



Memorandum

SRF No. 10207.03

To: Joe Gustafson, PE, PTOE
Washington County

From: Philip Kulis, PE, PTOE, RSP₂₁, Senior Project Manager
Jade Balcos, PE, Senior Engineer

Date: August 26, 2024

Subject: CR 15B South Segment
Traffic Analysis Technical Evaluation Documentation

Introduction

Washington County State Aid Highway (CSAH) 15 is an important arterial roadway that runs north-south through nearly all of Washington County in conjunction with Manning Avenue South (Trunk Highway 95) south of I-94. The roadway not only serves as a primary connection to the regional transportation system, but it also facilitates access to a multitude of businesses, commercial enterprises, schools, churches, and residential properties/neighborhoods. It has long been a goal of Washington County to have a continuous connection on the County State Aid Highway system in this area. The County's overarching goal for CSAH 15 is to develop and maintain a north-south arterial roadway that will improve safety and mobility, accommodate current and future traffic demands, incorporate bicycle and pedestrian facilities, appropriately manage access in a safe and efficient manner, and maintain the viability of commercial and residential growth throughout the County.

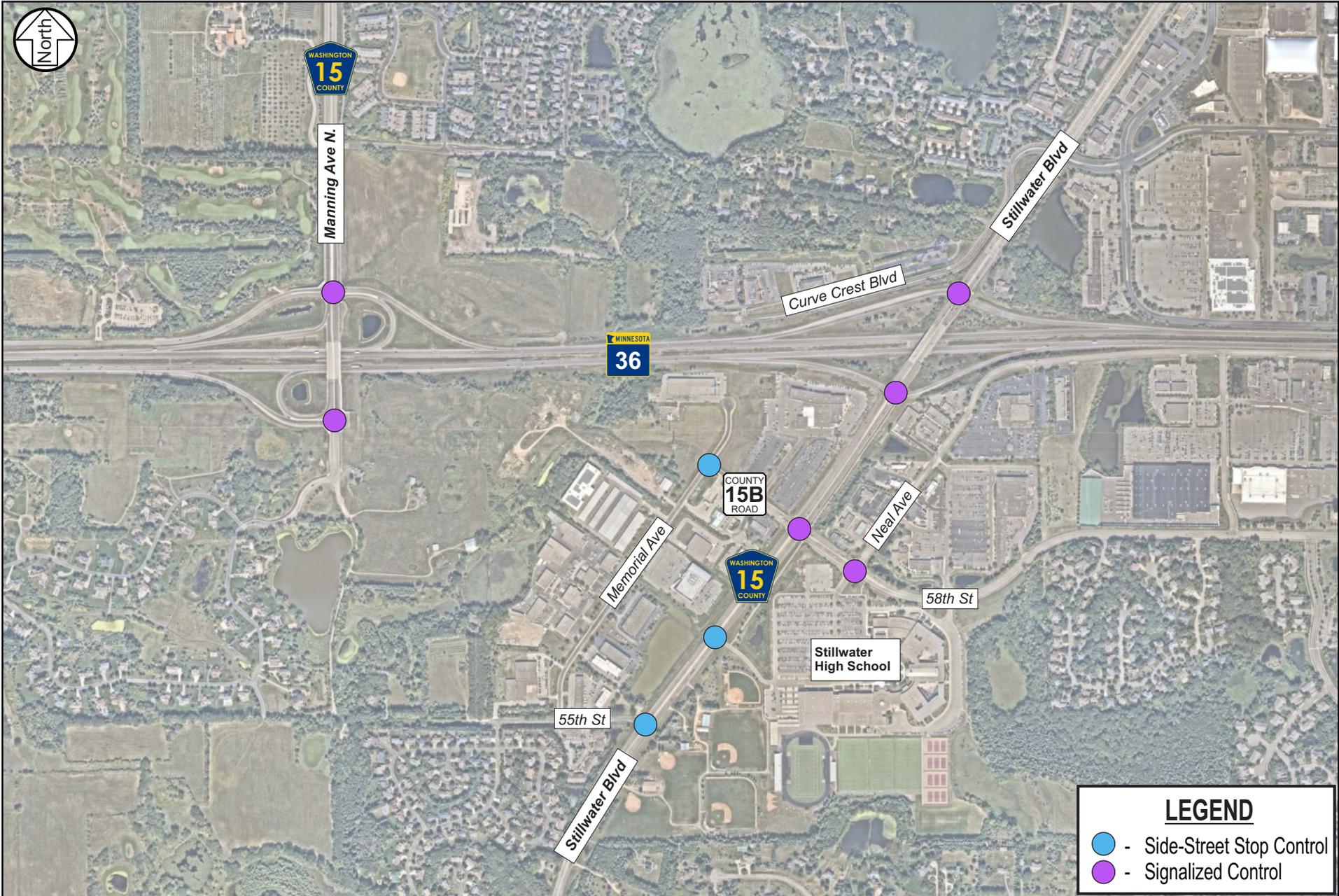
However, there is currently a gap in CSAH 15 between the portion north of Trunk Highway (TH) 36, which follows Manning Avenue North, and the segment south of TH 36 which follows Stillwater Boulevard. Currently, there is no continuous connection between Manning Avenue and Stillwater Boulevard on the County system, as County Road (CR) 15B currently extends approximately 700 feet west from Stillwater Boulevard and terminates at Memorial Avenue. With the recent construction of the TH 36/Manning Avenue interchange, coupled with pending development in the area, a unique opportunity presents itself to make the connection of CR 15B from Manning Avenue in Stillwater to Memorial Avenue in Oak Park Heights.

The purpose of this project is to prepare for future needs of the project area (see Figure 1) and extend CR 15B to provide a continuous County facility between Manning Avenue and Stillwater Boulevard, thus connecting the north and south portions of CSAH 15. The County is currently planning for construction of this project to begin in 2025. This traffic study was conducted to determine the needs of the project area in the future, accounting for development, traffic operations and safety. This memorandum documents the traffic analysis technical evaluation completed for the project that will be used to help guide the design of CR 15B and the surrounding area.

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Project Area
 CR 15B South Segment
 Washington County

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Figure 1

Existing Conditions

To facilitate the technical traffic analysis, a baseline condition was established based on the existing conditions. To complete this, updated traffic counts were collected in the area, along with field observations and retrieval of the existing signal timings. These are described in more detail below.

Data Collection

The volume set used for the existing baseline condition was developed using a combination of a few data sources, which are outlined as follows:

- Tuesday, February 28th, 2023 (from the Minnesota Department of Minnesota's (MnDOT) Metro Intersection Warrant Information):
 - TH 36 and Manning Avenue North (Westbound) Ramps
 - TH 36 and Manning Avenue South (Eastbound) Ramps
- Tuesday, May 23rd, 2023:
 - Stillwater Boulevard/Stillwater High School Entrance
 - Stillwater Boulevard/58th Street
 - 58th Street/Memorial Avenue
 - 58th Street/Neal Avenue
- Thursday, October 26th, 2023:
 - Stillwater Boulevard/55th Street
- Tuesday, December 26th, 2023:
 - TH 36 and Stillwater Boulevard North (Westbound) Ramps
 - TH 36 and Stillwater Boulevard South (Eastbound) Ramps

These counts were compared to MnDOT annual average daily traffic (AADT) volumes to ensure the turning movement counts collected are representative of a typical day.

Field Observations

Field observations were conducted to identify roadway characteristics within the project area (i.e. roadway geometry, posted speed limits, and intersection traffic controls):

- Stillwater Boulevard is a four-lane divided roadway. Stillwater Boulevard is functionally classified as an A-Minor Expander arterial with a posted speed limit of 50 miles per hour (mph) south of 58th Street and 45 mph north of 58th Street.
- 58th Street is a two-lane roadway west of Stillwater Boulevard, currently ending at a T-intersection at Memorial Avenue, approximately 700 feet west of Stillwater Boulevard. 58th Street is a four-lane divided roadway east of Stillwater Boulevard, transitioning to a four-lane undivided roadway approximately 200 feet east of Neal Avenue.
- Stillwater Area High School is in the southeast quadrant of the Stillwater Boulevard/58th Street intersection. It has two main access locations, with one located at the 58th Street/Neal Avenue intersection as the south leg and the other located on Stillwater Boulevard

approximately halfway between 55th Street and 58th Street. The access on Stillwater Boulevard is right-in, right-out (RIRO).

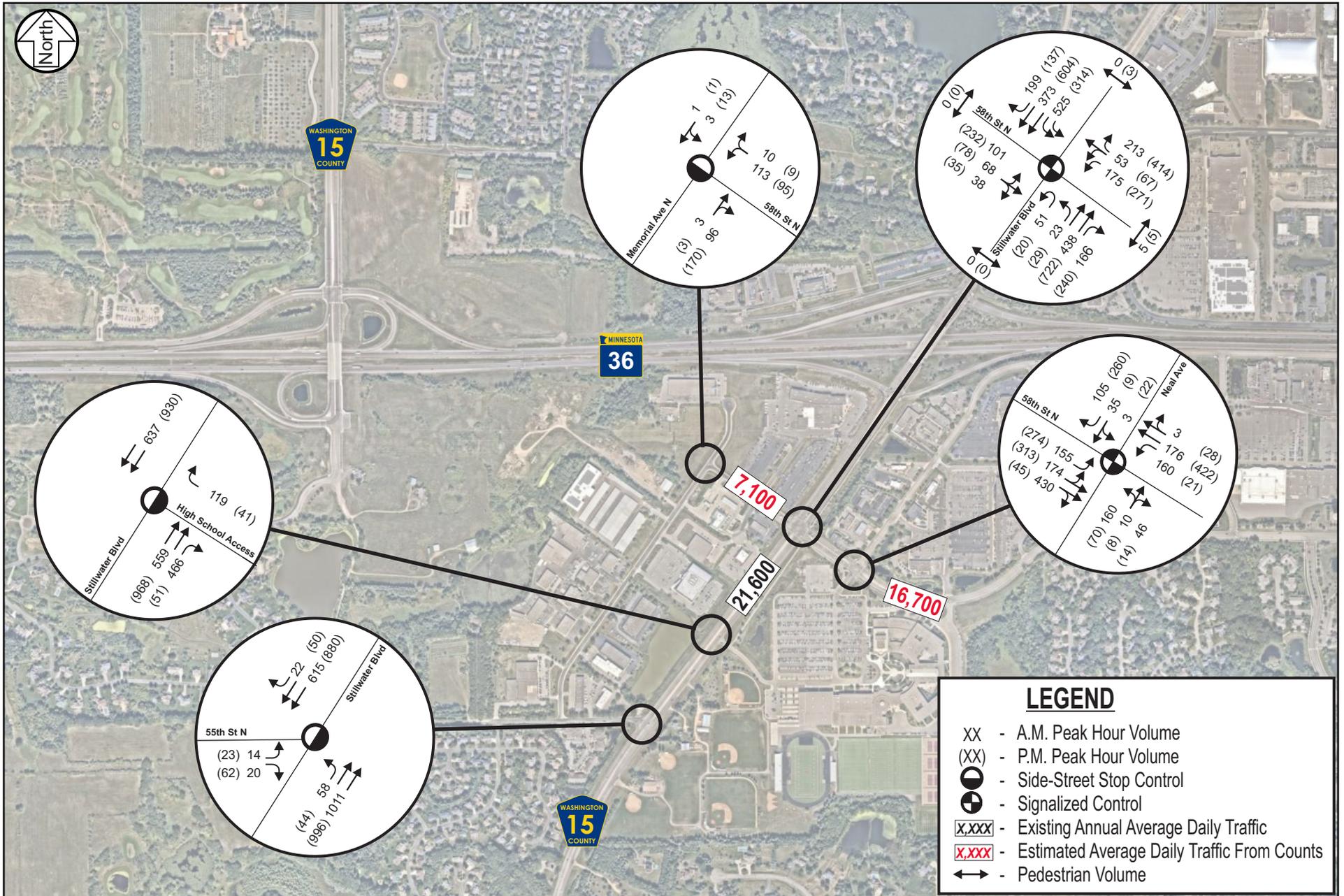
- The traffic signal systems at Stillwater Boulevard/58th Street and 58th Street/Neal Avenue both run split phased in the eastbound/westbound direction, which means that the two directions are not given a green indication concurrently. This type of phasing/operation can result in inefficiencies with the signal operations, particularly during lower volume time periods. These intersections are likely split phased due to the shared westbound through/left-turn lane at Stillwater Boulevard and the shared eastbound through/left-turn lane at Neal Avenue.
- The TH 36/Manning intersection was changed from an at-grade intersection to a grade separated interchange recently with construction completed in the fall of 2022.
- Curve Crest Boulevard is the frontage road between Stillwater Boulevard and Manning Avenue on the north side of TH 36. Currently, Curve Crest Boulevard is a cul-de-sac that provides access to a few businesses and does not yet extend west to Manning Avenue.
- There is no frontage road between Manning Avenue and Stillwater Boulevard on the south side of TH 36.

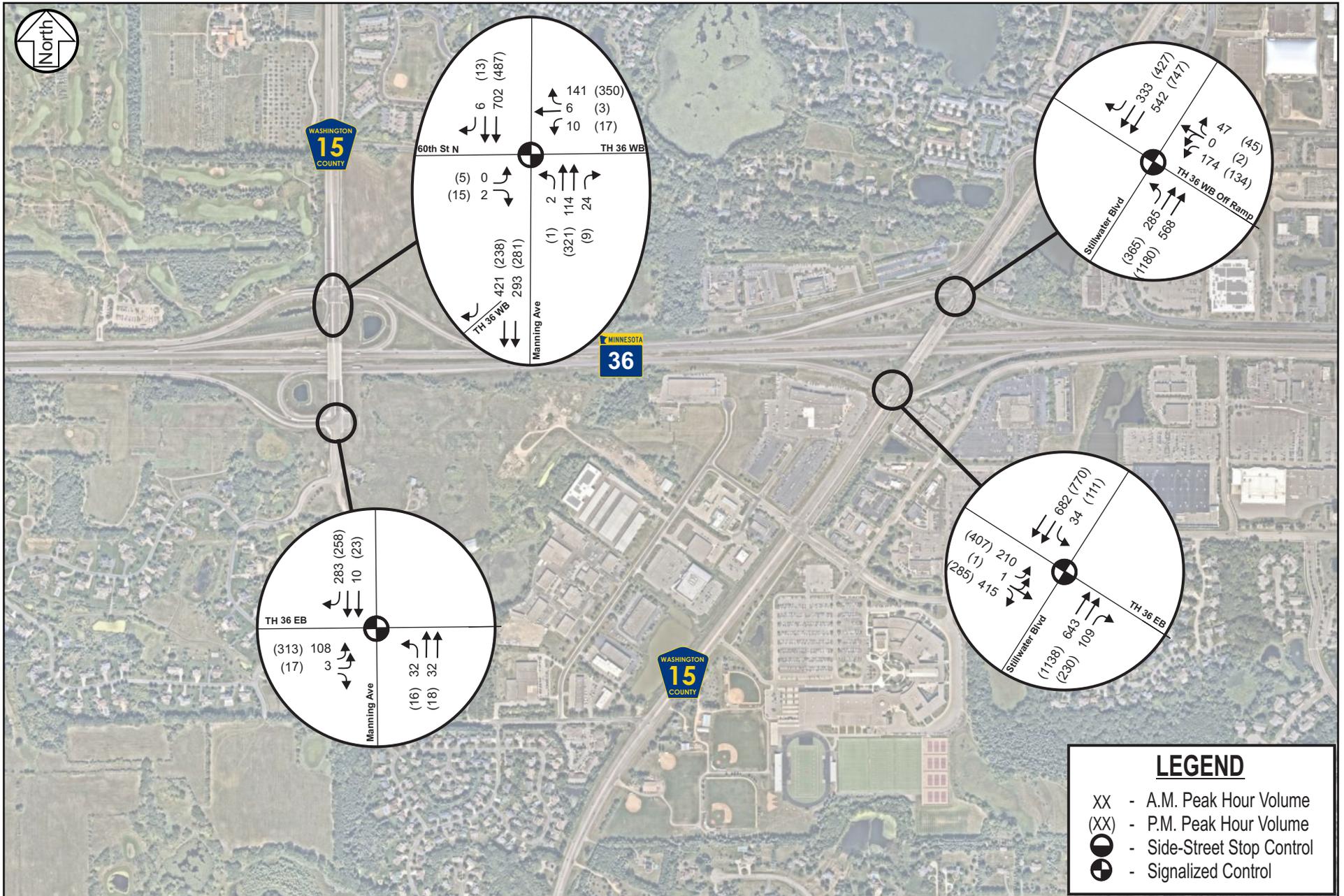
With the Stillwater High School located in the project area and impacting traffic operations during school arrivals and departures, a drone was used to capture the operations during these time periods. Stillwater High School hours are 7:40 a.m. to 2:10 p.m., Monday through Friday. Key observations of the school operations are:

- Due to the split phased operations at the Stillwater Boulevard/58th Street intersection, a pedestrian call for crossing Stillwater Boulevard can have a substantial impact on operations due to the north and south crossings not timing concurrently.
- Arrivals during the a.m. peak (7:00-8:00 a.m.) impact traffic operations in the morning.
 - Southbound left-turning vehicles at 58th Street heavily favor the outside turn lane for the right turn into the school at Neal Avenue. The queue nearly spills back to the TH 36 south ramp regularly, on days school is in session.
 - From the TH 36 and Stillwater Boulevard South Ramp, vehicles intending to make a southbound left turn at the Stillwater Boulevard and 58th Street intersection are required to weave across two lanes of traffic within 300 feet.
 - The eastbound queue from Neal Avenue spills back to Stillwater Boulevard.
 - The south school entrance is heavily used by vehicles from the south. The heavy use, in combination with on-site circulation, results in a northbound queue on Stillwater Boulevard.
- Departures during the p.m. school peak (2:00-3:00 p.m.) impact traffic operations in the afternoon:
 - The south school entrance is heavily used by vehicles exiting the school.
 - Westbound right-turning vehicles queue back through the school site.

- There are 105 northbound U-turns at 58th Street during the hour, from vehicles exiting the at the south school entrance.
- Westbound vehicles at Neal Avenue can get released into a red that just started at Stillwater Boulevard due to the two signals not being coordinated.
- There is a heavy northbound left-turn demand at Neal Avenue. There is currently no left-turn phase for this movement, thus northbound left vehicles must yield to southbound vehicles.

Existing traffic volumes, intersection geometry, and traffic controls at the key study intersections are shown in Figure 2 and Figure 3 for the overall daily peaks (7:00-8:00 a.m. and 4:15-5:15 p.m.).





Crash Analysis

Five years of crash data (2018 to 2022) were obtained from the Minnesota Crash Mapping and Analysis Tool (MnCMAT2) data for the study intersections. When analyzing crash data, the critical crash rate is defined using the statewide average rate at intersections with similar intersection control and the specific volume of the subject intersection to determine a value at which a crash rate is considered statistically greater than the average. A crash rate exceeding the critical rate indicates that more crashes have been experienced at that location compared to similar locations around the state, thus indicating a potential safety issue.

A total of 77 intersection-related crashes were reported at the nine subject intersections during the five-year analysis period. No fatal crashes occurred at any of the intersections, but one serious injury crash occurred at the TH 36 and Manning Avenue north ramp intersection. None of the intersections are above the critical crash rate; however, the Stillwater Boulevard and 58th Street intersection is above the average crash rate. A summary of the crashes by severity and type is shown in Table 1 and Table 2, respectively.

Table 1. Crashes by Severity/Crash Rate Calculations

Intersection	K	A	B	C	PDO	Total	Average Crash Rate	Observed Crash Rate	Critical Crash Rate
Stillwater Boulevard & 55th Street	0	0	0	0	1	1	0.13	0.02	0.28
Stillwater Boulevard & School RIRO Access	0	0	0	0	2	2	0.13	0.05	0.28
58th Street & Memorial Avenue	0	0	0	0	1	1	0.13	0.19	0.62
Stillwater Boulevard & 58th Street	0	0	1	1	22	24	0.59	0.41	0.86
Neal Avenue & 58th Street	0	0	0	0	7	7	0.51	0.23	0.86
TH 36 & Stillwater Boulevard South Ramp	0	0	1	4	20	25	0.59	0.52	0.89
TH 36 & Stillwater Boulevard North Ramp	0	0	5	5	6	16	0.59	0.34	0.89
TH 36 & Manning Avenue South Ramp*	0	0	0	0	0	0	0.51	0.00	1.49
TH 36 & Manning Avenue North Ramp*	0	1	0	0	0	1	0.59	0.13	1.36

* TH 36 and Manning Avenue crashes are only counted since the construction of the grade-separated interchange

Table 2. Crashes by Type

Intersection	Total	Ped	Single Vehicle ROR	Sideswipe	Rear End	Head On	Left Turn	Angle	Other
Stillwater Boulevard & 55th Street	1	0	0	0	1	0	0	0	0
Stillwater Boulevard & School RIRO Access	2	0	0	1	1	0	0	0	0
58th Street & Memorial Avenue	1	0	0	0	1	0	0	0	0
Stillwater Boulevard & 58th Street	24	0	0	3	10	0	0	9	2
Neal Avenue & 58th Street	7	0	0	0	2	1	1	3	0
TH 36 & Stillwater Boulevard South Ramp	25	0	1	0	21	0	0	3	0
TH 36 & Stillwater Boulevard North Ramp	16	0	1	2	1	1	2	9	0
TH 36 & Manning Avenue South Ramp*	0	0	0	0	0	0	0	0	0
TH 36 & Manning Avenue North Ramp*	1	1	0	0	0	0	0	0	0

* TH 36 and Manning Avenue crashes are only counted since the construction of the grade-separated interchange

37 of the 77 crashes at the subject intersections were rear end crashes. 10 of these crashes occurred at the Stillwater Boulevard and 58th Street intersection. 21 of these crashes occurred at the of TH 36 and Stillwater Boulevard south ramp intersection; the majority of these rear end crashes occurred with eastbound TH 36 exiting vehicles colliding with the queue at the signal on Stillwater Boulevard. 24 of the 77 crashes were right-angle crashes. The majority of these occurred at either the Stillwater Boulevard and 58th Street intersection or the TH 36 and Stillwater Boulevard north ramp intersection.

Intersection Operations Analysis

Intersection operations analysis identifies a Level of Service (LOS) which indicates how well an intersection is operating based on average delay per vehicle. Delay is calculated based on procedures outlined in the Highway Capacity Manual (HCM). Intersections are given a ranking from LOS A to LOS F; see Table 3 for the delay thresholds associated with each LOS. LOS A indicates the best traffic operation and LOS F indicates an intersection where demand exceeds capacity. LOS A through LOS D are typically considered acceptable in the Twin Cities Metro.

For side-street stop-controlled (SSSC) intersections, special emphasis is given to providing an estimate for the LOS of the side-street approach. Traffic operations at an unsignalized intersection with side-street stop control can be described in two ways. First, consideration is given to the overall intersection LOS. This considers the total number of vehicles entering the intersection and the capability of the intersection to support these volumes. Second, it is important to consider the delay on the minor

approach. Since the mainline does not have to stop, most of the delay is attributed to the side-street approaches. It is typical of intersections with higher mainline traffic volumes to experience high levels of delay (poor levels of service) on the side-street approaches, but an acceptable overall intersection LOS during peak hour conditions.

Table 3. Level of Service Criteria for Signalized and Unsignalized Intersections and Roundabouts

LOS Designation	Signalized Intersection Average Delay/Vehicle (seconds)	Unsignalized Intersection & Roundabout Average Delay/Vehicle (seconds)
A	≤ 10	≤ 10
B	> 10 - 20	> 10 - 15
C	> 20 - 35	> 15 - 25
D	> 35 - 55	> 25 - 35
E	> 55 - 80	> 35 - 50
F	> 80	> 50

An existing operations analysis was completed using PTV VISSIM (2022.00 - 05), which is a microscopic traffic simulation model that models individual vehicles, including how they interact with other vehicles and the transportation network, including roadway geometry and traffic control. The analysis was completed using the following data and assumptions:

- Existing turning movement counts previously shown were used as the volume inputs.
 - A.m. peak hour: 7:00 to 8:00 a.m.
 - Due to the sharp peak in traffic volumes associated with the school traffic, individual 15-minute volumes were balanced and loaded into the VISSIM model to capture the school operations more accurately.
 - P.m. peak hour: 4:15 to 5:15 p.m., which does not overlap with the school peak.
- Heavy vehicle percentages were assumed to be five (5) percent for the a.m. peak hour and two (2) percent for the p.m. peak hour based on collected turning movement counts.
- Roadway geometrics were obtained from aerial imagery and field observations.
- Existing signal timing was obtained from MnDOT and Washington County.
 - The intersection of 58th Street and Neal Avenue runs Free and is not coordinated with Stillwater Boulevard. Signal timing for this intersection was included in the timing files provided by the County.
- To model more realistic lane change behavior, the baseline lane change distance was 1,320 feet (per lane) and the emergency stop distance was 20 feet.
- Baseline driving behaviors for the different roadway types in the project area were used to reflect realistic roadway capacities.

A summary of the operational analysis under existing conditions is shown in Table 4, Figure 4 and Figure 5. Detailed 2023 operational results are shown in Appendix A.

Table 4: Operations Analysis Results – Existing Conditions

Intersection	AM Peak Hour		PM Peak Hour	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Stillwater Boulevard & 55th Street	5 / 18	A / C	1 / 18	A / C
Stillwater Boulevard & School RIRO Access	16 / 27	C / D	1 / 9	A / A
58th Street & Memorial Avenue	4 / 10	A / A	5 / 10	A / B
Stillwater Boulevard & 58th Street	31 / 48	C / D	32 / 43	C / D
Neal Avenue & 58th Street	14 / 18	B / B	15 / 21	B / C
TH 36 & Stillwater Boulevard South Ramp	12 / 32	B / C	13 / 25	B / C
TH 36 & Stillwater Boulevard North Ramp	13 / 41	B / D	11 / 30	B / C
TH 36 & Manning Avenue South Ramp	7 / 30	A / C	6 / 28	A / C
TH 36 & Manning Avenue North Ramp	5 / 15	A / B	6 / 14	A / B

Note: Overall results are followed by the worst-approach results.

Results of the existing conditions operations analysis indicate that the project intersections operate acceptably during the a.m. and p.m. peak hours.

A.M. Peak Hour

All intersections operate at overall LOS C or better. Intersections with maximum queues exceeding 500 feet are:

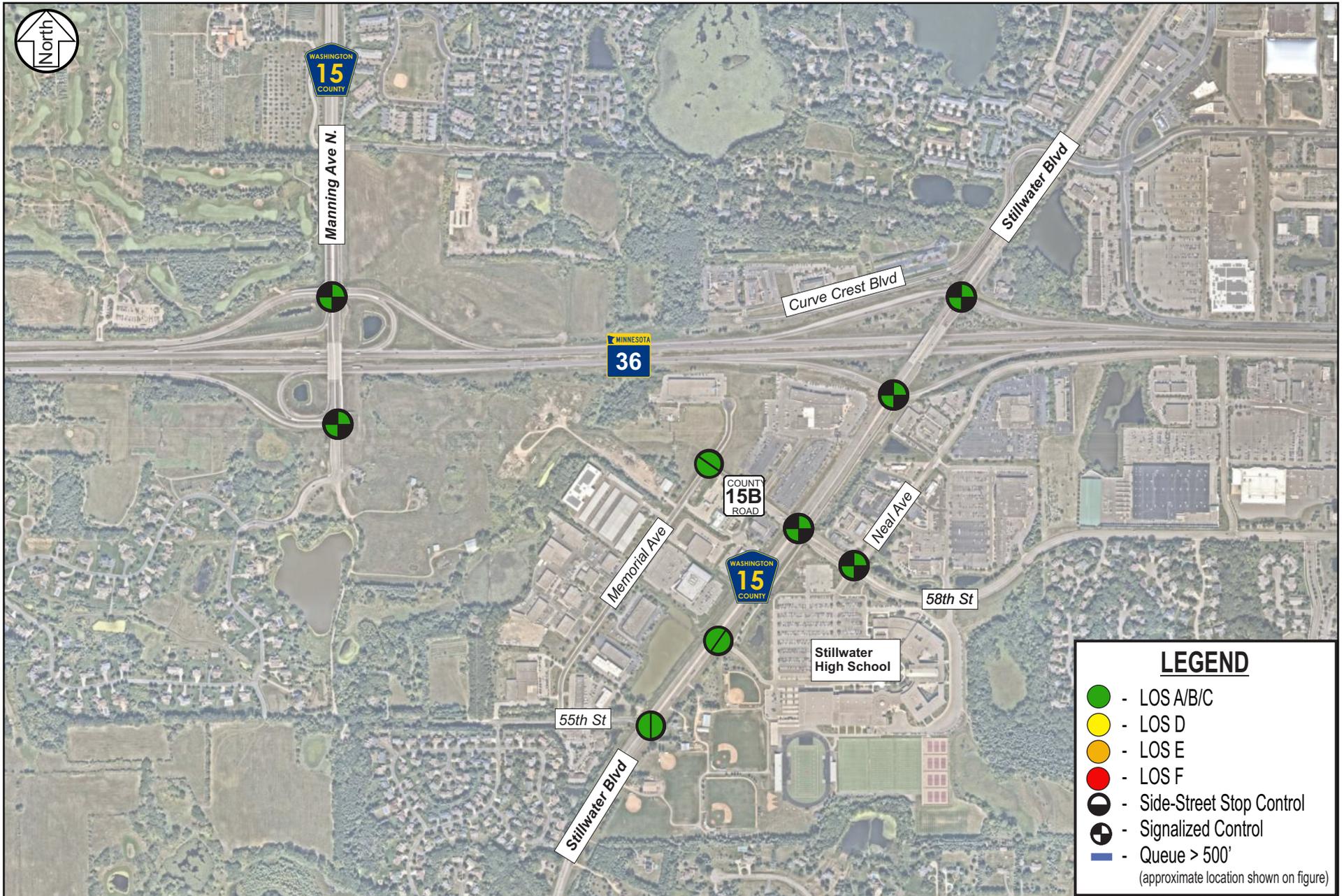
- Stillwater Boulevard and 58th Street
 - Southbound left queue: 525 feet
- Stillwater Boulevard and School RIRO Access
 - Northbound right queue: 625 feet

During the heaviest 30-minute arrival period, the Stillwater Boulevard and 58th Street intersection operates at an overall LOS D, and the southbound left maximum queue is approximately 675 feet.

P.M. Peak Hour

All intersections operate at overall LOS C or better. There are no movements with maximum queues exceeding 500 feet.

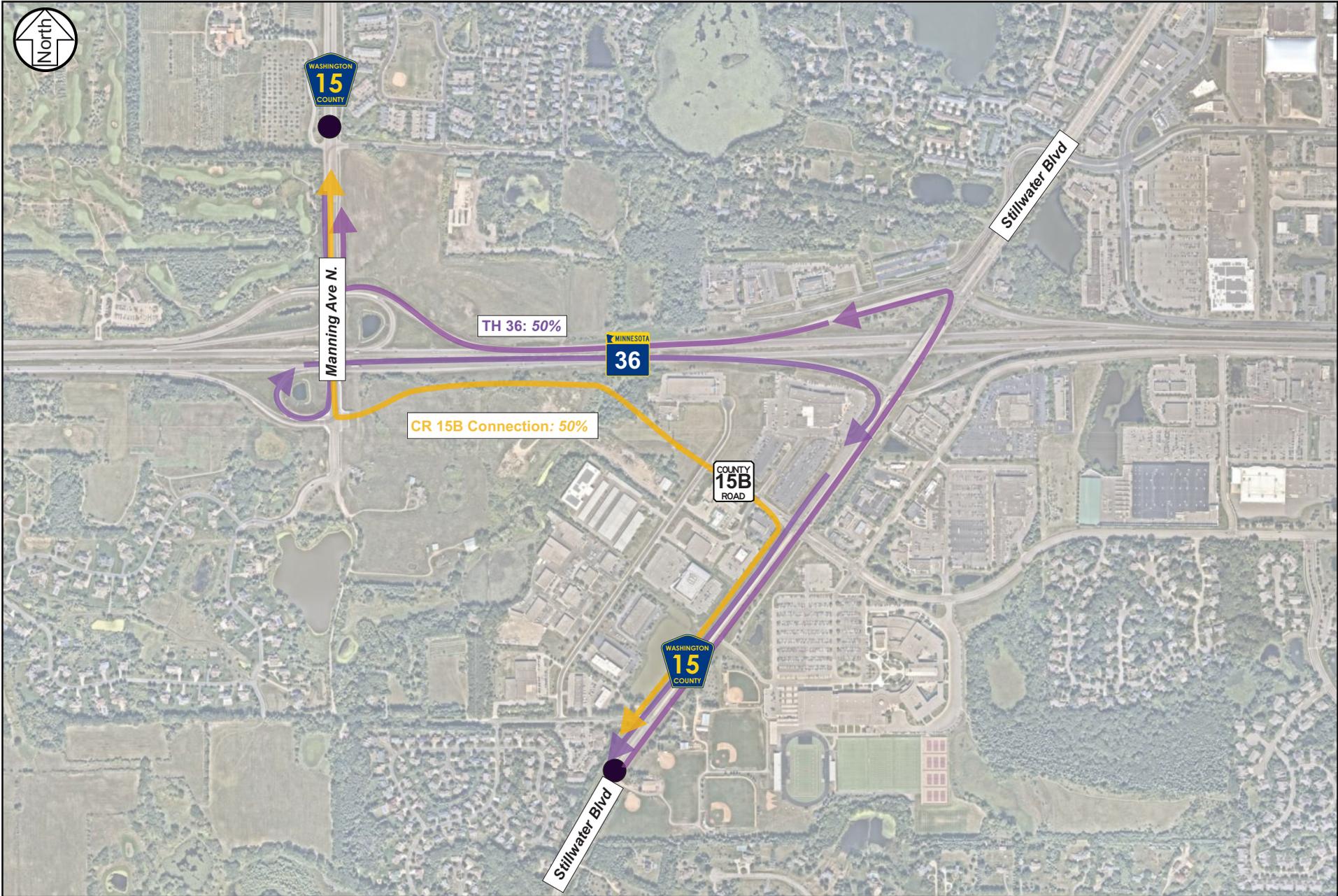




Existing Conditions with CR 15B Connection

An operations analysis was completed for an alternative with existing 2023 volumes and the CR 15B connection between Manning Avenue and Memorial Avenue. An initial travel time analysis was conducted using VISSIM to quantify the anticipated travel times between Manning Avenue and Stillwater Boulevard using TH 36 versus the CR 15B connection. The analysis accounted for the proposed alignment of CR 15B and the anticipated traffic control along the connection. The analysis indicated that travel times would be similar for vehicles traveling between Manning Avenue and Stillwater Boulevard, either using the CR 15B connection or TH 36. Based on this, it was assumed that approximately 50 percent of vehicles that are on Manning Avenue, north of TH 36 destined for Stillwater Boulevard south of TH 36 would divert and use the new connection and the other 50 percent would continue to use TH 36. This same assumption of approximately 50 percent of vehicles diverting was made for vehicles on Stillwater Boulevard, south of TH 36 destined for Manning Avenue north of TH 36. Detailed results of the travel time analysis are shown later in Table 8.

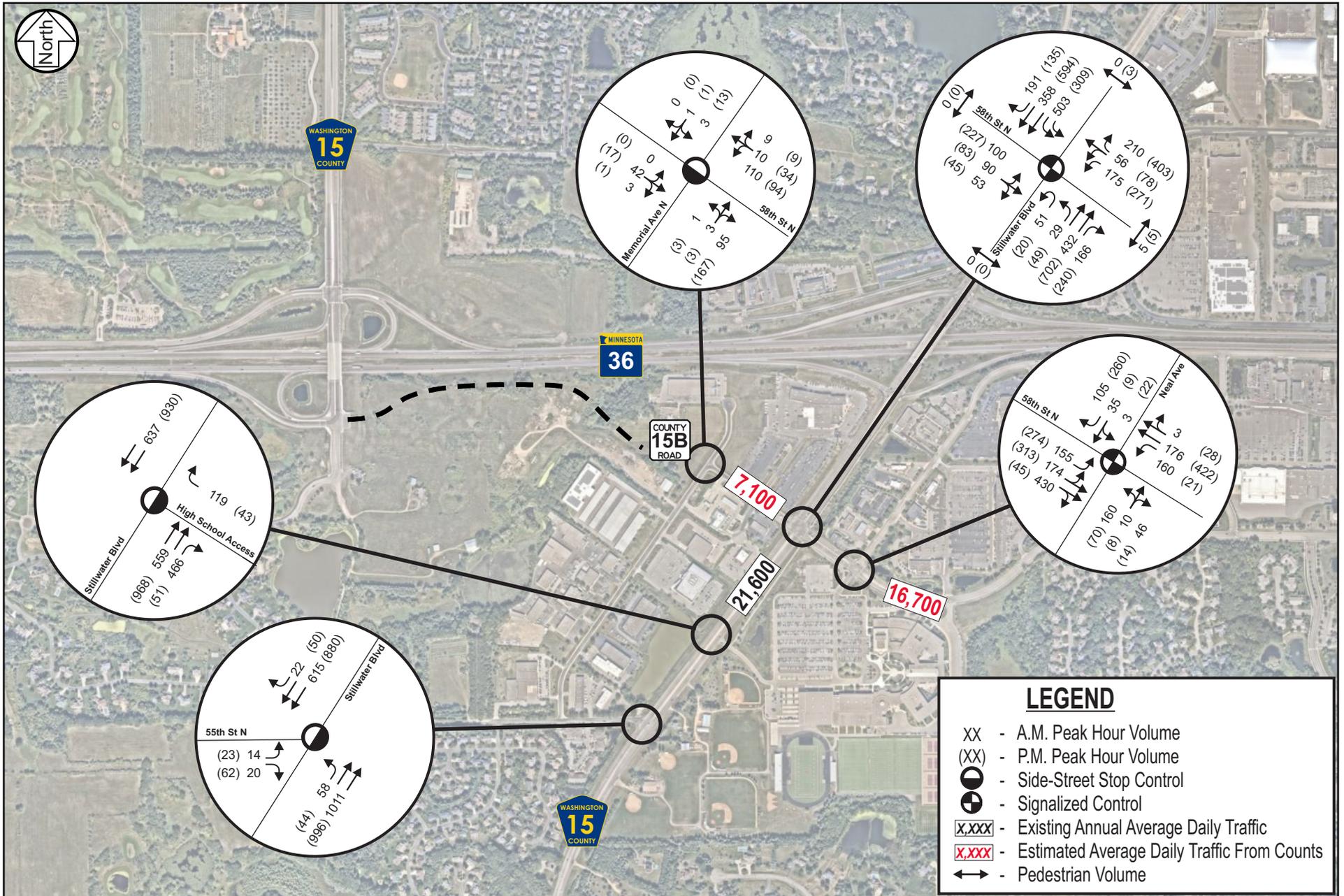
See Figure 6 for a visualization of these routing assumptions. Figure 7 and Figure 8 show the adjusted turning movement counts that were assumed based on the CR 15B connection.



Manning Avenue/Stillwater Boulevard Routing Assumptions

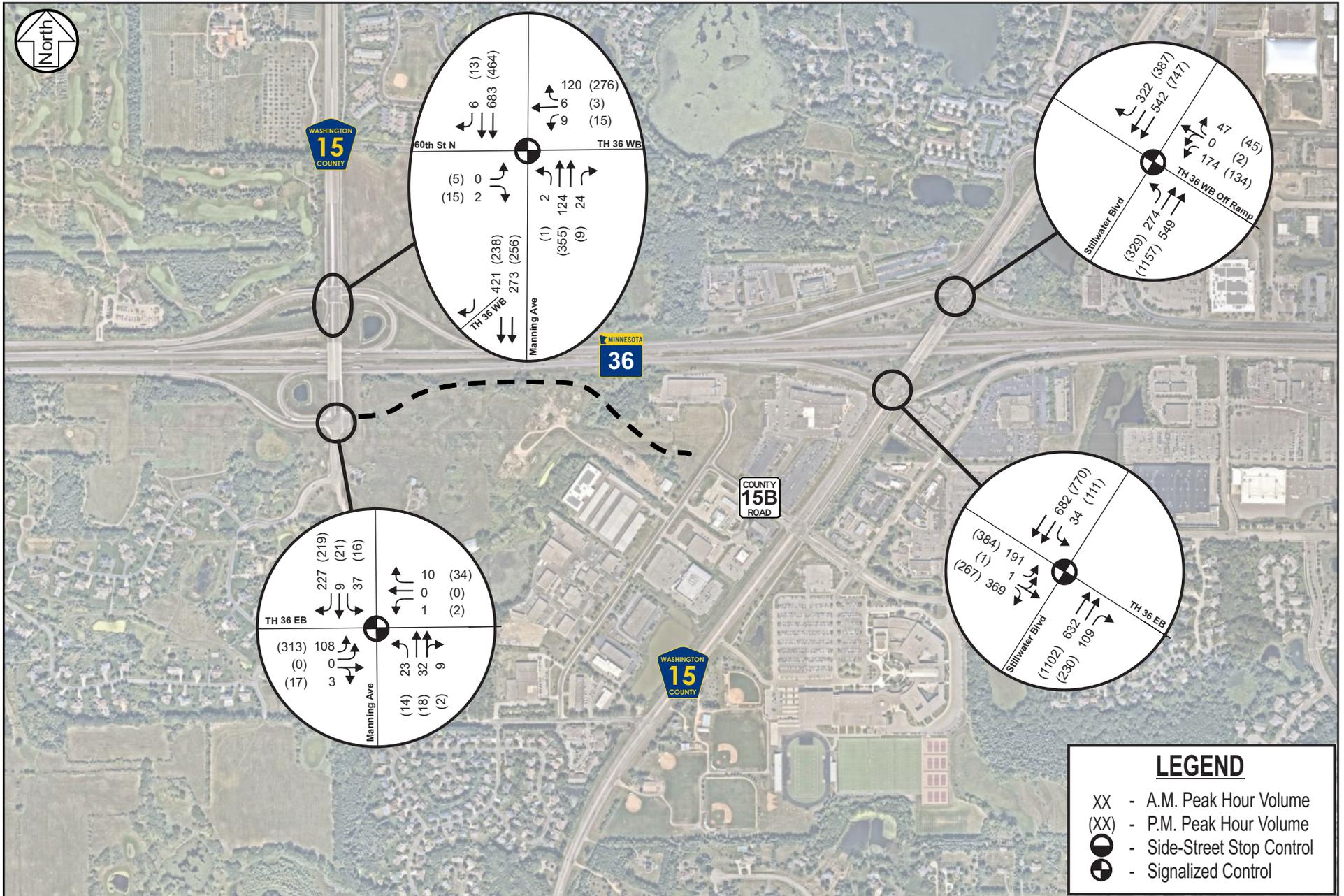
CR 15B South Segment
Washington County

Figure 6



SRF 2023 Expected Peak Volumes with CR 15B Connection
 CR 15B South Segment
 Washington County

Figure 7



SRF 2023 Expected Peak Volumes with CR 15B Connection
 CR 15B South Segment
 Washington County

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Figure 8

Intersection Operations Analysis

A summary of the operational analysis under existing 2023 volumes with the CR 15B connection is shown in Table 5, Figure 9, and Figure 10. The connection was assumed to be a four-lane roadway from Manning Avenue to approximately midway to Memorial Avenue, where it transitions to a three-lane roadway. Detailed 2023 operational results are shown in Appendix A. For this alternative, the signal timings for the study intersections were optimized based on the additional signal phases at the TH 36 and Manning Avenue South Ramp intersection and the shift in traffic volumes with the connection.

Table 5: Operations Analysis Results – Existing Conditions with Connection

Intersection	AM Peak Hour		PM Peak Hour	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Stillwater Boulevard & 55th Street	5 / 17	A / C	1 / 20	A / C
Stillwater Boulevard & School RIRO Access	17 / 27	C / D	1 / 9	A / A
58th Street & Memorial Avenue	3 / 10	A / B	5 / 11	A / B
Stillwater Boulevard & 58th Street	32 / 45	C / D	32 / 45	C / D
Neal Avenue & 58th Street	14 / 17	B / B	17 / 22	B / C
TH 36 & Stillwater Boulevard South Ramp	10 / 27	B / C	11 / 18	B / B
TH 36 & Stillwater Boulevard North Ramp	16 / 40	B / D	8 / 21	A / C
TH 36 & Manning Avenue South Ramp	10 / 29	A / C	15 / 27	B / C
TH 36 & Manning Avenue North Ramp	5 / 10	A / B	6 / 11	A / B

Note: Overall results are followed by the worst-approach results.

Results of the operations analysis based on 2023 volumes with the CR 15B operations analysis indicate that the project intersections operate acceptably during the a.m. and p.m. peak hours. The results are similar to the existing conditions without the CR 15B connection. This analysis does not include future anticipated traffic from planned developments, which is detailed in the *Future Conditions Analysis* section that follows. In both the a.m. and p.m. peak hours, the largest change in delay is at the TH 36 and Manning Avenue south ramp intersection. This is due to the addition of the east leg to that intersection, which is the west end of the CR 15B connection, that results in additional phases being

added to the intersection. In the a.m. peak, the delay increases by three seconds per vehicle and in the p.m. peak it increases by nine seconds per vehicle.

Overall, the study intersections are anticipated to perform acceptably, with LOS C or better in the a.m. and p.m. peaks with the CR 15B connection between Manning Avenue and Memorial Avenue. Furthermore, queues at the intersection of Stillwater Boulevard and 58th Street are reduced with the connection due to traffic redistributing with the connection and the green times being better utilized.

A.M. Peak Hour

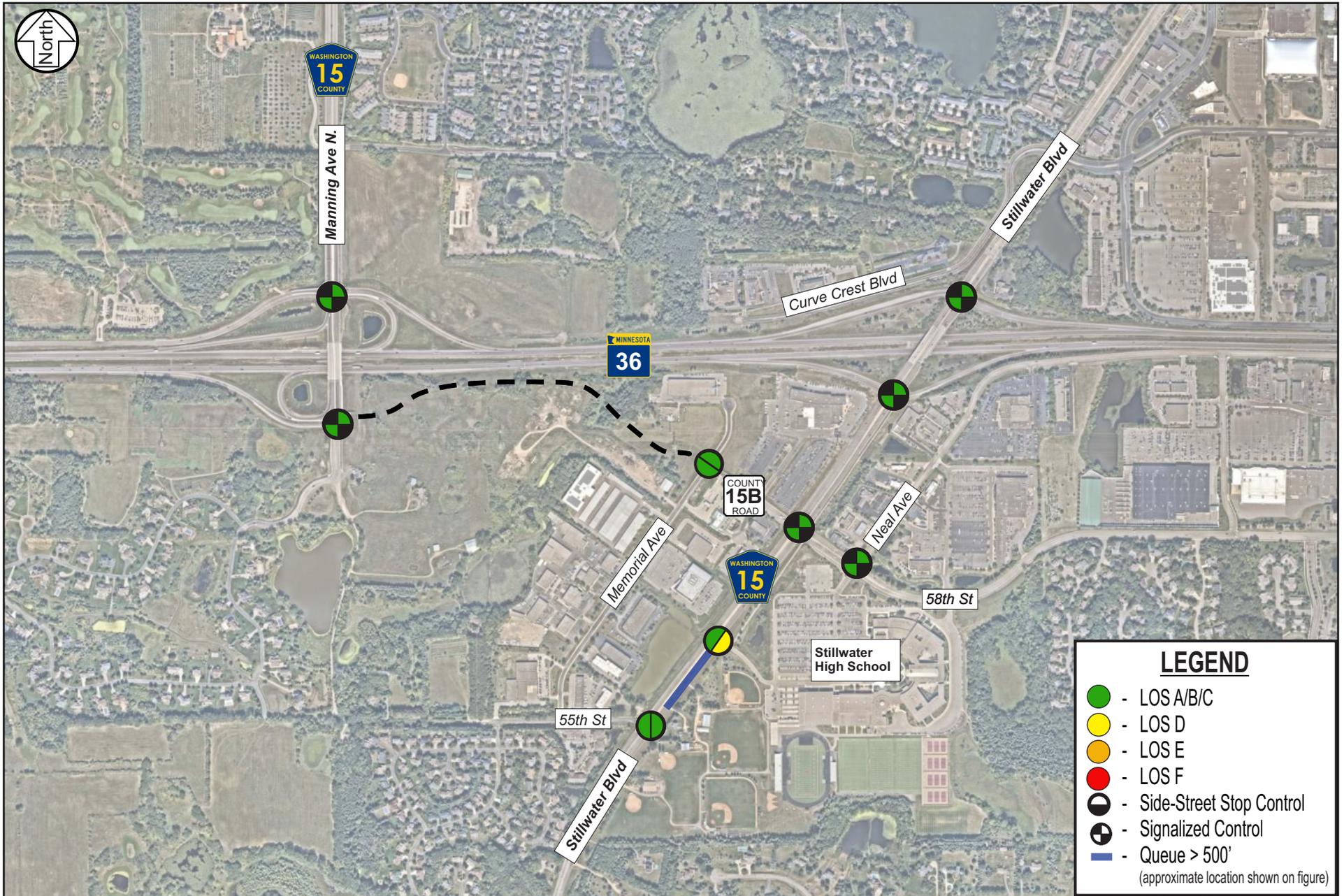
All intersections operate at overall LOS C or better. Intersections with maximum queues exceeding 500 feet are:

- Stillwater Boulevard and School RIRO Access
 - Northbound right queue: 650 feet
 - This queue develops and dissipates quickly due to the sharp peak in volume entering the school

During the heaviest 30-minute arrival period, the Stillwater Boulevard and 58th Street intersection operates at an overall LOS D, and the southbound left maximum queue is approximately 600 feet. This is a decrease of approximately 75 feet compared to the existing conditions without the connection.

P.M. Peak Hour

All intersections operate at overall LOS C or better. No movements are anticipated to have maximum queues exceeding 500 feet. The eastbound queue at Stillwater Boulevard and 58th Street increases to 290 feet, extending beyond the adjacent intersection, Minnesota Avenue and 58th Street.





Future Conditions Analysis

A future conditions analysis was completed to identify how the study intersections are anticipated to operate in the future with and without the CR 15B connection. To complete the future conditions analysis, future volumes were forecasted. These forecasts were then applied to study intersections and an operations analysis was completed. The development of the forecasts and corresponding operations analysis are described in this section.

Traffic Volume Forecasts

To estimate future traffic volumes at the study intersections, a two-step process was completed to capture the background traffic growth in the area, as well as the development that is anticipated adjacent to the study intersections. This two-step process was completed as follows:

- Future daily forecasts from the Washington County and Oak Park Heights 2040 Comprehensive Plans were synthesized. Using the existing year 2023 turning movement counts, existing year 2023 daily traffic forecasts and year 2040 daily traffic forecasts, year 2040 turning movement forecasts were estimated. On average, the growth rate between 2023 and 2040 is 1.1 percent. Utilizing the existing 2023 turning movement counts and 2040 turning movement forecasts, 2035 turning movement forecasts were estimated using interpolation. Furthermore, utilizing an assumed 0.5 percent annual growth rate and the estimated 2040 turning movement forecasts, 2045 turning movement forecasts were estimated through extrapolation. A 0.5 percent was assumed to account for a slower growth rate after 2040.
- For the three planned developments adjacent to the study intersections, the ITE Trip Generation Manual, 11th Edition was used to estimate future trips generated. These estimated trips were layered onto the future forecast estimates using the data from the comprehensive plans.

A 20-year planning horizon is typically used for roadway infrastructure projects so they can be designed to provide acceptable operations for the life cycle of the infrastructure. For this project, this would be 2045 based on an anticipated construction year of 2025. However, recognizing that the planned development in the area is anticipated to begin in the next few years and put pressure on the transportation system, an interim analysis was completed, which used the 2035 year forecasts. By 2035, it is anticipated that most of the development in the study area will be in place.

Planned Development

Additional details on the planned development adjacent to the study intersections are described in this section. There are three major developments planned near:

- Lakeview Hospital Campus will be located in the northeast quadrant of the TH 36 and Manning Avenue interchange. This site is planned for a mix of medical uses, including a hospital and supporting medical office buildings. Concurrent with this development, Curve

Crest Boulevard is planned to be extended to Manning Avenue at 62nd Street. This will provide access to this site from both Manning Avenue and Stillwater Boulevard.

- Central Commons is a 35-acre Planned Unit Development (PUD) located in the southeast quadrant of the TH 36 and Manning Avenue interchange. This is planned to be constructed as mixed use, including a grocery store, a gas station, apartments, and other retail over several phases.
- The Premier Bank site is located in the southeast quadrant of the TH 36 and Manning Avenue interchange, farther east than the Central Commons site. This site is planned for mixed retail.

Trip generation estimates for the proposed land uses were developed for the a.m. and p.m. peak hours and a daily basis. A 15 percent multi-use reduction was incorporated for vehicles that may be traveling within each development and not being a separate trip generated. For example, a vehicle traveling to the grocery store from an apartment within the site would not create a new trip to and from the development.

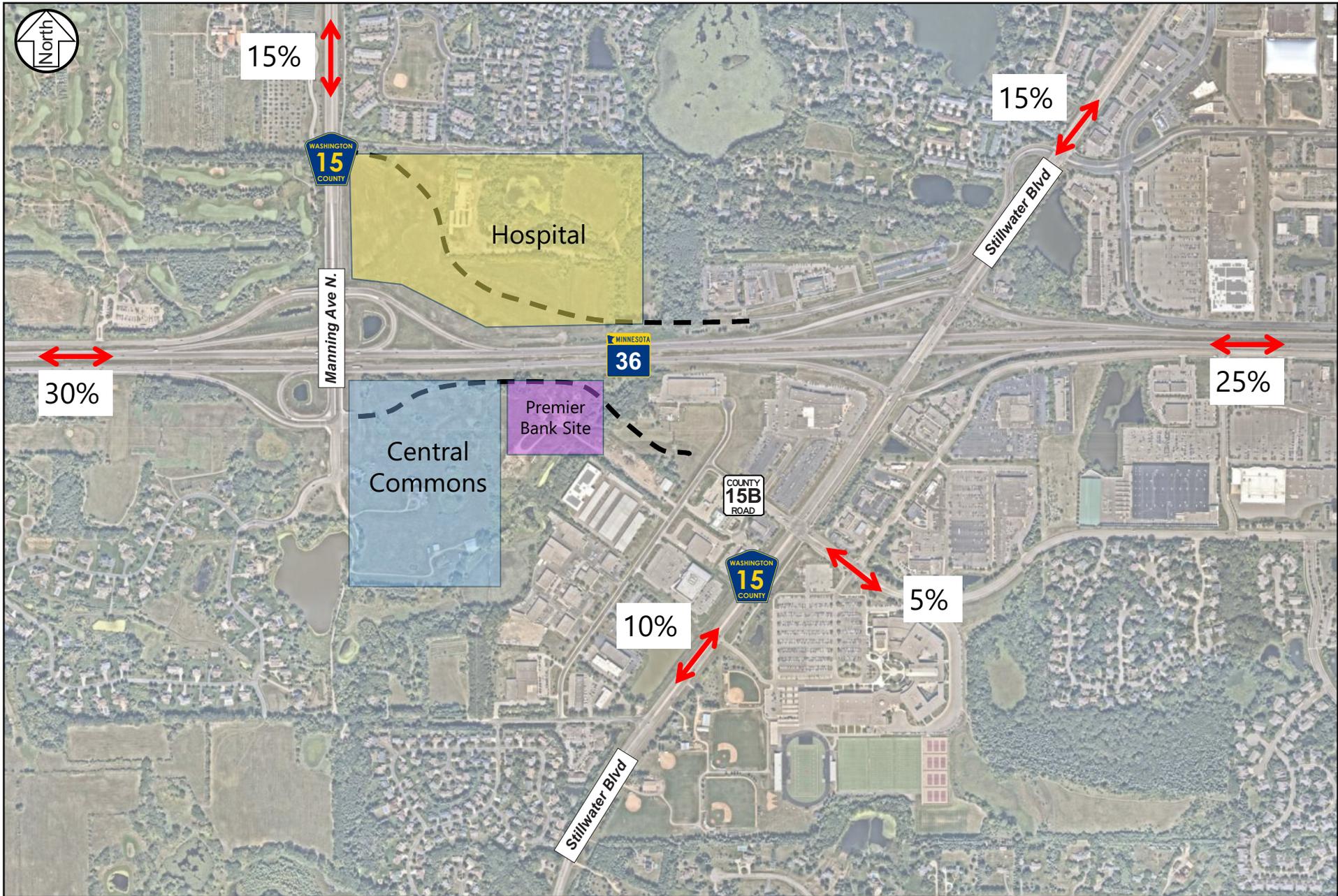
Based on the planned land uses and resulting trip generation, the developments are anticipated to generate the following daily trips:

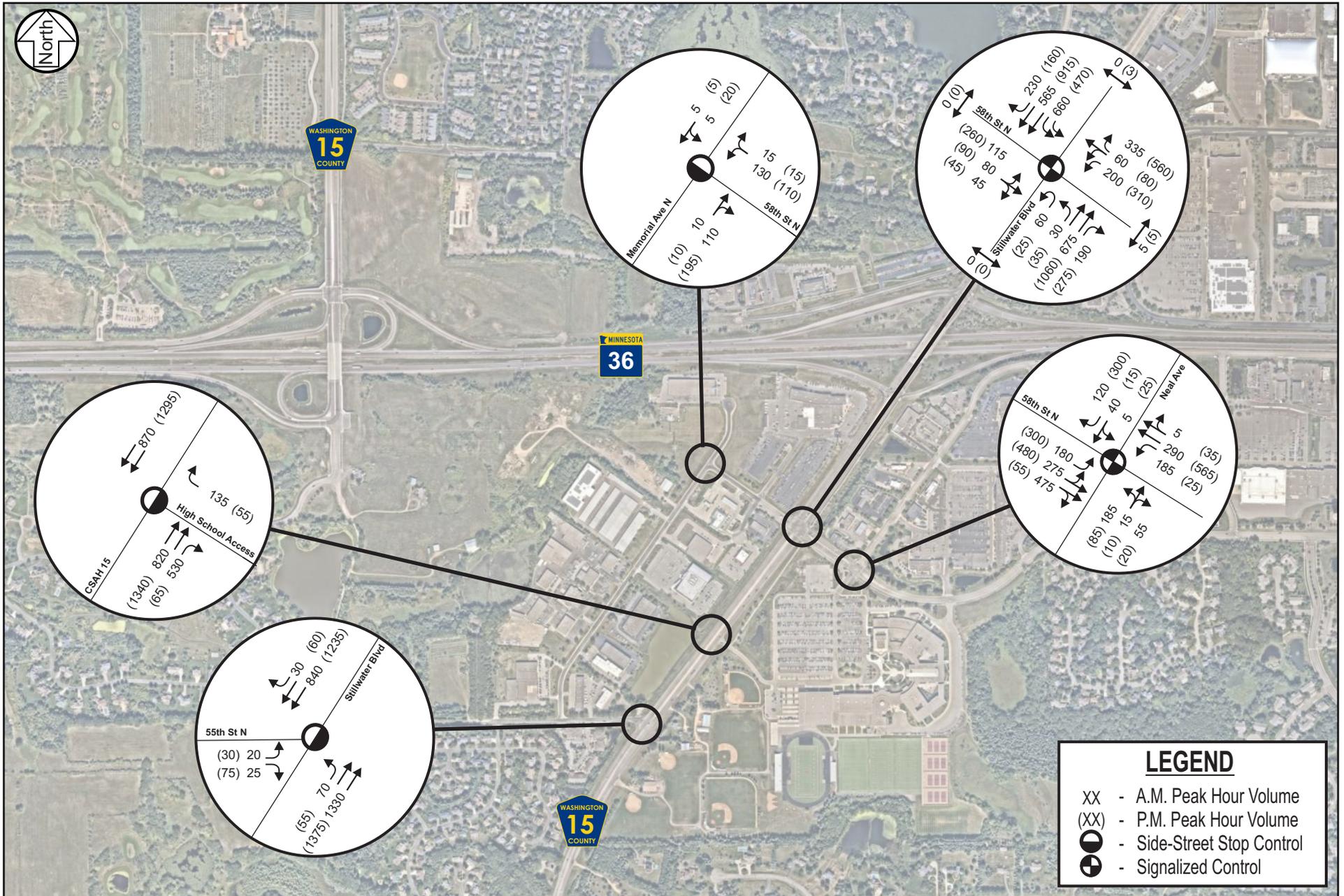
- Lakeview Hospital Campus – 25,000
- Central Commons – 19,000
- Premier Bank Site – 6,000

A directional distribution to and from all new developments was determined based on existing AADTs, existing travel patterns, the regional demand model and land use. The distribution was assumed to be the same for all three developments, listed below and shown in Figure 11:

- 30 percent to/from TH 36, West of Manning Avenue
- 25 percent to/from TH 36, East of Stillwater Boulevard
- 15 percent to/from Manning Avenue, north of TH 36
- 15 percent to/from Stillwater Boulevard, north of TH 36
- 10 percent to/from Stillwater Boulevard, south of 58th Street
- 5 percent to/from 58th Street, east of Stillwater Boulevard

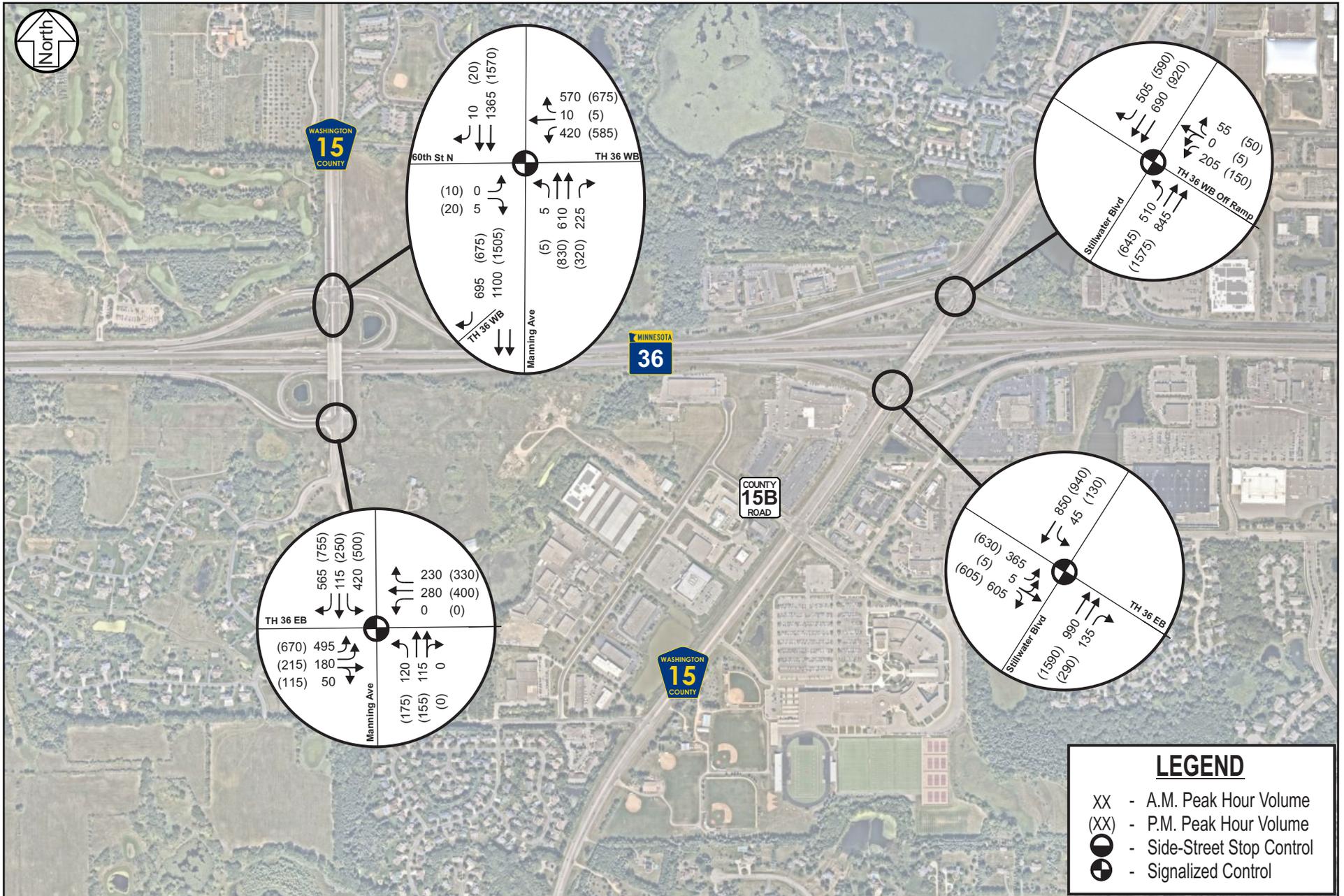
The resulting 2035 turning movement forecasts without the CR 15B connection are shown in Figure 12 and Figure 13. Furthermore, Figure 14 and Figure 15 show the turning movement forecasts for the build condition with the CR 15B connection between Manning Avenue and Memorial Avenue, which accounts for the anticipated traffic shifts with the connection. Recognizing that the CR 15B connection is anticipated to be in place, the 2045 turning movements forecasts account for that and are shown in Figure 16 and Figure 17. Additional details on the trip generation are shown in Appendix B.



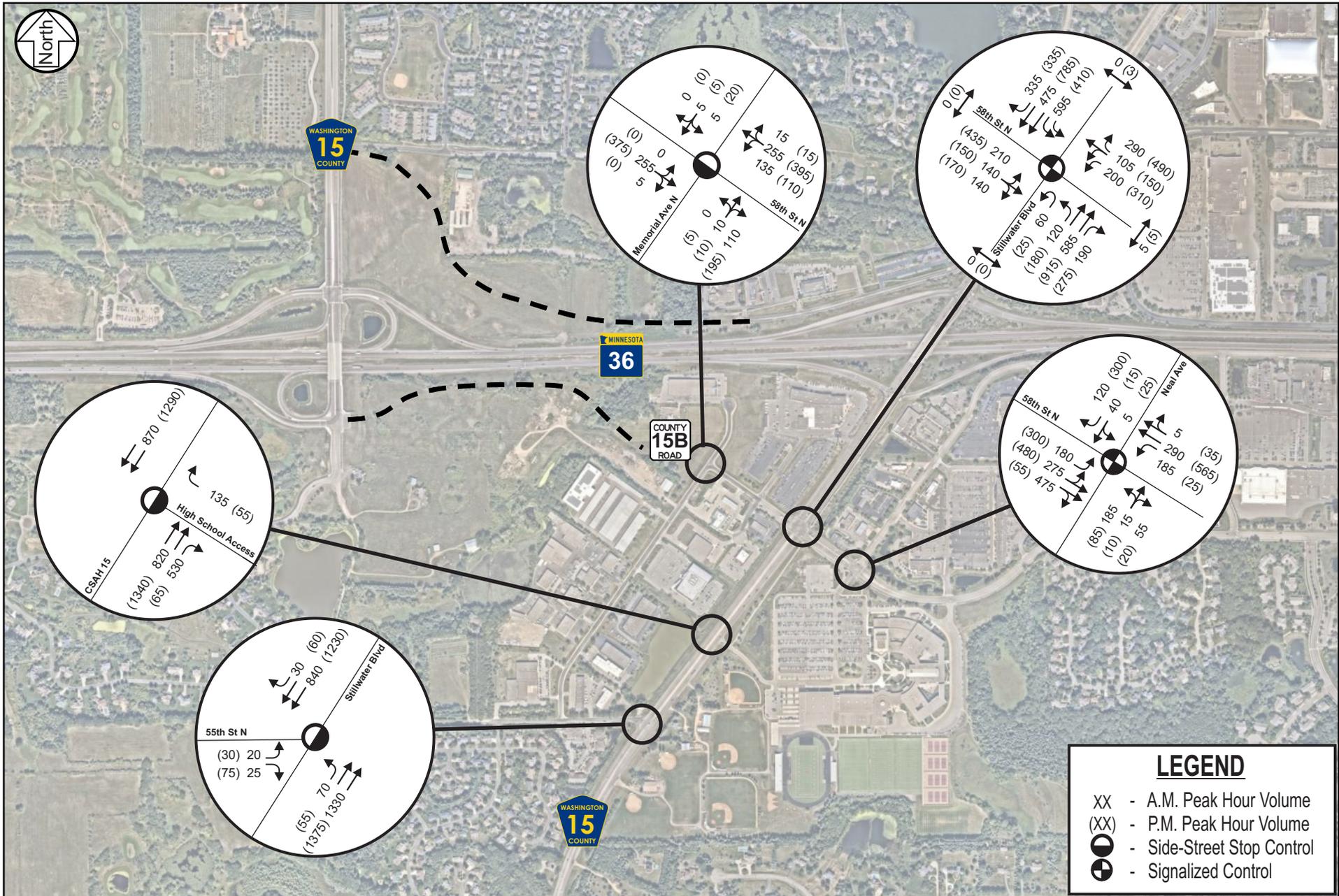


SRF Year 2035 Forecasted Volumes without CR 15B Connection
 CR 15B South Segment
 Washington County

Figure 12

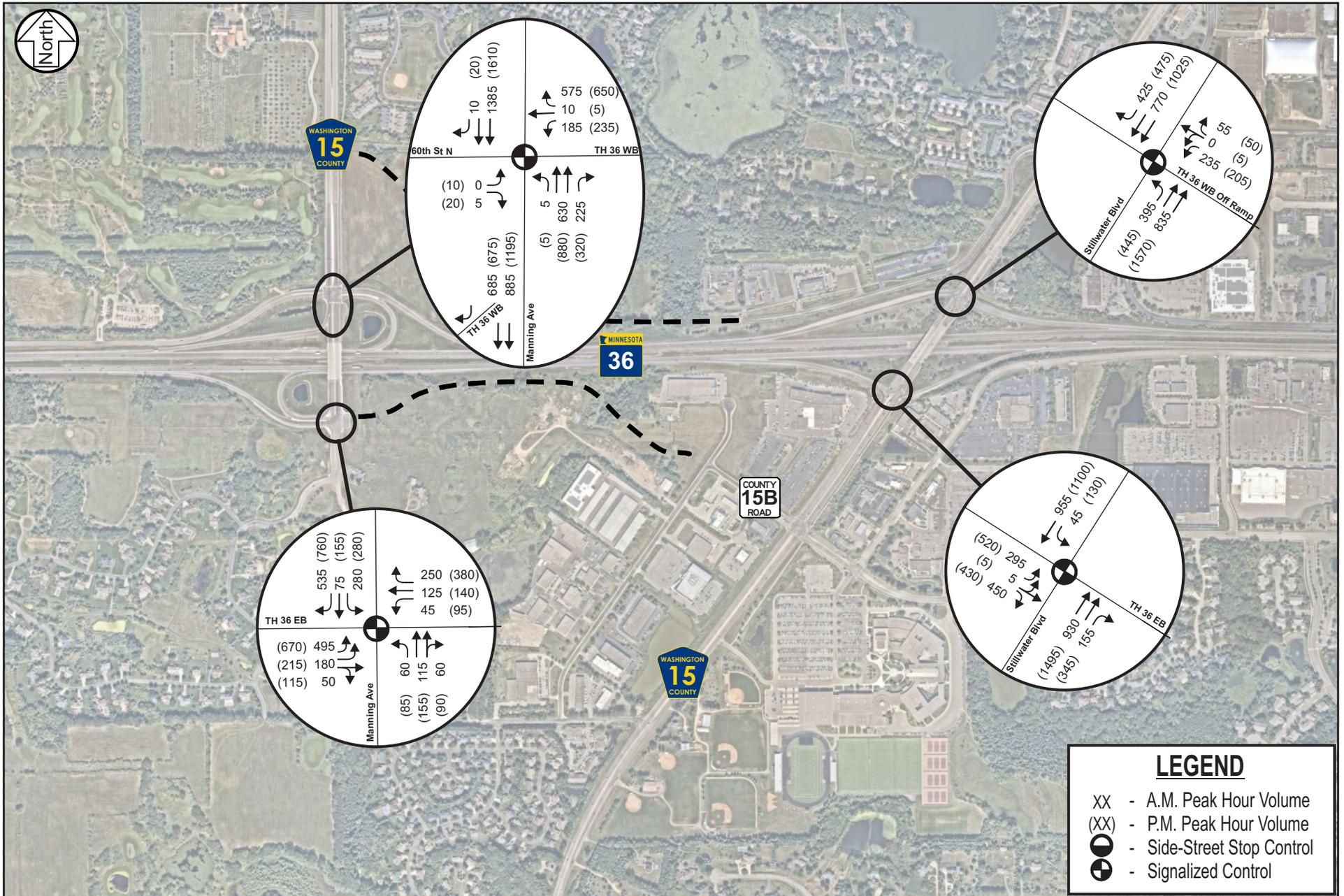


SRF Year 2035 Forecasted Volumes without CR 15B Connection
 CR 15B South Segment
 Washington County



SRF Future Year 2035 with Connection Peak Volumes
 CR 15B South Segment
 Washington County

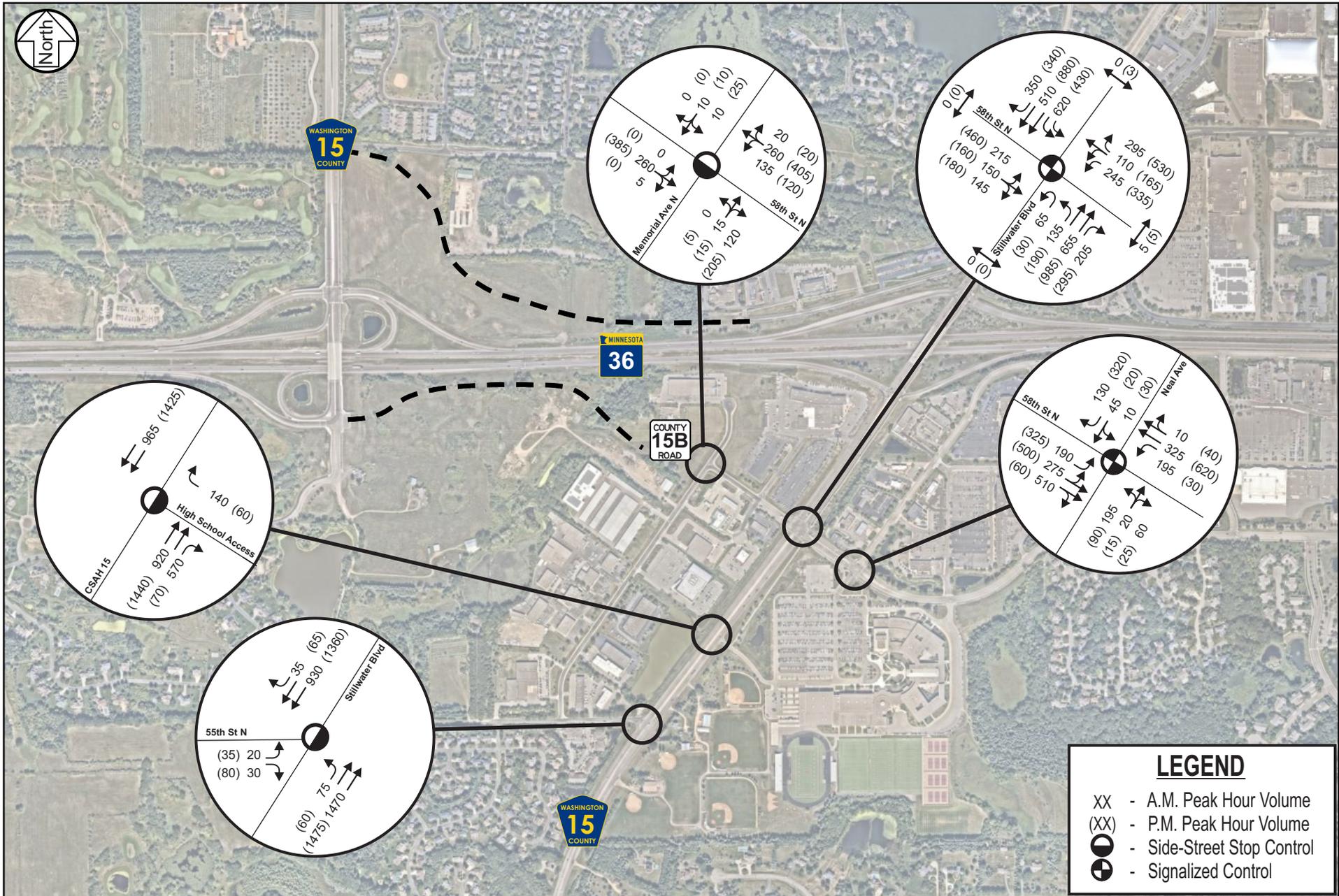
Figure 14



SRF Future Year 2035 with Connection Peak Volumes
 CR 15B South Segment
 Washington County

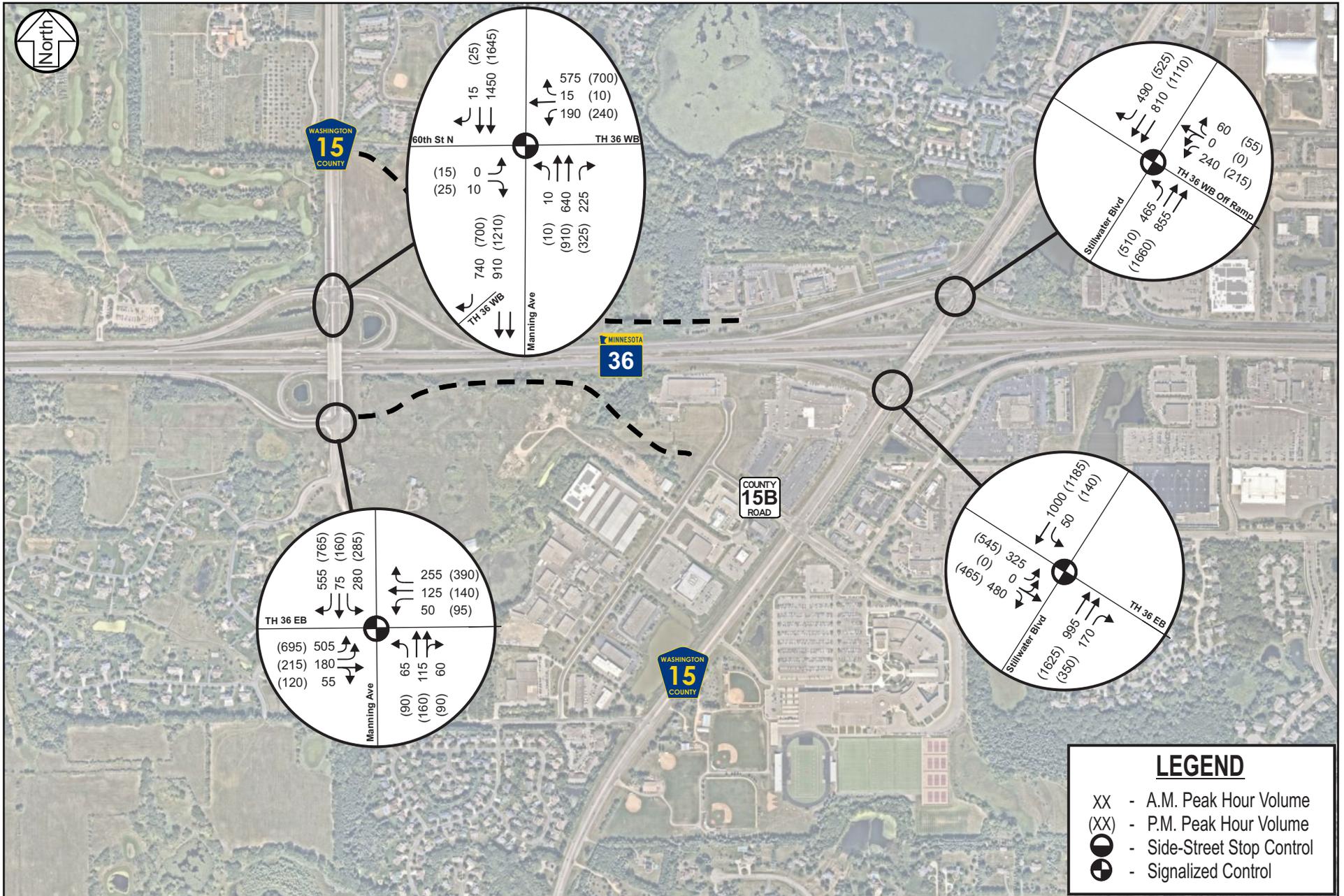
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Figure 15



SRF Future Year 2045 Build with CR 15B Connection Peak Volumes
 CR 15B South Segment
 Washington County

Figure 16



SRF Future Year 2045 Build with CR 15B Connection Peak Volumes
 CR 15B South Segment
 Washington County

Figure 17

Year 2035 No-Build Intersection Operations Analysis

A year 2035 no-build intersection operations analysis was completed to evaluate how the study intersections are anticipated to operate in the future if no geometric or traffic control changes are made, meaning that the CR 15B connection would not be in place. Assumptions that were included in this analysis are:

- Lakeview Hospital Campus, Central Commons and Premier Bank were assumed to be fully developed by year 2035, thus the volumes to and from these developments are included in all 2035 alternatives.
- Curve Crest Boulevard was assumed to connect to Manning Avenue at 62nd Street in all 2035 and 2045 models.
- Signal timing was optimized at signalized intersections to better accommodate development and traffic growth in the project area.
- A signal was not assumed at the CR 15B and Central Commons intersection under the no-build alternative as the roadway from Manning Avenue into the site would be a cul-de-sac and there would not be conflicting traffic on CR 15B.

Based on the analysis, key takeaways are:

- During the a.m. peak period, the northbound queue at the Stillwater Boulevard/RIRO access at Stillwater High School is anticipated to queue back to the adjacent Stillwater Boulevard and 55th Street intersection for a short time-period.
- Without any geometric or traffic control changes in the study area, Stillwater Boulevard/58th Street and TH 36/Manning Avenue north ramp are expected to operate at LOS E and be approaching capacity during the p.m. peak hour.
 - The TH 36/Manning Avenue interchange needs to accommodate additional traffic with this alternative as all the traffic for the developments in the southeast quadrant needs to travel through this interchange. The westbound off-ramp at the TH 36/Manning Avenue north ramp needs to accommodate the heavy westbound left-turn and right-turn traffic volumes destined for the developments in the southeast and northeast quadrants of the interchange. Based on these heavy volumes, the westbound queue is anticipated to reach TH 36.
 - Also, during the p.m. peak, the southbound left-turn queue at the TH 36/Manning Avenue south ramp is anticipated to spill back to the TH 36/Manning Avenue north ramp.
- During the p.m. peak period, the westbound queue at Stillwater Boulevard and 58th Street is anticipated to spill back to the adjacent Neal Avenue and 58th Street intersection, which impacts operations at that intersection.

A summary of the operational analysis under existing conditions is shown in Table 6, Figure 18 and Figure 19. Detailed 2035 operational results are shown in Appendix C.

Table 6: Operations Analysis Results – 2035 No Build Conditions

Intersection	AM Peak Hour		PM Peak Hour	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Stillwater Boulevard & 55th Street	16 / 38	C / E	2 / 39	A / E
Stillwater Boulevard & School RIRO Access	20 / 33	C / D	4 / 25	A / C
58th Street & Memorial Avenue	4 / 10	A / A	6 / 11	A / B
Stillwater Boulevard & 58th Street	43 / 46	D / D	57 / 69	E / E
Neal Avenue & 58th Street	16 / 22	B / C	44 / 78	D / E
TH 36 & Stillwater Boulevard South Ramp	31 / 50	C / D	24 / 46	C / D
TH 36 & Stillwater Boulevard North Ramp	29 / 40	C / D	35 / 57	C / E
TH 36 & Manning Avenue South Ramp	26 / 31	C / C	50 / 67	D / E
TH 36 & Manning Avenue North Ramp	33 / 39	C / D	57 / 72	E / E

Note: Overall results are followed by the worst-approach results.

A.M. Peak Hour

All intersections operate at overall LOS C or better with the exception of the following intersections:

- Stillwater Boulevard and 58th Street, LOS D
 - Southbound left queue: 675 feet
 - Northbound through queue: 525 feet

The following intersections perform at overall LOS C or better, but have approaches performing at LOS E or LOS F or movements with maximum queues exceeding 500 feet:

- Stillwater Boulevard and 55th Street
 - Northbound through queue: 825 feet (this queue briefly extends to 55th Street)
 - This queue is due to the heavy northbound right-turn at the school access. This queue develops and dissipates quickly due to the sharp peak in volume entering the school.
- Stillwater Boulevard and School RIRO Access
 - Northbound right queue: 650 feet
 - This queue develops and dissipates quickly due to the sharp peak in volume entering the school.

- Stillwater Boulevard and TH 36 South Ramp
 - Eastbound right queue: 1050 feet (this queue is within 150 feet of the gore with TH 36)
 - Northbound through queue: 675 feet
- Stillwater Boulevard and TH 36 North Ramp
 - Northbound left queue: 575 feet
 - Northbound through queue: 525 feet
- Manning Avenue and TH 36 North Ramp
 - Westbound right queue: 625 feet

P.M. Peak Hour

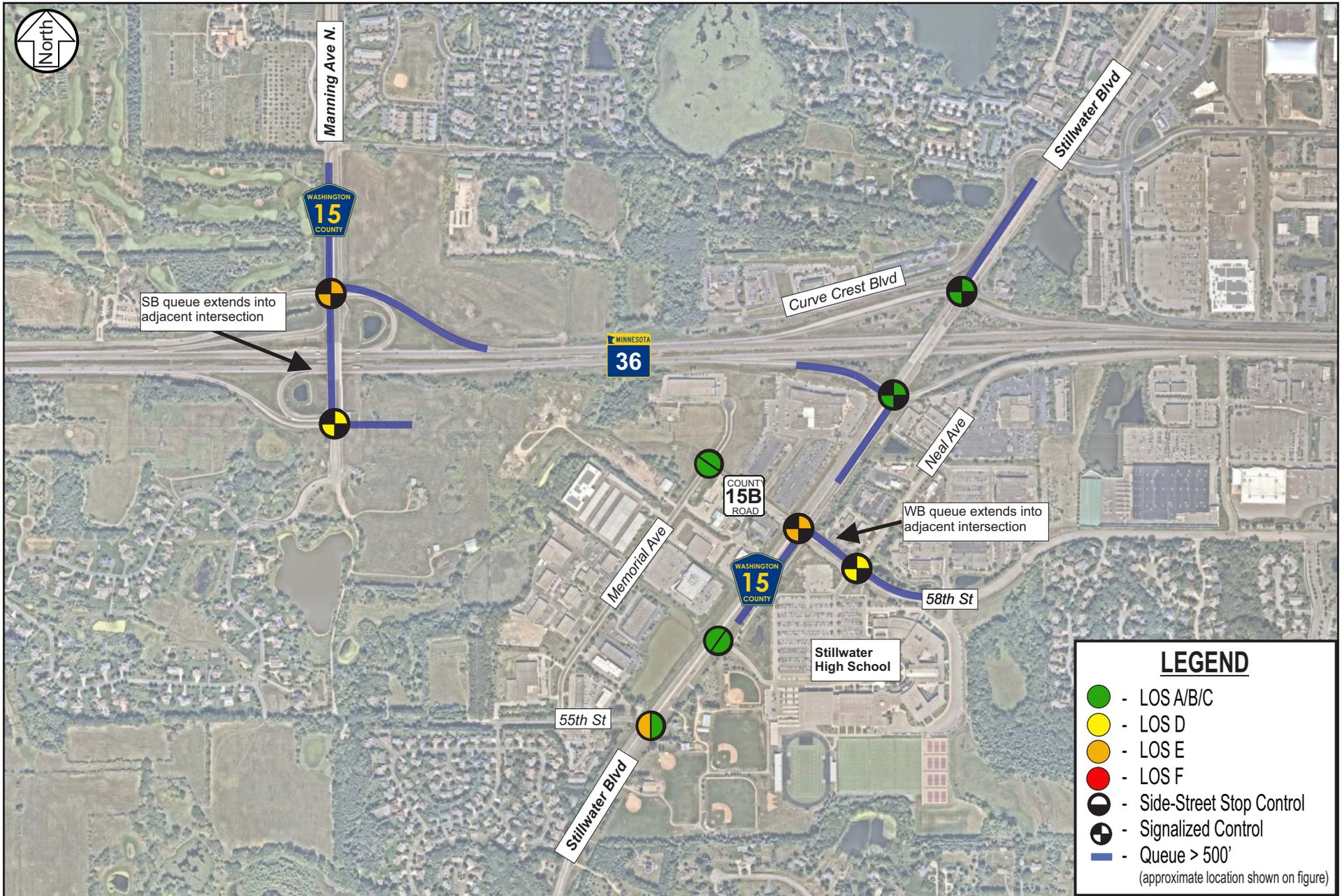
All intersections operate at overall LOS C or better with the exception of the following intersections:

- Stillwater Boulevard and 58th Street, LOS E
 - Northbound through queue: 800 feet
 - Westbound right queue: 550 feet (this queue extends to Neal Avenue)
 - Eastbound queue: 375 feet (this queue extends through Minnesota Avenue)
- Neal Avenue and 58th Street, LOS D
 - Westbound through queue: 550 feet
- Manning Avenue and TH 36 South Ramp, LOS D
 - Southbound (this queue extends to the TH 36 North Ramp)
 - Southbound left queue: 850 feet
 - Southbound through queue: 825 feet
 - Southbound right queue: 875 feet
 - Westbound through queue: 675 feet
- Manning Avenue and TH 36 North Ramp, LOS E
 - Southbound through queue: 775 feet
 - Westbound left queue: 1250 feet (this queue extends to the gore with TH 36)
 - Westbound right queue: 900 feet

The following intersections perform at overall LOS C or better, but have approaches performing at LOS E or LOS F or movements with maximum queues exceeding 500 feet:

- Stillwater Boulevard and TH 36 South Ramp
 - Eastbound right queue: 775 feet
 - Northbound through queue: 725 feet
- Stillwater Boulevard and TH 36 North Ramp
 - Southbound, LOS E
 - Southbound through queue: 875 feet
 - Southbound right queue: 900 feet
- Stillwater Boulevard and 55th Street
 - Eastbound, LOS E





Year 2035 with CR 15B Connection Operations Analysis

A year 2035 build operations analysis was completed to evaluate how the study intersections are anticipated to operate in the future with the CR 15B connection between Manning Avenue and Memorial Avenue. Assumptions that were included in this analysis are:

- Lakeview Hospital Campus, Central Commons and Premier Bank were assumed to be fully developed by year 2035, thus the volumes to and from these developments are included in all 2035 alternatives.
 - Curve Crest Boulevard was assumed to connect to Manning Avenue at 62nd Street.
- Traffic volumes were rerouted based on the connection.
 - Similar to the existing analysis with the existing year 2023 analysis with the connection, approximately 50 percent of traffic making the movement to/from Manning Avenue north of TH 36 and Stillwater Boulevard south of TH 36 was rerouted from TH 36 to the connection.
 - Traffic to/from the developments in the southeast quadrant was rerouted to use the connection based on their origin or destination. This means that trips to/from Stillwater Boulevard south of 58th Street were assumed to use the connection rather than travel out of direction and use TH 36. The specific assumptions are included in Appendix B with the trip generation details.
 - The year 2035 analysis volumes for the build scenario accounted for the anticipated rerouted traffic based on the connection. These volumes were previously shown in Figure 14 and Figure 15.
- Signal timing was optimized at signalized intersections to better accommodate the change in travel patterns with the connection.
- A signal was assumed at the CR 15B and Central Commons intersection due to the conflicting traffic on CR 15B with the connection and a warrants analysis indicating that one is anticipated to be needed with the development.

Based on the analysis, key takeaways are:

- During the a.m. peak period, the northbound queue at the Stillwater Boulevard/RIRO access at Stillwater High School is anticipated to queue back to the adjacent Stillwater Boulevard and 55th Street intersection for a short time-period. This is similar to the no-build condition.
- The Stillwater Boulevard and 58th Street intersection is expected to be approaching capacity in the p.m. peak. This is similar to the no-build condition, with a slight improvement in overall delay of approximately two seconds per vehicle.
- Eastbound queues at the Stillwater Boulevard and 58th Street intersection are anticipated to increase from the no-build condition, extending through the Minnesota Avenue and 58th Street intersection in both the a.m. and p.m. peaks.
- The southbound delay at the 58th Street and Memorial Drive intersection is anticipated to increase by approximately 42 seconds per vehicle in p.m. compared to the no-build condition. This is due to the CR 15B connection, which results in additional conflicting traffic.
- Operations at the TH 36 and Stillwater Boulevard interchange are anticipated to improve with the CR 15B connection because less traffic is required to utilize this interchange. Overall intersection delay at the two ramp terminals is anticipated to decrease between 7 and 17 seconds per vehicle during the a.m. and p.m. peak hours.
- Operations at the TH 36 and Manning Avenue interchange are anticipated to improve with the CR 15B connection because the traffic associated with the development in the southeast quadrant is spread across the transportation network and it all does not all need to go through this interchange.
 - During the a.m. peak hour, overall delay at the south ramp is anticipated to decrease by approximately 24 seconds per vehicle and improve from LOS D to LOS C compared to the no-build condition.
 - During the p.m. peak hour, overall delay at the north ramp is anticipated to decrease by approximately 20 seconds per vehicle and improve from LOS E to LOS D compared to the no-build condition. Queues from the westbound off-ramp from TH 36 are anticipated to decrease with the connection and not queue back to TH 36.
- Operations at the Neal Avenue and 58th Street interaction are anticipated to improve during the p.m. peak with the connection due to the shift in traffic associated with the connection. The heavy westbound right-turn at the Stillwater Boulevard and 58th Street intersection redistributes to westbound through vehicles with the connection, which reduces queueing back to Neal Avenue and impacting operations. Although the queuing to Neal Avenue decreases and does not extend through the 58th Street and Neal Avenue intersection, a queue would still be anticipated backing up to Neal Avenue with uncoordinated signals. Overall delay is anticipated to decrease by approximately 24 seconds per vehicle and improve from LOS D to LOS B compared to the no-build condition.
- Overall, the traffic volume on Memorial Avenue is anticipated to remain relatively the same with or without the CR 15 connection.

- Throughout most of the day, the eastbound right-turn at Stillwater Boulevard and 58th Street is anticipated to be made with minimal delay. During the p.m. peak, there could be some diversion of vehicles traveling eastbound along CR 15B desiring to head southbound on Stillwater Boulevard. There would be the opportunity for some of these vehicles to turn onto Memorial Avenue and access Stillwater Boulevard via 55th Street. This diversion would be to avoid potential queuing and longer delays heading eastbound at the Stillwater Boulevard and 58th Street intersection. This diversion route is present under the existing conditions.
- It is unlikely that vehicles heading northbound on Stillwater Boulevard and turning left onto westbound 58th Street would divert to 55th Street and ultimately Memorial Avenue. The northbound left-turn at the 58th Street and Stillwater Boulevard intersection is a signalized movement and a more direct movement compared to the 55th Street and Stillwater Boulevard intersection that is unsignalized and would be a more circuitous route to access CR 15B. Based on this, it is anticipated that there would be minimal diversion to Memorial Avenue from Stillwater Boulevard in the northbound direction.

Overall, operations are anticipated to improve across the network with the CR 15B, which is shown through the reduced delay and queuing at nearly all intersections in the a.m. and p.m. peak hours. The exception is Memorial Avenue and 58th Street as a side-street stop control intersection, which is anticipated to have an increase in side-street delay due to the additional leg at the intersection, which results in additional turning movements and additional conflicting traffic. In both alternatives, the operations of the intersection of Stillwater Boulevard and 58th Street stay relatively consistent, with delay anticipated to decrease one to two seconds in the peak hours.

A summary of the operational analysis under existing conditions is shown in Table 7, Figure 20 and Figure 21. Detailed 2035 operational results are shown in Appendix C.

Table 7: Operations Analysis Results – 2035 Conditions with CR 15B Connection

Intersection	AM Peak Hour		PM Peak Hour	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Stillwater Boulevard & 55th Street	16 / 37	C / E	2 / 40	A / E
Stillwater Boulevard & School RIRO Access	19 / 33	C / D	1 / 13	A / C
58th Street & Memorial Avenue	3 / 22	A / C	6 / 53	A / F
Stillwater Boulevard & 58th Street	42 / 48	D / D	55 / 62	E / E
Neal Avenue & 58th Street	17 / 23	B / C	20 / 25	B / C
TH 36 & Stillwater Boulevard South Ramp	14 / 35	B / D	15 / 42	B / D
TH 36 & Stillwater Boulevard North Ramp	19 / 40	B / D	28 / 57	C / E
TH 36 & Manning Avenue South Ramp	20 / 25	C / C	26 / 35	C / C
TH 36 & Manning Avenue North Ramp	28 / 32	C / C	37 / 47	D / D
CR 15B & Central Commons	9 / 14	A / B	9 / 15	A / B

Note: Overall results are followed by the worst-approach results.

A.M. Peak Hour

All intersections operate at overall LOS C or better with the exception of the following intersections:

- Stillwater Boulevard and 58th Street, LOS D
 - Southbound left queue: 625 feet
 - Eastbound queue: 425 feet (this queue extends through Minnesota Avenue)

The following intersections perform at overall LOS C or better, but have approaches performing at LOS E or LOS F or movements with maximum queues exceeding 500 feet:

- Stillwater Boulevard and School RIRO Access
 - Northbound right queue: 650 feet (this queue briefly extends to 55th Street)
- Stillwater Boulevard and 55th Street
 - Northbound through queue: 825 feet

- This queue is due to the heavy northbound right-turn at the school access. This queue develops and dissipates quickly due to the sharp peak in volume entering the school.
- Eastbound, LOS E

P.M. Peak Hour

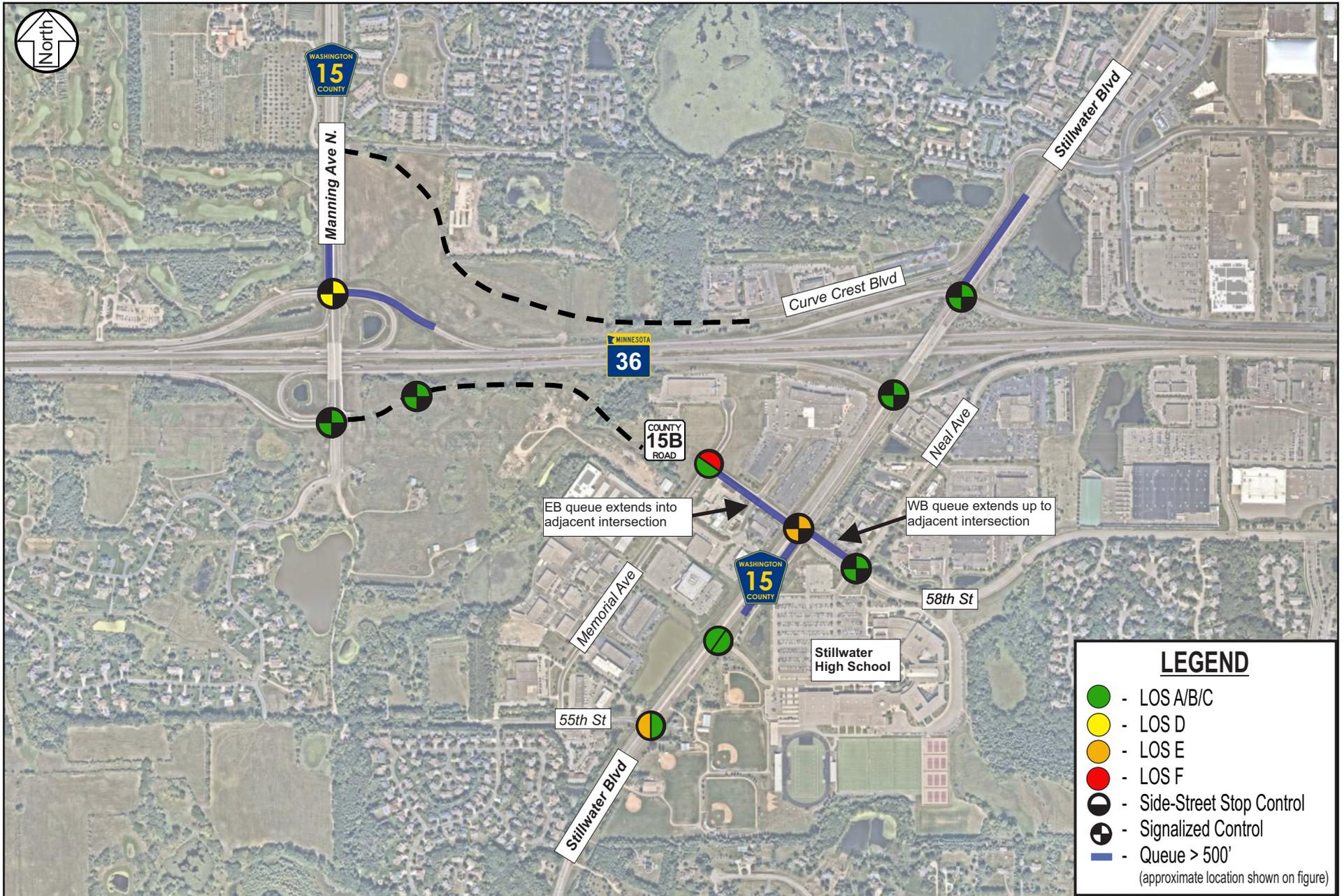
All intersections operate at overall LOS C or better with the exception of the following intersections:

- Stillwater Boulevard and 58th Street, LOS E
 - Northbound through queue: 700 feet
 - Eastbound (these queues extend to Memorial Avenue)
 - Eastbound left queue: 700 feet
 - Eastbound through queue: 700 feet
 - Eastbound right queue: 700 feet
 - Westbound (this queue reaches Neal Avenue)
- Manning Avenue and TH 36 North Ramp, LOS E
 - Southbound through queue: 525 feet
 - Westbound right queue: 600 feet

The following intersections perform at overall LOS C or better, but have approaches performing at LOS E or LOS F or movements with maximum queues exceeding 500 feet:

- Stillwater Boulevard and TH 36 North Ramp
 - Southbound through queue: 875 feet
 - Westbound, LOS E
- Stillwater Boulevard and 55th Street
 - Eastbound, LOS E
- Memorial Avenue and 58th Street
 - Southbound, LOS F





Travel Times

A travel time analysis was completed to understand how travel times between Manning Avenue and Stillwater Boulevard are anticipated to change with the connection. Average travel times were determined for vehicles traveling northbound from south of the Stillwater Boulevard and 55th Street intersection to north of the TH 36 and Manning Boulevard north ramp intersection. They were also determined vice versa for vehicles traveling southbound from Manning Avenue to Stillwater Boulevard. A speed limit of 35 mph was assumed for the CR 15B connection. These travel times were extracted from the VISSIM operations model, which simulates individual vehicles traveling these roadways and interacting with other vehicles and traffic control.

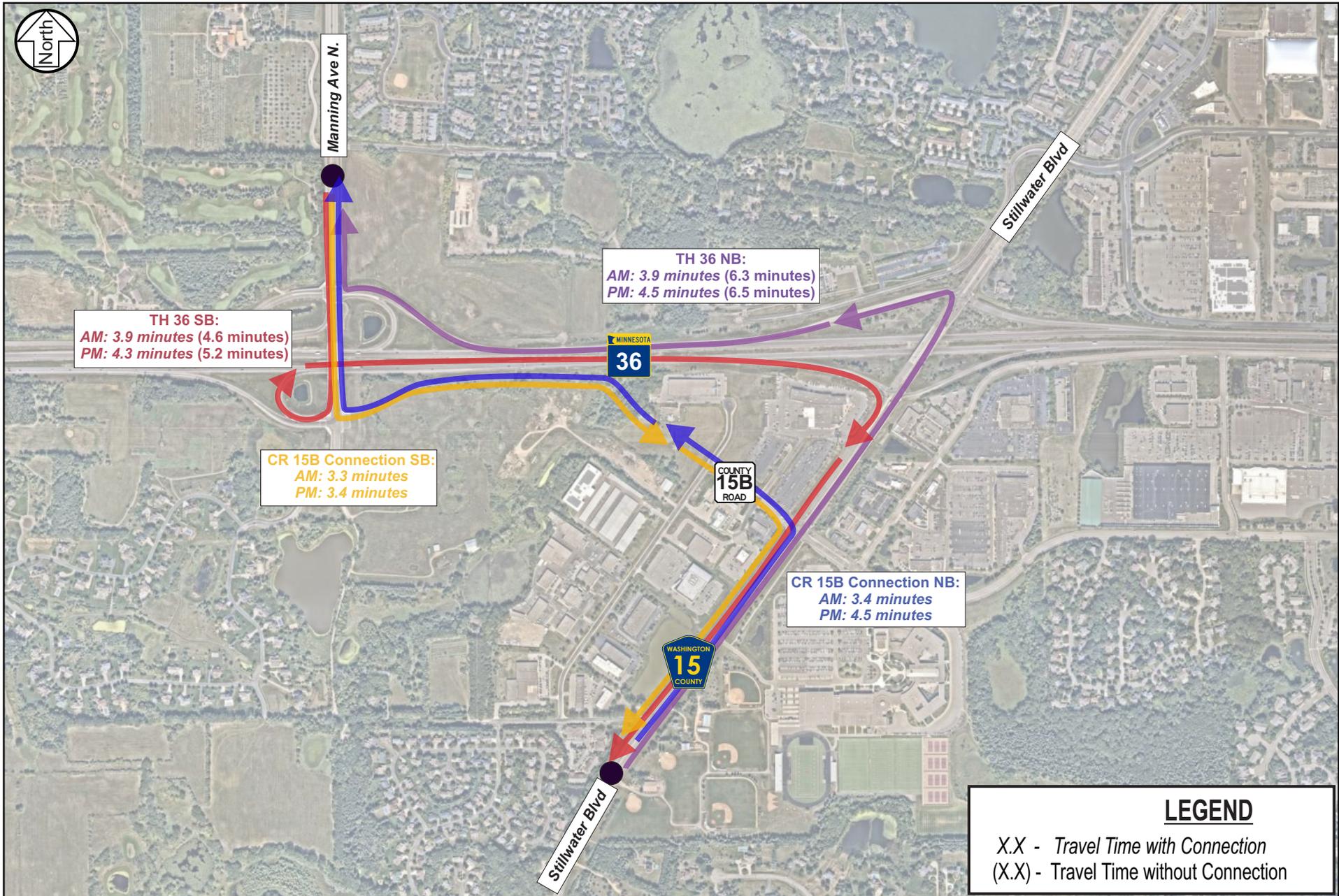
The average travel times for existing year 2023 and forecast year 2035 are shown below in Table 8 and shown in Figure 22.

Table 8: Travel Times (minutes)

Alternative	Route	AM Peak Hour		PM Peak Hour	
		Northbound	Southbound	Northbound	Southbound
Existing: No CR 15B Connection	TH 36	3.6	3.2	3.6	3.2
Existing: With CR 15B Connection	TH 36	3.8	3.1	3.5	3.2
	CR 15B	3.4	3.1	3.2	2.4
2035: No CR 15B Connection	TH 36	6.3	4.6	6.5	5.2
2035: With CR 15B Connection	TH 36	3.9	3.9	4.5	4.3
	CR 15B	3.4	3.3	4.5	3.4

Based on this travel time analysis, travel times utilizing TH 36 to travel between Manning Avenue and Stillwater Boulevard are anticipated to decrease with the addition of the CR 15B connection. In 2035, travel times are anticipated to decrease by at least two minutes in the northbound direction and by one to two minutes in the southbound direction. This decrease in travel times is related to the improved operations of the network with the CR 15B connection that have been described previously.

Additionally in 2035, travel times are anticipated to be up to a minute faster for vehicles utilizing the CR 15B connection compared to TH 36, in both the northbound and southbound directions. This indicates that the CR 15B connection is a viable option for drivers traveling between Manning Avenue and Stillwater Boulevard. The specific route people take could vary from day to day, along with the time of day and what the traffic signals are doing at that specific time.



Potential Improvement Strategies

Although the operations at the Stillwater Boulevard and 58th Street intersection are anticipated to remain similar overall with the CR 15B connection compared to without, the intersection is anticipated to operate at LOS E by 2035 with full development in the area. The County desires to improve the operations at this intersection, some potential improvement strategies were evaluated, which consisted of the following:

	Strategy	Benefits	Considerations	Potential Timing
1	- Coordinate 58th Street/Neal Avenue with Stillwater Boulevard/58th Street.	- Low cost and improves traffic flow on 58th Street between Stillwater Boulevard and Neal Avenue.	- Additional infrastructure at a non-County owned signal.	Near-Term
2	- Modify eastbound lane use to allow eastbound left-turn from middle lane.	- Minimal improvement to eastbound approach as a fair number of eastbound through vehicles that are impacted.	- Impacts ability for westbound right-turn to be made during eastbound phase.	Near-Term
3	- Modify westbound lane use and phasing at 58th Street/Stillwater Boulevard to remove split phasing. - Modify eastbound lane use and phasing at 58th Street/Neal Avenue to remove split phasing.	- Improves traffic flow at Stillwater Boulevard/58th Street, particularly during off peak hours.	- Additional infrastructure at an aging signal system. - Reduces capacity and storage for heavy westbound left-turn at 58th Street/Stillwater Boulevard.	Near-Term
4	- Add westbound right-turn overlap at 58th Street/Stillwater Boulevard.	- Allows heavy westbound right-turn to be made concurrently with heavy southbound left-turn	- Additional infrastructure at an aging signal system. - Right turn overlaps also require restricting U-turns.	Near-Term
5	- Reconstruct 58th Street from Memorial Avenue through Neal Avenue to remove split phasing and add additional capacity.	- Improves overall traffic flow through the busy Stillwater Boulevard/58th Street intersection.	- Stormwater management will be required due to additional impervious area. - Limited right-of-way	Mid-Term
6	- Modify south school access to full access and potentially shift south.	- Eliminates demand for NBU at Stillwater Boulevard/58th Street. - Reduces SBL and WBL turn volume at Stillwater Boulevard/58th Street.	- Requires coordination with school and modifications to site circulation. - Adds additional conflict points for Stillwater Boulevard through traffic	Long-Term

Figure 23 visually depicts these strategies.



Mid-Term Improvements

Overall, strategies one through four result in marginal improvements to the operations at the Stillwater Boulevard and 58th Street intersection, with a change of less than five seconds overall per vehicle during the peak hours. Detailed results of this analysis are located in Appendix C. Based on this, a more extensive alternative was reviewed and analyzed to determine what would be necessary to improve operations of this intersection, along with surrounding intersections. A capacity analysis was completed, which identified the following geometric and traffic control elements that would improve operations:

- Signal coordination between Stillwater Boulevard/58th Street and 58th Street/Neal Avenue intersections. This is also a recommended near-term improvement that can be implemented independently of other improvements.
- Removal of split phasing at the Stillwater Boulevard/58th Street and 58th Street/Neal Avenue intersections.
- Addition of northbound left-turn phase at 58th Street/Neal Avenue.
- Two eastbound through lanes along CR 15B from Memorial Avenue through Neal Avenue.
- Dual left-turn lanes eastbound and westbound at Stillwater Boulevard/58th Street.
- Westbound right-turn overlap with the southbound left movement at the Stillwater Boulevard and 58th Street intersection. This improves operations but would not be required.
- A single lane roundabout at 58th Street and Memorial Avenue to improve operations for the side streets. An intersection control evaluation (ICE) report will be completed at this intersection in the design phase to analyze the intersection based on a variety of criteria and ultimately recommend the type of control to be implemented.

An alternative with these elements was evaluated under both 2035 and 2045 conditions with CR 15B to verify that this alternative is anticipated to provide acceptable operations twenty years out. The specifics of this alternative would need to be further vetted during the preliminary design phase to determine any impacts and how these improvements tie into the existing network.

A summary of the operational analysis under existing conditions is shown in Table 9, Figure 24 and Figure 25. Detailed 2035 operational results are shown in Appendix C.

Table 9: Operations Analysis Results – 2035 Build Conditions (Mid-Term Improvement)

Intersection	AM Peak Hour		PM Peak Hour	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Stillwater Boulevard & 55th Street	16 / 38	C / E	2 / 48	A / E
Stillwater Boulevard & School RIRO Access	20 / 34	C / D	1 / 10	A / B
58th Street & Memorial Avenue	2 / 2	A / A	3 / 4	A / A
Stillwater Boulevard & 58th Street	37 / 46	D / D	36 / 46	D / D
Neal Avenue & 58th Street	14 / 29	B / C	12 / 24	B / C
TH 36 & Stillwater Boulevard South Ramp	12 / 35	B / C	17 / 37	B / D
TH 36 & Stillwater Boulevard North Ramp	18 / 40	B / D	21 / 48	C / D
TH 36 & Manning Avenue South Ramp	20 / 25	C / C	27 / 36	C / D
TH 36 & Manning Avenue North Ramp	27 / 32	C / C	36 / 47	D / D
CR 15B & Central Commons	9 / 14	A / B	9 / 15	A / B

Note: Overall results are followed by the worst-approach results.

A.M. Peak Hour

All intersections operate at overall LOS C or better with the exception of the following intersections:

- Stillwater Boulevard and 58th Street, LOS D
 - Southbound left queue: 525 feet
 - Eastbound queue: 375 feet (this queue reaches Minnesota Avenue)

The following intersections perform at overall LOS C or better, but have approaches performing at LOS E or LOS F or movements with maximum queues exceeding 500 feet:

- Stillwater Boulevard and School RIRO Access
 - Northbound right queue: 650 feet (this queue briefly extends to 55th Street)
- Stillwater Boulevard and 55th Street
 - Northbound through queue: 825 feet

- This queue is due to the heavy northbound right-turn at the school access. This queue develops and dissipates quickly due to the sharp peak in volume entering the school.
- Eastbound, LOS E

P.M. Peak Hour

All intersections operate at overall LOS C or better with the exception of the following intersections:

- Stillwater Boulevard and 58th Street, LOS D
 - Northbound through queue: 525 feet
 - Eastbound queue: 325 feet (this queue extends through Minnesota Avenue)
- Manning Avenue and TH 36 North Ramp, LOS D
 - Westbound right queue: 575 feet

The following intersections perform at overall LOS C or better, but have approaches performing at LOS E or LOS F or movements with maximum queues exceeding 500 feet:

- Stillwater Boulevard and TH 36 North Ramp
 - Southbound through queue: 700 feet
- Stillwater Boulevard and 55th Street
 - Eastbound, LOS E

Compared to the 2035 alternative with the CR 15B and no other changes, overall delay at the Stillwater Boulevard and 58th Street intersection is anticipated to improve by approximately 20 seconds per vehicle in the p.m. peak hour. Overall delay at the Neal Avenue and 58th Street intersection is anticipated to improve by approximately seven seconds per vehicle. Furthermore, the side-street delay at the 58th Street and Memorial Avenue intersection is anticipated to improve by approximately 50 seconds per vehicle and operate acceptably. Lastly, besides the eastbound queue at Stillwater Boulevard and 58th Street, queues are not anticipated to spill back through adjacent intersections at any of the study intersections.





Using the 2045 forecasts that were described earlier and shown in Figure 16 and Figure 17, a 2045 analysis of this alternative was completed to understand the operational benefits that it is anticipated to provide in the future. A summary of the operational analysis for year 2045 with the previous improvements for 2035 are shown in Table 10, Figure 26 and Figure 27. Detailed 2045 operational results are shown in Appendix D.

Table 10: Operations Analysis Results – 2045 Build Conditions (Mid-Term Improvement)

Intersection	AM Peak Hour		PM Peak Hour	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Stillwater Boulevard & 55th Street	32 / 78	D / F	4 / 72	A / F
Stillwater Boulevard & School RIRO Access	25 / 41	C / E	3 / 22	A / C
58th Street & Memorial Avenue	2 / 3	A / A	3 / 4	A / A
Stillwater Boulevard & 58th Street	46 / 65	D / E	46 / 60	D / E
Neal Avenue & 58th Street	14 / 30	B / C	15 / 24	B / C
TH 36 & Stillwater Boulevard South Ramp	14 / 38	B / D	19 / 39	B / D
TH 36 & Stillwater Boulevard North Ramp	22 / 39	C / D	28 / 51	C / D
TH 36 & Manning Avenue South Ramp	19 / 25	B / C	27 / 35	C / C
TH 36 & Manning Avenue North Ramp	28 / 33	C / C	46 / 56	D / E
CR 15B & Central Commons	8 / 13	A / B	9 / 14	A / B

Note: Overall results are followed by the worst-approach results.

A.M. Peak Hour

All intersections operate at overall LOS C or better with the exception of the following intersections:

- Stillwater Boulevard and 58th Street, LOS D
 - Southbound left queue: 650 feet
 - Northbound through queue: 725 feet
 - Eastbound queue: 450 feet (this queue extends through Minnesota Avenue)
- Stillwater Boulevard and 55th Street, LOS D
 - Northbound LOS F, through queue: 1175 feet

- This queue is due to the heavy northbound right-turn at the school access. This queue develops and dissipates quickly due to the sharp peak in volume entering the school.
- Eastbound, LOS F

The following intersections perform at overall LOS C or better, but have approaches performing at LOS E or LOS F or movements with maximum queues exceeding 500 feet:

- Stillwater Boulevard and School RIRO Access
 - Northbound LOS E, right queue: 725 feet (this queue briefly extends to 55th Street)
- Stillwater Boulevard and TH 36 South Ramp
 - Eastbound right queue: 600 feet

P.M. Peak Hour

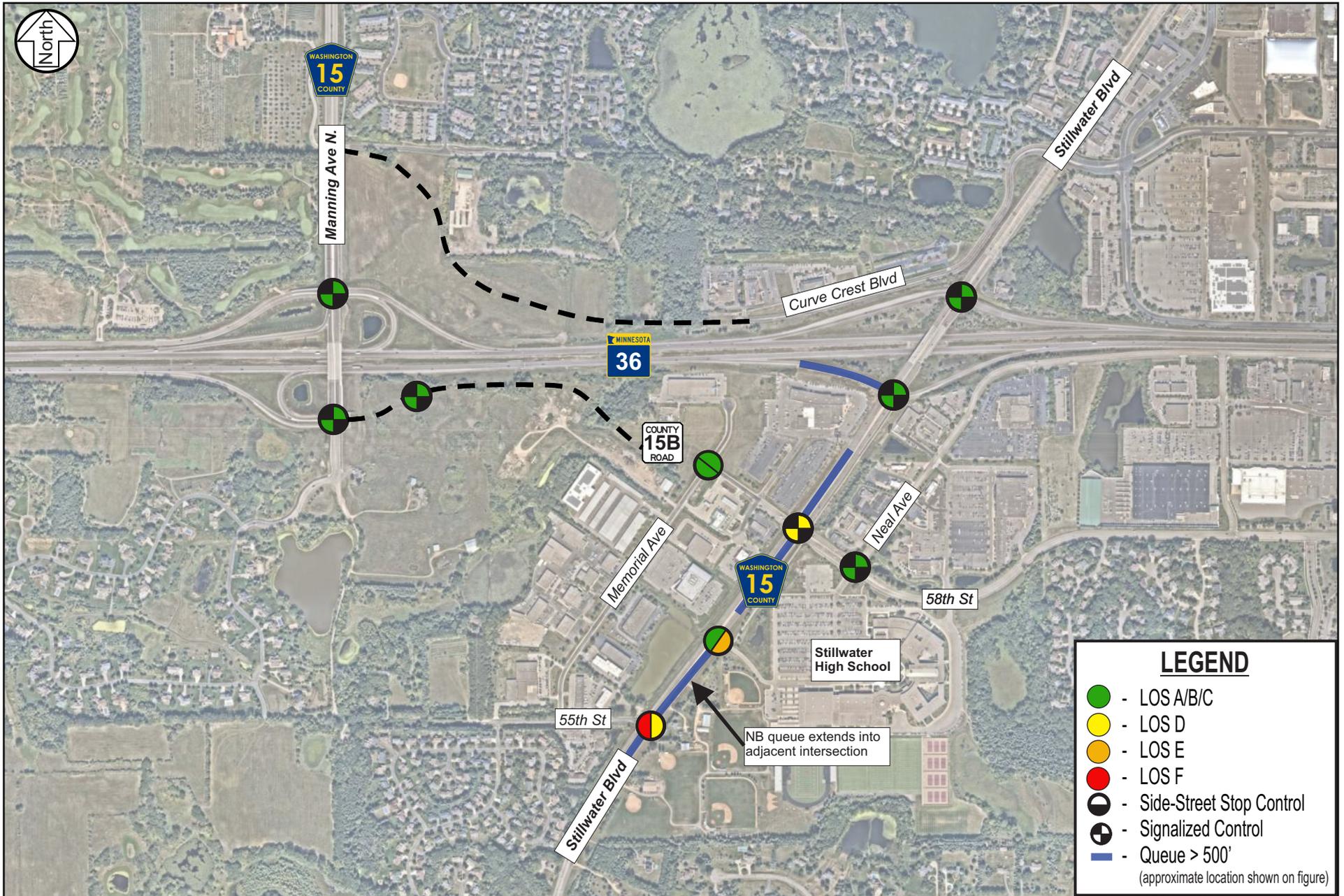
All intersections operate at overall LOS C or better with the exception of the following intersections:

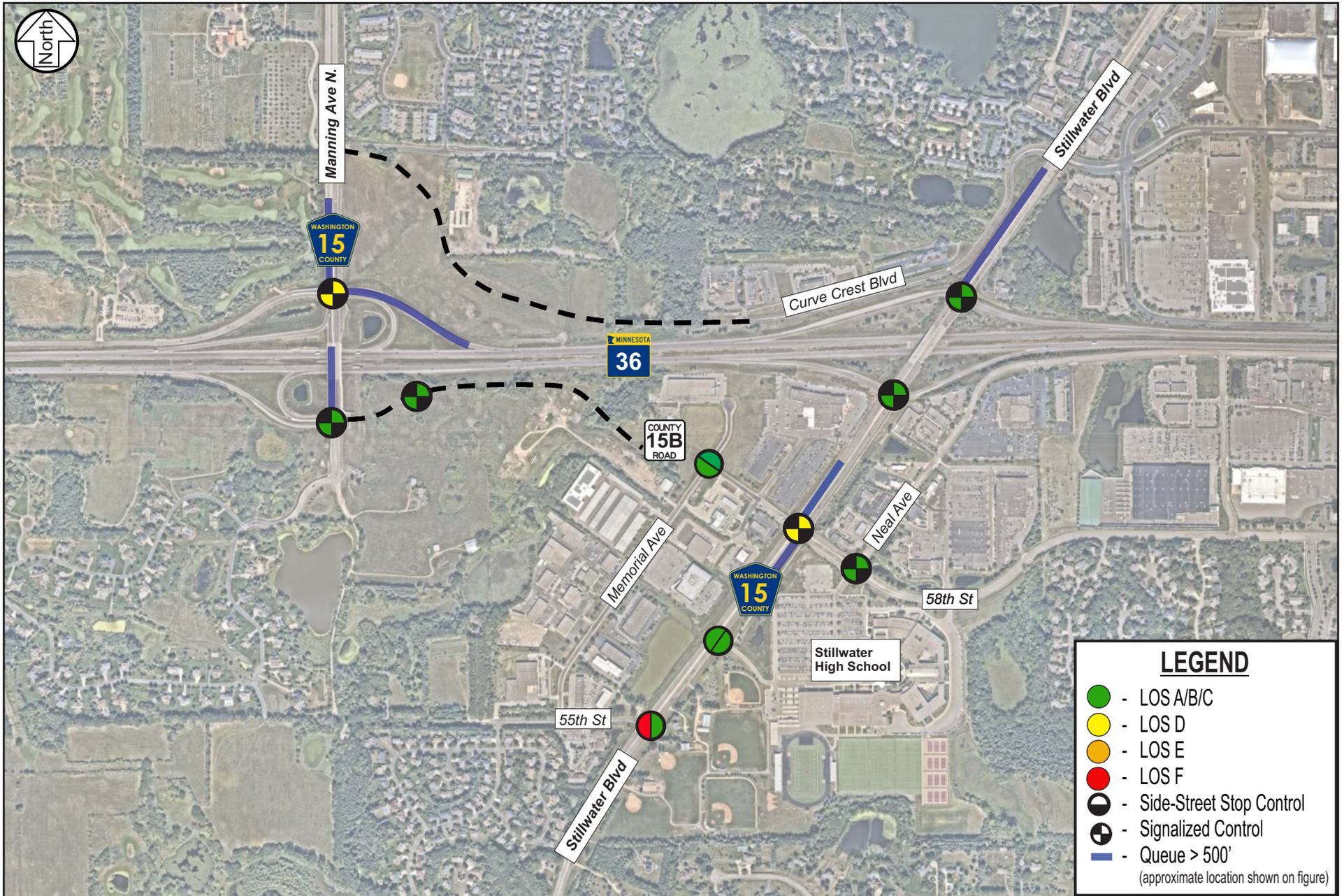
- Stillwater Boulevard and 58th Street, LOS D
 - Northbound LOS E, though queue: 725 feet
 - Southbound through queue: 525 feet
 - Eastbound queue: 375 feet (this queue extends through Minnesota Avenue)
- Manning Avenue and TH 36 North Ramp, LOS D
 - Westbound LOS E, right queue: 975 feet
 - Southbound through queue: 625 feet

The following intersections perform at overall LOS C or better, but have approaches performing at LOS E or LOS F or movements with maximum queues exceeding 500 feet:

- Stillwater Boulevard and TH 36 North Ramp
 - Southbound through queue: 1050 feet
- Manning Avenue and TH 36 South Ramp
 - Southbound right queue: 500 feet
- Stillwater Boulevard and 55th Street
 - Eastbound, LOS F

Overall, this alternative is anticipated to provide overall acceptable operations in the future at all study intersections. All study intersections are anticipated to operate acceptably, with the exception of the side-street stop-controlled intersections of Stillwater Boulevard/55th Street and Stillwater Boulevard/School RIRO access that have side-street movements that operate at LOS E or F in the peak hours due to sharp peaks in school traffic and limited gaps for side-street traffic. A more long-term improvement could be considered for the school access and on-site school circulation to improve these operations, which would require coordination with the school. This could include potential realignment of the school access, intersection access changes, and traffic control changes.





Conclusions

This memorandum documents the traffic analysis findings that will be used to guide the design of CR 15B and the surrounding project area, accounting for development in the area and future growth. The results are summarized as follows:

- Existing conditions with and without the CR 15B connection operate acceptably and similarly in both the a.m. and p.m. peaks. Overall, all study intersections are anticipated to perform at LOS C or better with or without the connection.
 - During the a.m. school peak, there are certain movements that operate poorly and have longer queues for a short period of time due to the peaking characteristics of the school traffic.
 - The intersections of Stillwater Boulevard/58th Street and 58th Street/Neal Avenue are split phased in the eastbound-westbound directions, which reduces the efficiency of these intersections.
 - The 58th Street and Neal Avenue signal runs “Free” and is not coordinated with Stillwater Boulevard. Therefore, drivers on 58th Street often have to stop at both intersections rather than receiving a green light at the second intersection, as would be possible if the intersections were coordinated.
- All study intersections are currently below the critical crash rate and they do not stand out from a safety performance standpoint relative to similar intersections around the state.
- There are three major private developments planned near the project area. Using ITE Trip Generation, the Lakeview Hospital Campus is estimated to generate 25,000 daily trips, Central Commons is estimated to generate 19,000 daily trips, and the Premier Bank site is estimated to generate 6,000 daily trips. The trips generated from the developments were included in the future analysis.
- Overall, by 2035, the TH 36/Manning Avenue and TH 36/Stillwater Boulevard intersections are anticipated to have longer delays and queues without the CR 15B connection. Without the connection, all traffic destined to and from the developments in the southeast quadrant of TH 36 and Manning Avenue must pass through the TH 36 and Manning Avenue interchange.
- The CR 15B connection provides a continuous route for drivers on CSAH 15 to continue on the County system without needing to utilize TH 36. A travel time analysis indicates that the connection is a viable alternative for people to use relative to TH 36.
- The CR 15B connection also distributes development traffic more equally across the transportation system so the TH 36/Manning Avenue interchange is not over capacity. With the connection, the traffic volumes at the TH 36/Stillwater Boulevard interchange are also anticipated to decrease. Both interchanges are anticipated to operate better with the CR 15B connection.
- The CR 15B connection provides the opportunity to implement a trail connection for pedestrians and bicyclists between Manning Avenue north of TH 36 and Stillwater Boulevard south of TH 36.

- Overall operations at the Stillwater Boulevard and 58th Street intersection are anticipated to be relatively similar with and without the CR 15B connection. With the connection, there is a shift from higher delays and queues for vehicles making a southbound left-turn to vehicles travelling eastbound through. By 2035 once the developments are in place, this intersection is anticipated to operate at LOS D and LOS E during the a.m. and p.m. peak hours, respectively, with or without the CR 15B connection. Based on the LOS E, the County desires to improve the operations at the intersection in the future through geometric, signal phasing, and traffic control changes.

Multiple near-term improvements were evaluated for 2035 with the CR 15B connection. These changes are anticipated to result in marginal improvements at the Stillwater Boulevard and 58th Street. Based on this, a longer-term improvement will be needed in the future to improve operations. As part of this traffic study, an alternative that reconstructs 58th Street from Memorial Avenue through Neal Avenue was identified, which is anticipated to improve operations and provide overall LOS D or better during both peak hours in 2045 at all study intersections. This includes adding additional capacity at the intersection, as well as removing split phasing at Stillwater Boulevard/58th Street and 58th Street/Neal Avenue. The specific details of this alternative would need to be further vetted through a preliminary design effort for that segment, which is not part of the County's proposed CR 15B project.

The CR 15B connection improves near-term traffic, particularly as major development in the project area becomes a reality. The current road network with or without the CR 15B connection is inadequate to support forecasted 2045 traffic at acceptable levels of service. A larger corridor improvement project will be necessary, specifically targeting improvements at intersections along 58th Street from Memorial Avenue to Neal Avenue. This could be further evaluated and planned for in the future as funding becomes available.

Appendix

Appendix A: Existing Conditions Detailed Traffic Operations Analysis

Appendix B: Trip Generation & **Routing Assumptions**

Appendix C: Future Year 2035 Detailed Traffic Operations Analysis

Appendix D: Future Year 2045 Detailed Traffic Operations Analysis

A. Existing Conditions Detailed Traffic Operations Analysis

Year 2023 Existing Conditions VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 A.M. Peak Hour



Stillwater Blvd & 55th St

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	59	1	40	4	A	8.1	A	5.4	A
	Thru	1,022	47	381	8.3	A				
Southbound	Thru	627	0	0	0.2	A	0.2	A		
	Right	19	0	0	0.9	A				
Eastbound	Left	13	4	93	33.2	D	18.0	C		
	Right	20	2	96	8.1	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
58	59	1
1,011	1,022	11
615	627	12
22	19	-3
14	13	-1
20	20	0

CSAH 15 & School RIRO Access

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	577	180	474	6.8	A	27.1	D	16.4	C
	Right	460	248	626	52.5	F				
Southbound	Thru	652	0	0	0.6	A	0.6	A		
Westbound	Right	119	18	132	9.4	A	9.4	A		

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
559	577	18
466	460	-6
637	652	15
119	119	0

58th Street & Memorial Avenue

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	2	4	78	10.1	B	7.0	A	3.6	A
	Right	96	1	57	6.9	A				
Southbound	Left	3	0	34	10.2	B	9.7	A		
	Thru	1	0	39	8.3	A				
Westbound	Left	118	0	0	0.8	A	0.8	A		
	Right	11	0	1	1.1	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
3	2	-1
96	96	0
3	3	0
1	1	0
113	118	5
10	11	1

CSAH 15 & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	U-turn	50	67	209	93	F	38.5	D	31.3	C
	Left	27	50	176	79.1	E				
	Thru	441	68	264	39.0	D				
	Right	169	18	145	14.4	B				
Southbound	Left	523	126	515	38.0	D	23.8	C		
	Thru	377	17	134	13.9	B				
	Right	200	7	117	5.2	A				
Eastbound	Left	90	42	156	53.5	D	48.2	D		
	Thru	71	47	165	61.7	E				
	Right	40	53	189	12.5	B				
Westbound	Left	184	51	174	48.8	D	31.2	C		
	Thru	52	54	181	51.2	D				
	Right	203	80	210	10.2	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
51	50	-1
23	27	4
438	441	3
166	169	3
525	523	-2
373	377	4
199	200	1
101	90	-11
68	71	3
38	40	2
175	184	9
53	52	-1
213	203	-10

Neal Ave & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	158	13	118	14	B	11.3	B	13.8	B
	Thru	9	12	120	8.3	A				
	Right	47	16	145	4.2	A				
Southbound	Left	2	3	67	13.7	B	7.7	A		
	Thru	34	3	70	10.8	B				
	Right	107	9	101	6.6	A				
Eastbound	Left	147	23	116	17.4	B	13.9	B		
	Thru	177	28	133	26.7	C				
	Right	439	9	192	7.5	A				
Westbound	Left	161	24	169	16.6	B	17.7	B		
	Thru	175	15	102	18.9	B				
	Right	4	19	117	7.4	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
160	158	-2
10	9	-1
46	47	1
3	2	-1
35	34	-1
105	107	2
155	147	-8
174	177	3
430	439	9
160	161	1
176	175	-1
3	4	1

Year 2023 Existing Conditions VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 A.M. Peak Hour



Stillwater and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	630	2	53	2.1	A	2.1	A	11.6	B
	Right	107	1	71	2.2	A				
Southbound	Left	37	1	29	9.7	A	3.8	A		
	Thru	669	4	102	3.4	A				
Eastbound	Left	197	37	134	48.6	D	31.9	C		
	Thru	0	#N/A	#N/A	0.0	A				
	Right	422	97	330	24.1	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
643	630	-13
109	107	-2
34	37	3
682	669	-13
210	197	-13
1	0	-1
415	422	7

Stillwater and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	289	46	275	29.4	C	11.4	B	13.0	B
	Thru	532	1	35	1.5	A				
	Right	0	0	0	0.1	A				
Southbound	Thru	540	13	139	7.8	A	7.6	A		
	Right	334	2	80	7.1	A				
Westbound	Left	173	36	126	49.3	D	40.7	D		
	Right	45	2	78	7.5	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
285	289	4
568	532	-36
0	0	0
542	540	-2
333	334	1
174	173	-1
47	45	-2

Manning and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	31	7	60	29.1	C	29.5	C	7.1	A
	Thru	31	5	52	29.8	C				
	Right	0	-	-	0.0	A				
Southbound	Left	0	-	-	0.0	A	3.6	A		
	Thru	18	3	45	29.8	C				
	Right	272	0	44	1.9	A				
Eastbound	Left	106	1	37	3.6	A	3.6	A		
	Thru	0	-	-	0.0	A				
	Right	2	0	15	3.5	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
32	31	-1
32	31	-1
0	0	0
0	0	0
10	18	8
283	272	-11
108	106	-2
0	0	0
3	2	-1

Manning and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	3	0	13	0.8	A	0.9	A	4.5	A
	Thru	117	0	34	0.9	A				
Southbound	Thru	701	12	228	4.1	A	4.1	A		
	Right	4	0	21	2.4	A				
Eastbound	Left	2	0	13	21.1	C	15.4	B		
	Right	2	0	41	9.7	A				
Westbound	Left	9	2	37	31.9	C	9.1	A		
	Thru	6	1	22	27.9	C				
	Right	138	6	107	6.8	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
2	3	1
114	117	3
702	701	-1
6	4	-2
0	2	2
2	2	0
10	9	-1
6	6	0
141	138	-3

Year 2023 Existing Conditions VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 P.M. Peak Hour



Stillwater Blvd & 55th St

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	45	1	29	6	A	0.5	A	1.1	A
	Thru	992	0	0	0.2	A				
Southbound	Thru	878	0	0	0.4	A	0.4	A		
	Right	46	0	0	1.1	A				
Eastbound	Left	21	6	92	41.7	E	17.6	C		
	Right	63	5	106	9.5	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
44	45	1
996	992	-4
880	878	-2
50	46	-4
23	21	-2
62	63	1

CSAH 15 & School RIRO Access

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	961	0	0	0.2	A	0.2	A	0.7	A
	Right	51	0	0	0.9	A				
Southbound	Thru	925	0	0	0.9	A	0.9	A		
Westbound	Right	41	3	76	9.2	A	9.2	A		

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
968	961	-7
51	51	0
930	925	-5
43	41	-2

58th Street & Memorial Avenue

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	4	7	83	11.9	B	7.5	A	5.3	A
	Right	168	3	66	7.4	A				
Southbound	Left	12	1	40	10.3	B	10.3	B		
	Thru	0	-	-	0.0	A				
Westbound	Left	92	0	0	0.8	A	0.8	A		
	Right	7	0	0	0.9	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
3	4	1
170	168	-2
13	12	-1
1	0	-1
95	92	-3
9	7	-2

CSAH 15 & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	U-turn	21	13	78	55	E	35.0	D	31.7	C
	Left	28	13	78	47.4	D				
	Thru	711	102	323	42.9	D				
	Right	238	13	105	8.3	A				
Southbound	Left	307	42	167	36.9	D	24.7	C		
	Thru	600	44	234	22.6	C				
	Right	134	6	116	6.0	A				
Eastbound	Left	224	59	204	47.8	D	43.4	D		
	Thru	80	59	203	44.2	D				
	Right	33	65	233	12.3	B				
Westbound	Left	273	75	255	43.7	D	31.9	C		
	Thru	65	75	256	47.2	D				
	Right	404	104	290	21.4	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
20	21	1
29	28	-1
722	711	-11
240	238	-2
314	307	-7
604	600	-4
137	134	-3
232	224	-8
78	80	2
35	33	-2
271	273	2
67	65	-2
414	404	-10

Neal Ave & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	70	4	57	14	B	12.2	B	15.2	B
	Right	14	2	72	4.4	A				
Eastbound	Thru	304	22	134	13.6	B	11.5	B		
	Right	47	0	0	0.7	A				
Westbound	Left	22	1	31	11.8	B	21.0	C		
	Thru	421	37	188	21.8	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
70	70	0
14	14	0
313	304	-9
45	47	2
21	22	1
422	421	-1

Year 2023 Existing Conditions VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 P.M. Peak Hour



Stillwater and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	1,115	45	336	12.4	B	11.1	B	13.1	B
	Right	221	7	131	5.0	A				
Southbound	Left	117	8	105	20.9	C	6.4	A		
	Thru	761	6	147	4.1	A				
Eastbound	Left	398	47	194	35.0	D	25.4	C		
	Thru	0	#N/A		0.0	A				
	Right	286	24	164	11.9	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
1,138	1,115	-23
230	221	-9
111	117	6
770	761	-9
407	398	-9
1	0	-1
285	286	1

Stillwater and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	361	21	242	18.4	B	6.9	A	10.8	B
	Thru	1,152	6	163	3.3	A				
	Right	0	0	0	0.1	A				
Southbound	Thru	744	41	252	17.0	B	13.0	B		
	Right	424	1	81	6.1	A				
Westbound	Left	134	19	84	36.0	D	29.5	C		
	Thru	0	#N/A	#N/A	0.0	A				
	Right	43	2	65	9.3	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
365	361	-4
1,180	1,152	-28
0	0	0
747	744	-3
427	424	-3
134	134	0
2	0	-2
45	43	-2

Manning and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	16	2	32	28.8	C	27.5	C	6.1	A
	Thru	18	2	35	26.3	C				
	Right	0	-	-	0.0	A				
Southbound	Left	0	-	-	0.0	A	5.1	A		
	Thru	39	5	57	27.7	C				
	Right	240	0	24	1.5	A				
Eastbound	Left	311	4	68	4.8	A	4.7	A		
	Thru	0	-	-	0.0	A				
	Right	17	0	29	2.9	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
16	16	0
18	18	0
0	0	0
0	0	0
23	39	16
258	240	-18
313	311	-2
0	0	0
17	17	0

Manning and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	1	0	7	1.0	A	1.3	A	5.6	A
	Thru	320	0	37	1.3	A				
Southbound	Thru	483	9	159	5.3	A	5.2	A		
	Right	13	0	31	2.3	A				
Eastbound	Left	5	1	22	35.8	D	14.4	B		
	Right	14	1	49	6.8	A				
Westbound	Left	16	2	32	30.3	C	9.6	A		
	Thru	3	0	7	25.9	C				
	Right	345	18	155	8.5	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
1	1	0
321	320	-1
487	483	-4
13	13	0
5	5	0
15	14	-1
17	16	-1
3	3	0
350	345	-5

Existing Conditions with Connection VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 A.M. Peak Hour



Stillwater Blvd & 55th St

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	59	1	31	4	A	7.5	A	5.0	A
	Thru	1,009	41	367	7.7	A				
Southbound	Thru	630	0	0	0.2	A	0.2	A		
	Right	21	0	0	0.8	A				
Eastbound	Left	13	3	93	30.1	D	16.9	C		
	Right	20	2	96	8.3	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
58	59	1
1,011	1,009	-2
615	630	15
22	21	-1
14	13	-1
20	20	0

CSAH 15 & School RIRO Access

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	561	182	480	5.8	A	27.4	D	16.5	C
	Right	463	249	629	53.6	F				
Southbound	Thru	653	0	0	0.6	A	0.6	A		
Westbound	Right	119	18	138	9.4	A	9.4	A		

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
559	561	2
466	463	-3
637	653	16
119	119	0

58th Street & Memorial Avenue

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	0	-	-	0.0	A	7.7	A	3.4	A
	Thru	3	6	97	10.7	B				
	Right	96	9	121	7.6	A				
Southbound	Left	3	0	67	10.7	B	10.3	B		
	Thru	1	1	80	9.1	A				
	Right	0	-	-	0.0	A				
Eastbound	Left	0	-	-	0.0	A	0.6	A		
	Thru	35	0	0	0.5	A				
	Right	4	0	0	1.1	A				
Westbound	Left	110	0	7	0.9	A	0.8	A		
	Thru	14	0	0	0.2	A				
	Right	10	0	0	0.9	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
1	0	-1
3	3	0
95	96	1
3	3	0
1	1	0
0	0	0
0	0	0
42	35	-7
3	4	1
110	110	0
10	14	4
9	10	1

CSAH 15 & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	U-turn	51	54	190	75	E	37.0	D	31.5	C
	Left	30	44	170	73.0	E				
	Thru	426	73	274	39.4	D				
	Right	165	15	136	12.8	B				
Southbound	Left	498	120	459	38.2	D	24.6	C		
	Thru	364	20	142	15.9	B				
	Right	192	5	109	5.9	A				
Eastbound	Left	90	48	186	50.7	D	45.3	D		
	Thru	90	57	202	62.5	E				
	Right	57	61	216	9.5	A				
Westbound	Left	185	53	174	49.7	D	32.2	C		
	Thru	54	55	180	54.8	D				
	Right	200	81	210	9.8	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
51	51	0
29	30	1
432	426	-6
166	165	-1
503	498	-5
358	364	6
191	192	1
100	90	-10
90	90	0
53	57	4
175	185	10
56	54	-2
210	200	-10

Neal Ave & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	160	13	122	14	B	11.5	B	13.5	B
	Thru	10	12	123	8.0	A				
	Right	47	17	149	4.3	A				
Southbound	Left	2	3	62	10.9	B	7.5	A		
	Thru	33	3	64	10.5	B				
	Right	108	6	94	6.5	A				
Eastbound	Left	152	23	120	18.2	B	13.6	B		
	Thru	176	28	130	25.7	C				
	Right	427	7	166	7.0	A				
Westbound	Left	161	23	168	16.3	B	17.2	B		
	Thru	173	14	105	18.3	B				
	Right	4	20	125	6.6	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
160	160	0
10	10	0
46	47	1
3	2	-1
35	33	-2
105	108	3
155	152	-3
174	176	2
430	427	-3
160	161	1
176	173	-3
3	4	1

Existing Conditions with Connection VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 A.M. Peak Hour



Stillwater and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	616	3	60	2.2	A	2.2	A	10.3	B
	Right	104	1	72	2.1	A				
Southbound	Left	38	1	34	7.9	A	5.2	A		
	Thru	674	12	197	5.0	A				
Eastbound	Left	188	36	129	47.8	D	27.1	C		
	Right	379	55	247	16.8	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
632	616	-16
109	104	-5
34	38	4
682	674	-8
191	188	-3
369	379	10

Stillwater and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	267	40	188	31.0	C	11.1	B	15.5	B
	Thru	535	3	88	1.1	A				
	Right	0	8	68	37.0	D				
Southbound	Thru	544	14	168	7.0	A	13.5	B		
	Right	322	4	53	24.5	C				
Westbound	Left	167	34	128	48.6	D	40.0	D		
	Right	45	2	79	8.2	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
274	267	-7
549	535	-14
0	0	0
542	544	2
322	322	0
174	167	-7
47	45	-2

Manning and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	23	4	53	24.5	C	29.0	C	9.8	A
	Thru	33	8	68	37.0	D				
	Right	8	9	79	9.1	A				
Southbound	Left	33	7	57	38.5	D	6.9	A		
	Thru	10	1	25	27.6	C				
	Right	230	0	18	1.5	A				
Eastbound	Left	105	2	45	6.2	A	6.2	A		
	Thru	0	-	-	0.0	A				
	Right	3	0	11	4.0	A				
Westbound	Left	0	-	-	0.0	A	5.9	A		
	Thru	0	-	-	0.0	A				
	Right	14	0	40	5.9	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
23	23	0
32	33	1
9	8	-1
37	33	-4
9	10	1
227	230	3
108	105	-3
0	0	0
3	3	0
1	0	-1
0	0	0
10	14	4

Manning and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	2	0	5	3.0	A	2.8	A	4.6	A
	Thru	122	1	42	2.8	A				
Southbound	Thru	680	8	154	3.8	A	3.8	A		
	Right	7	0	23	2.2	A				
Eastbound	Left	0	-	-	0.0	A	6.9	A		
	Right	4	0	39	6.9	A				
Westbound	Left	10	2	32	30.7	C	10.0	B		
	Thru	5	1	24	36.4	D				
	Right	116	6	98	7.1	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
2	2	0
124	122	-2
683	680	-3
6	7	1
0	0	0
2	4	2
9	10	1
6	5	-1
120	116	-4

Existing Conditions with Connection VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 P.M. Peak Hour



Stillwater Blvd & 55th St

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	45	1	29	6	A	0.5	A	1.2	A
	Thru	992	0	0	0.2	A				
Southbound	Thru	879	0	0	0.3	A	0.4	A		
	Right	46	0	0	1.0	A				
Eastbound	Left	21	6	88	49.5	E	19.5	C		
	Right	63	5	106	9.5	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
44	45	1
996	992	-4
880	879	-1
50	46	-4
23	21	-2
62	63	1

CSAH 15 & School RIRO Access

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	961	0	0	0.2	A	0.2	A	0.7	A
	Right	51	0	0	0.9	A				
Southbound	Thru	927	0	0	0.9	A	0.9	A		
Westbound	Right	41	3	76	9.1	A	9.1	A		

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
968	961	-7
51	51	0
930	927	-3
43	41	-2

58th Street & Memorial Avenue

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	3	7	85	9.7	A	7.8	A	4.6	A
	Thru	4	7	80	11.3	B				
	Right	166	11	106	7.6	A				
Southbound	Left	12	1	42	10.9	B	10.9	B		
	Thru	0	-	-	0.0	A				
	Right	0	-	-	0.0	A				
Eastbound	Left	0	-	-	0.0	A	0.1	A		
	Thru	18	0	0	0.1	A				
	Right	2	0	0	0.6	A				
Westbound	Left	90	0	2	0.8	A	0.7	A		
	Thru	37	0	0	0.2	A				
	Right	9	0	0	0.9	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
3	3	0
3	4	1
167	166	-1
13	12	-1
1	0	-1
0	0	0
0	0	0
17	18	1
1	2	1
94	90	-4
34	37	3
9	9	0

CSAH 15 & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	U-turn	21	20	98	56	E	31.9	C	32.1	C
	Left	49	20	98	56.4	E				
	Thru	694	87	320	37.5	D				
	Right	234	12	116	8.0	A				
Southbound	Left	305	49	168	42.5	D	25.4	C		
	Thru	592	41	218	21.0	C				
	Right	137	5	92	6.5	A				
Eastbound	Left	219	70	273	51.7	D	45.3	D		
	Thru	86	69	272	47.4	D				
	Right	45	74	288	10.0	A				
Westbound	Left	271	84	279	50.4	D	35.4	D		
	Thru	77	85	280	54.2	D				
	Right	393	114	315	21.3	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
20	21	1
49	49	0
702	694	-8
240	234	-6
309	305	-4
594	592	-2
135	137	2
227	219	-8
83	86	3
45	45	0
271	271	0
78	77	-1
403	393	-10

Neal Ave & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	69	4	55	13	B	11.8	B	17.0	B
	Right	14	2	72	4.7	A				
Eastbound	Thru	297	22	138	13.8	B	11.9	B		
	Right	50	0	0	0.8	A				
Westbound	Left	22	1	33	12.0	B	22.1	C		
	Thru	420	40	192	23.0	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
70	69	-1
14	14	0
313	297	-16
45	50	5
21	22	1
422	420	-2

Existing Conditions with Connection VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 P.M. Peak Hour



Stillwater and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	1,077	44	298	13.6	B	12.2	B	10.7	B
	Right	222	8	126	5.4	A				
Southbound	Left	118	3	63	10.6	B	3.2	A		
	Thru	760	2	64	2.1	A				
Eastbound	Left	383	28	130	22.5	C	17.6	B		
	Right	273	19	146	10.6	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
1,102	1,077	-25
230	222	-8
111	118	7
770	760	-10
384	383	-1
267	273	6

Stillwater and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	324	12	133	12.6	B	4.3	A	8.1	A
	Thru	1,138	5	121	1.9	A				
	Right	0	0	19	5.3	A				
Southbound	Thru	742	33	197	13.8	B	11.1	B		
	Right	384	0	20	5.9	A				
Westbound	Left	136	13	67	24.7	C	21.1	C		
	Right	44	3	68	9.8	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
329	324	-5
1,157	1,138	-19
0	0	0
747	742	-5
387	384	-3
134	136	2
45	44	-1

Manning and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	14	0	20	5.9	A	5.3	A	15.2	B
	Thru	18	0	19	5.3	A				
	Right	2	1	32	2.1	A				
Southbound	Left	16	0	22	6.9	A	2.4	A		
	Thru	20	1	27	7.8	A				
	Right	219	0	13	1.6	A				
Eastbound	Left	310	31	124	28.4	C	27.3	C		
	Thru	0	-	-	0.0	A				
	Right	16	0	45	5.6	A				
Westbound	Left	1	1	16	23.5	C	7.0	A		
	Thru	0	-	-	0.0	A				
	Right	37	1	49	6.5	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
14	14	0
18	18	0
2	2	0
16	16	0
21	20	-1
219	219	0
313	310	-3
0	0	0
17	16	-1
2	1	-1
0	0	0
34	37	3

Manning and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	0	-	-	0.0	A	2.1	A	5.7	A
	Thru	354	1	62	2.1	A				
Southbound	Thru	459	8	118	5.4	A	5.3	A		
	Right	14	0	34	2.3	A				
Eastbound	Left	5	1	19	25.4	C	11.4	B		
	Right	14	1	48	6.5	A				
Westbound	Left	15	2	28	24.4	C	10.3	B		
	Thru	4	0	11	24.5	C				
	Right	268	17	136	9.3	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
1	0	-1
355	354	-1
464	459	-5
13	14	1
5	5	0
15	14	-1
15	15	0
3	4	1
276	268	-8

B. Trip Generation and Routing Assumptions

Future Development

Central Commons - Manning & TH 36
 Traffic Impact Study
 March 10, 2020- Subject to Change

Land Use	Units	Size	A.M. In Veh.	A.M. Out Veh.	P.M. In Veh.	P.M. Out Veh.	Daily Trips
Convenience Store/Gas Station	Fueling Positions	14	95	96	103	103	3155
Multifamily Housing (Low-Rise)	DU	260	21	67	67	39	1489
Supermarket	SQ FT	850	137	96	342	343	7633
Fast-Food Restaurant with Drive-Through	SQ FT	5	97	93	69	63	1986
Coffee/Donut Shop with Drive-Through	SQ FT	5	186	179	78	78	2268
Strip Retail Plaza (<40k)	SQ FT	20	24	16	53	53	926
Hotel	Rooms	190	42	32	46	44	1290
Total Central Commons Trips with Multi-Use			602	579	758	723	18747

Premier Bank Site - Manning & TH 36
 Input from developer
 January 2019 - Subject to Change

Land Use	Units	Size	A.M. In Veh.	A.M. Out Veh.	P.M. In Veh.	P.M. Out Veh.	Daily Trips
Shopping Plaza (40-150k)	SQ FT	76.5	142	88	266	287	6144

Future Development

Lakeview Hospital Campus -
Manning & TH 36

Nov. 3, 2017 - Subject
to Change

Land Use	Units	Size	A.M. In Veh.	A.M. Out Veh.	P.M. In Veh.	P.M. Out Veh.	Daily Trips
Hospital	SQ FT	300	140	69	77	143	2746
Medical-Dental Office Building	SQ FT	120	250	66	120	281	3672
Hospital	SQ FT	25	12	6	7	12	229
Hospital	SQ FT	10	4	3	3	5	92
Recreational Community Center	SQ FT	70	88	46	82	93	2017
Assisted Living	Beds	150	14	9	12	19	332
Shopping Plaza (40-150k)	SQ FT	50	93	58	184	199	4016
Supermarket	SQ FT	30	43	30	114	115	2393
Fast Food Restaurant without Drive-Through	SQ FT	20	426	309	282	282	7659
General Office Building	SQ FT	50	57	8	10	51	461
Multifamily Housing (Low-Rise)	DU	150	12	39	41	25	859
Total Hospital Trips with Multi-Use			1139	642	931	1224	24475

Routing Assumptions

The following routing was assumed considering the new developments as well as the Curve Crest Boulevard connection and the CR 15B connection.

Lakeview Hospital Campus routing assumptions:

- 100 percent of vehicles to/from Stillwater Boulevard, north of TH 36, will take Curve Crest Boulevard.
- 75 percent of vehicles to/from Stillwater Boulevard, south of TH 36, will take Curve Crest Boulevard.
- 25 percent of vehicles to/from Stillwater Boulevard, south of TH 36, will take TH 36.

Manning Avenue, North of TH 36 routing assumptions:

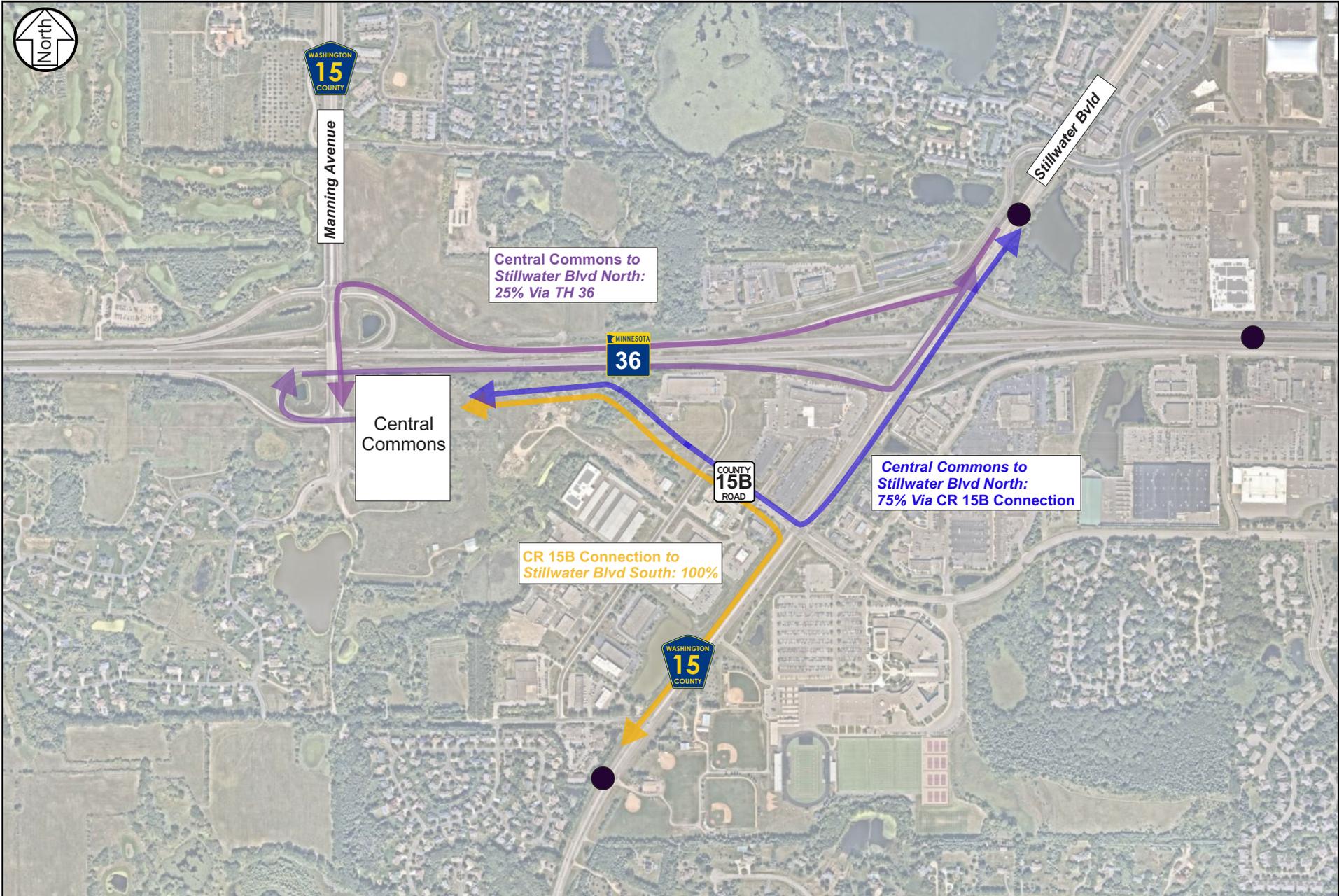
- 50 percent of vehicles to/from Stillwater Boulevard, north of TH 36, will take Curve Crest Boulevard.
- 50 percent of vehicles to/from Stillwater Boulevard, north of TH 36, will take TH 36.
- 50 percent of vehicles to/from Stillwater Boulevard, south of TH 36, will take the CR 15B connection.
- 50 percent of vehicles to/from Stillwater Boulevard, south of TH 36, will take TH 36.

Central Commons routing assumptions:

- 75 percent of vehicles to/from Stillwater Boulevard, north of TH 36, will take the CR 15B connection.
- 25 percent of vehicles to/from Stillwater Boulevard, north of TH 36, will take TH 36.
- 100 percent of vehicles to/from Stillwater Boulevard, south of TH 36, will take the CR 15B connection.

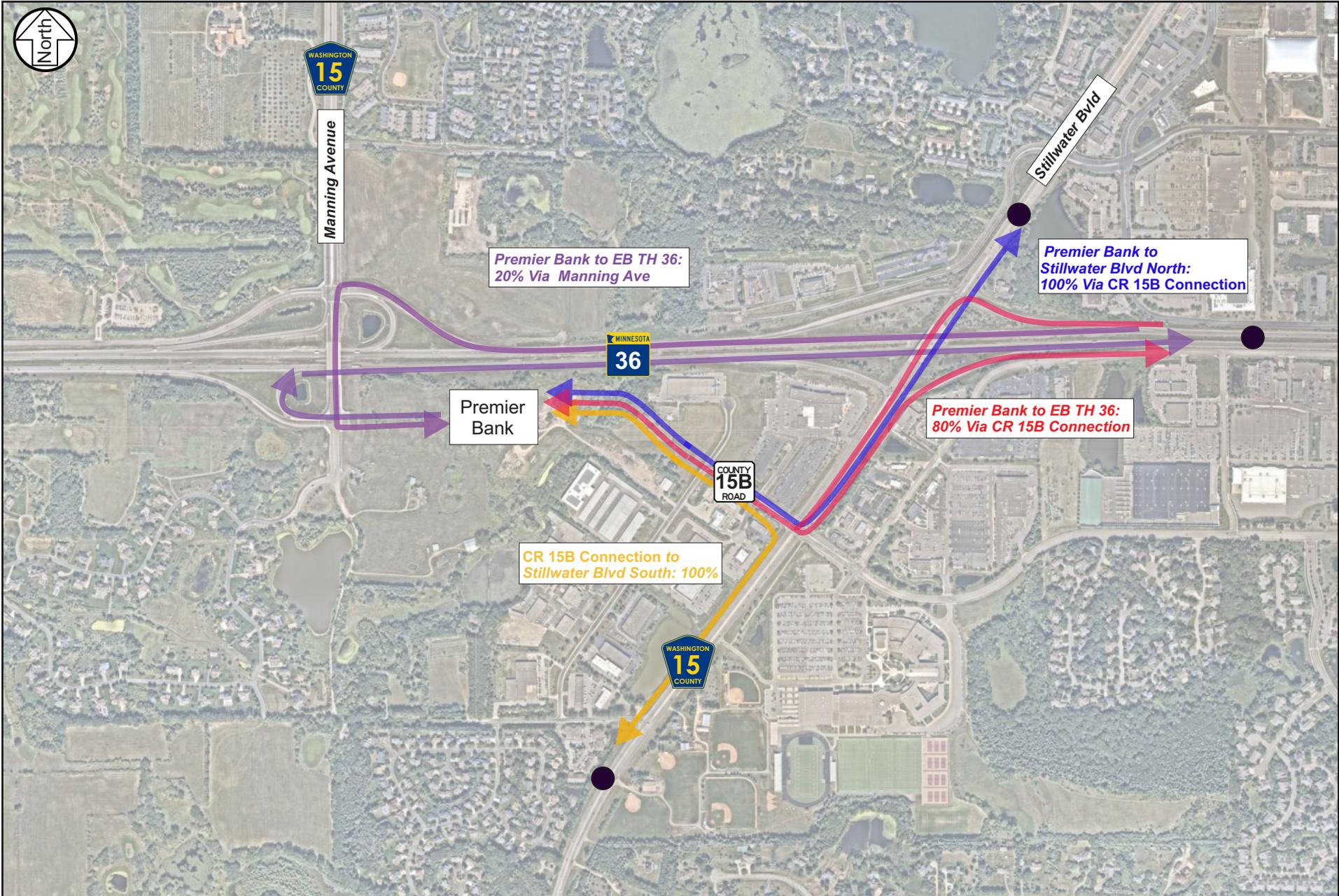
Premier Bank Site routing assumptions:

- 100 percent of vehicles to/from Stillwater Boulevard, north of TH 36, will take the CR 15B connection.
- 100 percent of vehicles to/from Stillwater Boulevard, south of TH 36, will take the CR 15B connection.
- 80 percent of vehicles traveling eastbound on TH 36 will take the CR 15B connection.
- 20 percent of vehicles traveling eastbound on TH 36 will get on TH 36 at Manning Avenue.



Central Commons Routing Assumptions

CR 15B South Segment
Washington County



Premier Bank Routing Assumptions

CR 15B South Segment
Washington County

C. Future Year 2035 Detailed Traffic Operations Analysis

Year 2035 No Connection VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 A.M. Peak Hour



Stillwater Blvd & 55th St

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	73	3	54	12	B	25.2	D	16.0	C
	Thru	1,325	248	819	25.9	D				
Southbound	Thru	851	0	0	0.3	A	0.3	A		
	Right	28	0	0	1.0	A				
Eastbound	Left	20	8	94	74.9	F	37.8	E		
	Right	26	2	102	9.3	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
70	73	3
1,330	1,325	-5
840	851	11
30	28	-2
20	20	0
25	26	1

CSAH 15 & School RIRO Access

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	803	331	588	6.5	A	33.3	D	19.9	C
	Right	543	383	644	72.9	F				
Southbound	Thru	879	0	0	0.7	A	0.7	A		
Westbound	Right	136	23	165	10.9	B	10.9	B		

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
820	803	-17
530	543	13
870	879	9
135	136	1

58th Street & Memorial Avenue

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	9	5	84	11.4	B	7.6	A	4.1	A
	Right	109	2	66	7.3	A				
Southbound	Left	6	1	47	9.4	A	9.8	A		
	Thru	5	1	46	10.3	B				
Westbound	Left	133	0	0	0.9	A	0.9	A		
	Right	14	0	3	1.0	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
10	9	-1
110	109	-1
5	6	1
5	5	0
130	133	3
15	14	-1

CSAH 15 & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	U-turn	59	41	165	64	E	45.8	D	42.9	D
	Left	31	34	147	58.1	E				
	Thru	659	171	519	52.0	D				
	Right	190	19	153	16.6	B				
Southbound	Left	662	307	671	71.1	E	41.0	D		
	Thru	571	33	226	19.5	B				
	Right	236	8	133	8.5	A				
Eastbound	Left	112	49	170	52.5	D	46.1	D		
	Thru	82	49	173	55.7	E				
	Right	45	61	201	12.5	B				
Westbound	Left	206	91	257	61.0	E	42.0	D		
	Thru	66	100	274	81.0	F				
	Right	320	123	295	21.8	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
60	59	-1
30	31	1
675	659	-16
190	190	0
660	662	2
565	571	6
230	236	6
115	112	-3
80	82	2
45	45	0
200	206	6
60	66	6
335	320	-15

Neal Ave & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	188	24	167	19	B	15.8	B	16.1	B
	Thru	15	24	167	13.7	B				
	Right	51	32	207	5.4	A				
Southbound	Left	6	4	62	13.5	B	9.6	A		
	Thru	37	5	70	14.4	B				
	Right	120	13	105	7.9	A				
Eastbound	Left	176	28	154	16.8	B	14.2	B		
	Thru	271	34	165	23.6	C				
	Right	496	8	139	8.2	A				
Westbound	Left	187	40	249	22.3	C	22.0	C		
	Thru	288	28	151	22.0	C				
	Right	5	34	161	11.3	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
185	188	3
15	15	0
55	51	-4
5	6	1
40	37	-3
120	120	0
180	176	-4
275	271	-4
475	496	21
185	187	2
290	288	-2
5	5	0

Year 2035 No Connection VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 A.M. Peak Hour



Stillwater and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	952	216	683	33.4	C	30.4	C	30.5	C
	Right	125	4	123	6.9	A				
Southbound	Left	47	5	62	24.7	C	10.2	B		
	Thru	850	27	194	9.3	A				
Eastbound	Left	338	51	208	55.2	E	49.5	D		
	Right	635	393	1,030	46.5	D				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
990	952	-38
135	125	-10
45	47	2
850	850	0
365	338	-27
605	635	30

Stillwater and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	483	241	578	72.0	E	32.4	C	29.1	C
	Thru	795	193	517	8.4	A				
	Right	0	44	201	7.0	A				
Southbound	Thru	687	57	296	20.8	C	23.2	C		
	Right	507	35	437	26.4	C				
Westbound	Left	211	40	154	46.8	D	39.5	D		
	Right	52	3	78	10.1	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
510	483	-27
845	795	-50
0	0	0
690	687	-3
505	507	2
205	211	6
55	52	-3

Manning and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	121	18	149	21.1	C	27.9	C	26.3	C
	Thru	117	23	112	35.0	C				
	Right	0	-	-	0.0	A				
Southbound	Left	393	63	308	25.6	C	21.2	C		
	Thru	107	12	125	14.5	B				
	Right	558	73	374	19.4	B				
Eastbound	Left	487	56	228	34.1	C	30.5	C		
	Thru	177	26	195	25.1	C				
	Right	51	34	216	15.6	B				
Westbound	Left	0	-	-	0.0	A	30.3	C		
	Thru	277	86	340	47.7	D				
	Right	232	11	116	9.5	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
120	121	1
115	117	2
0	0	0
420	393	-27
115	107	-8
565	558	-7
495	487	-8
180	177	-3
50	51	1
0	0	0
280	277	-3
230	232	2

Manning and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	6	1	16	9.7	A	10.6	B	32.9	C
	Thru	598	25	171	10.6	B				
Southbound	Thru	1,352	76	449	39.1	D	39.0	D		
	Right	10	0	30	27.5	C				
Eastbound	Left	0	-	-	0.0	A	14.9	B		
	Right	8	1	48	14.9	B				
Westbound	Left	391	125	496	47.0	D	38.5	D		
	Thru	10	2	27	40.6	D				
	Right	513	176	609	32.0	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
5	6	1
610	598	-12
1,365	1,352	-13
10	10	0
0	0	0
5	8	3
420	391	-29
10	10	0
570	513	-57

Year 2035 No Connection VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 P.M. Peak Hour



Stillwater Blvd & 55th St

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	54	3	45	12	B	1.0	A	2.1	A
	Thru	1,372	0	4	0.6	A				
Southbound	Thru	1,209	0	0	0.5	A	0.5	A		
	Right	58	0	0	1.1	A				
Eastbound	Left	25	21	105	108.0	F	38.7	E		
	Right	75	7	118	15.6	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
55	54	-1
1,375	1,372	-3
1,235	1,209	-26
60	58	-2
30	25	-5
75	75	0

CSAH 15 & School RIRO Access

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	1,331	16	93	5.2	A	5.0	A	3.5	A
	Right	67	0	0	1.6	A				
Southbound	Thru	1,266	0	0	1.0	A	1.0	A		
Westbound	Right	52	10	88	24.6	C	24.6	C		

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
1,340	1,331	-9
65	67	2
1,295	1,266	-29
55	52	-3

58th Street & Memorial Avenue

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	9	10	98	11.1	B	8.4	A	5.9	A
	Right	194	5	81	8.2	A				
Southbound	Left	20	1	42	11.2	B	10.8	B		
	Thru	4	1	42	9.1	A				
Westbound	Left	107	0	0	0.9	A	0.9	A		
	Right	14	0	1	1.2	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
10	9	-1
195	194	-1
20	20	0
5	4	-1
110	107	-3
15	14	-1

CSAH 15 & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	U-turn	23	23	102	97	F	69.3	E	57.3	E
	Left	33	23	101	93.8	F				
	Thru	1,019	383	799	77.5	E				
	Right	267	36	203	32.3	C				
Southbound	Left	454	144	366	84.0	F	38.2	D		
	Thru	889	65	349	20.6	C				
	Right	156	5	106	5.3	A				
Eastbound	Left	252	112	332	73.6	E	66.7	E		
	Thru	92	112	333	71.8	E				
	Right	44	129	362	16.2	B				
Westbound	Left	310	325	498	63.6	E	67.1	E		
	Thru	80	330	499	68.6	E				
	Right	527	360	534	69.0	E				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
25	23	-2
35	33	-2
1,060	1,019	-41
275	267	-8
470	454	-16
915	889	-26
160	156	-4
260	252	-8
90	92	2
45	44	-1
310	310	0
80	80	0
560	527	-33

Neal Ave & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	84	13	85	29	C	25.2	C	44.4	D
	Right	20	12	104	7.2	A				
Southbound	Left	23	56	213	27.5	C	39.6	D		
	Thru	16	57	214	28.0	C				
	Right	296	69	239	41.2	D				
Eastbound	Left	289	57	263	24.1	C	24.2	C		
	Thru	467	57	263	26.9	C				
	Right	53	0	0	0.8	A				
Westbound	Left	21	1	31	14.5	B	78.0	E		
	Thru	544	275	540	77.6	E				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
85	84	-1
20	20	0
25	23	-2
15	16	1
300	296	-4
300	289	-11
480	467	-13
55	53	-2
25	21	-4
565	544	-21

Year 2035 No Connection VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 P.M. Peak Hour



Stillwater and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	1,507	134	730	17.8	B	16.0	B	23.6	C
	Right	276	6	115	6.2	A				
Southbound	Left	124	36	195	54.7	D	10.6	B		
	Thru	920	10	194	4.7	A				
Eastbound	Left	605	115	406	57.9	E	46.2	D		
	Right	593	188	761	34.2	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
1,590	1,507	-83
290	276	-14
130	124	-6
940	920	-20
630	605	-25
605	593	-12

Stillwater and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	610	135	473	42.5	D	17.7	B	34.7	C
	Thru	1,490	50	420	7.5	A				
Southbound	Thru	888	322	872	60.5	E	56.5	E		
	Right	563	139	906	50.2	D				
Westbound	Left	155	37	122	66.7	E	54.1	D		
	Right	50	5	73	15.2	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
645	610	-35
1,575	1,490	-85
920	888	-32
590	563	-27
150	155	5
50	50	0

Manning and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	170	27	156	31.1	C	38.4	D	49.9	D
	Thru	158	39	171	46.3	D				
	Right	0	-	-	0.0	A				
Southbound	Left	464	351	838	65.4	E	66.7	E		
	Thru	230	386	821	68.2	E				
	Right	723	428	865	67.0	E				
Eastbound	Left	662	72	276	37.7	D	32.5	C		
	Thru	219	35	249	24.1	C				
	Right	113	43	269	17.9	B				
Westbound	Left	0	-	-	0.0	A	46.2	D		
	Thru	393	215	665	65.2	E				
	Right	328	32	214	23.5	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
175	170	-5
155	158	3
0	0	0
500	464	-36
250	230	-20
755	723	-32
670	662	-8
215	219	4
115	113	-2
0	0	0
400	393	-7
330	328	-2

Manning and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	5	0	17	11.3	B	18.8	B	56.7	E
	Thru	824	62	416	18.9	B				
Southbound	Thru	1,538	278	783	71.7	E	71.5	E		
	Right	18	0	47	56.1	E				
Eastbound	Left	10	0	0	0.7	A	13.0	B		
	Right	20	2	49	19.1	B				
Westbound	Left	544	512	1,235	79.2	E	64.9	E		
	Thru	4	0	10	56.9	E				
	Right	626	240	891	52.5	D				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
5	5	0
830	824	-6
1,570	1,538	-32
20	18	-2
10	10	0
20	20	0
585	544	-41
5	4	-1
675	626	-49

Year 2035 with Connection VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 A.M. Peak Hour



Stillwater Blvd & 55th St

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	72	3	53	12	B	24.8	C	15.7	C
	Thru	1,326	245	808	25.5	D				
Southbound	Thru	863	0	0	0.3	A	0.3	A		
	Right	30	0	0	0.9	A				
Eastbound	Left	21	9	96	68.9	F	37.1	E		
	Right	25	2	101	10.4	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
70	72	2
1,330	1,326	-4
840	863	23
30	30	0
20	21	1
25	25	0

CSAH 15 & School RIRO Access

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	806	327	579	6.1	A	32.9	D	19.4	C
	Right	541	381	637	72.8	F				
Southbound	Thru	895	0	0	0.8	A	0.8	A		
Westbound	Right	137	20	144	8.9	A	8.9	A		

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
820	806	-14
530	541	11
870	895	25
135	137	2

58th Street & Memorial Avenue

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	0	-	-	0.0	A	10.2	B	2.6	A
	Thru	9	8	97	21.1	C				
	Right	110	11	124	9.3	A				
Southbound	Left	7	2	82	22.5	C	22.3	C		
	Thru	4	3	88	22.0	C				
	Right	0	-	-	0.0	A				
Eastbound	Left	0	-	-	0.0	A	0.8	A		
	Thru	257	0	0	0.8	A				
	Right	5	0	0	1.8	A				
Westbound	Left	124	0	32	2.0	A	1.0	A		
	Thru	246	0	0	0.5	A				
	Right	16	0	0	1.0	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
0	0	0
10	9	-1
110	110	0
5	7	2
5	4	-1
0	0	0
0	0	0
255	257	2
5	5	0
125	124	-1
255	246	-9
15	16	1

CSAH 15 & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	U-turn	58	73	283	54	D	41.2	D	42.1	D
	Left	114	63	256	55.7	E				
	Thru	571	117	412	45.8	D				
	Right	187	19	150	14.5	B				
Southbound	Left	602	278	624	68.3	E	40.0	D		
	Thru	479	46	222	24.7	C				
	Right	328	13	142	10.3	B				
Eastbound	Left	172	122	371	56.7	E	47.6	D		
	Thru	149	149	405	71.4	E				
	Right	158	151	417	15.2	B				
Westbound	Left	206	106	275	59.1	E	43.9	D		
	Thru	110	115	290	81.5	F				
	Right	277	136	309	17.7	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
60	58	-2
120	114	-6
585	571	-14
190	187	-3
595	602	7
475	479	4
335	328	-7
210	172	-38
140	149	9
140	158	18
200	206	6
105	110	5
290	277	-13

Neal Ave & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	188	24	155	20	C	16.6	B	16.6	B
	Thru	13	23	161	11.6	B				
	Right	52	32	194	5.4	A				
Southbound	Left	7	5	76	15.9	B	10.2	B		
	Thru	39	6	77	14.8	B				
	Right	119	10	107	8.4	A				
Eastbound	Left	177	30	147	17.0	B	14.7	B		
	Thru	269	37	168	26.2	C				
	Right	493	5	122	7.6	A				
Westbound	Left	187	40	275	22.0	C	22.7	C		
	Thru	284	31	157	23.4	C				
	Right	6	39	168	9.1	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
185	188	3
15	13	-2
55	52	-3
5	7	2
40	39	-1
120	119	-1
180	177	-3
275	269	-6
475	493	18
185	187	2
290	284	-6
5	6	1

Year 2035 with Connection VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 A.M. Peak Hour



Stillwater and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	865	25	191	7.6	A	7.0	A	14.1	B
	Right	158	3	115	3.5	A				
Southbound	Left	50	3	59	19.1	B	5.6	A		
	Thru	947	13	136	4.8	A				
Eastbound	Left	284	45	175	46.6	D	35.3	D		
	Thru	0	#N/A		0.0	A				
	Right	460	125	482	28.3	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
930	865	-65
155	158	3
45	50	5
955	947	-8
295	284	-11
5	0	-5
450	460	10

Stillwater and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	343	61	284	34.3	C	12.7	B	18.6	B
	Thru	803	27	212	3.5	A				
	Right	0	27	153	31.1	C				
Southbound	Thru	754	63	313	20.4	C	19.1	B		
	Right	430	7	72	16.9	B				
Westbound	Left	235	44	155	46.2	D	39.6	D		
	Right	50	3	74	8.9	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
395	343	-52
835	803	-32
0	0	0
770	754	-16
425	430	5
235	235	0
55	50	-5

Manning and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	59	7	72	16.9	B	24.6	C	20.4	C
	Thru	119	27	153	31.1	C				
	Right	59	31	162	19.2	B				
Southbound	Left	281	51	285	30.6	C	16.5	B		
	Thru	76	8	83	22.6	C				
	Right	539	18	264	8.3	A				
Eastbound	Left	487	39	177	25.7	C	23.0	C		
	Thru	183	17	148	18.7	B				
	Right	49	23	168	12.2	B				
Westbound	Left	45	9	66	49.0	D	21.9	C		
	Thru	119	24	141	35.6	D				
	Right	249	14	134	10.5	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
60	59	-1
115	119	4
60	59	-1
280	281	1
75	76	1
535	539	4
495	487	-8
180	183	3
50	49	-1
45	45	0
125	119	-6
250	249	-1

Manning and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	7	1	27	13.3	B	19.5	B	27.9	C
	Thru	609	57	356	19.6	B				
Southbound	Thru	1,377	59	384	32.4	C	32.4	C		
	Right	11	0	45	30.3	C				
Eastbound	Left	0	-	-	0.0	A	13.7	B		
	Right	8	1	48	13.7	B				
Westbound	Left	185	26	158	26.8	C	26.7	C		
	Thru	9	2	26	19.6	B				
	Right	561	112	444	26.8	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
5	7	2
630	609	-21
1,385	1,377	-8
10	11	1
0	0	0
5	8	3
185	185	0
10	9	-1
575	561	-14

CR 15B and Central Commons

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	394	11	161	7.5	A	6.4	A	8.6	A
	Right	96	0	33	1.5	A				
Eastbound	Thru	67	3	50	12.3	B	13.6	B		
	Right	454	44	241	13.8	B				
Westbound	Left	225	1	53	2.9	A	2.7	A		
	Thru	19	0	0	0.8	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
395	394	-1
98	96	-2
65	67	2
455	454	-1
230	225	-5
25	19	-6

Year 2035 with Connection VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 P.M. Peak Hour



Stillwater Blvd & 55th St

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	53	3	44	14	B	0.9	A	2.2	A
	Thru	1,373	0	0	0.4	A				
Southbound	Thru	1,226	0	0	0.6	A	0.6	A		
	Right	60	0	0	1.2	A				
Eastbound	Left	25	19	104	113.4	F	39.9	E		
	Right	75	8	114	15.4	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
55	53	-2
1,375	1,373	-2
1,230	1,226	-4
60	60	0
30	25	-5
75	75	0

CSAH 15 & School RIRO Access

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	1,332	1	20	1.0	A	1.0	A	1.3	A
	Right	66	0	0	1.1	A				
Southbound	Thru	1,286	0	0	1.3	A	1.3	A		
Westbound	Right	53	5	81	13.0	B	13.0	B		

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
1,340	1,332	-8
65	66	1
1,290	1,286	-4
55	53	-2

58th Street & Memorial Avenue

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	0	-	-	0.0	A	16.7	C	5.5	A
	Thru	10	16	119	33.1	D				
	Right	192	26	148	15.8	C				
Southbound	Left	20	7	51	58.8	F	53.4	F		
	Thru	5	4	53	31.7	D				
	Right	0	-	-	0.0	A				
Eastbound	Left	0	-	-	0.0	A	1.9	A		
	Thru	371	0	14	1.9	A				
	Right	0	-	-	0.0	A				
Westbound	Left	105	1	45	3.5	A	1.3	A		
	Thru	385	0	0	0.7	A				
	Right	15	0	1	1.1	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
0	0	0
10	10	0
195	192	-3
20	20	0
5	5	0
0	0	0
0	0	0
375	371	-4
0	0	0
110	105	-5
395	385	-10
15	15	0

CSAH 15 & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	U-turn	23	97	293	86	F	62.2	E	55.3	E
	Left	176	96	294	87.4	F				
	Thru	890	268	688	68.9	E				
	Right	273	31	186	22.3	C				
Southbound	Left	400	112	310	73.6	E	42.9	D		
	Thru	774	116	480	39.5	D				
	Right	326	21	162	13.3	B				
Eastbound	Left	404	255	681	77.1	E	62.4	E		
	Thru	164	257	684	70.2	E				
	Right	182	274	704	22.8	C				
Westbound	Left	308	190	432	73.4	E	59.3	E		
	Thru	153	189	431	81.3	F				
	Right	477	223	468	43.2	D				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
25	23	-2
180	176	-4
915	890	-25
275	273	-2
410	400	-10
785	774	-11
335	326	-9
435	404	-31
150	164	14
170	182	12
310	308	-2
150	153	3
490	477	-13

Neal Ave & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	84	8	74	20	B	17.4	B	19.7	B
	Right	20	6	90	6.1	A				
Eastbound	Thru	480	34	197	15.5	B	14.1	B		
	Right	54	0	0	0.8	A				
Westbound	Left	24	2	32	12.8	B	25.1	C		
	Thru	563	58	249	26.0	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
85	84	-1
20	20	0
480	480	0
55	54	-1
25	24	-1
565	563	-2

Year 2035 with Connection VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 P.M. Peak Hour



Stillwater and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	1,428	32	271	7.7	A	6.9	A	14.9	B
	Right	337	4	104	3.4	A				
Southbound	Left	127	26	194	41.7	D	5.9	A		
	Thru	1,091	2	99	1.8	A				
Eastbound	Left	501	96	308	57.7	E	42.2	D		
	Thru	0	#N/A		0.0	A				
	Right	420	73	353	23.7	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
1,495	1,428	-67
345	337	-8
130	127	-3
1,100	1,091	-9
520	501	-19
5	0	-5
430	420	-10

Stillwater and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	383	44	276	28.4	C	13.9	B	28.4	C
	Thru	1,537	56	500	10.3	B				
	Right	0	41	229	33.8	C				
Southbound	Thru	1,007	267	874	52.7	D	42.3	D		
	Right	468	8	74	19.7	B				
Westbound	Left	211	49	148	66.6	E	56.9	E		
	Thru	0	#N/A	#N/A	0.0	A				
	Right	48	4	70	14.2	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
445	383	-62
1,570	1,537	-33
0	0	0
1,025	1,007	-18
475	468	-7
205	211	6
5	0	-5
50	48	-2

Manning and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	81	8	74	19.7	B	28.1	C	26.3	C
	Thru	157	41	229	33.8	C				
	Right	90	49	244	25.8	C				
Southbound	Left	272	33	209	25.4	C	17.8	B		
	Thru	143	23	230	25.9	C				
	Right	743	51	453	13.5	B				
Eastbound	Left	663	77	287	38.1	D	34.7	C		
	Thru	217	46	269	31.2	C				
	Right	110	57	289	21.3	C				
Westbound	Left	92	29	123	61.1	E	27.7	C		
	Thru	129	28	147	39.5	D				
	Right	377	32	202	15.5	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
85	81	-4
155	157	2
90	90	0
280	272	-8
155	143	-12
760	743	-17
670	663	-7
215	217	2
115	110	-5
95	92	-3
140	129	-11
380	377	-3

Manning and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	5	0	12	13.9	B	19.0	B	36.9	D
	Thru	879	64	414	19.0	B				
Southbound	Thru	1,583	102	517	47.4	D	47.3	D		
	Right	21	0	55	37.1	D				
Eastbound	Left	10	2	27	41.2	D	25.8	C		
	Right	19	2	48	17.7	B				
Westbound	Left	227	35	195	31.5	C	36.5	D		
	Thru	5	0	13	24.5	C				
	Right	627	192	603	38.4	D				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
5	5	0
880	879	-1
1,610	1,583	-27
20	21	1
10	10	0
20	19	-1
235	227	-8
5	5	0
650	627	-23

CR 15B and Central Commons

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	551	16	206	8.4	A	6.9	A	9.0	A
	Right	170	1	40	1.9	A				
Eastbound	Thru	46	2	35	14.4	B	15.2	B		
	Right	533	57	262	15.3	B				
Westbound	Left	335	2	77	4.1	A	3.7	A		
	Thru	49	0	0	1.2	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
550	551	1
165	170	5
45	46	1
540	533	-7
330	335	5
65	49	-16

Year 2035 with Connection (Split Timing Removed) VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 A.M. Peak Hour



Stillwater Blvd & 55th St

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	72	3	55	13	B	25.7	D	16.3	C
	Thru	1,325	252	799	26.4	D				
Southbound	Thru	859	0	0	0.3	A	0.3	A		
	Right	30	0	0	1.0	A				
Eastbound	Left	21	10	96	72.9	F	39.0	E		
	Right	25	2	102	10.5	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
70	72	2
1,330	1,325	-5
840	859	19
30	30	0
20	21	1
25	25	0

CSAH 15 & School RIRO Access

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	807	321	567	7.7	A	33.3	D	19.8	C
	Right	541	377	631	71.6	F				
Southbound	Thru	891	0	0	0.8	A	0.8	A		
Westbound	Right	137	22	154	10.9	B	10.9	B		

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
820	807	-13
530	541	11
870	891	21
135	137	2

58th Street & Memorial Avenue

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	0	-	-	0.0	A	10.9	B	2.8	A
	Thru	9	7	85	23.1	C				
	Right	111	10	110	10.0	A				
Southbound	Left	7	2	51	26.8	D	23.9	C		
	Thru	4	3	53	18.8	C				
	Right	0	-	-	0.0	A				
Eastbound	Left	0	-	-	0.0	A	0.8	A		
	Thru	256	0	0	0.8	A				
	Right	5	0	0	1.6	A				
Westbound	Left	123	0	35	2.0	A	1.0	A		
	Thru	246	0	0	0.5	A				
	Right	16	0	0	1.0	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
0	0	0
10	9	-1
110	111	1
5	7	2
5	4	-1
0	0	0
0	0	0
255	256	1
5	5	0
125	123	-2
255	246	-9
15	16	1

CSAH 15 & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	U-turn	59	72	285	58	E	51.4	D	44.4	D
	Left	113	63	259	59.9	E				
	Thru	570	172	553	60.5	E				
	Right	188	19	147	16.4	B				
Southbound	Left	603	271	621	66.1	E	39.4	D		
	Thru	478	42	219	25.8	C				
	Right	328	13	140	10.2	B				
Eastbound	Left	180	117	373	53.3	D	46.4	D		
	Thru	149	152	411	70.9	E				
	Right	158	148	419	15.6	B				
Westbound	Left	201	121	280	72.5	E	43.9	D		
	Thru	108	133	297	66.8	E				
	Right	277	150	315	14.2	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
60	59	-1
120	113	-7
585	570	-15
190	188	-2
595	603	8
475	478	3
335	328	-7
210	180	-30
140	149	9
140	158	18
200	201	1
105	108	3
290	277	-13

Neal Ave & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	189	23	164	19	B	15.8	B	17.2	B
	Thru	14	25	167	15.3	B				
	Right	52	29	198	5.0	A				
Southbound	Left	7	5	72	13.7	B	10.4	B		
	Thru	38	5	76	13.2	B				
	Right	119	9	103	9.3	A				
Eastbound	Left	177	31	157	11.0	B	15.4	B		
	Thru	271	40	171	33.0	C				
	Right	494	5	127	7.4	A				
Westbound	Left	187	25	213	15.0	B	23.7	C		
	Thru	287	39	182	29.6	C				
	Right	6	53	197	11.8	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
185	189	4
15	14	-1
55	52	-3
5	7	2
40	38	-2
120	119	-1
180	177	-3
275	271	-4
475	494	19
185	187	2
290	287	-3
5	6	1

Year 2035 with Connection (Split Timing Removed) VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 A.M. Peak Hour



Stillwater and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	864	13	150	5.0	A	4.7	A	12.6	B
	Right	159	2	89	2.8	A				
Southbound	Left	50	1	40	11.0	B	3.3	A		
	Thru	946	6	86	2.9	A				
Eastbound	Left	284	46	175	47.1	D	35.9	D		
	Thru	0	#N/A		0.0	A				
	Right	460	132	512	29.0	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
930	864	-66
155	159	4
45	50	5
955	946	-9
295	284	-11
5	0	-5
450	460	10

Stillwater and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	345	52	288	30.4	C	14.1	B	19.0	B
	Thru	797	35	270	7.1	A				
	Right	0	27	154	31.2	C				
Southbound	Thru	753	60	306	19.8	B	18.7	B		
	Right	428	7	73	16.9	B				
Westbound	Left	235	44	156	45.8	D	39.3	D		
	Right	50	3	74	8.8	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
395	345	-50
835	797	-38
0	0	0
770	753	-17
425	428	3
235	235	0
55	50	-5

Manning and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	59	7	73	16.9	B	24.7	C	20.2	C
	Thru	119	27	154	31.2	C				
	Right	59	32	163	19.3	B				
Southbound	Left	282	49	276	29.8	C	15.9	B		
	Thru	76	8	82	22.3	C				
	Right	539	17	257	7.8	A				
Eastbound	Left	487	40	177	25.7	C	23.0	C		
	Thru	183	17	151	18.7	B				
	Right	49	23	170	12.2	B				
Westbound	Left	45	9	66	47.7	D	22.0	C		
	Thru	119	25	141	36.5	D				
	Right	249	14	134	10.5	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
60	59	-1
115	119	4
60	59	-1
280	282	2
75	76	1
535	539	4
495	487	-8
180	183	3
50	49	-1
45	45	0
125	119	-6
250	249	-1

Manning and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	7	1	23	11.8	B	18.0	B	27.5	C
	Thru	608	52	355	18.0	B				
Southbound	Thru	1,377	52	369	31.4	C	31.3	C		
	Right	11	0	38	29.4	C				
Eastbound	Left	0	-	-	0.0	A	13.3	B		
	Right	8	1	48	13.3	B				
Westbound	Left	184	28	165	28.5	C	28.3	C		
	Thru	9	1	27	20.4	C				
	Right	563	121	450	28.4	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
5	7	2
630	608	-22
1,385	1,377	-8
10	11	1
0	0	0
5	8	3
185	184	-1
10	9	-1
575	563	-12

CR 15B and Central Commons

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	394	11	155	7.1	A	6.0	A	8.5	A
	Right	96	0	31	1.5	A				
Eastbound	Thru	68	2	46	12.1	B	13.4	B		
	Right	455	43	228	13.6	B				
Westbound	Left	225	1	55	3.0	A	2.8	A		
	Thru	19	0	0	0.6	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
395	394	-1
98	96	-2
65	68	3
455	455	0
230	225	-5
25	19	-6

Year 2035 with Connection (Split Timing Removed) VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 P.M. Peak Hour



Stillwater Blvd & 55th St

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	54	3	47	14	B	0.9	A	2.5	A
	Thru	1,373	0	0	0.4	A				
Southbound	Thru	1,218	0	0	0.5	A	0.5	A		
	Right	59	0	0	1.2	A				
Eastbound	Left	26	25	103	152.9	F	49.9	E		
	Right	75	7	111	14.2	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
55	54	-1
1,375	1,373	-2
1,230	1,218	-12
60	59	-1
30	26	-4
75	75	0

CSAH 15 & School RIRO Access

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	1,333	1	17	0.9	A	0.9	A	1.2	A
	Right	65	0	0	1.1	A				
Southbound	Thru	1,279	0	0	1.1	A	1.1	A		
Westbound	Right	53	5	81	13.3	B	13.3	B		

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
1,340	1,333	-7
65	65	0
1,290	1,279	-11
55	53	-2

58th Street & Memorial Avenue

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	0	-	-	0.0	A	23.3	C	7.9	A
	Thru	10	24	147	41.6	E				
	Right	191	35	177	22.3	C				
Southbound	Left	19	8	53	73.6	F	68.0	F		
	Thru	5	6	55	46.9	E				
	Right	0	-	-	0.0	A				
Eastbound	Left	0	-	-	0.0	A	4.0	A		
	Thru	371	2	37	4.0	A				
	Right	0	-	-	0.0	A				
Westbound	Left	105	2	49	5.5	A	1.7	A		
	Thru	382	0	0	0.7	A				
	Right	15	0	0	1.0	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
0	0	0
10	10	0
195	191	-4
20	19	-1
5	5	0
0	0	0
0	0	0
375	371	-4
0	0	0
110	105	-5
395	382	-13
15	15	0

CSAH 15 & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	U-turn	23	99	301	85	F	58.4	E	54.3	D
	Left	175	98	300	86.6	F				
	Thru	889	243	643	64.2	E				
	Right	272	28	180	19.2	B				
Southbound	Left	401	89	280	58.5	E	37.1	D		
	Thru	775	110	468	36.8	D				
	Right	326	17	154	11.4	B				
Eastbound	Left	399	303	698	86.0	F	68.1	E		
	Thru	163	305	700	73.2	E				
	Right	182	318	721	24.1	C				
Westbound	Left	299	250	449	85.1	F	65.0	E		
	Thru	154	248	449	85.0	F				
	Right	478	283	483	46.1	D				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
25	23	-2
180	175	-5
915	889	-26
275	272	-3
410	401	-9
785	775	-10
335	326	-9
435	399	-36
150	163	13
170	182	12
310	299	-11
150	154	4
490	478	-12

Neal Ave & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	84	11	84	28	C	23.8	C	24.5	C
	Thru	10	11	82	23.4	C				
	Right	20	10	100	5.9	A				
Southbound	Left	25	39	186	27.6	C	27.1	C		
	Thru	15	41	189	25.0	C				
	Right	299	49	211	27.1	C				
Eastbound	Left	295	54	218	31.6	C	16.5	B		
	Thru	483	54	218	9.0	A				
	Right	54	0	0	0.7	A				
Westbound	Left	25	3	36	24.2	C	33.9	C		
	Thru	560	83	290	34.6	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
85	84	-1
10	10	0
20	20	0
25	25	0
15	15	0
300	299	-1
300	295	-5
480	483	3
55	54	-1
25	25	0
565	560	-5

Year 2035 with Connection (Split Timing Removed) VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 P.M. Peak Hour



Stillwater and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	1,423	46	330	10.3	B	9.1	A	15.7	B
	Right	338	6	128	4.2	A				
Southbound	Left	126	20	173	34.3	C	5.1	A		
	Thru	1,092	2	99	1.7	A				
Eastbound	Left	501	94	293	57.8	E	42.2	D		
	Thru	0	#N/A		0.0	A				
	Right	420	73	357	23.6	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
1,495	1,423	-72
345	338	-7
130	126	-4
1,100	1,092	-8
520	501	-19
5	0	-5
430	420	-10

Stillwater and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	382	46	296	29.5	C	14.6	B	31.6	C
	Thru	1,532	60	530	10.9	B				
	Right	0	41	232	33.3	C				
Southbound	Thru	1,007	357	964	62.9	E	49.3	D		
	Right	467	8	75	19.9	B				
Westbound	Left	211	49	148	66.2	E	56.7	E		
	Thru	0	#N/A	#N/A	0.0	A				
	Right	48	4	70	14.8	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
445	382	-63
1,570	1,532	-38
0	0	0
1,025	1,007	-18
475	467	-8
205	211	6
5	0	-5
50	48	-2

Manning and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	81	8	75	19.9	B	27.9	C	26.4	C
	Thru	157	41	232	33.3	C				
	Right	90	49	247	25.8	C				
Southbound	Left	271	33	208	24.9	C	17.8	B		
	Thru	143	25	241	26.2	C				
	Right	743	55	471	13.6	B				
Eastbound	Left	664	77	287	38.1	D	34.7	C		
	Thru	219	46	264	31.0	C				
	Right	109	56	283	21.4	C				
Westbound	Left	92	31	129	64.1	E	28.5	C		
	Thru	129	29	151	40.3	D				
	Right	379	34	194	15.9	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
85	81	-4
155	157	2
90	90	0
280	271	-9
155	143	-12
760	743	-17
670	664	-6
215	219	4
115	109	-6
95	92	-3
140	129	-11
380	379	-1

Manning and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	5	0	12	14.5	B	19.2	B	37.0	D
	Thru	879	65	424	19.3	B				
Southbound	Thru	1,584	99	517	47.3	D	47.2	D		
	Right	21	0	55	37.2	D				
Eastbound	Left	10	2	28	41.7	D	25.2	C		
	Right	19	2	48	16.5	B				
Westbound	Left	228	36	203	32.0	C	36.4	D		
	Thru	5	0	13	23.8	C				
	Right	626	190	611	38.1	D				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
5	5	0
880	879	-1
1,610	1,584	-26
20	21	1
10	10	0
20	19	-1
235	228	-7
5	5	0
650	626	-24

CR 15B and Central Commons

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	551	17	223	8.7	A	7.1	A	9.3	A
	Right	170	0	38	1.9	A				
Eastbound	Thru	46	2	34	13.8	B	15.7	B		
	Right	534	60	276	15.9	B				
Westbound	Left	336	2	79	4.3	A	3.9	A		
	Thru	50	0	0	1.2	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
550	551	1
165	170	5
45	46	1
540	534	-6
330	336	6
65	50	-15

Year 2035 with Connection (Split Timing Removed, WBR Overlap Added) VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 A.M. Peak Hour



Stillwater Blvd & 55th St

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	72	3	58	12	B	26.0	D	16.5	C
	Thru	1,326	250	813	26.7	D				
Southbound	Thru	860	0	0	0.3	A	0.3	A		
	Right	30	0	0	0.9	A				
Eastbound	Left	21	10	96	74.6	F	39.7	E		
	Right	25	2	102	10.4	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
70	72	2
1,330	1,326	-4
840	860	20
30	30	0
20	21	1
25	25	0

CSAH 15 & School RIRO Access

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	807	323	587	8.6	A	34.1	D	20.2	C
	Right	542	382	642	72.0	F				
Southbound	Thru	892	0	0	0.8	A	0.8	A		
Westbound	Right	137	21	145	10.1	B	10.1	B		

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
820	807	-13
530	542	12
870	892	22
135	137	2

58th Street & Memorial Avenue

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	0	-	-	0.0	A	11.1	B	2.8	A
	Thru	9	7	85	23.9	C				
	Right	111	11	110	10.0	B				
Southbound	Left	7	2	50	30.6	D	27.6	D		
	Thru	4	3	52	22.2	C				
	Right	0	-	-	0.0	A				
Eastbound	Left	0	-	-	0.0	A	0.8	A		
	Thru	256	0	0	0.8	A				
	Right	5	0	0	1.5	A				
Westbound	Left	124	0	35	1.9	A	1.0	A		
	Thru	246	0	0	0.5	A				
	Right	16	0	0	1.0	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
0	0	0
10	9	-1
110	111	1
5	7	2
5	4	-1
0	0	0
0	0	0
255	256	1
5	5	0
125	124	-1
255	246	-9
15	16	1

CSAH 15 & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	U-turn	59	72	324	60	E	56.1	E	44.7	D
	Left	114	63	298	61.6	E				
	Thru	570	194	599	66.8	E				
	Right	188	20	153	18.8	B				
Southbound	Left	604	240	589	59.7	E	35.5	D		
	Thru	478	37	198	23.0	C				
	Right	327	12	144	9.1	A				
Eastbound	Left	178	134	401	55.0	E	51.9	D		
	Thru	149	182	466	83.4	F				
	Right	158	169	455	18.7	B				
Westbound	Left	202	125	289	70.5	E	42.6	D		
	Thru	108	134	304	76.4	E				
	Right	278	152	323	9.2	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
60	59	-1
120	114	-6
585	570	-15
190	188	-2
595	604	9
475	478	3
335	327	-8
210	178	-32
140	149	9
140	158	18
200	202	2
105	108	3
290	278	-12

Neal Ave & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	190	24	163	21	C	17.3	B	18.3	B
	Thru	13	29	159	11.3	B				
	Right	52	30	196	5.1	A				
Southbound	Left	7	6	85	14.2	B	13.7	B		
	Thru	39	8	84	14.1	B				
	Right	119	15	116	13.5	B				
Eastbound	Left	177	32	162	11.2	B	15.6	B		
	Thru	270	40	174	33.2	C				
	Right	493	6	147	7.5	A				
Westbound	Left	187	25	196	15.6	B	25.7	C		
	Thru	286	41	199	32.6	C				
	Right	6	54	208	12.7	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
185	190	5
15	13	-2
55	52	-3
5	7	2
40	39	-1
120	119	-1
180	177	-3
275	270	-5
475	493	18
185	187	2
290	286	-4
5	6	1

Year 2035 with Connection (Split Timing Removed, WBR Overlap Added) VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 A.M. Peak Hour



Stillwater and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	864	15	161	5.6	A	5.2	A	12.3	B
	Right	159	2	97	3.0	A				
Southbound	Left	50	1	35	10.9	B	3.0	A		
	Thru	945	5	74	2.6	A				
Eastbound	Left	284	45	172	45.6	D	34.5	C		
	Thru	0	#N/A		0.0	A				
	Right	459	120	493	27.6	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
930	864	-66
155	159	4
45	50	5
955	945	-10
295	284	-11
5	0	-5
450	459	9

Stillwater and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	344	47	269	28.5	C	13.4	B	18.8	B
	Thru	795	32	246	6.9	A				
	Right	0	27	154	31.3	C				
Southbound	Thru	753	61	307	19.8	B	19.0	B		
	Right	428	7	73	17.5	B				
Westbound	Left	235	44	156	45.7	D	39.2	D		
	Right	50	3	74	8.5	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
395	344	-51
835	795	-40
0	0	0
770	753	-17
425	428	3
235	235	0
55	50	-5

Manning and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	59	7	73	17.5	B	24.9	C	20.1	C
	Thru	119	27	154	31.3	C				
	Right	59	32	163	19.4	B				
Southbound	Left	282	47	271	29.5	C	15.8	B		
	Thru	76	8	82	22.0	C				
	Right	539	16	249	7.8	A				
Eastbound	Left	487	40	179	25.7	C	23.0	C		
	Thru	183	17	150	18.6	B				
	Right	49	23	170	12.2	B				
Westbound	Left	45	9	62	45.3	D	21.5	C		
	Thru	119	24	140	35.7	D				
	Right	249	14	132	10.4	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
60	59	-1
115	119	4
60	59	-1
280	282	2
75	76	1
535	539	4
495	487	-8
180	183	3
50	49	-1
45	45	0
125	119	-6
250	249	-1

Manning and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	7	1	26	11.5	B	17.9	B	27.5	C
	Thru	608	52	347	18.0	B				
Southbound	Thru	1,375	52	374	31.2	C	31.2	C		
	Right	11	0	40	29.7	C				
Eastbound	Left	0	-	-	0.0	A	12.9	B		
	Right	8	1	48	12.9	B				
Westbound	Left	185	28	163	28.4	C	28.5	C		
	Thru	9	2	25	20.5	C				
	Right	562	122	459	28.7	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
5	7	2
630	608	-22
1,385	1,375	-10
10	11	1
0	0	0
5	8	3
185	185	0
10	9	-1
575	562	-13

CR 15B and Central Commons

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	393	11	156	7.3	A	6.2	A	8.6	A
	Right	96	0	31	1.5	A				
Eastbound	Thru	68	3	47	12.5	B	13.5	B		
	Right	455	44	237	13.7	B				
Westbound	Left	226	1	59	3.0	A	2.8	A		
	Thru	19	0	0	0.5	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
395	393	-2
98	96	-2
65	68	3
455	455	0
230	226	-4
25	19	-6

Year 2035 with Connection (Split Timing Removed, WBR Overlap Added) VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 P.M. Peak Hour



Stillwater Blvd & 55th St

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	54	3	45	13	B	0.9	A	2.4	A
	Thru	1,373	0	0	0.4	A				
Southbound	Thru	1,208	0	0	0.5	A	0.5	A		
	Right	58	0	0	1.1	A				
Eastbound	Left	25	26	112	144.0	F	48.2	E		
	Right	75	7	118	16.3	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
55	54	-1
1,375	1,373	-2
1,230	1,208	-22
60	58	-2
30	25	-5
75	75	0

CSAH 15 & School RIRO Access

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	1,332	4	49	2.0	A	1.9	A	1.8	A
	Right	65	0	0	1.1	A				
Southbound	Thru	1,268	0	0	1.1	A	1.1	A		
Westbound	Right	53	6	82	16.5	C	16.5	C		

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
1,340	1,332	-8
65	65	0
1,290	1,268	-22
55	53	-2

58th Street & Memorial Avenue

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	0	-	-	0.0	A	19.9	C	6.8	A
	Thru	10	21	135	39.1	E				
	Right	191	31	163	18.9	C				
Southbound	Left	20	9	50	70.0	F	66.8	F		
	Thru	5	7	52	53.8	F				
	Right	0	-	-	0.0	A				
Eastbound	Left	0	-	-	0.0	A	2.6	A		
	Thru	372	1	18	2.6	A				
	Right	0	-	-	0.0	A				
Westbound	Left	104	2	48	4.7	A	1.6	A		
	Thru	379	0	0	0.7	A				
	Right	15	0	0	1.0	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
0	0	0
10	10	0
195	191	-4
20	20	0
5	5	0
0	0	0
0	0	0
375	372	-3
0	0	0
110	104	-6
395	379	-16
15	15	0

CSAH 15 & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	U-turn	23	102	312	89	F	62.3	E	52.8	D
	Left	174	102	312	92.4	F				
	Thru	887	269	677	68.1	E				
	Right	273	29	185	22.2	C				
Southbound	Left	398	105	290	69.0	E	40.4	D		
	Thru	773	110	474	37.7	D				
	Right	325	18	153	11.8	B				
Eastbound	Left	402	280	684	80.0	F	63.7	E		
	Thru	164	281	686	69.4	E				
	Right	182	294	707	22.4	C				
Westbound	Left	290	175	373	79.2	E	50.1	D		
	Thru	148	174	372	79.7	E				
	Right	460	207	407	22.1	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
25	23	-2
180	174	-6
915	887	-28
275	273	-2
410	398	-12
785	773	-12
335	325	-10
435	402	-33
150	164	14
170	182	12
310	290	-20
150	148	-2
490	460	-30

Neal Ave & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	86	9	77	21	C	18.3	B	16.5	B
	Thru	10	9	76	18.3	B				
	Right	20	7	91	5.8	A				
Southbound	Left	25	22	149	19.9	B	16.8	B		
	Thru	13	23	151	20.5	C				
	Right	300	30	173	16.4	B				
Eastbound	Left	296	32	179	16.1	B	10.0	B		
	Thru	482	32	178	7.3	A				
	Right	54	0	0	0.8	A				
Westbound	Left	24	2	36	20.6	C	25.3	C		
	Thru	523	156	367	25.9	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
85	86	1
10	10	0
20	20	0
25	25	0
15	13	-2
300	300	0
300	296	-4
480	482	2
55	54	-1
25	24	-1
565	523	-42

Year 2035 with Connection (Split Timing Removed, WBR Overlap Added) VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 P.M. Peak Hour



Stillwater and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	1,411	57	347	12.2	B	10.7	B	16.3	B
	Right	334	8	137	4.4	A				
Southbound	Left	125	18	175	32.5	C	4.9	A		
	Thru	1,090	2	96	1.7	A				
Eastbound	Left	501	97	323	58.0	E	42.1	D		
	Thru	0	#N/A		0.0	A				
	Right	420	72	346	23.2	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
1,495	1,411	-84
345	334	-11
130	125	-5
1,100	1,090	-10
520	501	-19
5	0	-5
430	420	-10

Stillwater and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	379	46	293	29.5	C	14.6	B	34.1	C
	Thru	1,524	61	527	10.9	B				
	Right	0	41	231	33.2	C				
Southbound	Thru	1,004	425	1,055	72.1	E	55.5	E		
	Right	467	8	72	19.6	B				
Westbound	Left	211	49	148	66.3	E	56.6	E		
	Thru	0	#N/A	#N/A	0.0	A				
	Right	48	4	69	14.1	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
445	379	-66
1,570	1,524	-46
0	0	0
1,025	1,004	-21
475	467	-8
205	211	6
5	0	-5
50	48	-2

Manning and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	80	8	72	19.6	B	27.7	C	26.4	C
	Thru	157	41	231	33.2	C				
	Right	90	48	246	25.5	C				
Southbound	Left	271	32	206	24.8	C	17.7	B		
	Thru	144	24	226	25.5	C				
	Right	744	52	461	13.6	B				
Eastbound	Left	664	78	284	38.6	D	35.1	D		
	Thru	219	46	268	31.1	C				
	Right	109	56	288	21.5	C				
Westbound	Left	92	30	128	63.3	E	28.4	C		
	Thru	129	29	149	40.4	D				
	Right	376	33	200	15.7	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
85	80	-5
155	157	2
90	90	0
280	271	-9
155	144	-11
760	744	-16
670	664	-6
215	219	4
115	109	-6
95	92	-3
140	129	-11
380	376	-4

Manning and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	5	0	10	12.5	B	19.1	B	36.9	D
	Thru	878	64	402	19.1	B				
Southbound	Thru	1,583	92	460	47.1	D	47.0	D		
	Right	21	0	55	37.4	D				
Eastbound	Left	10	2	27	41.4	D	26.1	C		
	Right	19	2	48	18.0	B				
Westbound	Left	227	36	208	32.8	C	36.7	D		
	Thru	5	0	13	25.0	C				
	Right	624	194	640	38.3	D				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
5	5	0
880	878	-2
1,610	1,583	-27
20	21	1
10	10	0
20	19	-1
235	227	-8
5	5	0
650	624	-26

CR 15B and Central Commons

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	551	18	225	8.8	A	7.2	A	9.2	A
	Right	170	1	37	1.9	A				
Eastbound	Thru	47	2	34	13.7	B	15.0	B		
	Right	534	56	259	15.1	B				
Westbound	Left	332	2	85	4.3	A	3.9	A		
	Thru	48	0	0	1.4	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
550	551	1
165	170	5
45	47	2
540	534	-6
330	332	2
65	48	-17

Year 2035 Mid-Term Improvements VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 A.M. Peak Hour



Stillwater Blvd & 55th St

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	72	3	46	12	B	26.0	D	16.3	C
	Thru	1,326	254	811	26.7	D				
Southbound	Thru	868	0	0	0.3	A	0.3	A		
	Right	31	0	0	1.0	A				
Eastbound	Left	21	9	95	71.0	F	37.6	E		
	Right	25	2	102	9.5	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
70	72	2
1,330	1,326	-4
840	868	28
30	31	1
20	21	1
25	25	0

CSAH 15 & School RIRO Access

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	808	327	577	8.2	A	33.9	D	20.0	C
	Right	541	382	634	72.4	F				
Southbound	Thru	898	0	0	0.8	A	0.8	A		
Westbound	Right	137	20	144	9.1	A	9.1	A		

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
820	808	-12
530	541	11
870	898	28
135	137	2

58th Street & Memorial Avenue

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	9	1	41	2.1	A	2.2	A	2.0	A
	Right	111	1	39	2.2	A				
Southbound	Left	7	0	19	2.1	A	2.2	A		
	Thru	4	0	26	2.4	A				
Eastbound	Thru	257	1	55	2.4	A	2.4	A		
	Right	5	1	55	3.4	A				
Westbound	Left	124	0	6	1.8	A	1.7	A		
	Thru	245	0	6	1.7	A				
	Right	15	0	7	1.6	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
10	9	-1
110	111	1
5	7	2
5	4	-1
255	257	2
5	5	0
125	124	-1
255	245	-10
15	15	0

CSAH 15 & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	U-turn	58	69	289	56	E	45.7	D	36.6	D
	Left	113	60	259	53.6	D				
	Thru	568	146	486	53.3	D				
	Right	188	18	144	14.9	B				
Southbound	Left	604	198	531	50.0	D	30.8	C		
	Thru	473	33	194	20.9	C				
	Right	326	16	170	9.6	A				
Eastbound	Left	181	86	304	51.0	D	42.6	D		
	Thru	150	120	370	61.9	E				
	Right	158	115	353	14.5	B				
Westbound	Left	207	64	176	52.0	D	31.2	C		
	Thru	110	67	183	47.8	D				
	Right	277	80	196	9.1	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
60	58	-2
120	113	-7
585	568	-17
190	188	-2
595	604	9
475	473	-2
335	326	-9
210	181	-29
140	150	10
140	158	18
200	207	7
105	110	5
290	277	-13

Neal Ave & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	188	50	212	36	D	29.0	C	13.5	B
	Thru	13	58	231	17.8	B				
	Right	52	62	246	6.2	A				
Southbound	Left	7	10	89	25.1	C	14.2	B		
	Thru	38	9	83	27.8	C				
	Right	118	14	110	9.2	A				
Eastbound	Left	177	16	132	10.0	B	9.8	A		
	Thru	270	20	131	12.4	B				
	Right	494	8	153	8.3	A				
Westbound	Left	187	20	187	13.2	B	12.6	B		
	Thru	287	17	143	12.2	B				
	Right	6	26	168	9.2	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
185	188	3
15	13	-2
55	52	-3
5	7	2
40	38	-2
120	118	-2
180	177	-3
275	270	-5
475	494	19
185	187	2
290	287	-3
5	6	1

Year 2035 Mid-Term Improvements VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 A.M. Peak Hour



Stillwater and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	864	10	141	4.4	A	4.2	A	11.7	B
	Right	158	2	95	2.8	A				
Southbound	Left	49	1	36	10.0	A	2.0	A		
	Thru	941	1	61	1.6	A				
Eastbound	Left	285	46	173	46.5	D	34.9	C		
	Thru	0	#N/A		0.0	A				
	Right	460	118	471	27.7	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
930	864	-66
155	158	3
45	49	4
955	941	-14
295	285	-10
5	0	-5
450	460	10

Stillwater and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	344	35	249	23.1	C	13.6	B	18.3	B
	Thru	788	33	282	9.5	A				
	Right	0	17	150	18.6	B				
Southbound	Thru	751	62	323	20.3	C	17.3	B		
	Right	429	23	169	12.2	B				
Westbound	Left	243	44	147	46.4	D	40.0	D		
	Right	49	3	71	8.5	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
395	344	-51
835	788	-47
0	0	0
770	751	-19
425	429	4
235	243	8
55	49	-6

Manning and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	59	7	75	17.4	B	25.0	C	20.2	C
	Thru	119	27	157	31.5	C				
	Right	59	32	167	19.5	B				
Southbound	Left	282	50	277	30.4	C	16.2	B		
	Thru	76	8	82	23.0	C				
	Right	539	17	253	7.7	A				
Eastbound	Left	487	39	177	25.6	C	22.9	C		
	Thru	183	17	150	18.6	B				
	Right	49	23	169	12.2	B				
Westbound	Left	44	9	64	47.1	D	21.5	C		
	Thru	120	24	135	35.1	D				
	Right	249	14	135	10.4	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
60	59	-1
115	119	4
60	59	-1
280	282	2
75	76	1
535	539	4
495	487	-8
180	183	3
50	49	-1
45	44	-1
125	120	-5
250	249	-1

Manning and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	7	1	28	12.0	B	18.0	B	27.4	C
	Thru	609	51	339	18.0	B				
Southbound	Thru	1,376	53	366	31.5	C	31.5	C		
	Right	11	0	43	30.0	C				
Eastbound	Left	0	-	-	0.0	A	13.4	B		
	Right	8	1	48	13.4	B				
Westbound	Left	184	27	165	28.1	C	27.8	C		
	Thru	9	2	27	18.4	B				
	Right	563	118	452	27.9	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
5	7	2
630	609	-21
1,385	1,376	-9
10	11	1
0	0	0
5	8	3
185	184	-1
10	9	-1
575	563	-12

CR 15B and Central Commons

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	394	11	162	7.4	A	6.2	A	8.5	A
	Right	96	0	33	1.5	A				
Eastbound	Thru	68	3	48	12.4	B	13.5	B		
	Right	455	44	235	13.6	B				
Westbound	Left	224	1	53	2.6	A	2.5	A		
	Thru	18	0	0	0.5	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
395	394	-1
98	96	-2
65	68	3
455	455	0
230	224	-6
25	18	-7

Year 2035 Mid-Term Improvements VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 P.M. Peak Hour



Stillwater Blvd & 55th St

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	54	3	41	12	B	0.9	A	2.4	A
	Thru	1,373	0	0	0.4	A				
Southbound	Thru	1,233	0	0	0.5	A	0.5	A		
	Right	60	0	0	1.1	A				
Eastbound	Left	26	24	105	141.0	F	47.9	E		
	Right	75	7	113	15.6	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
55	54	-1
1,375	1,373	-2
1,230	1,233	3
60	60	0
30	26	-4
75	75	0

CSAH 15 & School RIRO Access

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	1,332	0	3	0.4	A	0.4	A	0.9	A
	Right	66	0	4	1.0	A				
Southbound	Thru	1,295	0	0	1.1	A	1.1	A		
Westbound	Right	53	4	81	10.3	B	10.3	B		

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
1,340	1,332	-8
65	66	1
1,290	1,295	5
55	53	-2

58th Street & Memorial Avenue

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	0	-	-	0.0	A	3.5	A	2.6	A
	Thru	10	2	64	2.5	A				
	Right	193	2	65	3.6	A				
Southbound	Left	19	0	21	4.1	A	3.9	A		
	Thru	5	0	22	3.3	A				
	Right	0	-	-	0.0	A				
Eastbound	Thru	372	1	66	2.6	A	2.6	A		
	Right	0	-	-	0.0	A				
Westbound	Left	106	0	17	2.2	A	2.3	A		
	Thru	386	0	17	2.3	A				
	Right	16	0	17	1.9	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
0	0	0
10	10	0
195	193	-2
20	19	-1
5	5	0
0	0	0
375	372	-3
0	0	0
110	106	-4
395	386	-9
15	16	1

CSAH 15 & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	U-turn	24	72	263	59	E	42.3	D	36.2	D
	Left	178	72	263	63.0	E				
	Thru	898	160	510	47.0	D				
	Right	273	19	139	12.0	B				
Southbound	Left	407	57	239	38.3	D	24.0	C		
	Thru	786	61	359	22.5	C				
	Right	329	15	185	9.8	A				
Eastbound	Left	406	107	311	58.8	E	45.9	D		
	Thru	160	107	312	50.4	D				
	Right	182	125	338	13.2	B				
Westbound	Left	312	106	242	52.6	D	39.4	D		
	Thru	151	106	242	55.7	E				
	Right	478	126	265	25.7	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
25	24	-1
180	178	-2
915	898	-17
275	273	-2
410	407	-3
785	786	1
335	329	-6
435	406	-29
150	160	10
170	182	12
310	312	2
150	151	1
490	478	-12

Neal Ave & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	86	14	84	29	C	24.4	C	12.4	B
	Thru	10	14	83	20.8	C				
	Right	20	11	97	6.3	A				
Southbound	Left	25	23	140	36.4	D	18.2	B		
	Thru	14	23	140	31.0	C				
	Right	300	33	166	16.0	B				
Eastbound	Left	298	18	160	13.2	B	6.7	A		
	Thru	486	18	159	3.4	A				
	Right	55	0	0	0.7	A				
Westbound	Left	24	1	29	8.4	A	14.7	B		
	Thru	561	42	274	15.0	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
85	86	1
10	10	0
20	20	0
25	25	0
15	14	-1
300	300	0
300	298	-2
480	486	6
55	55	0
25	24	-1
565	561	-4

Year 2035 Mid-Term Improvements VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 P.M. Peak Hour



Stillwater and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	1,436	66	409	13.1	B	11.6	B	16.9	B
	Right	339	9	149	5.1	A				
Southbound	Left	128	17	143	32.2	C	10.0	A		
	Thru	1,099	22	224	7.4	A				
Eastbound	Left	494	79	254	48.3	D	36.5	D		
	Thru	0	#N/A		0.0	A				
	Right	420	68	297	22.7	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
1,495	1,436	-59
345	339	-6
130	128	-2
1,100	1,099	-1
520	494	-26
5	0	-5
430	420	-10

Stillwater and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	389	29	225	19.7	B	5.6	A	21.1	C
	Thru	1,539	8	129	2.1	A				
	Right	0	46	265	30.8	C				
Southbound	Thru	1,011	201	684	43.5	D	36.5	D		
	Right	468	56	284	21.4	C				
Westbound	Left	213	43	141	56.3	E	48.0	D		
	Right	50	4	70	12.9	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
445	389	-56
1,570	1,539	-31
0	0	0
1,025	1,011	-14
475	468	-7
205	213	8
50	50	0

Manning and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	80	8	74	19.5	B	28.2	C	26.6	C
	Thru	157	41	234	33.9	C				
	Right	90	49	248	25.9	C				
Southbound	Left	273	33	208	24.8	C	17.7	B		
	Thru	143	25	241	25.8	C				
	Right	743	54	470	13.5	B				
Eastbound	Left	664	81	297	39.5	D	35.6	D		
	Thru	218	46	265	30.8	C				
	Right	109	56	284	21.4	C				
Westbound	Left	92	30	130	62.5	E	27.9	C		
	Thru	128	28	148	39.3	D				
	Right	377	33	202	15.6	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
85	80	-5
155	157	2
90	90	0
280	273	-7
155	143	-12
760	743	-17
670	664	-6
215	218	3
115	109	-6
95	92	-3
140	128	-12
380	377	-3

Manning and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	5	0	10	10.1	B	19.4	B	36.4	D
	Thru	878	66	419	19.4	B				
Southbound	Thru	1,582	95	486	47.1	D	47.0	D		
	Right	21	0	55	37.2	D				
Eastbound	Left	10	2	27	39.9	D	25.5	C		
	Right	19	2	48	17.9	B				
Westbound	Left	228	35	204	30.7	C	34.6	C		
	Thru	4	0	12	21.5	C				
	Right	627	169	574	36.1	D				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
5	5	0
880	878	-2
1,610	1,582	-28
20	21	1
10	10	0
20	19	-1
235	228	-7
5	4	-1
650	627	-23

CR 15B and Central Commons

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	550	17	228	8.5	A	6.9	A	9.0	A
	Right	170	0	34	1.8	A				
Eastbound	Thru	46	2	35	14.6	B	15.3	B		
	Right	535	57	268	15.3	B				
Westbound	Left	335	2	74	3.6	A	3.3	A		
	Thru	49	0	0	0.9	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
550	550	0
165	170	5
45	46	1
540	535	-5
330	335	5
65	49	-16

D. Future Year 2035 Detailed Traffic Operations Analysis

Year 2045 Mid-Term Improvements VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 A.M. Peak Hour



Stillwater Blvd & 55th St

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	76	3	69	27	D	50.5	F	31.8	D
	Thru	1,466	539	1,162	51.7	F				
Southbound	Thru	954	0	0	0.3	A	0.3	A		
	Right	36	0	0	1.0	A				
Eastbound	Left	19	24	105	185.5	F	78.4	F		
	Right	31	3	105	12.8	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
70	76	6
1,330	1,466	136
840	954	114
30	36	6
20	19	-1
25	31	6

CSAH 15 & School RIRO Access

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	903	390	730	18.6	C	41.2	E	24.5	C
	Right	584	424	706	76.2	F				
Southbound	Thru	991	0	0	0.9	A	0.9	A		
Westbound	Right	141	28	166	14.8	B	14.8	B		

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
820	903	83
530	584	54
870	991	121
135	141	6

58th Street & Memorial Avenue

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	13	1	52	1.9	A	2.3	A	2.1	A
	Right	120	1	50	2.3	A				
Southbound	Left	9	0	25	2.6	A	2.7	A		
	Thru	9	1	43	2.8	A				
Eastbound	Thru	258	1	49	2.4	A	2.4	A		
	Right	5	1	49	1.8	A				
Westbound	Left	129	0	17	1.8	A	1.7	A		
	Thru	251	0	15	1.7	A				
	Right	18	0	21	2.0	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
10	13	3
110	120	10
5	9	4
5	9	4
255	258	3
5	5	0
125	129	4
255	251	-4
15	18	3

CSAH 15 & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	U-turn	63	83	362	65	E	64.7	E	46.0	D
	Left	130	71	317	66.9	E				
	Thru	633	297	727	76.5	E				
	Right	201	24	181	26.0	C				
Southbound	Left	631	262	640	61.3	E	38.1	D		
	Thru	511	55	291	26.4	C				
	Right	338	22	205	12.6	B				
Eastbound	Left	180	108	337	53.9	D	47.5	D		
	Thru	163	160	440	70.1	E				
	Right	166	146	393	18.5	B				
Westbound	Left	252	72	208	52.2	D	33.1	C		
	Thru	107	76	220	49.5	D				
	Right	286	88	228	10.1	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
60	63	3
120	130	10
585	633	48
190	201	11
595	631	36
475	511	36
335	338	3
210	180	-30
140	163	23
140	166	26
200	252	52
105	107	2
290	286	-4

Neal Ave & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	197	57	223	38	D	29.7	C	14.2	B
	Thru	21	55	234	16.3	B				
	Right	56	73	259	6.2	A				
Southbound	Left	9	12	105	28.2	C	14.7	B		
	Thru	43	11	93	28.0	C				
	Right	129	17	122	9.3	A				
Eastbound	Left	191	17	144	10.5	B	9.9	A		
	Thru	279	20	138	12.4	B				
	Right	525	7	146	8.4	A				
Westbound	Left	200	25	213	14.8	B	13.9	B		
	Thru	321	20	148	13.5	B				
	Right	10	30	172	10.8	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
185	197	12
15	21	6
55	56	1
5	9	4
40	43	3
120	129	9
180	191	11
275	279	4
475	525	50
185	200	15
290	321	31
5	10	5

Year 2045 Mid-Term Improvements VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 A.M. Peak Hour



Stillwater and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	921	19	174	6.6	A	6.0	A	13.6	B
	Right	175	2	94	2.9	A				
Southbound	Left	50	1	43	11.9	B	2.9	A		
	Thru	985	4	131	2.5	A				
Eastbound	Left	313	49	180	47.6	D	37.7	D		
	Thru	0	#N/A		0.0	A				
	Right	492	161	599	31.4	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
930	921	-9
155	175	20
45	50	5
955	985	30
295	313	18
5	0	-5
450	492	42

Stillwater and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	414	116	385	43.4	D	22.2	C	21.9	C
	Thru	807	104	375	11.3	B				
	Right	0	18	160	19.0	B				
Southbound	Thru	793	67	338	20.7	C	17.6	B		
	Right	496	25	180	12.6	B				
Westbound	Left	245	44	160	45.7	D	39.1	D		
	Right	56	4	78	10.0	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
395	414	19
835	807	-28
0	0	0
770	793	23
425	496	71
235	245	10
55	56	1

Manning and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	65	7	79	18.2	B	24.5	C	19.9	B
	Thru	119	27	161	30.7	C				
	Right	59	31	168	18.9	B				
Southbound	Left	276	46	257	29.3	C	15.8	B		
	Thru	76	8	88	24.0	C				
	Right	557	18	262	7.9	A				
Eastbound	Left	494	38	172	24.6	C	22.3	C		
	Thru	184	18	160	19.0	B				
	Right	56	25	180	12.6	B				
Westbound	Left	49	11	73	50.7	D	22.2	C		
	Thru	117	23	135	35.0	C				
	Right	253	15	134	10.7	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
60	65	5
115	119	4
60	59	-1
280	276	-4
75	76	1
535	557	22
495	494	-1
180	184	4
50	56	6
45	49	4
125	117	-8
250	253	3

Manning and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	9	1	42	14.1	B	17.4	B	28.1	C
	Thru	620	50	343	17.5	B				
Southbound	Thru	1,439	70	418	33.2	C	33.1	C		
	Right	16	0	59	27.8	C				
Eastbound	Left	0	-	-	0.0	A	14.8	B		
	Right	12	1	50	14.8	B				
Westbound	Left	187	28	167	28.4	C	27.4	C		
	Thru	14	2	42	21.2	C				
	Right	552	112	424	27.2	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
5	9	4
630	620	-10
1,385	1,439	54
10	16	6
0	0	0
5	12	7
185	187	2
10	14	4
575	552	-23

CR 15B and Central Commons

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	399	12	175	7.6	A	6.4	A	8.2	A
	Right	98	0	28	1.4	A				
Eastbound	Thru	70	3	49	12.2	B	12.7	B		
	Right	448	39	225	12.7	B				
Westbound	Left	230	1	47	2.6	A	2.4	A		
	Thru	21	0	0	0.4	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
395	399	4
98	98	0
65	70	5
455	448	-7
230	230	0
25	21	-4

Year 2045 Mid-Term Improvements VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 P.M. Peak Hour



Stillwater Blvd & 55th St

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	57	3	49	14	B	1.0	A	3.5	A
	Thru	1,474	0	0	0.5	A				
Southbound	Thru	1,357	0	0	0.6	A	0.6	A		
	Right	63	0	0	1.2	A				
Eastbound	Left	32	45	150	190.2	F	72.2	F		
	Right	81	15	132	25.5	D				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
60	57	-3
1,475	1,474	-1
1,360	1,357	-3
65	63	-2
35	32	-3
80	81	1

CSAH 15 & School RIRO Access

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	1,433	9	88	3.5	A	3.4	A	2.8	A
	Right	70	10	92	1.2	A				
Southbound	Thru	1,423	0	0	1.3	A	1.3	A		
Westbound	Right	57	8	88	21.5	C	21.5	C		

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
1,440	1,433	-7
70	70	0
1,425	1,423	-2
60	57	-3

58th Street & Memorial Avenue

2-Way Stop

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	6	3	80	5.4	A	4.1	A	3.0	A
	Thru	16	3	77	3.4	A				
	Right	202	3	80	4.1	A				
Southbound	Left	25	0	27	4.2	A	4.0	A		
	Thru	10	0	28	3.6	A				
	Right	0	-	-	0.0	A				
Eastbound	Thru	376	1	54	2.8	A	2.8	A		
	Right	0	-	-	0.0	A				
Westbound	Left	120	0	28	2.5	A	2.5	A		
	Thru	400	0	28	2.5	A				
	Right	21	0	28	2.4	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
5	6	1
15	16	1
205	202	-3
25	25	0
10	10	0
0	0	0
385	376	-9
0	0	0
120	120	0
405	400	-5
20	21	1

CSAH 15 & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	U-turn	29	88	294	81	F	59.9	E	46.0	D
	Left	187	88	296	78.3	E				
	Thru	969	306	715	66.5	E				
	Right	295	29	182	24.5	C				
Southbound	Left	427	82	281	51.0	D	34.6	C		
	Thru	876	121	521	34.6	C				
	Right	333	22	212	13.7	B				
Eastbound	Left	423	111	332	58.3	E	45.5	D		
	Thru	168	111	332	49.3	D				
	Right	191	128	357	13.9	B				
Westbound	Left	340	132	329	51.7	D	44.3	D		
	Thru	165	131	328	60.6	E				
	Right	513	152	351	34.1	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
30	29	-1
190	187	-3
985	969	-16
295	295	0
430	427	-3
880	876	-4
340	333	-7
460	423	-37
160	168	8
180	191	11
335	340	5
165	165	0
530	513	-17

Neal Ave & 58th Street

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	89	15	95	29	C	24.1	C	15.2	B
	Thru	14	15	93	24.3	C				
	Right	26	13	106	6.9	A				
Southbound	Left	29	32	171	31.5	C	21.1	C		
	Thru	20	33	171	31.7	C				
	Right	320	44	197	19.5	B				
Eastbound	Left	320	26	180	17.0	B	8.6	A		
	Thru	507	26	180	4.1	A				
	Right	57	0	0	0.8	A				
Westbound	Left	29	1	32	9.4	A	18.8	B		
	Thru	615	62	323	19.2	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
90	89	-1
15	14	-1
25	26	1
30	29	-1
20	20	0
320	320	0
325	320	-5
500	507	7
60	57	-3
30	29	-1
620	615	-5

Year 2045 Mid-Term Improvements VISSIM Analysis
 Stillwater Blvd/CSAH 15 Extension
 P.M. Peak Hour



Stillwater and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Thru	1,550	91	490	15.8	B	13.9	B	18.7	B
	Right	342	10	138	5.4	A				
Southbound	Left	139	21	164	34.8	C	10.7	B		
	Thru	1,176	26	275	7.8	A				
Eastbound	Left	517	84	271	49.4	D	38.9	D		
	Right	455	91	396	26.9	C				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
1,625	1,550	-75
350	342	-8
140	139	-1
1,185	1,176	-9
545	517	-28
465	455	-10

Stillwater and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	446	46	251	24.4	C	7.4	A	27.8	C
	Thru	1,617	14	182	2.7	A				
Southbound	Thru	1,088	435	1,040	64.2	E	50.5	D		
	Right	516	56	294	21.6	C				
Westbound	Left	222	44	143	56.5	E	48.2	D		
	Right	54	5	73	14.1	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
510	446	-64
1,660	1,617	-43
1,110	1,088	-22
525	516	-9
215	222	7
55	54	-1

Manning and TH 36 South Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	84	8	78	18.9	B	28.4	C	26.7	C
	Thru	162	42	226	35.0	D				
	Right	90	50	240	25.3	C				
Southbound	Left	272	32	212	24.6	C	18.5	B		
	Thru	151	25	226	26.0	C				
	Right	749	62	505	14.8	B				
Eastbound	Left	683	81	301	38.8	D	34.9	C		
	Thru	221	46	274	30.0	C				
	Right	118	56	294	21.6	C				
Westbound	Left	92	30	124	62.3	E	27.8	C		
	Thru	127	28	143	40.0	D				
	Right	390	34	202	15.7	B				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
90	84	-6
160	162	2
90	90	0
285	272	-13
160	151	-9
765	749	-16
695	683	-12
215	221	6
120	118	-2
95	92	-3
140	127	-13
390	390	0

Manning and TH 36 North Ramp

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	9	0	11	8.7	A	21.6	C	45.7	D
	Thru	906	76	452	21.7	C				
Southbound	Thru	1,616	147	609	53.9	D	53.8	D		
	Right	27	1	58	45.5	D				
Eastbound	Left	15	3	36	44.8	D	28.3	C		
	Right	22	2	50	17.0	B				
Westbound	Left	230	36	219	40.8	D	55.9	E		
	Thru	10	1	21	33.1	C				
	Right	668	421	959	61.4	E				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
10	9	-1
910	906	-4
1,645	1,616	-29
25	27	2
15	15	0
25	22	-3
240	230	-10
10	10	0
700	668	-32

CR 15B and Central Commons

Signal

Approach	Movement	Volume (vph)	Average Queue (ft)	Maximum Queue (ft)	Movement Delay (sec/veh)	Movement LOS	Approach Delay (sec/veh)	Approach LOS	Overall Delay (sec/veh)	Overall LOS
Northbound	Left	547	20	248	9.4	A	7.6	A	8.9	A
	Right	169	1	43	2.0	A				
Eastbound	Thru	48	2	38	13.4	B	14.4	B		
	Right	533	53	273	14.5	B				
Westbound	Left	339	2	72	3.6	A	3.2	A		
	Thru	63	0	0	0.8	A				

Target Volume (vph)	Simulated Volume (vph)	Difference (vph)
545	547	2
165	169	4
50	48	-2
540	533	-7
330	339	9
80	63	-17