	3	175	1	0	0	0	0	1	0	0	0	99	2	0	0	0	0	1	0	**282**
8:30 PM	0	4	145	3	0	0	0	0	1	0	0	0	107	0	0	0	0	0	7	0	**267**
8:45 PM	0	1	162	1	0	0	0	0	3	0	0	0	77	1	0	0	0	0	4	0	**249**
Hourly Total	0	11	636	5	0	0	0	0	6	0	1	0	397	5	0	0	0	0	12	0	**1073**
9:00 PM	0	1	151	0	0	0	0	0	0	0	0	0	95	0	0	0	0	0	3	0	**250**
9:15 PM	0	2	143	2	0	0	0	0	0	0	1	0	85	2	0	0	0	0	2	0	**237**
9:30 PM	0	2	114	1	0	0	0	0	1	0	0	1	100	0	0	0	0	0	0	0	**219**
9:45 PM	0	0	108	0	0	0	0	0	1	0	2	0	87	0	0	0	0	0	0	0	**198**
Hourly Total	0	5	516	3	0	0	0	0	2	0	3	1	367	2	0	0	0	0	5	0	**904**
10:00 PM	0	1	104	0	0	0	0	0	0	0	0	1	65	1	0	0	0	0	0	0	**172**
10:15 PM	0	1	95	1	0	0	0	0	0	0	0	0	55	1	0	0	0	0	1	0	**154**
10:30 PM	0	0	83	1	0	0	0	0	0	0	1	0	46	0	0	0	0	0	1	0	**132**
10:45 PM	0	2	56	0	0	0	0	0	0	0	2	0	46	0	0	0	0	0	0	0	**106**
Hourly Total	0	4	338	2	0	0	0	0	0	0	3	1	212	2	0	0	0	0	2	0	**564**
11:00 PM	0	0	56	0	0	0	0	0	0	0	0	0	52	0	0	0	0	0	0	0	**108**
11:15 PM	0	0	83	0	0	0	0	0	0	0	1	0	35	0	0	0	0	0	0	0	**119**
11:30 PM	0	0	72	1	0	0	0	0	0	0	1	0	39	0	0	0	0	0	0	0	**113**
11:45 PM	0	1	36	2	0	0	0	0	0	0	1	0	30	0	0	0	0	0	0	0	**70**
Hourly Total	0	1	247	3	0	0	0	0	0	0	3	0	156	0	0	0	0	0	0	0	**410**
DAILY TOTAL	**6**	**106**	**14549**	**219**	**2**	**0**	**1**	**1**	**100**	**0**	**51**	**115**	**15080**	**64**	**1**	**0**	**0**	**0**	**203**	**1**	**30495**
Cars	5	104	12956	209	2	0	1	1	95	0	51	107	13621	58	1	0	0	0	188	0	**27396**
Heavy Vehicles	1	2	1593	10	0	0	0	0	5	0	0	8	1459	6	0	0	0	0	15	1	**3099**
Heavy Vehicle %	16.67%	1.89%	10.95%	4.57%	0.00%	0.00%	0.00%	0.00%	5.00%	0.00%	0.00%	6.96%	9.68%	9.38%	0.00%	0.00%	0.00%	0.00%	7.39%	100.00%	**10.16%**

4 - US 169 & 173rd St
Sand Creek Township, MN
Thursday, May 17, 2018

AM Peak Hour

Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Peds/ Bicycles	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Peds/ Bicycles	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Peds/ Bicycles	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Peds/ Bicycles	TOTAL
6:45 AM	0	1	159	2	1	0	0	0	3	0	1	1	415	1	1	0	0	0	2	0	**585**
7:00 AM	0	1	164	3	0	0	0	0	1	0	0	1	376	0	0	0	0	0	3	0	**549**
7:15 AM	0	2	173	3	0	0	0	0	5	0	3	1	384	0	0	0	0	0	5	0	**576**
7:30 AM	0	3	192	3	0	0	0	0	3	0	1	3	444	1	0	0	0	0	1	0	**651**
Peak Hour Total	0	7	688	11	1	0	0	0	12	0	5	6	1619	2	1	0	0	0	11	0	**2361**
PHF	0.000	0.583	0.896	0.917	0.250	0.000	0.000	0.000	0.600	0.000	0.417	0.500	0.912	0.500	0.250	0.000	0.000	0.000	0.550	0.000	**0.907**

PM Peak Hour

Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Peds/ Bicycles	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Peds/ Bicycles	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Peds/ Bicycles	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Peds/ Bicycles	TOTAL
4:15 PM	0	6	399	6	0	0	0	0	0	0	0	0	188	2	0	0	0	0	4	0	**605**
4:30 PM	0	6	349	6	0	0	0	0	1	0	2	3	203	1	0	0	0	0	2	0	**573**
4:45 PM	0	6	394	4	0	0	0	0	0	0	1	0	199	2	0	0	0	0	13	0	**619**
5:00 PM	0	5	356	4	0	0	0	0	2	0	1	2	200	2	0	0	0	0	12	0	**584**
Peak Hour Total	0	23	1498	20	0	0	0	0	3	0	4	5	790	7	0	0	0	0	31	0	**2381**
PHF	0.000	0.958	0.939	0.833	0.000	0.000	0.000	0.000	0.375	0.000	0.500	0.417	0.973	0.875	0.000	0.000	0.000	0.000	0.596	0.000	**0.962**

Total Vehicles On Leg 30066					
Vehicles Entering Intersection 14880			Vehicles Exiting Intersection 15186		
Southbound					
Cars	209	12956	104	5	2
Heavy	10	1593	2	1	0
Total	**219**	**14549**	**106**	**6**	**2**

Total Vehicles on Leg 538			Cars	Heavy	Total
	Vehicles Entering Intersection 203	**Eastbound**	0	1	**1**
			0	0	**0**
			0	0	**0**
	Vehicles Exiting Intersection 335		0	0	**0**
			188	15	**203**

Daily Volumes

Cars	Heavy	Total			
95	5	**100**	**Westbound**	Vehicles Entering Intersection 102	Total Vehicles on Leg 272
1	0	**1**			
1	0	**1**		Vehicles Exiting Intersection 170	
0	0	**0**			
0	0	**0**			

Cars	1	51	107	13621	58
Heavy	0	0	8	1459	6
Total	**1**	**51**	**115**	**15080**	**64**
Northbound					
Vehicles Entering Intersection 15310			Vehicles Exiting Intersection 14804		
Total Vehicles On Leg 30114					

1 - US 169 & Bluff Dr
Sand Creek Township, MN
Friday, May 18, 2018

Time	Southbound US 169					Westbound Bluff Dr					Northbound US 169					Eastbound Bluff Dr					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
12:00 AM	0	0	43	0	0	0	0	0	0	0	0	0	26	0	0	0	0	0	0	0	**69**
12:15 AM	0	0	39	0	0	0	0	0	0	0	0	4	15	0	0	0	0	0	0	0	**58**
12:30 AM	0	1	39	1	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	**53**
12:45 AM	0	0	23	0	0	0	0	0	0	0	0	0	14	0	0	0	1	0	0	0	**38**
Hourly Total	0	1	144	1	0	0	0	0	0	0	0	4	67	0	0	0	1	0	0	0	**218**
1:00 AM	0	0	27	2	0	0	0	0	0	0	0	0	17	0	0	0	1	0	0	0	**47**
1:15 AM	0	0	21	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	3	0	**38**
1:30 AM	0	0	18	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	**27**
1:45 AM	0	0	22	0	0	0	0	0	0	0	0	0	11	0	0	0	1	0	0	0	**34**
Hourly Total	0	0	88	2	0	0	0	0	0	0	0	0	51	0	0	0	2	0	3	0	**146**
2:00 AM	0	0	14	0	0	0	6	0	0	0	0	0	19	0	0	0	0	0	0	0	**39**
2:15 AM	0	0	24	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	2	0	**43**
2:30 AM	0	0	10	0	0	0	0	0	0	0	0	0	21	0	0	0	0	0	0	0	**31**
2:45 AM	0	0	15	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	**30**
Hourly Total	0	0	63	0	0	0	6	0	0	0	0	0	72	0	0	0	0	0	2	0	**143**
3:00 AM	0	0	12	1	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	**33**
3:15 AM	0	0	15	0	0	0	0	0	0	0	0	1	19	0	0	0	1	0	0	0	**36**
3:30 AM	0	0	16	1	0	0	0	0	0	0	0	0	25	0	0	0	1	0	0	0	**43**
3:45 AM	0	0	12	2	0	0	0	0	0	0	0	0	26	0	0	0	1	0	0	0	**41**
Hourly Total	0	0	55	4	0	0	0	0	0	0	0	1	90	0	0	0	3	0	0	0	**153**
4:00 AM	0	0	15	0	0	0	0	0	0	0	0	0	32	0	0	0	3	0	1	0	**51**
4:15 AM	0	1	28	0	0	0	0	0	0	0	0	0	58	0	0	0	0	0	0	0	**87**
4:30 AM	0	1	20	1	0	0	0	0	1	0	0	5	83	0	0	0	1	0	0	0	**112**
4:45 AM	0	0	31	1	0	0	0	0	2	0	0	0	87	0	0	0	3	0	0	0	**124**
Hourly Total	0	2	94	2	0	0	0	0	3	0	0	5	260	0	0	0	7	0	1	0	**374**
5:00 AM	0	0	30	0	0	0	0	0	0	0	0	1	126	1	0	0	3	0	0	0	**161**
5:15 AM	0	1	64	1	0	0	0	0	0	0	0	0	186	1	0	0	0	0	0	0	**253**
5:30 AM	0	0	65	3	0	0	0	0	4	0	0	4	244	1	0	0	0	0	0	0	**321**
5:45 AM	0	0	95	6	0	0	0	0	2	0	0	7	277	0	0	0	2	0	1	0	**390**
Hourly Total	0	1	254	10	0	0	0	0	6	0	0	12	833	3	0	0	5	0	1	0	**1125**
6:00 AM	0	1	71	10	0	0	0	0	0	0	0	4	282	0	0	0	4	0	0	0	**372**
6:15 AM	0	0	145	7	0	0	1	1	2	0	0	5	329	1	0	0	3	0	0	0	**494**
6:30 AM	0	0	141	5	0	0	1	0	1	0	0	5	342	2	0	0	2	0	0	0	**499**
6:45 AM	0	0	183	3	0	0	0	0	1	0	0	9	364	3	0	0	3	1	1	0	**568**
Hourly Total	0	1	540	25	0	0	2	1	4	0	0	23	1317	6	0	0	12	1	1	0	**1933**
7:00 AM	0	3	156	7	0	0	0	0	4	0	0	0	349	3	0	0	7	0	0	0	**529**
7:15 AM	0	2	174	0	0	0	0	0	0	0	0	3	343	1	0	0	8	0	2	0	**533**
7:30 AM	0	3	167	7	0	0	0	0	4	0	1	7	401	3	0	0	5	0	0	0	**598**
7:45 AM	0	3	176	4	0	0	3	0	3	0	1	5	365	1	0	0	3	0	1	0	**565**
Hourly Total	0	11	673	18	0	0	3	0	11	0	2	15	1458	8	0	0	23	0	3	0	**2225**

1 - US 169 & Bluff Dr
Sand Creek Township, MN
Friday, May 18, 2018

Time	Southbound US 169					Westbound Bluff Dr					Northbound US 169					Eastbound Bluff Dr					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
8:00 AM	0	4	165	9	0	0	2	0	1	0	0	2	310	6	0	0	4	0	1	0	**504**
8:15 AM	0	2	151	11	0	0	1	0	2	0	0	6	280	4	0	0	2	0	2	0	**461**
8:30 AM	1	2	171	4	0	0	0	0	4	0	0	3	251	1	0	0	9	0	3	0	**449**
8:45 AM	0	1	190	9	0	0	2	0	4	0	0	1	266	3	0	0	7	0	2	0	**485**
Hourly Total	1	9	677	33	0	0	5	0	11	0	0	12	1107	14	0	0	22	0	8	0	**1899**
9:00 AM	0	2	170	5	0	1	2	0	6	0	0	4	194	2	0	0	3	0	0	0	**389**
9:15 AM	0	7	187	2	0	0	2	0	1	0	0	3	237	5	0	0	4	0	2	0	**450**
9:30 AM	0	0	145	5	0	0	3	0	3	0	0	0	237	2	0	0	4	0	2	0	**401**
9:45 AM	0	3	199	8	0	0	0	0	2	0	0	4	234	5	0	0	5	0	1	0	**461**
Hourly Total	0	12	701	20	0	1	7	0	12	0	0	11	902	14	0	0	16	0	5	0	**1701**
10:00 AM	0	4	191	4	0	0	0	0	3	0	0	1	189	2	0	0	6	0	3	0	**403**
10:15 AM	0	2	162	8	0	0	0	0	7	0	0	0	225	0	0	0	7	0	4	0	**415**
10:30 AM	0	2	218	5	0	0	2	1	4	0	0	2	205	3	0	0	5	0	0	0	**447**
10:45 AM	0	1	195	4	0	0	2	0	3	0	0	2	213	2	0	0	3	0	1	0	**426**
Hourly Total	0	9	766	21	0	0	4	1	17	0	0	5	832	7	0	0	21	0	8	0	**1691**
11:00 AM	0	1	220	9	0	0	1	0	1	0	0	2	195	1	0	0	2	0	1	0	**433**
11:15 AM	0	3	237	2	0	0	1	0	4	2	0	2	229	0	0	0	5	0	3	0	**486**
11:30 AM	0	3	196	3	0	0	0	0	5	0	0	0	252	1	0	0	5	0	4	0	**469**
11:45 AM	0	2	202	5	0	0	4	1	3	0	0	2	218	4	0	0	4	0	2	0	**447**
Hourly Total	0	9	855	19	0	0	6	1	13	2	0	6	894	6	0	0	16	0	10	0	**1835**
12:00 PM	0	2	232	8	0	0	0	0	5	0	0	5	222	4	0	0	6	0	1	0	**485**
12:15 PM	1	2	254	8	0	0	0	0	1	0	0	0	254	1	0	0	4	0	2	0	**527**
12:30 PM	1	2	233	9	0	0	2	0	1	0	0	6	223	3	0	0	7	0	2	0	**489**
12:45 PM	0	2	229	9	0	0	2	2	3	0	1	1	213	3	0	0	4	0	6	0	**475**
Hourly Total	2	8	948	34	0	0	4	2	10	0	1	12	912	11	0	0	21	0	11	0	**1976**
1:00 PM	0	3	285	10	0	0	2	1	4	0	0	0	201	1	0	0	3	1	2	0	**513**
1:15 PM	0	1	291	5	0	0	1	0	1	0	0	0	235	2	0	0	4	0	4	0	**544**
1:30 PM	0	2	253	4	0	0	1	0	0	0	0	2	267	1	0	0	3	0	5	0	**538**
1:45 PM	0	2	257	2	0	0	1	1	2	0	0	0	211	3	0	0	2	2	3	0	**486**
Hourly Total	0	8	1086	21	0	0	5	2	7	0	0	2	914	7	0	0	12	3	14	0	**2081**
2:00 PM	0	5	263	4	0	0	1	0	1	0	0	1	239	0	0	0	3	1	1	0	**519**
2:15 PM	0	5	264	5	0	0	1	0	6	0	0	1	196	0	0	0	5	0	1	0	**484**
2:30 PM	1	4	305	5	0	0	4	0	3	0	0	3	252	1	0	0	3	0	0	0	**581**
2:45 PM	0	2	351	5	0	0	4	0	3	0	0	1	261	2	0	0	5	0	0	0	**634**
Hourly Total	1	16	1183	19	0	0	10	0	13	0	0	6	948	3	0	0	16	1	2	0	**2218**
3:00 PM	0	3	324	1	0	0	3	0	5	0	0	2	292	7	0	0	10	0	3	0	**650**
3:15 PM	0	4	348	4	0	0	3	0	3	0	1	1	246	1	0	0	5	0	2	0	**618**
3:30 PM	0	4	360	5	0	0	1	2	3	0	1	2	315	6	0	0	5	0	2	0	**706**
3:45 PM	0	2	358	4	0	0	4	0	3	0	0	2	227	0	0	0	8	1	4	0	**613**
Hourly Total	0	13	1390	14	0	0	11	2	14	0	2	7	1080	14	0	0	28	1	11	0	**2587**

1 - US 169 & Bluff Dr
Sand Creek Township, MN
Friday, May 18, 2018

Time	Southbound US 169					Westbound Bluff Dr					Northbound US 169					Eastbound Bluff Dr					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
4:00 PM	0	2	353	2	0	0	2	0	3	0	0	2	270	2	0	0	5	0	3	0	**644**
4:15 PM	0	4	374	3	0	0	0	0	2	0	0	1	247	3	0	0	2	1	10	0	**647**
4:30 PM	0	1	384	10	0	0	2	0	2	0	0	2	270	1	0	0	3	0	4	0	**679**
4:45 PM	0	5	329	7	0	0	0	0	1	0	0	5	270	1	0	0	7	1	4	0	**630**
Hourly Total	0	12	1440	22	0	0	4	0	8	0	0	10	1057	7	0	0	17	2	21	0	**2600**
5:00 PM	0	2	337	6	0	0	1	0	6	0	0	3	283	2	0	0	11	0	5	0	**656**
5:15 PM	2	2	380	7	0	0	0	0	0	0	0	1	266	2	0	0	5	0	4	0	**669**
5:30 PM	3	2	342	3	0	0	0	0	0	0	0	1	268	2	0	0	6	0	3	0	**630**
5:45 PM	0	2	338	4	0	0	2	0	1	0	0	0	245	1	0	0	2	0	1	0	**596**
Hourly Total	5	8	1397	20	0	0	3	0	7	0	0	5	1062	7	0	0	24	0	13	0	**2551**
6:00 PM	0	3	261	0	0	0	2	0	4	0	0	3	237	1	0	0	2	0	1	0	**514**
6:15 PM	0	2	257	5	0	0	1	0	5	0	0	0	244	2	0	0	4	0	1	0	**521**
6:30 PM	0	1	215	1	0	0	1	0	3	0	0	3	199	0	0	0	4	0	1	0	**428**
6:45 PM	1	1	243	1	0	0	2	0	0	0	0	0	187	0	0	0	1	0	1	0	**437**
Hourly Total	1	7	976	7	0	0	6	0	12	0	0	6	867	3	0	0	11	0	4	0	**1900**
7:00 PM	0	5	235	3	0	0	2	1	0	0	1	0	185	1	0	0	1	0	1	0	**435**
7:15 PM	0	3	197	1	0	0	0	0	1	0	0	0	191	1	0	0	1	1	0	0	**396**
7:30 PM	0	2	187	0	0	0	0	0	0	0	0	0	154	0	0	0	0	0	1	0	**344**
7:45 PM	1	1	174	2	0	0	0	0	0	0	0	1	144	0	0	0	0	0	1	0	**324**
Hourly Total	1	11	793	6	0	0	2	1	1	0	1	1	674	2	0	0	2	1	3	0	**1499**
8:00 PM	0	0	175	2	0	0	0	0	1	0	0	0	169	0	0	0	0	0	0	0	**347**
8:15 PM	0	3	216	2	0	0	1	0	1	0	0	0	133	2	0	0	3	0	0	0	**361**
8:30 PM	0	2	170	0	0	0	0	0	0	0	0	0	128	0	0	0	4	0	0	0	**304**
8:45 PM	0	0	153	0	0	0	0	0	1	0	0	1	114	2	0	0	3	0	0	0	**274**
Hourly Total	0	5	714	4	0	0	1	0	3	0	0	1	544	4	0	0	10	0	0	0	**1286**
9:00 PM	0	1	157	0	0	0	0	0	0	0	0	0	115	0	0	0	0	0	0	0	**273**
9:15 PM	0	5	143	0	0	0	2	0	5	0	0	0	111	0	0	0	2	0	0	0	**268**
9:30 PM	1	0	139	0	0	0	2	1	0	0	0	0	97	0	0	0	1	0	0	0	**241**
9:45 PM	1	0	125	1	0	0	0	0	1	0	0	0	91	1	0	0	0	0	0	0	**220**
Hourly Total	2	6	564	1	0	0	4	1	6	0	0	0	414	1	0	0	3	0	0	0	**1002**
10:00 PM	0	4	141	0	0	0	1	0	0	0	0	1	95	0	0	0	0	0	0	0	**242**
10:15 PM	0	2	160	0	0	0	2	1	0	0	0	0	82	1	0	0	1	0	0	0	**249**
10:30 PM	0	1	113	0	0	0	0	1	1	0	0	2	64	0	0	0	0	0	1	0	**183**
10:45 PM	0	0	106	0	0	0	1	0	0	0	0	0	66	0	0	0	0	0	0	0	**173**
Hourly Total	0	7	520	0	0	0	4	2	1	0	0	3	307	1	0	0	1	0	1	0	**847**
11:00 PM	0	0	107	0	0	0	0	0	1	0	0	0	68	0	0	0	0	0	1	0	**177**
11:15 PM	0	3	120	0	0	0	0	0	0	0	0	1	41	0	0	0	0	0	2	0	**167**
11:30 PM	0	0	97	0	0	0	0	0	0	0	0	0	48	0	0	0	0	0	0	0	**145**
11:45 PM	0	1	82	0	0	0	0	0	1	0	0	1	41	0	0	0	0	0	0	0	**126**
Hourly Total	0	4	406	0	0	0	0	0	2	0	0	2	198	0	0	0	0	0	3	0	**615**
DAILY TOTAL	**13**	**160**	**16327**	**303**	**0**	**1**	**87**	**13**	**161**	**2**	**6**	**149**	**16860**	**118**	**0**	**0**	**273**	**9**	**125**	**0**	**34605**
Cars	13	146	14697	177	0	1	87	12	151	2	6	112	15442	113	0	0	166	7	89	0	**31219**
Heavy Vehicles	0	14	1630	126	0	0	0	1	10	0	0	37	1418	5	0	0	107	2	36	0	**3386**
Heavy Vehicle %	0.00%	8.75%	9.98%	41.58%	0.00%	0.00%	0.00%	7.69%	6.21%	0.00%	0.00%	24.83%	8.41%	4.24%	0.00%	0.00%	39.19%	22.22%	28.80%	0.00%	**9.78%**

1 - US 169 & Bluff Dr
Sand Creek Township, MN
Friday, May 18, 2018

AM Peak Hour

Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Peds/ Bicycles	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Peds/ Bicycles	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Peds/ Bicycles	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Peds/ Bicycles	TOTAL
6:45 AM	0	0	183	3	0	0	0	0	1	0	0	9	364	3	0	0	3	1	1	0	**568**
7:00 AM	0	3	156	7	0	0	0	0	4	0	0	0	349	3	0	0	7	0	0	0	**529**
7:15 AM	0	2	174	0	0	0	0	0	0	0	0	3	343	1	0	0	8	0	2	0	**533**
7:30 AM	0	3	167	7	0	0	0	0	4	0	1	7	401	3	0	0	5	0	0	0	**598**
Peak Hour Total	0	8	680	17	0	0	0	0	9	0	1	19	1457	10	0	0	23	1	3	0	**2228**
PHF	0.000	0.667	0.929	0.607	0.000	0.000	0.000	0.000	0.563	0.000	0.250	0.528	0.908	0.833	0.000	0.000	0.719	0.250	0.375	0.000	**0.931**

PM Peak Hour

Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Peds/ Bicycles	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Peds/ Bicycles	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Peds/ Bicycles	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Peds/ Bicycles	TOTAL
4:30 PM	0	1	384	10	0	0	2	0	2	0	0	2	270	1	0	0	3	0	4	0	**679**
4:45 PM	0	5	329	7	0	0	0	0	1	0	0	5	270	1	0	0	7	1	4	0	**630**
5:00 PM	0	2	337	6	0	0	1	0	6	0	0	3	283	2	0	0	11	0	5	0	**656**
5:15 PM	2	2	380	7	0	0	0	0	0	0	0	1	266	2	0	0	5	0	4	0	**669**
Peak Hour Total	2	10	1430	30	0	0	3	0	9	0	0	11	1089	6	0	0	26	1	17	0	**2634**
PHF	0.250	0.500	0.931	0.750	0.000	0.000	0.375	0.000	0.375	0.000	0.000	0.550	0.962	0.750	0.000	0.000	0.591	0.250	0.850	0.000	**0.970**

Total Vehicles On Leg 34110

Vehicles Entering Intersection 16803			Vehicles Exiting Intersection 17307	
Southbound				
Cars	177	14697	146	13	0
Heavy	126	1630	14	0	0
Total	**303**	**16327**	**160**	**13**	**0**

Total Vehicles on Leg 872

Vehicles Entering Intersection 407	Vehicles Exiting Intersection 465	Eastbound	Cars	Heavy	Total
			0	0	**0**
			0	0	**0**
			166	107	**273**
			7	2	**9**
			89	36	**125**

Daily Volumes

Cars	Heavy	Total	Westbound	Vehicles Entering Intersection 262	Vehicles Exiting Intersection 288	Total Vehicles on Leg 550
151	10	**161**				
12	1	**13**				
87	0	**87**				
1	0	**1**				
2	0	**2**				

Cars	0	6	112	15442	113
Heavy	0	0	37	1418	5
Total	**0**	**6**	**149**	**16860**	**118**
Northbound					
Vehicles Entering Intersection 17133			Vehicles Exiting Intersection 16545		
Total Vehicles On Leg 33678					

2 - US 169 & 166th St
Sand Creek Township, MN
Friday, May 18, 2018

Time	Southbound US 169					Westbound 166th St					Northbound US 169					Eastbound 166th St					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
12:00 AM	0	0	43	0	0	0	0	0	0	0	0	0	29	0	0	0	0	0	0	0	**72**
12:15 AM	0	0	42	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	**60**
12:30 AM	0	0	38	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	**53**
12:45 AM	0	0	25	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	**37**
Hourly Total	0	0	148	0	0	0	0	0	0	0	0	0	74	0	0	0	0	0	0	0	**222**
1:00 AM	0	0	28	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	**45**
1:15 AM	0	0	21	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	**35**
1:30 AM	0	1	18	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	**28**
1:45 AM	0	0	20	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	**33**
Hourly Total	0	1	87	0	0	0	0	0	0	0	0	0	53	0	0	0	0	0	0	0	**141**
2:00 AM	0	0	22	0	0	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	**41**
2:15 AM	0	0	23	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	**41**
2:30 AM	0	0	12	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	**36**
2:45 AM	0	0	15	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	**30**
Hourly Total	0	0	72	0	0	0	0	0	0	0	0	0	76	0	0	0	0	0	0	0	**148**
3:00 AM	0	0	12	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	**29**
3:15 AM	0	0	15	0	0	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	**37**
3:30 AM	0	0	16	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	**40**
3:45 AM	0	0	11	0	0	0	0	0	0	0	0	3	31	0	0	0	0	0	0	0	**45**
Hourly Total	0	0	54	0	0	0	0	0	0	0	0	3	94	0	0	0	0	0	0	0	**151**
4:00 AM	0	0	16	0	0	0	0	0	0	0	0	0	34	0	0	0	0	0	0	0	**50**
4:15 AM	0	0	28	0	0	0	0	0	0	0	0	0	59	0	0	0	0	0	0	0	**87**
4:30 AM	0	0	20	0	0	0	0	0	0	0	0	0	91	0	0	0	0	0	0	0	**111**
4:45 AM	0	1	29	0	0	0	0	0	1	0	0	0	90	1	0	0	0	0	0	0	**122**
Hourly Total	0	1	93	0	0	0	0	0	1	0	0	0	274	1	0	0	0	0	0	0	**370**
5:00 AM	0	1	29	0	0	0	0	0	0	0	0	1	136	0	0	0	0	0	0	0	**167**
5:15 AM	0	2	57	0	0	0	0	0	0	0	0	1	189	1	0	0	0	0	0	0	**250**
5:30 AM	0	1	64	1	0	0	0	0	0	0	0	2	253	4	0	0	1	0	2	0	**328**
5:45 AM	0	3	90	1	0	0	0	1	4	0	0	0	281	3	0	0	0	0	0	0	**383**
Hourly Total	0	7	240	2	0	0	0	1	4	0	0	4	859	8	0	0	1	0	2	0	**1128**
6:00 AM	1	2	68	0	0	0	1	1	2	0	0	0	295	2	0	0	0	1	1	0	**374**
6:15 AM	0	5	136	0	0	0	0	1	0	0	0	0	330	2	0	0	1	1	0	0	**476**
6:30 AM	0	0	143	0	0	0	1	0	1	0	0	0	357	2	0	0	1	1	0	0	**506**
6:45 AM	0	5	177	0	0	0	2	0	5	0	0	0	369	7	0	0	1	0	1	0	**567**
Hourly Total	1	12	524	0	0	0	4	2	8	0	0	0	1351	13	0	0	3	3	2	0	**1923**
7:00 AM	0	2	151	1	0	0	0	0	6	0	0	0	353	7	0	0	0	0	0	0	**520**
7:15 AM	0	2	172	0	0	0	5	1	3	0	0	0	340	5	0	0	0	1	2	0	**531**
7:30 AM	0	5	164	1	0	0	1	0	7	0	0	0	422	7	0	0	0	0	0	0	**607**
7:45 AM	0	7	171	3	0	0	4	0	11	0	0	2	349	6	0	0	0	0	0	0	**553**
Hourly Total	0	16	658	5	0	0	10	1	27	0	0	2	1464	25	0	0	0	1	2	0	**2211**

2 - US 169 & 166th St
Sand Creek Township, MN
Friday, May 18, 2018

Time	Southbound US 169					Westbound 166th St					Northbound US 169					Eastbound 166th St					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
8:00 AM	1	9	154	0	0	0	1	2	8	0	0	0	311	7	0	0	0	0	0	0	**493**
8:15 AM	0	5	147	0	0	0	2	0	13	0	0	0	268	5	0	0	0	2	0	0	**442**
8:30 AM	0	2	180	0	0	0	7	1	6	0	0	0	258	3	0	0	0	2	0	0	**459**
8:45 AM	0	7	185	1	0	0	2	0	7	0	0	0	259	3	0	0	1	0	0	0	**465**
Hourly Total	1	23	666	1	0	0	12	3	34	0	0	0	1096	18	0	0	1	4	0	0	**1859**
9:00 AM	0	2	171	0	0	0	1	0	7	0	0	0	202	3	0	0	0	0	0	0	**386**
9:15 AM	0	8	185	2	0	0	1	2	9	0	0	0	240	5	0	0	1	1	0	0	**454**
9:30 AM	0	9	140	3	0	0	4	0	1	0	0	0	244	3	0	0	0	3	1	0	**408**
9:45 AM	0	11	184	0	0	0	6	0	11	0	0	1	223	5	0	0	0	0	0	0	**441**
Hourly Total	0	30	680	5	0	0	12	2	28	0	0	1	909	16	0	0	1	4	1	0	**1689**
10:00 AM	1	10	191	0	0	0	4	1	13	0	0	0	179	2	0	0	0	1	0	0	**402**
10:15 AM	0	4	164	0	0	0	6	0	8	0	0	0	213	6	0	0	0	0	0	0	**401**
10:30 AM	0	3	214	2	0	0	3	0	6	0	0	0	200	6	0	0	1	0	0	0	**435**
10:45 AM	0	8	188	0	0	0	2	0	12	0	1	1	209	3	0	0	0	1	0	0	**425**
Hourly Total	1	25	757	2	0	0	15	1	39	0	1	1	801	17	0	0	1	2	0	0	**1663**
11:00 AM	0	11	219	0	0	0	5	0	9	0	0	0	188	2	0	0	0	1	1	0	**436**
11:15 AM	0	8	227	1	0	0	4	1	4	0	0	0	236	5	0	0	1	0	0	0	**487**
11:30 AM	1	6	190	0	0	0	5	0	6	0	0	0	245	3	0	0	1	0	0	0	**457**
11:45 AM	0	4	198	0	0	0	0	0	13	0	0	1	210	5	0	0	0	2	0	0	**433**
Hourly Total	1	29	834	1	0	0	14	1	32	0	0	1	879	15	0	0	2	3	1	0	**1813**
12:00 PM	0	10	221	0	0	0	1	0	12	0	0	1	218	4	0	0	0	0	1	0	**468**
12:15 PM	0	12	247	1	0	0	2	1	11	0	0	1	241	1	0	0	0	0	0	0	**517**
12:30 PM	0	16	235	0	0	0	3	0	9	0	0	1	235	3	0	0	1	1	1	0	**505**
12:45 PM	1	10	227	0	0	0	6	0	9	0	0	0	204	8	0	0	0	0	0	0	**465**
Hourly Total	1	48	930	1	0	0	12	1	41	0	0	3	898	16	0	0	1	1	2	0	**1955**
1:00 PM	0	8	283	0	0	0	2	0	15	0	0	1	213	5	0	0	1	0	1	0	**529**
1:15 PM	0	10	274	1	0	0	9	0	8	0	0	0	221	6	0	0	0	0	0	0	**529**
1:30 PM	0	10	247	0	0	0	11	0	3	0	0	1	265	4	0	0	0	0	1	0	**542**
1:45 PM	0	4	244	0	0	0	4	0	8	0	1	0	210	4	0	0	0	0	0	0	**475**
Hourly Total	0	32	1048	1	0	0	26	0	34	0	1	2	909	19	0	0	1	0	2	0	**2075**
2:00 PM	0	9	259	0	0	0	8	1	10	0	0	0	240	3	0	0	0	0	0	0	**530**
2:15 PM	0	8	263	0	0	0	1	0	9	0	0	0	212	6	0	0	0	1	0	0	**500**
2:30 PM	0	10	310	0	0	0	7	0	6	0	0	2	278	6	0	0	1	0	0	0	**620**
2:45 PM	0	12	344	1	0	0	2	0	6	0	0	0	255	2	0	0	1	0	0	0	**623**
Hourly Total	0	39	1176	1	0	0	18	1	31	0	0	2	985	17	0	0	2	1	0	0	**2273**
3:00 PM	0	4	319	2	0	0	7	0	5	0	0	0	292	4	0	0	0	2	0	0	**635**
3:15 PM	0	10	353	2	0	0	4	0	8	0	0	1	257	3	0	0	0	1	0	0	**639**
3:30 PM	0	11	341	0	0	0	3	1	15	0	0	0	314	3	0	0	0	1	0	0	**689**
3:45 PM	0	7	368	0	0	0	4	0	3	0	0	1	258	3	0	0	0	1	0	0	**645**
Hourly Total	0	32	1381	4	0	0	18	1	31	0	0	2	1121	13	0	0	0	5	0	0	**2608**

2 - US 169 & 166th St
Sand Creek Township, MN
Friday, May 18, 2018

	Southbound US 169					Westbound 166th St					Northbound US 169					Eastbound 166th St					
Time	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	TOTAL
4:00 PM	0	9	348	0	0	0	5	1	8	0	0	0	283	10	0	0	1	0	0	0	**665**
4:15 PM	1	7	367	0	0	0	5	1	10	0	0	0	253	4	0	0	0	0	1	0	**649**
4:30 PM	0	9	373	1	0	0	11	1	3	0	0	0	282	3	0	0	0	2	4	0	**689**
4:45 PM	0	6	346	0	0	0	5	0	8	0	0	0	287	1	0	0	0	0	0	0	**653**
Hourly Total	1	31	1434	1	0	0	26	3	29	0	0	0	1105	18	0	0	1	2	5	0	**2656**
5:00 PM	0	8	328	0	0	0	5	0	6	0	0	1	280	5	0	0	1	0	1	0	**635**
5:15 PM	0	8	367	0	0	0	7	0	5	0	0	0	280	5	0	0	1	0	1	0	**674**
5:30 PM	0	6	352	0	0	0	6	0	11	0	0	0	264	5	0	0	0	0	0	0	**644**
5:45 PM	1	5	340	0	0	0	4	0	5	0	0	0	255	6	0	0	0	0	3	0	**619**
Hourly Total	1	27	1387	0	0	0	22	0	27	0	0	1	1079	21	0	0	2	0	5	0	**2572**
6:00 PM	0	1	257	0	0	0	3	0	3	0	0	0	233	0	0	0	0	0	0	0	**497**
6:15 PM	0	4	257	0	0	0	1	0	4	0	0	0	267	2	0	0	0	0	0	0	**535**
6:30 PM	0	2	216	0	0	0	3	1	3	0	0	0	197	2	0	0	0	0	2	0	**426**
6:45 PM	0	4	241	1	0	0	2	1	1	0	0	1	191	5	0	0	0	0	1	0	**448**
Hourly Total	0	11	971	1	0	0	9	2	11	0	0	1	888	9	0	0	0	0	3	0	**1906**
7:00 PM	0	8	231	1	0	1	0	0	2	0	0	1	206	4	0	0	0	0	1	0	**455**
7:15 PM	0	2	187	0	0	0	1	2	2	0	0	0	191	0	0	0	0	0	1	0	**386**
7:30 PM	0	2	188	1	0	0	0	0	1	0	0	1	165	4	0	0	0	0	0	0	**362**
7:45 PM	0	1	173	0	0	0	2	2	0	0	0	1	144	1	0	0	0	0	3	0	**327**
Hourly Total	0	13	779	2	0	1	3	4	5	0	0	3	706	9	0	0	0	0	5	0	**1530**
8:00 PM	0	1	176	0	0	0	0	1	4	0	0	2	166	2	0	0	0	3	1	0	**356**
8:15 PM	0	4	208	0	0	0	0	0	2	0	0	0	140	3	0	0	1	0	1	0	**359**
8:30 PM	0	3	172	0	0	0	3	0	0	0	0	0	135	4	0	0	0	0	1	0	**318**
8:45 PM	0	3	159	0	0	0	0	1	2	0	0	0	117	5	0	0	1	0	0	0	**288**
Hourly Total	0	11	715	0	0	0	3	2	8	0	0	2	558	14	0	0	2	3	3	0	**1321**
9:00 PM	0	1	159	0	0	0	3	1	0	0	0	1	116	4	0	0	1	0	0	0	**286**
9:15 PM	0	1	143	0	0	0	0	0	4	0	0	0	113	2	0	0	0	0	0	0	**263**
9:30 PM	0	2	137	1	0	0	1	0	0	0	0	0	105	0	0	0	0	0	0	0	**246**
9:45 PM	0	0	140	0	0	0	1	0	2	0	0	0	83	0	0	0	0	0	0	0	**226**
Hourly Total	0	4	579	1	0	0	5	1	6	0	0	1	417	6	0	0	1	0	0	0	**1021**
10:00 PM	0	2	146	0	0	0	0	0	1	0	0	0	101	0	0	0	0	0	0	0	**250**
10:15 PM	0	4	166	0	0	0	0	0	4	0	0	0	90	0	0	0	0	0	0	0	**264**
10:30 PM	0	1	126	0	0	0	0	0	1	0	0	0	57	1	0	0	0	0	0	0	**186**
10:45 PM	0	1	105	0	0	0	0	0	0	0	0	0	68	0	0	0	0	0	0	0	**174**
Hourly Total	0	8	543	0	0	0	0	0	6	0	0	0	316	1	0	0	0	0	0	0	**874**
11:00 PM	0	2	106	0	0	0	2	0	1	0	0	0	69	0	0	0	0	0	0	0	**180**
11:15 PM	0	1	127	0	0	0	0	0	0	0	0	0	40	0	0	0	0	0	0	0	**168**
11:30 PM	0	1	103	0	0	0	0	0	0	0	0	0	47	0	0	0	0	0	0	0	**151**
11:45 PM	0	0	90	0	0	0	1	0	0	0	0	0	43	0	0	0	0	0	0	0	**134**
Hourly Total	0	4	426	0	0	0	3	0	1	0	0	0	199	0	0	0	0	0	0	0	**633**
DAILY TOTAL	**7**	**404**	**16182**	**28**	**0**	**1**	**212**	**26**	**403**	**0**	**2**	**29**	**17111**	**256**	**0**	**0**	**19**	**29**	**33**	**0**	**34742**
Cars	6	249	14681	20	0	1	151	10	249	0	2	24	15694	195	0	0	11	14	23	0	**31330**
Heavy Vehicles	1	155	1501	8	0	0	61	16	154	0	0	5	1417	61	0	0	8	15	10	0	**3412**
Heavy Vehicle %	14.29%	38.37%	9.28%	28.57%	0.00%	0.00%	28.77%	61.54%	38.21%	0.00%	0.00%	17.24%	8.28%	23.83%	0.00%	0.00%	42.11%	51.72%	30.30%	0.00%	**9.82%**

2 - US 169 & 166th St
Sand Creek Township, MN
Friday, May 18, 2018

AM Peak Hour

Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Peds/ Bicycles	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Peds/ Bicycles	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Peds/ Bicycles	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Peds/ Bicycles	TOTAL
6:45 AM	0	5	177	0	0	0	2	0	5	0	0	0	369	7	0	0	1	0	1	0	**567**
7:00 AM	0	2	151	1	0	0	0	0	6	0	0	0	353	7	0	0	0	0	0	0	**520**
7:15 AM	0	2	172	0	0	0	5	1	3	0	0	0	340	5	0	0	0	1	2	0	**531**
7:30 AM	0	5	164	1	0	0	1	0	7	0	0	0	422	7	0	0	0	0	0	0	**607**
Peak Hour Total	0	14	664	2	0	0	8	1	21	0	0	0	1484	26	0	0	1	1	3	0	**2225**
PHF	0.000	0.700	0.938	0.500	0.000	0.000	0.400	0.250	0.750	0.000	0.000	0.000	0.879	0.929	0.000	0.000	0.250	0.250	0.375	0.000	**0.916**

PM Peak Hour

Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Peds/ Bicycles	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Peds/ Bicycles	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Peds/ Bicycles	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Peds/ Bicycles	TOTAL
4:00 PM	0	9	348	0	0	0	5	1	8	0	0	0	283	10	0	0	1	0	0	0	**665**
4:15 PM	1	7	367	0	0	0	5	1	10	0	0	0	253	4	0	0	0	0	1	0	**649**
4:30 PM	0	9	373	1	0	0	11	1	3	0	0	0	282	3	0	0	0	2	4	0	**689**
4:45 PM	0	6	346	0	0	0	5	0	8	0	0	0	287	1	0	0	0	0	0	0	**653**
Peak Hour Total	1	31	1434	1	0	0	26	3	29	0	0	0	1105	18	0	0	1	2	5	0	**2656**
PHF	0.250	0.861	0.961	0.250	0.000	0.000	0.591	0.750	0.725	0.000	0.000	0.000	0.963	0.450	0.000	0.000	0.250	0.250	0.313	0.000	**0.964**

Daily Volumes

Total Vehicles On Leg 34161					
Vehicles Entering Intersection 16621			Vehicles Exiting Intersection 17540		
Southbound					
Cars	20	14681	249	6	0
Heavy	8	1501	155	1	0
Total	**28**	**16182**	**404**	**7**	**0**

Total Vehicles on Leg 164		**Eastbound**	Cars	Heavy	**Total**
	Vehicles Entering Intersection 81		0	0	**0**
			0	0	**0**
	Vehicles Exiting Intersection 83		11	8	**19**
			14	15	**29**
			23	10	**33**

Cars	Heavy	**Total**	**Westbound**		Total Vehicles on Leg 1332
249	154	**403**		Vehicles Entering Intersection 642	
10	16	**26**			
151	61	**212**		Vehicles Exiting Intersection 690	
1	0	**1**			
0	0	**0**			

Cars	0	2	24	15694	195
Heavy	0	0	5	1417	61
Total	**0**	**2**	**29**	**17111**	**256**
Northbound					
Vehicles Entering Intersection 17398			Vehicles Exiting Intersection 16429		
Total Vehicles On Leg 33827					

3 - US 169 & Jordan Ave
Sand Creek Township, MN
Friday, May 18, 2018

Time	Southbound US 169					Westbound --					Northbound US 169					Eastbound Jordan Ave					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
12:00 AM	0	0	38	0	0	0	0	0	0	0	0	0	28	0	0	0	0	0	0	0	**66**
12:15 AM	0	0	43	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	**60**
12:30 AM	0	0	41	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	**55**
12:45 AM	0	0	24	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	1	0	**37**
Hourly Total	0	0	146	0	0	0	0	0	0	0	0	0	71	0	0	0	0	0	1	0	**218**
1:00 AM	0	0	27	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	**44**
1:15 AM	0	0	22	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	**35**
1:30 AM	0	0	17	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	**25**
1:45 AM	0	0	19	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	**32**
Hourly Total	0	0	85	0	0	0	0	0	0	0	0	0	51	0	0	0	0	0	0	0	**136**
2:00 AM	0	0	23	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	**40**
2:15 AM	0	0	22	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	**40**
2:30 AM	0	0	14	0	0	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	**36**
2:45 AM	0	0	15	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	**30**
Hourly Total	0	0	74	0	0	0	0	0	0	0	0	0	72	0	0	0	0	0	0	0	**146**
3:00 AM	0	0	12	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	**29**
3:15 AM	0	0	14	0	0	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	**36**
3:30 AM	0	0	17	0	0	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0	**40**
3:45 AM	0	0	10	0	0	0	0	0	0	0	0	0	34	0	0	0	0	0	0	0	**44**
Hourly Total	0	0	53	0	0	0	0	0	0	0	0	0	96	0	0	0	0	0	0	0	**149**
4:00 AM	0	0	16	0	0	0	0	0	0	0	0	0	33	0	0	0	0	0	0	0	**49**
4:15 AM	0	0	26	0	0	0	0	0	0	0	0	0	63	0	0	0	0	0	0	0	**89**
4:30 AM	0	0	22	0	0	0	0	0	0	0	0	0	82	0	0	0	0	0	0	0	**104**
4:45 AM	0	0	28	0	0	0	0	0	0	0	0	0	90	0	0	0	0	0	0	0	**118**
Hourly Total	0	0	92	0	0	0	0	0	0	0	0	0	268	0	0	0	0	0	0	0	**360**
5:00 AM	0	0	27	0	0	0	0	0	0	0	0	0	134	0	0	0	0	0	0	0	**161**
5:15 AM	0	0	58	0	0	0	0	0	0	0	0	0	200	0	0	0	0	0	0	0	**258**
5:30 AM	0	0	62	0	0	0	0	0	0	1	0	0	251	0	0	0	0	0	0	0	**313**
5:45 AM	0	0	86	0	0	0	0	0	0	0	0	0	277	0	0	0	0	0	0	0	**363**
Hourly Total	0	0	233	0	0	0	0	0	0	1	0	0	862	0	0	0	0	0	0	0	**1095**
6:00 AM	0	0	78	0	0	0	0	0	0	0	0	0	297	0	0	0	0	0	3	0	**378**
6:15 AM	0	0	125	0	0	0	0	0	0	0	0	0	325	0	0	0	0	0	0	0	**450**
6:30 AM	0	0	137	0	0	0	0	0	0	0	0	0	358	0	0	0	0	0	1	0	**496**
6:45 AM	0	0	192	0	0	0	0	0	0	0	0	0	361	0	0	0	0	0	2	0	**555**
Hourly Total	0	0	532	0	0	0	0	0	0	0	0	0	1341	0	0	0	0	0	6	0	**1879**
7:00 AM	0	0	140	0	0	0	0	0	0	0	0	0	345	0	0	0	0	0	2	0	**487**
7:15 AM	0	0	177	0	0	0	0	0	0	0	0	0	344	0	0	0	0	0	0	0	**521**
7:30 AM	0	0	183	0	0	0	0	0	0	1	0	0	413	0	0	0	0	0	1	0	**597**
7:45 AM	0	0	179	0	0	0	0	0	0	0	0	0	337	0	0	0	0	0	1	0	**517**
Hourly Total	0	0	679	0	0	0	0	0	0	1	0	0	1439	0	0	0	0	0	4	0	**2122**

3 - US 169 & Jordan Ave
Sand Creek Township, MN
Friday, May 18, 2018

Time	Southbound US 169					Westbound --					Northbound US 169					Eastbound Jordan Ave					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
8:00 AM	0	0	145	1	0	0	0	0	0	0	0	0	304	0	0	0	0	0	0	0	**450**
8:15 AM	0	0	150	0	0	0	0	0	0	0	0	0	267	0	0	0	0	0	0	0	**417**
8:30 AM	0	0	195	0	0	0	0	0	0	0	0	0	257	0	0	0	0	0	0	0	**452**
8:45 AM	0	0	181	0	0	0	0	0	0	0	0	0	252	0	0	0	0	0	0	0	**433**
Hourly Total	0	0	671	1	0	0	0	0	0	0	0	0	1080	0	0	0	0	0	0	0	**1752**
9:00 AM	0	0	167	0	0	0	0	0	0	0	0	0	207	0	0	0	0	0	0	0	**374**
9:15 AM	0	0	190	0	0	0	0	0	0	0	0	0	233	0	0	0	0	0	1	0	**424**
9:30 AM	0	0	150	0	0	0	0	0	0	0	0	0	244	0	0	0	0	0	0	0	**394**
9:45 AM	0	0	176	0	0	0	0	0	0	0	0	0	216	0	0	0	0	0	0	0	**392**
Hourly Total	0	0	683	0	0	0	0	0	0	0	0	0	900	0	0	0	0	0	1	0	**1584**
10:00 AM	0	0	188	0	0	0	0	0	0	0	0	0	178	0	0	0	0	0	3	0	**369**
10:15 AM	0	0	180	0	0	0	0	0	0	0	0	0	218	0	0	0	0	0	1	0	**399**
10:30 AM	0	0	222	0	0	0	0	0	0	0	0	0	202	0	0	0	0	0	3	0	**427**
10:45 AM	0	0	186	0	0	0	0	0	0	0	0	0	212	0	0	0	0	0	1	0	**399**
Hourly Total	0	0	776	0	0	0	0	0	0	0	0	0	810	0	0	0	0	0	8	0	**1594**
11:00 AM	0	0	230	0	0	0	0	0	0	0	0	0	186	0	0	0	0	0	0	0	**416**
11:15 AM	0	0	234	0	0	0	0	0	0	0	0	0	236	0	0	0	0	0	0	0	**470**
11:30 AM	0	0	179	1	0	0	0	0	0	0	0	0	236	0	0	0	0	0	1	0	**417**
11:45 AM	0	0	210	0	0	0	0	0	0	0	0	0	217	0	0	0	0	0	1	0	**428**
Hourly Total	0	0	853	1	0	0	0	0	0	0	0	0	875	0	0	0	0	0	2	0	**1731**
12:00 PM	0	0	218	0	0	0	0	0	0	0	0	0	219	0	0	0	0	0	1	0	**438**
12:15 PM	0	0	245	0	0	0	0	0	0	0	0	0	249	0	0	0	0	0	1	0	**495**
12:30 PM	0	0	229	0	0	0	0	0	0	0	0	0	231	0	0	0	0	0	0	0	**460**
12:45 PM	0	0	245	0	0	0	0	0	0	0	0	0	220	0	0	0	0	0	1	0	**466**
Hourly Total	0	0	937	0	0	0	0	0	0	0	0	0	919	0	0	0	0	0	3	0	**1859**
1:00 PM	0	0	268	1	0	0	0	0	0	0	0	0	208	0	0	0	0	0	5	0	**482**
1:15 PM	0	0	279	0	0	0	0	0	0	0	0	0	226	0	0	0	0	0	0	0	**505**
1:30 PM	0	0	274	0	0	0	0	0	0	0	0	0	266	0	0	0	0	0	0	0	**540**
1:45 PM	0	0	233	0	0	0	0	0	0	0	0	0	215	0	0	0	0	0	2	0	**450**
Hourly Total	0	0	1054	1	0	0	0	0	0	0	0	0	915	0	0	0	0	0	7	0	**1977**
2:00 PM	0	0	256	0	0	0	0	0	0	0	0	0	237	0	0	0	0	0	1	0	**494**
2:15 PM	0	0	291	0	0	0	0	0	0	0	0	0	228	0	0	0	0	0	0	0	**519**
2:30 PM	0	0	297	0	0	0	0	0	0	0	0	0	275	0	0	0	0	0	1	0	**573**
2:45 PM	0	0	347	0	0	0	0	0	0	0	0	0	252	0	0	0	0	0	2	0	**601**
Hourly Total	0	0	1191	0	0	0	0	0	0	0	0	0	992	0	0	0	0	0	4	0	**2187**
3:00 PM	0	0	296	1	0	0	0	0	0	0	0	0	289	0	0	0	0	0	1	0	**587**
3:15 PM	0	0	363	0	0	0	0	0	0	0	0	0	265	0	0	0	0	0	4	0	**632**
3:30 PM	0	0	332	1	0	0	0	0	0	0	0	0	316	0	0	0	0	0	4	0	**653**
3:45 PM	0	0	393	0	0	0	0	0	0	0	0	0	257	0	0	0	0	0	5	0	**655**
Hourly Total	0	0	1384	2	0	0	0	0	0	0	0	0	1127	0	0	0	0	0	14	0	**2527**

3 - US 169 & Jordan Ave
Sand Creek Township, MN
Friday, May 18, 2018

Time	Southbound US 169					Westbound --					Northbound US 169					Eastbound Jordan Ave					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
4:00 PM	0	0	343	0	0	0	0	0	0	0	0	0	288	0	0	0	0	0	2	0	**633**
4:15 PM	0	0	376	0	0	0	0	0	0	0	0	0	252	0	0	0	0	0	3	0	**631**
4:30 PM	0	0	356	0	0	0	0	0	0	0	0	0	286	0	0	0	0	0	3	0	**645**
4:45 PM	0	0	387	0	0	0	0	0	0	0	0	0	289	0	0	0	0	0	8	0	**684**
Hourly Total	0	0	1462	0	0	0	0	0	0	0	0	0	1115	0	0	0	0	0	16	0	**2593**
5:00 PM	0	0	335	0	0	0	0	0	0	0	0	0	282	0	0	0	0	0	3	0	**620**
5:15 PM	0	0	373	0	0	0	0	0	0	0	0	0	286	0	0	0	0	0	4	0	**663**
5:30 PM	0	0	337	0	0	0	0	0	0	0	0	0	265	0	0	0	0	0	1	0	**603**
5:45 PM	0	0	337	1	0	0	0	0	0	0	0	0	261	0	0	0	0	0	2	0	**601**
Hourly Total	0	0	1382	1	0	0	0	0	0	0	0	0	1094	0	0	0	0	0	10	0	**2487**
6:00 PM	0	0	256	0	0	0	0	0	0	0	0	0	239	0	0	0	0	0	1	0	**496**
6:15 PM	0	0	295	0	0	0	0	0	0	0	0	0	258	0	0	0	0	0	3	0	**556**
6:30 PM	0	0	221	0	0	0	0	0	0	0	0	0	206	0	0	0	0	0	0	0	**427**
6:45 PM	0	0	230	0	0	0	0	0	0	0	0	0	189	0	0	0	0	0	1	0	**420**
Hourly Total	0	0	1002	0	0	0	0	0	0	0	0	0	892	0	0	0	0	0	5	0	**1899**
7:00 PM	0	0	243	0	0	0	0	0	0	0	0	0	205	0	0	0	0	0	0	0	**448**
7:15 PM	0	0	189	0	0	0	0	0	0	0	0	0	183	0	0	0	0	0	0	0	**372**
7:30 PM	0	0	182	0	0	0	0	0	0	0	0	0	164	0	0	0	0	0	0	0	**346**
7:45 PM	0	0	187	0	0	0	0	0	0	0	0	0	141	0	0	0	0	0	0	0	**328**
Hourly Total	0	0	801	0	0	0	0	0	0	0	0	0	693	0	0	0	0	0	0	0	**1494**
8:00 PM	0	0	173	0	0	0	0	0	0	0	0	0	166	0	0	0	0	0	1	0	**340**
8:15 PM	0	0	201	0	0	0	0	0	0	0	0	0	141	0	0	0	0	0	0	0	**342**
8:30 PM	0	0	182	0	0	0	0	0	0	0	0	0	141	0	0	0	0	0	1	0	**324**
8:45 PM	0	0	141	0	0	0	0	0	0	0	0	0	119	0	0	0	0	0	0	0	**260**
Hourly Total	0	0	697	0	0	0	0	0	0	0	0	0	567	0	0	0	0	0	2	0	**1266**
9:00 PM	0	0	158	0	0	0	0	0	0	0	0	0	120	0	0	0	0	0	0	0	**278**
9:15 PM	0	0	149	0	0	0	0	0	0	0	0	0	110	0	0	0	0	0	0	0	**259**
9:30 PM	0	0	139	0	0	0	0	0	0	0	0	0	105	0	0	0	0	0	0	0	**244**
9:45 PM	0	0	127	0	0	0	0	0	0	0	0	0	77	0	0	0	0	0	1	0	**205**
Hourly Total	0	0	573	0	0	0	0	0	0	0	0	0	412	0	0	0	0	0	1	0	**986**
10:00 PM	0	0	140	0	0	0	0	0	0	0	0	0	95	0	0	0	0	0	0	0	**235**
10:15 PM	0	0	150	0	0	0	0	0	0	0	0	0	90	0	0	0	0	0	0	0	**240**
10:30 PM	0	0	131	0	0	0	0	0	0	0	0	0	55	0	0	0	0	0	0	0	**186**
10:45 PM	0	0	103	0	0	0	0	0	0	0	0	0	62	0	0	0	0	0	0	0	**165**
Hourly Total	0	0	524	0	0	0	0	0	0	0	0	0	302	0	0	0	0	0	0	0	**826**
11:00 PM	0	0	101	0	0	0	0	0	0	0	0	0	71	0	0	0	0	0	0	0	**172**
11:15 PM	0	0	120	0	0	0	0	0	0	0	0	0	39	0	0	0	0	0	0	0	**159**
11:30 PM	0	0	99	0	0	0	0	0	0	0	0	0	47	0	0	0	0	0	0	0	**146**
11:45 PM	0	0	84	1	0	0	0	0	0	0	0	0	42	0	0	0	0	0	0	0	**127**
Hourly Total	0	0	404	1	0	0	0	0	0	0	0	0	199	0	0	0	0	0	0	0	**604**
DAILY TOTAL	**0**	**0**	**16288**	**7**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**17092**	**0**	**0**	**0**	**0**	**0**	**84**	**0**	**33471**
Cars	0	0	14698	7	0	0	0	0	0	0	0	0	15680	0	0	0	0	0	78	0	**30463**
Heavy Vehicles	0	0	1590	0	0	0	0	0	0	2	0	0	1412	0	0	0	0	0	6	0	**3008**
Heavy Vehicle %	0.00%	0.00%	9.76%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	8.26%	0.00%	0.00%	0.00%	0.00%	0.00%	7.14%	0.00%	**8.99%**

3 - US 169 & Jordan Ave
Sand Creek Township, MN
Friday, May 18, 2018

AM Peak Hour

Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Peds/ Bicycles	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Peds/ Bicycles	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Peds/ Bicycles	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Peds/ Bicycles	TOTAL
6:45 AM	0	0	192	0	0	0	0	0	0	0	0	0	361	0	0	0	0	0	2	0	**555**
7:00 AM	0	0	140	0	0	0	0	0	0	0	0	0	345	0	0	0	0	0	2	0	**487**
7:15 AM	0	0	177	0	0	0	0	0	0	0	0	0	344	0	0	0	0	0	0	0	**521**
7:30 AM	0	0	183	0	0	0	0	0	0	1	0	0	413	0	0	0	0	0	1	0	**597**
Peak Hour Total	0	0	692	0	0	0	0	0	0	1	0	0	1463	0	0	0	0	0	5	0	**2160**
PHF	0.000	0.000	0.901	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.886	0.000	0.000	0.000	0.000	0.000	0.625	0.000	**0.905**

PM Peak Hour

Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Peds/ Bicycles	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Peds/ Bicycles	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Peds/ Bicycles	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Peds/ Bicycles	TOTAL
4:30 PM	0	0	356	0	0	0	0	0	0	0	0	0	286	0	0	0	0	0	3	0	**645**
4:45 PM	0	0	387	0	0	0	0	0	0	0	0	0	289	0	0	0	0	0	8	0	**684**
5:00 PM	0	0	335	0	0	0	0	0	0	0	0	0	282	0	0	0	0	0	3	0	**620**
5:15 PM	0	0	373	0	0	0	0	0	0	0	0	0	286	0	0	0	0	0	4	0	**663**
Peak Hour Total	0	0	1451	0	0	0	0	0	0	0	0	0	1143	0	0	0	0	0	18	0	**2612**
PHF	0.000	0.000	0.937	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.989	0.000	0.000	0.000	0.000	0.000	0.563	0.000	**0.955**

Total Vehicles On Leg 33387

Vehicles Entering Intersection 16295			Vehicles Exiting Intersection 17092		
Southbound					
Cars	7	14698	0	0	0
Heavy	0	1590	0	0	0
Total	**7**	**16288**	**0**	**0**	**0**

Total Vehicles on Leg 91	Vehicles Entering Intersection 84	Eastbound	Cars	Heavy	Total
			0	0	**0**
			0	0	**0**
			0	0	**0**
			0	0	**0**
	Vehicles Exiting Intersection 7		78	6	**84**

Daily Volumes

Cars	Heavy	Total	Westbound	Vehicles Entering Intersection 0	Total Vehicles on Leg 0
0	0	**0**			
0	0	**0**			
0	0	**0**			
0	0	**0**		Vehicles Exiting Intersection 0	
0	2	**2**			

Cars	0	0	0	15680	0
Heavy	0	0	0	1412	0
Total	**0**	**0**	**0**	**17092**	**0**
Northbound					
Vehicles Entering Intersection 17092			Vehicles Exiting Intersection 16372		
Total Vehicles On Leg 33464					

4 - US 169 & 173rd St
Sand Creek Township, MN
Friday, May 18, 2018

Time	Southbound US 169					Westbound 173rd St					Northbound US 169					Eastbound 173rd St					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
12:00 AM	0	0	39	0	0	0	0	0	0	0	0	0	28	0	0	0	0	0	2	0	**69**
12:15 AM	0	0	44	1	0	0	0	0	0	0	1	0	20	0	0	0	0	0	1	0	**67**
12:30 AM	0	0	37	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	1	0	**53**
12:45 AM	0	1	25	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	**38**
Hourly Total	0	1	145	1	0	0	0	0	0	0	1	0	75	0	0	0	0	0	4	0	**227**
1:00 AM	0	0	28	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	**46**
1:15 AM	0	0	22	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	**35**
1:30 AM	0	0	18	0	0	0	0	0	0	0	0	1	9	0	0	0	0	0	0	0	**28**
1:45 AM	0	0	18	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	1	0	**32**
Hourly Total	0	0	86	0	0	0	0	0	0	0	0	1	53	0	0	0	0	0	1	0	**141**
2:00 AM	0	0	23	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	**41**
2:15 AM	0	0	22	0	0	0	0	0	0	0	1	0	19	0	0	0	0	0	0	0	**42**
2:30 AM	0	0	14	0	0	0	0	0	0	0	1	0	21	0	0	0	0	0	0	0	**36**
2:45 AM	0	0	15	0	0	0	0	0	0	0	0	1	15	0	0	0	0	0	0	0	**31**
Hourly Total	0	0	74	0	0	0	0	0	0	0	2	1	73	0	0	0	0	0	0	0	**150**
3:00 AM	0	0	10	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	2	0	**30**
3:15 AM	0	0	15	0	0	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	**37**
3:30 AM	0	0	15	1	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	**40**
3:45 AM	0	0	10	0	0	0	0	0	0	0	0	0	35	0	0	0	0	0	0	0	**45**
Hourly Total	0	0	50	1	0	0	0	0	0	0	0	0	99	0	0	0	0	0	2	0	**152**
4:00 AM	0	0	16	0	0	0	0	0	0	0	0	0	36	0	0	0	0	0	0	0	**52**
4:15 AM	0	0	26	0	0	0	0	0	1	0	0	0	60	0	0	0	0	0	1	0	**88**
4:30 AM	0	0	22	0	0	0	0	0	1	0	0	0	83	0	0	0	0	0	0	0	**106**
4:45 AM	0	0	23	1	0	0	0	0	1	0	1	0	89	0	0	0	0	0	0	0	**115**
Hourly Total	0	0	87	1	0	0	0	0	3	0	1	0	268	0	0	0	0	0	1	0	**361**
5:00 AM	0	0	26	0	0	0	0	0	2	0	1	0	129	0	0	0	0	0	0	0	**158**
5:15 AM	0	0	56	0	0	0	0	0	2	0	1	1	192	0	0	0	0	0	2	0	**254**
5:30 AM	0	0	50	1	0	0	0	0	0	0	2	0	258	0	0	0	0	0	2	0	**313**
5:45 AM	0	0	77	2	0	0	0	0	1	0	2	3	270	0	0	0	0	0	0	0	**355**
Hourly Total	0	0	209	3	0	0	0	0	5	0	6	4	849	0	0	0	0	0	4	0	**1080**
6:00 AM	2	1	75	2	0	0	0	0	3	0	0	2	293	0	0	0	0	0	0	0	**378**
6:15 AM	0	1	122	3	0	0	0	0	2	0	2	13	331	0	1	0	0	0	1	0	**475**
6:30 AM	0	2	139	1	0	0	0	0	2	0	1	3	358	1	0	0	0	0	1	0	**508**
6:45 AM	0	0	191	1	0	0	0	0	3	0	0	0	357	2	0	0	0	0	2	0	**556**
Hourly Total	2	4	527	7	0	0	0	0	10	0	3	18	1339	3	1	0	0	0	4	0	**1917**
7:00 AM	1	0	137	0	0	0	0	0	2	0	3	0	344	1	1	0	0	0	8	0	**496**
7:15 AM	0	0	184	2	0	0	0	0	4	0	2	0	350	1	0	0	0	0	2	0	**545**
7:30 AM	0	0	167	8	0	0	0	0	2	0	1	2	396	0	0	0	0	0	3	0	**579**
7:45 AM	0	0	168	12	0	0	0	0	3	0	0	2	337	1	0	0	0	0	2	0	**525**
Hourly Total	1	0	656	22	0	0	0	0	11	0	6	4	1427	3	1	0	0	0	15	0	**2145**

4 - US 169 & 173rd St
Sand Creek Township, MN
Friday, May 18, 2018

Time	Southbound US 169					Westbound 173rd St					Northbound US 169					Eastbound 173rd St					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
8:00 AM	0	0	147	2	0	0	0	0	6	0	0	1	300	1	0	0	0	0	2	0	**459**
8:15 AM	0	2	141	6	0	0	0	0	4	0	1	3	268	1	0	0	0	0	2	0	**428**
8:30 AM	0	1	190	3	0	0	0	0	4	0	0	1	242	0	0	0	0	0	2	0	**443**
8:45 AM	0	2	185	0	0	0	0	0	1	0	2	4	242	1	0	0	0	0	1	0	**438**
Hourly Total	0	5	663	11	0	0	0	0	15	0	3	9	1052	3	0	0	0	0	7	0	**1768**
9:00 AM	0	1	168	1	0	0	0	0	4	0	1	2	201	0	0	0	0	0	1	0	**379**
9:15 AM	0	0	194	1	0	0	0	0	3	0	0	1	233	0	0	0	0	0	2	0	**434**
9:30 AM	0	0	141	1	0	0	0	0	0	0	0	1	244	2	0	0	0	0	0	0	**389**
9:45 AM	0	0	174	2	0	0	0	0	0	0	2	0	216	0	0	0	0	0	1	0	**395**
Hourly Total	0	1	677	5	0	0	0	0	7	0	3	4	894	2	0	0	0	0	4	0	**1597**
10:00 AM	0	5	186	1	0	0	0	0	2	0	1	0	178	0	0	0	0	0	0	0	**373**
10:15 AM	0	2	175	2	0	0	0	0	5	0	0	0	217	1	0	0	0	0	4	0	**406**
10:30 AM	0	0	220	6	0	0	0	0	2	0	0	0	194	1	0	0	0	0	1	0	**424**
10:45 AM	0	0	183	1	0	0	0	0	3	0	0	0	209	0	0	0	0	0	4	0	**400**
Hourly Total	0	7	764	10	0	0	0	0	12	0	1	0	798	2	0	0	0	0	9	0	**1603**
11:00 AM	0	0	230	1	0	0	0	0	4	0	0	1	184	0	0	0	0	0	0	0	**420**
11:15 AM	0	2	230	3	0	0	0	0	1	0	0	3	237	0	0	0	0	0	3	0	**479**
11:30 AM	0	0	195	1	0	0	0	0	1	0	1	1	236	2	0	0	0	0	2	0	**439**
11:45 AM	2	1	196	2	0	0	0	0	0	0	1	0	215	0	0	0	0	0	0	0	**417**
Hourly Total	2	3	851	7	0	0	0	0	6	0	2	5	872	2	0	0	0	0	5	0	**1755**
12:00 PM	2	0	221	3	0	0	0	0	3	0	0	0	212	0	0	0	0	0	5	0	**446**
12:15 PM	0	1	237	7	0	0	0	0	0	0	2	3	243	0	0	0	0	0	1	0	**494**
12:30 PM	0	1	229	4	0	0	0	0	0	0	0	3	230	0	0	0	0	0	3	0	**470**
12:45 PM	0	1	224	5	0	0	0	0	0	0	0	0	218	0	0	0	0	0	2	0	**450**
Hourly Total	2	3	911	19	0	0	0	0	3	0	2	6	903	0	0	0	0	0	11	0	**1860**
1:00 PM	0	1	261	2	0	0	0	0	1	0	0	1	203	0	0	0	0	0	2	0	**471**
1:15 PM	1	0	269	2	0	0	0	0	0	0	0	1	232	0	0	0	0	0	1	0	**506**
1:30 PM	0	2	264	1	0	0	0	0	2	0	3	2	260	2	0	0	0	0	0	0	**536**
1:45 PM	0	2	229	3	0	0	0	0	0	0	0	7	230	1	0	0	0	0	0	0	**472**
Hourly Total	1	5	1023	8	0	0	0	0	3	0	3	11	925	3	0	0	0	0	3	0	**1985**
2:00 PM	0	1	250	7	0	0	0	0	1	0	1	4	229	0	0	0	0	0	7	0	**500**
2:15 PM	2	1	286	0	0	0	0	0	0	0	1	2	234	1	0	0	0	0	3	0	**530**
2:30 PM	0	0	246	2	0	0	0	0	0	0	1	0	269	1	0	0	0	0	11	0	**530**
2:45 PM	0	0	342	6	0	0	0	0	0	0	1	0	248	1	0	0	0	0	12	0	**610**
Hourly Total	2	2	1124	15	0	0	0	0	1	0	4	6	980	3	0	0	0	0	33	0	**2170**
3:00 PM	0	2	297	3	0	0	0	0	2	0	3	0	293	2	0	0	0	0	3	0	**605**
3:15 PM	0	6	370	4	0	0	0	0	1	0	0	3	274	2	0	0	0	0	1	0	**661**
3:30 PM	0	1	332	2	0	0	0	0	2	0	2	2	303	3	0	0	0	0	3	0	**650**
3:45 PM	0	2	379	8	0	0	0	0	2	0	0	1	251	2	0	0	0	0	3	0	**648**
Hourly Total	0	11	1378	17	0	0	0	0	7	0	5	6	1121	9	0	0	0	0	10	0	**2564**

4 - US 169 & 173rd St
Sand Creek Township, MN
Friday, May 18, 2018

Time	Southbound US 169					Westbound 173rd St					Northbound US 169					Eastbound 173rd St					TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	U Turns	Left Turns	Straight Through	Right Turns	Peds/ Bicycles	
4:00 PM	0	2	345	4	0	0	0	0	1	0	0	1	288	2	0	0	0	0	23	0	**666**
4:15 PM	0	4	373	8	0	0	0	0	0	0	1	0	248	0	0	0	0	0	5	0	**639**
4:30 PM	0	1	360	6	0	0	0	0	3	0	2	1	291	2	0	0	0	0	1	0	**667**
4:45 PM	1	6	379	3	0	0	0	0	1	0	1	1	287	0	0	0	0	0	2	0	**681**
Hourly Total	1	13	1457	21	0	0	0	0	5	0	4	3	1114	4	0	0	0	0	31	0	**2653**
5:00 PM	0	1	338	1	0	0	0	0	2	0	1	0	269	0	0	0	0	0	4	0	**616**
5:15 PM	2	4	362	5	0	0	0	0	0	0	0	0	291	0	0	0	0	0	0	0	**664**
5:30 PM	0	2	340	2	0	0	0	0	2	0	1	0	274	2	0	0	0	0	1	0	**624**
5:45 PM	0	3	341	1	0	0	0	0	2	0	0	1	244	0	0	0	0	0	0	0	**592**
Hourly Total	2	10	1381	9	0	0	0	0	6	0	2	1	1078	2	0	0	0	0	5	0	**2496**
6:00 PM	1	1	258	3	0	0	0	0	1	0	0	0	250	0	0	0	0	0	2	0	**516**
6:15 PM	0	3	280	1	0	0	0	0	2	0	2	1	242	1	0	0	0	0	0	0	**532**
6:30 PM	0	1	216	2	0	0	0	0	1	0	3	1	216	0	0	0	0	0	0	0	**440**
6:45 PM	1	3	237	1	0	0	0	0	3	0	1	1	178	0	0	0	0	0	0	0	**425**
Hourly Total	2	8	991	7	0	0	0	0	7	0	6	3	886	1	0	0	0	0	2	0	**1913**
7:00 PM	0	0	227	3	0	1	0	0	0	0	1	0	215	0	0	0	0	0	3	0	**450**
7:15 PM	0	3	185	1	0	0	0	0	1	0	0	2	183	3	0	0	0	0	1	0	**379**
7:30 PM	0	0	181	1	0	0	0	0	0	0	0	0	164	0	0	0	0	0	0	0	**346**
7:45 PM	0	3	185	1	0	0	0	0	0	0	0	1	140	2	0	0	0	0	0	0	**332**
Hourly Total	0	6	778	6	0	1	0	0	1	0	1	3	702	5	0	0	0	0	4	0	**1507**
8:00 PM	0	0	173	2	0	0	0	0	1	0	2	0	163	1	0	0	0	0	1	0	**343**
8:15 PM	0	2	198	1	0	0	0	0	1	0	1	0	139	3	0	0	0	0	1	0	**346**
8:30 PM	0	1	177	1	0	0	0	0	1	0	1	1	134	1	0	0	0	0	1	0	**318**
8:45 PM	0	4	134	3	0	0	0	0	1	0	0	1	115	1	0	0	0	0	1	0	**260**
Hourly Total	0	7	682	7	0	0	0	0	4	0	4	2	551	6	0	0	0	0	4	0	**1267**
9:00 PM	0	0	161	1	0	0	0	0	0	0	0	0	115	4	0	0	0	0	2	0	**283**
9:15 PM	0	2	136	4	0	0	0	0	1	0	1	0	104	2	0	0	0	0	1	0	**251**
9:30 PM	0	0	140	3	0	0	0	0	1	0	0	0	105	0	0	0	0	0	1	0	**250**
9:45 PM	0	1	133	3	0	0	0	0	0	0	1	3	79	1	0	0	0	0	2	0	**223**
Hourly Total	0	3	570	11	0	0	0	0	2	0	2	3	403	7	0	0	0	0	6	0	**1007**
10:00 PM	0	1	140	2	0	0	0	0	0	0	2	0	91	2	0	0	0	0	3	0	**241**
10:15 PM	0	0	153	1	0	0	0	0	0	0	0	0	95	1	0	0	0	0	0	0	**250**
10:30 PM	0	2	123	1	0	0	0	0	0	0	0	0	55	0	0	0	0	0	1	0	**182**
10:45 PM	0	3	98	1	0	0	0	0	0	0	2	1	65	1	0	0	0	0	1	0	**172**
Hourly Total	0	6	514	5	0	0	0	0	0	0	4	1	306	4	0	0	0	0	5	0	**845**
11:00 PM	0	0	106	1	0	0	0	0	1	0	0	0	72	0	0	0	0	0	2	0	**182**
11:15 PM	0	3	116	1	0	0	0	0	1	0	0	0	39	0	0	0	0	0	1	0	**161**
11:30 PM	1	0	96	2	0	0	0	0	0	0	0	1	48	1	0	0	0	0	0	0	**149**
11:45 PM	0	0	88	0	0	0	0	0	0	0	0	0	40	0	0	0	0	0	0	0	**128**
Hourly Total	1	3	406	4	0	0	0	0	2	0	0	1	199	1	0	0	0	0	3	0	**620**
DAILY TOTAL	**16**	**98**	**16004**	**197**	**0**	**1**	**0**	**0**	**110**	**0**	**65**	**92**	**16967**	**60**	**2**	**0**	**0**	**0**	**173**	**0**	**33783**
Cars	16	95	14414	193	0	1	0	0	104	0	65	90	15519	58	2	0	0	0	168	0	**30723**
Heavy Vehicles	0	3	1590	4	0	0	0	0	6	0	0	2	1448	2	0	0	0	0	5	0	**3060**
Heavy Vehicle %	0.00%	3.06%	9.94%	2.03%	0.00%	0.00%	0.00%	0.00%	5.45%	0.00%	0.00%	2.17%	8.53%	3.33%	0.00%	0.00%	0.00%	0.00%	2.89%	0.00%	**9.06%**

4 - US 169 & 173rd St
Sand Creek Township, MN
Friday, May 18, 2018

AM Peak Hour

Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Peds/ Bicycles	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Peds/ Bicycles	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Peds/ Bicycles	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Peds/ Bicycles	TOTAL
6:45 AM	0	0	191	1	0	0	0	0	3	0	0	0	357	2	0	0	0	0	2	0	**556**
7:00 AM	1	0	137	0	0	0	0	0	2	0	3	0	344	1	1	0	0	0	8	0	**496**
7:15 AM	0	0	184	2	0	0	0	0	4	0	2	0	350	1	0	0	0	0	2	0	**545**
7:30 AM	0	0	167	8	0	0	0	0	2	0	1	2	396	0	0	0	0	0	3	0	**579**
Peak Hour Total	1	0	679	11	0	0	0	0	11	0	6	2	1447	4	1	0	0	0	15	0	**2176**
PHF	0.250	0.000	0.889	0.344	0.000	0.000	0.000	0.000	0.688	0.000	0.500	0.250	0.914	0.500	0.250	0.000	0.000	0.000	0.469	0.000	**0.940**

PM Peak Hour

Time	Southbound U Turns	Southbound Left Turns	Southbound Straight Through	Southbound Right Turns	Southbound Peds/ Bicycles	Westbound U Turns	Westbound Left Turns	Westbound Straight Through	Westbound Right Turns	Westbound Peds/ Bicycles	Northbound U Turns	Northbound Left Turns	Northbound Straight Through	Northbound Right Turns	Northbound Peds/ Bicycles	Eastbound U Turns	Eastbound Left Turns	Eastbound Straight Through	Eastbound Right Turns	Eastbound Peds/ Bicycles	TOTAL
4:00 PM	0	2	345	4	0	0	0	0	1	0	0	1	288	2	0	0	0	0	23	0	**666**
4:15 PM	0	4	373	8	0	0	0	0	0	0	1	0	248	0	0	0	0	0	5	0	**639**
4:30 PM	0	1	360	6	0	0	0	0	3	0	2	1	291	2	0	0	0	0	1	0	**667**
4:45 PM	1	6	379	3	0	0	0	0	1	0	1	1	287	0	0	0	0	0	2	0	**681**
Peak Hour Total	1	13	1457	21	0	0	0	0	5	0	4	3	1114	4	0	0	0	0	31	0	**2653**
PHF	0.250	0.542	0.961	0.656	0.000	0.000	0.000	0.000	0.417	0.000	0.500	0.750	0.957	0.500	0.000	0.000	0.000	0.000	0.337	0.000	**0.974**

Daily Volumes

Total Vehicles On Leg 33408

Vehicles Entering Intersection 16315			Vehicles Exiting Intersection 17093	
Southbound				
Cars	193	14414	95	16	0
Heavy	4	1590	3	0	0
Total	**197**	**16004**	**98**	**16**	**0**

Eastbound

Total Vehicles on Leg 462

Vehicles Entering Intersection 173

Vehicles Exiting Intersection 289

Cars	Heavy	Total
0	0	**0**
0	0	**0**
0	0	**0**
0	0	**0**
168	5	**173**

Westbound

Total Vehicles on Leg 270

Vehicles Entering Intersection 111

Vehicles Exiting Intersection 159

Cars	Heavy	Total
104	6	**110**
0	0	**0**
0	0	**0**
1	0	**1**
0	0	**0**

Northbound

Cars	2	65	90	15519	58
Heavy	0	0	2	1448	2
Total	**2**	**65**	**92**	**16967**	**60**

Vehicles Entering Intersection 17184	Vehicles Exiting Intersection 16242

Total Vehicles On Leg 33426

1: W 166th Street & TH 169 SB Performance by movement

Movement	EBT	WBL	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.1	0.0	0.0	0.0
Total Del/Veh (s)	11.0	6.0	3.1	1.2	0.9	0.3	1.0

2: TH TH 169 NB/TH 169 NB & W 166th Street Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.7	0.1	0.1	0.1	0.0	0.0	0.2	0.0
Total Del/Veh (s)	8.8	11.1	22.9	17.8	2.9	4.3	3.6	4.6

13: TH 169 SB & Bluff Drive Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	11.6	6.2	3.2	3.5	1.2	0.5	0.0	0.9

14: TH 169 NB & Bluff Drive Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	11.3	12.4	26.8	10.8	1.3	2.7	1.1	3.0

21: TH 169 SB Performance by movement

Movement	EBR	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	1.9	0.2	0.0	0.3

24: TH 169 NB/TH TH 169 NB & 173rd Street W Performance by movement

Movement	EBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	24.4	13.6	0.4	1.4	0.2	1.5

25: 173rd Street W & TH 169 SB Performance by movement

Movement	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	3.5	2.5	3.0	2.8	0.3	0.0	0.4

28: TH 169 SB Performance by movement

Movement	SBT	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	1.4	1.4

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	11.4

Intersection: 1: W 166th Street & TH 169 SB

Movement	EB	WB	SB
Directions Served	TR	LT	L
Maximum Queue (ft)	63	50	10
Average Queue (ft)	8	4	0
95th Queue (ft)	40	26	6
Link Distance (ft)	406	41	
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			280
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: TH TH 169 NB/TH 169 NB & W 166th Street

Movement	EB	WB
Directions Served	LT	TR
Maximum Queue (ft)	55	88
Average Queue (ft)	13	24
95th Queue (ft)	44	67
Link Distance (ft)	41	447
Upstream Blk Time (%)	2	
Queuing Penalty (veh)	1	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: TH 169 SB & Bluff Drive

Movement	EB	WB	SB
Directions Served	TR	LT	L
Maximum Queue (ft)	96	55	10
Average Queue (ft)	24	10	0
95th Queue (ft)	70	35	5
Link Distance (ft)	210	34	
Upstream Blk Time (%)		1	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			310
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 14: TH 169 NB & Bluff Drive

Movement	EB	WB	NB	NB
Directions Served	LT	TR	L	T
Maximum Queue (ft)	69	51	5	4
Average Queue (ft)	23	13	0	0
95th Queue (ft)	62	38	4	3
Link Distance (ft)	34	211		1817
Upstream Blk Time (%)	7			
Queuing Penalty (veh)	3			
Storage Bay Dist (ft)			280	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 21: TH 169 SB

Movement	EB
Directions Served	R
Maximum Queue (ft)	64
Average Queue (ft)	5
95th Queue (ft)	30
Link Distance (ft)	-4
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 24: TH 169 NB/TH TH 169 NB & 173rd Street W

Movement	EB	WB	NB
Directions Served	LT	R	L
Maximum Queue (ft)	52	36	6
Average Queue (ft)	6	11	0
95th Queue (ft)	30	34	4
Link Distance (ft)	19	1596	
Upstream Blk Time (%)	3		
Queuing Penalty (veh)	0		
Storage Bay Dist (ft)			540
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 25: 173rd Street W & TH 169 SB

Movement	EB	WB	SB
Directions Served	R	LT	L
Maximum Queue (ft)	35	39	12
Average Queue (ft)	8	4	1
95th Queue (ft)	31	22	12
Link Distance (ft)	1206	19	341
Upstream Blk Time (%)		1	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 28: TH 169 SB

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 4

1: W 166th Street & TH 169 SB Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	1.2	0.0	0.0	0.1
Total Del/Veh (s)	11.4	10.5	12.9	20.0	1.4	2.0	1.0	2.3

2: TH TH 169 NB/TH 169 NB & W 166th Street Performance by movement

Movement	EBL	EBT	WBT	WBR	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.1	0.1	0.2	0.0	0.0	0.0
Total Del/Veh (s)	8.3	7.1	14.1	7.3	3.1	2.5	3.6

13: TH 169 SB & Bluff Drive Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	22.8	11.7	11.2	19.3	0.1	1.0	0.1	1.6

14: TH 169 NB & Bluff Drive Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	5.8	9.1	17.4	6.8	4.7	1.9	1.1	2.2

21: TH 169 SB Performance by movement

Movement	EBR	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	5.5	0.5	0.5

24: TH 169 NB/TH TH 169 NB & 173rd Street W Performance by movement

Movement	EBL	EBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)		0.0	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)		7.2	4.7	0.2	0.8	0.3	0.9

25: 173rd Street W & TH 169 SB Performance by movement

Movement	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	13.0	10.3	15.5	1.4	0.6	0.0	0.9

28: TH 169 SB Performance by movement

Movement	SBT	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	2.6	2.6

Total Network Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	10.1

Intersection: 1: W 166th Street & TH 169 SB

Movement	EB	WB	SB
Directions Served	TR	LT	L
Maximum Queue (ft)	67	57	48
Average Queue (ft)	9	18	3
95th Queue (ft)	40	48	25
Link Distance (ft)	406	41	
Upstream Blk Time (%)		2	
Queuing Penalty (veh)		1	
Storage Bay Dist (ft)			280
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: TH TH 169 NB/TH 169 NB & W 166th Street

Movement	EB	WB	NB
Directions Served	LT	TR	LT
Maximum Queue (ft)	74	79	4
Average Queue (ft)	23	29	0
95th Queue (ft)	63	63	3
Link Distance (ft)	41	447	3781
Upstream Blk Time (%)	4		
Queuing Penalty (veh)	1		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 13: TH 169 SB & Bluff Drive

Movement	EB	WB	SB
Directions Served	TR	LT	R
Maximum Queue (ft)	104	64	4
Average Queue (ft)	28	15	0
95th Queue (ft)	73	51	0
Link Distance (ft)	210	34	
Upstream Blk Time (%)	0	6	
Queuing Penalty (veh)	0	1	
Storage Bay Dist (ft)			280
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 14: TH 169 NB & Bluff Drive

Movement	EB	WB	NB
Directions Served	LT	TR	L
Maximum Queue (ft)	57	40	22
Average Queue (ft)	19	8	1
95th Queue (ft)	49	26	13
Link Distance (ft)	34	211	
Upstream Blk Time (%)	4		
Queuing Penalty (veh)	2		
Storage Bay Dist (ft)			280
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 21: TH 169 SB

Movement	EB
Directions Served	R
Maximum Queue (ft)	49
Average Queue (ft)	15
95th Queue (ft)	41
Link Distance (ft)	5
Upstream Blk Time (%)	2
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 24: TH 169 NB/TH TH 169 NB & 173rd Street W

Movement	EB	WB
Directions Served	LT	R
Maximum Queue (ft)	27	25
Average Queue (ft)	6	3
95th Queue (ft)	23	18
Link Distance (ft)	19	1596
Upstream Blk Time (%)	2	
Queuing Penalty (veh)	1	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 25: 173rd Street W & TH 169 SB

Movement	EB	WB	SB
Directions Served	R	LT	L
Maximum Queue (ft)	66	26	14
Average Queue (ft)	16	4	1
95th Queue (ft)	50	19	9
Link Distance (ft)	1206	19	340
Upstream Blk Time (%)		2	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 28: TH 169 SB

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 6

1: W 166th Street & TH 169 SB Performance by movement

Movement	EBT	WBL	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	33.4	8.0	5.5	3.9	1.2	0.3	1.6

2: TH TH 169 NB/TH 169 NB & W 166th Street Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.0	0.0	0.2	0.0
Total Del/Veh (s)	15.7	26.6	41.2	38.0	4.2	5.6	5.9	6.2

13: TH 169 SB & Bluff Drive Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	15.7	6.1	4.9	6.3	1.5	0.6	0.0	1.2

14: TH 169 NB & Bluff Drive Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0
Total Del/Veh (s)	18.5	23.3	50.9	25.3	1.2	3.4	2.6	4.0

21: TH 169 SB Performance by movement

Movement	EBR	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	1.8	0.3	0.0	0.3

24: TH 169 NB/TH TH 169 NB & 173rd Street W Performance by movement

Movement	EBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	31.5	19.7	0.5	1.9	0.3	2.1

25: 173rd Street W & TH 169 SB Performance by movement

Movement	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	5.2	2.1	4.0	1.3	0.3	0.0	0.5

28: TH 169 SB Performance by movement

Movement	SBT	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	1.8	1.8

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	14.7

Intersection: 1: W 166th Street & TH 169 SB

Movement	EB	WB	SB
Directions Served	TR	LT	L
Maximum Queue (ft)	96	54	19
Average Queue (ft)	14	6	1
95th Queue (ft)	61	31	11
Link Distance (ft)	406	41	
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			280
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: TH TH 169 NB/TH 169 NB & W 166th Street

Movement	EB	WB	NB	NB
Directions Served	LT	TR	LT	T
Maximum Queue (ft)	74	131	10	4
Average Queue (ft)	22	30	0	0
95th Queue (ft)	61	86	5	3
Link Distance (ft)	41	447	3781	3781
Upstream Blk Time (%)	7			
Queuing Penalty (veh)	2			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 13: TH 169 SB & Bluff Drive

Movement	EB	WB	SB
Directions Served	TR	LT	L
Maximum Queue (ft)	97	64	20
Average Queue (ft)	32	15	1
95th Queue (ft)	76	45	11
Link Distance (ft)	210	34	
Upstream Blk Time (%)		3	
Queuing Penalty (veh)		1	
Storage Bay Dist (ft)			310
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 14: TH 169 NB & Bluff Drive

Movement	EB	WB	NB
Directions Served	LT	TR	L
Maximum Queue (ft)	66	43	6
Average Queue (ft)	32	13	0
95th Queue (ft)	66	36	6
Link Distance (ft)	34	211	
Upstream Blk Time (%)	18		
Queuing Penalty (veh)	7		
Storage Bay Dist (ft)			280
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 21: TH 169 SB

Movement	EB
Directions Served	R
Maximum Queue (ft)	57
Average Queue (ft)	4
95th Queue (ft)	26
Link Distance (ft)	6
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 24: TH 169 NB/TH TH 169 NB & 173rd Street W

Movement	EB	WB
Directions Served	LT	R
Maximum Queue (ft)	47	61
Average Queue (ft)	5	13
95th Queue (ft)	25	42
Link Distance (ft)	19	1596
Upstream Blk Time (%)	6	
Queuing Penalty (veh)	1	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 25: 173rd Street W & TH 169 SB

Movement	EB	WB	SB
Directions Served	R	LT	L
Maximum Queue (ft)	53	36	10
Average Queue (ft)	12	4	0
95th Queue (ft)	39	20	5
Link Distance (ft)	1206	19	345
Upstream Blk Time (%)		1	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 28: TH 169 SB

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 11

1: W 166th Street & TH 169 SB Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.5	0.0	0.0	0.0
Total Del/Veh (s)	46.8	15.0	16.0	16.7	1.6	2.7	0.3	3.0

2: TH TH 169 NB/TH 169 NB & W 166th Street Performance by movement

Movement	EBL	EBT	WBT	WBR	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)	2.5	8.9	18.5	11.9	3.6	3.0	4.3

13: TH 169 SB & Bluff Drive Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	29.9	16.3	27.0	23.7	0.1	1.2	0.1	2.0

14: TH 169 NB & Bluff Drive Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
Total Del/Veh (s)	6.7	10.5	14.3	7.8	1.4	2.3	1.3	2.5

21: TH 169 SB Performance by movement

Movement	EBR	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	6.3	0.7	0.7

24: TH 169 NB/TH TH 169 NB & 173rd Street W Performance by movement

Movement	EBL	EBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	11.9	12.4	7.2	0.4	1.1	0.2	1.2

25: 173rd Street W & TH 169 SB Performance by movement

Movement	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.2	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	15.8	12.0	15.7	0.2	0.8	0.0	1.1

28: TH 169 SB Performance by movement

Movement	SBT	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	3.7	3.7

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	13.7

Intersection: 1: W 166th Street & TH 169 SB

Movement	EB	WB	SB
Directions Served	TR	LT	L
Maximum Queue (ft)	63	68	36
Average Queue (ft)	12	25	2
95th Queue (ft)	46	59	17
Link Distance (ft)	406	41	
Upstream Blk Time (%)		4	
Queuing Penalty (veh)		1	
Storage Bay Dist (ft)			280
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: TH TH 169 NB/TH 169 NB & W 166th Street

Movement	EB	WB	NB
Directions Served	LT	TR	T
Maximum Queue (ft)	72	88	8
Average Queue (ft)	28	35	0
95th Queue (ft)	66	72	4
Link Distance (ft)	41	447	3781
Upstream Blk Time (%)	5		
Queuing Penalty (veh)	2		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 13: TH 169 SB & Bluff Drive

Movement	EB	WB	SB
Directions Served	TR	LT	T
Maximum Queue (ft)	88	65	4
Average Queue (ft)	32	20	0
95th Queue (ft)	73	56	3
Link Distance (ft)	210	34	878
Upstream Blk Time (%)		10	
Queuing Penalty (veh)		2	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 14: TH 169 NB & Bluff Drive

Movement	EB	WB	NB
Directions Served	LT	TR	L
Maximum Queue (ft)	63	27	27
Average Queue (ft)	21	9	1
95th Queue (ft)	52	27	13
Link Distance (ft)	34	211	
Upstream Blk Time (%)	6		
Queuing Penalty (veh)	3		
Storage Bay Dist (ft)			280
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 21: TH 169 SB

Movement	EB
Directions Served	R
Maximum Queue (ft)	50
Average Queue (ft)	15
95th Queue (ft)	42
Link Distance (ft)	5
Upstream Blk Time (%)	3
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 24: TH 169 NB/TH TH 169 NB & 173rd Street W

Movement	EB	WB	NB
Directions Served	LT	R	L
Maximum Queue (ft)	27	31	4
Average Queue (ft)	9	5	0
95th Queue (ft)	28	23	3
Link Distance (ft)	19	1596	
Upstream Blk Time (%)	5		
Queuing Penalty (veh)	1		
Storage Bay Dist (ft)			540
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 25: 173rd Street W & TH 169 SB

Movement	EB	WB	SB
Directions Served	R	LT	L
Maximum Queue (ft)	66	26	5
Average Queue (ft)	27	7	0
95th Queue (ft)	57	24	6
Link Distance (ft)	1206	19	340
Upstream Blk Time (%)		3	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 28: TH 169 SB

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
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 169 SB & W 166th Street Performance by movement

Movement	EBR	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0
Total Del/Veh (s)	2.2	1.1	0.5	1.1

2: Jordan Ave SE & Bluff Drive Performance by movement

Movement	WBL	WBT	WBR	NBR	SBL	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	4.2	0.0	2.3	0.1	1.5	2.3

13: TH 169 SB & Bluff Drive Performance by movement

Movement	EBR	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.3	0.5	0.1	0.6

14: TH 169 NB & Bluff Drive Performance by movement

Movement	WBT	WBR	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	0.1	3.0	4.5	4.1	4.4

16: Berkshire Ave & Bluff Drive Performance by movement

Movement	EBT	EBR	WBT	NBL	NBT	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	0.0	0.0
Total Del/Veh (s)	0.2	0.0	0.0	4.3	0.0	1.0

24: TH 169 NB & 173rd Street W Performance by movement

Movement	EBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	15.2	2.3	0.5	1.8	0.6	1.8

25: TH 169 SB & 173rd Street W Performance by movement

Movement	EBR	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.3	3.3	0.9	1.1	0.5	1.2

26: 173rd Street W & Jordan Ave SE Performance by movement

Movement	EBT	WBT	WBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.1	0.4	0.5	4.8	0.1	0.3

31: Berkshire Ave & W 166th Street Performance by movement

Movement	EBL	WBR	NBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.4	2.8	0.0	1.8	0.1	0.0	1.5

33: TH 169 SB & TA3 Performance by movement

Movement	WBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	4.5	0.3	0.4

35: TH 169 NB & TA3 Performance by movement

Movement	NBL	NBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.1	0.8	0.8

36: TH 169 SB & TA4 Performance by movement

Movement	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	13.1	0.3	1.2

37: TH 169 NB & TA4 Performance by movement

Movement	EBL	NBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	21.8	1.3	2.0

38: TH 169 NB & TA2 Performance by movement

Movement	NBL	NBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	1.2	1.0	1.0

39: TA1 & TH 169 NB Performance by movement

Movement	EBL	NBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	10.6	0.2	0.2

40: TH 169 SB & TA2 Performance by movement

Movement	WBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	5.0	0.1	0.2

41: TA1 & TH 169 SB Performance by movement

Movement	SBL	SBT	All
Denied Del/Veh (s)	3.0	0.1	0.2
Total Del/Veh (s)	0.2	0.7	0.7

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	13.1

Intersection: 1: TH 169 SB & W 166th Street

Movement	EB
Directions Served	R
Maximum Queue (ft)	63
Average Queue (ft)	11
95th Queue (ft)	46
Link Distance (ft)	398
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Jordan Ave SE & Bluff Drive

Movement	WB
Directions Served	LR
Maximum Queue (ft)	72
Average Queue (ft)	23
95th Queue (ft)	58
Link Distance (ft)	866
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 13: TH 169 SB & Bluff Drive

Movement	EB
Directions Served	R
Maximum Queue (ft)	76
Average Queue (ft)	22
95th Queue (ft)	63
Link Distance (ft)	216
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 14: TH 169 NB & Bluff Drive

Movement	WB
Directions Served	R
Maximum Queue (ft)	70
Average Queue (ft)	27
95th Queue (ft)	60
Link Distance (ft)	483
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Berkshire Ave & Bluff Drive

Movement	NB
Directions Served	LR
Maximum Queue (ft)	74
Average Queue (ft)	23
95th Queue (ft)	61
Link Distance (ft)	554
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 24: TH 169 NB & 173rd Street W

Movement	EB	WB
Directions Served	LT	R
Maximum Queue (ft)	43	53
Average Queue (ft)	6	12
95th Queue (ft)	26	37
Link Distance (ft)	17	1579
Upstream Blk Time (%)	3	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 25: TH 169 SB & 173rd Street W

Movement	EB	WB	SB
Directions Served	R	LT	L
Maximum Queue (ft)	44	28	9
Average Queue (ft)	11	2	0
95th Queue (ft)	36	13	5
Link Distance (ft)	731	17	
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			470
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 26: 173rd Street W & Jordan Ave SE

Movement	SB
Directions Served	LR
Maximum Queue (ft)	22
Average Queue (ft)	2
95th Queue (ft)	14
Link Distance (ft)	619
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: Berkshire Ave & W 166th Street

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	54	36	6
Average Queue (ft)	6	11	0
95th Queue (ft)	30	36	5
Link Distance (ft)	390	225	1231
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 33: TH 169 SB & TA3

Movement	WB
Directions Served	L
Maximum Queue (ft)	31
Average Queue (ft)	2
95th Queue (ft)	16
Link Distance (ft)	28
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 35: TH 169 NB & TA3

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 36: TH 169 SB & TA4

Movement	SB	SB
Directions Served	L	T
Maximum Queue (ft)	123	52
Average Queue (ft)	26	2
95th Queue (ft)	86	26
Link Distance (ft)		355
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	250	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 37: TH 169 NB & TA4

Movement	EB
Directions Served	L
Maximum Queue (ft)	82
Average Queue (ft)	42
95th Queue (ft)	79
Link Distance (ft)	21
Upstream Blk Time (%)	31
Queuing Penalty (veh)	16
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 38: TH 169 NB & TA2

Movement	NB
Directions Served	L
Maximum Queue (ft)	26
Average Queue (ft)	1
95th Queue (ft)	11
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	500
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 39: TA1 & TH 169 NB

Movement	EB
Directions Served	L
Maximum Queue (ft)	30
Average Queue (ft)	2
95th Queue (ft)	15
Link Distance (ft)	26
Upstream Blk Time (%)	1
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 40: TH 169 SB & TA2

Movement	WB
Directions Served	L
Maximum Queue (ft)	69
Average Queue (ft)	19
95th Queue (ft)	59
Link Distance (ft)	22
Upstream Blk Time (%)	3
Queuing Penalty (veh)	1
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 41: TA1 & TH 169 SB

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 17

1: TH 169 SB & W 166th Street Performance by movement

Movement	EBR	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0
Total Del/Veh (s)	2.1	0.7	0.1	0.7

2: Jordan Ave SE & Bluff Drive Performance by movement

Movement	WBL	WBR	NBR	SBL	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.1
Total Del/Veh (s)	4.3	2.2	0.3	2.7	2.2

13: TH 169 SB & Bluff Drive Performance by movement

Movement	EBR	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.5	0.0
Total Del/Veh (s)	2.6	1.0	0.1	1.0

14: TH 169 NB & Bluff Drive Performance by movement

Movement	WBR	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	3.2	3.3	2.1	3.2

16: Berkshire Ave & Bluff Drive Performance by movement

Movement	EBT	EBR	WBT	NBL	All
Denied Del/Veh (s)	0.0	0.1	0.1	0.0	0.0
Total Del/Veh (s)	0.2	0.1	0.0	4.6	1.8

24: TH 169 NB & 173rd Street W Performance by movement

Movement	EBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	7.8	2.3	0.2	1.1	0.3	1.1

25: TH 169 SB & 173rd Street W Performance by movement

Movement	EBT	EBR	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	1.6	2.6	6.6	1.0	2.1	1.3	2.1

26: 173rd Street W & Jordan Ave SE Performance by movement

Movement	EBT	WBT	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.1	0.1	4.5	0.1	0.9

31: Berkshire Ave & W 166th Street Performance by movement

Movement	EBL	WBR	NBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.0	0.0	0.0	0.1
Total Del/Veh (s)	4.7	2.8	0.1	1.9	0.3	0.1	1.8

33: TH 169 SB & TA3 Performance by movement

Movement	WBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	10.2	0.6	0.6

35: TH 169 NB & TA3 Performance by movement

Movement	NBL	NBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.2	0.5	0.5

36: TH 169 SB & TA4 Performance by movement

Movement	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.6	0.5	0.6

37: TH 169 NB & TA4 Performance by movement

Movement	EBL	NBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	7.9	0.9	1.4

38: TH 169 NB & TA2 Performance by movement

Movement	NBL	NBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.9	0.6	0.6

39: TA1 & TH 169 NB Performance by movement

Movement	EBL	NBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	3.0	0.1	0.1

40: TH 169 SB & TA2 Performance by movement

Movement	WBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	11.6	0.1	0.4

41: TA1 & TH 169 SB Performance by movement

Movement	SBL	SBT	All
Denied Del/Veh (s)	2.6	0.3	0.3
Total Del/Veh (s)	0.2	0.9	0.9

Total Network Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	12.1

Intersection: 1: TH 169 SB & W 166th Street

Movement	EB
Directions Served	R
Maximum Queue (ft)	47
Average Queue (ft)	8
95th Queue (ft)	33
Link Distance (ft)	399
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Jordan Ave SE & Bluff Drive

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	88	25
Average Queue (ft)	35	1
95th Queue (ft)	78	10
Link Distance (ft)	866	402
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: TH 169 SB & Bluff Drive

Movement	EB
Directions Served	R
Maximum Queue (ft)	61
Average Queue (ft)	26
95th Queue (ft)	54
Link Distance (ft)	218
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 14: TH 169 NB & Bluff Drive

Movement	WB
Directions Served	R
Maximum Queue (ft)	74
Average Queue (ft)	32
95th Queue (ft)	60
Link Distance (ft)	483
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Berkshire Ave & Bluff Drive

Movement	NB
Directions Served	LR
Maximum Queue (ft)	86
Average Queue (ft)	36
95th Queue (ft)	68
Link Distance (ft)	554
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 24: TH 169 NB & 173rd Street W

Movement	EB	WB
Directions Served	LT	R
Maximum Queue (ft)	27	27
Average Queue (ft)	8	4
95th Queue (ft)	25	19
Link Distance (ft)	17	1579
Upstream Blk Time (%)	2	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 25: TH 169 SB & 173rd Street W

Movement	EB	WB
Directions Served	R	LT
Maximum Queue (ft)	38	18
Average Queue (ft)	23	1
95th Queue (ft)	40	7
Link Distance (ft)	731	17
Upstream Blk Time (%)		0
Queuing Penalty (veh)		0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 26: 173rd Street W & Jordan Ave SE

Movement	SB
Directions Served	LR
Maximum Queue (ft)	53
Average Queue (ft)	15
95th Queue (ft)	43
Link Distance (ft)	619
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: Berkshire Ave & W 166th Street

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	74	36	18
Average Queue (ft)	18	18	1
95th Queue (ft)	60	43	9
Link Distance (ft)	390	225	1231
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 33: TH 169 SB & TA3

Movement	WB
Directions Served	L
Maximum Queue (ft)	31
Average Queue (ft)	3
95th Queue (ft)	17
Link Distance (ft)	28
Upstream Blk Time (%)	1
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 35: TH 169 NB & TA3

Movement	NB
Directions Served	L
Maximum Queue (ft)	5
Average Queue (ft)	0
95th Queue (ft)	3
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	400
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 36: TH 169 SB & TA4

Movement	SB	SB
Directions Served	L	T
Maximum Queue (ft)	68	36
Average Queue (ft)	12	1
95th Queue (ft)	46	13
Link Distance (ft)		355
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	200	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 37: TH 169 NB & TA4

Movement	EB
Directions Served	L
Maximum Queue (ft)	69
Average Queue (ft)	36
95th Queue (ft)	63
Link Distance (ft)	21
Upstream Blk Time (%)	16
Queuing Penalty (veh)	12
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 38: TH 169 NB & TA2

Movement	NB	NB
Directions Served	L	T
Maximum Queue (ft)	63	16
Average Queue (ft)	8	1
95th Queue (ft)	38	12
Link Distance (ft)		557
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	400	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 39: TA1 & TH 169 NB

Movement	EB
Directions Served	L
Maximum Queue (ft)	6
Average Queue (ft)	0
95th Queue (ft)	6
Link Distance (ft)	26
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 40: TH 169 SB & TA2

Movement	WB
Directions Served	L
Maximum Queue (ft)	68
Average Queue (ft)	29
95th Queue (ft)	62
Link Distance (ft)	22
Upstream Blk Time (%)	13
Queuing Penalty (veh)	6
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 41: TA1 & TH 169 SB

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 18

1: TH 169 SB & W 166th Street Performance by movement

Movement	EBR	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.1	0.0
Total Del/Veh (s)	2.2	1.2	0.9	1.2

2: Jordan Ave SE & Bluff Drive Performance by movement

Movement	WBL	WBT	WBR	NBR	SBL	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	4.0	0.3	2.0	0.1	2.3	2.2

13: TH 169 SB & Bluff Drive Performance by movement

Movement	EBR	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.7	0.6	0.1	0.7

14: TH 169 NB & Bluff Drive Performance by movement

Movement	WBR	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.8	5.6	5.3	5.5

16: Berkshire Ave & Bluff Drive Performance by movement

Movement	EBT	EBR	WBT	NBL	NBT	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	0.0	0.0
Total Del/Veh (s)	0.2	0.1	0.1	4.2	0.0	1.1

24: TH 169 NB & 173rd Street W Performance by movement

Movement	EBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	26.8	2.4	0.5	2.6	0.6	2.7

25: TH 169 SB & 173rd Street W Performance by movement

Movement	EBR	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.3	4.9	2.8	1.3	0.6	1.4

26: 173rd Street W & Jordan Ave SE Performance by movement

Movement	EBT	WBT	WBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.0	0.4	0.7	4.3	0.0	0.3

31: Berkshire Ave & W 166th Street Performance by movement

Movement	EBL	WBR	NBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.7	2.7	0.0	1.8	0.5	0.0	1.7

33: TH 169 SB & TA3 Performance by movement

Movement	WBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	4.3	0.4	0.4

35: TH 169 NB & TA3 Performance by movement

Movement	NBL	NBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.1	1.0	1.0

36: TH 169 SB & TA4 Performance by movement

Movement	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	74.1	0.9	5.6

37: TH 169 NB & TA4 Performance by movement

Movement	EBL	NBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	36.9	1.9	2.8

38: TH 169 NB & TA2 Performance by movement

Movement	NBL	NBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.9	1.2	1.2

39: TA1 & TH 169 NB Performance by movement

Movement	EBL	NBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	31.2	0.2	0.3

40: TH 169 SB & TA2 Performance by movement

Movement	WBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	5.3	0.1	0.3

41: TA1 & TH 169 SB Performance by movement

Movement	SBL	SBT	All
Denied Del/Veh (s)	2.4	0.2	0.2
Total Del/Veh (s)	3.8	0.7	0.7

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	18.2

Intersection: 1: TH 169 SB & W 166th Street

Movement	EB
Directions Served	R
Maximum Queue (ft)	69
Average Queue (ft)	11
95th Queue (ft)	48
Link Distance (ft)	398
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Jordan Ave SE & Bluff Drive

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	62	6
Average Queue (ft)	26	0
95th Queue (ft)	58	0
Link Distance (ft)	866	402
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: TH 169 SB & Bluff Drive

Movement	EB
Directions Served	R
Maximum Queue (ft)	78
Average Queue (ft)	30
95th Queue (ft)	69
Link Distance (ft)	216
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 14: TH 169 NB & Bluff Drive

Movement	WB
Directions Served	R
Maximum Queue (ft)	64
Average Queue (ft)	27
95th Queue (ft)	58
Link Distance (ft)	483
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Berkshire Ave & Bluff Drive

Movement	NB
Directions Served	LR
Maximum Queue (ft)	67
Average Queue (ft)	24
95th Queue (ft)	60
Link Distance (ft)	554
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 24: TH 169 NB & 173rd Street W

Movement	EB	WB
Directions Served	LT	R
Maximum Queue (ft)	25	44
Average Queue (ft)	4	11
95th Queue (ft)	19	35
Link Distance (ft)	17	1579
Upstream Blk Time (%)	4	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 25: TH 169 SB & 173rd Street W

Movement	EB	WB	SB
Directions Served	R	LT	L
Maximum Queue (ft)	53	23	5
Average Queue (ft)	13	2	0
95th Queue (ft)	40	12	4
Link Distance (ft)	731	17	
Upstream Blk Time (%)		1	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			470
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 26: 173rd Street W & Jordan Ave SE

Movement	SB
Directions Served	LR
Maximum Queue (ft)	52
Average Queue (ft)	3
95th Queue (ft)	24
Link Distance (ft)	619
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: Berkshire Ave & W 166th Street

Movement	EB	WB
Directions Served	LTR	LTR
Maximum Queue (ft)	47	31
Average Queue (ft)	6	13
95th Queue (ft)	29	38
Link Distance (ft)	390	225
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 33: TH 169 SB & TA3

Movement	WB
Directions Served	L
Maximum Queue (ft)	31
Average Queue (ft)	4
95th Queue (ft)	20
Link Distance (ft)	28
Upstream Blk Time (%)	1
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 35: TH 169 NB & TA3

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 36: TH 169 SB & TA4

Movement	SB	SB	SB
Directions Served	L	T	T
Maximum Queue (ft)	192	197	148
Average Queue (ft)	56	28	12
95th Queue (ft)	159	126	82
Link Distance (ft)		355	355
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	250		
Storage Blk Time (%)	1		
Queuing Penalty (veh)	4		

Intersection: 37: TH 169 NB & TA4

Movement	EB
Directions Served	L
Maximum Queue (ft)	76
Average Queue (ft)	42
95th Queue (ft)	72
Link Distance (ft)	21
Upstream Blk Time (%)	57
Queuing Penalty (veh)	35
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 38: TH 169 NB & TA2

Movement	NB
Directions Served	L
Maximum Queue (ft)	53
Average Queue (ft)	3
95th Queue (ft)	20
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	500
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 39: TA1 & TH 169 NB

Movement	EB
Directions Served	L
Maximum Queue (ft)	30
Average Queue (ft)	6
95th Queue (ft)	24
Link Distance (ft)	26
Upstream Blk Time (%)	5
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 40: TH 169 SB & TA2

Movement	WB
Directions Served	L
Maximum Queue (ft)	69
Average Queue (ft)	26
95th Queue (ft)	65
Link Distance (ft)	22
Upstream Blk Time (%)	5
Queuing Penalty (veh)	2
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 41: TA1 & TH 169 SB

Movement	SB
Directions Served	L
Maximum Queue (ft)	16
Average Queue (ft)	1
95th Queue (ft)	7
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	600
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 41

1: TH 169 SB & W 166th Street Performance by movement

Movement	EBR	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0
Total Del/Veh (s)	2.3	1.0	0.0	1.0

2: Jordan Ave SE & Bluff Drive Performance by movement

Movement	WBL	WBR	NBR	SBL	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.1
Total Del/Veh (s)	4.3	2.5	0.3	1.8	2.1

13: TH 169 SB & Bluff Drive Performance by movement

Movement	EBR	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.6	0.0
Total Del/Veh (s)	2.5	1.3	0.2	1.3

14: TH 169 NB & Bluff Drive Performance by movement

Movement	WBT	WBR	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	2.3	3.2	3.8	2.9	3.7

16: Berkshire Ave & Bluff Drive Performance by movement

Movement	EBT	EBR	WBT	NBL	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	0.0
Total Del/Veh (s)	0.2	0.2	0.0	4.4	1.7

24: TH 169 NB & 173rd Street W Performance by movement

Movement	EBL	EBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)		0.0	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)		11.8	2.1	0.1	1.3	0.7	1.5

25: TH 169 SB & 173rd Street W Performance by movement

Movement	EBT	EBR	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.1	2.6	33.2	2.0	2.7	1.5	2.8

26: 173rd Street W & Jordan Ave SE Performance by movement

Movement	EBT	WBT	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.1	0.2	4.3	0.2	0.9

31: Berkshire Ave & W 166th Street Performance by movement

Movement	EBL	WBR	NBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.0	0.0	0.0	0.1
Total Del/Veh (s)	5.2	2.7	0.1	2.0	0.5	0.3	1.9

33: TH 169 SB & TA3 Performance by movement

Movement	WBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	21.6	0.7	0.8

35: TH 169 NB & TA3 Performance by movement

Movement	NBL	NBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.1	0.6	0.6

36: TH 169 SB & TA4 Performance by movement

Movement	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	7.6	0.6	0.9

37: TH 169 NB & TA4 Performance by movement

Movement	EBL	NBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	12.2	1.2	1.8

38: TH 169 NB & TA2 Performance by movement

Movement	NBL	NBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	14.1	0.6	1.1

39: TA1 & TH 169 NB Performance by movement

Movement	EBL	NBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	12.9	0.1	0.1

40: TH 169 SB & TA2 Performance by movement

Movement	WBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	22.3	0.2	0.7

41: TA1 & TH 169 SB Performance by movement

Movement	SBL	SBT	All
Denied Del/Veh (s)	2.2	0.3	0.3
Total Del/Veh (s)	0.3	1.1	1.1

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	15.3

Intersection: 1: TH 169 SB & W 166th Street

Movement	EB
Directions Served	R
Maximum Queue (ft)	57
Average Queue (ft)	10
95th Queue (ft)	40
Link Distance (ft)	399
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Jordan Ave SE & Bluff Drive

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	86	6
Average Queue (ft)	41	0
95th Queue (ft)	81	4
Link Distance (ft)	866	402
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: TH 169 SB & Bluff Drive

Movement	EB
Directions Served	R
Maximum Queue (ft)	58
Average Queue (ft)	29
95th Queue (ft)	53
Link Distance (ft)	218
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 14: TH 169 NB & Bluff Drive

Movement	WB
Directions Served	R
Maximum Queue (ft)	80
Average Queue (ft)	34
95th Queue (ft)	60
Link Distance (ft)	483
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Berkshire Ave & Bluff Drive

Movement	NB
Directions Served	LR
Maximum Queue (ft)	83
Average Queue (ft)	37
95th Queue (ft)	71
Link Distance (ft)	554
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 24: TH 169 NB & 173rd Street W

Movement	EB	WB
Directions Served	LT	R
Maximum Queue (ft)	27	26
Average Queue (ft)	9	4
95th Queue (ft)	27	19
Link Distance (ft)	17	1579
Upstream Blk Time (%)	5	
Queuing Penalty (veh)	1	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 25: TH 169 SB & 173rd Street W

Movement	EB	WB	SB
Directions Served	R	LT	L
Maximum Queue (ft)	46	20	15
Average Queue (ft)	25	2	1
95th Queue (ft)	41	13	8
Link Distance (ft)	731	17	
Upstream Blk Time (%)		3	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			470
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 26: 173rd Street W & Jordan Ave SE

Movement	SB
Directions Served	LR
Maximum Queue (ft)	52
Average Queue (ft)	17
95th Queue (ft)	44
Link Distance (ft)	619
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: Berkshire Ave & W 166th Street

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	76	45	25
Average Queue (ft)	20	20	1
95th Queue (ft)	63	45	14
Link Distance (ft)	390	225	1231
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 33: TH 169 SB & TA3

Movement	WB
Directions Served	L
Maximum Queue (ft)	31
Average Queue (ft)	4
95th Queue (ft)	21
Link Distance (ft)	28
Upstream Blk Time (%)	2
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 35: TH 169 NB & TA3

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 36: TH 169 SB & TA4

Movement	SB	SB
Directions Served	L	T
Maximum Queue (ft)	110	46
Average Queue (ft)	25	3
95th Queue (ft)	72	24
Link Distance (ft)		355
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	200	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 37: TH 169 NB & TA4

Movement	EB
Directions Served	L
Maximum Queue (ft)	74
Average Queue (ft)	38
95th Queue (ft)	64
Link Distance (ft)	21
Upstream Blk Time (%)	28
Queuing Penalty (veh)	25
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 38: TH 169 NB & TA2

Movement	NB	NB
Directions Served	L	T
Maximum Queue (ft)	100	49
Average Queue (ft)	20	2
95th Queue (ft)	71	23
Link Distance (ft)		557
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	400	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 39: TA1 & TH 169 NB

Movement	EB
Directions Served	L
Maximum Queue (ft)	30
Average Queue (ft)	2
95th Queue (ft)	13
Link Distance (ft)	26
Upstream Blk Time (%)	1
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 40: TH 169 SB & TA2

Movement	WB
Directions Served	L
Maximum Queue (ft)	74
Average Queue (ft)	31
95th Queue (ft)	65
Link Distance (ft)	22
Upstream Blk Time (%)	29
Queuing Penalty (veh)	15
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 41: TA1 & TH 169 SB

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 41

1: TH 169 SB & W 166th Street Performance by movement

Movement	EBR	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0
Total Del/Veh (s)	2.2	0.3	0.0	0.3

2: Jordan Ave SE & Bluff Drive Performance by movement

Movement	WBL	WBT	WBR	NBT	NBR	SBL	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	4.3	0.0	2.2	0.3	0.0	1.1	2.8

13: TH 169 SB & Bluff Drive Performance by movement

Movement	EBT	EBR	SBT	SBR	All
Denied Del/Veh (s)		0.0	0.0	0.0	0.0
Total Del/Veh (s)		2.4	0.3	0.0	0.3

14: TH 169 NB & Bluff Drive Performance by movement

Movement	WBR	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.0
Total Del/Veh (s)	3.7	4.9	3.8	4.8

16: Berkshire Ave & Bluff Drive Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0
Total Del/Veh (s)	0.1	0.0	1.7	0.1	4.7	0.1	3.1	1.7

22: Jordan Ave SE & Berkshire Ave Performance by movement

Movement	WBL	WBT	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.9	0.2	2.5	0.1	0.0	2.2	0.0	1.9

24: TH 169 NB & 173rd Street W Performance by movement

Movement	EBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	13.4	2.1	0.3	1.4	0.1	1.4

25: TH 169 SB & 173rd Street W Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)		2.8	2.5	3.9	2.8	1.4	0.7	1.4

26: 173rd Street W & Jordan Ave SE Performance by movement

Movement	EBT	WBT	WBR	SBL	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.1	0.0
Total Del/Veh (s)	0.0	0.5	0.6	4.1	0.8

31: Berkshire Ave & W 166th Street Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.6	2.8	5.0	2.5	2.1	0.4	0.2	2.2	0.2	0.0	0.9

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	10.9

Intersection: 1: TH 169 SB & W 166th Street

Movement	EB
Directions Served	R
Maximum Queue (ft)	67
Average Queue (ft)	8
95th Queue (ft)	41
Link Distance (ft)	398
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Jordan Ave SE & Bluff Drive

Movement	WB
Directions Served	LR
Maximum Queue (ft)	68
Average Queue (ft)	27
95th Queue (ft)	58
Link Distance (ft)	866
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 13: TH 169 SB & Bluff Drive

Movement	EB
Directions Served	R
Maximum Queue (ft)	60
Average Queue (ft)	10
95th Queue (ft)	40
Link Distance (ft)	218
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 14: TH 169 NB & Bluff Drive

Movement	WB
Directions Served	R
Maximum Queue (ft)	74
Average Queue (ft)	38
95th Queue (ft)	76
Link Distance (ft)	483
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Berkshire Ave & Bluff Drive

Movement	NB
Directions Served	LR
Maximum Queue (ft)	92
Average Queue (ft)	42
95th Queue (ft)	87
Link Distance (ft)	554
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: Jordan Ave SE & Berkshire Ave

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	44	20
Average Queue (ft)	14	1
95th Queue (ft)	40	11
Link Distance (ft)	954	1434
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 24: TH 169 NB & 173rd Street W

Movement	EB	WB	NB
Directions Served	LT	R	L
Maximum Queue (ft)	31	44	5
Average Queue (ft)	4	10	0
95th Queue (ft)	20	33	4
Link Distance (ft)	18	1579	
Upstream Blk Time (%)	3		
Queuing Penalty (veh)	0		
Storage Bay Dist (ft)			540
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 25: TH 169 SB & 173rd Street W

Movement	EB	WB	SB
Directions Served	R	LT	L
Maximum Queue (ft)	61	30	9
Average Queue (ft)	15	5	0
95th Queue (ft)	46	22	5
Link Distance (ft)	731	18	
Upstream Blk Time (%)		1	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			470
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 26: 173rd Street W & Jordan Ave SE

Movement	SB
Directions Served	LR
Maximum Queue (ft)	63
Average Queue (ft)	7
95th Queue (ft)	36
Link Distance (ft)	619
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: Berkshire Ave & W 166th Street

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	69	31	31
Average Queue (ft)	7	8	1
95th Queue (ft)	40	30	11
Link Distance (ft)	390	384	1231
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0

1: TH 169 SB & W 166th Street Performance by movement

Movement	EBR	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0
Total Del/Veh (s)	2.1	0.5	0.0	0.5

2: Jordan Ave SE & Bluff Drive Performance by movement

Movement	WBL	WBT	WBR	NBT	NBR	SBL	All
Denied Del/Veh (s)	0.0		0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	4.2		2.7	0.0	0.2	1.8	3.1

13: TH 169 SB & Bluff Drive Performance by movement

Movement	EBR	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.4	0.7	0.1	0.7

14: TH 169 NB & Bluff Drive Performance by movement

Movement	WBR	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	3.2	3.5	2.1	3.5

16: Berkshire Ave & Bluff Drive 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)	0.0	0.0	2.3	0.0	4.7	0.1	2.7	2.4

22: Jordan Ave SE & Berkshire Ave Performance by movement

Movement	WBL	WBT	WBR	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	5.3	0.1	2.5	0.1	2.2	0.1	2.3

24: TH 169 NB & 173rd Street W Performance by movement

Movement	EBL	EBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	3.9	6.8	2.0	0.2	0.8	0.1	0.9

25: TH 169 SB & 173rd Street W Performance by movement

Movement	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	3.0	5.6	11.2	1.4	2.7	1.5	2.7

26: 173rd Street W & Jordan Ave SE Performance by movement

Movement	EBT	WBT	WBR	SBL	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.0	0.3	0.3	4.5	1.9

31: Berkshire Ave & W 166th Street Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Total Del/Veh (s)	5.1	2.4	5.2	2.8	2.3	0.5	0.4	2.3	0.1	0.0	1.5

Total Network Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	10.4

Intersection: 1: TH 169 SB & W 166th Street

Movement	EB
Directions Served	R
Maximum Queue (ft)	63
Average Queue (ft)	11
95th Queue (ft)	42
Link Distance (ft)	398
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Jordan Ave SE & Bluff Drive

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	80	6
Average Queue (ft)	46	0
95th Queue (ft)	76	4
Link Distance (ft)	866	402
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: TH 169 SB & Bluff Drive

Movement	EB
Directions Served	R
Maximum Queue (ft)	60
Average Queue (ft)	18
95th Queue (ft)	51
Link Distance (ft)	218
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 14: TH 169 NB & Bluff Drive

Movement	WB
Directions Served	R
Maximum Queue (ft)	67
Average Queue (ft)	28
95th Queue (ft)	51
Link Distance (ft)	483
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Berkshire Ave & Bluff Drive

Movement	NB
Directions Served	LR
Maximum Queue (ft)	71
Average Queue (ft)	36
95th Queue (ft)	64
Link Distance (ft)	554
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: Jordan Ave SE & Berkshire Ave

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	78	6
Average Queue (ft)	29	0
95th Queue (ft)	65	4
Link Distance (ft)	954	1434
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 24: TH 169 NB & 173rd Street W

Movement	EB	WB
Directions Served	LT	R
Maximum Queue (ft)	26	27
Average Queue (ft)	5	4
95th Queue (ft)	21	20
Link Distance (ft)	18	1579
Upstream Blk Time (%)	2	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 25: TH 169 SB & 173rd Street W

Movement	EB	WB
Directions Served	R	LT
Maximum Queue (ft)	61	26
Average Queue (ft)	26	4
95th Queue (ft)	49	18
Link Distance (ft)	731	18
Upstream Blk Time (%)		2
Queuing Penalty (veh)		0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 26: 173rd Street W & Jordan Ave SE

Movement	SB
Directions Served	LR
Maximum Queue (ft)	69
Average Queue (ft)	25
95th Queue (ft)	55
Link Distance (ft)	619
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: Berkshire Ave & W 166th Street

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	66	71	39
Average Queue (ft)	14	24	2
95th Queue (ft)	51	56	22
Link Distance (ft)	390	346	1231
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0

1: TH 169 SB & W 166th Street Performance by movement

Movement	EBR	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0
Total Del/Veh (s)	2.2	0.3	0.0	0.3

2: Jordan Ave SE & Bluff Drive Performance by movement

Movement	WBL	WBT	WBR	NBT	NBR	SBL	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	4.2	0.0	2.6	0.2	0.0	2.2	2.8

13: TH 169 SB & Bluff Drive Performance by movement

Movement	EBR	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.4	0.4	0.1	0.4

14: TH 169 NB & Bluff Drive Performance by movement

Movement	WBR	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	3.6	6.4	5.1	6.3

16: Berkshire Ave & Bluff Drive 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)	0.1	0.1	1.8	0.1	5.0	0.2	3.0	1.9

22: Jordan Ave SE & Berkshire Ave Performance by movement

Movement	WBL	WBT	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	6.9	0.0	2.4	0.0	0.2	2.3	0.6	2.0

24: TH 169 NB & 173rd Street W Performance by movement

Movement	EBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	20.5	2.2	0.5	1.9	0.6	1.9

25: TH 169 SB & 173rd Street W Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)		2.5	3.1	4.5	2.2	1.5	0.7	1.6

26: 173rd Street W & Jordan Ave SE Performance by movement

Movement	EBT	WBT	WBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.1	0.0	0.0
Total Del/Veh (s)	0.0	0.6	0.5	3.7	0.0	0.7

31: Berkshire Ave & W 166th Street Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.1	3.4	5.1	2.6	2.3	0.6	0.6	2.3	0.4	0.3	1.1

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	13.7

Intersection: 1: TH 169 SB & W 166th Street

Movement	EB
Directions Served	R
Maximum Queue (ft)	57
Average Queue (ft)	8
95th Queue (ft)	38
Link Distance (ft)	398
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Jordan Ave SE & Bluff Drive

Movement	WB
Directions Served	LR
Maximum Queue (ft)	66
Average Queue (ft)	32
95th Queue (ft)	56
Link Distance (ft)	866
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 13: TH 169 SB & Bluff Drive

Movement	EB
Directions Served	R
Maximum Queue (ft)	71
Average Queue (ft)	17
95th Queue (ft)	55
Link Distance (ft)	218
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 14: TH 169 NB & Bluff Drive

Movement	WB
Directions Served	R
Maximum Queue (ft)	76
Average Queue (ft)	42
95th Queue (ft)	76
Link Distance (ft)	483
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Berkshire Ave & Bluff Drive

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	6	105
Average Queue (ft)	0	49
95th Queue (ft)	4	91
Link Distance (ft)	747	554
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 22: Jordan Ave SE & Berkshire Ave

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	56	35
Average Queue (ft)	19	2
95th Queue (ft)	45	17
Link Distance (ft)	954	1434
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 24: TH 169 NB & 173rd Street W

Movement	EB	WB	NB
Directions Served	LT	R	L
Maximum Queue (ft)	34	46	9
Average Queue (ft)	6	10	0
95th Queue (ft)	23	34	5
Link Distance (ft)	18	1579	
Upstream Blk Time (%)	5		
Queuing Penalty (veh)	0		
Storage Bay Dist (ft)			540
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 25: TH 169 SB & 173rd Street W

Movement	EB	WB	SB
Directions Served	R	LT	L
Maximum Queue (ft)	59	27	9
Average Queue (ft)	16	7	1
95th Queue (ft)	48	25	6
Link Distance (ft)	731	18	
Upstream Blk Time (%)		2	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			470
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 26: 173rd Street W & Jordan Ave SE

Movement	SB
Directions Served	LR
Maximum Queue (ft)	61
Average Queue (ft)	7
95th Queue (ft)	37
Link Distance (ft)	619
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: Berkshire Ave & W 166th Street

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	69	31	36
Average Queue (ft)	10	11	2
95th Queue (ft)	45	34	16
Link Distance (ft)	390	384	1231
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 1

1: TH 169 SB & W 166th Street Performance by movement

Movement	EBR	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0
Total Del/Veh (s)	2.3	0.8	0.0	0.8

2: Jordan Ave SE & Bluff Drive Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	4.4	2.6	0.0	0.2	2.1	3.3

13: TH 169 SB & Bluff Drive Performance by movement

Movement	EBR	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.4	1.0	0.2	1.0

14: TH 169 NB & Bluff Drive Performance by movement

Movement	WBR	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	3.1	4.2	3.2	4.2

16: Berkshire Ave & Bluff Drive 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)	0.1	0.1	2.2	0.1	4.7	0.2	2.8	2.4

22: Jordan Ave SE & Berkshire Ave Performance by movement

Movement	WBL	WBT	WBR	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	5.2	0.1	2.6	0.1	2.3	0.3	2.5

24: TH 169 NB & 173rd Street W Performance by movement

Movement	EBL	EBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)		0.0	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)		9.1	2.4	1.9	1.0	0.2	1.1

25: TH 169 SB & 173rd Street W Performance by movement

Movement	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Total Del/Veh (s)	3.1	13.1	27.7	3.0	3.6	2.0	3.6

26: 173rd Street W & Jordan Ave SE Performance by movement

Movement	EBT	WBT	WBR	SBL	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.1
Total Del/Veh (s)	0.1	0.3	0.2	4.6	2.0

31: Berkshire Ave & W 166th Street Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.4	2.9	4.8	2.6	2.5	0.7	0.5	2.1	0.2	0.3	1.5

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	12.9

Intersection: 1: TH 169 SB & W 166th Street

Movement	EB
Directions Served	R
Maximum Queue (ft)	59
Average Queue (ft)	11
95th Queue (ft)	39
Link Distance (ft)	398
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Jordan Ave SE & Bluff Drive

Movement	WB
Directions Served	LR
Maximum Queue (ft)	96
Average Queue (ft)	49
95th Queue (ft)	81
Link Distance (ft)	866
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 13: TH 169 SB & Bluff Drive

Movement	EB
Directions Served	R
Maximum Queue (ft)	64
Average Queue (ft)	21
95th Queue (ft)	52
Link Distance (ft)	218
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 14: TH 169 NB & Bluff Drive

Movement	WB
Directions Served	R
Maximum Queue (ft)	72
Average Queue (ft)	30
95th Queue (ft)	53
Link Distance (ft)	483
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Berkshire Ave & Bluff Drive

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	12	74
Average Queue (ft)	1	38
95th Queue (ft)	7	62
Link Distance (ft)	747	554
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 22: Jordan Ave SE & Berkshire Ave

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	72	27
Average Queue (ft)	32	1
95th Queue (ft)	63	12
Link Distance (ft)	954	1434
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 24: TH 169 NB & 173rd Street W

Movement	EB	WB	NB
Directions Served	LT	R	L
Maximum Queue (ft)	26	32	8
Average Queue (ft)	7	4	0
95th Queue (ft)	25	20	5
Link Distance (ft)	18	1579	
Upstream Blk Time (%)	3		
Queuing Penalty (veh)	1		
Storage Bay Dist (ft)			540
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 25: TH 169 SB & 173rd Street W

Movement	EB	WB	SB
Directions Served	R	LT	L
Maximum Queue (ft)	58	24	11
Average Queue (ft)	30	4	0
95th Queue (ft)	47	18	6
Link Distance (ft)	731	18	
Upstream Blk Time (%)		4	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			470
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 26: 173rd Street W & Jordan Ave SE

Movement	SB
Directions Served	LR
Maximum Queue (ft)	70
Average Queue (ft)	30
95th Queue (ft)	57
Link Distance (ft)	619
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: Berkshire Ave & W 166th Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	73	57	6	26
Average Queue (ft)	20	23	0	2
95th Queue (ft)	63	50	4	21
Link Distance (ft)	390	346	981	1231
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 1

1: TH 169 SB & W 166th Street Performance by movement

Movement	EBR	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0
Total Del/Veh (s)	2.4	1.1	0.9	1.1

2: Jordan Ave SE & Bluff Drive Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	4.4	2.6	0.5	0.7	2.3	1.8

5: TH 169 NB & TH 169 NB On-ramp Performance by movement

Movement	NBT	NWT	NWR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	5.0	0.0	0.0	4.8

13: Bluff Drive & TH 169 NB On-ramp Performance by movement

Movement	EBL	EBT	WBT	WBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.2	0.5	0.8	0.6	0.9

16: Berkshire Ave & Bluff Drive Performance by movement

Movement	EBT	EBR	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.2	0.1	0.0	4.4	0.1	2.5	2.0

24: TH 169 NB & 173rd Street W Performance by movement

Movement	EBL	EBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.8	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	12.1	14.9	2.4	0.3	1.4	0.0	1.5

25: TH 169 SB & 173rd Street W Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)		3.1	2.3	2.4	4.2	1.5	0.7	1.5

26: 173rd Street W & Jordan Ave SE Performance by movement

Movement	EBT	WBT	WBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.1	0.3	0.2	4.5	0.1	0.8

31: Berkshire Ave & W 166th Street Performance by movement

Movement	EBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.2	2.4	1.9	0.2	0.5	1.8	0.7	0.0	1.1

32: TH 169 NB Off-ramp/Berkshire Ave Performance by movement

Movement	NBT	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.1	0.1	0.1

36: TH 169 NB & TH 169 NB Off-ramp Performance by movement

Movement	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.1	0.0
Total Del/Veh (s)	0.5	2.5	0.6

Total Network Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	10.6

Intersection: 1: TH 169 SB & W 166th Street

Movement	EB
Directions Served	R
Maximum Queue (ft)	62
Average Queue (ft)	7
95th Queue (ft)	37
Link Distance (ft)	398
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Jordan Ave SE & Bluff Drive

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	66	6
Average Queue (ft)	20	0
95th Queue (ft)	52	4
Link Distance (ft)	866	402
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: TH 169 NB & TH 169 NB On-ramp

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 13: Bluff Drive & TH 169 NB On-ramp

Movement	EB
Directions Served	LT
Maximum Queue (ft)	43
Average Queue (ft)	2
95th Queue (ft)	20
Link Distance (ft)	578
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Berkshire Ave & Bluff Drive

Movement	NB
Directions Served	LR
Maximum Queue (ft)	72
Average Queue (ft)	32
95th Queue (ft)	61
Link Distance (ft)	554
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 24: TH 169 NB & 173rd Street W

Movement	EB	WB
Directions Served	LT	R
Maximum Queue (ft)	34	54
Average Queue (ft)	8	13
95th Queue (ft)	26	39
Link Distance (ft)	18	1580
Upstream Blk Time (%)	5	
Queuing Penalty (veh)	1	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 25: TH 169 SB & 173rd Street W

Movement	EB	WB	SB
Directions Served	R	LT	L
Maximum Queue (ft)	71	33	23
Average Queue (ft)	22	3	1
95th Queue (ft)	57	17	10
Link Distance (ft)	731	18	
Upstream Blk Time (%)		1	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			470
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 26: 173rd Street W & Jordan Ave SE

Movement	SB
Directions Served	LR
Maximum Queue (ft)	71
Average Queue (ft)	17
95th Queue (ft)	56
Link Distance (ft)	619
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: Berkshire Ave & W 166th Street

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	66	31	12
Average Queue (ft)	9	7	0
95th Queue (ft)	42	29	5
Link Distance (ft)	390	406	1231
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 32: TH 169 NB Off-ramp/Berkshire Ave

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 36: TH 169 NB & TH 169 NB Off-ramp

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 1

1: TH 169 SB & W 166th Street Performance by movement

Movement	EBR	SBT	SBR	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.0
Total Del/Veh (s)	2.5	2.3	0.7	2.3

2: Jordan Ave SE & Bluff Drive Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	4.5	3.2	0.9	1.4	3.5	2.3

5: TH 169 NB & TH 169 NB On-ramp Performance by movement

Movement	NBT	NWT	NWR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.0	0.1	0.7	3.7

13: Bluff Drive & TH 169 NB On-ramp Performance by movement

Movement	EBL	EBT	WBT	WBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.3	0.9	1.2	0.8	1.2

16: Berkshire Ave & Bluff Drive Performance by movement

Movement	EBT	EBR	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.9	0.5	0.1	4.8	0.1	2.7	2.8

24: TH 169 NB & 173rd Street W Performance by movement

Movement	EBL	EBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	6.4	6.6	2.3	0.1	0.9	0.1	1.0

25: TH 169 SB & 173rd Street W Performance by movement

Movement	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	3.2	5.2	9.2	2.1	2.8	1.8	2.8

26: 173rd Street W & Jordan Ave SE Performance by movement

Movement	EBT	WBT	WBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.1	0.0	0.0
Total Del/Veh (s)	0.1	0.5	0.2	4.6	0.4	1.7

31: Berkshire Ave & W 166th Street Performance by movement

Movement	EBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.1
Total Del/Veh (s)	4.9	2.6	2.0	0.2	0.1	2.7	1.3	0.5	1.6

32: TH 169 NB Off-ramp/Berkshire Ave Performance by movement

Movement	NBT	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.0	0.4	0.1

36: TH 169 NB & TH 169 NB Off-ramp Performance by movement

Movement	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.2	0.0
Total Del/Veh (s)	0.4	2.6	0.5

Total Network Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	10.7

Intersection: 1: TH 169 SB & W 166th Street

Movement	EB
Directions Served	R
Maximum Queue (ft)	55
Average Queue (ft)	7
95th Queue (ft)	34
Link Distance (ft)	398
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Jordan Ave SE & Bluff Drive

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	77	24
Average Queue (ft)	30	1
95th Queue (ft)	71	10
Link Distance (ft)	866	402
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: TH 169 NB & TH 169 NB On-ramp

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 13: Bluff Drive & TH 169 NB On-ramp

Movement	EB
Directions Served	LT
Maximum Queue (ft)	44
Average Queue (ft)	3
95th Queue (ft)	20
Link Distance (ft)	578
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Berkshire Ave & Bluff Drive

Movement	NB
Directions Served	LR
Maximum Queue (ft)	84
Average Queue (ft)	44
95th Queue (ft)	76
Link Distance (ft)	554
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 24: TH 169 NB & 173rd Street W

Movement	EB	WB
Directions Served	LT	R
Maximum Queue (ft)	27	27
Average Queue (ft)	9	6
95th Queue (ft)	27	23
Link Distance (ft)	18	1579
Upstream Blk Time (%)	3	
Queuing Penalty (veh)	1	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 25: TH 169 SB & 173rd Street W

Movement	EB	WB	SB
Directions Served	R	LT	L
Maximum Queue (ft)	74	26	14
Average Queue (ft)	32	4	1
95th Queue (ft)	58	18	11
Link Distance (ft)	731	18	
Upstream Blk Time (%)		1	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			470
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 26: 173rd Street W & Jordan Ave SE

Movement	SB
Directions Served	LR
Maximum Queue (ft)	81
Average Queue (ft)	35
95th Queue (ft)	67
Link Distance (ft)	619
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: Berkshire Ave & W 166th Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	76	35	14	20
Average Queue (ft)	15	19	0	1
95th Queue (ft)	55	42	10	14
Link Distance (ft)	390	296	1124	1231
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 32: TH 169 NB Off-ramp/Berkshire Ave

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 36: TH 169 NB & TH 169 NB Off-ramp

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 1

1: TH 169 SB & W 166th Street Performance by movement

Movement	EBR	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0
Total Del/Veh (s)	2.5	1.5	0.6	1.5

2: Jordan Ave SE & Bluff Drive Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	4.3	2.5	0.3	1.0	1.9	1.9

5: TH 169 NB & TH 169 NB On-ramp Performance by movement

Movement	NBT	NWT	NWR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	6.2	0.0	0.1	6.0

13: Bluff Drive & TH 169 NB On-ramp Performance by movement

Movement	EBL	EBT	WBT	WBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.6	0.8	0.7	0.6	1.1

16: Berkshire Ave & Bluff Drive Performance by movement

Movement	EBT	EBR	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.4	0.3	0.1	4.6	0.0	2.8	2.1

24: TH 169 NB & 173rd Street W Performance by movement

Movement	EBL	EBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	19.9	37.5	2.5	0.5	2.0	0.5	2.2

25: TH 169 SB & 173rd Street W Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.7	2.9	3.8	3.6	7.9	1.8	1.1	1.9

26: 173rd Street W & Jordan Ave SE Performance by movement

Movement	EBT	WBT	WBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.0	0.3	0.2	4.3	0.1	0.7

31: Berkshire Ave & W 166th Street Performance by movement

Movement	EBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	5.5	2.4	2.7	0.2	0.3	2.5	0.7	0.1	1.1

32: TH 169 NB Off-ramp/Berkshire Ave Performance by movement

Movement	NBT	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.0	0.2	0.1

36: TH 169 NB & TH 169 NB Off-ramp Performance by movement

Movement	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.7	2.6	0.7

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	13.2

Intersection: 1: TH 169 SB & W 166th Street

Movement	EB
Directions Served	R
Maximum Queue (ft)	64
Average Queue (ft)	8
95th Queue (ft)	40
Link Distance (ft)	398
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Jordan Ave SE & Bluff Drive

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	71	6
Average Queue (ft)	19	0
95th Queue (ft)	50	5
Link Distance (ft)	866	402
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: TH 169 NB & TH 169 NB On-ramp

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 13: Bluff Drive & TH 169 NB On-ramp

Movement	EB
Directions Served	LT
Maximum Queue (ft)	58
Average Queue (ft)	3
95th Queue (ft)	24
Link Distance (ft)	578
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 16: Berkshire Ave & Bluff Drive

Movement	NB
Directions Served	LR
Maximum Queue (ft)	75
Average Queue (ft)	30
95th Queue (ft)	58
Link Distance (ft)	554
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 24: TH 169 NB & 173rd Street W

Movement	EB	WB
Directions Served	LT	R
Maximum Queue (ft)	34	32
Average Queue (ft)	8	10
95th Queue (ft)	27	31
Link Distance (ft)	18	1580
Upstream Blk Time (%)	10	
Queuing Penalty (veh)	2	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 25: TH 169 SB & 173rd Street W

Movement	EB	WB	SB
Directions Served	R	LT	L
Maximum Queue (ft)	75	27	19
Average Queue (ft)	22	4	1
95th Queue (ft)	59	20	10
Link Distance (ft)	731	18	
Upstream Blk Time (%)		1	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			470
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 26: 173rd Street W & Jordan Ave SE

Movement	SB
Directions Served	LR
Maximum Queue (ft)	72
Average Queue (ft)	14
95th Queue (ft)	51
Link Distance (ft)	619
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: Berkshire Ave & W 166th Street

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	67	31	18
Average Queue (ft)	6	11	1
95th Queue (ft)	36	35	9
Link Distance (ft)	390	406	1231
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 32: TH 169 NB Off-ramp/Berkshire Ave

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 36: TH 169 NB & TH 169 NB Off-ramp

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 2

1: TH 169 SB & W 166th Street Performance by movement

Movement	EBR	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0
Total Del/Veh (s)	2.3	3.1	2.4	3.0

2: Jordan Ave SE & Bluff Drive Performance by movement

Movement	WBL	WBT	WBR	NBT	NBR	SBL	All
Denied Del/Veh (s)	0.0		0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	4.8		2.7	0.8	1.4	1.7	2.4

5: TH 169 NB & TH 169 NB On-ramp Performance by movement

Movement	NBT	NWT	NWR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.3	0.1	0.8	4.1

13: Bluff Drive & TH 169 NB On-ramp Performance by movement

Movement	EBL	EBT	WBT	WBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.7	0.8	1.0	0.8	1.2

16: Berkshire Ave & Bluff Drive Performance by movement

Movement	EBT	EBR	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.8	0.5	0.1	4.7	0.1	3.1	2.6

24: TH 169 NB & 173rd Street W Performance by movement

Movement	EBL	EBT	WBR	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	5.0	9.2	2.4	0.2	1.1	0.1	1.2

25: TH 169 SB & 173rd Street W Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	1.8	3.5	10.5	18.5	2.1	3.6	2.5	3.5

26: 173rd Street W & Jordan Ave SE Performance by movement

Movement	EBT	WBT	WBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.1	0.0	0.0
Total Del/Veh (s)	0.1	0.3	0.2	5.2	0.1	1.8

31: Berkshire Ave & W 166th Street Performance by movement

Movement	EBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	5.0	2.7	2.4	0.4	0.3	2.4	1.1	0.8	1.7

32: TH 169 NB Off-ramp/Berkshire Ave Performance by movement

Movement	NBT	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.1	0.3	0.1

36: TH 169 NB & TH 169 NB Off-ramp Performance by movement

Movement	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.2	0.0
Total Del/Veh (s)	0.5	2.7	0.5

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	12.7

Intersection: 1: TH 169 SB & W 166th Street

Movement	EB
Directions Served	R
Maximum Queue (ft)	65
Average Queue (ft)	10
95th Queue (ft)	40
Link Distance (ft)	398
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Jordan Ave SE & Bluff Drive

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	91	6
Average Queue (ft)	36	0
95th Queue (ft)	74	4
Link Distance (ft)	866	402
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: TH 169 NB & TH 169 NB On-ramp

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 13: Bluff Drive & TH 169 NB On-ramp

Movement	EB	WB
Directions Served	LT	TR
Maximum Queue (ft)	52	4
Average Queue (ft)	5	0
95th Queue (ft)	28	3
Link Distance (ft)	578	267
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 16: Berkshire Ave & Bluff Drive

Movement	NB
Directions Served	LR
Maximum Queue (ft)	96
Average Queue (ft)	44
95th Queue (ft)	79
Link Distance (ft)	554
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 24: TH 169 NB & 173rd Street W

Movement	EB	WB
Directions Served	LT	R
Maximum Queue (ft)	27	27
Average Queue (ft)	9	5
95th Queue (ft)	27	21
Link Distance (ft)	18	1579
Upstream Blk Time (%)	4	
Queuing Penalty (veh)	1	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 25: TH 169 SB & 173rd Street W

Movement	EB	WB	SB
Directions Served	R	LT	L
Maximum Queue (ft)	80	26	14
Average Queue (ft)	33	4	1
95th Queue (ft)	59	19	7
Link Distance (ft)	731	18	
Upstream Blk Time (%)		3	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			470
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 26: 173rd Street W & Jordan Ave SE

Movement	SB
Directions Served	LR
Maximum Queue (ft)	90
Average Queue (ft)	37
95th Queue (ft)	72
Link Distance (ft)	619
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: Berkshire Ave & W 166th Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	72	31	11	54
Average Queue (ft)	19	21	0	2
95th Queue (ft)	60	43	8	26
Link Distance (ft)	390	296	1124	1231
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 32: TH 169 NB Off-ramp/Berkshire Ave

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 36: TH 169 NB & TH 169 NB Off-ramp

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 1

Appendix B

SAFETY ANALYSIS

Safety Analysis of Proposed Alternatives Technical Memorandum

Memo Appendix: IHSDM Output/HSM Spreadsheets

Stantec

Memo

To:	File	From:	Miguel Andrews 3255 Greensboro Drive, Bismarck ND 58503
File:	US169_Safety Analysis of Proposed Alternatives	Date:	October 11, 2018

Reference: Sand Creek Corridor Study - Safety Analysis of Proposed Alternatives

INTRODUCTION

A safety analysis of the final conceptual layouts, outlined in the TH 169 Corridor Study Report, was performed to quantify relative safety benefits. The analysis was completed in accordance with the Highway Safety Manual, 1st Edition, 2010 (HSM) utilizing FHWA's Interactive Highway Safety Design Model (IHSDM) version 14.0[1].

METHODOLOGY

The quantification of safety benefits was completed for the 2.96-mile TH 169 corridor between Bluff Drive and 173rd Street. The corridor was segmented into several rural multi-lane highway site types for analysis as outlined in the HSM including: 4-lane divided highway segment, 3-legged stop-controlled intersection, and 4-legged stop control intersection. Input data for each alternative included proposed geometric design, traffic control features, and 20-year forecasted traffic volume. An estimate of expected average crash frequency and severity for each alternative was compared to a no-build scenario to quantify potential safety benefits. For each site type, crash modification factors (CMFs) for existing geometric design and traffic control features, outlined in **Table 1**, were used to adjust each location to site specific conditions. The HSM crash prediction model was calibrated to Greater Minnesota in terms of crash type and severity distribution using factors developed by the Minnesota Department of Transportation (MnDOT)[2].

Additional treatment CMFs, representing other proposed treatments along the corridor, were applied to determine how the proposed alternatives improved safety along the corridor. For quantification of net safety benefits the following assumptions were made:

- Analysis period: 2020-2040
- Real Discount Rate: 1.3%
- MnDOT 2016 Crash Costs

An incremental cost-benefit analysis was performed to quantify the expected change in average crash frequency between a no-build scenario and the proposed conceptual alternatives. The net safety benefit was calculated as the difference between the present value of crash costs for the no-build scenario and each alternative.

[1] Federal Highway Administration, 2018
[2] Phase I-II of the Minnesota Highway Safety Manual Calibration, 2014

Table 1 – Rural Multi-lane Highway Crash Modification Factors and Corresponding SPFs[3]

Applicable SPF	CMF	CMF Description	CMF Equations and Exhibits
Undivided Roadway Segment SPF	CMF_{1ru}	Lane Width on Undivided Segments	Equation 11-13, Table 11-11, Figure 11-8
	CMF_{2ru}	Shoulder Width and Shoulder Type	Equation 11-14, Figure 11-9, Tables 11-12 and 11-13
	CMF_{3ru}	Sideslopes	Table 11-14
	CMF_{4ru}	Lighting	Equation 11-15, Table 11-15
	CMF_{5ru}	Automated Speed Enforcement	See text
Divided Roadway Segment SPF	CMF_{1rd}	Lane Width on Divided Segments	Equation 11-16, Table 11-16, Figure 11-10
	CMF_{2rd}	Right Shoulder Width on Divided Roadway Segment	Table 11-17
	CMF_{3rd}	Median Width	Table 11-18
	CMF_{4rd}	Lighting	Equation 11-17, Table 11-19
	CMF_{5rd}	Automated Speed Enforcement	See text
Three-and Four-Leg Stop-Controlled Intersection SPFs	CMF_{1t}	Intersection Angle	Tables 11-20, 11-21
	CMF_{2t}	Left-Turn Lane on Major Road	Tables 11-20, 11-21
	CMF_{3t}	Right-Turn Lane on Major Road	Tables 11-20, 11-21
	CMF_{4t}	Lighting	Tables 11-20, 11-21

[3] Highway Safety Manual, 2010

ANALYSIS OF ALTERNATIVES

Each alternative was analyzed according to IHSDMs crash prediction model. Crash modification factors were applied to each alternative for proposed treatments as outlined in the tables that follow. Concept 1 aims to achieve the safety benefits of grade separation without the sizeable investment. Concept 2 reduces demand on TH 169 by diverting vehicles along an improved local roadway network. The local network includes a TH 169 overpass along Berkshire Avenue. Concept 3 proposes an overpass of Bluff Drive as well as the improvement of Berkshire Avenue as a TH 169 service road.

No-Build (2020-2040)

A summary of no-build scenario site-types and analysis inputs are summarized in Table 3.

Table 2: No-Build Input Data

Location	Site Type	Site Conditions/Base Inputs
TH 169 Mainline	Four-Lane Divided Segment (RML_4D)	Length of Segment, L (mi): 2.96 AADT (veh/day): 2018 = 28,500; 2038 = 34,200 Lane Width (ft): 12 Shoulder Width (ft): Left = 4; Right = 10 Shoulder Type: Paved Median: Traversable Lighting: no Automated Speed Enforcement: no
TH 169 @ Bluff Drive	Four-Legged, Minor Road Stop Control Intersection (RML_4ST)	AADT Major (veh/day): 2018 = 28,500; 2038 = 34,200 AADT Minor (veh/day): 2018 = 699; 2038 = 839 Approaches with Left-Turn Lanes: 2 Approaches with Right-Turn Lanes: 2 Lighting: no Skew Angle 1: 0; Skew Angle 2: 0
TH 169 @ 166th Street W	Four-Legged, Minor Road Stop Control Intersection (RML_4ST)	AADT Major (veh/day): 2018 = 28,500; 2038 = 34,200 AADT Minor (veh/day): 2018 = 620; 2038 = 744 Approaches with Left-Turn Lanes: 1 Approaches with Right-Turn Lanes: 1 Presence of Lighting: no Skew Angle 1: 0; Skew Angle 2: 0
TH 169 @ 173rd Street W	Four-Legged, Minor Road Stop Control Intersection (RML_4ST)	AADT Major (veh/day): 2018 = 28,500; 2038 = 34,200 AADT Minor (veh/day): 2018 = 433; 2038 = 520 Approaches with Left-Turn Lanes: 2 Approaches with Right-Turn Lanes: 2 Presence of Lighting: yes Skew Angle 1: 20; Skew Angle 2: 20

Concept 1: At-Grade Interim Solutions (2020-2040)

Concept 1 involves the implementation of low-cost interim solutions such as the consolidation of median access points from private driveways, elimination of at-grade crossings (Jordan Avenue and 166th Street), installation of acceleration lanes, and the implementation of restricted crossing U-turn intersections (RCUT) (173rd Street and Bluff Drive). RCUTs typically result in a 35% reduction in total crashes and 49% reduction in injury crashes. The implementation of RCUTs are intended to reduce angled and rear-end crashes involving heavy vehicles. right-turn acceleration lanes (RTALs) are proposed to assist turning heavy vehicles to accelerate to mainline traffic speed before merging. While it is expected that RTALs would reduce abrupt and right-angle merges, studies indicate that crash rates tend to be higher when RTALs are present[4]. Currently, there are no CMFs for quantification of the safety benefit of RTAL treatments.

Similarly, there are no CMFs available for the elimination of median access points. However, preventing turning movements at these medians is expected to reduce right-angled crashes as they eliminate left-turn movements. several driveways are eliminated along the TH 169 corridor which is expected to reduce the number of segment related crashes and is quantified using a CMF outlined in **Table 3**.

Table 3: Concept 1 Input Data

Location	Site Type	Site Conditions/Inputs	Proposed Treatments/CMF
TH 169 Mainline	Four-Lane Divided Segment (RML_4D)	Length of Segment, L (mi): 2.96 AADT (veh/day): 2018 = 28,500; 2038 = 34,200 Lane Width (ft): 12 Shoulder Width (ft): Left = 4; Right = 10 Shoulder Type: Paved Median: Traversable Lighting: no Automated Speed Enforcement: no	Consolidation of median access points: CMF unknown Change driveway density from X to Y: CMF = e^0.0232 (Y-X)[5] [6]
TH 169 @ Bluff Drive	Four-Legged, Minor Road Stop Control Intersection (RML_4ST)	AADT Major (veh/day): 2018 = 28,500; 2038 = 34,200 AADT Minor (veh/day): 2018 = 699; 2038 = 839 Approaches with Left-Turn Lanes: 2 Approaches with Right-Turn Lanes: 2 Lighting: no Skew Angle 1: 0; Skew Angle 2: 0	Restricted Crossing U-turn Intersections (RCUT): All severities: 0.65[7] Injury: 0.51 Provide Right-Turn Acceleration lanes: Unknown
TH 169 @ 166th Street	Eliminated	-	-

[4] MnDOT Technical Memorandum No. 17-03-TS-01 (2017)
[5] Fitzpatrick et al. (2008)
[6] Potential Driveway Density Accident Modification Factors for Rural Highways (2008)
[7] Highway Safety Manual (2010)

TH 169 @ 173rd Street	Four-Legged, Minor Road Stop Control Intersection (RML_4ST)	AADT Major (veh/day): 2018 = 28,500; 2038 = 34,200 AADT Minor (veh/day): 2018 = 433; 2038 = 520 Approaches with Left-Turn Lanes: 2 Approaches with Right-Turn Lanes: 2 Presence of Lighting: yes Skew Angle 1: 20; Skew Angle 2: 20	Restricted Crossing U-turn Intersections (RCUT): All severities: 0.65[8] Injury: 0.51 Provide Right-Turn Acceleration lanes: Unknown

Concept 2: Overpass of US 169

Concept 2 involves the development of the local roadway network through the construction of an overpass of TH 169 via Berkshire Avenue. Jordan Avenue is extended to intersect with 173rd Street away from US 169. It also includes the consolidation of median access points, elimination of at-grade crossings, and installation of acceleration lanes along TH 169 at the same locations as outlined in Concept 1. While Concept 2 is expected to result in a marked increase in safety due to the elimination of crossings, it increases travel time for truck traffic. Concept 2 input data is summarized in **Table 4**.

Table 4: Concept 2 Input Data

Location	Site Type	Site Conditions/Inputs	Proposed Treatments/CMF
TH 169 Mainline	Four-Lane Divided Segment (RML_4D)	Length of Segment, L (mi): 2.96 AADT (veh/day): 2018 = 28,500; 2038 = 34,200 Lane Width (ft): 12 Shoulder Width (ft): Left = 4; Right = 10 Shoulder Type: Paved Median: Traversable Lighting: no Automated Speed Enforcement: no	Consolidation of median access points: CMF unknown Change driveway density from X to Y: CMF = $e^{0.0232 (Y-X)}$[9]
TH 169 @ Bluff Drive	Eliminated	-	-
TH 169 @ 166th Street	Eliminated	-	-
TH 169 @ 173rd Street	Four-Legged, Minor Road Stop Control Intersection (RML_4ST)	AADT Major (veh/day): 2018 = 28,500; 2038 = 34,200 AADT Minor (veh/day): 2018 = 433; 2038 = 520 Approaches with Left-Turn Lanes: 2 Approaches with Right-Turn Lanes: 2 Presence of Lighting: yes Skew Angle 1: 20; Skew Angle 2: 20	Provide Right-Turn Acceleration lanes: Unknown

[8] Highway Safety Manual (2010)
[9] Fitzpatrick et al. (2008)

Concept 3: Grade Separated Interchange at Bluff Drive

Involves the construction of an overpass of Bluff Drive with ramps to access US 169, construction of an off-ramp to access an improved Berkshire Avenue, and the extension of Jordan Avenue to intersect with 173rd Street. Also includes the consolidation of median access points, elimination of at-grade crossings, and installation of acceleration lanes along US 169. The conversion of the existing at-grade intersection at Bluff to a grade separated interchange is expected to reduce the total number of crashes by 42% and fatal and injury crashes by 57%. Grade separation would be achieved via the construction of a bridge over Bluff Drive. TH 169 would be accessed via an off-ramp and on-ramp east of Bluff creating half of a diamond interchange.

Table 5: Concept 3 Input Data

Location	Site Type	Site Conditions/Inputs	Proposed Treatments/CMF
TH 169 Mainline	Four-Lane Divided Segment (RML_4D)	Length of Segment, L (mi): 2.96 AADT (veh/day): 2018 = 28,500; 2038 = 34,200 Lane Width (ft): 12 Shoulder Width (ft): Left = 4; Right = 10 Shoulder Type: Paved Median: Traversable Lighting: no Automated Speed Enforcement: no	Consolidation of median access points: CMF unknown Change driveway density from X to Y: CMF = $e^{\wedge 0.0232 (Y-X)}$[10]
TH 169 @ Bluff Drive	Four-Legged, Minor Road Stop Control Intersection (RML_4ST)	AADT Major (veh/day): 2018 = 28,500; 2038 = 34,200 AADT Minor (veh/day): 2018 = 699; 2038 = 839 Approaches with Left-Turn Lanes: 2 Approaches with Right-Turn Lanes: 2 Lighting: no Skew Angle 1: 0; Skew Angle 2: 0	Conversion of at-grade intersection to interchange: All severities: 0.58 Injury: 0.43 Non-injury: 0.64
TH 169 @ 166th Street W	Eliminated	-	-
TH 169 @ 173rd Street W	Four-Legged, Minor Road Stop Control Intersection (RML_4ST)	AADT Major (veh/day): 2018 = 28,500; 2038 = 34,200 AADT Minor (veh/day): 2018 = 433; 2038 = 520 Approaches with Left-Turn Lanes: 2 Approaches with Right-Turn Lanes: 2 Presence of Lighting: yes Skew Angle 1: 20; Skew Angle 2: 20	Provide Right-Turn Acceleration lanes: Unknown

[10] Fitzpatrick et al. (2008)

RESULTS

The results of the analysis are summarized in **Table 6**. Each explored concept resulted in a reduction in crash frequency and severity along the corridor. Concept 1 lead to the largest reduction in total and fatal/injury crashes compared to the No-Build scenario.

Table 6: IHSDM Summary

Alternative	Total Crashes	Fatal and Injury Crashes	Fatal and Serious Injury Crashes	Property Damage Only Crashes
No-Build - Existing Conditions	731.82	312.22	150.52	419.60
Concept 1 – At-Grade Intersection Solutions	454.96	206.72	83.37	248.24
Concept 2 – Jordan Avenue Overpass	579.11	252.49	113.67	326.61
Concept 3 – Grade Separated Interchange at Bluff	519.19	229.32	100.33	289.87

As outlined in the Existing Safety Analysis section, Bluff Drive exceeded the statewide average crash rate while 173rd Street exceeded the state average severity rate (1.93 vs 1.05) based on 5-year crash data (2011-2015). Similarly, the IHSDM predicted crash rate per million entering vehicles for the TH 169 segment of **0.58** was close to the **0.60** calculated for the existing analysis. The projected crash rates from the IHSDM No-Build scenario were close to the existing crash rates as shown in **Table 7**, which gives a breakdown of how crash rate per MEV vary between alternatives.

Table 7: Existing vs IHSDM Intersection Crash Rates

Intersection	Existing Crash Rate (crashes/MEV)	IHSDM Crash Rate by Alternative (crashes/MEV)			
		No-Build	Concept 1	Concept 2	Concept 3
TH 169 @ Bluff	0.33	0.35	0.12	-	0.11
TH 169 @ 173rd	0.25	0.37	0.09	0.37	0.37
TH 169 @ 166th	0.08	0.34	-	-	-

Concept 1 resulted in a marked reduction in crash rates at Bluff Drive and 173rd Street. This was due to the elimination of minor roadway through movements from the proposed Restricted Crossing U-Turns (RCUTs). RCUTs are expected to maintain current traffic operations while reducing the frequency and severity of crashes at the existing at-grade crossings. The construction cost of Concept 1 was estimated to be significantly less than the others, resulting in a benefit-cost ratio of 5.32. This suggests that Concept 1 would be feasible based solely on safety benefits compared to the No-Build scenario. Estimated construction costs are shown in **Table 8**.

Table 8: Estimated Construction Costs

Alternative	Estimated Cost ($)
Concept 1 - At-Grade Interim Solutions	3,877,223
Concept 2 - Overpass of US 169	9,320,784
Concept 3 - Grade Separated Interchange at Bluff Drive	13,328,835

Concept 2 eliminated at-grade crossings along TH 169, except for 173rd Street, while focusing improvements on the local roadway network. Since there were no improvements at 173rd Street, the overall crash rate remained equal to the No-Build scenario. However, Concept 2 would result in less angled collisions and rear-end collisions due to a lower number of turning movements and conflict points along mainline TH 169. Concept 2 had a benefit-cost ratio of 1.75, suggesting that it would also be a viable alternative based solely on safety.

Concept 3 resulted in a marked reduction in the crash rate at 173rd Street due to the addition a grade separated interchange. Concept 3 had a benefit-cost greater than 1, suggesting that it could be a viable alternative based solely on safety.

Table 9: IHSDM Segment and Intersection Analysis

Site Type	IHSDM Segment and Intersection Crashes by Alternative			
	No-Build	Concept 1	Concept 2	Concept 3
Segment	403.01	403.01	403.01	403.01
Intersection	328.81	51.95	176.1	116.18
Total	731.82	454.96	579.11	519.19

Overall, Concept 1 resulted in the greatest decrease in intersection crashes, as shown in **Table 9**. There were no proposed roadway segment improvements along mainline TH 169. A summary of present value of crash costs, net safety benefit, and benefit-cost ratio are shown in **Table 10**.

Table 10: Net Safety Benefit

Alternative	Present Value of Crash Costs				Total	Safety Benefit*($)	Benefit-Cost Ratio**
	US 169 Mainline	TH 169 @ Bluff Drive	TH 169 @ 166th Street	TH 169 @ 173rd Street			
No-Build	52,102,017.45	8,412,099.52	7,901,252.78	9,141,417.34	77,556,787.09	-	-
Concept 1 - At-Grade Interim Solutions	52,102,017.45	2,338,679.58	-	2,475,363.80	56,916,060.83	20,640,726.26	5.32
Concept 2 - Overpass of TH 169	52,102,017.45	-	-	9,141,417.34	61,243,434.79	16,313,352.30	1.75
Concept 3 - Grade Separated Interchange at Bluff Drive	52,102,017.45	1,981,978.94	-	9,141,417.34	63,225,413.73	14,331,373.36	1.08

* Net Safety Benefit based on change in expected average crash frequency using the predictive methodology of the HSM

** Based on Preliminary Cost Estimate for Implementation of Each Concept

LIMITATIONS

The safety benefits of each alternative were quantified using CMFs from the HSM as well as the well-known CMF Clearinghouse[11]. However, CMFs were not available to quantify the safety benefits of median access closures. It was assumed that median access closures at current at-grade intersections would effectively form right-in right-out driveways in each direction of TH 169. Since proposed median access closures were the same for each alternative, the absence of a CMF is not expected to significantly impact the results as the analysis considered the relative difference between alternatives.

Concept 2 involves significant re-direction of traffic and elimination of turning movements along TH 169. While these measures would be expected to have safety benefit, they could not be quantified due to unavailability of applicable CMFs to take those treatments into account.

RECOMMENDATIONS

It is recommended that Concept 1 be selected as the preferred alternative as it provides comparable safety benefits to grade separation but at the lowest cost and disruption of operations along US 169. The improvement of shoulders, median widths, and lighting should also be explored as additional safety treatments for the TH 169 corridor. Since the economic analysis validated all explored concepts as viable alternatives, more emphasis could be placed on traffic operations and project objectives for future decision making.

It is worth noting that road user benefits resulting from travel time savings and vehicle operating benefits were not explored as part of the safety analysis. Those additional road user benefits should be explored in further detail to determine the most feasible alternative.

Stantec Consulting Services Inc.

Miguel Andrews

Miguel Andrews P.E., PTOE
Civil Designer

Phone: (701) 989-7089
Fax:
Miguel.Andrews@stantec.com

Attachment:

c.

[11] http://www.cmfclearinghouse.org/index.cfm

IHSDM OUTPUT/HSM SPREADSHEETS

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

October 19, 2018

Disclaimer

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Report Overview

Report Generated: Oct 19, 2018 4:19 PM
Report Template: System: Multi-Page [System] (sscpm2, Sep 30, 2018 10:21 AM)

Evaluation Date: Fri Oct 19 13:00:03 CDT 2018
IHSDM Version: v14.0.0 (Sep 26, 2018)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: miandrews
Organization Name:
Phone:
E-Mail:

Project Title: 193804245
Project Comment: Created using wizard
Project Unit System: U.S. Customary

Site Set: No-Build
Site Set Comment: Created Tue Oct 02 09:45:50 CDT 2018
Site Set Version: v29

Evaluation Title: No Build Calibrated 1
Evaluation Comment: Created Fri Oct 19 12:59:45 CDT 2018
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: Minnesota HSM Configuration - Greater Minnesota
Crash Distribution: Minnesota HSM Configuration - Greater Minnesota
Model/CMF: HSM Configuration
First Year of Analysis: 2018
Last Year of Analysis: 2038
Empirical-Bayes Analysis: None

Section Types

Rural MultiLane Site Set CPM Evaluation

Type: 4D
Calibration Factor: 0.69

Table 1. Evaluation Segment - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length(mi)	AADT	Left Side Lane Width (ft)	Right Side Lane Width (ft)	Left Side Outside Paved Shoulder Width (ft)	Right Side Outside Paved Shoulder Width (ft)	Effective Median Width (ft)	Median Type	Lighting	Automated Speed Enforcement
1	4D	USTH 169 (Johnson Memorial Highway) Segment 1	4-lane divided	2.9600	2018: 28500; 2019: 28785; 2020: 29070; 2021: 29355; 2022: 29640; 2023: 29925; 2024: 30210; 2025: 30495; 2026: 30780; 2027: 31065; 2028: 31350; 2029: 31635; 2030: 31920; 2031: 32205; 2032: 32490; 2033: 32775; 2034: 33060; 2035: 33345; 2036: 33630; 2037: 33915; 2038: 34200	24.00	24.00	10.00	4.00	40.00	Traversable Median	no	no

Table 2. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	4D	USTH 169 (Johnson Memorial Highway) Segment 1	4-lane divided	2.9600	278.09	4.4738	0.39

Table 3. Expected 4D Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Angle Collision	4.97	1.8	5.16	1.9	10.01	3.6
Highway Segment	Head-on Collision	4.97	1.8	5.16	1.9	10.01	3.6
Highway Segment	Other Collision	15.30	5.5	19.59	7.0	35.60	12.8
Highway Segment	Rear-end Collision	19.88	7.1	20.18	7.2	39.49	14.2
Highway Segment	Sideswipe	5.75	2.1	14.73	5.3	22.80	8.2
Highway Segment	Single	80.05	28.8	82.33	29.6	160.46	57.6
	Total Crashes	130.94	47.0	147.14	52.9	278.37	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.
Type: 3ST
Calibration Factor: 2.32

Table 4. Evaluation Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Skew Angle 1 (deg)	Presence of Lighting
3	3ST	TH 169 @ Jordan Avenue	Minor-Road Stop Controlled	2018: 14250; 2019: 14392; 2020: 14535; 2021: 14677; 2022: 14820; 2023: 14962; 2024: 15105; 2025: 15247; 2026: 15390; 2027: 15532; 2028: 15675; 2029: 15817; 2030: 15960; 2031: 16102; 2032: 16245; 2033: 16387; 2034: 16530; 2035: 16672; 2036: 16815; 2037: 16957; 2038: 17100	2018-2019: 90; 2020: 91; 2021: 92; 2022: 93; 2023: 94; 2024: 95; 2025: 96; 2026: 97; 2027: 98; 2028-2029: 99; 2030: 100; 2031: 101; 2032: 102; 2033: 103; 2034: 104; 2035: 105; 2036: 106; 2037: 107; 2038: 108	0	0	15.0000	no

Table 5. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Expected No. Crashes for Evaluation Period	Expected No. Crashes/Year (crashes/million veh)	Expected Crash Rate (crashes/yr)
3	3ST	TH 169 @ Jordan Avenue	Minor-Road Stop Controlled	70.42	0.58	3.3533

Table 6. Expected 3ST Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Intersection	Angle Collision	15.74	22.4	7.79	11.1	21.48	30.5
Intersection	Head-on Collision	0.79	1.1	2.49	3.5	3.59	5.1
Intersection	Other Collision	0.60	0.8	5.41	7.7	6.83	9.7
Intersection	Rear-end Collision	3.59	5.1	5.53	7.9	9.29	13.2
Intersection	Sideswipe	1.20	1.7	6.19	8.8	8.24	11.7
Intersection	Single	9.57	13.6	11.49	16.3	20.98	29.8
	Total Crashes	31.48	44.7	38.90	55.2	70.42	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.
Type: 4ST
Calibration Factor: 1.87

Table 7. Evaluation Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Skew Angle 1 (deg)	Skew Angle 2 (deg)	Presence of Lighting
1	4ST	TH 169 @ Bluff Drive	Minor-Road Stop Controlled	2018: 28500; 2019: 28785; 2020: 29070; 2021: 29355; 2022: 29640; 2023: 29925; 2024: 30210; 2025: 30495; 2026: 30780; 2027: 31065; 2028: 31350; 2029: 31635; 2030: 31920; 2031: 32205; 2032: 32490; 2033: 32775; 2034: 33060; 2035: 33345; 2036: 33630; 2037: 33915; 2038: 34200	2018: 699; 2019: 706; 2020: 713; 2021: 720; 2022: 727; 2023: 734; 2024: 741; 2025: 748; 2026: 755; 2027: 762; 2028: 769; 2029: 776; 2030: 783; 2031: 790; 2032: 797; 2033: 804; 2034: 811; 2035: 818; 2036: 825; 2037: 832; 2038: 839	2	2	0.0000	0.0000	no
2	4ST	TH 169 @ 166th Street W	Minor-Road Stop Controlled	2018: 28500; 2019: 28785; 2020: 29070; 2021: 29355; 2022: 29640; 2023: 29925; 2024: 30210; 2025: 30495; 2026: 30780; 2027: 31065; 2028: 31350; 2029: 31635; 2030: 31920; 2031: 32205; 2032: 32490; 2033: 32775; 2034: 33060; 2035: 33345; 2036: 33630; 2037: 33915; 2038: 34200	2018: 620; 2019: 626; 2020: 632; 2021: 638; 2022: 644; 2023: 651; 2024: 657; 2025: 663; 2026: 669; 2027: 675; 2028: 682; 2029: 688; 2030: 694; 2031: 700; 2032: 706; 2033: 713; 2034: 719; 2035: 725; 2036: 731; 2037: 737; 2038: 744	2	2	0.0000	0.0000	no
3	4ST	TH 169 @ 173rd Street W	Minor-Road Stop Controlled	2018: 28500; 2019: 28785; 2020: 29070; 2021: 29355; 2022: 29640; 2023: 29925; 2024: 30210; 2025: 30495; 2026: 30780; 2027: 31065; 2028: 31350; 2029: 31635; 2030: 31920; 2031: 32205; 2032: 32490; 2033: 32775; 2034: 33060; 2035: 33345; 2036: 33630; 2037: 33915; 2038: 34200	2018: 433; 2019: 437; 2020: 441; 2021: 446; 2022: 450; 2023: 454; 2024: 459; 2025: 463; 2026: 467; 2027: 472; 2028: 476; 2029: 480; 2030: 485; 2031: 489; 2032: 493; 2033: 498; 2034: 502; 2035: 506; 2036: 511; 2037: 515; 2038: 520	2	2	20.0000	20.0000	yes

Table 8. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Expected No. Crashes for Evaluation Period	Expected No. Crashes/Year (crashes/million veh)	Expected Crash Rate (crashes/yr)
1	4ST	TH 169 @ Bluff Drive	Minor-Road Stop Controlled	86.86	0.35	4.1363
2	4ST	TH 169 @ 166th Street W	Minor-Road Stop Controlled	82.29	0.34	3.9187
3	4ST	TH 169 @ 173rd Street W	Minor-Road Stop Controlled	89.23	0.37	4.2491

Table 9. Expected 4ST Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Intersection	Angle Collision	48.60	18.8	41.30	16.0	94.31	36.5
Intersection	Head-on Collision	1.37	0.5	9.36	3.6	10.08	3.9
Intersection	Other Collision	8.02	3.1	21.57	8.4	28.94	11.2
Intersection	Rear-end Collision	9.76	3.8	25.25	9.8	34.37	13.3
Intersection	Sideswipe	4.56	1.8	19.40	7.5	22.74	8.8
Intersection	Single	18.87	7.3	50.33	19.5	67.70	26.2
	Total Crashes	91.18	35.3	167.21	64.8	258.13	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

October 19, 2018

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Report Overview

Report Generated: Oct 19, 2018 4:19 PM
Report Template: System: Multi-Page [System] (sscpm2, Sep 30, 2018 10:21 AM)

Evaluation Date: Fri Oct 19 13:00:29 CDT 2018
IHSDM Version: v14.0.0 (Sep 26, 2018)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: miandrews
Organization Name:
Phone:
E-Mail:

Project Title: 193804245
Project Comment: Created using wizard
Project Unit System: U.S. Customary

Site Set: Alternative 1
Site Set Comment: Copied from No-Build (v19)
Site Set Version: v15

Evaluation Title: No-Build Calibrated 2
Evaluation Comment: Created Fri Oct 19 13:00:14 CDT 2018
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: Minnesota HSM Configuration - Greater Minnesota
Crash Distribution: Minnesota HSM Configuration - Greater Minnesota
Model/CMF: HSM Configuration
First Year of Analysis: 2018
Last Year of Analysis: 2038
Empirical-Bayes Analysis: None

Section Types

Rural MultiLane Site Set CPM Evaluation

Type: 4D
Calibration Factor: 0.69

Table 1. Evaluation Segment - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length(mi)	AADT	Left Side Lane Width (ft)	Right Side Lane Width (ft)	Left Side Outside Paved Shoulder Width (ft)	Right Side Outside Paved Shoulder Width (ft)	Effective Median Width (ft)	Median Type	Lighting	Automated Speed Enforcement
1	4D	USTH 169 (Johnson Memorial Highway) Segment 1	4-lane divided	2.9600	2018: 28500; 2019: 28785; 2020: 29070; 2021: 29355; 2022: 29640; 2023: 29925; 2024: 30210; 2025: 30495; 2026: 30780; 2027: 31065; 2028: 31350; 2029: 31635; 2030: 31920; 2031: 32205; 2032: 32490; 2033: 32775; 2034: 33060; 2035: 33345; 2036: 33630; 2037: 33915; 2038: 34200	24.00	24.00	10.00	4.00	40.00	Traversable Median	no	no

Table 2. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	4D	USTH 169 (Johnson Memorial Highway) Segment 1	4-lane divided	2.9600	278.09	4.4738	0.39

Table 3. Expected 4D Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Angle Collision	4.97	1.8	5.16	1.9	10.01	3.6
Highway Segment	Head-on Collision	4.97	1.8	5.16	1.9	10.01	3.6
Highway Segment	Other Collision	15.30	5.5	19.59	7.0	35.60	12.8
Highway Segment	Rear-end Collision	19.88	7.1	20.18	7.2	39.49	14.2
Highway Segment	Sideswipe	5.75	2.1	14.73	5.3	22.80	8.2
Highway Segment	Single	80.05	28.8	82.33	29.6	160.46	57.6
	Total Crashes	130.94	47.0	147.14	52.9	278.37	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.
Type: 4ST
Calibration Factor: 1.87

Table 4. Evaluation Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Skew Angle 1 (deg)	Skew Angle 2 (deg)	Presence of Lighting
3	4ST	TH 169 @ 173rd Street W	Minor-Road Stop Controlled	2018: 28500; 2019: 28785; 2020: 29070; 2021: 29355; 2022: 29640; 2023: 29925; 2024: 30210; 2025: 30495; 2026: 30780; 2027: 31065; 2028: 31350; 2029: 31635; 2030: 31920; 2031: 32205; 2032: 32490; 2033: 32775; 2034: 33060; 2035: 33345; 2036: 33630; 2037: 33915; 2038: 34200	2018: 433; 2019: 437; 2020: 441; 2021: 446; 2022: 450; 2023: 454; 2024: 459; 2025: 463; 2026: 467; 2027: 472; 2028: 476; 2029: 480; 2030: 485; 2031: 489; 2032: 493; 2033: 498; 2034: 502; 2035: 506; 2036: 511; 2037: 515; 2038: 520	2	2	20.0000	20.0000	yes
2	4ST	TH 169 @ Bluff Street	Minor-Road Stop Controlled	2018: 28500; 2019: 28785; 2020: 29070; 2021: 29355; 2022: 29640; 2023: 29925; 2024: 30210; 2025: 30495; 2026: 30780; 2027: 31065; 2028: 31350; 2029: 31635; 2030: 31920; 2031: 32205; 2032: 32490; 2033: 32775; 2034: 33060; 2035: 33345; 2036: 33630; 2037: 33915; 2038: 34200	2018: 699; 2019: 706; 2020: 713; 2021: 720; 2022: 727; 2023: 734; 2024: 741; 2025: 748; 2026: 755; 2027: 762; 2028: 769; 2029: 776; 2030: 783; 2031: 790; 2032: 797; 2033: 804; 2034: 811; 2035: 818; 2036: 825; 2037: 832; 2038: 839	2	2	0.0000	0.0000	no

Table 5. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Expected No. Crashes for Evaluation Period	Expected No. Crashes/Year (crashes/million veh)	Expected Crash Rate (crashes/yr)
3	4ST	TH 169 @ 173rd Street W	Minor-Road Stop Controlled	89.23	0.37	4.2491
2	4ST	TH 169 @ Bluff Street	Minor-Road Stop Controlled	86.86	0.35	4.1363

Table 6. Expected 4ST Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Intersection	Angle Collision	33.54	19.1	27.95	15.9	64.27	36.5
Intersection	Head-on Collision	0.94	0.5	6.34	3.6	6.87	3.9
Intersection	Other Collision	5.54	3.1	14.60	8.3	19.72	11.2
Intersection	Rear-end Collision	6.73	3.8	17.09	9.7	23.42	13.3
Intersection	Sideswipe	3.15	1.8	13.13	7.5	15.50	8.8
Intersection	Single	13.03	7.4	34.06	19.4	46.14	26.2
	Total Crashes	62.93	35.8	113.16	64.3	175.92	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Interactive Highway Safety Design Model

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Report Overview

Report Generated: Oct 19, 2018 4:20 PM
Report Template: System: Multi-Page [System] (sscpm2, Sep 30, 2018 10:21 AM)

Evaluation Date: Fri Oct 19 13:00:53 CDT 2018
IHSDM Version: v14.0.0 (Sep 26, 2018)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: miandrews
Organization Name:
Phone:
E-Mail:

Project Title: 193804245
Project Comment: Created using wizard
Project Unit System: U.S. Customary

Site Set: Alternative 2
Site Set Comment: Copied from Alternative 1 (v7)
Site Set Version: v7

Evaluation Title: Alternative 2 Calibrated 1
Evaluation Comment: Created Fri Oct 19 13:00:35 CDT 2018
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: Minnesota HSM Configuration - Greater Minnesota
Crash Distribution: Minnesota HSM Configuration - Greater Minnesota
Model/CMF: HSM Configuration
First Year of Analysis: 2018
Last Year of Analysis: 2038
Empirical-Bayes Analysis: None

Section Types

Rural MultiLane Site Set CPM Evaluation

Type: 4D
Calibration Factor: 0.69

Table 1. Evaluation Segment - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length(mi)	AADT	Left Side Lane Width (ft)	Right Side Lane Width (ft)	Left Side Outside Paved Shoulder Width (ft)	Right Side Outside Paved Shoulder Width (ft)	Effective Median Width (ft)	Median Type	Lighting	Automated Speed Enforcement
1	4D	USTH 169 (Johnson Memorial Highway) Segment 1	4-lane divided	2.9600	2018: 28500; 2019: 28785; 2020: 29070; 2021: 29355; 2022: 29640; 2023: 29925; 2024: 30210; 2025: 30495; 2026: 30780; 2027: 31065; 2028: 31350; 2029: 31635; 2030: 31920; 2031: 32205; 2032: 32490; 2033: 32775; 2034: 33060; 2035: 33345; 2036: 33630; 2037: 33915; 2038: 34200	24.00	24.00	10.00	4.00	40.00	Traversable Median	no	no

Table 2. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	4D	USTH 169 (Johnson Memorial Highway) Segment 1	4-lane divided	2.9600	278.09	4.4738	0.39

Table 3. Expected 4D Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Angle Collision	4.97	1.8	5.16	1.9	10.01	3.6
Highway Segment	Head-on Collision	4.97	1.8	5.16	1.9	10.01	3.6
Highway Segment	Other Collision	15.30	5.5	19.59	7.0	35.60	12.8
Highway Segment	Rear-end Collision	19.88	7.1	20.18	7.2	39.49	14.2
Highway Segment	Sideswipe	5.75	2.1	14.73	5.3	22.80	8.2
Highway Segment	Single	80.05	28.8	82.33	29.6	160.46	57.6
	Total Crashes	130.94	47.0	147.14	52.9	278.37	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.
Type: 4ST
Calibration Factor: 1.87

Table 4. Evaluation Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Skew Angle 1 (deg)	Skew Angle 2 (deg)	Presence of Lighting
1	4ST	TH 169 @ Bluff Drive	4-legged stop control	2018: 28500; 2019: 28785; 2020: 29070; 2021: 29355; 2022: 29640; 2023: 29925; 2024: 30210; 2025: 30495; 2026: 30780; 2027: 31065; 2028: 31350; 2029: 31635; 2030: 31920; 2031: 32205; 2032: 32490; 2033: 32775; 2034: 33060; 2035: 33345; 2036: 33630; 2037: 33915; 2038: 34200	2018: 699; 2019: 706; 2020: 713; 2021: 720; 2022: 727; 2023: 734; 2024: 741; 2025: 748; 2026: 755; 2027: 762; 2028: 769; 2029: 776; 2030: 783; 2031: 790; 2032: 797; 2033: 804; 2034: 811; 2035: 818; 2036: 825; 2037: 832; 2038: 839	2	2	0.0000	0.0000	no
2	4ST	TH 169 @ 173rd Street	4-legged stop control	2018: 28500; 2019: 28785; 2020: 29070; 2021: 29355; 2022: 29640; 2023: 29925; 2024: 30210; 2025: 30495; 2026: 30780; 2027: 31065; 2028: 31350; 2029: 31635; 2030: 31920; 2031: 32205; 2032: 32490; 2033: 32775; 2034: 33060; 2035: 33345; 2036: 33630; 2037: 33915; 2038: 34200	2018: 433; 2019: 437; 2020: 441; 2021: 446; 2022: 450; 2023: 454; 2024: 459; 2025: 463; 2026: 467; 2027: 472; 2028: 476; 2029: 480; 2030: 485; 2031: 489; 2032: 493; 2033: 498; 2034: 502; 2035: 506; 2036: 511; 2037: 515; 2038: 520	2	2	20.0000	20.0000	yes

Table 5. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Expected No. Crashes for Evaluation Period	Expected No. Crashes/Year (crashes/million veh)	Expected Crash Rate (crashes/yr)
1	4ST	TH 169 @ Bluff Drive	4-legged stop control	86.86	0.35	4.1363
2	4ST	TH 169 @ 173rd Street	4-legged stop control	89.23	0.37	4.2491

Table 6. Expected 4ST Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Intersection	Angle Collision	33.54	19.1	27.95	15.9	64.27	36.5
Intersection	Head-on Collision	0.94	0.5	6.34	3.6	6.87	3.9
Intersection	Other Collision	5.54	3.1	14.60	8.3	19.72	11.2
Intersection	Rear-end Collision	6.73	3.8	17.09	9.7	23.42	13.3
Intersection	Sideswipe	3.15	1.8	13.13	7.5	15.50	8.8
Intersection	Single	13.03	7.4	34.06	19.4	46.14	26.2
	Total Crashes	62.93	35.8	113.16	64.3	175.92	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

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Report Overview

Report Generated: Oct 19, 2018 4:20 PM
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Evaluation Date: Fri Oct 19 13:01:11 CDT 2018
IHSDM Version: v14.0.0 (Sep 26, 2018)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: miandrews
Organization Name:
Phone:
E-Mail:

Project Title: 193804245
Project Comment: Created using wizard
Project Unit System: U.S. Customary

Site Set: Alternative 3
Site Set Comment: Copied from Alternative 2 (v4)
Site Set Version: v6

Evaluation Title: Alternative 3 Calibrated 1
Evaluation Comment: Created Fri Oct 19 13:01:00 CDT 2018
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: Minnesota HSM Configuration - Greater Minnesota
Crash Distribution: Minnesota HSM Configuration - Greater Minnesota
Model/CMF: HSM Configuration
First Year of Analysis: 2018
Last Year of Analysis: 2038
Empirical-Bayes Analysis: None

Section Types

Rural MultiLane Site Set CPM Evaluation

Type: 4D
Calibration Factor: 0.69

Table 1. Evaluation Segment - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length(mi)	AADT	Left Side Lane Width (ft)	Right Side Lane Width (ft)	Left Side Outside Paved Shoulder Width (ft)	Right Side Outside Paved Shoulder Width (ft)	Effective Median Width (ft)	Median Type	Lighting	Automated Speed Enforcement
1	4D	USTH 169 (Johnson Memorial Highway) Segment 1	4-lane divided	2.9600	2018: 28500; 2019: 28785; 2020: 29070; 2021: 29355; 2022: 29640; 2023: 29925; 2024: 30210; 2025: 30495; 2026: 30780; 2027: 31065; 2028: 31350; 2029: 31635; 2030: 31920; 2031: 32205; 2032: 32490; 2033: 32775; 2034: 33060; 2035: 33345; 2036: 33630; 2037: 33915; 2038: 34200	24.00	24.00	10.00	4.00	40.00	Traversable Median	no	no

Table 2. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	4D	USTH 169 (Johnson Memorial Highway) Segment 1	4-lane divided	2.9600	278.09	4.4738	0.39

Table 3. Expected 4D Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Angle Collision	4.97	1.8	5.16	1.9	10.01	3.6
Highway Segment	Head-on Collision	4.97	1.8	5.16	1.9	10.01	3.6
Highway Segment	Other Collision	15.30	5.5	19.59	7.0	35.60	12.8
Highway Segment	Rear-end Collision	19.88	7.1	20.18	7.2	39.49	14.2
Highway Segment	Sideswipe	5.75	2.1	14.73	5.3	22.80	8.2
Highway Segment	Single	80.05	28.8	82.33	29.6	160.46	57.6
	Total Crashes	130.94	47.0	147.14	52.9	278.37	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.
Type: 4ST
Calibration Factor: 1.87

Table 4. Evaluation Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Skew Angle 1 (deg)	Skew Angle 2 (deg)	Presence of Lighting
1	4ST	TH 169 @ Bluff Drive	4-legged stop control (to be converted to grade separated interchange)	2018: 28500; 2019: 28785; 2020: 29070; 2021: 29355; 2022: 29640; 2023: 29925; 2024: 30210; 2025: 30495; 2026: 30780; 2027: 31065; 2028: 31350; 2029: 31635; 2030: 31920; 2031: 32205; 2032: 32490; 2033: 32775; 2034: 33060; 2035: 33345; 2036: 33630; 2037: 33915; 2038: 34200	2018: 699; 2019: 706; 2020: 713; 2021: 720; 2022: 727; 2023: 734; 2024: 741; 2025: 748; 2026: 755; 2027: 762; 2028: 769; 2029: 776; 2030: 783; 2031: 790; 2032: 797; 2033: 804; 2034: 811; 2035: 818; 2036: 825; 2037: 832; 2038: 839	2	2	0.0000	0.0000	no
2	4ST	TH 169 @ 173rd Street W	4-legged stop control	2018: 28500; 2019: 28785; 2020: 29070; 2021: 29355; 2022: 29640; 2023: 29925; 2024: 30210; 2025: 30495; 2026: 30780; 2027: 31065; 2028: 31350; 2029: 31635; 2030: 31920; 2031: 32205; 2032: 32490; 2033: 32775; 2034: 33060; 2035: 33345; 2036: 33630; 2037: 33915; 2038: 34200	2018: 433; 2019: 437; 2020: 441; 2021: 446; 2022: 450; 2023: 454; 2024: 459; 2025: 463; 2026: 467; 2027: 472; 2028: 476; 2029: 480; 2030: 485; 2031: 489; 2032: 493; 2033: 498; 2034: 502; 2035: 506; 2036: 511; 2037: 515; 2038: 520	2	2	0.0000	0.0000	yes

Table 5. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Expected No. Crashes for Evaluation Period	Expected No. Crashes/Year (crashes/million veh)	Expected Crash Rate (crashes/yr)
1	4ST	TH 169 @ Bluff Drive	4-legged stop control (to be converted to grade separated interchange)	86.86	0.35	4.1363
2	4ST	TH 169 @ 173rd Street W	4-legged stop control	62.59	0.26	2.9803

Table 6. Expected 4ST Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Intersection	Angle Collision	27.18	18.2	24.32	16.3	54.55	36.5
Intersection	Head-on Collision	0.77	0.5	5.51	3.7	5.83	3.9
Intersection	Other Collision	4.49	3.0	12.70	8.5	16.74	11.2
Intersection	Rear-end Collision	5.46	3.7	14.87	10.0	19.88	13.3
Intersection	Sideswipe	2.55	1.7	11.42	7.7	13.15	8.8
Intersection	Single	10.55	7.1	29.64	19.9	39.16	26.2
	Total Crashes	50.99	34.2	98.46	65.9	149.30	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

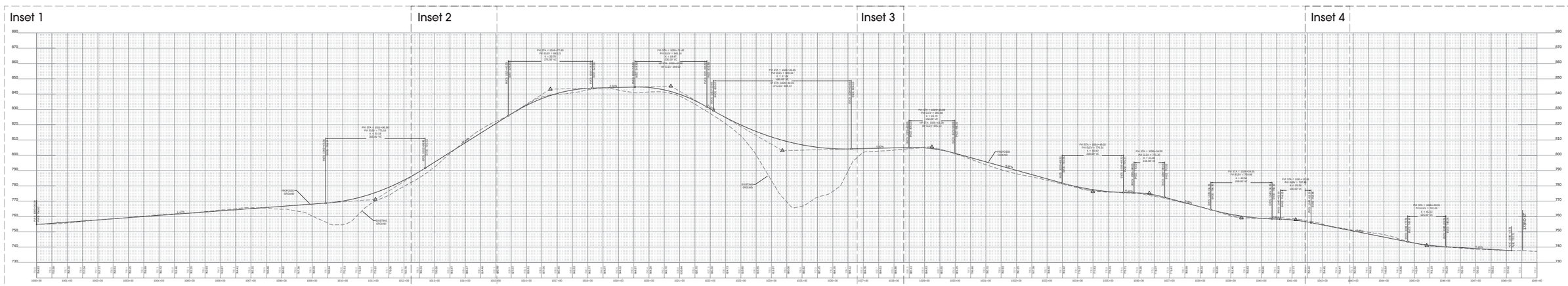
Appendix C

FRONTAGE ROAD FEASIBILITY

Sample Frontage Road Profile

Sample Frontage Road Cross Sections

Sample Frontage Road Profile
Overall Layout



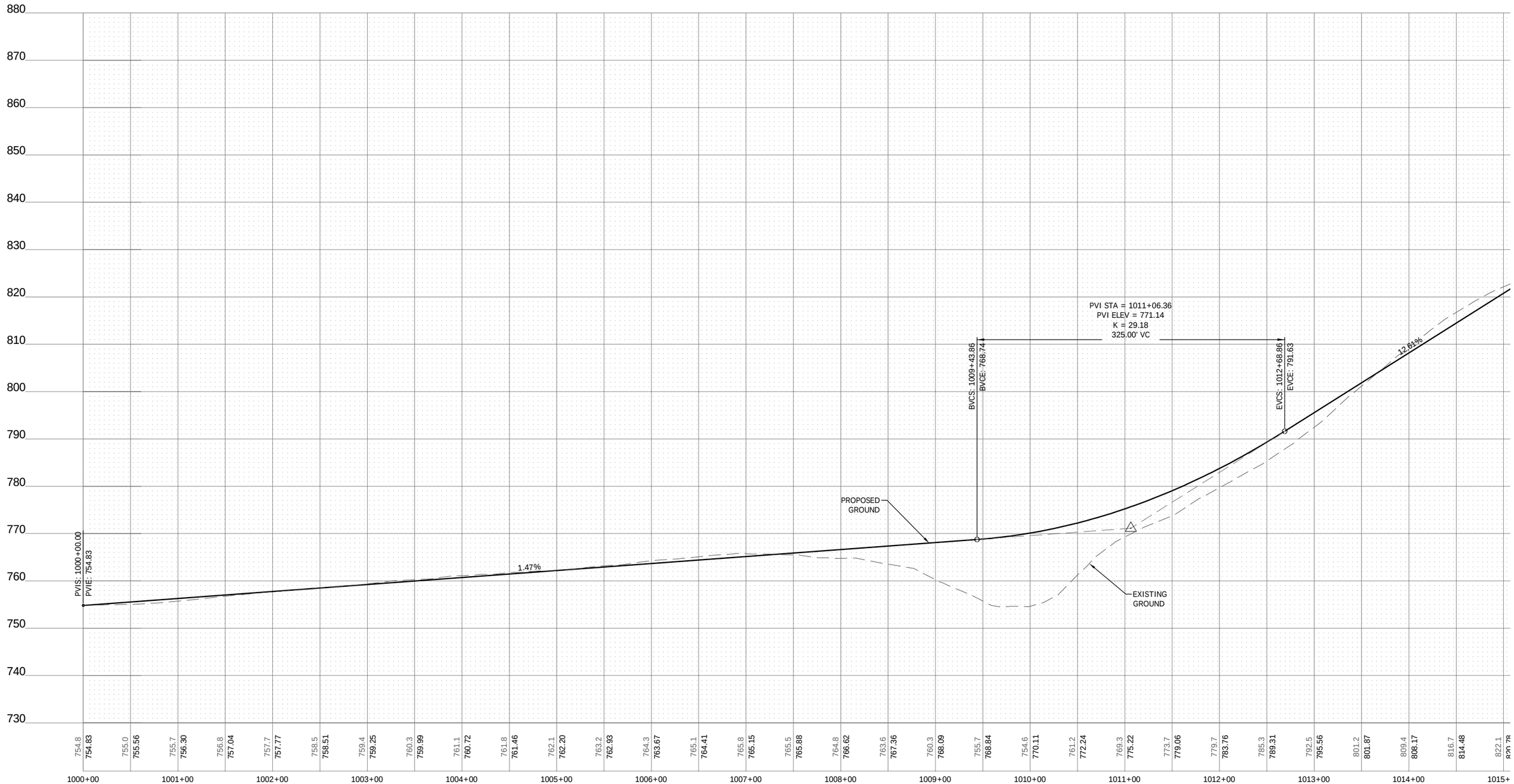
TH 169 Corridor Study

SAND CREEK TOWNSHIP, MINNESOTA

November 2018

Stantec

Sample Frontage Road Profile
Inset 1



TH 169 Corridor Study

SAND CREEK TOWNSHIP, MINNESOTA

November 2018

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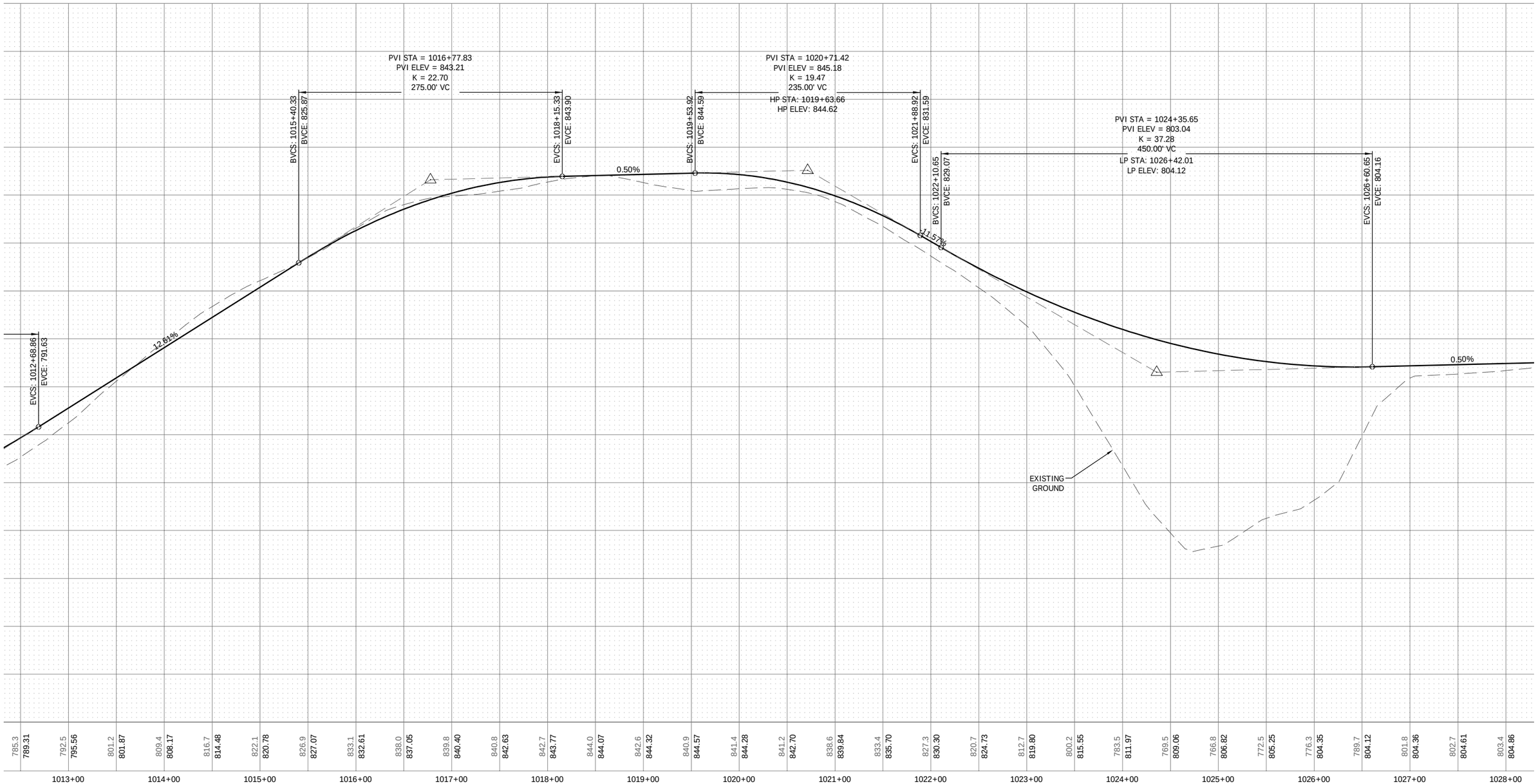
Sample Frontage Road Profile
Inset 2



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Sample Frontage Road Profile
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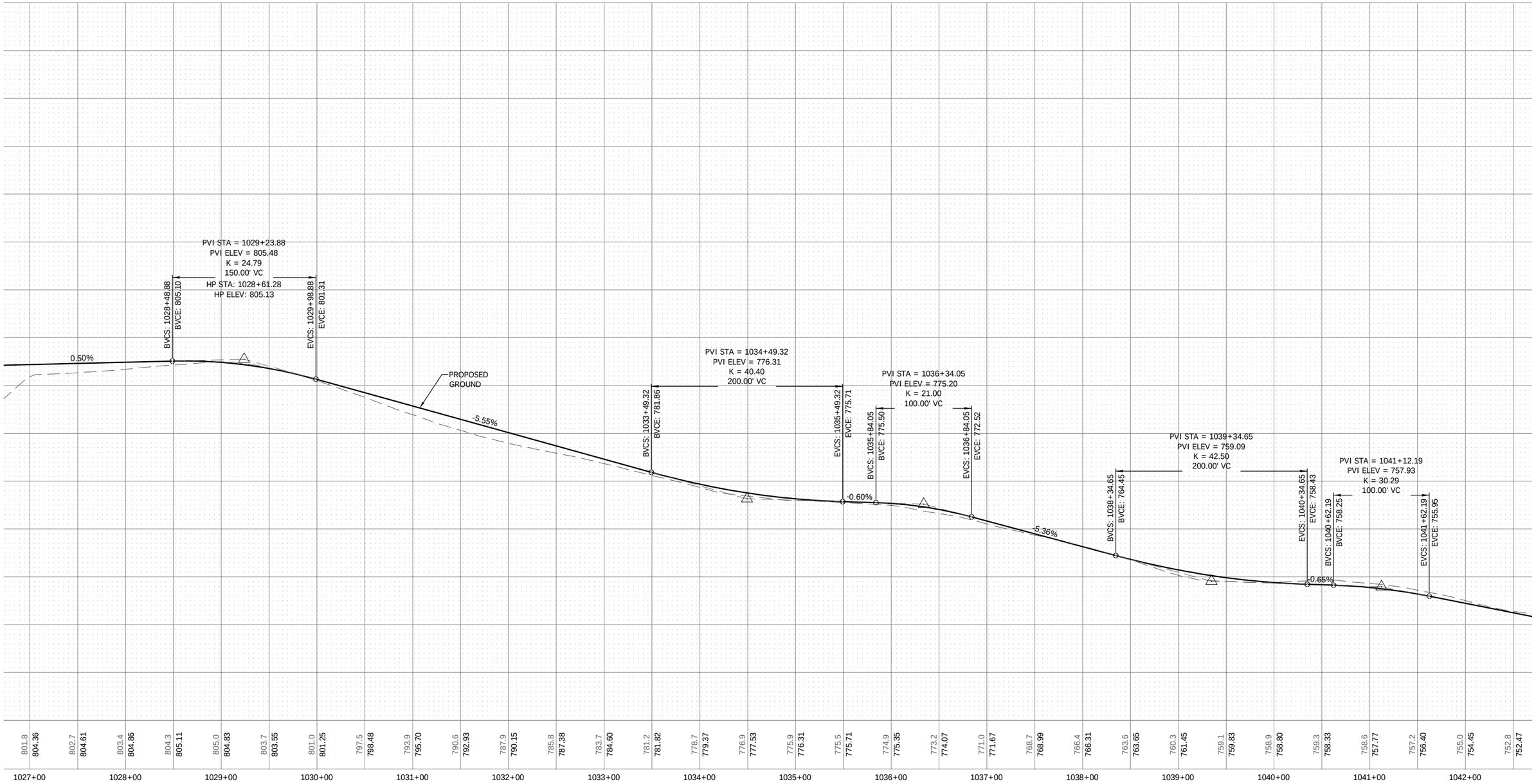

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Sample Frontage Road Profile
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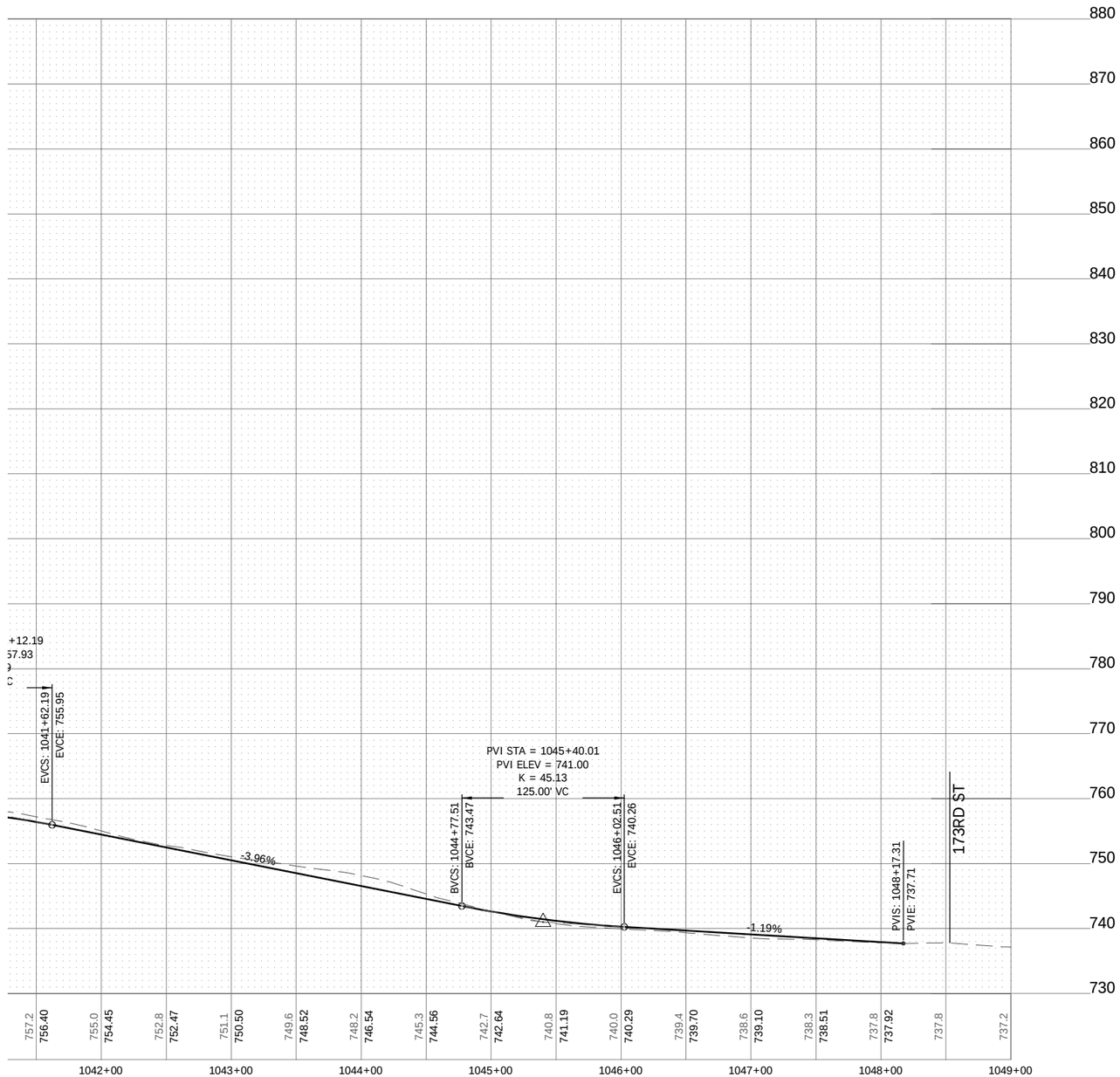

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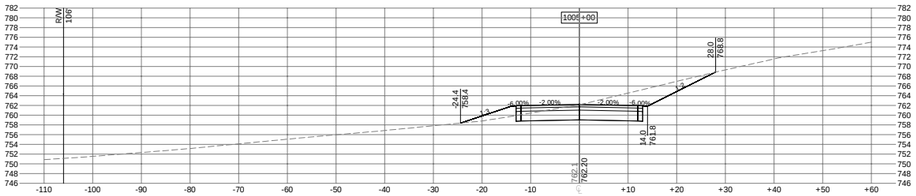
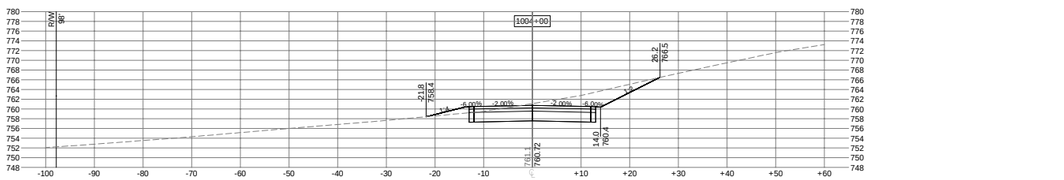
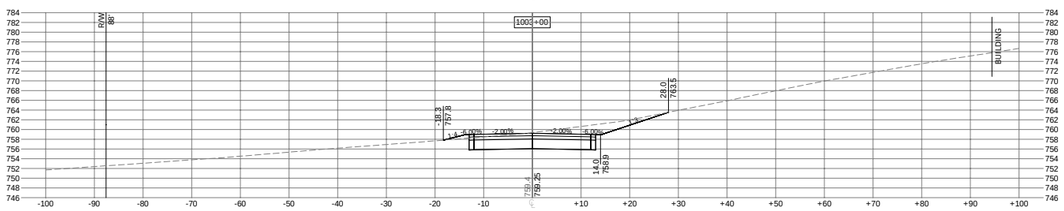
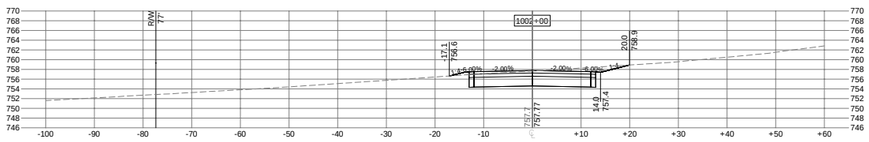
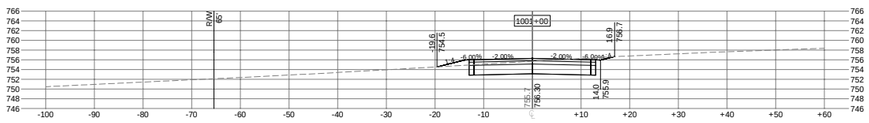
Sample Frontage Cross Sections

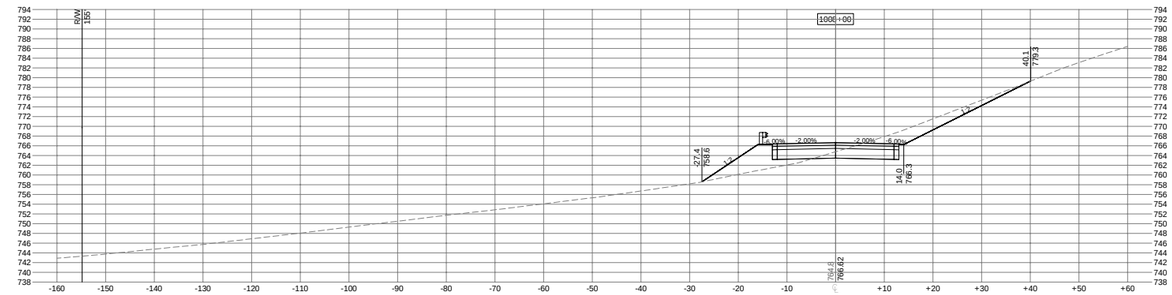


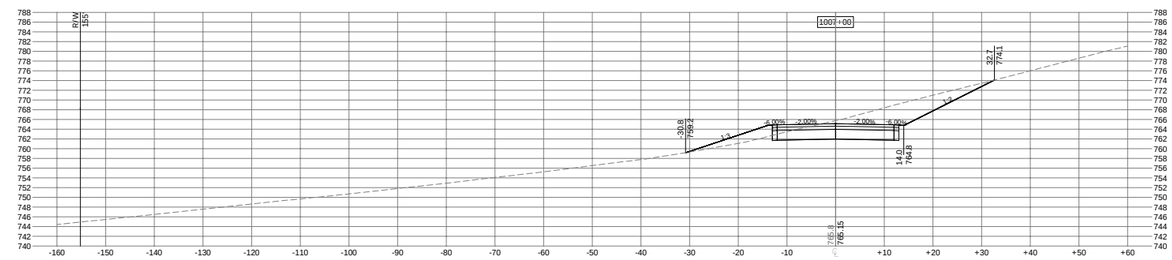


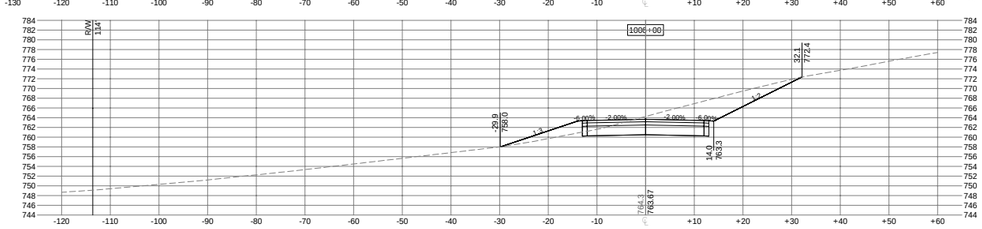












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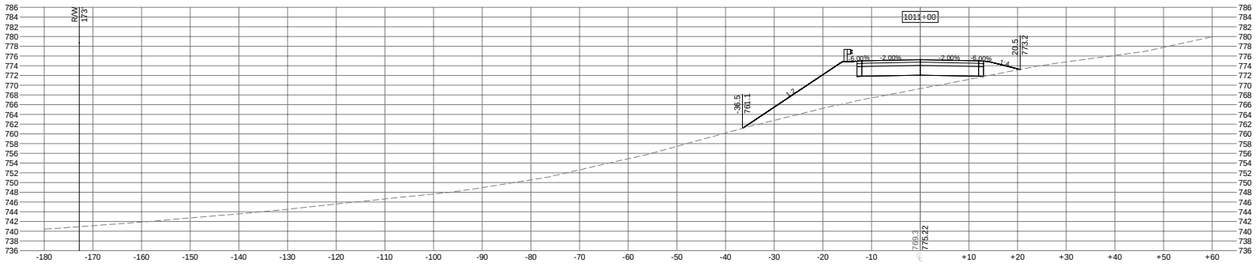
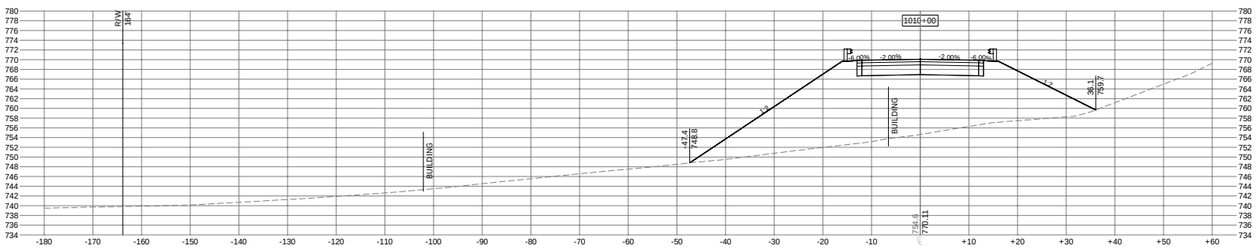
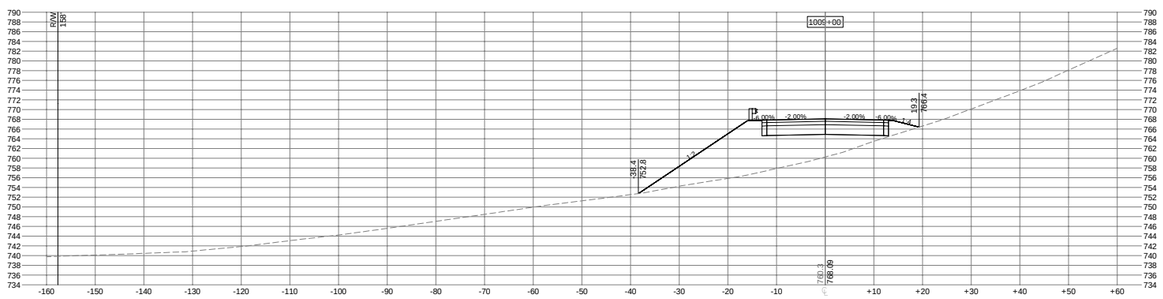
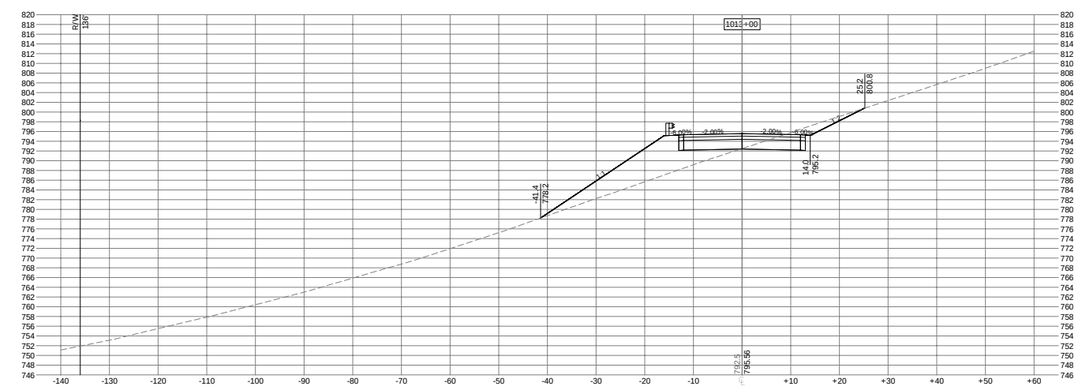
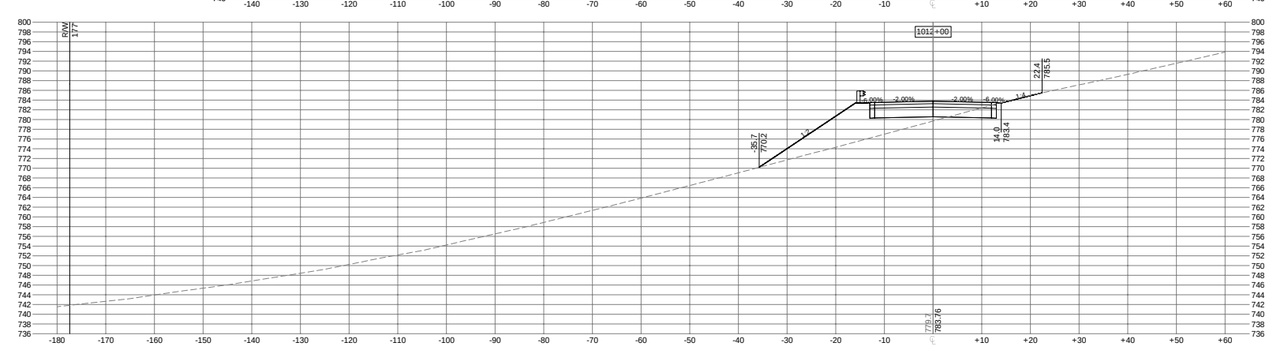
Sample Frontage Cross Sections











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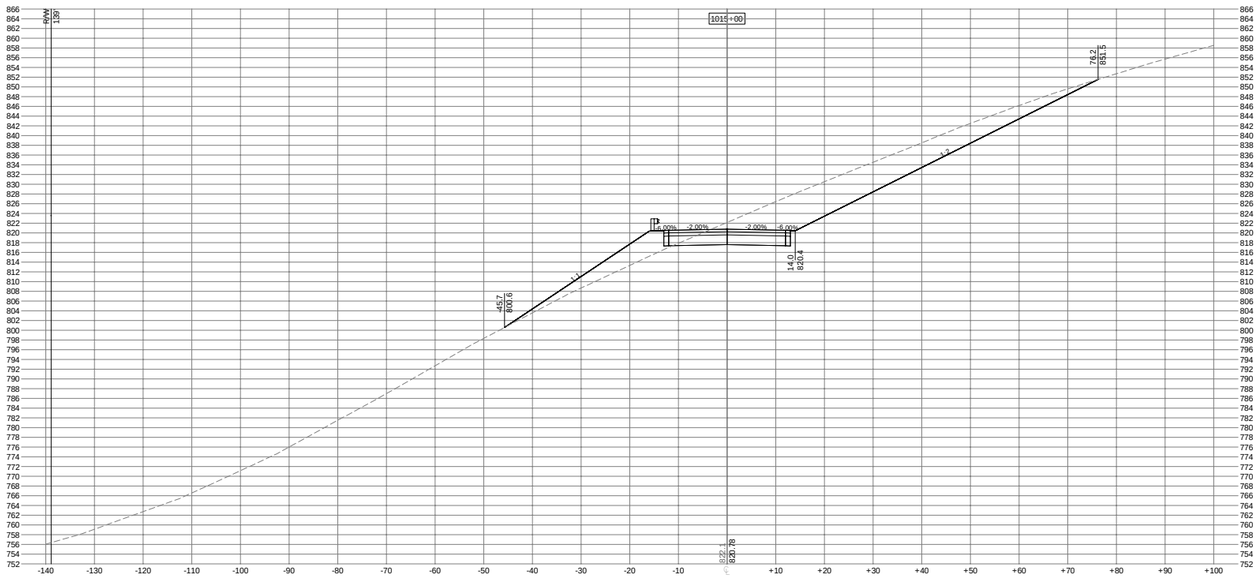
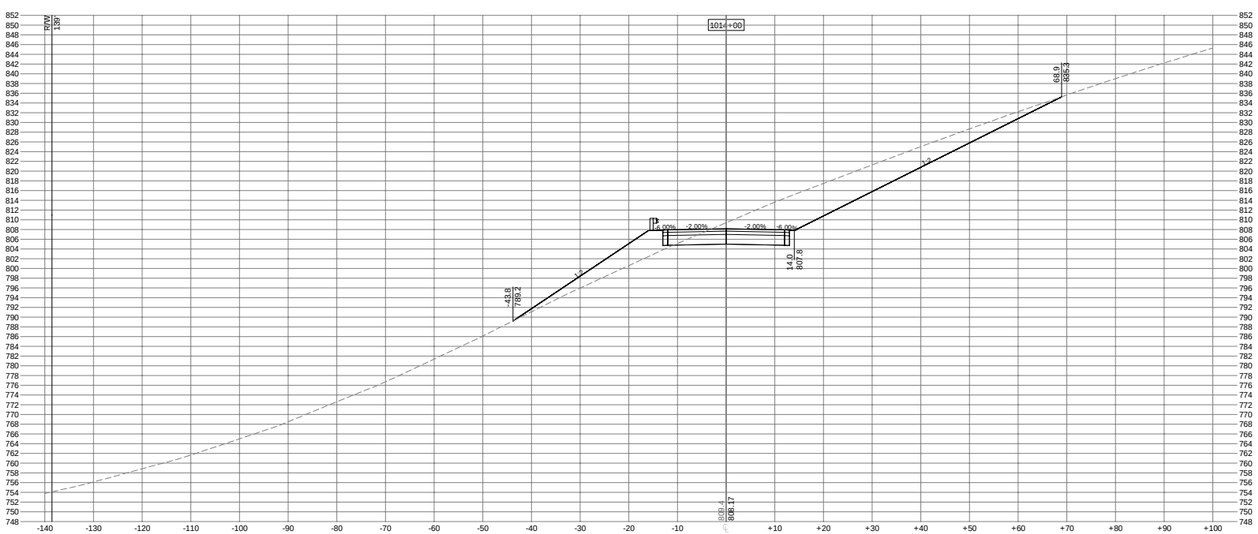
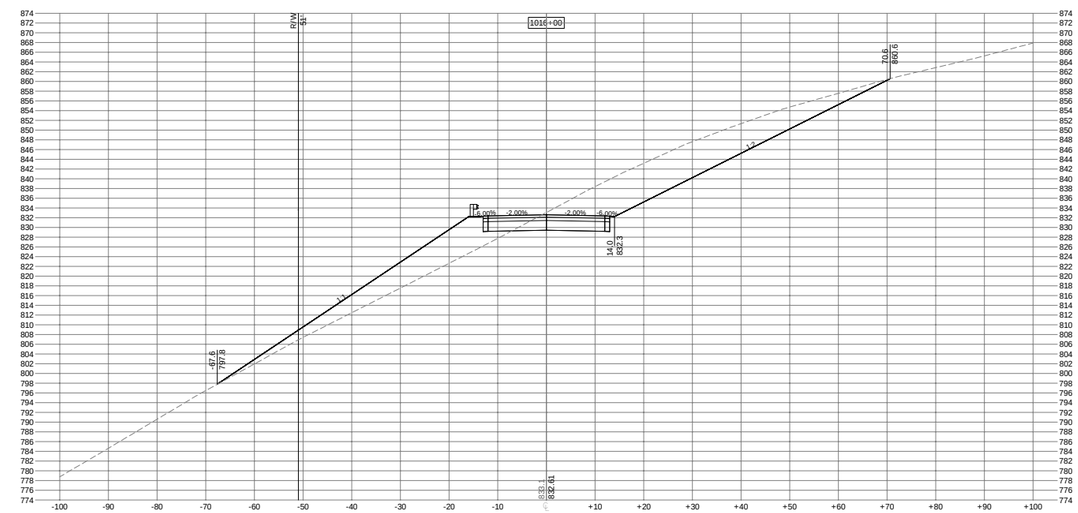
Sample Frontage Cross Sections







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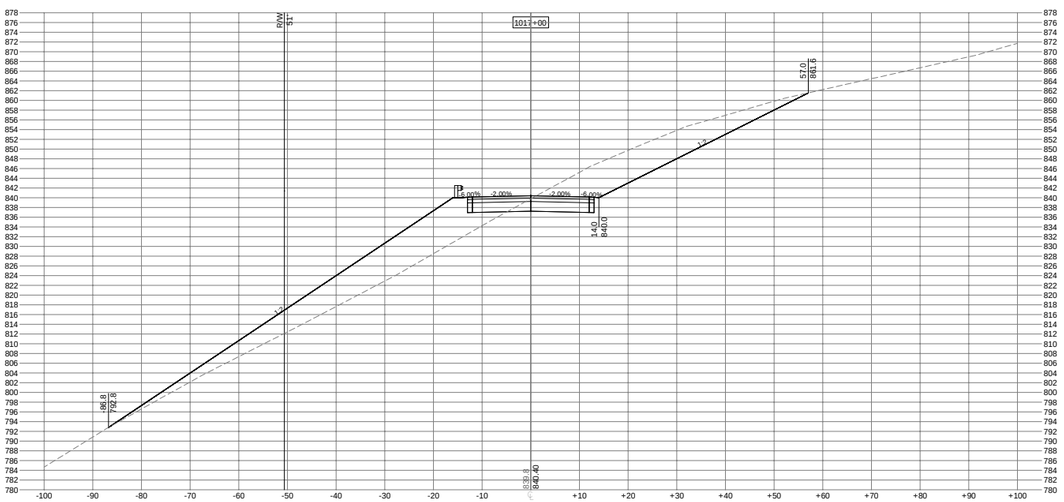
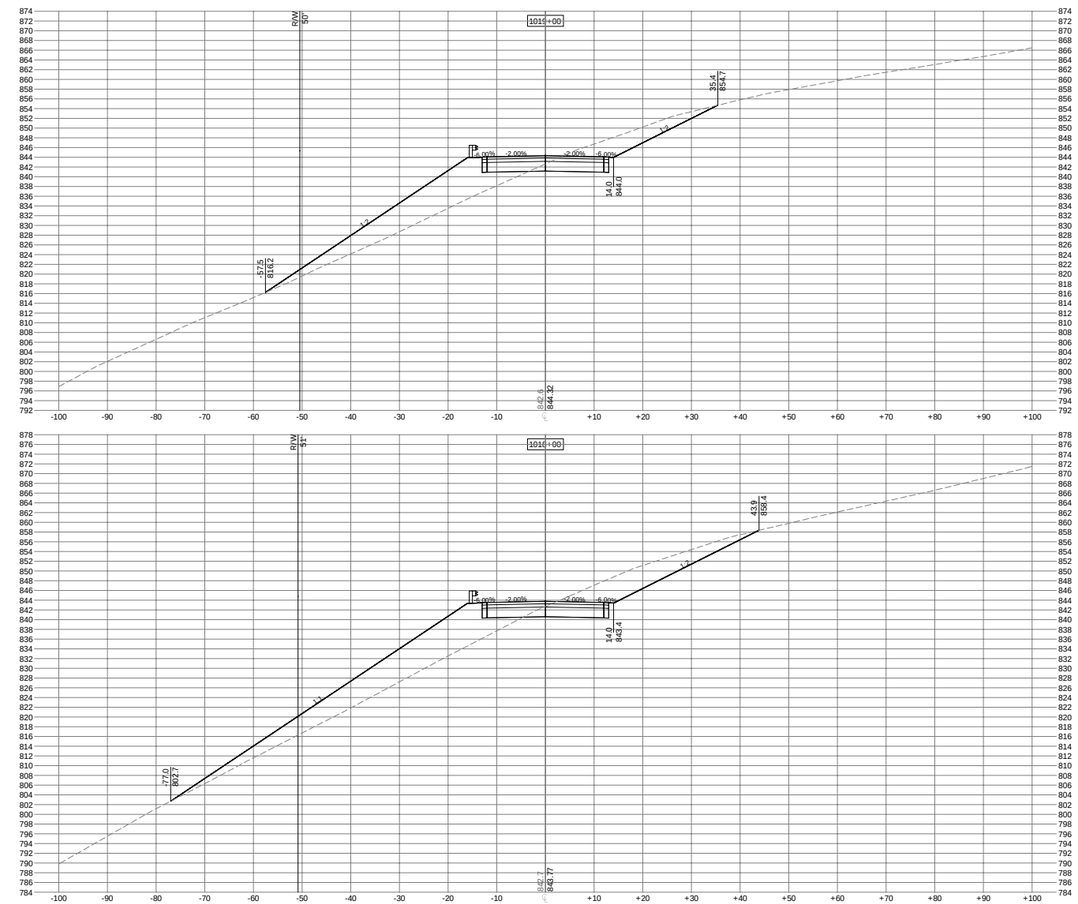
Sample Frontage Cross Sections





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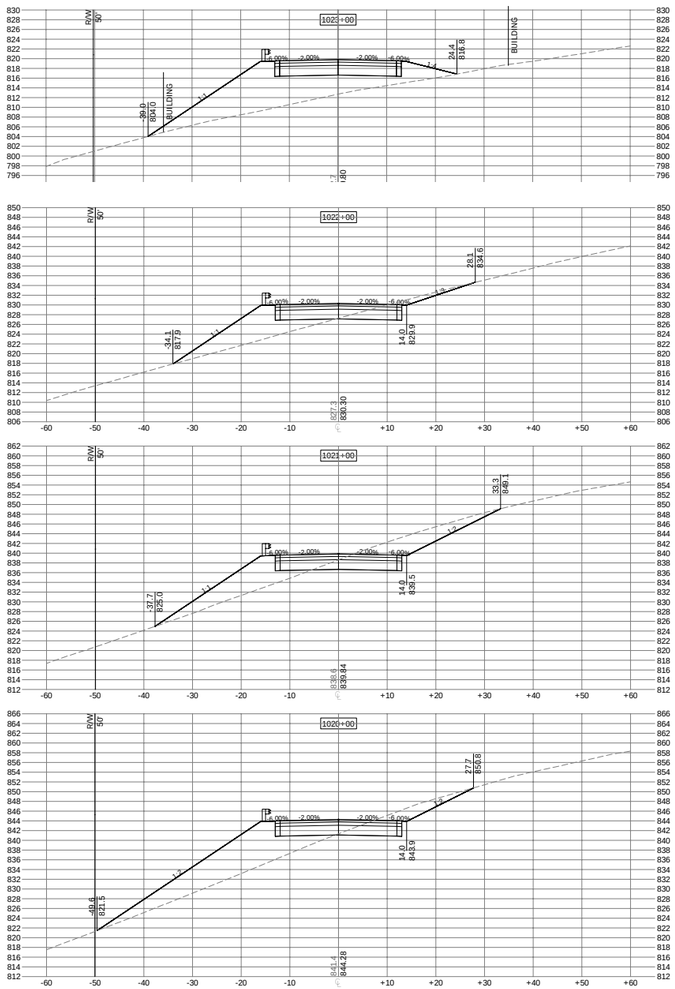
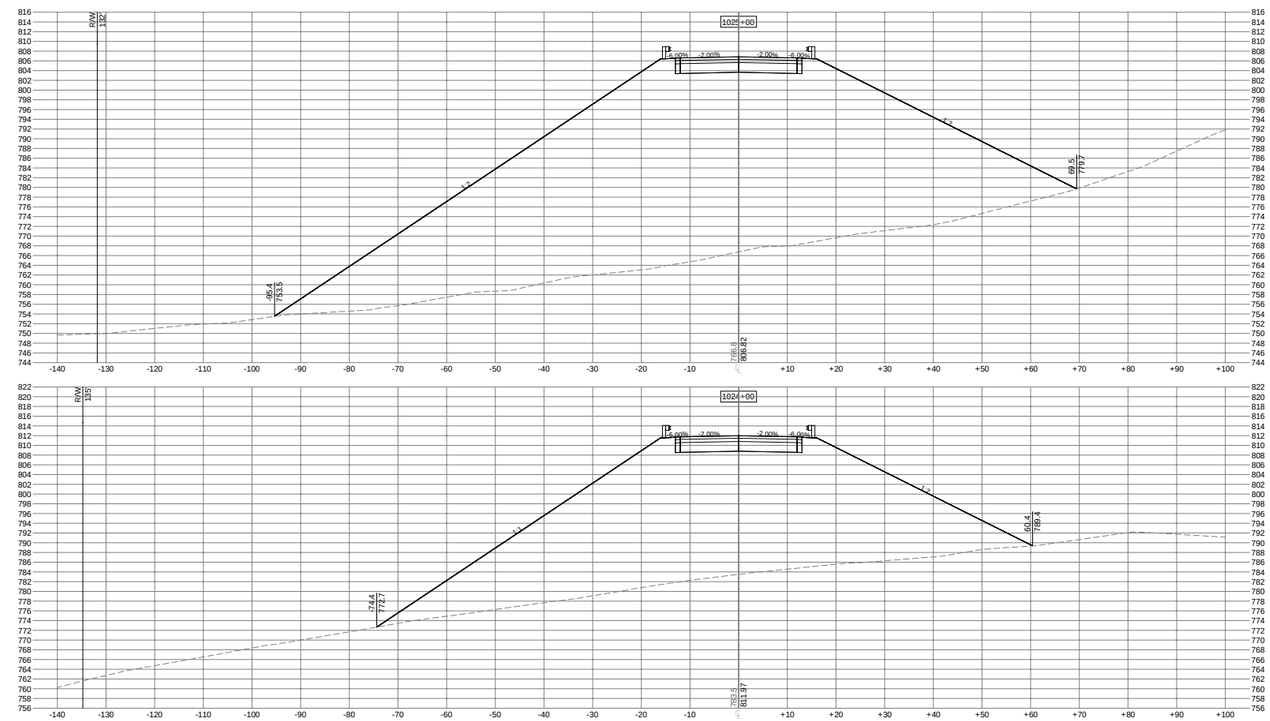
Sample Frontage Cross Sections





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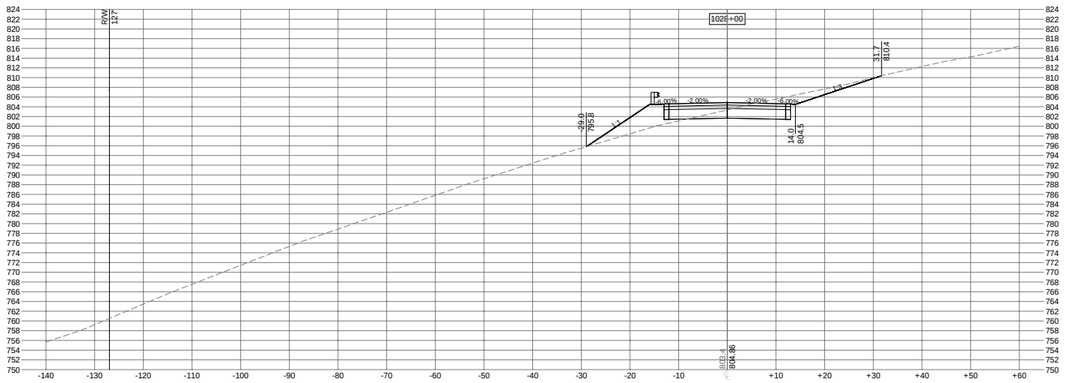
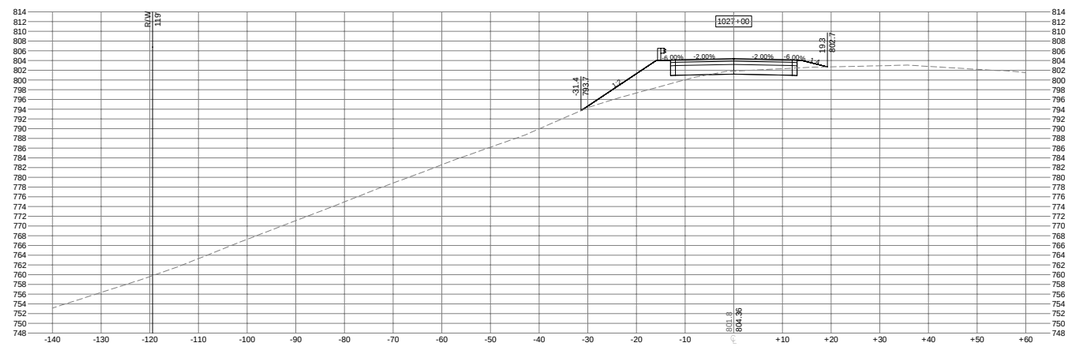
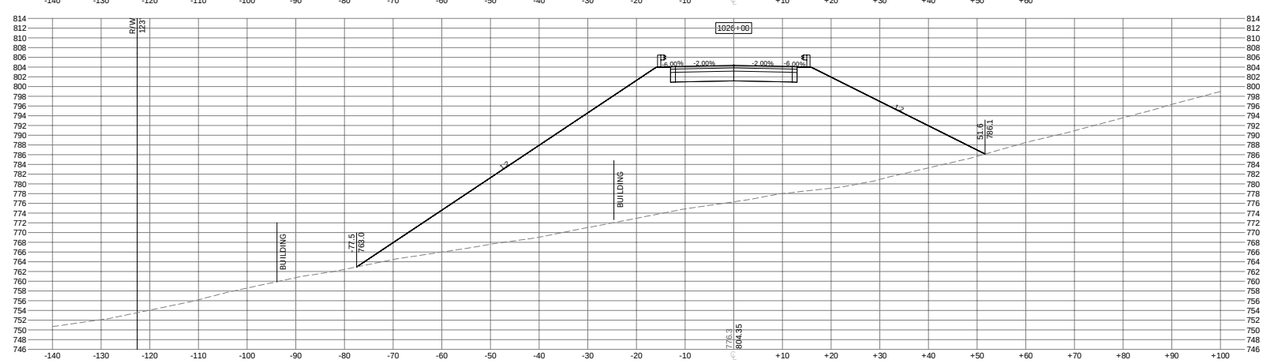
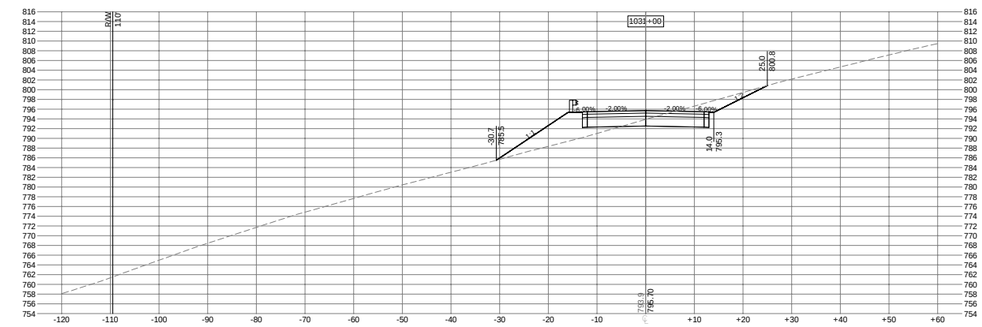
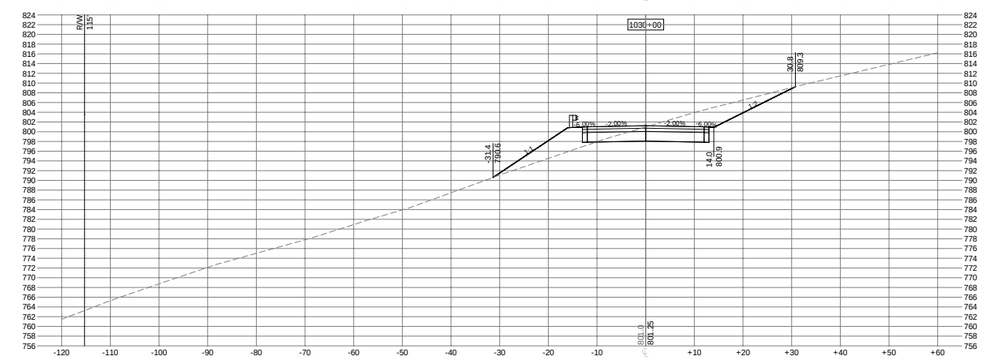
Sample Frontage Cross Sections

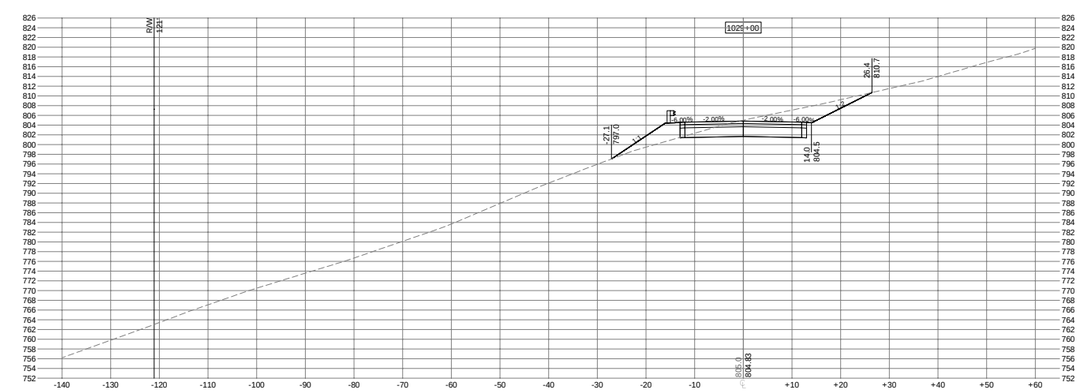












TH 169 Corridor Study

SAND CREEK TOWNSHIP, MINNESOTA

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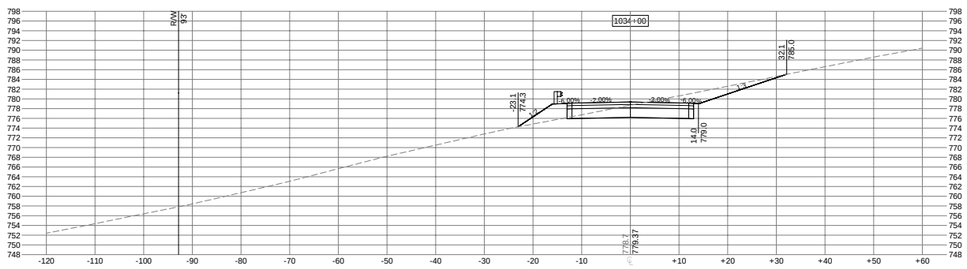
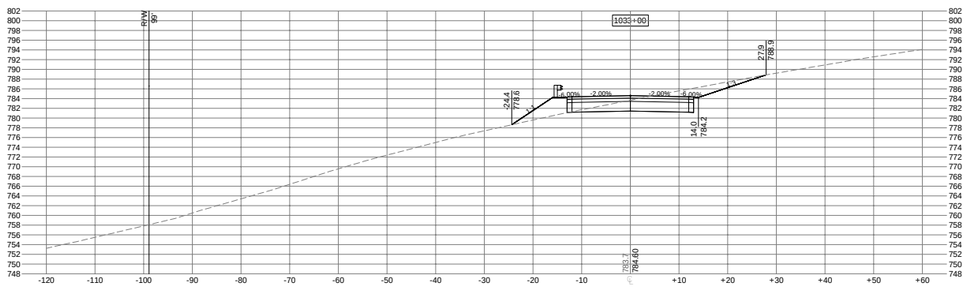
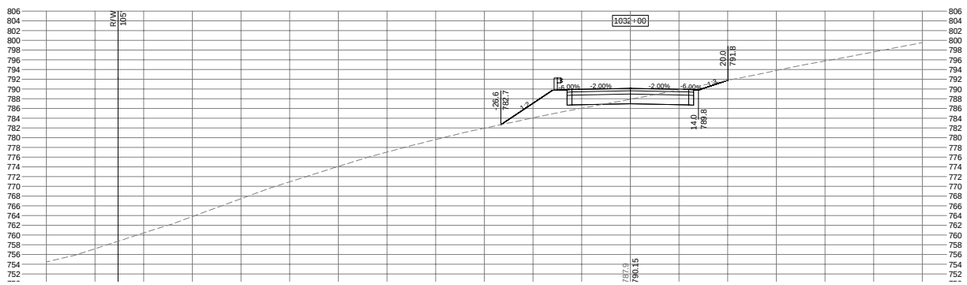
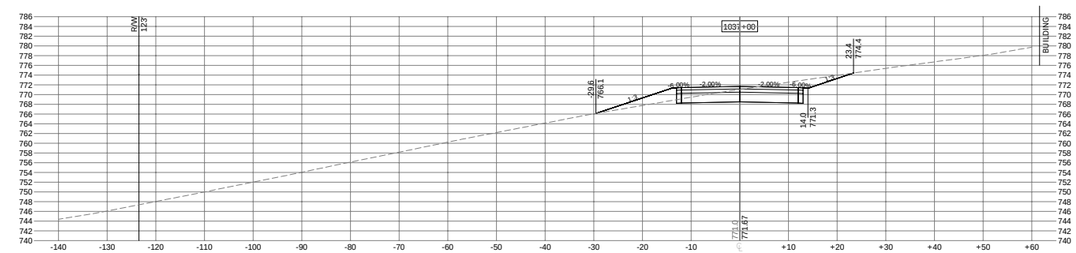
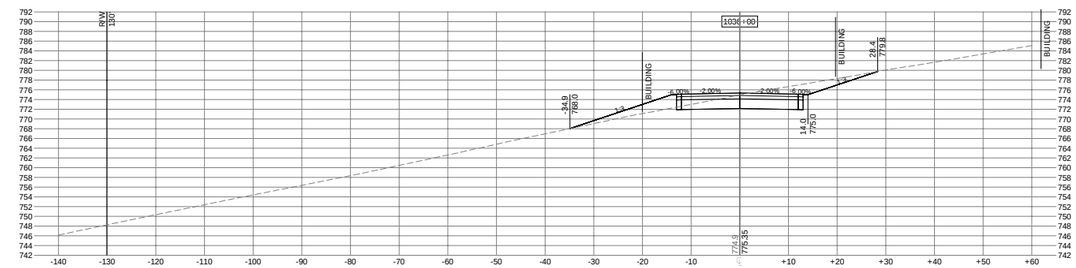
Sample Frontage Cross Sections

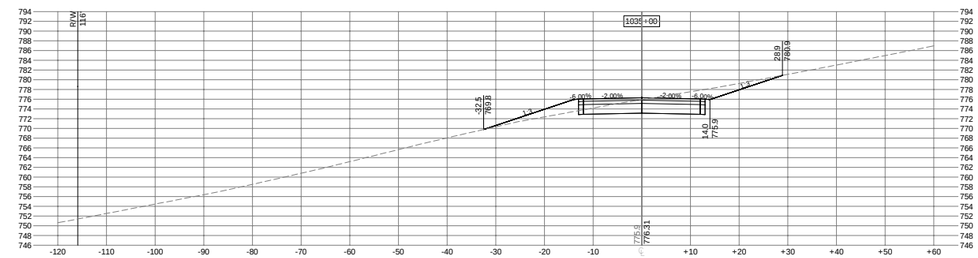












TH 169 Corridor Study

SAND CREEK TOWNSHIP, MINNESOTA

November 2018

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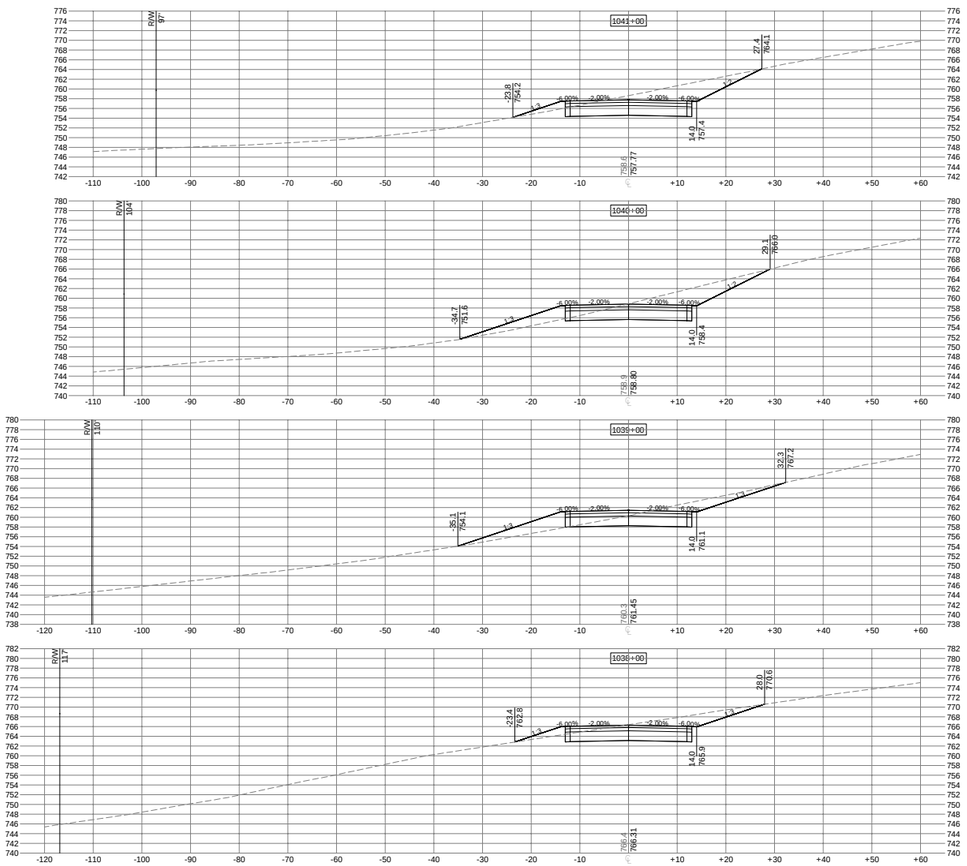
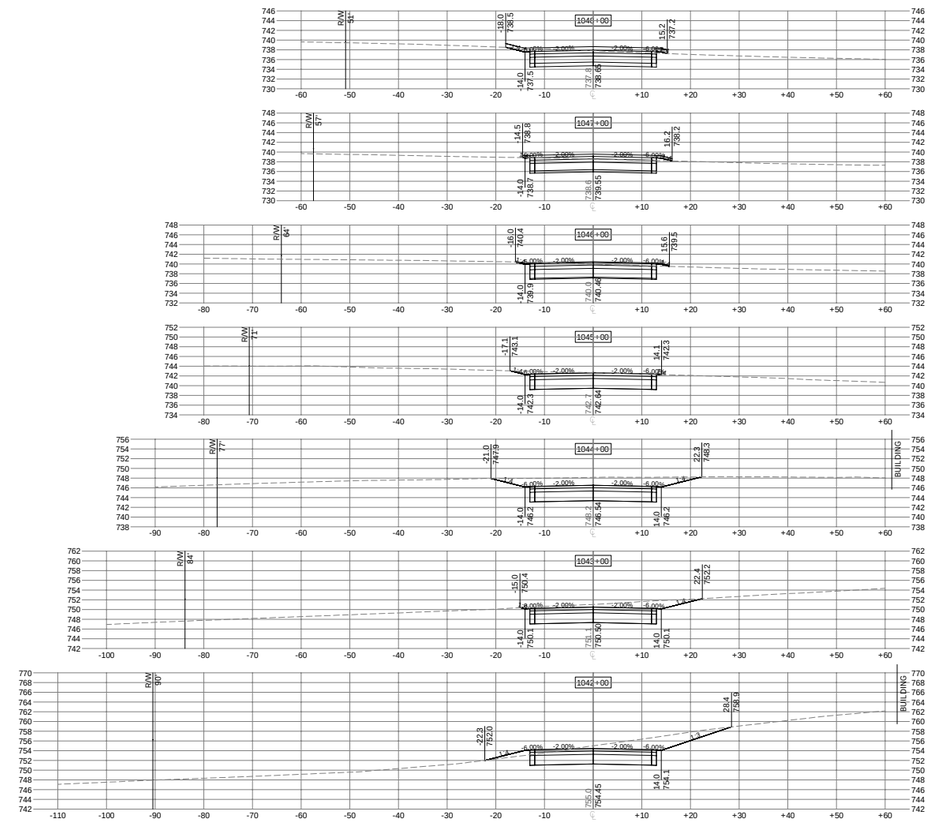
Sample Frontage Cross Sections





TH 169 Corridor Study

SAND CREEK TOWNSHIP, MINNESOTA

November 2018

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Appendix D

MEETING SUMMARIES

Business Owner Meeting Summary

Public Input Meeting Summary

Agency Kick-Off Meeting Notes

Concept Development Workshop

Final Concept Review Meeting

Stantec

Meeting Summary

Business and Land Owner Open House

Sand Creek Township TH169 Study / 193804245

Date/Time:	June 6, 2018 / 4PM to 7PM
Place:	SCALE Regional Training Facility – 17706 Valley View Drive Jordan, MN 55352
Attendees:	See Sign-In Sheet

Overview

Sand Creek Township initiated a project to study the feasibility of access improvements along TH 169 south of the Louisville Township line and north of Jordan, MN. The purpose of the study is to gather information, define issues, and discuss improvement strategies for TH 169 within Sand Creek Township. Improvement options will include safety, mobility, freight, accessibility, connectivity, public input, and environmental considerations.

A meeting with business and property owners along the project corridor was held to gain input on their specific needs, concerns, desires, and ideas as they relate to the TH 169 corridor. The open house was held at the SCALE Regional Training Facility from 4-7pm in Jordan, Minnesota. Project representatives from Sand Creek Township and Stantec Consulting were at the meeting to assist in facilitating discussion, answering questions, and collecting input from business/landowners.

Advertising

A direct invite and comment card was mailed to approximately 50 businesses and property owners located along the project corridor. A map of the invited properties along with the invite and comment cards sent are included in the supporting documentation of the meeting summary.

Meeting Material

Meeting material presented at the open house included:

- An informational PowerPoint cycling through slides for individuals to sit and view as they desired. No formal presentation was given as part of the meeting.
- Large layout drawings with an aerial image for individuals to write issues, ideas, or future development plans on.
- Boards with the project location, existing conditions, project schedule, and contact information were located around the room.
- Handout and board with contact information for submitting comments.
- Comment forms for individuals to express comments and/or ideas.

All meeting material is included in the supporting documentation of the summary.

Comments

Comments were collected by encouraging individuals to contact the project manager, submit formal comment cards, and/or write on aerial layout drawings provided at the meeting. All comments received are included in the supporting documentation of the summary.

Stantec Consulting Services Inc.

Pat McGraw, PE
Associate

Phone: (651) 967-4655

Pat.McGraw@stantec.com

Attachment: Supporting Documentation

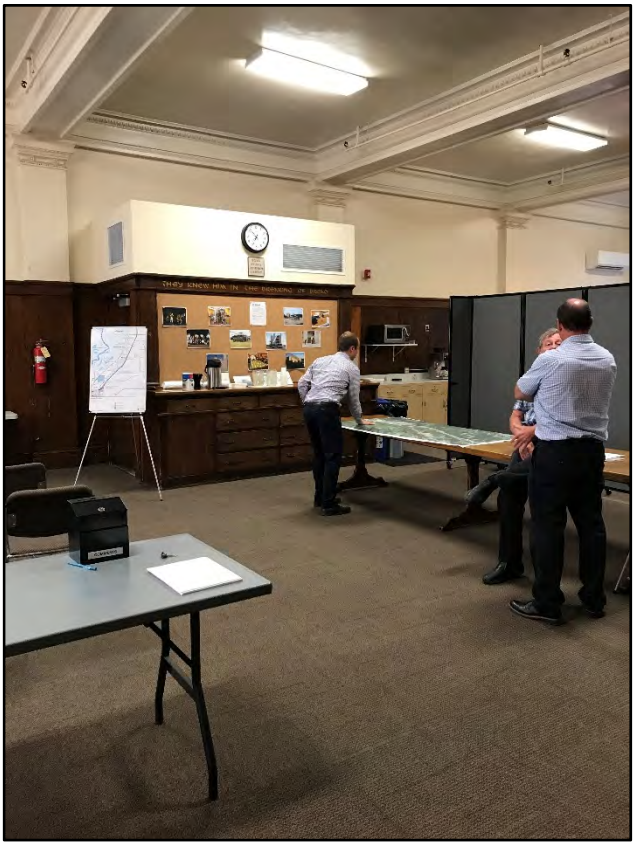
cc. Kyle Renneke, Chad Sandey

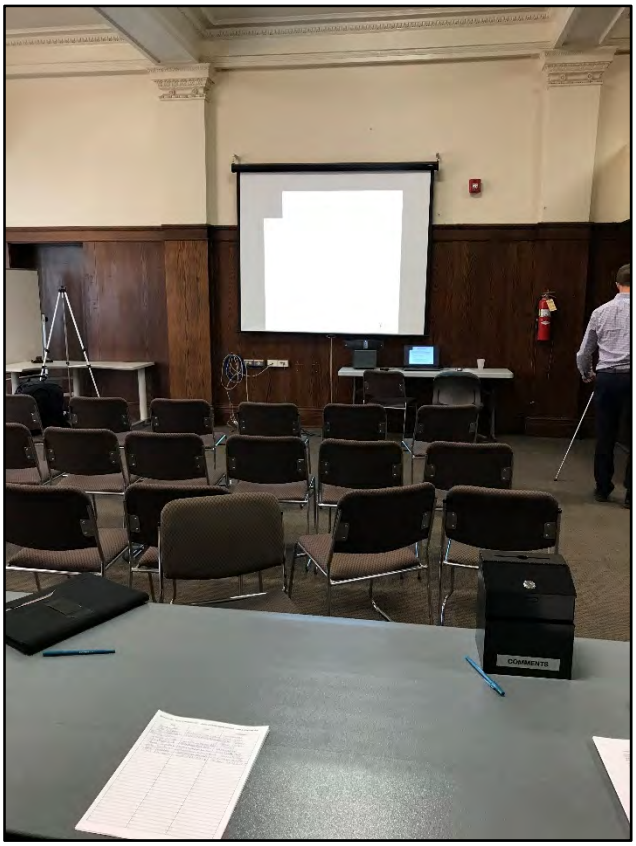
Supporting Documentation

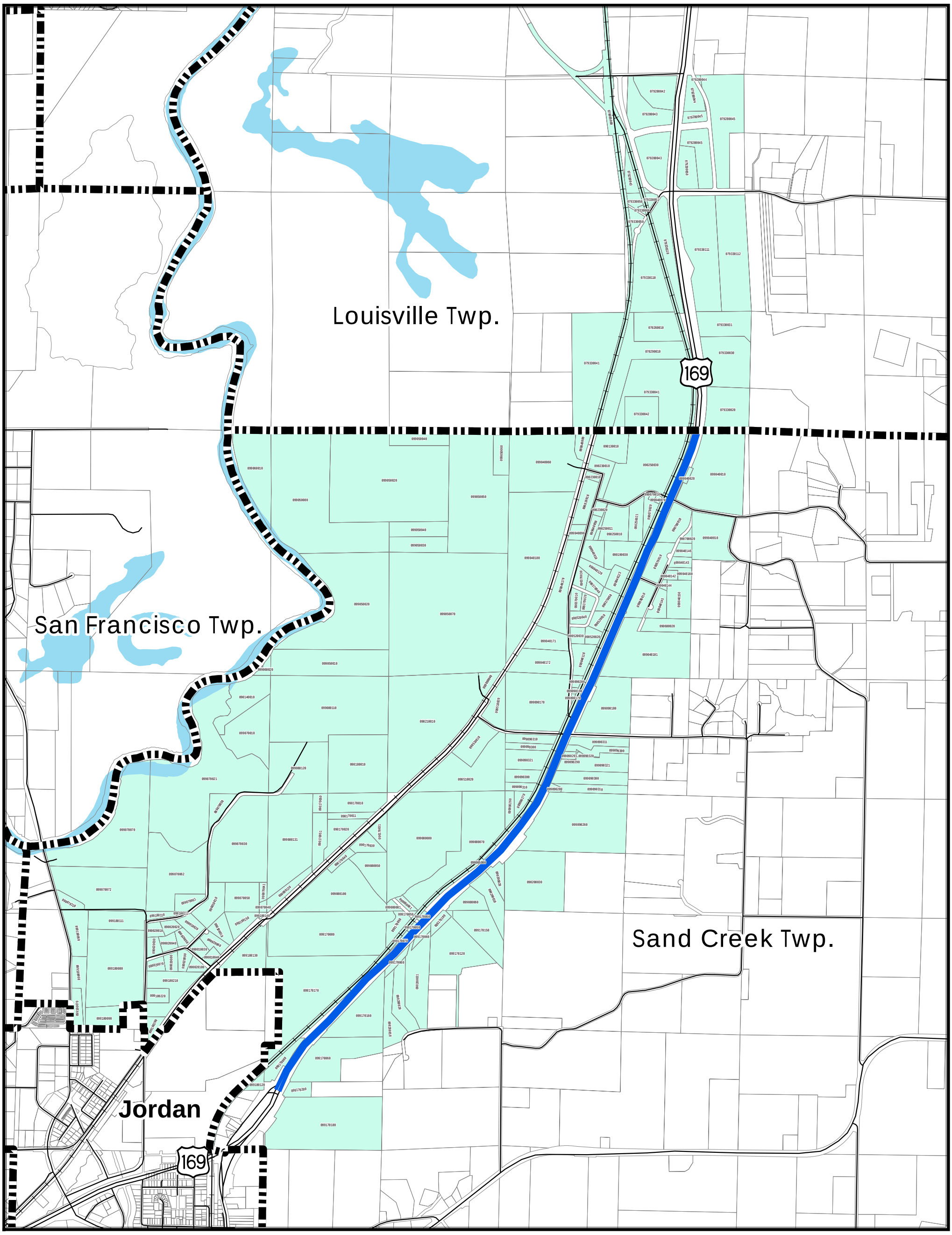
- Sign-in Sheet
- Pictures
- Map of Invited Business and Property Owners
- Meeting Invitation
- Comment Card
- PowerPoint Presentation
- Boards: Project Location, Existing Conditions, and Project Schedule
- Project Handout/Board with Contact Information
- Layout Drawings with Comments
- Received Comments

SIGN-IN SHEET TH169 CORRIDOR STUDY LAND & BUSINESS OWNER MEETING JUNE 6, 2018 4PM-7PM

Name
Wayne Jahn
Chris Russgal
Herb Baldwin
Beverly Koehnen
Jennifer Witten
Amy Bedeaux
Chad Sonnley
John Weckman
JEFF TAYLOR
Wes Herman




COMMENTS



Properties for Invite

TH 169 Corridor Study
Sand Creek Township, Minnesota

TH 169 Study Segment
Properties for Invite
Parcels
Municipal Boundary
Open Water

May 16, 2018

N
0 2,000 4,000 Feet

Stantec

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YOUR INVITED
TH 169 CORIDOR STUDY
BUSINESS OWNER MEETING

PROJECT PURPOSE AND NEED

Sand Creek Township is working with Stantec Consulting to study the feasibility of access improvements along US 169 south of the Louisville Township line and north of Jordan, MN.

In 2020 construction of a full interchange and frontage road system will be complete on US 169 at TH 41, CSAH 78, and CSAH 14. This project removes direct access from US 169, effectively extending the freeway-type facility from Brooklyn Park, MN to CSAH 14. US 169 through Sand Creek Township is the next closest segment of highway containing at-grade accesses, many with minimal or no acceleration, deceleration or dedicated turn-lanes. These uncontrolled access points are increasingly presenting safety and mobility concerns. With the continually increasing traffic flow on US 169 and the removal of the stop condition at TH 41, the opportunities for safe and efficient access at these nearby intersections are diminishing.

The purpose of this study is to gather information, define issues, and discuss improvement strategies for US 169 within Sand Creek Township. Improvement options will include safety, mobility, freight, accessibility, connectivity, public input, and environmental considerations.

Stantec

A MEETING WITH BUSINESS & PROPERTY OWNERS IS BEING HELD TO DISCUSS THE TH169 CORRIDOR STUDY'S PURPOSE AND NEED, GOALS AND OBJECTIVES, AND GAIN INPUT FROM ADJACENT LAND/BUISINESS OWNERS

MEETING DETAILS

WEDNESDAY, JUNE 6TH
4PM – 7PM
SCALE REGIONAL TRAINING FACILITY
17706 VALLEY VIEW DRIVE
JORDAN, MN 55352

PLEASE SEND ALL WRITTEN COMMENTS TO PAT MCGRAW BY THURSDAY, JUNE 21ST

CONTACT INFORMATION

Pat McGraw, PE
Stantec Consulting
Project Manager
(651) 967-4655
2335 Highway 36 West
St. Paul, MN 55113
Pat.McGraw@Stantec.com

Chad Sandey
Sand Creek Township
Chairman
(952) 423-8177
20221 Sand Creek Drive
Jordan, MN 55352
sandcreektownship@gmail.com

VISIT THE PROJECT WEBSITE

https://www.scottcountymn.gov/1800/TH-169-Sand-Creek-Township-Corridor-Stud

LAND AND BUSINESS OWNER MEETING

Scale Regional Training Facility
17706 Valley View Drive ● Jordan, MN 55352
Wednesday, June 6, 2018
4:00 P.M. TO 7:00 P.M.

Sand Creek Township is studying the feasibility of access improvements along US 169 south of the Louisville Township Line and north of Jordan, MN. We want to hear your input! Comments will be accepted by mail or email until June 21, 2018.

To learn more, visit the project website at:
https://www.scottcountymn.gov/1800/TH-169-Sand-Creek-Township-Corridor-Stud

Name: _____

Address: _____

_____

Phone: _____

E-mail: _____

Comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

US 169 CORRIDOR STUDY
BUSINESS OWNER MEETING

COMMENT FORM

SAND CREEK TOWNSHIP
Local Government at its Best!

Stantec

Fold Here

Pat McGraw
Stantec
2335 Highway 36 West
St. Paul, MN 55113-3819

Fold Here

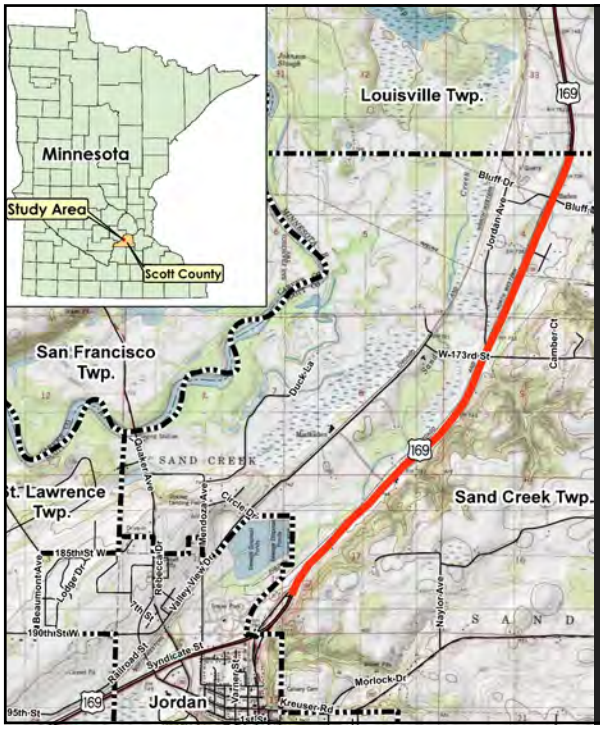
Contact Information:

Pat McGraw

Stantec

Phone: (651) 967-4655

E-mail: Pat.McGraw@stantec.com



Business Owner Input Meeting
June 6, 2018

TH 169 Sand Creek Township Corridor Study

Stantec

Why this Study?

- Mobility & safety concerns have been building.
- New interchanges to the north will remove last remaining interruptions to traffic flow which may make access to/from the corridor more difficult.
- Township Board has been working over the past two years to address this issue:
  - Plans to study or make improvements to the corridor are currently not included in other agencies strategic plans.
  - If/when other agencies do address this corridor, they will do so from their perspective.
  - The Township Board is working to address concerns now and from the perspective of the Township residents and businesses.
  - Township Board has worked with Scott County to receive a grant and a generous County contribution to complete this study.

Stantec

Study Goals:

- Identify current and anticipated safety and mobility concerns for our residents and commercial properties.
- Identify economic development opportunities.
- Identify any other associated concerns of Township residents, property owners or businesses.
- Identify conceptual alternatives which may address the concerns and opportunities identified.
- Prioritize potential projects and identify possible funding sources.

Stantec

- Markup one of (any of) the maps around the room – really, that's what they're there for – scribble away! ☺
- Speak with a consultant, Township Board member or other agency staff present – that's why they're here.
- Submit a comment card in the box at the welcome table.
- Mail in a comment card

Why you're here:

- To share your needs, concerns, desires, ideas as they may relate to the TH 169 Corridor.

Stantec

Concerns?

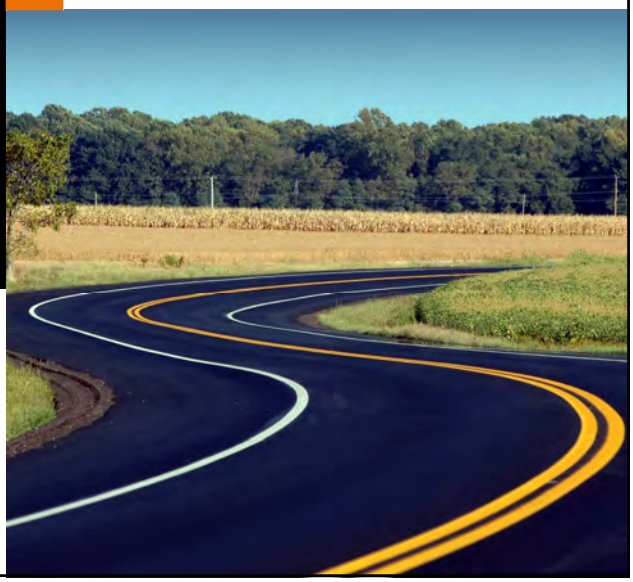
With the new interchange at Hwy 41 & Hwy 169 how do you see safety issues with coming and going from your business?

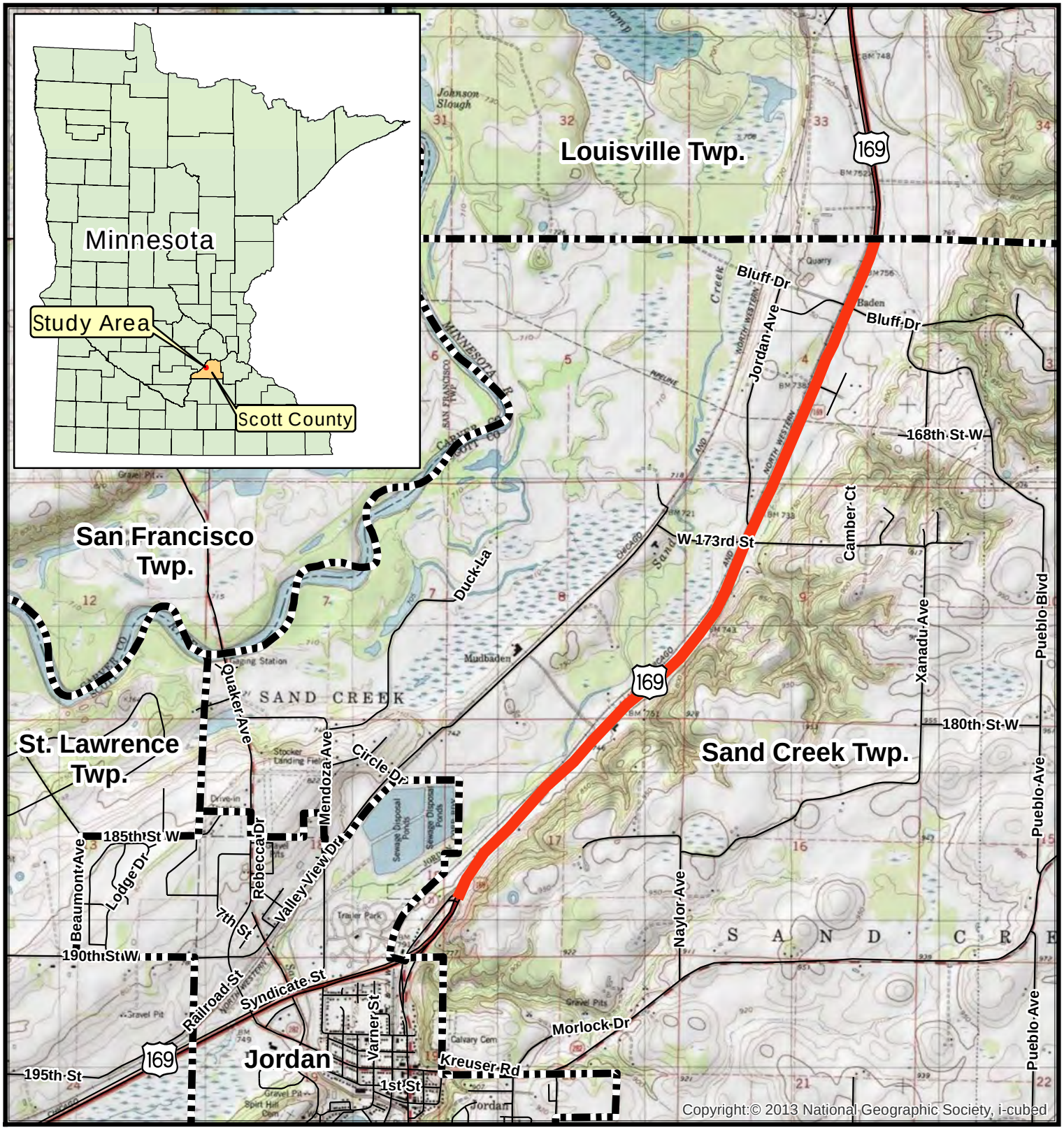
How do you see economic development related to your business?

Do you have concerns that should be identified?

Do you see a priority in the different possible projects?

Thank you for taking time to be here this evening





Project Location Map

TH 169 Corridor Study
Sand Creek Township, Minnesota

TH 169 Study Segment
Municipal Boundary

N
0 3,000 6,000 Feet

April 17, 2018

Stantec

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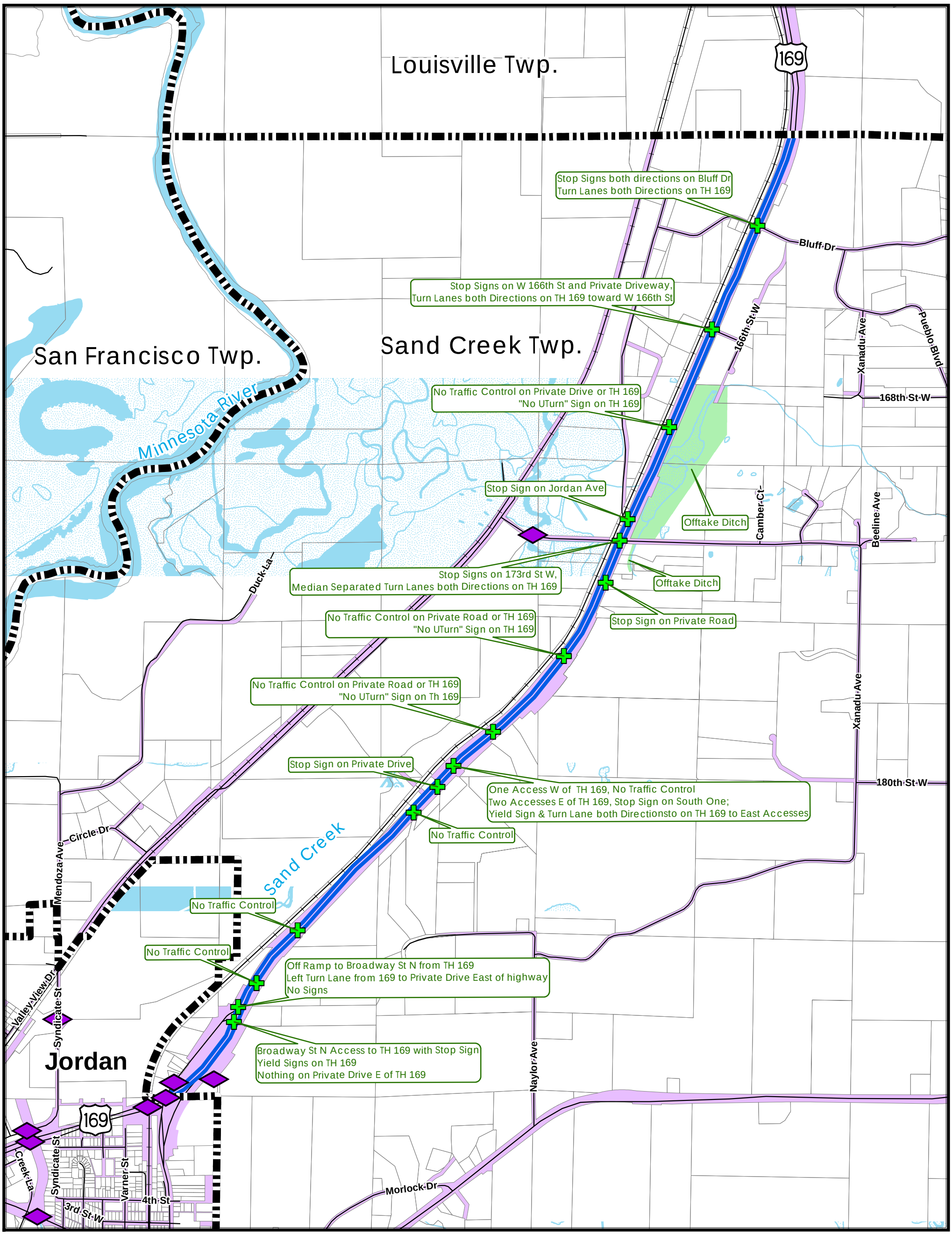

Existing Conditions

TH 169 Corridor Study
Sand Creek Township, Minnesota

Access Points on TH 169
Bridges
Municipal Boundary
TH 169 Study Segment
Right-of-Way
Offtake Ditch Location
Open Water
NWI Wetland

N
0 1,500 3,000 Feet

June 5, 2018

Stantec

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Sand Creek Township - TH 169 Corridor Study
PROJECT TIMELINE

2018

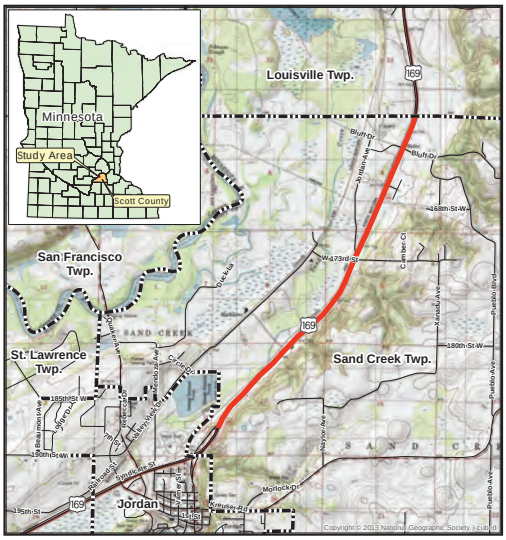
April | MAY | JUNE | JULY | AUG | SEPT | OCT | NOV | DEC

- Collect traffic data, develop base mapping, & summarize historic vs. existing safety concerns
- Open House with Business & Property Owners
- Open House with General Public (6/13)
- Follow up meetings with individual stakeholders or focus groups as needed
- Conceptual alternatives identification workshops
- Identify final set of alternatives
- Develop alternatives & quantify costs, impacts & benefits
- Draft report to agencies
- Final report (1)

Next Steps

These items are beyond the scope of this current project and will take place along a yet to be determined timeline

- Project selection
- Pursue project funding and/or partners
- Project pre-design (geometrics, environmental documentation (NEPA), R/W acquisitions (if needed), etc.
- Develop construction documents
- Construction



Project Location Map

TH 169 Corridor Study
Sand Creek Township, Minnesota

(1) The primary report components will include an executive summary; study purpose; project needs (traffic and safety needs); brief synopsis of the need for further hydrologic/hydraulics study; public involvement summary; design workshop summary; alternatives selection summary; comparison of alternatives; and next steps section, including suggested interim or prioritized projects and possible project funding sources.

Stantec

Sand Creek Township - TH 169 Corridor Study
HOW CAN WE WORK TOGETHER?

Stakeholders are asked to:

- Identify specific needs or concerns
- Identify potential solutions

Contacts & Resources:

Stantec Project Manager:

Pat McGraw, PE
Direct: 651-967-4655
Email: pat.mcgraw@stantec.com

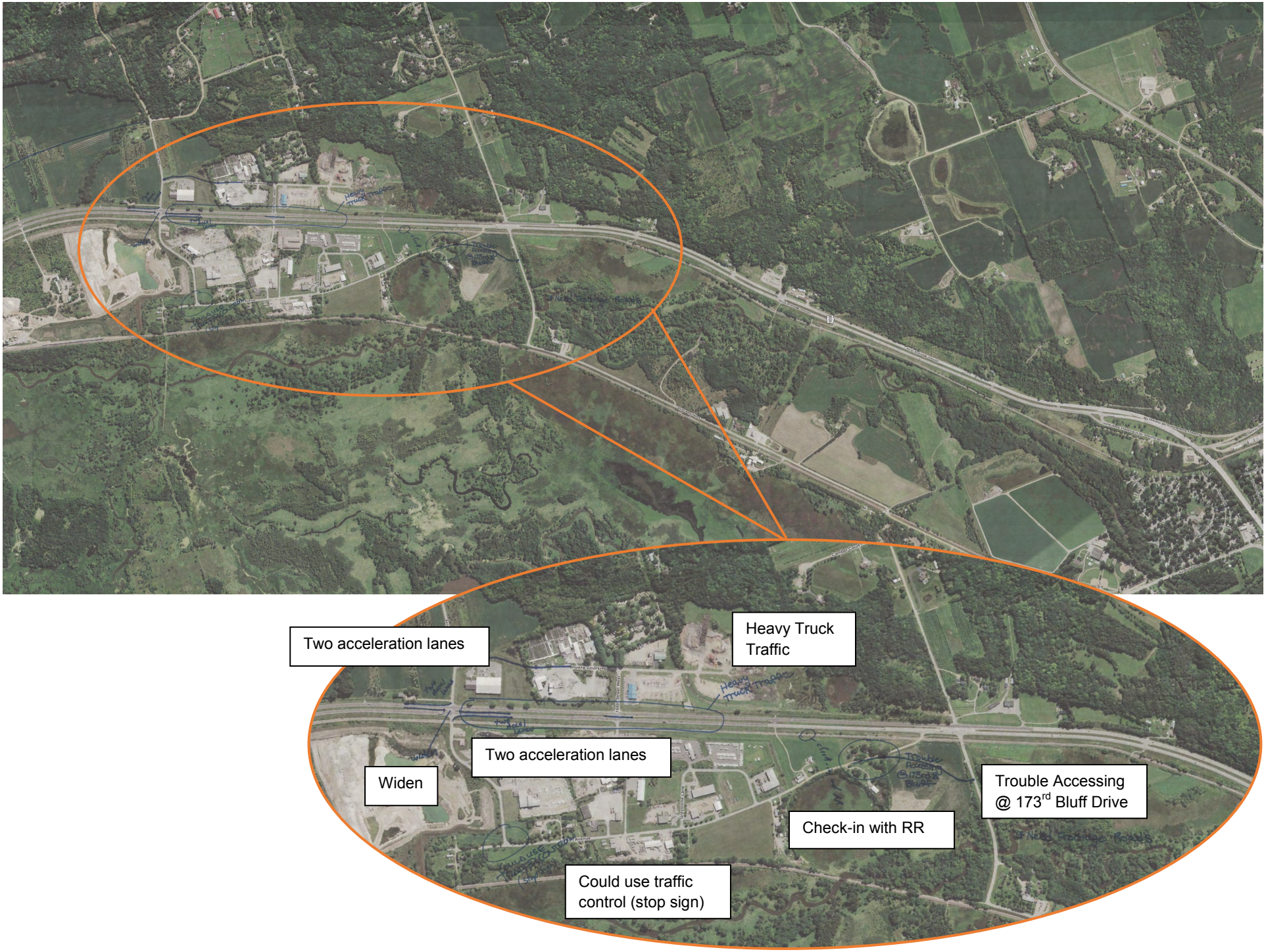
Project Website:

www.scottcountymn.gov/1800/TH-169-Sand-Creek-Township-Corridor-Study

Comment cards are provided at the welcome table

Stantec

Need access to friends on other side
- Likes idea of adding acceleration lane on Bluff
- Max wait time is 10 minutes to cross TH 169
- Cross TH 169 approximately 20 times a day
- In general there are 100-200 trips per day out on TH 169
Bluff Avenue
Berkshire Avenue
Jordan Street West
Greystone Lane
Jordan Avenue


Two acceleration lanes
Heavy Truck Traffic
Two acceleration lanes
Widen
Trouble Accessing @ 173rd Bluff Drive
Check-in with RR
Could use traffic control (stop sign)

Meeting Notes

Call from Property Owner

Sand Creek Township TH 169 Corridor Study / 193804245

Date/Time:	May 30, 2018 / 2:22 PM
Place:	Telephone Conversation
Next Meeting:	N/A
Attendees:	Beverly Koehnen, Pat McGraw
Absentees:	N/A
Distribution:	File

Safety Moment: N/A

Item:	**Action:**
Call from Resident Beverly Koehnen contacted Pat McGraw after receipt of the meeting invitation for the June 6th, 2018 open house. Ms. Koehnen had standing issues with Sand Creek and their disposition regarding her property which she did not elaborate on. Here general input regarding corridor needs was that it should “stay as it is.” Pat made Ms. Koehnen aware of the planned June 13th meeting in case she would be un able to attend on the 6th.	N/A

The meeting adjourned at 2:32 PM

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Stantec Consulting Services Inc.

Pat McGraw PE
Associate

Phone: (651) 967-4655
Fax: (651) 636-1311
Pat.mcgraw@stantec.com

Attachment: N/A

c. Angie Bolstad

LAND AND BUSINESS OWNER MEETING

Scale Regional Training Facility
17706 Valley View Drive • Jordan, MN 55352
Wednesday, June 6, 2018
4:00 P.M. TO 7:00 P.M.

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Comments:

I want the State of MN Highway Dept statistics for the number of accidents on the study area involved, and also the position of them.

In short, is there a problem that needs to be fixed?

Is there a sufficient number + quality + longevity of the few businesses that are now involved to warrant the expense of construction that benefits only them?

LAND AND BUSINESS OWNER MEETING

Scale Regional Training Facility
17706 Valley View Drive • Jordan, MN 55352
Wednesday, June 6, 2018
4:00 P.M. TO 7:00 P.M.

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Comments:

Frontage Road To 14
Pot Excavation Causes
Caution Lights

Bolstad, Angela

From: Renneke, Kyle
Sent: Tuesday, June 12, 2018 6:23 PM
To: McGraw, Pat; Bolstad, Angela
Subject: FW: TH 169 Study - Open House Information

Pat and Angie,

Please see below additional comments from one of our resident attendees at the last open house, for our review/records.

Kyle Renneke
Civil Engineer
Direct: (651) 604-4735
Mobile: (651) 587-3593
Stantec Consulting Services Inc.

The content of this email is the confidential property of Stantec and should not be copied, modified, retransmitted, or used for any purpose except with Stantec's written authorization. If you are not the intended recipient, please delete all copies and notify us immediately.

…Good Afternoon, Kyle…

…thank you for the information, which I requested from the last presentation by Stantec regarding the 169 Corridor through Sand Creek Township, Scott County MN…

…I appreciate and benefitted from your presentation… particularly as it might be understood by land owners and business owners along the corridor...

…as I understand it, there is another presentation at SCALE tomorrow afternoon…I shall plan to be there…I assume that the meeting will be in an 'open house' format…

…I had promised to send to you and Pat a list of my notes from my observations at the last open house…please pass on this email for me to Pat as I do not have his email address…at least I cannot find it…

…you and I as well as the staff members of Stantec are basically oriented to the impact on the 'ground' in a three-dimensional sense…as Civil Engineers you practice the engineering technology, methods and systems to manage the impact on the 'ground'…I, on the other hand, attempt to practice the making sense, both from understanding and application (how do we

use the information) to 'fit' the 'project' into it's natural site and the 'balance' between humans and the environment…

…my notes, albeit random, are as they appeared or struck, me as I reviewed the presentation material…they are…

1. Include topography as a means of trying to understand the three-dimensional aspects of the 169 project corridor…in this situation a model would be immensely helpful…
2. Recognize and document the natural resources above at and below the 'ground' surface…
3. Use site sections cut through the highway and 'lateral' areas...
4. Documenting the 'lateral' conditions, both natural and built, in three-dimensions would add to the comprehensive study of the impact and treatment of the adjacent properties and land uses…
5. Consider and document all potential issues and impacts, real and perceived, from off-site that will have a bearing on our understanding and possible proposals…
6. Verify accident prone areas along the 169 Corridor sourced from MNDOT, State Highway Patrol, Sheriff Hennen's Office and 911 callas…
7. Document the 'historical' issues, which may have a bearing on the 169 Corridor…
8. Can you address a possible 'Pedestrian Crossing(s)'…
9. Document and describe the landmark bluffs along the 169 Corridor…
10 Draft 'Site Specific' criteria for the preservation of the natural systems along the corridor…
11. Explore and attempt to establish a coordinated relationship with adjacent authorities (MetC, Cities, Townships), agencies and land use owners to include out of the region users of the 169 Corridor…
12. Establish a time line of current needs and anticipated future needs over the next decade and foreseeable future to assist in the realization of 'what's next'…this effort should also include 'Planning and Design Criteria'…as well as 'what ifs' ideas and notions that might stimulate and lead to future solutions…

…Obviously and practically much of what this list suggests will need to be trimmed to stay within the contract scope…however, I have found in my practice that providing some of the answers to questions in a understandable way can lead to an acceptance of the proposals and a but-in by the affected users along the Project Corridor…

…thank you…

Stantec

Meeting Summary

Business and Land Owner Open House

Sand Creek Township TH169 Study / 193804245

Date/Time:	June 13, 2018 / 4PM to 7PM
Place:	SCALE Regional Training Facility – 17706 Valley View Drive Jordan, MN 55352
Attendees:	See Sign-In Sheet

Overview

Sand Creek Township initiated a project to study the feasibility of access improvements along TH 169 south of the Louisville Township line and north of Jordan, MN. The purpose of the study is to gather information, define issues, and discuss improvement strategies for TH 169 within Sand Creek Township. Improvement options will include safety, mobility, freight, accessibility, connectivity, public input, and environmental considerations.

A public open house meeting was held to gain input from residents on specific needs, concerns, desires, and ideas as they relate to the TH 169 corridor. The open house was held at the SCALE Regional Training Facility from 4-7pm in Jordan, Minnesota. Project representatives from Sand Creek Township and Stantec Consulting were at the meeting to assist in facilitating discussion, answering questions, and collecting input from business/landowners.

Advertising

An advertisement and legal notice was published in the June 7, 2018 edition of the Jordan Independent. For a week, the advertisement was also cycled through the Local Guide which is available on the newspaper's website. A copy of the advertisement is available in the supporting documentation of the meeting summary.

Meeting Material

Meeting material presented at the open house included:

- An informational PowerPoint cycling through slides for individuals to sit and view as they desired. No formal presentation was given as part of the meeting.
- Large layout drawings with an aerial image for individuals to write issues, ideas, or future development plans on.
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All meeting material is included in the supporting documentation of the summary.

Comments

Comments were collected by encouraging individuals to contact the project manager, submit formal comment cards, and/or write on aerial layout drawings provided at the meeting. No comments other than those written on the aerial layout drawing displayed at the meeting were received.

Stantec Consulting Services Inc.

Pat McGraw, PE
Associate

Phone: (651) 967-4655

Pat.McGraw@stantec.com

Attachment: Supporting Documentation

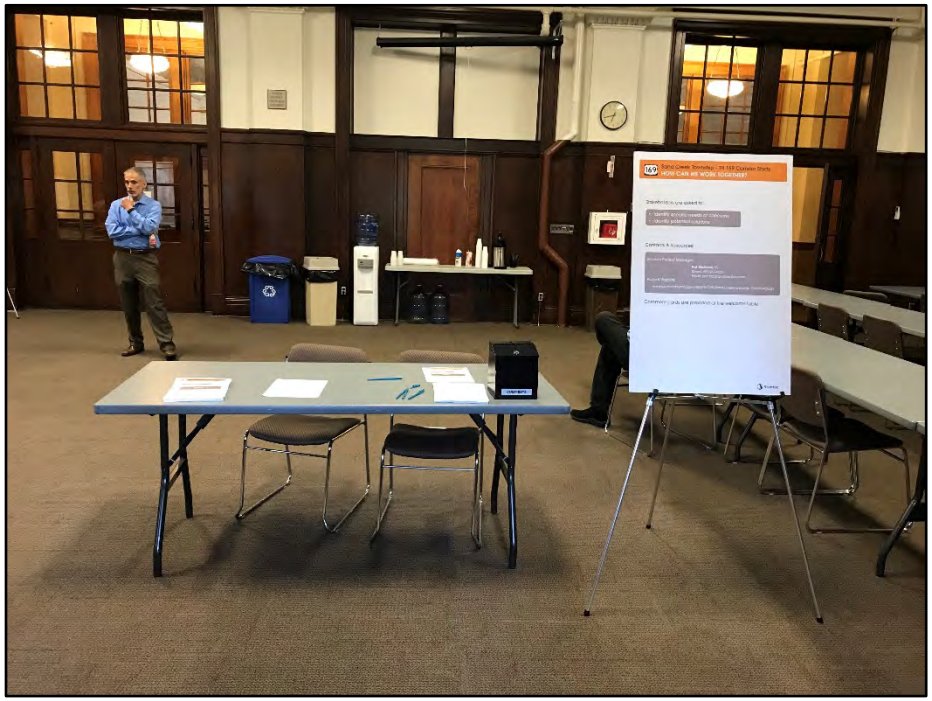
cc. Kyle Renneke, Chad Sandey

Supporting Documentation

- Sign-in Sheet
- Pictures
- Meeting Advertisements
- Comment Card
- PowerPoint Presentation
- Boards: Project Location, Existing Conditions, and Project Schedule
- Project Handout/Board with Contact Information
- Layout Drawings with Comments

SIGN-IN SHEET TH169 CORRIDOR STUDY OPEN HOUSE | JUNE 13, 2018 4PM-7PM

Name
Jarrett Hubbard
Donna Breeggemann
Luke Hennen
Herb Baldwin
MICHAEL LEEK
Chad Sandry
Emily Nordick
Jennifer Wilton
Jay & Laureen Picha
Bob Pieper
Peggy Jo Dunnette
Myron Pauly
Deb Pauly


HOW CAN WE WORK TOGETHER?

Jordan Independent
Public Notices Section
June 7, 2018 Edition

PUBLIC INPUT MEETING NOTICE

WHAT? – Sand Creek Township TH 169 Corridor Study Public Input Meeting

WHEN? Wednesday, June 13th, 2018 from 4-7pm

WHERE? Scale Regional Training Facility, 17706 Valley View Drive Jordan, MN 55352

WHY? Sand Creek Township is studying the feasibility of access improvements along TH 169 south of Louisville Township and north of Jordan, MN

VISIT THE PROJECT WEBSITE AT: https://www.scottcountymn.gov/1800/TH-169-Sand-Creek-Township-Corridor-Stud

COMMENTS Send All Written Comments by June 27th, 2018 to Pat McGraw, Stantec Consulting, 2335 Highway 36 West, St. Paul, MN 55113

(Published in the Jordan Independent on Thursday, June 7, 2018; No. 1232)

PUBLIC INPUT MEETING NOTICE

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COMMENTS – Send All Written Comments by June 27th, 2018 to Pat McGraw, Stantec Consulting, 2335 Highway 36 West, St. Paul, MN 55113

Jordan Independent
June 7, 2018 Edition

First time home buyer looking for FREE money?!
Scott County is offering $4,000 & $2,000 grants!
To learn more about the Homebuyers' Club contact
Bruce Goldberg
763-227-5819
bgoldberg@themmmortgage.com

Get connected.

PUBLIC INPUT MEETING NOTICE
WHAT? – Sand Creek Township TH 169 Corridor Study Public Input Meeting
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HOUSING

➤ continued from 1

"But until someone moves out, you don't have a prayer," she said. "Jordan just doesn't have a whole lot to offer, so that's kind of the sad part."

A NATIONAL PROBLEM

Hennen is among millions of baby boomers across the country beginning to look for senior living.

By 2035, adults over 65 are expected to outnumber children under 18 for the first time in U.S. history, according to the U.S. Census Bureau.

The number of Minnesotans over 65 is expected to double between 2010 and 2030, and by then more than one in five Minnesotans will be older and considered a baby boomer, according to the Minnesota State Demographic Center.

In Scott County alone, there are almost 18,000 people aged 65 and up, according to 2016 Census Bureau statistics. Since 2010, that number has increased by about 32 percent.

And now they're beginning to look for senior housing and some, like Hennen, are having a hard time.

Yvonne Perkins, a real estate agent at Edina Realty, said a lot of her clients look for smaller square footage and one-level living.

"There is a shortage of first time, entry-level housing and there is also a shortage of housing for the elderly, I think," Perkins said. "For people that want to sell their home and get into one level living, there's just not many places for them to go that are affordable."

PHOTO BY SARAH BYNN

Paul Stracke looks up at his journalism awards at Oak Terrace. One of his favorite activities at the assisted living home is Card Bingo."I hate bingo worse than the devil hates holy water, but I like Card Bingo," he said. "It's just a fun game."

OPTIONS IN JORDAN

Applicants at Schule Haus have to qualify for Section 8 housing and be at least 62 years old, or have a disability. The building has 32 units, and over 50 people on its waiting list, said Director Deb Pauly. Only one or two units open up annually.

"I would say it's been increasing (the number of applicants) and the number of phone calls and requests that I get," she said. "In general we need more affordable housing."

The 50-unit Brentwood Court Apartments above the Jordan Public Library offer independent living, but they're all filled. Its apartments start at $382 for a one bedroom and $1,402 for a large two-bedroom.

Jennifer Cox is a housing manager at an assisted living home, Oak Terrace, on Aberdeen Avenue in Jordan. The 67-unit home has services for independent seniors and those who need daily help. However, all seniors have to pay for the services, which run from $1,500 to $4,400. On top of that, residents pay for rent which ranges from $2,000 to $4,500 a month.

Cox doesn't think Jordan needs more assisted living, but said the city needs more homes for seniors that want to live independently.

"I do get a lot of calls from individuals that are not quite ready to take that step, that are kind of frightened of the word 'assisted living' so maybe something geared just toward independent living," Cox said.

Its waiting list fluctuates, but currently has six people waiting to move in.

Paul Stracke, 80, has lived at Oak Terrace for about five years. He was born and raised in Minneapolis, and spent 30 years in St. Cloud radio covering politics.

After surgery for lung cancer and losing a third of one of his lungs, he went into assisted living. His three daughters live in Lakeville and wanted their father to be near them

Housing to 22 ➤

Local Guide on Jordan Independent's Webpage

SAND CREEK TOWNSHIP TH-169 CORRIDOR STUDY OPEN HOUSE

Scale Regional Training Facility
17706 Valley View Drive ● Jordan, MN 55352
Wednesday, June 13, 2018
4:00 P.M. TO 7:00 P.M.

Sand Creek Township is studying the feasibility of access improvements along US 169 south of the Louisville Township Line and north of Jordan, MN. We want to hear your input! Comments will be accepted by mail or email until June 28, 2018.

To learn more, visit the project website at:
https://www.scottcountymn.gov/1800/TH-169-Sand-Creek-Township-Corridor-Stud

Name: _____

Address: _____

_____

Phone: _____

E-mail: _____

Comments:

_____

_____

_____

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US 169 CORRIDOR STUDY

OPEN HOUSE

COMMENT FORM

SAND CREEK TOWNSHIP

Local Government at its Best!

Stantec

Fold Here

Pat McGraw
Stantec
2335 Highway 36 West
St. Paul, MN 55113-3819

Fold Here

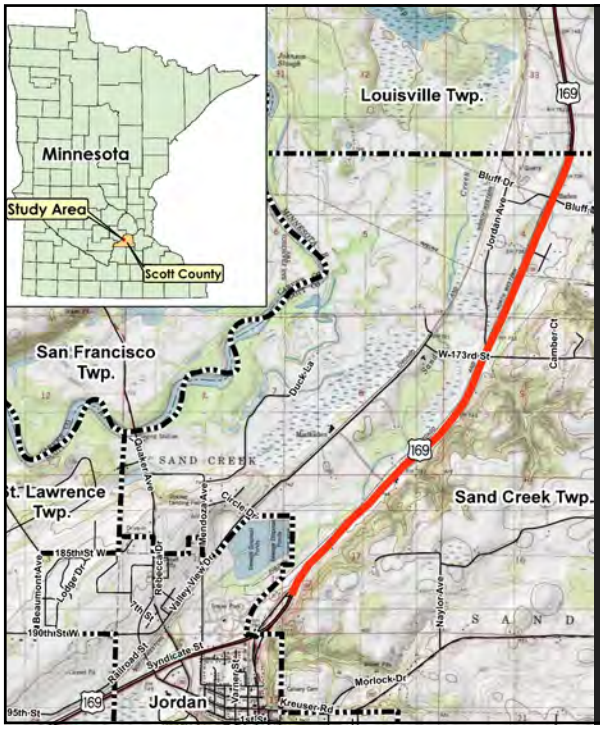
Contact Information:

Pat McGraw

Stantec

Phone: (651) 967-4655

E-mail: Pat.McGraw@stantec.com



Public Input Meeting
June 13, 2018

TH 169 Sand Creek Township Corridor Study

Stantec

Why this Study?

- Mobility & safety concerns have been building.
- New interchanges to the north will remove last remaining interruptions to traffic flow which may make access to/from the corridor more difficult.
- Township Board has been working over the past two years to address this issue:
  - Plans to study or make improvements to the corridor are currently not included in other agencies strategic plans.
  - If/when other agencies do address this corridor, they will do so from their perspective.
  - The Township Board is working to address concerns now and from the perspective of the Township residents and businesses.
  - Township Board has worked with Scott County to receive a grant and a generous County contribution to complete this study.

Stantec

Study Goals:

- Identify current and anticipated safety and mobility concerns for our residents and commercial properties.
- Identify economic development opportunities.
- Identify any other associated concerns of Township residents, property owners or businesses.
- Identify conceptual alternatives which may address the concerns and opportunities identified.
- Prioritize potential projects and identify possible funding sources.

Stantec

- Markup one of (any of) the maps around the room – really, that's what they're there for – scribble away! ☺
- Speak with a consultant, Township Board member or other agency staff present – that's why they're here.
- Submit a comment card in the box at the welcome table.
- Mail in a comment card

Why you're here:

- To share your needs, concerns, desires, ideas as they may relate to the TH 169 Corridor.

Stantec

Concerns?

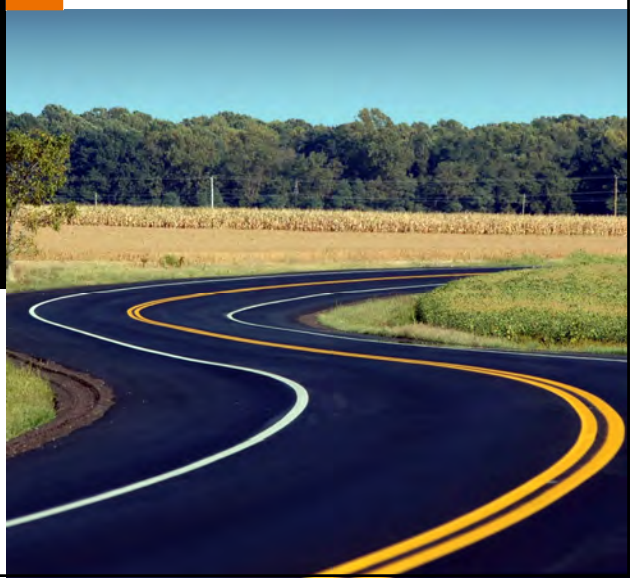
With the new interchange at Hwy 41 & Hwy 169 how do you see safety issues with coming and going from your home or business?

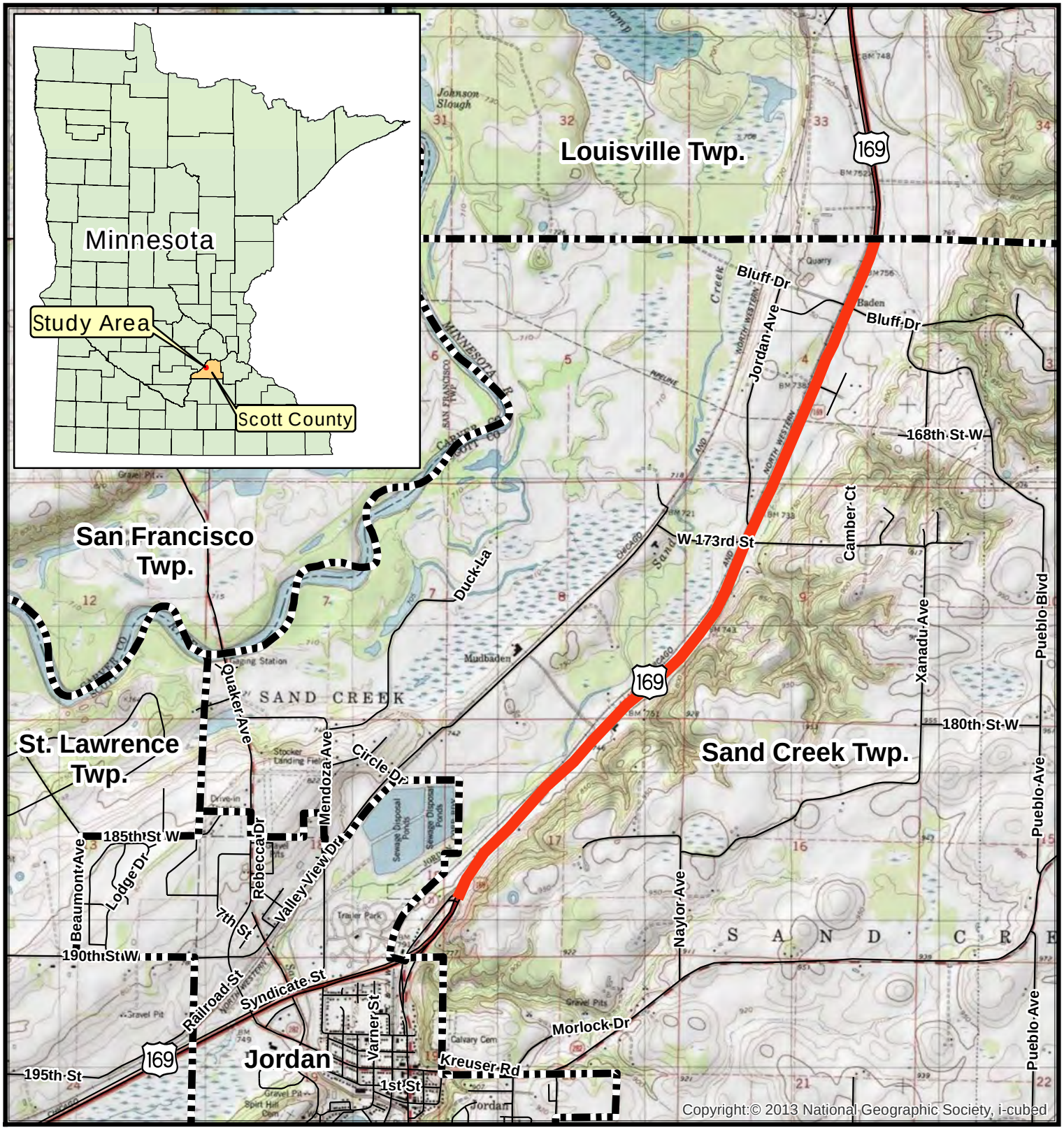
How do you see economic development related to your business?

Do you have concerns that should be identified?

Do you see a priority in the different possible projects?

Thank you for taking time to be here this evening





Project Location Map

TH 169 Corridor Study
Sand Creek Township, Minnesota

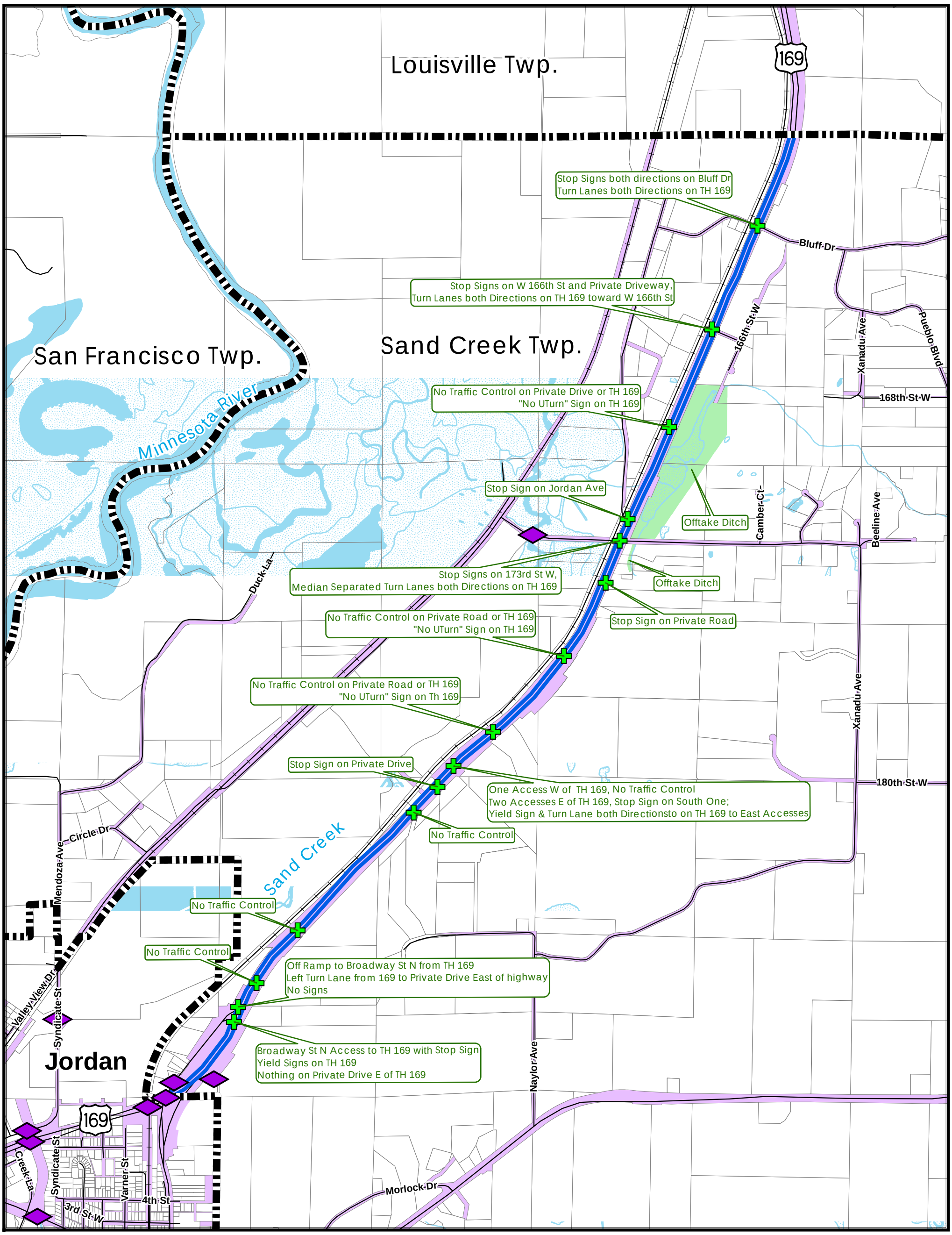
TH 169 Study Segment
Municipal Boundary

N
0 3,000 6,000 Feet

April 17, 2018

Stantec

V:\1938\active\193804245\GIS\Projects\Project Location.mxd



Existing Conditions

TH 169 Corridor Study
Sand Creek Township, Minnesota

Access Points on TH 169
Bridges
Municipal Boundary
TH 169 Study Segment
Right-of-Way
Offtake Ditch Location
Open Water
NWI Wetland

N
0 1,500 3,000 Feet

June 5, 2018

Stantec

V:\1938\active\193804245\GIS\Projects\Existing Conditions.mxd

Sand Creek Township - TH 169 Corridor Study
PROJECT TIMELINE

2018

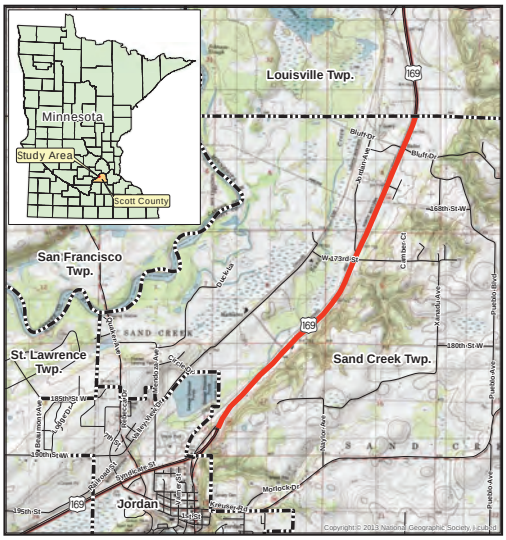
April | MAY | JUNE | JULY | AUG | SEPT | OCT | NOV | DEC

- Collect traffic data, develop base mapping, & summarize historic vs. existing safety concerns
- Open House with Business & Property Owners
- Open House with General Public (6/13)
- Follow up meetings with individual stakeholders or focus groups as needed
- Conceptual alternatives identification workshops
- Identify final set of alternatives
- Develop alternatives & quantify costs, impacts & benefits
- Draft report to agencies
- Final report (1)

Next Steps

These items are beyond the scope of this current project and will take place along a yet to be determined timeline

- Project selection
- Pursue project funding and/or partners
- Project pre-design (geometrics, environmental documentation (NEPA), R/W acquisitions (if needed), etc.
- Develop construction documents
- Construction



Project Location Map

TH 169 Corridor Study
Sand Creek Township, Minnesota

(1) The primary report components will include an executive summary; study purpose; project needs (traffic and safety needs); brief synopsis of the need for further hydrologic/hydraulics study; public involvement summary; design workshop summary; alternatives selection summary; comparison of alternatives; and next steps section, including suggested interim or prioritized projects and possible project funding sources.

Stantec

Sand Creek Township - TH 169 Corridor Study
HOW CAN WE WORK TOGETHER?

Stakeholders are asked to:

- Identify specific needs or concerns
- Identify potential solutions

Contacts & Resources:

Stantec Project Manager:

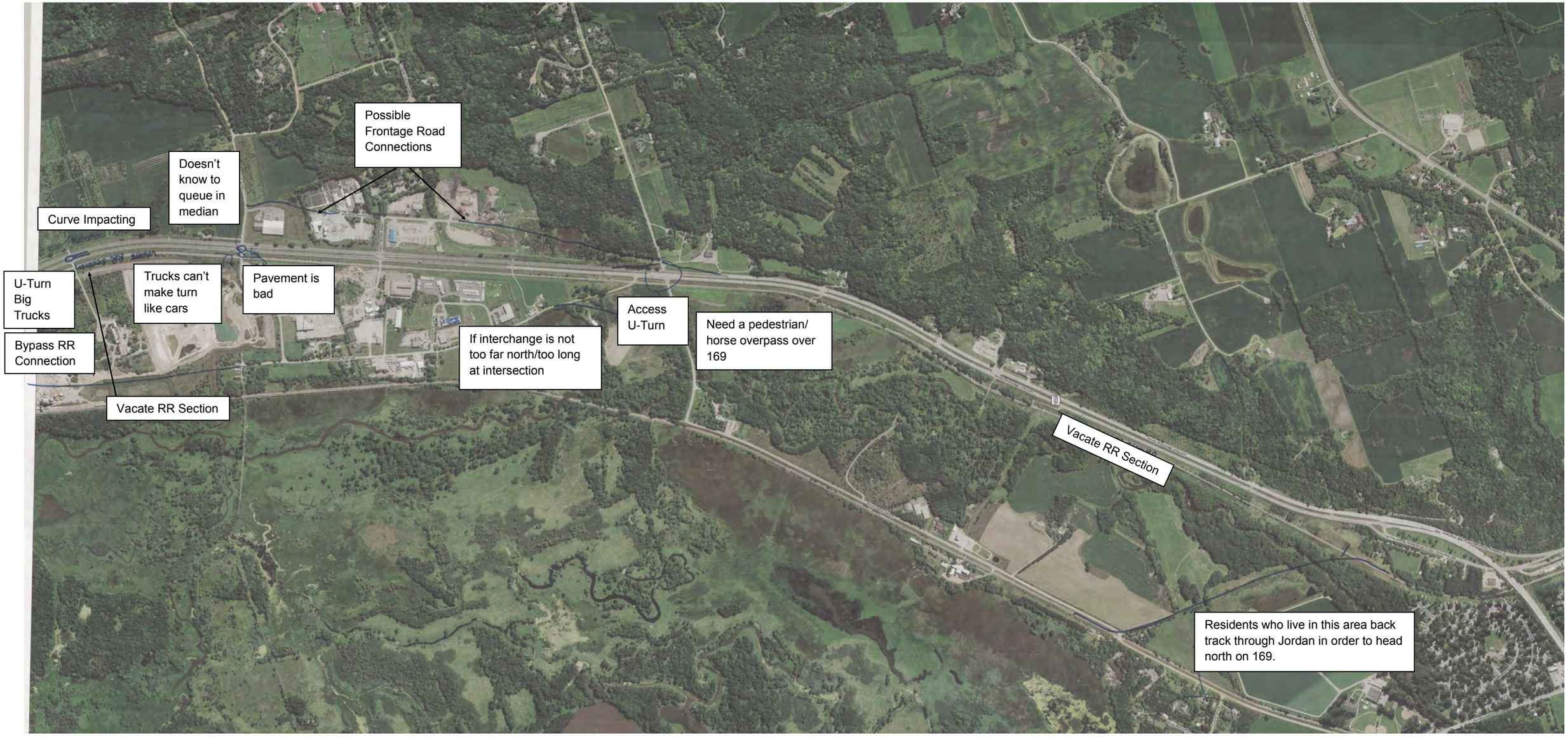
Pat McGraw, PE
Direct: 651-967-4655
Email: pat.mcgraw@stantec.com

Project Website:

www.scottcountymn.gov/1800/TH-169-Sand-Creek-Township-Corridor-Study

Comment cards are provided at the welcome table

Stantec


Possible Frontage Road Connections
Doesn't know to queue in median
Curve Impacting
U-Turn Big Trucks
Trucks can't make turn like cars
Pavement is bad
Bypass RR Connection
Vacate RR Section
If interchange is not too far north/too long at intersection
Access U-Turn
Need a pedestrian/ horse overpass over 169
Vacate RR Section
Residents who live in this area back track through Jordan in order to head north on 169.

Section Line
Largest flat property for possible development opportunities
Possible bridge/access
If a frontage road was constructed it would need to follow the bluffs
Residents need to use private access to turn left onto TH 169. Why weren't U-Turns put in when the access was re-done?
MnDOT digs out sand creek here
Unnamed Creek
Substation
Steep Topography
Take into account emergency response time when closing accesses etc.
Septic?
Better Access to Trails/Nature Areas
When/if stop light at 282 was removed, problems with traffic gaps would be made worse

Meeting Notes

Sand Creek Township - 169 Corridor Study Agency Kickoff

TH 169 Corridor Study / 193804245

Date/Time:	May 9, 2018 / 10:00 AM
Place:	Scott County Government Center, 200 4th Ave West, Shakopee, MN 55379
Next Meeting:	TBD
Attendees:	Brad Davis (Scott County), Jarrett Hubbard (Scott County), Craig Jensen (Scott County), Pat McGraw (Stantec), Bob Pieper (Louisville Township), Kyle Renneke (Stantec), Chad Sandey (Sand Creek Township), Bill Schneider (Sand Creek Township), Jon Solberg (MnDOT), John Weckman (Louisville Township), Jennifer Wiltgen (MnDOT)
Absentees:	Diane Langenbach (MnDOT), Almin Ramic (MnDOT), Tod Sherman (MnDOT)
Distribution:	Attendees and Absentees

Safety Moment: N/A

Item:	Action:
Introductions Introductions were made around the table. Primary contacts with each agency were established. MnDOT: Typically Diane Langenbach would be the point of contact for this project. However, Diane is consumed by another project for the near-term. Assume Jennifer Wiltgen as the primary contact and copy Jon Solberg and Diane. Louisville Township: John Weckman will be the primary contact. Copy Bob Pieper and Cheryl Doucette. Sand Creek Township: Chad Sandey. Scott County: Brad Davis. Note: Add TH 169 Corridor Coalition to project contact list.	Add TH 169 Corridor Coalition to project contact list – Pat McGraw
Project scope, goals and objectives The primary components of the project scope, and goals and objectives were reviewed as outlined in the meeting agenda (attached). Attendees were asked to review the list of materials collected to-date and to provide any additional input that may be of value for the study team to consider.	Review provided list of data, studies, reports and other items collected to-date and provide any additional input that may be of value for the study team to consider by May 18th - All

Business and property owner open house

- Be prepared to share preliminary summary of safety data
  - Note: Contact 911 dispatch to request call data for comparison to State crash data.
  - Hold meeting at Regional Training Facility just off study corridor. Brad Davis will provide RTF contact information to Pat
  - Hold general/public open house at same location as business/property owner open house.
  - Contact both business owners and property owners.
  - Contact property and business owners north of the township line too.

Provide Regional Training Center contact to Pat McGraw by May 11th – Brad Davis

General/Miscellaneous study items

- Receive developable acreage data from County for area south of 173rd Street West and consider future traffic implications.
- Be sure to have designers or industry representatives involved who have a keen understanding of the workings of the various applicable vehicle types, such as semi-trailers.
- Concept development workshop invitees:
  - Brad Davis (Scott County)
  - Craig Jensen (Scott County)
  - Jarrett Hubbard (Scott County)
  - Diane Langenbach (MnDOT)
  - Jon Solberg (MnDOT)
  - Almin Ramic (MnDOT)
  - Tod Sherman (MnDOT)
  - Douglas Carter (MnDOT)
  - Jim Rosenow (MnDOT
  - Will Stein (FHWA)
  - DerekSchmidt (WSB)
- Primary points of engagement for this group moving forward will be base map review, project open houses, the concept development workshop and review of the draft report. General, reoccurring meetings will not be held.
- How far south frontage roads can be realistically extended will be investigated.
- Consider broadening traffic count data to other seasons if future counts are conducted (harvest, school, construction, renaissance, etc.) or review previous traffic studies as a check.

Provide summary of developable acreage by land use type for area south of 173rd Street West by May 28th – Brad Davis

The meeting adjourned at 11:15 AM

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Stantec Counsulting Services Inc.

Pat McGraw
Associate
Phone: (651) 967-4655
Fax: (651) 636-1311
Pat.mcgraw@stantec.com

Attachment: Meeting agenda

c. N/A

Agenda

Sand Creek Township - 169 Corridor Study Agency KO Meeting

Scott County Government Center, 200 4th Avenue West, Shakopee, MN 55379

May 9, 2018

Safety Moment: N/A

Time:	Item:
10:00AM	Introductions Why We're Here Establish Primary Contacts

10:10:AM	Project Scope
	
	• Goals/Objectives
	  o Quantifiable understanding of existing and future conditions (Safety & LOS)
	  o Up to three final conceptual alternatives (R/W, environmental and cost impacts quantified)
	  o Identification of next steps
	
	• Physical Termini
	  o North of CSAH 21 to north township line (interchange project to the north will be considered)
	  o Specific focus on intersections at
	  ▪ US 169 & Bluff Drive
	  ▪ US 169 & West 166th Street
	  ▪ US 169 & Jordan Avenue
	  ▪ US 169 & CR 65/173rd Street West
	
	• Primary Work Tasks
	  o Note fiscal & time constraints
	  o Data collection/base mapping (April thru May)
	  ▪ Mapping Collected
	  • 2030 Scott County Natural Area Corridors Map

- 2030 Scott County Planned Future Functional Classification Roadways
- 2030 Scott County Planned Land Use
- 2030 Scott County Planned Parks and Trails System
- 2040 Scott County Com Plan - Draft Future Land Use_20180409
- 2040 Scott County Com Plan - Future Functional Class_20180409
- 2040 Scott County Com Plan - Roadway Future Study Needs
- 2030 Jordan Com Plan 6.2-Future-Land-Use-Map
- 2030 Jordan Com Plan 8.4b-Existing-Sidewalks-Trails-and-Future-Trail-Map
- Jordan_Zoning_Map 11x17
- Scott County Bicycle Map from MnDOT
- 2016 Existing Land Use
- Hydrology, Bluffs, Wildlife Refuge and Contaminated Sites
- Historic and Archaeological Sites from SHPO
- Significant Biodiversity and Ecological Areas – DNR
- Zoning

▪ Reports, plans, traffic data and misc. collected

- MnDOT_2017-2020 Approved CIP
- Scott County_CIP_2018-2022
- Scott County Ordinance No. 7_Design Stds CH 7
- 169 173rd Layout 1
- at 173rd SP 7009-70 fully signed plan 080111
- Handout showing access modifications at Jim's Apple Farm and Alloy Hardfacing & Engineering

	• TH169 at 173rd 2013_2015 Collision Diagrams • 13-hour turning movement counts at TH 169 & TH 21 (Broadway) • th169corridor_coalition booklet July 2009 • US 169 ACCESS MANAGEMENT PLAN TAC Meeting Notes (Northern Section) • 2015 TH 169 Access Management Study concepts • US 169 from South of County Road 14 through Jordan - Access Management Plan PowerPoint (not adopted) • SRF_Freight_Vision_Not_Adopted • Scott County TH 169 Frontage Road Alignment Study • Scott County 2030 Comprehensive Plan – Adopted October 25, 2011 Transportation Plan • TH 169 Corridor Management Plan (2002) • TH 169 & CSAH 14 Layout • TH 169 & TH 41 Layout • 2002-2016_ATR-WIM_AADT ▪ Supplemental information to any of the above or additional resources recommended? o Open House with Businesses (early June) o Follow-up meetings with businesses (mid thru late June) o Open house with public (mid-June) o Project website (goals/objectives, contacts, meeting announcements) (on-going) o 48-hr turning movement counts (May 17 & 18) o Safety analysis (existing conditions late April; related to alternatives July)

	o Traffic analysis (existing conditions late May; future conditions late July) o Develop conceptual alternatives ▪ Internal and external workshops (late May & early June) • Review invitees to external workshop ▪ Up to six original (late June) and three final (mid July) ▪ Quantify impacts and costs (late July) o Report (draft early August) o Items not included ▪ Topo Surveys ▪ Researching and applying for funding ▪ Study or assessment of hydrology or hydraulics
10:45AM	Key points of engagement • Base map review • Open houses • Workshops • Draft report review
11:00AM	Q&A/Misc.

Meeting Notes

Sand Creek Township - 169 Corridor Study External Concept Development Workshop

TH 169 Corridor Study / 193804245

Date/Time:	August 1, 2018 / 1:00 PM
Place:	SCALE Regional Training Facility – 17706 Valley View Drive Jordan, MN 55352
Next Meeting:	TBD
Attendees:	Brad Davis (Scott County), Tom Fidler (Stantec), Jarrett Hubbard (Scott County), Craig Jensen (Scott County), Pat McGraw (Stantec), Kyle Renneke (Stantec), Tony Winiecki (Scott County), Jennifer Wiltgen (MnDOT)
Absentees:	Lisa Freese (Scott County), Diane Langenbach (MnDOT), Almin Ramic (MnDOT), Tod Sherman (MnDOT), Jon Solberg (MnDOT)
Distribution:	Attendees and Absentees

Safety Moment: N/A

Item:

Introductions

Introductions were made around the table.

Project Update

Pat McGraw summarized the primary tasks completed since the Agency Kickoff Meeting on May 9, 2018. Primary tasks included:

- Review of existing data. See minutes of May 9th kickoff meeting for listing resources reviewed.
- Draft Existing Conditions Safety Summary Memo was prepared
- 48-hr turning movement traffic counts were collected May 17th and 18th
- Existing conditions traffic model was build and draft summary memo prepared
- Open house with business and property owners was held on June 6th
- General public open house was held on June 13th
- Ten conceptual geometric alternatives have been developed

Review of Conceptual Alternatives (alternatives are attached)

- Reiterate Key Drivers: Prior to reviewing the conceptual alternatives Pat highlighted key safety and mobility considerations
- Concept 1 – RCUT Corridor:
    - An RCUT corridor is not anticipated as a long-term solution. However, RCUT's may have be a component of an interim fix.
    - Proximity of northern most U-turn to the south bound acceleration lane from the CSAH 14 interchange was noted as a concern. The northern RCUT will be shifted south.
    - Use of U-turn(s) to compliment overpass or underpass alternatives or existing reduced conflict intersection at 173rd St is a possible consideration. Therefore, further analysis to confirm the need for signalization of the u-turn and the specific layout to accommodate trucks should be completed.
- Concept 2, 2A & 2B – Controlled Access Corridor (overpasses): Each of these three utilizes a combination of over-passes of TH 169 and right-in/right-out (RIRO) accesses on TH 169. The three vary in their means of providing access, primarily at the south end.
    - Cost of three bridges likely beyond funding resources. Reduce to one bridge
    - Reduce to one concept
    - Supplement RIRO's with acceleration lanes.
- Concept 3 – Controlled Access Corridor (underpasses): Concept utilizes a combination of under-passes of TH 169 and right-in/right-out (RIRO) accesses on TH 169.
    - Cost of three underpass locations likely beyond funding resources. Reduce to one underpass
    - Reduce to one concept
    - Supplement RIRO's with acceleration lanes.
    - Supplement with on/off ramps
- Concept 4 – Acceleration Lanes Corridor
    - Concept is not anticipated as a long-term solution. However, acceleration lanes and right-turn lanes may be components of an interim fix.
    - Additional storage in the median and acceleration lanes provide immediate, lowest cost response to the current concerns.
    - MnDOT may not approve of acceleration lanes as a singular response. Efforts to limit access points should also be included. For example, extension of east side backage road to Bluff Drive would allow closing of access at 166th St. These access closures, combined with acceleration lanes at Bluff Drive may be acceptable.

- Concept 5 – Realigned DDI Corridor: Concept developed to answer question of "could an interchange be constructed?" Unless railroad is relocated realignment of TH 169 and extensive right-of-way and business takings would be required. This concept is not politically or economically acceptable.
- Concept 5A - Realigned DDI Overpass Corridor: Concept developed to answer question of "could an interchange be constructed?" Unless railroad is relocated realignment of TH 169 and extensive right-of-way and business takings would be required. This concept is not politically or economically acceptable.
- Concept 5B – DDI Corridor (RR gone): Only feasible if railroad was relocated. Concept not feasible at this time.
- Concept 5C DDI Overpass Corridor: Cost of raising TH 169 and bridging railroad are beyond attainable funding.

Concepts to advance: Prepare a singular version of concept 2 with a single bridge. Prepare a version of concept 3 with a single bridge. Prepare an "interim" solution concept comprised of U-turns, acceleration lanes, RIRI and frontage road connections.

General/Miscellaneous Information and/or Comments

- Reduction of access points through completion of frontage or backage road connections will be a strong plus for MnDOT
- Be aware of recent fatality at 150th St.
- Consider asking County to acknowledge study in County Comprehensive Plan. Would need to have draft to County before October.
- Consider identifying necessary additional analysis needed tor eventual project funding pursuits and potentially seeking a second CDA grant for such efforts.
- Consider seeking buy-in from property owners along proposed backage road extensions early in process.
- Consider pulling out/focusing on heavy vehicle traffic. Doing so may benefit in pursuit of funding.
- Consider capturing video of particularly troubling movements.

The meeting adjourned at 2:30 PM

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Stantec Counsulting Services Inc.

Pat McGraw, PE

Associate
Phone: (651) 967-4655
Fax: (651) 636-1311
Pat.mcgraw@stantec.com

Attachment: Sign-in-sheet; conceptual alternatives

c. N/A

Meeting Notes

Meeting with Scott County

Sand Creek Township TH 169 Corridor Study / 193804245

Date/Time:	September 13, 2018 / 8:00 AM
Place:	Scott County Highway Department
Next Meeting:	N/A
Attendees:	Scott County: Tony Winiecki, Brad Davis, Lisa Freese, Craig Jensen Sand Creek Township: Chad Sandy Stantec: Pat McGraw, Kyle Renneke
Absentees:	N/A
Distribution:	Attendees

Safety Moment: N/A

Item: **Action:**

Final three conceptual alternatives

Ten conceptual alternatives based on five fundamental options were previously reviewed with the County and Township staff during meetings on August 1st, and with MnDOT on August 6th. The five fundamental options were as follows:

- Concept 1 – Reduced conflict intersections (RCI)
- Concept 2 – Controlled access with local roads over TH 169 (included three overpasses)
- Concept 3 – Controlled access with TH 169 over local roads (included three underpasses)
- Concept 4 – Acceleration lanes
- Concept 5 – Diverging diamond interchanges

Through these earlier meetings it was determined concepts 2 & 3 would be refined to utilize single over or underpasses, and components of concepts 1 & 4 would be utilized to create an alternative based on at-grade solutions. The revised concepts as reviewed during this meeting were:

- Concept 1 – At-Grade solutions (a combination of RCI's, acceleration lanes, frontage road extensions and access modifications)
- Concept 2 – Overpass of TH 169 (overpass connecting Jordan avenue to the south end of the eastern backage road, acceleration lanes, frontage road extensions and access modifications)
- Concept 3 – Underpass of TH 169 at Bluff Drive (TH 169 over Bluff Drive, TH 169 NB off-ramp to south end of eastern backage road, on-

Item: **Action:**

ramp to TH 169 NB at Bluff Drive, acceleration lanes, frontage road extensions and access modifications)

The attendees reviewed the final three concepts and made the following comments:

- Concept 1:
  - Turn-lanes and/or acceleration lanes for W 166th Street: Be aware that MnDOT will most likely not support such improvements to this relatively minor access. It was decided that the results of the on-going traffic modeling will dictate whether or not these improvements are called for in the conceptual alternatives.
  - U-Turns: Careful modeling will be needed to assess whether signalization would be required.
- Concept 2:
  - If median if fully closed at 173rd St W as currently shown, U-turn will be needed south of the intersection to accommodate southbound to eastbound movements. Concept two will be modified to maintain the current left-turns from TH 169. This will provide clearer comparability to concept 3 which maintains these movements.
- Concept 3:
  - Southbound exit-ramp at Bluff Drive: Consider shifting southbound TH 169 to the east, providing a barrier between north and southbound TH 169, to allow for addition of a southbound TH 169 exit to Bluff Drive.
  - Accesses immediately north and south of Bluff Drive will likely need to be removed to accommodate the TH 169 over-pass of Bluff Drive.

Possible Funding Sources:

The attendees briefly worked to identify potential funding sources for further consideration. Potential sources noted are:

- County Sales Tax: Funds are committed through 2022. However, there is some potential for projects to shift.
- MnDOT Cooperative Agreements
- Local Road Improvement Program (LRIP)

Item: **Action:**

- Federal Freight
- Highway Safety Improvement Program (HSIP)
- Federal BUILD Grants
- Local property owners: It was suggested that some of the more prominent businesses or landowners may be interested in donating land in order to advance area improvements.
- MCES – Principal Arterial Intersection Conversion Study

Miscellaneous:

- Concept level layouts will be developed for each of the three final alternatives.
- Attendees were asked if this project is on track to meet expectations and to be of value moving forward. The attendees confirmed the project is on track to meet expectations and to provide the anticipated value.
- Interstate Review will be needed.
- On-going efforts: Pat provided a brief update regarding on-going tasks. The following are the primary items noted.
    - Refinement of three final conceptual alternatives as noted above
    - Definition of construction limits for the three final alternatives
    - Construction cost estimates for the three final alternatives
    - Traffic modeling of the three final alternatives
    - Evaluation of safety improvements and concerns associated with each of the final three alternatives
    - Draft study report

The meeting adjourned at 9:40 AM

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Entity

Pat McGraw PE
Associate, Senior Project Manager

Phone: (651) 967-4655
Fax: N/A
Pat.McGraw@stantec.com

Attachment: Three final conceptual alternatives

c. N/A

Appendix E

PRELIMINARY CONCEPTUAL ALTERNATIVES

Concept 1: Reduced Conflict Intersections (RCI)

Concept 2: Controlled access with local roads over TH 169 (overpasses)

Concept 2A: Controlled access with local roads over TH 169 (overpasses)

Concept 2B: Controlled access with local roads over TH 169 (overpasses)

Concept 3: Controlled access with TH 169 over local roads (underpasses)

Concept 4: Acceleration Lanes

Concept 5: Diverging Diamond Interchange (DDI)

Concept 5A: Diverging Diamond Interchange (DDI)

Concept 5B: Diverging Diamond Interchange (DDI)

Concept 5C: Diverging Diamond Interchange (DDI)

CONCEPT 1

RCUT (U-TURN) CORRIDOR

US 169

193804245

SAND CREEK TOWNSHIP

DATE: $DATE$ PROJ. NO.: 193804245

FILENAME: 193804245-01.DWG

CONCEPT 2

CONTROLLED ACCESS CORRIDOR

US 169

193804245

SAND CREEK TOWNSHIP

DATE: $DATE$ PROJ. NO.: 193804245

FILENAME: 193804245-01.DWG

CONCEPT 2A

CONTROLLED ACCESS CORRIDOR

US 169

193804245

SAND CREEK TOWNSHIP

DATE: $DATE$ PROJ. NO.: 193804245

FILENAME: 193804245-1P1.DWG

CONCEPT 2B

CONTROLLED ACCESS CORRIDOR

US 169

193804245

SAND CREEK TOWNSHIP

DATE: $DATE$ PROJ. NO.: 193804245

FILENAME: 193804245-1P1.DWG

CONCEPT 3

SIDE-ROAD UNDER CORRIDOR

US 169

193804245

SAND CREEK TOWNSHIP

DATE: $DATE$ PROJ. NO.: 193804245

FILENAME: PM-193804245-SP1.DWG

CONCEPT 4

ACCELERATION LANES CORRIDOR

US 169

193804245

SAND CREEK TOWNSHIP

DATE: $DATE$ PROJ. NO.: 193804245

FILENAME: PM-193804245-XFLT2.DWG

NOTE: DS = DESIGN SPEED

1. PROHIBIT LEFT-TURN TO SB TH 169 ONLY
2. IF AREA IS CONNECTED TO BLUFF DRIVE, ACCESSES HERE COULD BE REMOVED

CONCEPT 5

REALIGNED DDI CORRIDOR

US 169

193804245

SAND CREEK TOWNSHIP

DATE: $DATE$ PROJ. NO.: 193804245

FILENAME: 193804245-01.DWG

CONCEPT 5A

REALIGNED DDI OVERPASS CORRIDOR

US 169

193804245

SAND CREEK TOWNSHIP

DATE: $DATE$ PROJ. NO.: 193804245

FILENAME: 193804245-5A.DWG

NOTE: DS = DESIGN SPEED

Stantec

CONCEPT 5B

DDI CORRIDOR

US 169

193804245

SAND CREEK TOWNSHIP

DATE: $DATE$ PROJ. NO.: 193804245

FILENAME: 193804245-5B.DWG

NOTES:
DS.= DESIGN SPEED
CONCEPT ONLY FEASIBLE IF RAILROAD IS RELOCATED

CONCEPT 5C

DDI OVERPASS CORRIDOR

US 169

193804245

SAND CREEK TOWNSHIP

DATE: $DATE$ PROJ. NO.: 193804245

FILENAME: 193804245-5PLD1a

Appendix F

OPINION OF PROBABLE COST FOR FINAL THREE OPTIONS

Option 1 Opinion of Probable Cost

Option 2 Opinion of Probable Cost

Option 3 Opinion of Probable Cost

Stantec

OPINION OF PROBABLE COST

TH 169 - AT GRADE / INTERIM SOLUTIONS

PREFERRED CONCEPT 1

PREPARED BY: JDP

DATE: 11/12/2018

NO.	ITEM	UNIT	UNIT PRICE	TOTAL PROJECT	
				QUANTITY	COST
1	MOBILIZATION	LUMP SUM	$ 16,000.00	1	$ 16,000.00
2	ACCESS CLOSURES	EACH	$ 15,000.00	12	$ 180,000.00
3	COMMON EXCAVATION	CU YD	$ 10.00	32,593	$ 325,930.00
4	AGGREGATE BASE CLASS 5	CU YD	$ 35.00	8,656	$ 302,960.00
5	SELECT GRANULAR BORROW	CU YD	$ 25.00	20,690	$ 517,250.00
6	BITUMINOUS PAVEMENT	TON	$ 75.00	12,369	$ 927,675.00
7	PERMANENT DRAINAGE	LUMP SUM	$ 150,000.00	1	$ 150,000.00
8	TRAFFIC CONTROL	LUMP SUM	$ 40,000.00	1	$ 40,000.00
9	EROSION CONTROL	LUMP SUM	$ 35,000.00	1	$ 35,000.00
10	PERMANENT RESTORATION	ACRE	$ 1,500.00	10	$ 15,000.00
11	UTILITY RELOCATIONS	LUMP SUM	$ 75,000.00	1	$ 75,000.00
SUBTOTAL					$ 2,584,815.00
50% CONTINGENCY					$ 1,292,408.00
TOTAL CONSTRUCTION ESTIMATE					**$ 3,877,223.00**

GENERAL NOTES:

Stantec

OPINION OF PROBABLE COST

TH 169 - AT GRADE / INTERIM SOLUTIONS

PREFERRED CONCEPT 2

PREPARED BY: JDP

DATE: 11/12/2018

NO.	ITEM	UNIT	UNIT PRICE	TOTAL PROJECT	
				QUANTITY	COST
1	MOBILIZATION	LUMP SUM	$ 296,000.00	1	$ 296,000.00
2	ACCESS CLOSURE	EACH	$ 15,000.00	12	$ 180,000.00
3	COMMON EXCAVATION	CU YD	$ 10.00	27,606	$ 276,060.00
4	COMMON BORROW	CU YD	$ 11.00	19,556	$ 215,116.00
5	AGGREGATE BASE CLASS 5	CU YD	$ 35.00	7,174	$ 251,090.00
6	SELECT GRANULAR BORROW	CU YD	$ 25.00	18,507	$ 462,675.00
7	BITUMINOUS PAVEMENT	TON	$ 75.00	10,476	$ 785,700.00
8	BRIDGE	SQ FT	$ 150.00	14,080	$ 2,112,000.00
9	WALL	SQ FT	$ 110.00	12,000	$ 1,320,000.00
10	PERMANENT DRAINAGE	LUMP SUM	$ 150,000.00	1	$ 150,000.00
11	TRAFFIC CONTROL	LUMP SUM	$ 40,000.00	1	$ 40,000.00
12	EROSION CONTROL	LUMP SUM	$ 35,000.00	1	$ 35,000.00
13	PERMANENT RESTORATION	ACRE	$ 1,500.00	10	$ 15,000.00
14	UTILITY RELOCATIONS	LUMP SUMP	$ 75,000.00	1	$ 75,000.00
SUBTOTAL					$ 6,213,641.00
50% CONTINGENCY					$ 3,106,821.00
TOTAL CONSTRUCTION ESTIMATE					**$ 9,320,462.00**

GENERAL NOTES:

Stantec

OPINION OF PROBABLE COST

TH 169 - AT GRADE / INTERIM SOLUTIONS

PREFERRED CONCEPT 3

PREPARED BY: JDP

DATE: 11/12/2018

NO.	ITEM	UNIT	UNIT PRICE	TOTAL PROJECT	
				QUANTITY	COST
1	MOBILIZATION	LUMP SUM	$ 539,000.00	1	$ 539,000.00
2	ACCESS CLOSURE	EACH	$ 15,000.00	11	$ 165,000.00
3	COMMON EXCAVATION	CU YD	$ 10.00	10,162	$ 101,620.00
4	COMMON BORROW	CU YD	$ 10.00	39,112	$ 391,120.00
5	AGGREGATE BASE CLASS 5	CU YD	$ 25.00	11,963	$ 299,075.00
6	SELECT GRANULAR BORROW	CU YD	$ 35.00	31,453	$ 1,100,855.00
7	BITUMINOUS PAVEMENT	SQ YD	$ 45.00	22,042	$ 991,890.00
8	CONCRETE PAVEMENT	SQ YD	$ 65.00	38,075	$ 2,474,875.00
9	BRIDGE	SQ FT	$ 150.00	14,784	$ 2,217,600.00
10	WALL	SQ FT	$ 110.00	24,000	$ 2,640,000.00
11	PERMANENT DRAINAGE	LUMP SUM	$ 150,000.00	1	$ 150,000.00
12	TRAFFIC CONTROL	LUMP SUM	$ 100,000.00	1	$ 100,000.00
13	EROSION CONTROL	LUMP SUM	$ 50,000.00	1	$ 50,000.00
14	PERMANENT RESTORATION	ACRE	$ 1,500.00	10	$ 15,000.00
15	UTILITY RELOCATIONS	LUMP SUMP	$ 75,000.00	1	$ 75,000.00
SUBTOTAL					$ 11,311,035.00
50% CONTINGENCY					$ 5,655,518.00
TOTAL CONSTRUCTION ESTIMATE					**$ 16,966,553.00**

GENERAL NOTES: