Appendix A-3 Chapter 3: Traffic and Aviation Documents

The Traffic and Aviation Documents are companion documents to the Supplemental Draft Environmental Impact Statement containing Chapter 3 (Transportation). These documents are available online: https://metrocouncil.org/Transportation/Projects/Light-Rail-Projects/METRO-Blue-Line-Extension/Environmental/Supplemental-Draft-EIS.aspx

Documents Included:

Traffic Operations Technical Memorandum September 2022 Draft
Traffic Operations Technical Memorandum December 2022 Crystal
Traffic Operations Technical Memorandum December 2022 East of I-94
Traffic Operations Technical Memorandum September 2022 Final
Crystal Airport Runway Protection Zone Technical Memorandum
Crystal Airport Runway Protection Zone Exhibits
Crystal Airport (MIC) Runway Protection Zone FAA Correspondence
Crystal Airport MnDOT Safety Zones and Clear Zones Exhibit

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To: Nick Landwer, P.E.
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Date: September 15, 2022

Subject: BLRT Traffic Operations Technical Memorandum
Supplemental Draft Environmental Impact Statement

1.0 Introduction

The Blue Line Light Rail Transit Extension (BLRT) project is proposed to be a 13-mile Light Rail Transit (LRT) project with 11 new stations that will operate from downtown Minneapolis through Robbinsdale, Crystal, and Brooklyn Park. The BLRT line will serve as an extension of the METRO Blue Line (Hiawatha Corridor) and will also connect to the METRO Green Line in downtown Minneapolis.

A traffic analysis was previously completed in 2015 for the BLRT alignment that included the BNSF Railway Monticello Subdivision. To advance the project without using railroad right-of-way, a modified route was approved by Hennepin County and the Metropolitan Council in 2022. The traffic analysis presented in this technical memorandum is based on the project scope as presented to the Metropolitan Council through August 2022.

1.1 Purpose of Memorandum

This technical memorandum has been prepared in support of the BLRT project design and the Supplemental Draft Environmental Impact Statement (SDEIS). The objective of the traffic analysis is to evaluate the potential traffic impacts of the project, including:

- Evaluation of the project's impacts on traffic operations at existing and proposed intersections and at-grade rail crossings along or near the BLRT alignment.
- Identification of preliminary improvements to address operational issues identified in the traffic analysis.

The methodology, assumptions, and results of the SDEIS analysis are presented in the following sections.

1.2 Study Areas

The location of the overall BLRT alignment is shown in **Figure 1.1**. The proposed BLRT guideway will be at-grade for most of its alignment and includes segments with the LRT operating in an exclusive guideway, grade-separated guideway, or semi-exclusive street-running operation. The locations of the intersections and at-grade crossings studied as part of the BLRT traffic analysis are shown in **Figure 1.2** - **Figure 1.7**. The analysis was broken into five sections, as shown in **Figure 1.1** and described below:

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FIGURE 1.5
STUDY INTERSECTIONS

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- CSAH 103 (West Broadway)
  - Operations and Maintenance Facility (OMF) to County State Aid Highway (CSAH) 81 (Bottineau Boulevard)/73rd Avenue
  - BLRT alignment side-running north of TH 610
  - BLRT alignment generally center-running along CSAH 103 (West Broadway Avenue)
- CSAH 81 North
  - 73rd Avenue N to TH 100
  - BLRT alignment center-running along CSAH 81 (Bottineau Boulevard)
- CSAH 81 South
  - TH 100 to CSAH 153 (Lowry Avenue)
  - BLRT alignment generally center-running along CSAH 81 (Bottineau Boulevard)
- CSAH 81 (West Broadway)
  - CSAH 153 (Lowry Avenue) to N Lyndale Avenue
  - BLRT alignment center-running along CSAH 81 (W Broadway Avenue)
- N Lyndale Avenue
  - CSAH 81 (W Broadway Avenue) to Target Field Station
  - BLRT alignment side-running along N Lyndale Avenue and N 7th Street

1.3 Data Collection

Multiple data elements were collected for each of the areas analyzed:

- Weekday intersection turning movement counts including passenger vehicles, heavy vehicles, pedestrians, and bicycles
  - Existing turning movement count data from 2021 was utilized where available
  - New turning movement count data was collected in April and May of 2022
- Signal timing and coordination plans for existing signalized intersections
- Bus routes, stops, and passenger loading/unloading

This data was used to assemble a comprehensive model of the existing conditions.

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2.0 Methodology

2.1 Key Intersections and At-Grade Crossings

To determine the impacts of the BLRT project on the local roadway network, a traffic operations analysis was conducted for signalized and unsignalized intersections within the vicinity of the new BLRT alignment or for intersections that would be expected to have increased traffic due to the BLRT stations, such as near park-and-ride facilities. The analysis area included signalized intersections with an LRT crossing in the intersection, unsignalized intersections that may have a change in intersection control, and intersections that provide access to an LRT station park-and-ride facility. Additional intersections were analyzed based on their proximity to an LRT crossing or park-and-ride facility and the potential for interaction with the crossing or park-and-ride facility.

2.2 Development of Traffic Volumes

Due to the lingering impacts of the COVID-19 pandemic at the time of analysis, the 2021/2022 traffic volumes were compared to traffic volumes collected prior to the pandemic. Based on these comparisons, the 2021/2022 peak hour traffic volumes at some intersections were consistently lower than the pre-COVID peak hour volumes. It is not known if peak hour traffic patterns will return to pre-pandemic conditions due to permanent changes in remote work and commuter behavior. Therefore, adjustment factors were developed and they produce a conservative analysis by reflecting pre-pandemic traffic levels. Separate adjustment factors were utilized for different zones within the study area and for each peak hour.

The development of the 2040 future year traffic forecasts was based on several data sources:

- Historic annual average daily traffic (AADT) volumes in the study area
- 2040 forecast daily traffic volumes as documented in the Hennepin County and city 2040 comprehensive plans
- 2040 socioeconomic data prepared by local communities and consistent with the Metropolitan Council's Thrive MSP 2040

This information was utilized at a localized level to develop future year forecasts for each roadway segment within the project area.

2.3 Traffic Analysis Methodology

Based on the current stage of the BLRT project, the traffic analysis was focused on the identification of intersection-level vehicle delays that will need to be mitigated as part of the project. As the project design is further developed and refined, more detailed traffic analysis will be conducted to document vehicle delays and queues for each intersection approach.

Three scenarios were analyzed as part of this traffic analysis:

- Existing conditions – Used to validate and calibrate the simulation models of the study areas
- 2040 No Build conditions – Analysis of future traffic conditions without BLRT
- 2040 Build conditions – Analysis of future traffic conditions with BLRT (including park-and-rides)

The approach to the traffic operations analysis is derived from the established methodologies documented in the Highway Capacity Manual, 6th Edition (HCM). The HCM contains a series of analysis techniques for evaluating the operations of transportation facilities under specified conditions. The models for the BLRT analysis have been developed using Synchro/SimTraffic or VISSIM, software packages that implements the HCM methodologies. The inputs to the software include lane geometrics, traffic volumes, pedestrian/bicycle volumes, transit stations, freight

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and LRT alignments, freight and LRT volumes, intersection and grade crossing control devices, and signal phase and timing characteristics.

The outputs of the models are evaluated using the level of service thresholds as defined in the HCM, which are shown in **Table 2.1**. Based on standard practice in the traffic engineering industry, as well as guidance from the American Association of State Highway and Transportation Officials (AASHTO) and conformance with MnDOT practice, level of service D/E is considered to be the threshold of acceptable operations for an overall intersection in an urban or suburban area during peak hours. This analysis was focused at the intersection level, therefore all intersection analysis results in this memorandum are reported as Under Capacity (LOS A-D), At Capacity (LOS E), or Over Capacity (LOS F).

Table 2.1 Intersection Level of Service Definitions

Level of Service	Signalized Intersection Delay (seconds per vehicle)	Unsignalized Intersection Delay (seconds per vehicle)	BLRT Traffic Analysis Reporting
A	<10	<10	Under Capacity
B	>10-20	>10-15	
C	>20-35	>15-25	
D	>35-55	>25-35	
E	>55-80	>35-50	At Capacity
F	>80	>50	Over Capacity

Source: Highway Capacity Manual 6th Edition

The timeframe for the AM peak hour was determined from the highest four consecutive 15-minute interval volumes in the 7:00-9:00 AM time period, and the timeframe for the PM peak hour was determined from the highest four 15-minute interval volumes in the 4:00-6:00 PM time period.

In determining the peak hours, the highest hour of traffic volumes was calculated from the 7:00-9:00 AM time period for the AM peak hour and from 4:00-6:00 PM time period for the PM peak hour.

2.4 Design Criteria and Assumptions

All full access intersections with the LRT guideway, where all vehicular movements are allowed across the guideway, were assumed to be signalized to provide safe movement of LRT and vehicles. If any intersections along the LRT guideway were assumed to remain unsignalized, the intersections were converted to right-in right-out only intersections. Gates were not assumed to be used at any of the LRT guideway crossings because the operating speed of the LRT would not exceed the limit at which gates are required by the Manual on Uniform Traffic Control Devices.

2.5 Measures of Effectiveness

The measure of effectiveness that was used to evaluate the traffic operations results and identify potential project impacts was based on intersection delay (level of service).

The level of service criterion used to identify a project impact and potential mitigation is as follows:

- Overall intersection classified as At Capacity or Over Capacity in 2040 Build conditions if the overall intersection was classified as Under Capacity in 2040 No Build conditions.

In addition to level of service, intersection queues were reviewed at a high level in capacity-constrained areas. Qualitative assessments were made to identify queues that would be expected to extend into upstream intersections, to understand congestion impacts at the corridor level.

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3.0 Existing Conditions Analysis

The existing conditions models were developed to validate and calibrate the simulation models of the study areas, which were then used to model the future year conditions. The assumptions, methodology, and results of the existing conditions analysis are presented in the following sections.

3.1 Existing Conditions Assumptions

The existing conditions analysis was based on traffic volumes, roadway geometrics, rail crossing treatments, and signal operations as they existed in 2021/2022 when the data collection was completed. The existing peak hour traffic volumes, which are based on the counts conducted in 2021/2022 and adjusted as previously described, are provided in **Appendix A**. The geometrics and intersection control for the existing conditions are shown in the intersection layout tables provided in **Appendix B**.

The actual peak hours varied for each study area; however, in all sections, all AM peak hours occurred within the range of 7:15 AM and 8:30 AM, and all PM peak hours occurred within the range of 4:00 PM and 5:30 PM. These ranges are based on the turning movement data collected within the study area.

The actual calculated peak hours varied for each study area but occurred within the range of 7:15 AM and 8:30 AM for the AM peak hour and 4:00 PM and 5:30 PM for the PM peak hour in all sections, based on the turning movement data collected within the study area.

Information collected along the freight rail corridor as part of the previous traffic analysis showed that at most one train per day with less than 20 cars is expected on the BNSF Monticello Subdivision. The data collected in 2014 showed that trains typically travel through the corridor in the AM peak hour, between 7:30 and 8:00 AM. No freight trains have been observed during the PM peak hour. Thus, a freight train event was included in a scenario in the AM peak hour for the CSAH 81 North segment, which has several intersections that are less than 200 feet away from freight rail crossings.

3.2 Existing Conditions Traffic Modeling Results

The existing operations results are presented for each of the five modeling areas in the following sections. All intersections were modeled in VISSIM.

3.2.1 CSAH 81 South

The results of the AM and PM peak hour analysis showed that all intersections currently operate Under Capacity during the Existing peak hour scenarios. The overall intersection results are shown in **Table 3.3**.

Table 3.1 CSAH 81 South – Existing Conditions Results

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Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
CSAH 81 (Bottineau Blvd) / CSAH 9 (42nd Ave N)	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 41st Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 40th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 36th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 35th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Abbott Ave N	Under Capacity	Under Capacity

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4.0 2040 No Build Conditions Analysis

The 2040 No Build conditions modeling focused on a high-level intersection analysis of the forecast horizon year (2040). The assumptions, methodology, and results of the 2040 No Build conditions analysis are presented in the following sections.

4.1 2040 No Build Conditions Assumptions

The 2040 No Build conditions analysis was based on the future year 2040 No Build conditions traffic volumes, existing roadway geometrics, programmed improvements, and rail crossing treatments.

The 2040 forecast peak hour traffic volumes, which are provided in **Appendix A**, were developed based on the methodology described in Section 2.2. Geometric improvements assumed in the 2040 No Build conditions analysis are shown in the intersection layouts provided in **Appendix B**, and were based on currently programmed projects:

- The D Line arterial bus rapid transit (BRT) is currently under construction and is anticipated to open in late 2022 to replace local bus Route 5. Within the study area, the route will travel on N 7th Street, Emerson Avenue N, and Fremont Avenue N in Minneapolis. The 2040 No Build conditions assumes that the D Line BRT would replace local bus Route 5 and would utilize D Line station locations and 10-minute service during weekday peak periods.
- CSAH 103 (West Broadway Avenue) reconstruction from a two-lane to a four-lane roadway from 78th Avenue N to CSAH 30 (93rd Avenue N) currently planned by Hennepin County.
- CSAH 30 (93rd Avenue N) reconstruction to extend the four-lane roadway from Xylon Avenue N to Louisiana Avenue N currently planned by Hennepin County.

The geometrics and intersection control for the 2040 No Build conditions are shown in the intersection layout tables provided in **Appendix B.**

No improvements were assumed at any of the existing rail crossings. Signal timing was modified and optimized in the 2040 analysis as part of the VISSIM simulation models. The CSAH 103 (West Broadway Avenue), CSAH 81 (Bottineau Boulevard), CSAH 81 (West Broadway), N Lyndale Avenue and 7th Street were all assumed to operate with coordinated and interconnected traffic signals.

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4.2 2040 No Build Conditions Traffic Modeling Results

The same five modeling areas created for the Existing conditions modeling were used for the 2040 No Build conditions analysis. The 2040 No Build conditions operations results are presented by modeling area in the following sections. All intersections were modeled in VISSIM.

4.2.1 CSAH 81 South

The results of the AM and PM peak hour analysis showed that all intersections are expected to operate Under Capacity during the 2040 No Build conditions peak hour scenarios. The overall intersection results are shown in **Table 4.3**.

Table 4.1 CSAH 81 South – 2040 No Build Conditions Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
CSAH 81 (Bottineau Blvd) / CSAH 9 (42nd Ave N)	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 41st Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 40th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 36th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 35th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Abbott Ave N	Under Capacity	Under Capacity

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5.0 2040 Build Conditions Analysis

The 2040 Build conditions modeling was conducted to identify the expected traffic operations for the forecast horizon year (2040) with the LRT operating. The assumptions, methodology, and results of the 2040 Build conditions analysis are presented in the following sections.

5.1 2040 Build Conditions Assumptions

The traffic volumes for the 2040 Build conditions were based on the same land use and growth forecasts as the 2040 No Build conditions.

Due to the proposed reduction in lanes on CSAH 81 between TH 100 and CSAH 103, volumes along CSAH 103 (W Broadway Avenue) and CSAH 81 (Bottineau Boulevard) were adjusted to reflect potential traffic shifts between 12% and 14% within the study area. The extent of the traffic shifts along CSAH 81 (Bottineau Boulevard) included the section from CSAH 103 (W Broadway Avenue) to TH 100. The Hennepin County Travel Demand Model was used to develop 2040 Build conditions volumes for these corridors.

The location and size of park-and-ride facilities included in the traffic modeling are summarized in **Table 5.1**. The trips to and from the park-and-ride facilities in Brooklyn Park and Crystal were incorporated into the traffic

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analysis. The traffic analysis assumed the full 2040 demand for parking spaces in order to capture the full potential parking capacity of these sites and produce a conservative analysis of the park-and-ride traffic impacts. The traffic analysis at the 63rd Avenue Station included an increased number of parking spaces, compared to what is currently proposed by the BLRT project, in order to model the expected traffic operations if the existing parking facility were to be expanded in the future to the site's full parking capacity.

Table 5.1 Park-and-Ride Facility Summary – 2040 Build Conditions

Location	Number of Park-and-Ride Spaces Proposed	Number of Park-and-Ride Spaces Analyzed
Oak Grove Station	850	850
63rd Avenue Station	565	725
Bass Lake Road Station	170	170

A park-and-ride is also planned in Downtown Robbinsdale, but the location and size of the facility have not been determined. It is anticipated that the parking facility would likely have 250 to 500 parking spaces. A parking facility of this size would generate approximately 125 to 250 trips in the peak hours, which would be approximately 15 percent of the 2040 forecast volume on CSAH 81 (Bottineau Boulevard). Based on the 2040 No Build conditions and 2040 Build conditions intersection operations on this segment of CSAH 81 (Bottineau Boulevard), which are all Under Capacity, a 15 percent increase in traffic would not be expected to result in At Capacity or Over Capacity intersection operations in the peak hours. Detailed analysis of the Robbinsdale park-and-ride traffic will be completed when the location, access points, and size of the facility are determined. A park-and-ride facility is not currently planned in Minneapolis.

The location of each park-and-ride facility along the alignment is shown in **Figure 1.1**.

For 2040 Build conditions, unsignalized intersections that intersect the LRT alignment were assumed to be signalized, were modified to right-in right-out only, or the side street was closed, as shown in **Appendix B.** Where side street access was modified, volumes were redistributed to nearby intersections. The modeled AM and PM peak hour turning movement volumes for the 2040 Build conditions are provided in **Appendix A**.

The LRT was assumed to operate with a 10-minute headway and with a 20 second dwell time at each station. Near the proposed LRT stations, the locations of which are shown in **Figure 1.1**, pedestrian volumes were increased to account for increased pedestrian activity that would occur.

All the LRT crossings were assumed to be controlled by traffic signals. At intersections with left turns across the LRT tracks, protected-only left turn phasing was assumed. For all intersections with right turns across the tracks, right turns on red were prohibited. Signal coordination, signal phasing, and cycle splits were modified and optimized along the entire LRT alignment.

Bus stops for existing routes 14, 22, and 30 were consolidated along the route to reflect the likely levels of local bus service along the LRT alignment.

Several infrastructure, geometric, and signal modifications were identified along the route to provide control of the LRT at intersections and to provide adequate infrastructure to accommodate buses, pedestrians, and park-and-ride traffic near stations. These project elements were incorporated into the 2040 Build conditions modeling, and the significant infrastructure improvements are listed below:

- Reconstruct 101st Avenue N and Oak Grove Parkway to accommodate the needs of the BLRT OMF site.

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- Reconstruct CSAH 103 (West Broadway Avenue) from TH 610 to north of Oak Grove Parkway to accommodate the desired location of the LRT alignment, station location, and park-and-ride parking structure.
- Install a new traffic signal at CSAH 103 (West Broadway Avenue)/99th Avenue N to provide a second access point to the park-and-ride facility.
- Install a new traffic signal at CSAH 103 (West Broadway Avenue)/94th Avenue N to allow LRT to transition from side-running to center-running.
- Reconstruct CSAH 103 (West Broadway Avenue)/CSAH 109 (85th Avenue) to remove channelized right turns and dedicated right turn lanes to accommodate pedestrian crossings for 85th Avenue Station.
- Construct west leg of CSAH 103 (West Broadway Avenue)/Candlewood Drive.
- Reconstruct CSAH 103 (West Broadway Avenue)/CSAH 130 (Brooklyn Boulevard) to remove channelized rights and dedicated right turn lanes to accommodate pedestrian crossings for Brooklyn Boulevard Station.
- Install a new traffic signal at CSAH 103 (West Broadway Avenue)/75th Avenue N to allow LRT to transition from side-running to center-running.
- Install a new traffic signal at 63rd Avenue N/Louisiana Avenue N to provide for pedestrian crossings of 63rd Avenue N and facilitate traffic exiting the park-and-ride facility.
- Install a new traffic signal at CSAH 81 (W Broadway Avenue)/Bryant Avenue N to maintain neighborhood pedestrian access.
- Install a new traffic signal at N Lyndale Avenue/N 14th Avenue to maintain neighborhood pedestrian access.

The future configuration of the CSAH 81 (Bottineau Boulevard)/CSAH 10 (Bass Lake Road) intersection with the addition of LRT is currently being evaluated. Two scenarios were analyzed:

- Scenario 1 – Convert the intersection of CSAH 81 (Bottineau Boulevard)/CSAH 10 (Bass Lake Road) into a tight diamond interchange with CSAH 81 (Bottineau Boulevard) being constructed over CSAH 10 (Bass Lake Road). This design would keep the LRT tracks at-grade across CSAH 10 (Bass Lake Road).
- Scenario 2 – CSAH 81 (Bottineau Boulevard) remains at-grade through the CSAH 10 intersection and would have six through traffic lanes from CSAH 10 (Bass Lake Road) to just south of Wilshire Boulevard.

In both scenarios, CSAH 81 (Bottineau Boulevard) would be a four-lane divided roadway with LRT in the median on the rest of the CSAH 81 (Bottineau Boulevard) corridor, except CSAH 81 (Bottineau Boulevard) from Corvallis Avenue to TH 100 where it was assumed to be a five-lane section with three southbound lanes and two northbound lanes.

Several new intersections were added to the analysis north of TH 610 for the 2040 Build conditions. The Oak Grove Parkway/Xylon Avenue intersection will provide access to the OMF and is proposed to operate with stop control on Xylon Avenue. The CSAH 103 (West Broadway Avenue)/99th Avenue intersection will provide access to the Oak Grove Station park-and-ride facility and is proposed to operate with signalized control. Due to the roadway reconfiguration in this area, the CSAH 103 (West Broadway Avenue)/101st Avenue N and CSAH 103 (West Broadway Avenue)/Winnetka Avenue N intersections would no longer exist, and therefore were not included in the 2040 Build conditions analysis. The CSAH 103 (West Broadway Avenue)/Oak Grove Parkway intersection has a non-revenue LRT crossing, which would include LRT movements only in and out of the OMF site. These crossings would be limited and would occur outside of the peak periods and were not included in the analysis.

The geometrics and intersection control for the 2040 Build conditions are shown in the intersection layout tables provided in **Appendix B**.

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5.2 2040 Build Conditions Traffic Modeling Results

The same modeling areas created for the Existing and 2040 No Build conditions modeling were used for the 2040 Build conditions analysis, with the exception of the new intersections north of TH 610. The 2040 Build conditions operations results are presented by modeling area in the following sections. All intersections were modeled in VISSIM with the exception of the new intersection of Oak Grove Parkway/Xylon Avenue which was modeled in Synchro/SimTraffic.

5.2.1 CSAH 81 South

The results of the AM and PM peak hour analysis showed that all intersections would be expected to operate Under Capacity during the 2040 Build conditions peak hour scenarios. The overall intersection results are shown in **Table 5.4**.

Table 5.2 CSAH 81 South – 2040 Build Conditions Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
CSAH 81 (Bottineau Blvd) / 42nd Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 41st Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 40th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 36th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 35th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Abbott Ave N	Under Capacity	Under Capacity

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Date: December 27, 2022

Subject: BLRT Traffic Operations Technical Memorandum
CSAH 81 Supplemental Analysis (Crystal)

1.0 Introduction

The Blue Line Light Rail Transit Extension (BLRT) project is proposed to be a 13-mile Light Rail Transit (LRT) project with 11 new stations that will operate from downtown Minneapolis through Robbinsdale, Crystal, and Brooklyn Park. The BLRT line will serve as an extension of the METRO Blue Line (Hiawatha Corridor) and will also connect to the METRO Green Line in downtown Minneapolis.

A traffic analysis was previously completed in September 2022 to support the project design and evaluate the potential traffic impacts of the project. Additional design options on CSAH 81 in the city of Crystal were identified and this memorandum documents the traffic operations of each of the options. The traffic operations of the following conditions and design options were analyzed:

- Existing conditions
- 2040 No Build
- 2040 Build 4 Lane At Grade: LRT in the median of CSAH 81, 4 through traffic lanes on CSAH 81, and the CSAH 81/CSAH 10 (Bass Lake Road) intersection would be at grade
- 2040 Build 4/5 Lane Grade Separated: LRT in the median of CSAH 81, 4 through traffic lanes on CSAH 81 with an auxiliary southbound lane from Bass Lake Road to TH 100, and the CSAH 81 would be grade separated over CSAH 10 (Bass Lake Road) with a tight diamond interchange configuration
- 2040 Build 4/6 Lane At Grade: LRT in the median of CSAH 81, 4 through traffic lanes on CSAH 81 except at Bass Lake Road where 6 lanes are provided, and the CSAH 81/CSAH 10 (Bass Lake Road) intersection would be at grade
- 2040 Build 6 Lane At Grade: LRT in the median of CSAH 81, 6 through traffic lanes on CSAH 81, and the CSAH 81/CSAH 10 (Bass Lake Road) intersection would be at grade
- 2040 Build 6 Lane Grade Separated: LRT in the median of CSAH 81, 6 through traffic lanes on CSAH 81, and CSAH 81 would be grade separated over CSAH 10 (Bass Lake Road) with a tight diamond interchange configuration

Additional information about the traffic data collection and the methodology for the analysis can be found in the BLRT Traffic Operations Technical Memorandum dated September 15, 2022.

2.0 Existing Conditions Analysis

The models developed as part of the SDEIS modeling were utilized as the basis for this analysis. The results of the existing conditions analysis are presented in the following sections. Additional information regarding the assumptions and methodology for the Existing Conditions analysis can be found in the BLRT Traffic Operations Technical Memorandum dated September 15, 2022.

2.1 Existing Conditions Traffic Modeling Results

The existing operations results are presented in the following sections. All intersections were modeled in VISSIM. The Existing conditions peak hour traffic volumes are provided in **Appendix A**. The geometrics and intersection control for the Existing conditions are shown in the intersection layout tables provided in **Appendix B**.

2.1.1 Existing Conditions Peak Hour Analysis

The data collected along the BNSF Monticello Subdivision in 2014 showed that trains typically travel through the corridor in the AM peak hour, between 7:30 and 8:00 AM. No freight trains have been observed during the PM peak hour. Therefore, the AM peak hour analysis was conducted with a freight event. The assumed freight event was approximately one minute in duration, which is consistent with the existing freight activity in the corridor. No freight events were analyzed for the PM peak hour. This assumption has not changed from the SDEIS modeling.

The results of the AM and PM peak hour analysis showed that all intersections currently operate Under Capacity during the Existing peak hour scenarios, but several movements are over capacity. The overall intersection results are shown in **Table 2.1**.

Table 2.1 – Existing Conditions Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
CSAH 81 (Bottineau Blvd) / CSAH 10 (Bass Lake Rd)	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Wilshire Blvd	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Corvallis Ave	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 47th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / TH 100 SB Ramp	Under Capacity	Under Capacity

All intersections currently operate under capacity.

2.1.2 Existing Conditions Travel Time

The corridor travel times were modeled for the northbound and southbound directions for the AM and PM peak hours. The travel time limits were defined as TH 100 to Crystal Airport Road in the northbound direction, and from Crystal Airport Road to TH 100 in the southbound direction. The AM Peak Hour travel times in both direction and the PM Peak Hour northbound travel time were approximately three minutes. The PM Peak Hour southbound travel time was nearly four minutes because the signal coordination favors northbound traffic, which is the primary direction. The travel time results are shown in **Table 2.2.**

Table 2.2 – Existing Conditions Travel Times

Direction	Travel Time	
	AM Peak Hour	PM Peak Hour
Northbound CSAH 81	2:54	2:54
Southbound CSAH 81	3:12	3:48

2.2 Existing Conditions Traffic Modeling Summary

All intersections operate Under Capacity in the AM and PM peak hours of Existing conditions. The AM Peak Hour travel times in both direction and the PM Peak Hour northbound travel time were approximately three minutes. The PM Peak Hour southbound travel time was nearly four minutes because the signal coordination favors northbound traffic, which is the primary direction.

3.0 2040 No Build Conditions Analysis

The 2040 No Build conditions modeling focused on a high-level intersection analysis of the forecast horizon year (2040). The 2040 No Build conditions analysis was based on the future year 2040 No Build conditions traffic volumes and existing roadway geometrics. The 2040 forecast peak hour traffic volumes, which are provided in **Appendix A**, were developed based on the methodology described in the BLRT Traffic Operations Technical Memorandum dated September 15, 2022. Geometrics assumed in the 2040 No Build conditions analysis are shown in the intersection layouts provided in **Appendix B**. Signal timing was modified and optimized for the 2040 No Build conditions. Additional information regarding the assumptions and methodology for the Existing Conditions analysis can be found in the BLRT Traffic Operations Technical Memorandum dated September 15, 2022.

3.1 2040 No Build Conditions Traffic Modeling Results

The same modeling area created for the Existing conditions modeling was used for the 2040 No Build conditions analysis. The 2040 No Build conditions operations results are presented in the following sections. All intersections were modeled in VISSIM.

3.1.1 2040 No Build Conditions Peak Hour Analysis

The results of the AM and PM peak hour analysis showed that all intersections are expected to continue to operate Under Capacity during the 2040 No Build conditions peak hour scenarios. The overall intersection results are shown in **Table** 3.1.

Table 3.1 – 2040 No Build Conditions Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
CSAH 81 (Bottineau Blvd) / CSAH 10 (Bass Lake Rd)	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Wilshire Blvd	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Corvallis Ave	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 47th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / TH 100 SB Ramp	Under Capacity	Under Capacity

All intersections are expected to continue to operate under capacity.

3.1.2 2040 No Build Conditions Travel Time

The results of the travel time analysis showed that the travel times are expected to be very similar to the Existing Conditions. The AM peak hour travel times in both directions and the PM peak hour northbound travel time were approximately three minutes. The PM Peak Hour southbound travel time was nearly four minutes. The travel time results are shown in **Table 3.2.**

Table 3.2 – 2040 No Build Travel Times

Direction	Travel Time	
	AM Peak Hour	PM Peak Hour
Northbound CSAH 81	2:56	2:58
Southbound CSAH 81	3:19	3:50

3.2 2040 No Build Conditions Traffic Modeling Summary

All intersections are expected to continue to operate Under Capacity in the AM and PM peak hours of 2040 No Build conditions. The travel times in the AM and PM peak hours are expected to be similar to the Existing Conditions.

4.0 2040 Build Conditions Analysis

The 2040 Build conditions modeling was conducted to identify the expected traffic operations for the forecast horizon year (2040) under different geometric design options with the LRT operating and added park and ride traffic within the study area. The 2040 forecast peak hour traffic volumes, which are provided in **Appendix A**, are the same as the 2040 No Build conditions to produce a conservative analysis and allow for direct comparison among design options. Geometrics assumed in the 2040 Build conditions analysis are shown in the intersection layouts provided in **Appendix B** and are described in section 4.1. The results of the 2040 Build conditions analysis are presented in section 4.2.

4.1 2040 Build Conditions Options

The 2040 Build conditions modeling included the analysis of five geometric options on CSAH 81. The geometric assumptions are presented in the following sections. See **Appendix C** for layouts of each design option.

4.1.1 4 Lane At Grade

The 4 Lane At Grade design option would have four through lanes and center-running LRT on CSAH 81 from north of the CSAH 81 and 73rd Avenue intersection to the TH 100 interchange. The CSAH 81 and CSAH 10 intersection would be an at-grade intersection.

4.1.2 4/5 Lane Grade Separated

The 4/5 Lane Grade Separated design option would have four through lanes and center-running LRT on CSAH 81 from north of the CSAH 81 and 73rd Avenue intersection to the TH 100 interchange. A southbound auxiliary lane on CSAH 81 would also be provided from CSAH 10 to the eastbound TH 100 on-ramp. CSAH 81 would be grade separated over CSAH 10, with a tight diamond interchange.

4.1.3 4/6 Lane At Grade

The 4/6 Lane At Grade, or "4-6-4", design option would have four through lanes and center-running LRT on CSAH 81 from north of the CSAH 81 and 73rd Avenue intersection to the TH 100 interchange. An additional lane each direction would also be provided on CSAH 81 from immediately north of CSAH 10 to immediately south of Wilshire Boulevard. The CSAH 81 and CSAH 10 intersection would be an at-grade intersection.

4.1.4 6 Lane At Grade

The 6 Lane At Grade design option would have four through lanes and center-running LRT on CSAH 81 from north of the CSAH 81 and 73rd Avenue intersection to just north of CSAH 10. CSAH 81 would have six through lanes and center running LRT from just north of CSAH 10 to TH 100.

4.1.5 6 Lane Grade Separated

The 6 Lane Grade Separated design option would have four through lanes and center-running LRT on CSAH 81 from north of the CSAH 81 and 73rd Avenue intersection to just north of CSAH 10. CSAH 81 would have six through lanes and center running LRT from just north of CSAH 10 to TH 100. CSAH 81 would be grade separated over CSAH 10, with a tight diamond interchange.

4.2 2040 Build Conditions Traffic Modeling Results

The same modeling area created for the Existing and 2040 No Build conditions modeling were used for the 2040 Build conditions analysis. The 2040 Build conditions operations results are presented in the following sections. All intersections were modeled in VISSIM.

4.2.1 2040 Build Conditions 4 Lane At Grade

4.2.1.1 2040 Build Conditions 4 Lane At Grade Peak Hour Analysis

The results of the AM and PM peak hour analysis showed that all intersections are expected to operate Under Capacity during the 2040 Build conditions peak hour scenarios, except for the intersections of CSAH 81 and Bass Lake Road as well as CSAH 81 and Wilshire which are expected to operate At Capacity during the PM peak hour. The overall intersection results are shown in **Table 4.1**.

Table 4.1 – 2040 Build Conditions 4 Lane At Grade Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
CSAH 81 (Bottineau Blvd) / CSAH 10 (Bass Lake Rd)	Under Capacity	At Capacity
CSAH 81 (Bottineau Blvd) / Wilshire Blvd	Under Capacity	At Capacity
CSAH 81 (Bottineau Blvd) / Corvallis Ave	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 47th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / TH 100 SB Ramp	Under Capacity	Under Capacity

4.2.1.2 2040 Build Conditions 4 Lane At Grade Travel Time

The results of the travel time analysis showed that the northbound travel time would be expected to be approximately 15 seconds greater, and the southbound travel time would be expected to be approximately 50 seconds greater than the 2040 No Build conditions in the AM peak hour. In the PM peak hour, the northbound travel time would be expected to be approximately 1:45 greater and the southbound travel time would be expected to be approximately 1:20 greater than the 2040 No Build conditions. The travel time results are shown in **Table 4.2.**

Table 4.2 – 2040 Build 4 Lane At Grade Travel Times

Direction	Travel Time (Average Speed)	
	AM Peak Hour	PM Peak Hour
Northbound CSAH 81	3:11	5:45
Southbound CSAH 81	4:07	5:09

4.2.2 2040 Build Conditions 4/5 Lane Grade Separated

4.2.2.1 2040 Build Conditions 4/5 Lane Grade Separated Peak Hour Analysis

The results of the AM and PM peak hour analysis showed that all intersections are expected to operate Under Capacity during the 2040 Build conditions peak hour scenarios. The overall intersection results are shown in **Table 4.3.**

Table 4.3 – 2040 Build Conditions 4/5 Lane Grade Separated Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
CSAH 81 (Bottineau Blvd) / CSAH 10 (Bass Lake Rd)	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Wilshire Blvd	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Corvallis Ave	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 47th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / TH 100 SB Ramp	Under Capacity	Under Capacity

All intersections are expected to operate under capacity.

4.2.2.2 2040 Build Conditions 4/5 Lane Grade Separated Travel Time

The results of the travel time analysis showed that the northbound and southbound travel times would be expected to be approximately 20 to 25 seconds less than the 2040 No Build conditions in the AM peak hour. Northbound and southbound travel times in the PM peak hour would be expected to be approximately 25 to 35 seconds less than the 2040 No Build conditions. The travel time results are shown in **Table 4.4.**

Table 4.4 Crystal – 2040 Build 4/5 Lane Grade Separated Travel Times

Direction	Travel Time (Average Speed)	
	AM Peak Hour	PM Peak Hour
Northbound CSAH 81	2:38	2:46
Southbound CSAH 81	2:54	3:13

4.2.3 2040 Build Conditions 4/6 Lane At Grade

4.2.3.1 2040 Build Conditions 4/6 Lane At Grade Peak Hour Analysis

The results of the AM and PM peak hour analysis showed that all intersections are expected to operate Under Capacity during the 2040 Build conditions peak hour scenarios. The overall intersection results are shown in **Table 4.5**.

Table 4.5 – 2040 Build Conditions 4/6 Lane At Grade Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
CSAH 81 (Bottineau Blvd) / CSAH 10 (Bass Lake Rd)	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Wilshire Blvd	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Corvallis Ave	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 47th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / TH 100 SB Ramp	Under Capacity	Under Capacity

All intersections are expected to operate under capacity.

4.2.3.2 2040 Build Conditions 4/6 Lane At Grade Travel Time

The results of the travel time analysis showed that the northbound and southbound travel times would be expected to be approximately 10 to 15 seconds greater than the 2040 No Build conditions in the AM peak hour. The travel times in the PM peak hour would be expected to be approximately 55 seconds greater than the 2040 No Build conditions in the northbound direction and approximately 10 seconds less than the 2040 No Build conditions in the southbound direction. The travel time results are shown in **Table 4.6.**

Table 4.6 – 2040 Build 4/6 Lane At Grade Travel Times

Direction	Travel Time	
	AM Peak Hour	PM Peak Hour
Northbound CSAH 81	3:06	3:53
Southbound CSAH 81	3:36	3:42

4.2.4 2040 Build Conditions 6 Lane At Grade

4.2.4.1 2040 Build Conditions 6 Lane At Grade Peak Hour Analysis

The results of the AM and PM peak hour analysis showed that all intersections are expected to operate Under Capacity during the 2040 Build conditions peak hour scenarios. The overall intersection results are shown in **Table 4.7**.

Table 4.7 – 2040 Build Conditions 6 Lane At Grade Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
CSAH 81 (Bottineau Blvd) / CSAH 10 (Bass Lake Rd)	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Wilshire Blvd	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Corvallis Ave	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 47th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / TH 100 SB Ramp	Under Capacity	Under Capacity

All intersections are expected to operate under capacity.

4.2.4.2 2040 Build Conditions 6 Lane At Grade Travel Time

The results of the travel time analysis showed that the northbound and southbound travel times would be expected to be similar to the 2040 No Build conditions in the AM peak hour. The travel times in the PM peak hour would be expected to be similar to the 2040 No Build conditions in the southbound direction and approximately 5 seconds greater than the 2040 No Build conditions in the northbound direction. The travel time results are shown in **Table 4.8.**

Table 4.8 – 2040 Build 6 Lane At Grade Travel Times

Direction	Travel Time (Average Speed)	
	AM Peak Hour	PM Peak Hour
Northbound CSAH 81	2:55	3:05
Southbound CSAH 81	3:18	3:49

4.2.5 2040 Build Conditions 6 Lane Grade Separated

4.2.5.1 2040 Build Conditions 6 Lane Grade Separated Peak Hour Analysis

The results of the AM and PM peak hour analysis showed that all intersections are expected to operate Under Capacity during the 2040 Build conditions peak hour scenarios. The overall intersection results are shown in **Table 4.9**.

Table 4.9 – 2040 Build Conditions 6 Lane Grade Separated Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
CSAH 81 (Bottineau Blvd) / CSAH 10 (Bass Lake Rd)	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Wilshire Blvd	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Corvallis Ave	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 47th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / TH 100 SB Ramp	Under Capacity	Under Capacity

All intersections are expected to operate under capacity.

4.2.5.2 2040 Build Conditions 6 Lane Grade Separated Travel Time

The results of the travel time analysis showed that the northbound and southbound travel times would be expected to be approximately 20 to 25 seconds less than the 2040 No Build conditions in the AM peak hour. The travel times in the PM peak hour would be expected to be approximately 15 seconds less than the 2040 No Build conditions in the northbound direction and approximately 1 minute less than the 2040 No Build conditions in the southbound direction. The travel time results are shown in **Table 4.10.**

Table 4.10 – 2040 Build 6 Lane Grade Separated Travel Times

Direction	Travel Time (Average Speed)	
	AM Peak Hour	PM Peak Hour
Northbound CSAH 81	2:34	2:42
Southbound CSAH 81	2:52	2:47

4.3 2040 Build Conditions Traffic Modeling Summary

All intersections are expected to operate Under Capacity in the AM and PM peak hours of 2040 Build conditions for all scenarios, except for the intersections of CSAH 81 and Bass Lake Road and CSAH 81 and Wilshire Blvd which are expected to operate At Capacity under 2040 Build 4 Lane At Grade PM peak conditions.

Table 4.11 summarizes the travel times under each 2040 Build option.

Table 4.111 – 2040 Conditions Travel Time Summary

2040 Scenario	Travel Time			
	AM Peak Hour		PM Peak Hour	
	Northbound	Southbound	Northbound	Southbound
2040 No Build	2:56	3:19	2:58	3:50
2040 Build 4 Lane At Grade	3:11	4:07	5:45	5:09
2040 Build 4/5 Lane Grade Separated	2:38	2:54	2:46	3:13
2040 Build 4/6 Lane At Grade	3:06	3:36	3:53	3:42
2040 Build 6 Lane At Grade	2:55	3:18	3:05	3:49
2040 Build 6 Lane Grade Separated	2:34	2:52	2:42	2:47

Overall, the travel times in the 4/5 Lane Grade Separated and the 6 Lane Grade Separated design options would be expected to be less than the travel times in the 2040 No Build conditions. The travel times in the 4 Lane At Grade and the 4/6 Lane At Grade design options would be expected to be greater than the 2040 No Build conditions. The travel times in the 6 Lane At Grade design option would be expected to be similar to the 2040 No Build conditions.

Appendix A

2040 No Build Peak Hour Traffic Volumes

AM Peak Hour												
Intersection	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
CSAH 81 (Bottineau Blvd) / CSAH 10 (Bass Lake Rd)	113	182	350	56	209	69	281	669	47	89	1098	187
CSAH 81 (Bottineau Blvd) / Wilshire Blvd	3	4	15	149	8	64	14	930	146	75	1407	22
CSAH 81 (Bottineau Blvd) / Corvallis Ave N	45	10	135	37	19	22	53	1023	12	15	1513	43
CSAH 81 (Bottineau Blvd) / 47th Ave N	8	0	71	58	3	4	30	1076	16	5	1674	6
CSAH 81 (Bottineau Blvd) / TH 100 Southbound Ramps	-	-	-	122	-	64	-	1058	-	-	776	1027
Assumes no traffic diversion from CSAH 81 to alternate routes.												

PM Peak Hour												
Intersection	Eastbound			Westbound			Northbound					
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
CSAH 81 (Bottineau Blvd) / CSAH 10 (Bass Lake Rd)	405	453	413	71	299	129	411	1444	132	151	944	305
CSAH 81 (Bottineau Blvd) / Wilshire Blvd	17	8	28	105	4	86	14	1884	153	66	1343	19
CSAH 81 (Bottineau Blvd) / Corvallis Ave N	47	18	92	23	20	32	74	1972	33	34	1392	50
CSAH 81 (Bottineau Blvd) / 47th Ave N	6	2	40	40	2	3	58	2070	55	7	1485	15
CSAH 81 (Bottineau Blvd) / TH 100 Southbound Ramps	-	-	-	92	-	269	-	1914	-	-	816	749
Assumes no traffic diversion from CSAH 81 to alternate routes.												

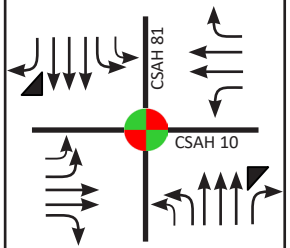
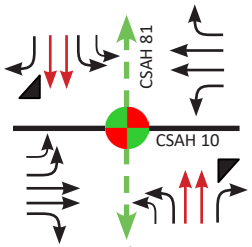
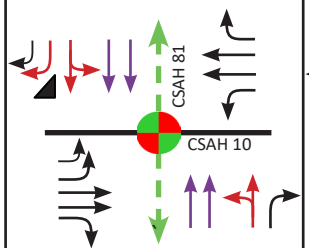
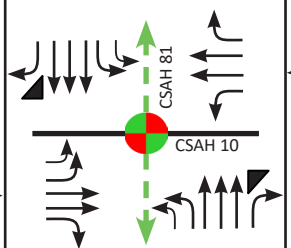
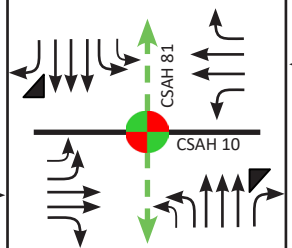
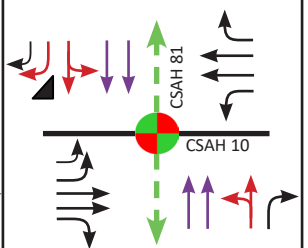
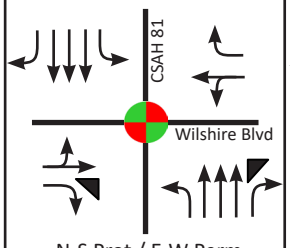
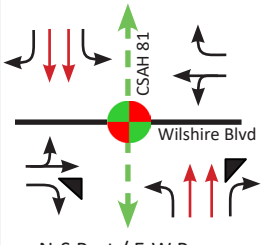
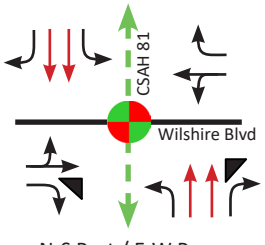
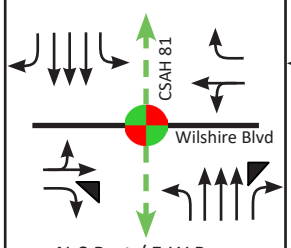
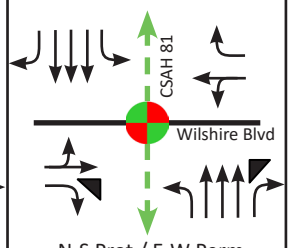
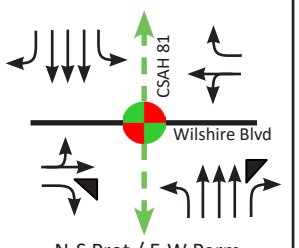
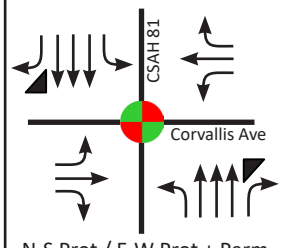
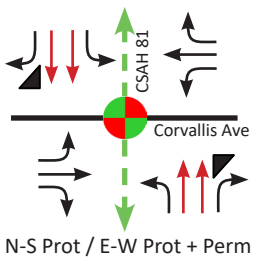
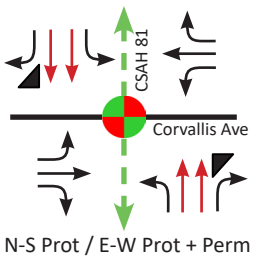
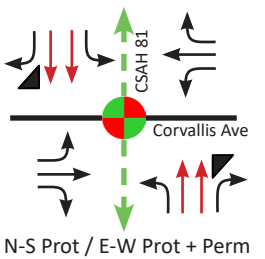
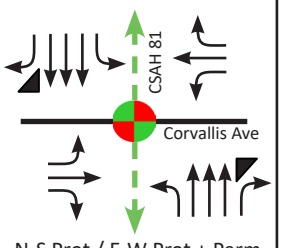
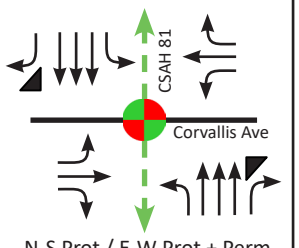
2040 Build Peak Hour Traffic Volumes

AM Peak Hour												
Intersection	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
CSAH 81 (Bottineau Blvd) / CSAH 10 (Bass Lake Rd)	113	182	417	63	209	69	290	670	48	89	1105	187
CSAH 81 (Bottineau Blvd) / Wilshire Blvd	14	4	15	149	8	64	16	930	146	75	1407	103
CSAH 81 (Bottineau Blvd) / Corvallis Ave N	45	10	135	37	19	24	53	1023	12	15	1513	43
CSAH 81 (Bottineau Blvd) / 47th Ave N	8	0	71	58	3	4	30	1076	16	5	1674	6
CSAH 81 (Bottineau Blvd) / TH 100 Southbound Ramps	-	-	-	122	-	64	-	1058	-	-	776	1027
Assumes no traffic diversion from CSAH 81 to alternate routes.												

PM Peak Hour												
Intersection	Eastbound			Westbound			Northbound					
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
CSAH 81 (Bottineau Blvd) / CSAH 10 (Bass Lake Rd)	405	453	424	72	299	129	470	1450	139	151	945	305
CSAH 81 (Bottineau Blvd) / Wilshire Blvd	89	8	28	105	4	86	15	1884	153	66	1343	32
CSAH 81 (Bottineau Blvd) / Corvallis Ave N	47	18	92	23	20	33	74	1972	33	36	1392	50
CSAH 81 (Bottineau Blvd) / 47th Ave N	6	2	40	40	2	3	58	2070	55	7	1485	15
CSAH 81 (Bottineau Blvd) / TH 100 Southbound Ramps	-	-	-	92	-	269	-	1914	-	-	816	749
Assumes no traffic diversion from CSAH 81 to alternate routes.												

Appendix B

BLRT CSAH 81 Supplemental Analysis - Intersection Layout Table

Intersection	Existing Conditions / 2040 No Build	2040 Build 4 Lane At Grade	2040 Build 4/5 Lane Grade Separated	2040 Build 4/6 Lane At Grade	2040 Build 6 Lane At Grade	2040 Build 6 Lane Grade Separated
CSAH 81 (Bottineau Blvd) / CSAH 10 (Bass Lake Rd)						
CSAH 81 (Bottineau Blvd) / Wilshire Blvd						
CSAH 81 (Bottineau Blvd) / Corvallis Ave						

Legend

N

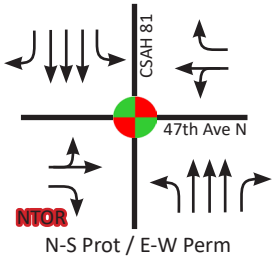
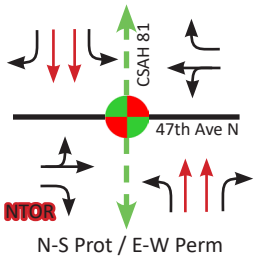
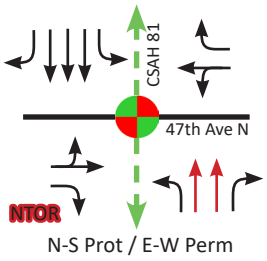
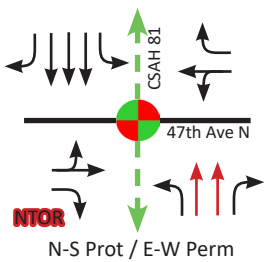
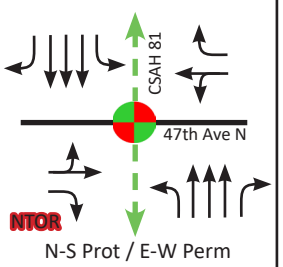
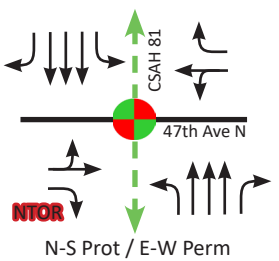
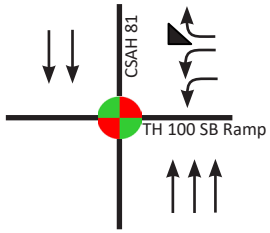
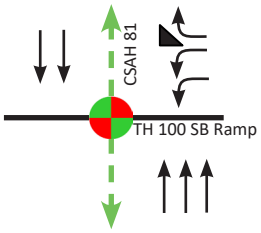
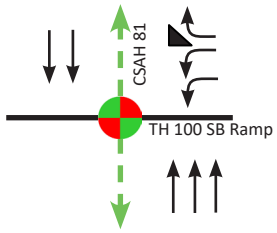
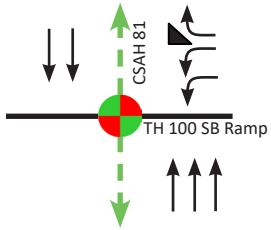
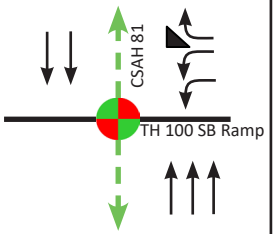
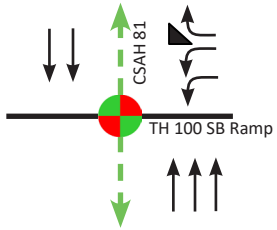
NOT TO SCALE

Traffic Signal	
Stop Control	
Lane Use	
Lane Use Change (Compared to Existing Conditions)	

Grade Separated Lane	
No Turn on Red	NTOR
LRT	
Channelized Right-Turn	

Perm	Permissive Left-Turn Phase
Prot+Perm	Protected/Permissive Left-Turn Phase
Prot	Protected Left-Turn Phase

BLRT CSAH 81 Supplemental Analysis - Intersection Layout Table

Intersection	Existing Conditions / 2040 No Build	2040 Build 4 Lane At Grade	2040 Build 4/5 Lane Grade Separated	2040 Build 4/6 Lane At Grade	2040 Build 6 Lane At Grade	2040 Build 6 Lane Grade Separated
CSAH 81 (Bottineau Blvd) / 47th Ave N	 N-S Prot / E-W Perm	 N-S Prot / E-W Perm	 N-S Prot / E-W Perm	 N-S Prot / E-W Perm	 N-S Prot / E-W Perm	 N-S Prot / E-W Perm
CSAH 81 (Bottineau Blvd) / TH 100 SB Ramp	 W Prot	 W Prot	 W Prot	 W Prot	 W Prot	 W Prot

Legend

NOT TO SCALE

Traffic Signal	
Stop Control	
Lane Use	
Lane Use Change (Compared to Existing Conditions)	

Grade Separated Lane	
No Turn on Red	NTOR
LRT	
Channelized Right-Turn	

Perm	Permissive Left-Turn Phase
Prot+Perm	Protected/Permissive Left-Turn Phase
Prot	Protected Left-Turn Phase

Appendix C

To: Nick Landwer, P.E.
Director of Design and Engineering, Blue Line LRT Extension Project

From: JoNette Kuhnau, P.E., PTOE
Traffic Engineering Task Lead, Kimley-Horn and Associates, Inc.

Date: December 27, 2022

Subject: BLRT Traffic Operations Technical Memorandum – East of I-94 Alternative Attachment Supplemental Draft Environmental Impact Statement

1.0 Introduction

The Blue Line Light Rail Transit Extension (BLRT) project is proposed to be a 13-mile Light Rail Transit (LRT) project with 11 new stations that will operate from downtown Minneapolis through Robbinsdale, Crystal, and Brooklyn Park. The BLRT line will serve as an extension of the METRO Blue Line (Hiawatha Corridor) and will also connect to the METRO Green Line in downtown Minneapolis.

A traffic analysis was previously completed in 2015 for the BLRT alignment that included the BNSF Railway Monticello Subdivision. To advance the project without using railroad right-of-way, a modified route was approved by Hennepin County and the Metropolitan Council in 2022.
This document is a supplement to the Traffic Operations Technical Memorandum dated September 15, 2022. It presents the traffic analysis for an alternative alignment considered for the BLRT Extension alignment in Minneapolis between W Broadway Avenue and downtown Minneapolis. The alternative alignment discussed in this memorandum is referred to as the East of I-94 Alternative. The traffic analysis presented in this technical memorandum is based on the project scope as presented to the Metropolitan Council through August 2022.

1.1 Purpose of Memorandum

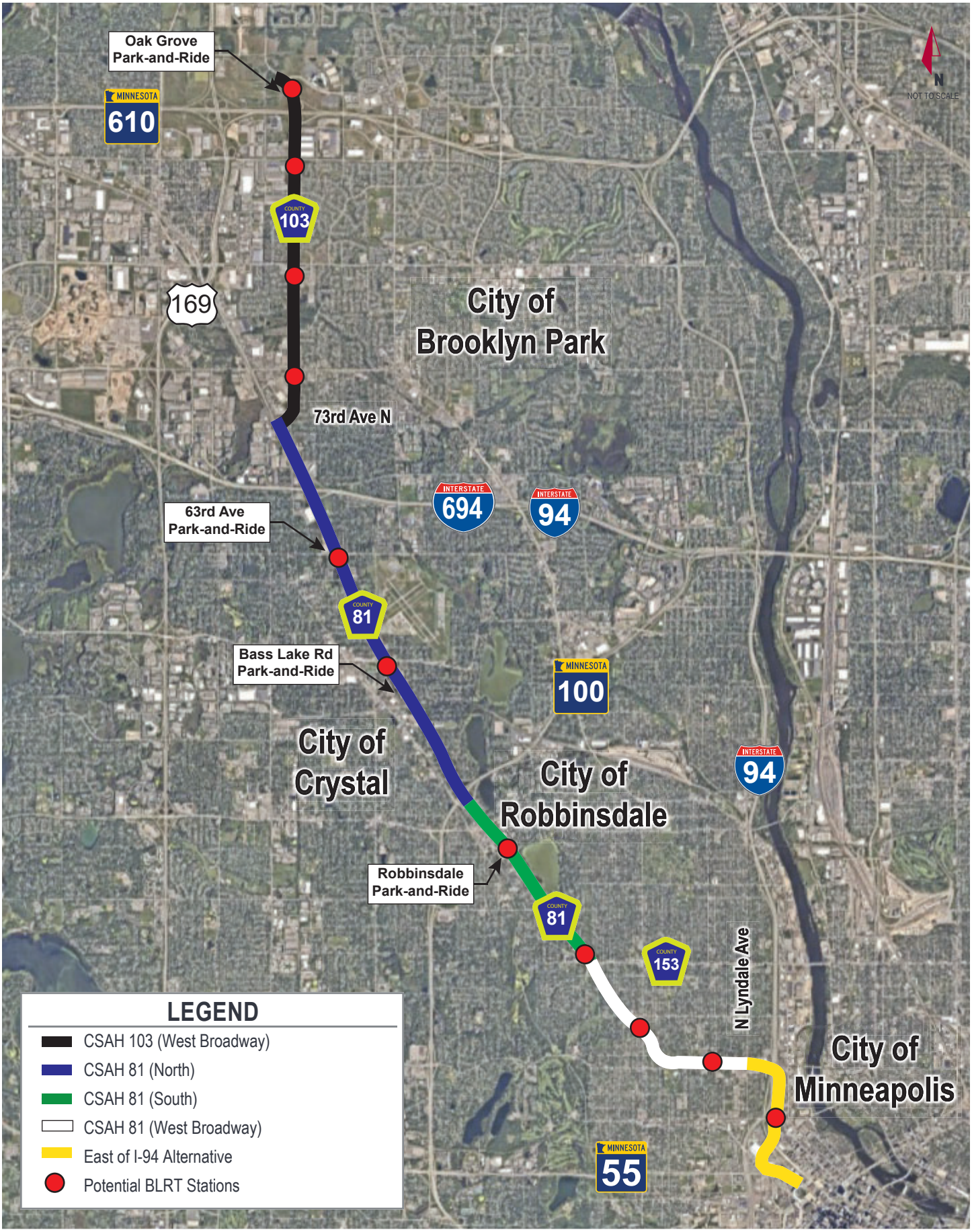
This technical memorandum has been prepared in support of the BLRT project design and the Supplemental Draft Environmental Impact Statement (SDEIS). The objective of the traffic analysis is to evaluate the potential traffic impacts of the East of I-94 Alternative, including:

- Evaluation of the alternative's impacts on traffic operations at existing and proposed intersections and at-grade rail crossings along or near the BLRT alignment.
- Identification of preliminary improvements to address operational issues identified in the traffic analysis.

The methodology, assumptions, and results of the analysis are presented in the following sections.

1.2 Study Areas

The location of the BLRT alignment with the East of I-94 Alternative is shown in **Figure 1.1**. The East of I-94 Alternative would be center running on CSAH 81 (W Broadway Avenue) and continue further east on CSAH 81 (W Broadway Avenue) compared to the N Lyndale Avenue alternative. At N 4th Street, the LRT would be grade-separated and would cross I-94 to run parallel to N Washington Avenue. The alignment would generally be side-running until N 10th Avenue, where it would be center-running. The LRT would be side-running along N 7th Street to Target Field Station.



Kimley»Horn

FIGURE 1.1
ROUTE ALIGNMENT AND SEGMENTS

The locations of the intersections and at-grade crossings studied as part of the East of I-94 Alternative are shown in **Figure 1.2**. The East of I-94 Alternative discussed in this memorandum is an alternative to the N Lyndale alignment.

1.3 Data Collection

Multiple data elements were collected for the East of I-94 Alternative:

- Weekday intersection turning movement counts including passenger vehicles, heavy vehicles, pedestrians, and bicycles
  - Existing turning movement count data from 2021 was utilized where available
  - New turning movement count data was collected in October of 2022
- Signal timing and coordination plans for existing signalized intersections
- Bus routes, stops, and passenger loading/unloading

This data was used to assemble a comprehensive model of the existing conditions.

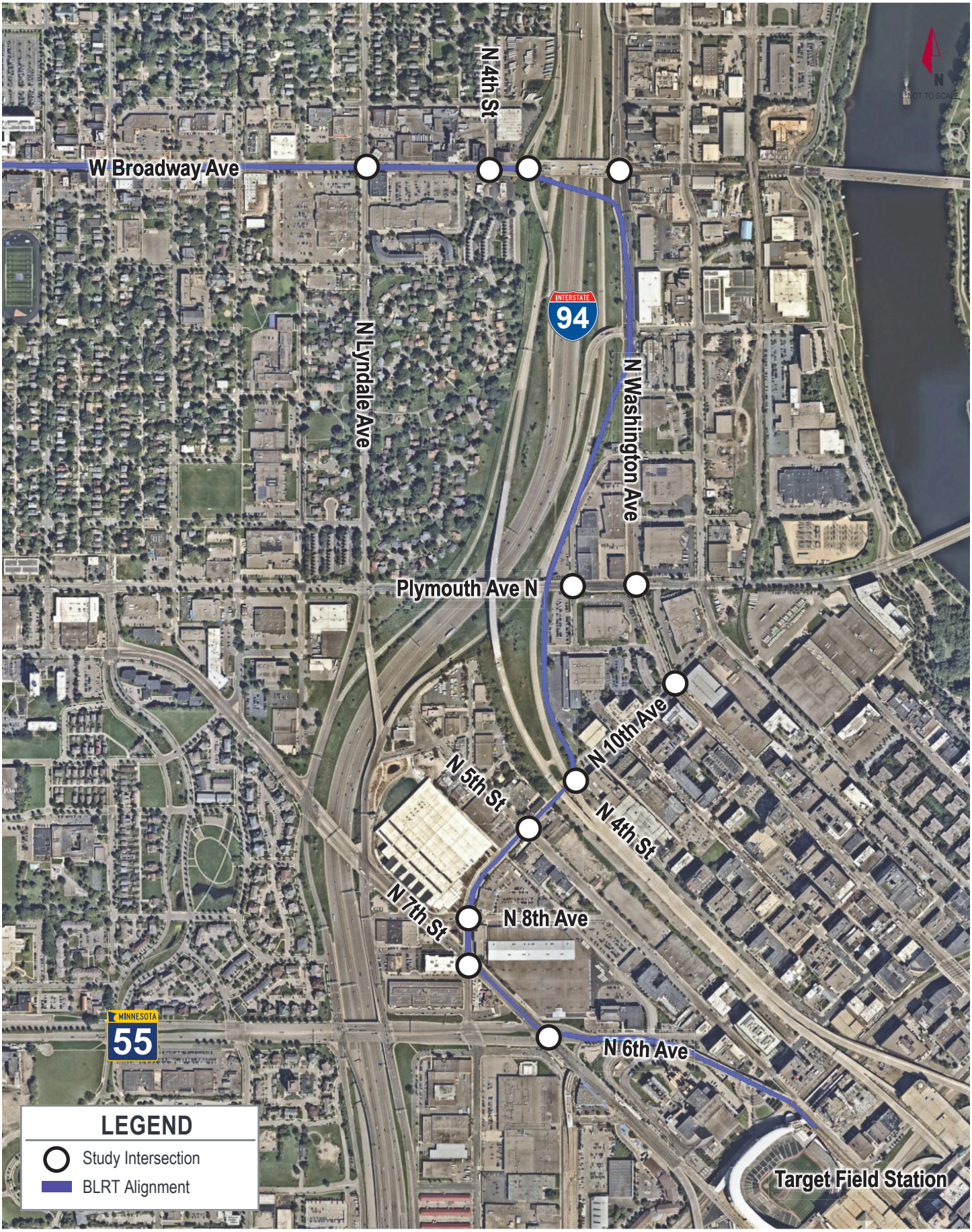


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FIGURE 1.2
STUDY INTERSECTIONS

2.0 Methodology

The analysis of the East of I-94 Alternative followed the same methodology as the analysis documented in the BLRT Traffic Operations Technical Memorandum dated September 15, 2022. Refer to Chapter 2 of the BLRT Traffic Operations Technical Memorandum for a summary of the selection of study intersections, development of traffic volumes, traffic analysis methodology, design criteria, measures of effectiveness, and other assumptions

3.0 Existing Conditions Analysis

The existing conditions model was developed to validate and calibrate the simulation model of the study area, which was then used to model the future year conditions. The assumptions, methodology, and results of the existing conditions analysis are presented in the following sections.

3.1 Existing Conditions Assumptions

The existing conditions analysis was based on traffic volumes, roadway geometrics, and signal operations as they existed in 2021/2022 when the data collection was completed. The existing peak hour traffic volumes, which are based on the counts conducted in 2021/2022 and adjusted as described in the BLRT Traffic Operations Technical Memorandum, are provided in **Appendix A**. The geometrics and intersection control for the existing conditions are shown in the intersection layout tables provided in **Appendix B**.

The peak hours for the East of I-94 Alternative study area occurred from 7:30-8:30AM and 4:30-5:30PM. These ranges are based on the turning movement data collected within the study area.

3.2 Existing Conditions Traffic Modeling Results

The results of the AM and PM peak hour analysis showed that all intersections currently operate Under Capacity during the Existing peak hour scenarios. The overall intersection results are shown in **Table 3.1**.

Table 3.1 East of I-94 Alternative – Existing Conditions Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
CSAH 81 (W Broadway Ave) / N Lyndale Ave**	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / N 4th St	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / I-94 Eastbound Ramps	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / CSAH 152 (N Washington Ave)	Under Capacity	Under Capacity
N Plymouth Ave / CSAH 152 (N Washington Ave)	Under Capacity	Under Capacity
N Plymouth Ave / N 3rd St*	Under Capacity	Under Capacity
CSAH 152 (N Washington Ave) / N 10th Ave	Under Capacity	Under Capacity
N 10th Ave / N 4th St*	Under Capacity	Under Capacity
N 10th Ave / N 5th St*	Under Capacity	Under Capacity
Oak Lake Ave N / N 8th Ave*	Under Capacity	Under Capacity
N 7th St / Oak Lake Ave N**	Under Capacity	Under Capacity
TH 55 (Olson Memorial Highway) / N 7th St / N 6th Ave**	Under Capacity	Under Capacity

* Side street stop-controlled intersection
** Also Included in BLRT Traffic Operations Technical Memorandum dated September 15, 2022

4.0 2040 No Build Conditions Analysis

The 2040 No Build conditions modeling focused on a high-level intersection analysis of the forecast horizon year (2040). The assumptions, methodology, and results of the 2040 No Build conditions analysis are presented in the following sections.

4.1 2040 No Build Conditions Assumptions

The 2040 No Build conditions analysis was based on the future year 2040 No Build conditions traffic volumes and existing roadway geometrics.

The 2040 forecast peak hour traffic volumes, which are provided in **Appendix A**, were developed based on the methodology described in the BLRT Traffic Operations Technical Memorandum dated September 15, 2022. Geometric improvements assumed in the 2040 No Build conditions analysis are shown in the intersection layouts provided in **Appendix B.**

The D Line BRT route opened for service on December 3, 2022 and substantially replaced local bus Route 5. Within the study area for this alternative, the D Line travels on N 7th Street. The 2040 No Build conditions assumes that the D Line would replace local bus Route 5 and would serve D Line stations at 7th Street & Olson/5th and 7th Street & Bryant with 10-minute service during weekday peak periods.

Signal timing was modified and optimized in the 2040 analysis as part of the VISSIM simulation models. The CSAH 81 (W Broadway Avenue), CSAH 152 (N Washington Avenue), and 7th Street intersections were all assumed to operate with coordinated and interconnected traffic signals.

4.2 2040 No Build Conditions Traffic Modeling Results

The results of the AM and PM peak hour analysis showed that all intersections are expected to operate Under Capacity during the 2040 No Build conditions peak hour scenarios with the exception of Plymouth Ave/N 3rd Street which is anticipated to operate At Capacity during the PM peak hour. The overall intersection results are shown in **Table 4.1**.

Table 4.1 East of I-94 Alternative – 2040 No Build Conditions Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
CSAH 81 (W Broadway Ave) / N Lyndale Ave**	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / N 4th St	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / I-94 Eastbound Ramps	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / CSAH 152 (N Washington Ave)	Under Capacity	Under Capacity
N Plymouth Ave / CSAH 152 (N Washington Ave)	Under Capacity	Under Capacity
N Plymouth Ave / N 3rd St*	Under Capacity	At Capacity
CSAH 152 (N Washington Ave) / N 10th Ave	Under Capacity	Under Capacity
N 10th Ave / N 4th St*	Under Capacity	Under Capacity
N 10th Ave / N 5th St*	Under Capacity	Under Capacity
Oak Lake Ave N / N 8th Ave*	Under Capacity	Under Capacity
N 7th St / Oak Lake Ave N**	Under Capacity	Under Capacity
TH 55 (Olson Memorial Highway) / N 7th St / N 6th Ave**	Under Capacity	Under Capacity

* Side street stop-controlled intersection
** Also Included in BLRT Traffic Operations Technical Memorandum dated September 15, 2022

5.0 2040 Build Conditions Analysis

The 2040 Build conditions modeling was conducted to identify the expected traffic operations for the forecast horizon year (2040) with the LRT operating. The assumptions, methodology, and results of the 2040 Build conditions analysis are presented in the following sections.

5.1 2040 Build Conditions Assumptions

The traffic volumes for the 2040 Build conditions were based on the same land use and growth forecasts as the 2040 No Build conditions.

For 2040 Build conditions, unsignalized intersections that intersect the LRT alignment were assumed to be signalized or were modified to right-in right-out only, as shown in **Appendix B.** Where side street access was modified, volumes were redistributed to nearby intersections. The modeled AM and PM peak hour turning movement volumes for the 2040 Build conditions are provided in **Appendix A**.

The LRT was assumed to operate with a 10-minute headway and with a 20 second dwell time at each station. Near the proposed LRT stations, the locations of which are shown in **Figure 1.1**, pedestrian volumes were increased to account for increased pedestrian activity that would occur.

All the LRT crossings were assumed to be controlled by traffic signals. At intersections with left turns across the LRT tracks, protected-only left turn phasing was assumed. For all intersections with right turns across the tracks, right turns on red were prohibited. These movements were also prohibited in the presence of LRT, which was assumed to run concurrently with the non-conflicting movements on the track's parallel approaches. Signal coordination, signal phasing, and cycle splits were modified and optimized along the entire LRT alignment.

Bus stops for existing routes 14, 22, and 30 were consolidated along the route to reflect the likely levels of local bus service along the LRT alignment.

Several infrastructure, geometric, and signal modifications were identified along the route to provide control of the LRT at intersections and to provide adequate infrastructure to accommodate buses and pedestrians near stations. These project elements were incorporated into the 2040 Build conditions modeling, and the significant infrastructure improvements are listed below:

- Install a new traffic signal at N 10th Avenue / N 5th Street to maintain local access
- Install a new traffic signal at N 10th Avenue / N 4th Street to maintain local access
- Install an automatic gate for the LRT crossing of N Plymouth Avenue just west of the Plymouth Avenue / N 3rd Street intersection

The geometrics and intersection control for the 2040 Build conditions are shown in the intersection layout tables provided in **Appendix B**.

5.2 2040 Build Conditions Traffic Modeling Results

The results of the AM and PM peak hour analysis showed that all intersections are expected to operate Under Capacity during the 2040 Build conditions peak hour scenarios with the following exceptions:

- 7th St/Oak Lake Avenue is anticipated to operate At Capacity in the AM peak hour.
- TH 55 (Olson Memorial Highway)/N 7th St/N 6th Avenue is anticipated to operate Over Capacity in the PM peak hour.
- W Broadway Ave/N Lyndale Ave is anticipated to operate Over Capacity in the PM peak hour

In the AM peak hour, there is significant traffic volume heading into downtown Minneapolis from the I-94 Eastbound off-ramp. The reduction in vehicle traffic lanes on N 7th Street results in queues that extend upstream along N 7th Street which is consistent with the operations in the N Lyndale Avenue Alternative as presented in the BLRT Traffic Operations Technical Memorandum dated September 15, 2022.

During the PM peak hour, a similar capacity constraint occurs in the opposite direction heading out of downtown Minneapolis. The reduction in vehicle traffic lanes on N 7th Street from Lyndale Avenue to TH 55 (Olson Memorial Highway) results in queues that block upstream intersections and exacerbate the capacity issue at TH 55 (Olson Memorial Highway)/N 7th Street/N 6th Avenue. This also occurs in the N Lyndale Avenue Alternative as presented in the BLRT Traffic Operations Technical Memorandum dated September 15, 2022.

To accommodate the center-running LRT on CSAH 81 (W Broadway Avenue), the number of through lanes in the peak direction on W Broadway Avenue was decreased from two in the 2040 No Build conditions to one in the 2040 Build conditions. As a result, all movements at the intersection of W Broadway Avenue at N Lyndale Avenue experience delays and queue spillbacks through upstream intersections. This intersection was also shown operating Over Capacity with the N Lyndale Avenue Alternative as presented in the BLRT Traffic Operations Technical Memorandum dated September 15, 2022.

The overall intersection results are shown in **Table 5.1**.

Table 5.1 East of I-94 Alternative – 2040 Build Conditions Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
CSAH 81 (W Broadway Ave) / N Lyndale Ave**	Under Capacity	Over Capacity
CSAH 81 (W Broadway Ave) / N 4th St	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / I-94 Eastbound Ramps	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / CSAH 152 (N Washington Ave)	Under Capacity	Under Capacity
N Plymouth Ave / CSAH 152 (N Washington Ave)	Under Capacity	Under Capacity
N Plymouth Ave / N 3rd St*	Under Capacity	Under Capacity
CSAH 152 (N Washington Ave) / N 10th Ave	Under Capacity	Under Capacity
N 10th Ave / N 4th St*	Under Capacity	Under Capacity
N 10th Ave / N 5th St*	Under Capacity	Under Capacity
Oak Lake Ave N / N 8th Ave*	Under Capacity	Under Capacity
N 7th St / Oak Lake Ave N**	At Capacity	Under Capacity
TH 55 (Olson Memorial Highway) / N 7th St / N 6th Ave**	Under Capacity	Over Capacity

* Side street stop-controlled intersection
** Included in original Analysis

Appendix A

Existing Conditions: AM Peak Hour Traffic Volumes

Intersection	ID	Eastbound			Westbound			Northbound			Southbound		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Turning Movement Code		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
CSAH 81 (W Broadway Ave) / N Lyndale Ave	1	30	690	65	110	385	40	35	110	55	165	210	30
CSAH 81 (W Broadway Ave) / N 4th St	2	10	615	15	15	410	45	15	5	25	90	5	10
CSAH 81 (W Broadway Ave) / I-94 Eastbound Ramps	3	0	360	370	535	315	0	0	0	0	615	5	155
CSAH 81 (W Broadway Ave) / CSAH 152 (N Washington Ave)	4	85	570	320	75	535	140	165	390	315	15	95	150
N Plymouth Ave / CSAH 152 (N Washington Ave)	5	45	365	145	75	310	40	45	160	35	75	500	80
N Plymouth Ave / N 3rd St	6	5	510	10	35	395	5	25	0	35	10	0	10
CSAH 152 (N Washington Ave) / N 10th Ave	7	90	490	145	55	205	70	40	105	40	30	155	10
N 10th Ave / N 4th St	8	0	0	0	40	0	20	0	195	15	15	300	0
N 10th Ave / N 5th St	9	30	20	25	5	15	10	15	170	15	30	250	60
Oak Lake Ave N / N 8th Ave	10	5	0	15	25	5	5	30	285	65	5	280	5
N 7th St / Oak Lake Ave N	11	85	745	65	5	205	55	15	240	5	100	190	30
TH 55 (Olson Memorial Highway) / N 7th St / N 6th Ave	12	0	360	375	65	155	30	75	235	40	65	845	10

Existing Conditions: PM Peak Hour Traffic Volumes

Intersection	ID	Eastbound			Westbound			Northbound			Southbound		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Turning Movement Code		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
CSAH 81 (W Broadway Ave) / N Lyndale Ave	1	90	765	75	100	555	90	55	195	95	170	225	50
CSAH 81 (W Broadway Ave) / N 4th St	2	25	805	50	35	615	85	35	15	35	130	10	25
CSAH 81 (W Broadway Ave) / I-94 Eastbound Ramps	3	0	495	475	695	555	0	0	0	0	435	5	180
CSAH 81 (W Broadway Ave) / CSAH 152 (N Washington Ave)	4	190	535	205	75	705	255	320	650	490	10	110	225
N Plymouth Ave / CSAH 152 (N Washington Ave)	5	70	440	80	45	500	45	130	360	70	80	345	60
N Plymouth Ave / N 3rd St	6	10	585	5	5	680	5	10	0	5	0	5	5
CSAH 152 (N Washington Ave) / N 10th Ave	7	15	365	115	95	450	45	70	180	40	80	250	45
N 10th Ave / N 4th St	8	0	0	0	50	0	35	0	295	40	30	540	0
N 10th Ave / N 5th St	9	20	15	35	10	30	35	30	280	25	30	475	85
Oak Lake Ave N / N 8th Ave	10	5	0	0	30	0	10	30	370	40	5	450	5
N 7th St / Oak Lake Ave N	11	50	325	35	10	615	105	15	285	10	150	275	55
TH 55 (Olson Memorial Highway) / N 7th St / N 6th Ave	12	0	290	260	55	295	65	140	665	95	45	465	25

No Build Conditions: AM Peak Hour Traffic Volumes

Intersection	ID	Eastbound			Westbound			Northbound			Southbound		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Turning Movement Code		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
CSAH 81 (W Broadway Ave) / N Lyndale Ave	1	35	725	70	120	405	45	40	120	60	175	220	35
CSAH 81 (W Broadway Ave) / N 4th St	2	15	645	15	20	430	50	20	10	30	95	10	15
CSAH 81 (W Broadway Ave) / I-94 Eastbound Ramps	3	0	380	390	560	335	0	0	0	0	645	10	165
CSAH 81 (W Broadway Ave) / CSAH 152 (N Washington Ave)	4	90	600	335	80	560	150	175	410	330	20	100	160
N Plymouth Ave / CSAH 152 (N Washington Ave)	5	50	380	155	80	325	45	50	170	40	80	525	85
N Plymouth Ave / N 3rd St	6	10	530	15	40	410	10	30	0	40	15	0	15
CSAH 152 (N Washington Ave) / N 10th Ave	7	95	515	155	60	215	75	45	110	45	35	165	15
N 10th Ave / N 4th St	8	0	0	0	45	0	25	0	210	20	20	315	0
N 10th Ave / N 5th St	9	35	25	30	10	20	15	20	180	20	30	265	65
Oak Lake Ave N / N 8th Ave	10	10	0	15	30	10	10	35	300	70	10	295	10
N 7th St / Oak Lake Ave N	11	90	780	70	10	215	60	20	255	10	105	200	35
TH 55 (Olson Memorial Highway) / N 7th St / N 6th Ave	12	0	380	400	75	165	35	80	250	45	70	885	15

No Build Conditions: PM Peak Hour Traffic Volumes

Intersection	ID	Eastbound			Westbound			Northbound			Southbound		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Turning Movement Code		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
CSAH 81 (W Broadway Ave) / N Lyndale Ave	1	95	805	80	105	585	95	60	210	100	180	240	55
CSAH 81 (W Broadway Ave) / N 4th St	2	30	840	55	40	645	90	40	20	40	140	15	30
CSAH 81 (W Broadway Ave) / I-94 Eastbound Ramps	3	0	520	500	730	585	0	0	0	0	455	10	190
CSAH 81 (W Broadway Ave) / CSAH 152 (N Washington Ave)	4	200	560	215	80	740	270	335	680	515	15	120	240
N Plymouth Ave / CSAH 152 (N Washington Ave)	5	75	465	85	50	525	50	140	380	75	85	365	65
N Plymouth Ave / N 3rd St	6	15	615	10	10	710	10	15	0	10	0	10	10
CSAH 152 (N Washington Ave) / N 10th Ave	7	20	385	125	100	475	50	75	190	45	85	265	50
N 10th Ave / N 4th St	8	0	0	0	55	0	40	0	315	45	35	570	0
N 10th Ave / N 5th St	9	25	20	40	15	35	40	35	295	30	35	500	90
Oak Lake Ave N / N 8th Ave	10	10	0	0	30	0	15	35	390	40	10	475	10
N 7th St / Oak Lake Ave N	11	55	340	40	15	645	110	20	300	15	160	290	55
TH 55 (Olson Memorial Highway) / N 7th St / N 6th Ave	12	0	310	275	60	310	70	150	700	100	50	490	30

Build Conditions: AM Peak Hour Traffic Volumes

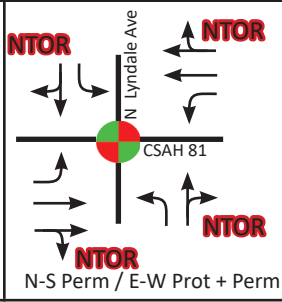
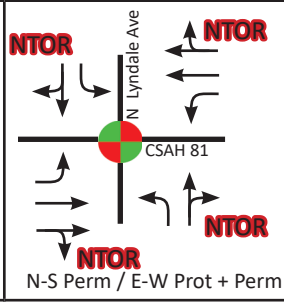
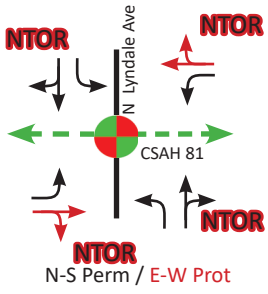
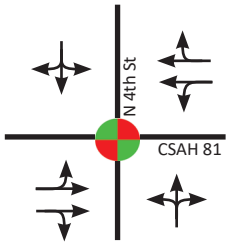
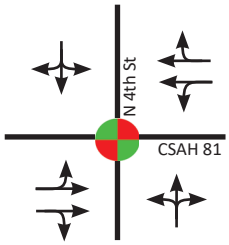
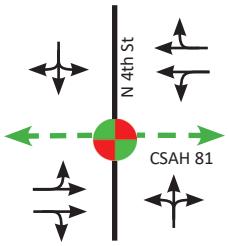
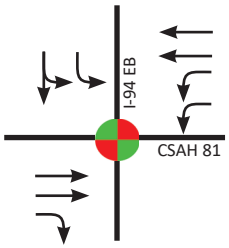
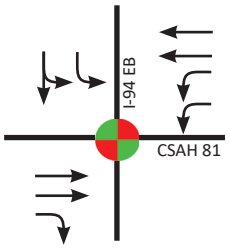
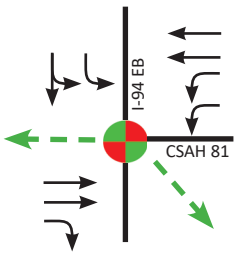
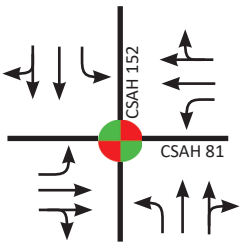
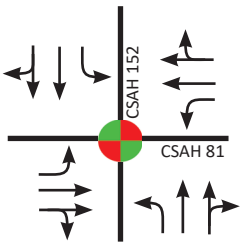
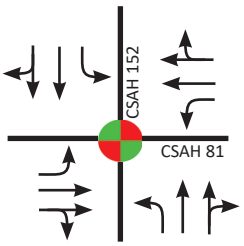
Intersection	ID	Eastbound			Westbound			Northbound			Southbound		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Turning Movement Code		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
CSAH 81 (W Broadway Ave) / N Lyndale Ave	1	35	725	70	120	405	45	40	120	60	175	220	35
CSAH 81 (W Broadway Ave) / N 4th St	2	15	645	15	20	430	50	20	10	30	95	10	15
CSAH 81 (W Broadway Ave) / I-94 Eastbound Ramps	3	0	380	390	560	335	0	0	0	0	645	10	165
CSAH 81 (W Broadway Ave) / CSAH 152 (N Washington Ave)	4	90	600	335	80	560	150	175	410	330	20	100	160
N Plymouth Ave / CSAH 152 (N Washington Ave)	5	50	380	155	80	325	45	50	170	40	80	525	85
N Plymouth Ave / N 3rd St	6	10	530	15	40	410	10	30	0	40	15	0	15
CSAH 152 (N Washington Ave) / N 10th Ave	7	95	515	155	60	215	75	45	110	45	35	165	15
N 10th Ave / N 4th St	8	0	0	0	45	0	25	0	210	20	20	315	0
N 10th Ave / N 5th St	9	45	25	30	50	20	15	20	170	20	30	265	65
Oak Lake Ave N / N 8th Ave	10	0	0	25	0	0	10	0	300	70	0	335	20
N 7th St / Oak Lake Ave N	11	90	780	70	10	215	60	20	255	10	105	200	35
TH 55 (Olson Memorial Highway) / N 7th St / N 6th Ave	12	0	380	400	75	165	35	80	250	45	70	885	15

Build Conditions: PM Peak Hour Traffic Volumes

Intersection	ID	Eastbound			Westbound			Northbound			Southbound		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Turning Movement Code		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
CSAH 81 (W Broadway Ave) / N Lyndale Ave	1	95	805	80	105	585	95	60	210	100	180	240	55
CSAH 81 (W Broadway Ave) / N 4th St	2	30	840	55	40	645	90	40	20	40	140	15	30
CSAH 81 (W Broadway Ave) / I-94 Eastbound Ramps	3	0	520	500	730	585	0	0	0	0	455	10	190
CSAH 81 (W Broadway Ave) / CSAH 152 (N Washington Ave)	4	200	560	215	80	740	270	335	680	515	15	120	240
N Plymouth Ave / CSAH 152 (N Washington Ave)	5	75	465	85	50	525	50	140	380	75	85	365	65
N Plymouth Ave / N 3rd St	6	15	615	10	10	710	10	15	0	10	0	10	10
CSAH 152 (N Washington Ave) / N 10th Ave	7	20	385	125	100	475	50	75	190	45	85	265	50
N 10th Ave / N 4th St	8	0	0	0	55	0	40	0	315	45	35	570	0
N 10th Ave / N 5th St	9	35	20	40	45	35	40	35	295	30	35	500	90
Oak Lake Ave N / N 8th Ave	10	0	0	0	0	0	15	0	390	40	0	505	10
N 7th St / Oak Lake Ave N	11	55	340	40	15	645	110	20	300	15	160	290	55
TH 55 (Olson Memorial Highway) / N 7th St / N 6th Ave	12	0	310	275	60	310	70	150	700	100	50	490	30

Appendix B

BLRT East of I-94 Alternative - Intersection Layout

#	Intersection	Existing Conditions	No Build Conditions	Build Conditions	Notes
1	CSAH 81 (W Broadway Ave) / N Lyndale Ave	 N-S Perm / E-W Prot + Perm	 N-S Perm / E-W Prot + Perm	 N-S Perm / E-W Prot	
2	CSAH 81 (W Broadway Ave) / N 4th St	 N-S Perm / E-W Perm	 N-S Perm / E-W Perm	 N-S Perm / E-W Perm	LRT grade-separated at N 4th St
3	CSAH 81 (W Broadway Ave) / I-94 EB Ramps	 N Perm / W Prot + Perm	 N Perm / W Prot + Perm	 N Perm / W Prot + Perm	LRT grade-separated at I-94 EB
4	CSAH 81 (W Broadway Ave) / CSAH 152 (N Washington Ave)	 N-S Prot + Perm / E Prot + Perm W Perm (AM); Prot + Perm (PM)	 N-S Prot + Perm / E Prot + Perm W Perm (AM); Prot + Perm (PM)	 N-S Prot + Perm / E Prot + Perm W Perm (AM); Prot + Perm (PM)	

Legend

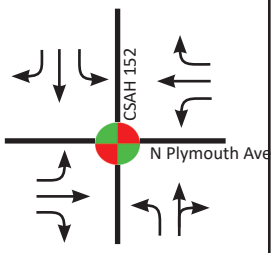
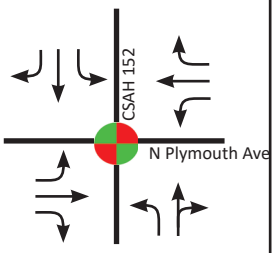
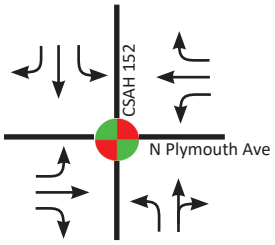
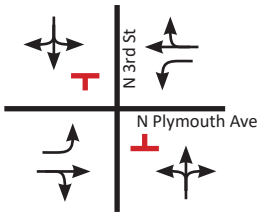
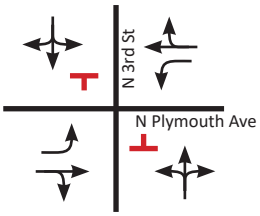
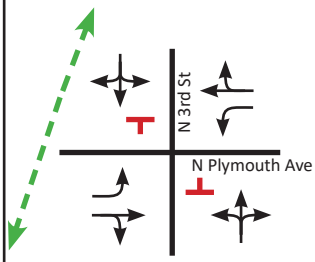
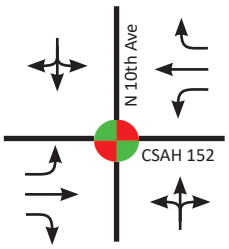
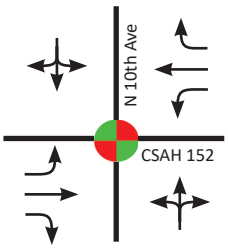
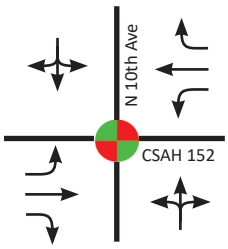
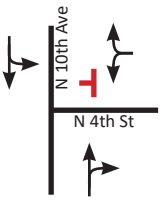
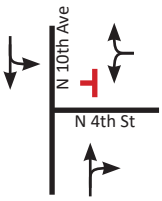
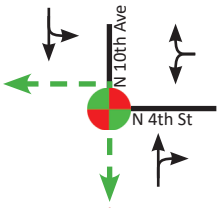
NOT TO SCALE

Traffic Signal	
Stop Control	
Lane Use	
Lane Use Change	

No Turn on Red	NTOR
LRT	
Channelized Right-Turn	

Perm	Permissive Left-Turn Phase
Prot+Perm	Protected/Permissive Left-Turn Phase
Prot	Protected Left-Turn Phase

BLRT East of I-94 Alternative - Intersection Layout

#	Intersection	Existing Conditions	No Build Conditions	Build Conditions	Notes
5	N Plymouth Ave / CSAH 152 (N Washington Ave)	 N-S Prot + Perm / E-W Perm	 N-S Prot + Perm / E-W Perm	 N-S Prot + Perm / E-W Perm	
6	N Plymouth Ave / N 3rd St				
7	CSAH 152 (N Washington Ave) / N 10th Ave	 N-S Perm / E-W Perm	 N-S Perm / E-W Perm	 N-S Perm / E-W Perm	Near side bus stops on CSAH 152 provide approach width for de facto right-turn lane
8	N 10th Ave / N 4th St			 S Perm / W Perm	

Legend

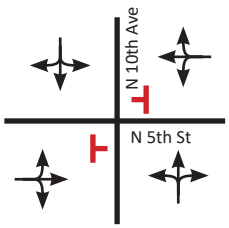
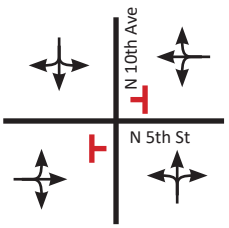
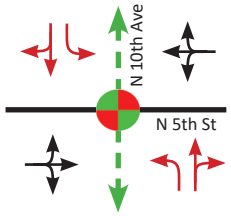
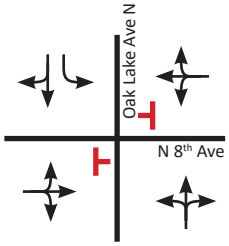
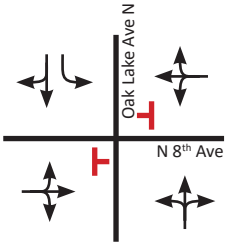
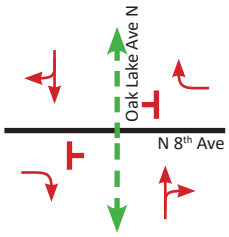
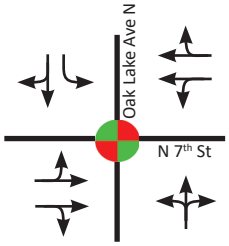
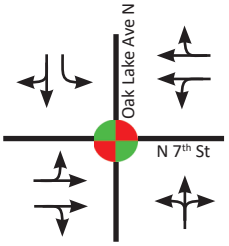
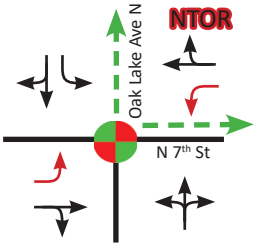
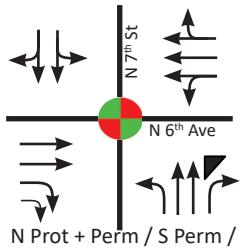
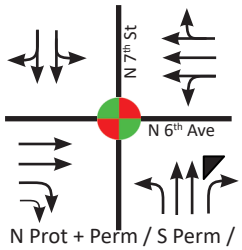
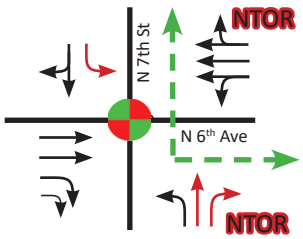
NOT TO SCALE

Traffic Signal	
Stop Control	
Lane Use	
Lane Use Change	

No Turn on Red	NTOR
LRT	
Channelized Right-Turn	

Perm	Permissive Left-Turn Phase
Prot+Perm	Protected/Permissive Left-Turn Phase
Prot	Protected Left-Turn Phase

BLRT East of I-94 Alternative - Intersection Layout

#	Intersection	Existing Conditions	No Build Conditions	Build Conditions	Notes
9	N 10th Ave / N 5th St			 N-S Prot / E-W Perm	
10	Oak Lake Ave N / N 8th Ave				Intersection converted to right-in right-out in 2040 Build conditions
11	N 7th St / Oak Lake Ave N	 N-S Perm / E-W Perm	 N-S Perm / E-W Perm	 N-S Perm / W Perm / E Prot	
12	TH 55 (Olson Memorial Highway) / N 7th St / N 6th Ave	 N Prot + Perm / S Perm / W Perm	 N Prot + Perm / S Perm / W Perm	 N Prot+Perm / S Prot / W Perm	WB assumed to operate Prot only in AM peak hour in 2040 Build conditions

Legend

N

NOT TO SCALE

Traffic Signal	
Stop Control	
Lane Use	
Lane Use Change	

No Turn on Red	NTOR
LRT	
Channelized Right-Turn	

Perm	Permissive Left-Turn Phase
Prot+Perm	Protected/Permissive Left-Turn Phase
Prot	Protected Left-Turn Phase

To: Nick Landwer, P.E.
Director of Design and Engineering, Blue Line LRT Extension Project

From: JoNette Kuhnau, P.E., PTOE
Traffic Engineering Task Lead, Kimley-Horn and Associates, Inc.

Leif Garnass, P.E., PTOE
SRF Consulting Group

Date: September 15, 2022

Subject: BLRT Traffic Operations Technical Memorandum
Supplemental Draft Environmental Impact Statement

1.0 Introduction

The Blue Line Light Rail Transit Extension (BLRT) project is proposed to be a 13-mile Light Rail Transit (LRT) project with 11 new stations that will operate from downtown Minneapolis through Robbinsdale, Crystal, and Brooklyn Park. The BLRT line will serve as an extension of the METRO Blue Line (Hiawatha Corridor) and will also connect to the METRO Green Line in downtown Minneapolis.

A traffic analysis was previously completed in 2015 for the BLRT alignment that included the BNSF Railway Monticello Subdivision. To advance the project without using railroad right-of-way, a modified route was approved by Hennepin County and the Metropolitan Council in 2022. The traffic analysis presented in this technical memorandum is based on the project scope as presented to the Metropolitan Council through August 2022.

1.1 Purpose of Memorandum

This technical memorandum has been prepared in support of the BLRT project design and the Supplemental Draft Environmental Impact Statement (SDEIS). The objective of the traffic analysis is to evaluate the potential traffic impacts of the project, including:

- Evaluation of the project's impacts on traffic operations at existing and proposed intersections and at-grade rail crossings along or near the BLRT alignment.
- Identification of preliminary improvements to address operational issues identified in the traffic analysis.

The methodology, assumptions, and results of the SDEIS analysis are presented in the following sections.

1.2 Study Areas

The location of the overall BLRT alignment is shown in **Figure 1.1**. The proposed BLRT guideway will be at-grade for most of its alignment and includes segments with the LRT operating in an exclusive guideway, grade-separated guideway, or semi-exclusive street-running operation. The locations of the intersections and at-grade crossings studied as part of the BLRT traffic analysis are shown in **Figure 1.2** - **Figure 1.7**. The analysis was broken into five sections, as shown in **Figure 1.1** and described below:

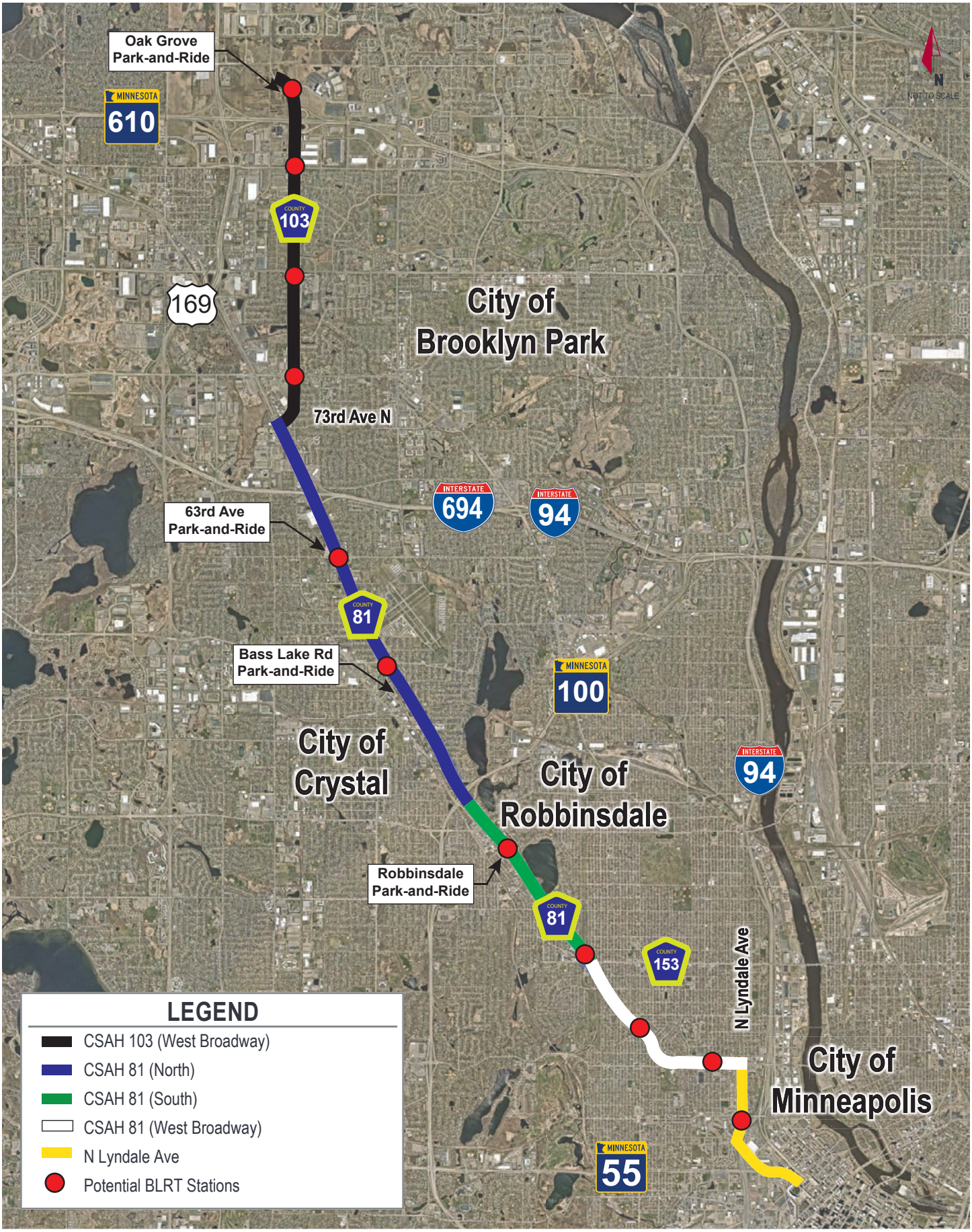
- CSAH 103 (West Broadway)
    - Operations and Maintenance Facility (OMF) to County State Aid Highway (CSAH) 81 (Bottineau Boulevard)/73rd Avenue
    - BLRT alignment side-running north of TH 610
    - BLRT alignment generally center-running along CSAH 103 (West Broadway Avenue)
- CSAH 81 North
    - 73rd Avenue N to TH 100
    - BLRT alignment center-running along CSAH 81 (Bottineau Boulevard)
- CSAH 81 South
    - TH 100 to CSAH 153 (Lowry Avenue)
    - BLRT alignment generally center-running along CSAH 81 (Bottineau Boulevard)
- CSAH 81 (West Broadway)
    - CSAH 153 (Lowry Avenue) to N Lyndale Avenue
    - BLRT alignment center-running along CSAH 81 (W Broadway Avenue)
- N Lyndale Avenue
    - CSAH 81 (W Broadway Avenue) to Target Field Station
    - BLRT alignment side-running along N Lyndale Avenue and N 7th Street

1.3 Data Collection

Multiple data elements were collected for each of the areas analyzed:

- Weekday intersection turning movement counts including passenger vehicles, heavy vehicles, pedestrians, and bicycles
    - Existing turning movement count data from 2021 was utilized where available
    - New turning movement count data was collected in April and May of 2022
- Signal timing and coordination plans for existing signalized intersections
- Bus routes, stops, and passenger loading/unloading

This data was used to assemble a comprehensive model of the existing conditions.

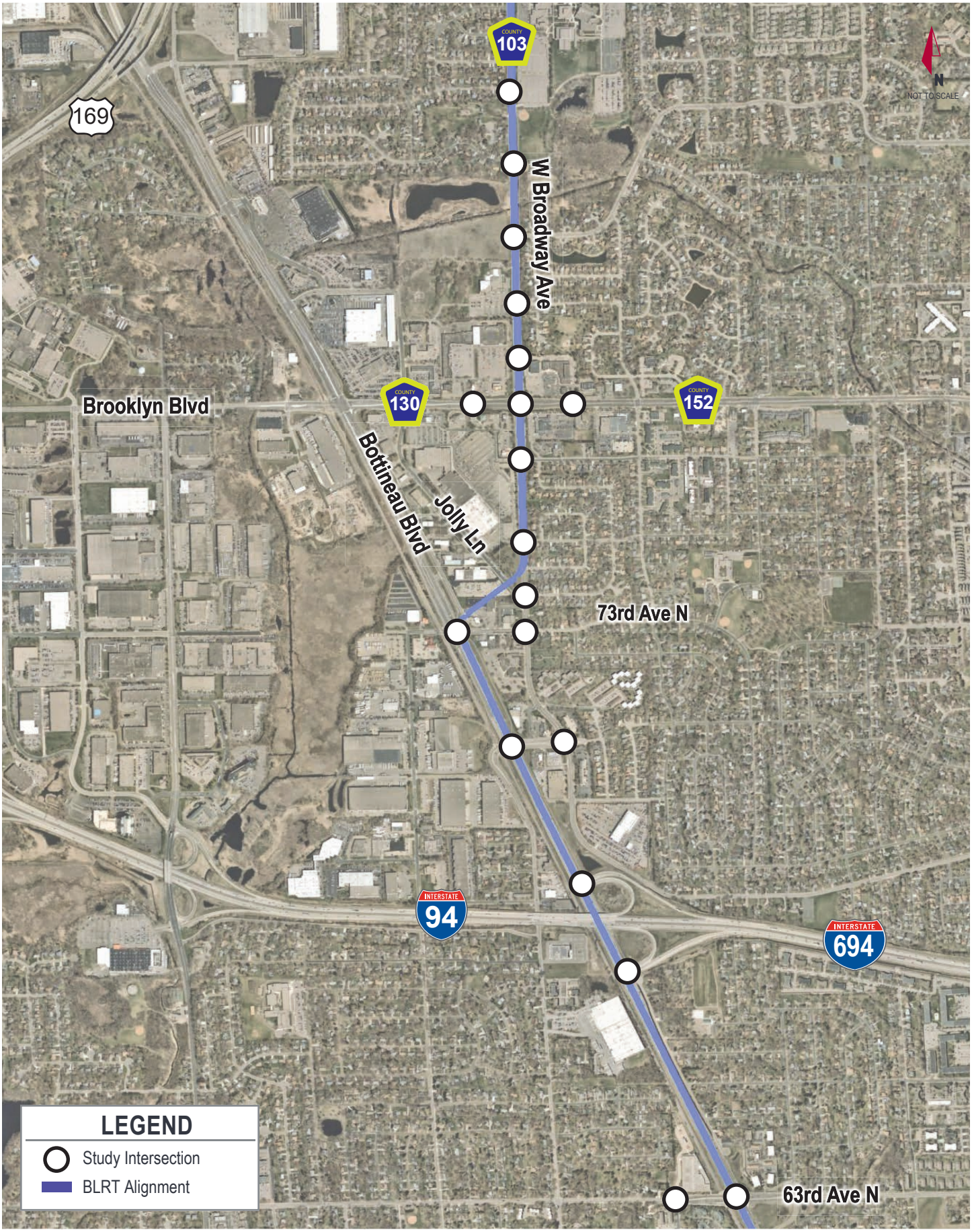


Kimley»Horn

FIGURE 1.1
ROUTE ALIGNMENT AND SEGMENTS

Kimley»Horn

FIGURE 1.2
STUDY INTERSECTIONS



Kimley»Horn

FIGURE 1.3
STUDY INTERSECTIONS

Kimley»Horn

FIGURE 1.4
STUDY INTERSECTIONS

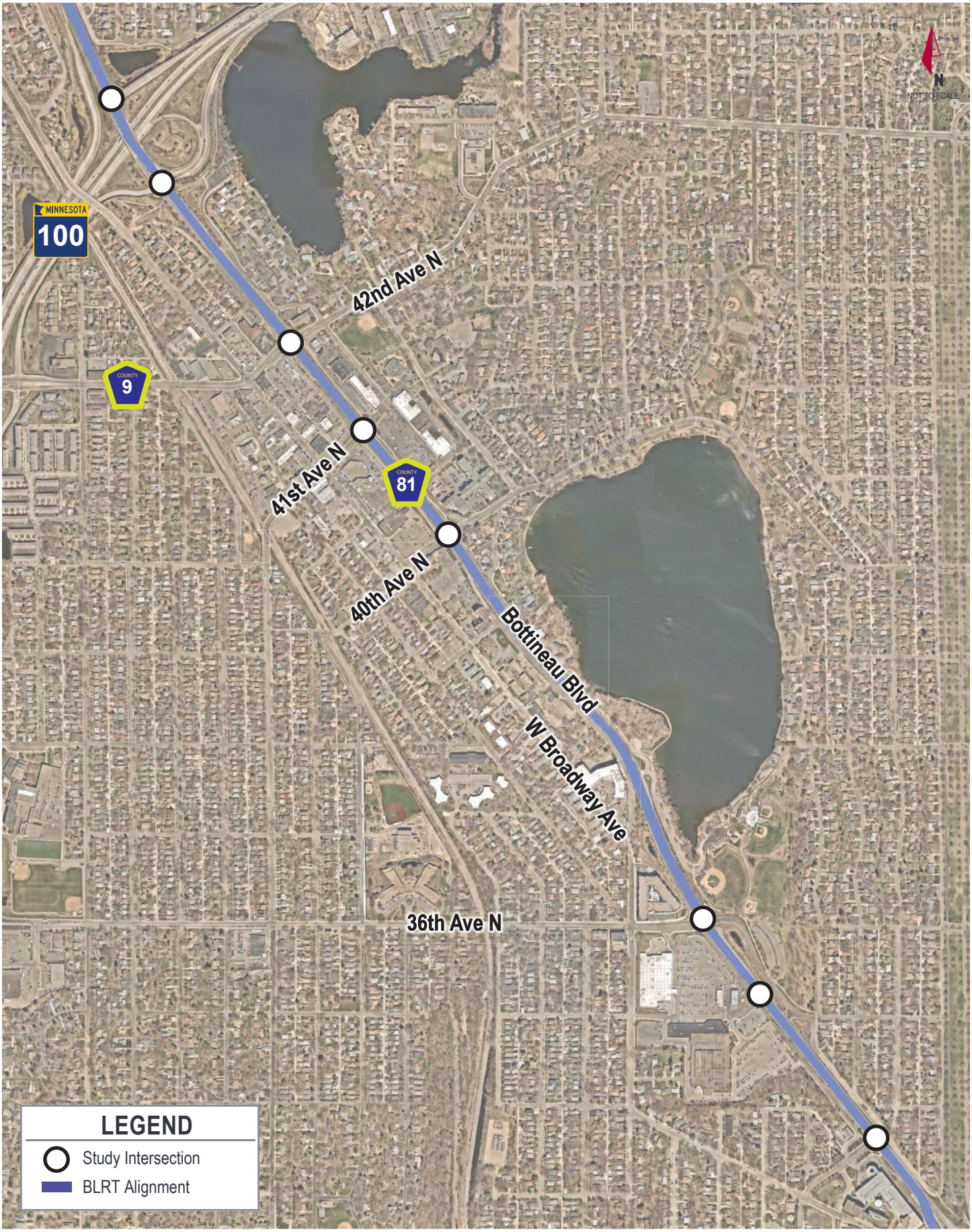


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FIGURE 1.5
STUDY INTERSECTIONS

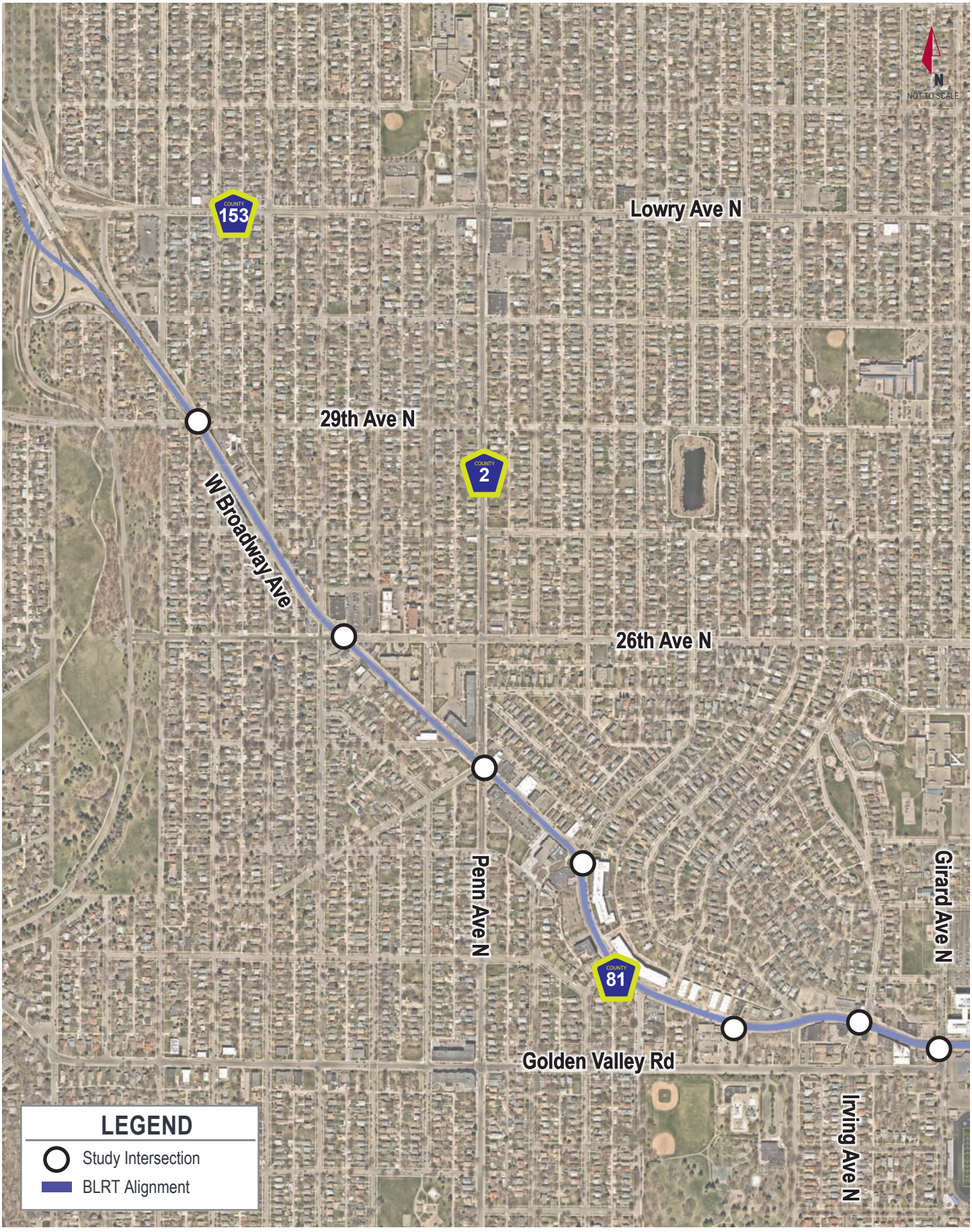

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FIGURE 1.6
STUDY INTERSECTIONS

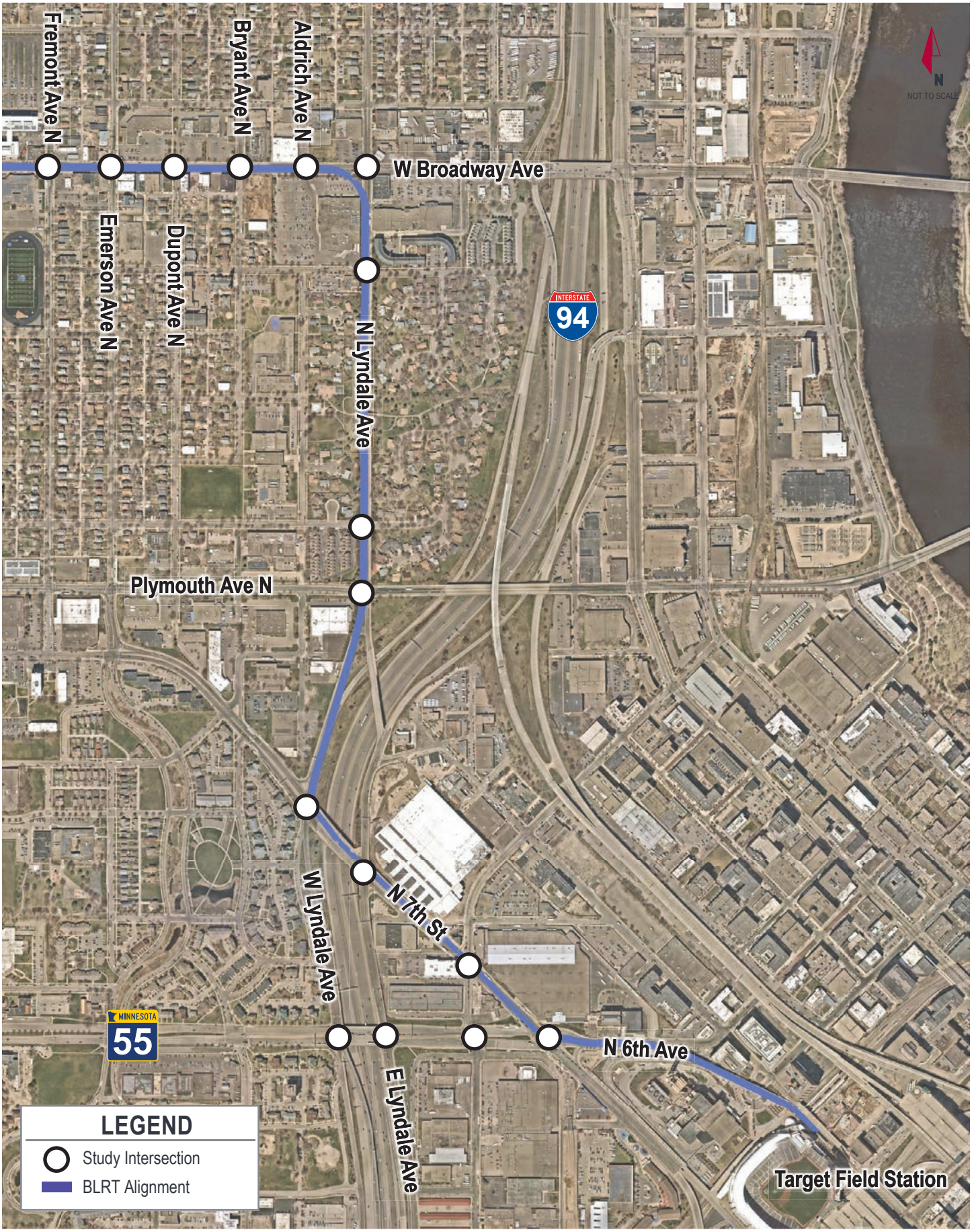

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FIGURE 1.7
STUDY INTERSECTIONS

2.0 Methodology

2.1 Key Intersections and At-Grade Crossings

To determine the impacts of the BLRT project on the local roadway network, a traffic operations analysis was conducted for signalized and unsignalized intersections within the vicinity of the new BLRT alignment or for intersections that would be expected to have increased traffic due to the BLRT stations, such as near park-and-ride facilities. The analysis area included signalized intersections with an LRT crossing in the intersection, unsignalized intersections that may have a change in intersection control, and intersections that provide access to an LRT station park-and-ride facility. Additional intersections were analyzed based on their proximity to an LRT crossing or park-and-ride facility and the potential for interaction with the crossing or park-and-ride facility.

2.2 Development of Traffic Volumes

Due to the lingering impacts of the COVID-19 pandemic at the time of analysis, the 2021/2022 traffic volumes were compared to traffic volumes collected prior to the pandemic. Based on these comparisons, the 2021/2022 peak hour traffic volumes at some intersections were consistently lower than the pre-COVID peak hour volumes. It is not known if peak hour traffic patterns will return to pre-pandemic conditions due to permanent changes in remote work and commuter behavior. Therefore, adjustment factors were developed and they produce a conservative analysis by reflecting pre-pandemic traffic levels. Separate adjustment factors were utilized for different zones within the study area and for each peak hour.

The development of the 2040 future year traffic forecasts was based on several data sources:

- Historic annual average daily traffic (AADT) volumes in the study area
- 2040 forecast daily traffic volumes as documented in the Hennepin County and city 2040 comprehensive plans
- 2040 socioeconomic data prepared by local communities and consistent with the Metropolitan Council's Thrive MSP 2040

This information was utilized at a localized level to develop future year forecasts for each roadway segment within the project area.

2.3 Traffic Analysis Methodology

Based on the current stage of the BLRT project, the traffic analysis was focused on the identification of intersection-level vehicle delays that will need to be mitigated as part of the project. As the project design is further developed and refined, more detailed traffic analysis will be conducted to document vehicle delays and queues for each intersection approach.

Three scenarios were analyzed as part of this traffic analysis:

- Existing conditions – Used to validate and calibrate the simulation models of the study areas
- 2040 No Build conditions – Analysis of future traffic conditions without BLRT
- 2040 Build conditions – Analysis of future traffic conditions with BLRT (including park-and-rides)

The approach to the traffic operations analysis is derived from the established methodologies documented in the Highway Capacity Manual, 6th Edition (HCM). The HCM contains a series of analysis techniques for evaluating the operations of transportation facilities under specified conditions. The models for the BLRT analysis have been developed using Synchro/SimTraffic or VISSIM, software packages that implements the HCM methodologies. The inputs to the software include lane geometrics, traffic volumes, pedestrian/bicycle volumes, transit stations, freight

and LRT alignments, freight and LRT volumes, intersection and grade crossing control devices, and signal phase and timing characteristics.

The outputs of the models are evaluated using the level of service thresholds as defined in the HCM, which are shown in **Table 2.1**. Based on standard practice in the traffic engineering industry, as well as guidance from the American Association of State Highway and Transportation Officials (AASHTO) and conformance with MnDOT practice, level of service D/E is considered to be the threshold of acceptable operations for an overall intersection in an urban or suburban area during peak hours. This analysis was focused at the intersection level, therefore all intersection analysis results in this memorandum are reported as Under Capacity (LOS A-D), At Capacity (LOS E), or Over Capacity (LOS F).

Table 2.1 Intersection Level of Service Definitions

Level of Service	Signalized Intersection Delay (seconds per vehicle)	Unsignalized Intersection Delay (seconds per vehicle)	BLRT Traffic Analysis Reporting
A	<10	<10	Under Capacity
B	>10-20	>10-15	
C	>20-35	>15-25	
D	>35-55	>25-35	
E	>55-80	>35-50	At Capacity
F	>80	>50	Over Capacity

Source: Highway Capacity Manual 6th Edition

The timeframe for the AM peak hour was determined from the highest four consecutive 15-minute interval volumes in the 7:00-9:00 AM time period, and the timeframe for the PM peak hour was determined from the highest four 15-minute interval volumes in the 4:00-6:00 PM time period.

In determining the peak hours, the highest hour of traffic volumes was calculated from the 7:00-9:00 AM time period for the AM peak hour and from 4:00-6:00 PM time period for the PM peak hour.

2.4 Design Criteria and Assumptions

All full access intersections with the LRT guideway, where all vehicular movements are allowed across the guideway, were assumed to be signalized to provide safe movement of LRT and vehicles. If any intersections along the LRT guideway were assumed to remain unsignalized, the intersections were converted to right-in right-out only intersections. Gates were not assumed to be used at any of the LRT guideway crossings because the operating speed of the LRT would not exceed the limit at which gates are required by the Manual on Uniform Traffic Control Devices.

2.5 Measures of Effectiveness

The measure of effectiveness that was used to evaluate the traffic operations results and identify potential project impacts was based on intersection delay (level of service).

The level of service criterion used to identify a project impact and potential mitigation is as follows:

- Overall intersection classified as At Capacity or Over Capacity in 2040 Build conditions if the overall intersection was classified as Under Capacity in 2040 No Build conditions.

In addition to level of service, intersection queues were reviewed at a high level in capacity-constrained areas. Qualitative assessments were made to identify queues that would be expected to extend into upstream intersections, to understand congestion impacts at the corridor level.

3.0 Existing Conditions Analysis

The existing conditions models were developed to validate and calibrate the simulation models of the study areas, which were then used to model the future year conditions. The assumptions, methodology, and results of the existing conditions analysis are presented in the following sections.

3.1 Existing Conditions Assumptions

The existing conditions analysis was based on traffic volumes, roadway geometrics, rail crossing treatments, and signal operations as they existed in 2021/2022 when the data collection was completed. The existing peak hour traffic volumes, which are based on the counts conducted in 2021/2022 and adjusted as previously described, are provided in **Appendix A**. The geometrics and intersection control for the existing conditions are shown in the intersection layout tables provided in **Appendix B**.

The actual peak hours varied for each study area; however, in all sections, all AM peak hours occurred within the range of 7:15 AM and 8:30 AM, and all PM peak hours occurred within the range of 4:00 PM and 5:30 PM. These ranges are based on the turning movement data collected within the study area.

The actual calculated peak hours varied for each study area but occurred within the range of 7:15 AM and 8:30 AM for the AM peak hour and 4:00 PM and 5:30 PM for the PM peak hour in all sections, based on the turning movement data collected within the study area.

Information collected along the freight rail corridor as part of the previous traffic analysis showed that at most one train per day with less than 20 cars is expected on the BNSF Monticello Subdivision. The data collected in 2014 showed that trains typically travel through the corridor in the AM peak hour, between 7:30 and 8:00 AM. No freight trains have been observed during the PM peak hour. Thus, a freight train event was included in a scenario in the AM peak hour for the CSAH 81 North segment, which has several intersections that are less than 200 feet away from freight rail crossings.

3.2 Existing Conditions Traffic Modeling Results

The existing operations results are presented for each of the five modeling areas in the following sections. All intersections were modeled in VISSIM.

3.2.1 CSAH 103 (West Broadway)

The results of the AM and PM peak hour analysis showed that all intersections currently operate Under Capacity during the Existing peak hour scenarios with the following exception:

- CSAH 103 (W Broadway Avenue)/CSAH 30 (93rd Avenue N) operates At Capacity in the PM peak hour.

The overall intersection results are shown in **Table 3.1**.

Table 3.1 CSAH 103 (West Broadway) – Existing Conditions Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
CSAH 103 (W Broadway Ave) / 101st Ave N*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / Winnetka Ave N*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / Oak Grove Pkwy	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / TH 610 WB Ramps	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / TH 610 EB Ramps	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / 94th Ave N*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / CSAH 30 (93rd Ave N)	Under Capacity	At Capacity
CSAH 103 (W Broadway Ave) / 92nd Ave N*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / Setzler Pkwy*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / 89th Ave N*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / Maplebrook Pkwy*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / CSAH 109 (85th Ave N)	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / 84th Ave N	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / College Park Dr*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / 82nd Ave N*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / Candlewood Dr	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / 78th Ave N*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / Shopping Center Access	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / CSAH 130 (Brooklyn Blvd) / CSAH 152	Under Capacity	Under Capacity
CSAH 130 (Brooklyn Blvd) / Shopping Center Access (west of CSAH 103)	Under Capacity	Under Capacity
CSAH 152 (Brooklyn Blvd) / Shopping Center Access (east of CSAH 103)*	Under Capacity	Under Capacity
CSAH 130 (W Broadway Ave) / 76th Ave N	Under Capacity	Under Capacity
CSAH 130 (W Broadway Ave) / 75th Ave N*	Under Capacity	Under Capacity
CSAH 130 (W Broadway Ave) / 74th Ave N*	Under Capacity	Under Capacity
CSAH 130 (W Broadway Ave) / 73rd Ave N	Under Capacity	Under Capacity

*Side street stop-controlled intersection

3.2.2 CSAH 81 North

The data collected along the BNSF Monticello Subdivision in 2014 showed that trains typically travel through the corridor in the AM peak hour, between 7:30 and 8:00 AM. No freight trains have been observed during the PM peak hour. Therefore, the AM peak hour analysis was conducted both with and without a freight event. The assumed freight event was approximately one minute in duration, which is consistent with the existing freight activity in the corridor. No freight events were analyzed for the PM peak hour.

The results of the AM and PM peak hour analysis showed that all intersections currently operate Under Capacity during the Existing peak hour scenarios, including during a 20-car freight event in the AM peak hour. The overall intersection results are shown in **Table 3.2**.

Table 3.2 CSAH 81 North – Existing Conditions Results

Intersection	Capacity Classification		
	AM Peak Hour No Freight Event	AM Peak Hour Freight Event	PM Peak Hour
CSAH 81 (Bottineau Blvd) / 73rd Ave N	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / CSAH 8 (W Broadway Ave) / 71st Ave N	Under Capacity	Under Capacity	Under Capacity
CSAH 130 (W Broadway Ave) / 71st Ave N	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / I-94 WB Ramps	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / I-94 EB Ramps	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 63rd Ave N	Under Capacity	Under Capacity	Under Capacity
63rd Ave N / Louisiana Ave N / Park-and-Ride Access*	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / CSAH 10 (Bass Lake Rd)	Under Capacity	Under Capacity	Under Capacity
Bass Lake Rd / Adair Ave*	Under Capacity	Under Capacity	Under Capacity
CSAH 10 (Bass Lake Rd) / Sherburne Ave	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Wilshire Blvd	Under Capacity	Under Capacity	Under Capacity
Wilshire Blvd / Lakeland Ave N*	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Corvallis Ave	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 47th Ave N	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / TH 100 SB Ramp	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / TH 100 NB Ramp	Under Capacity	Under Capacity	Under Capacity

*Side street stop-controlled intersection

3.2.3 CSAH 81 South

The results of the AM and PM peak hour analysis showed that all intersections currently operate Under Capacity during the Existing peak hour scenarios. The overall intersection results are shown in **Table 3.3**.

Table 3.3 CSAH 81 South – Existing Conditions Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
CSAH 81 (Bottineau Blvd) / CSAH 9 (42nd Ave N)	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 41st Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 40th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 36th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 35th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Abbott Ave N	Under Capacity	Under Capacity

3.2.4 CSAH 81 (West Broadway)

The results of the AM and PM peak hour analysis showed that all intersections currently operate Under Capacity during the Existing peak hour scenarios.

On-street parking is permitted on CSAH 81 between 29th Avenue N and Fremont Avenue N in the existing condition. During the AM peak hour, parking is permitted along the north curb line; therefore, the model included two eastbound/southbound through vehicle lanes and one westbound/northbound through vehicle lane. During the PM peak hour, parking is permitted along the south curb line; therefore, the model included two westbound/northbound through vehicle lanes and one eastbound/southbound through vehicle lane.

The overall intersection results are shown in **Table 3.4**.

Table 3.4 CSAH 81 (West Broadway) – Existing Conditions Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
CSAH 81 (W Broadway Ave) / 29th Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / 26th Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / CSAH 2 (Penn Ave N) / McNair Ave	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / Logan Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / Knox Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / Irving Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / Girard Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / Fremont Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / Emerson Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / Dupont Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / Bryant Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / Aldrich Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / N Lyndale Ave	Under Capacity	Under Capacity

3.2.5 N Lyndale Avenue

The results of the AM and PM peak hour analysis showed that all intersections currently operate Under Capacity during the Existing peak hour scenarios. The overall intersection results are shown in **Table 3.5.**

Table 3.5 N Lyndale Avenue – Existing Conditions Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
N Lyndale Ave / N 18th Ave	Under Capacity	Under Capacity
N Lyndale Ave / N 14th Ave*	Under Capacity	Under Capacity
N Lyndale Ave / Plymouth Ave N	Under Capacity	Under Capacity
N 7th St / W Lyndale Ave	Under Capacity	Under Capacity
N 7th St / E Lyndale Ave	Under Capacity	Under Capacity
N 7th St / Oak Lake Ave N	Under Capacity	Under Capacity
TH 55 (Olson Memorial Highway) / W Lyndale Ave	Under Capacity	Under Capacity
TH 55 (Olson Memorial Highway) / E Lyndale Ave	Under Capacity	Under Capacity
TH 55 (Olson Memorial Highway) / Oak Lake Ave N	Under Capacity	Under Capacity
TH 55 (Olson Memorial Highway) / N 7th St / N 6th Ave	Under Capacity	Under Capacity

* Side street stop-controlled intersection

3.3 Existing Conditions Traffic Modeling Summary

All intersections operate Under Capacity in the AM and PM peak hours of Existing conditions, with the following exception:

- CSAH 103 (W Broadway Avenue)/CSAH 30 (93rd Avenue N) operates At Capacity in the PM peak hour.

The operations at the CSAH 103 (W Broadway Avenue)/CSAH 30 (93rd Avenue N) intersection is primarily due to the eastbound and northbound approaches. During the PM peak hour CSAH 30 (93rd Avenue N) is frequently congested as it serves as a reliever for TH 610 when TH 610 is congested. Hennepin County and the City of Brooklyn Park have programmed projects to add capacity to this intersection to address the existing capacity issues.

4.0 2040 No Build Conditions Analysis

The 2040 No Build conditions modeling focused on a high-level intersection analysis of the forecast horizon year (2040). The assumptions, methodology, and results of the 2040 No Build conditions analysis are presented in the following sections.

4.1 2040 No Build Conditions Assumptions

The 2040 No Build conditions analysis was based on the future year 2040 No Build conditions traffic volumes, existing roadway geometrics, programmed improvements, and rail crossing treatments.

The 2040 forecast peak hour traffic volumes, which are provided in **Appendix A**, were developed based on the methodology described in Section 2.2. Geometric improvements assumed in the 2040 No Build conditions analysis are shown in the intersection layouts provided in **Appendix B**, and were based on currently programmed projects:

- The D Line arterial bus rapid transit (BRT) is currently under construction and is anticipated to open in late 2022 to replace local bus Route 5. Within the study area, the route will travel on N 7th Street, Emerson Avenue N, and Fremont Avenue N in Minneapolis. The 2040 No Build conditions assumes that the D Line BRT would replace local bus Route 5 and would utilize D Line station locations and 10-minute service during weekday peak periods.
- CSAH 103 (West Broadway Avenue) reconstruction from a two-lane to a four-lane roadway from 78th Avenue N to CSAH 30 (93rd Avenue N) currently planned by Hennepin County.
- CSAH 30 (93rd Avenue N) reconstruction to extend the four-lane roadway from Xylon Avenue N to Louisiana Avenue N currently planned by Hennepin County.

The geometrics and intersection control for the 2040 No Build conditions are shown in the intersection layout tables provided in **Appendix B**.

No improvements were assumed at any of the existing rail crossings. Signal timing was modified and optimized in the 2040 analysis as part of the VISSIM simulation models. The CSAH 103 (West Broadway Avenue), CSAH 81 (Bottineau Boulevard), CSAH 81 (West Broadway), N Lyndale Avenue and 7th Street were all assumed to operate with coordinated and interconnected traffic signals.

4.2 2040 No Build Conditions Traffic Modeling Results

The same five modeling areas created for the Existing conditions modeling were used for the 2040 No Build conditions analysis. The 2040 No Build conditions operations results are presented by modeling area in the following sections. All intersections were modeled in VISSIM.

4.2.1 CSAH 103 (W Broadway)

The results of the AM and PM peak hour analysis showed that all intersections operate Under Capacity during the 2040 No Build conditions peak hour scenarios with the following exceptions:

- CSAH 103 (West Broadway Avenue)/101st Avenue N is anticipated to operate Over Capacity in the PM peak hour.
- CSAH 103 (West Broadway Avenue)/Winnetka Avenue N is anticipated to operate Over Capacity in the PM peak hour.
- CSAH 103 (West Broadway Avenue)/CSAH 30 (93rd Avenue N) is anticipated to operate Over Capacity in the PM peak hour.
- CSAH 103 (West Broadway Avenue)/CSAH 109 (85th Avenue) is anticipated to operate Over Capacity in the PM peak hour.

The overall intersection results are shown in **Table 4.1**.

Table 4.1 CSAH 103 (W Broadway) – 2040 No Build Conditions Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
CSAH 103 (W Broadway Ave) / 101st Ave N*	Under Capacity	Over Capacity
CSAH 103 (W Broadway Ave) / Winnetka Ave N*	Under Capacity	Over Capacity
CSAH 103 (W Broadway Ave) / Oak Grove Pkwy	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / TH 610 WB Ramps	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / TH 610 EB Ramps	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / 94th Ave N*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / CSAH 30 (93rd Ave N)	Under Capacity	Over Capacity
CSAH 103 (W Broadway Ave) / 92nd Ave N*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / Setzler Pkwy*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / 89th Ave N*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / Maplebrook Pkwy	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / CSAH 109 (85th Ave N)	Under Capacity	Over Capacity
CSAH 103 (W Broadway Ave) / 84th Ave N	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / College Park Dr*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / 82nd Ave N*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / Candlewood Dr*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / 78th Ave N*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / Shopping Center Access	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / CSAH 130 (Brooklyn Blvd) / CSAH 152	Under Capacity	Under Capacity
CSAH 130 (Brooklyn Blvd) / Shopping Center Access (west of CSAH 103)	Under Capacity	Under Capacity
CSAH 152 (Brooklyn Blvd) / Shopping Center Access (east of CSAH 103)*	Under Capacity	Under Capacity
CSAH 130 (W Broadway Ave) / 76th Ave N	Under Capacity	Under Capacity
CSAH 130 (W Broadway Ave) / 75th Ave N*	Under Capacity	Under Capacity
CSAH 130 (W Broadway Ave) / 74th Ave N*	Under Capacity	Under Capacity
CSAH 130 (W Broadway Ave) / 73rd Ave N	Under Capacity	Under Capacity

* Side street stop-controlled intersection

The poor operations (delay and queuing) in the 2040 No Build conditions are due to the intense development planned to occur in this area by 2040. Queues spill back between all intersections north of TH 610 and roadway capacity improvements would be needed to accommodate the forecast growth in traffic. However, there are not currently roadway improvement projects programmed in this area independent of the BLRT project.

Several of the intersections along CSAH 103 (West Broadway Avenue) south of TH 610 had better operations in 2040 No Build conditions than in the Existing conditions, due to the planned CSAH 103 (W Broadway Avenue) roadway reconstruction.

The poor operations at CSAH 103 (W Broadway Avenue)/CSAH 30 (93rd Avenue N) is primarily due to the westbound left turn movement and the eastbound movements. These are fairly high volumes which demand a lot of signal time and are competing with the northbound and southbound movements. During the PM peak hour CSAH 30 (93rd Avenue N) is frequently congested as it serves as a reliever for TH 610 when TH 610 is congested

The poor operations at CSAH 103 (West Broadway Avenue)/CSAH 109 (85th Avenue) is primarily due to the westbound left turn movement and the eastbound movements. These are fairly high volumes which demand a lot of signal time and are competing with the northbound and southbound movements.

4.2.2 CSAH 81 North

The results of the AM and PM peak hour analysis showed that all intersections would be expected to operate Under Capacity during the 2040 No Build conditions peak hour scenarios, including a 20-car (approximately one minute) freight event in the AM peak hour. The overall intersection results are shown in **Table 4.2**.

Table 4.2 CSAH 81 North – 2040 No Build Conditions Results

Intersection	Capacity Classification		
	AM Peak Hour No Freight Event	AM Peak Hour Freight Event	PM Peak Hour
CSAH 81 (Bottineau Blvd) / 73rd Ave N	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / CSAH 8 (W Broadway Ave) / 71st Ave N	Under Capacity	Under Capacity	Under Capacity
CSAH 130 (W Broadway Ave) / 71st Ave N	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / I-94 WB Ramps	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / I-94 EB Ramps	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 63rd Ave N	Under Capacity	Under Capacity	Under Capacity
63rd Ave N / Louisiana Ave N / Park-and-Ride Access*	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / CSAH 10 (Bass Lake Rd)	Under Capacity	Under Capacity	Under Capacity
Bass Lake Rd / Adair Ave*	Under Capacity	Under Capacity	Under Capacity
CSAH 10 (Bass Lake Rd) / Sherburne Ave	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Wilshire Blvd	Under Capacity	Under Capacity	Under Capacity
Wilshire Blvd / Lakeland Ave N*	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Corvallis Ave N	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 47th Ave N	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / TH 100 SB Ramp	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / TH 100 NB Ramp	Under Capacity	Under Capacity	Under Capacity

*Side street stop-controlled intersection

4.2.3 CSAH 81 South

The results of the AM and PM peak hour analysis showed that all intersections are expected to operate Under Capacity during the 2040 No Build conditions peak hour scenarios. The overall intersection results are shown in **Table 4.3**.

Table 4.3 CSAH 81 South – 2040 No Build Conditions Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
CSAH 81 (Bottineau Blvd) / CSAH 9 (42nd Ave N)	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 41st Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 40th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 36th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 35th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Abbott Ave N	Under Capacity	Under Capacity

4.2.4 CSAH 81 (West Broadway)

The results of the AM and PM peak hour analysis showed that all intersections are expected to operate Under Capacity during the 2040 No Build conditions peak hour scenarios.

The overall intersection results are shown in **Table 4.4.**

Table 4.4 CSAH 81 (West Broadway) – 2040 No Build Conditions Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
CSAH 81 (W Broadway Ave) / 29th Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / 26th Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / CSAH 2 (Penn Ave N) / McNair Ave	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / Logan Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / Knox Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / Irving Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / Girard Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / Fremont Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / Emerson Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / Dupont Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / Bryant Ave N*	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / Aldrich Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / N Lyndale Ave	Under Capacity	Under Capacity

*Side street stop-controlled intersection

4.2.5 N Lyndale Avenue

The results of the AM and PM peak hour analysis showed that all intersections are expected to operate Under Capacity during the 2040 No Build conditions peak hour scenarios. The overall intersection results are shown in **Table 4.5**.

Table 4.5 N Lyndale Avenue – 2040 No Build Conditions Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
N Lyndale Ave / N 18th Ave	Under Capacity	Under Capacity
N Lyndale Ave / N 14th Ave*	Under Capacity	Under Capacity
N Lyndale Ave / Plymouth Ave N	Under Capacity	Under Capacity
N 7th St / W Lyndale Ave	Under Capacity	Under Capacity
N 7th St / E Lyndale Ave	Under Capacity	Under Capacity
N 7th St / Oak Lake Ave N	Under Capacity	Under Capacity
TH 55 (Olson Memorial Highway) / W Lyndale Ave	Under Capacity	Under Capacity
TH 55 (Olson Memorial Highway) / E Lyndale Ave	Under Capacity	Under Capacity
TH 55 (Olson Memorial Highway) / Oak Lake Ave N	Under Capacity	Under Capacity
TH 55 (Olson Memorial Highway) / N 7th St / N 6th Ave	Under Capacity	Under Capacity

* Side street stop-controlled intersection

4.3 2040 No Build Conditions Traffic Modeling Summary

All intersections would be expected to operate Under Capacity in the AM and PM peak hours of 2040 No Build conditions, with the following exceptions:

- CSAH 103 (West Broadway Avenue)/101st Avenue N is expected to operate Over Capacity in the 2040 PM peak hour.
- CSAH 103 (West Broadway Avenue)/Winnetka Avenue N is expected to operate Over Capacity in the 2040 PM peak hour.
- CSAH 103 (W Broadway Avenue)/CSAH 30 (93rd Avenue N) is expected to operate Over Capacity in the 2040 PM peak hour.
- CSAH 103 (W Broadway Avenue)/CSAH 109 (85th Avenue) is expected to operate Over Capacity in the 2040 PM peak hour.

The poor operations (delay and queuing) in the 2040 No Build conditions north of TH 610 are due to the intense development planned to occur in this area by 2040. Queues spill back between all intersections north of TH 610 and roadway capacity improvements would be needed to accommodate the forecast growth in traffic. However, there are not currently roadway improvement projects programmed in this area independent of the BLRT project.

The poor operations at CSAH 103 (W Broadway Avenue)/CSAH 30 (93rd Avenue N) is primarily due to the westbound left turn movement and the eastbound movements. These are fairly high volumes which demand a lot of signal time and are competing with the northbound and southbound movements. During the PM peak hour CSAH 30 (93rd Avenue N) is frequently congested as it serves as a reliever for TH 610 when TH 610 is congested.

The poor operations at CSAH 103 (West Broadway Avenue)/CSAH 109 (85th Avenue) is primarily due to the westbound left turn movement and the eastbound movements. These are fairly high volumes which demand a lot of signal time and are competing with the northbound and southbound movements.

Many of the intersections along CSAH 103 (West Broadway Avenue) had better operations in the 2040 No Build conditions than in the Existing conditions due to the planned capital projects.

5.0 2040 Build Conditions Analysis

The 2040 Build conditions modeling was conducted to identify the expected traffic operations for the forecast horizon year (2040) with the LRT operating. The assumptions, methodology, and results of the 2040 Build conditions analysis are presented in the following sections.

5.1 2040 Build Conditions Assumptions

The traffic volumes for the 2040 Build conditions were based on the same land use and growth forecasts as the 2040 No Build conditions.

Due to the proposed reduction in lanes on CSAH 81 between TH 100 and CSAH 103, volumes along CSAH 103 (W Broadway Avenue) and CSAH 81 (Bottineau Boulevard) were adjusted to reflect potential traffic shifts between 12% and 14% within the study area. The extent of the traffic shifts along CSAH 81 (Bottineau Boulevard) included the section from CSAH 103 (W Broadway Avenue) to TH 100. The Hennepin County Travel Demand Model was used to develop 2040 Build conditions volumes for these corridors.

The location and size of park-and-ride facilities included in the traffic modeling are summarized in **Table 5.1**. The trips to and from the park-and-ride facilities in Brooklyn Park and Crystal were incorporated into the traffic analysis. The traffic analysis assumed the full 2040 demand for parking spaces in order to capture the full potential parking capacity of these sites and produce a conservative analysis of the park-and-ride traffic impacts. The traffic analysis at the 63rd Avenue Station included an increased number of parking spaces, compared to what is currently proposed by the BLRT project, in order to model the expected traffic operations if the existing parking facility were to be expanded in the future to the site's full parking capacity.

Table 5.1 Park-and-Ride Facility Summary – 2040 Build Conditions

Location	Number of Park-and-Ride Spaces Proposed	Number of Park-and-Ride Spaces Analyzed
Oak Grove Station	850	850
63rd Avenue Station	565	725
Bass Lake Road Station	170	170

A park-and-ride is also planned in Downtown Robbinsdale, but the location and size of the facility have not been determined. It is anticipated that the parking facility would likely have 250 to 500 parking spaces. A parking facility of this size would generate approximately 125 to 250 trips in the peak hours, which would be approximately 15 percent of the 2040 forecast volume on CSAH 81 (Bottineau Boulevard). Based on the 2040 No Build conditions and 2040 Build conditions intersection operations on this segment of CSAH 81 (Bottineau Boulevard), which are all Under Capacity, a 15 percent increase in traffic would not be expected to result in At Capacity or Over Capacity intersection operations in the peak hours. Detailed analysis of the Robbinsdale park-

and-ride traffic will be completed when the location, access points, and size of the facility are determined. A park-and-ride facility is not currently planned in Minneapolis.

The location of each park-and-ride facility along the alignment is shown in **Figure 1.1**.

For 2040 Build conditions, unsignalized intersections that intersect the LRT alignment were assumed to be signalized, were modified to right-in right-out only, or the side street was closed, as shown in **Appendix B.** Where side street access was modified, volumes were redistributed to nearby intersections. The modeled AM and PM peak hour turning movement volumes for the 2040 Build conditions are provided in **Appendix A**.

The LRT was assumed to operate with a 10-minute headway and with a 20 second dwell time at each station. Near the proposed LRT stations, the locations of which are shown in **Figure 1.1**, pedestrian volumes were increased to account for increased pedestrian activity that would occur.

All the LRT crossings were assumed to be controlled by traffic signals. At intersections with left turns across the LRT tracks, protected-only left turn phasing was assumed. For all intersections with right turns across the tracks, right turns on red were prohibited. Signal coordination, signal phasing, and cycle splits were modified and optimized along the entire LRT alignment.

Bus stops for existing routes 14, 22, and 30 were consolidated along the route to reflect the likely levels of local bus service along the LRT alignment.

Several infrastructure, geometric, and signal modifications were identified along the route to provide control of the LRT at intersections and to provide adequate infrastructure to accommodate buses, pedestrians, and park-and-ride traffic near stations. These project elements were incorporated into the 2040 Build conditions modeling, and the significant infrastructure improvements are listed below:

- Reconstruct 101st Avenue N and Oak Grove Parkway to accommodate the needs of the BLRT OMF site.
- Reconstruct CSAH 103 (West Broadway Avenue) from TH 610 to north of Oak Grove Parkway to accommodate the desired location of the LRT alignment, station location, and park-and-ride parking structure.
- Install a new traffic signal at CSAH 103 (West Broadway Avenue)/99th Avenue N to provide a second access point to the park-and-ride facility.
- Install a new traffic signal at CSAH 103 (West Broadway Avenue)/94th Avenue N to allow LRT to transition from side-running to center-running.
- Reconstruct CSAH 103 (West Broadway Avenue)/CSAH 109 (85th Avenue) to remove channelized right turns and dedicated right turn lanes to accommodate pedestrian crossings for 85th Avenue Station.
- Construct west leg of CSAH 103 (West Broadway Avenue)/Candlewood Drive.
- Reconstruct CSAH 103 (West Broadway Avenue)/CSAH 130 (Brooklyn Boulevard) to remove channelized rights and dedicated right turn lanes to accommodate pedestrian crossings for Brooklyn Boulevard Station.
- Install a new traffic signal at CSAH 103 (West Broadway Avenue)/75th Avenue N to allow LRT to transition from side-running to center-running.
- Install a new traffic signal at 63rd Avenue N/Louisiana Avenue N to provide for pedestrian crossings of 63rd Avenue N and facilitate traffic exiting the park-and-ride facility.
- Install a new traffic signal at CSAH 81 (W Broadway Avenue)/Bryant Avenue N to maintain neighborhood pedestrian access.
- Install a new traffic signal at N Lyndale Avenue/N 14th Avenue to maintain neighborhood pedestrian access.

The future configuration of the CSAH 81 (Bottineau Boulevard)/CSAH 10 (Bass Lake Road) intersection with the addition of LRT is currently being evaluated. Two scenarios were analyzed:

- Scenario 1 – Convert the intersection of CSAH 81 (Bottineau Boulevard)/CSAH 10 (Bass Lake Road) into a tight diamond interchange with CSAH 81 (Bottineau Boulevard) being constructed over CSAH 10 (Bass Lake Road). This design would keep the LRT tracks at-grade across CSAH 10 (Bass Lake Road).
- Scenario 2 – CSAH 81 (Bottineau Boulevard) remains at-grade through the CSAH 10 intersection and would have six through traffic lanes from CSAH 10 (Bass Lake Road) to just south of Wilshire Boulevard.

In both scenarios, CSAH 81 (Bottineau Boulevard) would be a four-lane divided roadway with LRT in the median on the rest of the CSAH 81 (Bottineau Boulevard) corridor, except CSAH 81 (Bottineau Boulevard) from Corvallis Avenue to TH 100 where it was assumed to be a five-lane section with three southbound lanes and two northbound lanes.

Several new intersections were added to the analysis north of TH 610 for the 2040 Build conditions. The Oak Grove Parkway/Xylon Avenue intersection will provide access to the OMF and is proposed to operate with stop control on Xylon Avenue. The CSAH 103 (West Broadway Avenue)/99th Avenue intersection will provide access to the Oak Grove Station park-and-ride facility and is proposed to operate with signalized control. Due to the roadway reconfiguration in this area, the CSAH 103 (West Broadway Avenue)/101st Avenue N and CSAH 103 (West Broadway Avenue)/Winnetka Avenue N intersections would no longer exist, and therefore were not included in the 2040 Build conditions analysis. The CSAH 103 (West Broadway Avenue)/Oak Grove Parkway intersection has a non-revenue LRT crossing, which would include LRT movements only in and out of the OMF site. These crossings would be limited and would occur outside of the peak periods and were not included in the analysis.

The geometrics and intersection control for the 2040 Build conditions are shown in the intersection layout tables provided in **Appendix B**.

5.2 2040 Build Conditions Traffic Modeling Results

The same modeling areas created for the Existing and 2040 No Build conditions modeling were used for the 2040 Build conditions analysis, with the exception of the new intersections north of TH 610. The 2040 Build conditions operations results are presented by modeling area in the following sections. All intersections were modeled in VISSIM with the exception of the new intersection of Oak Grove Parkway/Xylon Avenue which was modeled in Synchro/SimTraffic.

5.2.1 CSAH 103 (W Broadway)

The results of the AM and PM peak hour analysis showed that all intersections would be expected to operate Under Capacity during the 2040 Build conditions peak hour scenarios with the following exceptions:

- Oak Grove Parkway/Xylon Avenue is anticipated to operate Over Capacity in the AM and PM peak hours.
- CSAH 103 (W Broadway Avenue)/CSAH 30 (93rd Avenue N) is anticipated to operate Over Capacity in the AM and PM peak hours.
- CSAH 103 (W Broadway Avenue)/CSAH 109 (85th Avenue N) is anticipated to operate Over Capacity in the AM and PM peak hours.

A future traffic signal is expected to be needed at Oak Grove Parkway/Xylon Avenue to accommodate future traffic volumes. The traffic signal is recommended to be constructed (by others) as its warranted by development traffic. The signal is not needed for the BLRT project or for LRT operations, and therefore it is not proposed to be constructed as part of the BLRT project. The overall intersection results are shown in **Table 5.2**.

Table 5.2 CSAH 103 (W Broadway) – 2040 Build Conditions Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
Oak Grove Pkwy/Xylon Ave*	Over Capacity	Over Capacity
CSAH 103 (W Broadway Ave) / Oak Grove Pkwy	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / 99th Ave N	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / TH 610 WB Ramps	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / TH 610 EB Ramps	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / 94th Ave N	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / CSAH 30 (93rd Ave N)	Over Capacity	Over Capacity
CSAH 103 (W Broadway Ave) / 92nd Ave N*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / Setzler Pkwy	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / 89th Ave N*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / Maplebrook Pkwy	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / CSAH 109 (85th Ave N)	Over Capacity	Over Capacity
CSAH 103 (W Broadway Ave) / 84th Ave N*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / College Park Dr	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / 82nd Ave N*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / Candlewood Dr	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / 78th Ave N*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / Shopping Center Access*	Under Capacity	Under Capacity
CSAH 103 (W Broadway Ave) / CSAH 130 (Brooklyn Blvd) / CSAH 152	Under Capacity	Under Capacity
CSAH 130 (Brooklyn Blvd) / Shopping Center Access (west of CSAH 103)	Under Capacity	Under Capacity
CSAH 152 (Brooklyn Blvd) / Shopping Center Access (east of CSAH 103)*	Under Capacity	Under Capacity
CSAH 130 (W Broadway Ave) / 76th Ave N	Under Capacity	Under Capacity
CSAH 130 (W Broadway Ave) / 75th Ave N	Under Capacity	Under Capacity
CSAH 130 (W Broadway Ave) / 74th Ave N*	Under Capacity	Under Capacity
CSAH 130 (W Broadway Ave) / 73rd Ave N	Under Capacity	Under Capacity

*Side street stop-controlled intersection

The poor operations at CSAH 103 (W Broadway Avenue)/CSAH 30 (93rd Avenue N) is primarily due to the westbound left turn movement and the eastbound movements. These are fairly high volumes which demand a lot of signal time and are competing with the northbound and southbound movements. This intersection also operated Over Capacity in the 2040 No Build conditions PM peak hour.

The poor operations at CSAH 103 (W Broadway Avenue)/CSAH 109 (85th Avenue N) is primarily due to the westbound and eastbound movement conflicting with the northbound and southbound movements for signal time. The primary driver of this is the eastbound left turns conflicting with the northbound left turns, and dual left-turn lanes could be considered at this intersection. This intersection also operated Over Capacity in the 2040 No Build conditions PM peak hour.

5.2.2 CSAH 81 North

The results of the AM and PM peak hour analysis showed that all intersections would be expected to operate Under Capacity during the 2040 Build conditions peak hour scenarios except:

- CSAH 81 (Bottineau Blvd)/63rd Avenue N which is expected to operate Over Capacity during the PM peak hour under both Scenario 1 and Scenario 2.

The CSAH 81 (Bottineau Boulevard)/Bass Lake Road intersection would be expected to operate Under Capacity for both Scenario 1 and Scenario 2. The overall intersection results are shown in **Table 5.3**.

Table 5.3 CSAH 81 North – 2040 Build Conditions Results

Intersection	Capacity Classification					
	AM Peak Hour No Freight Event – Scenario 1	AM Peak Hour Freight Event – Scenario 1	PM Peak Hour – Scenario 1	AM Peak Hour No Freight – Scenario 2	AM Peak Hour Freight Event – Scenario 2	PM Peak Hour – Scenario 2
CSAH 81 (Bottineau Blvd) / 73rd Ave N	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / CSAH 8 (W Broadway Ave) / 71st Ave N	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity
CSAH 130 (W Broadway Ave) / 71st Ave N	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / I-94 WB Ramps	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / I-94 EB Ramps	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 63rd Ave N	Under Capacity	Under Capacity	Over Capacity	Under Capacity	Under Capacity	Over Capacity
63rd Ave N / Louisiana Ave N / Park-and-Ride Access	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity

Intersection	Capacity Classification					
	AM Peak Hour No Freight Event – Scenario 1	AM Peak Hour Freight Event – Scenario 1	PM Peak Hour – Scenario 1	AM Peak Hour No Freight – Scenario 2	AM Peak Hour Freight Event – Scenario 2	PM Peak Hour – Scenario 2
CSAH 81 (Bottineau Blvd) / CSAH 10 (Bass Lake Rd)	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity
Bass Lake Rd / Adair Ave*	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity
CSAH 10 (Bass Lake Rd) / Sherburne Ave	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Wilshire Blvd	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity
Wilshire Blvd / Lakeland Ave N*	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Corvallis Ave N	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 47th Ave N	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / TH 100 SB Ramp	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / TH 100 NB Ramp	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity

*Side street stop-controlled intersection

The poor operations at CSAH 81 (Bottineau Boulevard)/63rd Avenue N is primarily due to the westbound and eastbound movements competing with the northbound and southbound movements for signal timing. The primary driver in this is high northbound volumes conflicting with the southbound left volumes and the increase in traffic associated with the park-and-ride for the eastbound and westbound movements. The 63rd Avenue park-and-ride was modeled assuming it was at full site capacity, which means these results are conservative. Further evaluation will be conducted as the alternatives progress in project development.

5.2.3 CSAH 81 South

The results of the AM and PM peak hour analysis showed that all intersections would be expected to operate Under Capacity during the 2040 Build conditions peak hour scenarios. The overall intersection results are shown in **Table 5.4**.

Table 5.4 CSAH 81 South – 2040 Build Conditions Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
CSAH 81 (Bottineau Blvd) / 42nd Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 41st Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 40th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 36th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / 35th Ave N	Under Capacity	Under Capacity
CSAH 81 (Bottineau Blvd) / Abbott Ave N	Under Capacity	Under Capacity

5.2.4 CSAH 81 (West Broadway)

The results of the AM and PM peak hour analysis showed that all intersections are expected to operate Under Capacity during the 2040 Build conditions peak hour scenarios with the following exceptions:

- CSAH 81 (W Broadway Avenue)/CSAH 2 (Penn Avenue N) is anticipated to operate At Capacity in both the AM and PM peak hours.
- CSAH 81 (W Broadway Avenue)/Knox Avenue N is anticipated to operate Over Capacity in both the AM and PM peak hours.
- CSAH 81 (W Broadway Avenue)/Irving Avenue N is anticipated to operate At Capacity in both the AM and PM peak hours.
- CSAH 81 (W Broadway Avenue)/Girard Avenue N is anticipated to operate At Capacity in the PM peak hour.
- CSAH 81 (W Broadway Avenue)/Emerson Avenue N is anticipated to operate At Capacity in the PM peak hour.
- CSAH 81 (W Broadway Avenue)/N Lyndale Avenue is anticipated to operate At Capacity in the AM peak hour and Over Capacity in the PM peak hour.

To accommodate the center-running LRT on CSAH 81 (W Broadway Avenue), the number of through lanes in the peak direction on W Broadway Avenue was decreased from two in 2040 No Build conditions to one in 2040 Build conditions. On-street parking would no longer be permitted on either side of CSAH 81 (W Broadway Avenue). Because of this reduction in capacity, eastbound and westbound traffic along W Broadway Avenue between CSAH 2 (Penn Avenue N) and N Lyndale Avenue experience delays and queue spillbacks through multiple intersections. At many intersections, demand exceeds capacity, and some traffic diversion to other routes would likely occur.

The overall intersection results are shown in **Table 5.5**.

Table 5.5 CSAH 81 (West Broadway) – 2040 Build Conditions Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
CSAH 81 (W Broadway Ave) / 29th Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / 26th Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / CSAH 2 (Penn Ave N)	At Capacity	At Capacity
CSAH 81 (W Broadway Ave) / Logan Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / Knox Ave N	Over Capacity	Over Capacity
CSAH 81 (W Broadway Ave) / Irving Ave N	At Capacity	At Capacity
CSAH 81 (W Broadway Ave) / Girard Ave N	Under Capacity	At Capacity
CSAH 81 (W Broadway Ave) / Fremont Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / Emerson Ave N	Under Capacity	At Capacity
CSAH 81 (W Broadway Ave) / Dupont Ave N*	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / Bryant Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / Aldrich Ave N	Under Capacity	Under Capacity
CSAH 81 (W Broadway Ave) / N Lyndale Ave	At Capacity	Over Capacity

5.2.5 N Lyndale Avenue

The results of the AM and PM peak hour analysis showed that all intersections are expected to operate Under Capacity during the 2040 Build conditions peak hour scenarios with the following exceptions:

- N Lyndale Avenue/Plymouth Avenue N is anticipated to operate At Capacity in the AM peak hour.
- N 7th St/W Lyndale Avenue is anticipated to operate Over Capacity in the AM peak hour.
- N 7th St/Oak Lake Avenue N is anticipated to operate At Capacity in the AM peak hour.
- TH 55 (Olson Memorial Highway)/N 7th St/N 6th Avenue is anticipated to operate Over Capacity in the PM peak hour.

In the AM peak hour, there is significant traffic volume heading into downtown Minneapolis from the I-94 Eastbound off-ramp and a majority of this traffic turns onto N 7th Street at W Lyndale Avenue. The southbound approach of N 7th Street/W Lyndale Avenue would be limited to one southbound left-turn lane under 2040 Build conditions because there would be only one receiving lane on N 7th Street. The reduction in capacity on the ramp and on N 7th Street results in queues that extend upstream along N 7th Street, W Lyndale Avenue, and the I-94 Eastbound off-ramp.

During the PM peak hour, a similar capacity constraint occurs in the opposite direction heading out of downtown Minneapolis. The number of through lanes on northbound 7th Street at TH 55 (Olson Memorial Highway) was reduced from two in 2040 No Build conditions to one in 2040 Build conditions. The reduction in through capacity on N 7th Street from Lyndale Avenue to TH 55 (Olson Memorial Highway) results in queues that block upstream intersections and exacerbate the issue at TH 55 (Olson Memorial Highway)/N 7th Street/N 6th Avenue.

The overall intersection results are shown in **Table 5.6**.

Table 5.6 N Lyndale Avenue – 2040 Build Conditions Results

Intersection	Capacity Classification	
	AM Peak Hour	PM Peak Hour
N Lyndale Ave / N 18th Ave	Under Capacity	Under Capacity
N Lyndale Ave / N 14th Ave	Under Capacity	Under Capacity
N Lyndale Ave / Plymouth Ave N	At Capacity	Under Capacity
N 7th St / W Lyndale Ave	Over Capacity	Under Capacity
N 7th St / E Lyndale Ave	Under Capacity	Under Capacity
N 7th St / Oak Lake Ave N	At Capacity	Under Capacity
TH 55 (Olson Memorial Highway) / W Lyndale Ave	Under Capacity	Under Capacity
TH 55 (Olson Memorial Highway) / E Lyndale Ave	Under Capacity	Under Capacity
TH 55 (Olson Memorial Highway) / Oak Lake Ave N	Under Capacity	Under Capacity
TH 55 (Olson Memorial Highway) / N 7th St / N 6th Ave	Under Capacity	Over Capacity

5.3 2040 Build Conditions Traffic Modeling Summary

Several infrastructure, geometric, and signal modifications were identified along the route to provide control of the LRT at intersections and to provide adequate infrastructure to accommodate buses, pedestrians, and park-and-ride traffic near stations. These project elements were incorporated into the 2040 Build conditions modeling, and the significant infrastructure improvements are listed below:

- Reconstruct 101st Avenue N and Oak Grove Parkway to accommodate the needs of the BLRT OMF site.
- Reconstruct CSAH 103 (West Broadway Avenue) from TH 610 to north of Oak Grove Parkway to accommodate the desired location of the LRT alignment, station location, and park-and-ride parking structure.
- Install a new traffic signal at CSAH 103 (West Broadway Avenue)/99th Avenue to provide a second access point to the park-and-ride facility.
- Install a new traffic signal at CSAH 103 (West Broadway Avenue)/94th Avenue N to allow LRT to transition from side-running to center-running.
- Reconstruct CSAH 103 (West Broadway Avenue)/CSAH 109 (85th Avenue) to remove channelized right turns and dedicated right turn lanes to accommodate pedestrian crossings for 85th Avenue Station.
- Construct west leg of CSAH 103 (West Broadway Avenue)/Candlewood Drive.
- Reconstruct CSAH 103 (West Broadway Avenue)/CSAH 130 (Brooklyn Boulevard) to remove channelized rights and dedicated right turn lanes to accommodate pedestrian crossings for Brooklyn Boulevard Station.

- Install a new traffic signal at CSAH 103 (West Broadway Avenue)/75th Avenue N to allow LRT to transition from side-running to center-running.
- Install a new traffic signal at 63rd Avenue N/Louisiana Avenue to provide for pedestrian crossings of 63rd Avenue N and facilitate traffic exiting the park-and-ride facility.
- Install a new traffic signal at CSAH 81 (W Broadway Avenue)/Bryant Avenue N to maintain neighborhood pedestrian access.
- Install a new traffic signal at N Lyndale Avenue/N 14th Avenue to maintain neighborhood pedestrian access.

With these modifications, all intersections would be expected to operate Under Capacity for 2040 Build conditions AM and PM peak hours with the following exceptions:

- Oak Grove Pkwy/Xylon Avenue is anticipated to operate Over Capacity in both the AM and PM peak hours.
- CSAH 103 (W Broadway Avenue)/ CSAH 30 (93rd Avenue N) is anticipated to operate Over Capacity in the 2040 AM and PM peak hours. This intersection was also identified as being Over Capacity in the PM peak hour of 2040 No Build conditions.
- CSAH 103 (W Broadway Avenue)/CSAH 109 (85th Avenue N) is expected to operate Over Capacity in the 2040 AM and PM peak hours. This intersection was also identified as being Over Capacity in the PM peak hour of 2040 No Build conditions.
- CSAH 81 (Bottineau Blvd)/63rd Avenue N is anticipated to operate Over Capacity in the 2040 PM peak hour under both Scenario 1 and Scenario 2.
- CSAH 81 (W Broadway Avenue)/CSAH 2 (Penn Avenue N) is anticipated to operate At Capacity in the AM and PM peak hours.
- CSAH 81 (W Broadway Avenue)/Knox Avenue N is anticipated to operate Over Capacity in the AM and PM peak hours.
- CSAH 81 (W Broadway Avenue)/Irving Avenue N is anticipated to operate At Capacity in both the AM and PM peak hours.
- CSAH 81 (W Broadway Avenue)/Girard Avenue N is anticipated to operate At Capacity in the PM peak hour.
- CSAH 81 (W Broadway Avenue)/Emerson Avenue N is anticipated to operate At Capacity in the PM peak hour.
- CSAH 81 (W Broadway Avenue)/N Lyndale Avenue is anticipated to operate At Capacity in the AM peak hour and Over Capacity in the PM peak hour.
- N Lyndale Avenue/Plymouth Avenue N is anticipated to operate At Capacity in the AM peak hour.
- N 7th St/W Lyndale Avenue is anticipated to operate Over Capacity in the AM peak hour.
- N 7th St/Oak Lake Avenue N is anticipated to operate At Capacity in the AM peak hour.
- TH 55 (Olson Memorial Highway)/N 7th St/N 6th Avenue is anticipated to operate Over Capacity in the PM peak hour.

A future traffic signal is expected to be needed at the Oak Grove Parkway/Xylon Avenue intersection to accommodate 2040 development-generated traffic volumes.

To accommodate the center-running LRT on CSAH 81 (W Broadway Avenue) in Minneapolis, the number of through lanes in the peak direction on CSAH 81 (W Broadway Avenue) decreased from two in 2040 No Build conditions to one in 2040 Build conditions. Because of this reduction in capacity, eastbound and westbound traffic along CSAH 81 (W Broadway Avenue) between CSAH 2 (Penn Avenue N) and N Lyndale Avenue experiences delays and queue spillbacks through multiple intersections. At many intersections, demand exceeds capacity, and some traffic diversion to other routes would likely occur.

There is significant traffic volume in the AM peak hour heading into downtown Minneapolis from the I-94 Eastbound off-ramp and a majority of this traffic turns onto N 7th Street at W Lyndale Avenue. The southbound approach of N 7th Street/W Lyndale Avenue has dual left-turn lanes under 2040 No Build conditions, and this approach would be modified to only have one southbound left-turn lane under 2040 Build conditions to accommodate side-running LRT on N 7th Street. This modification, in addition to the reduced southbound through capacity on N 7th Street, results in queues that extend along N 7th Street, W Lyndale Avenue, and the I-94 Eastbound off-ramp.

A similar capacity constraint occurs in the opposite direction heading out of downtown Minneapolis during the PM peak hour. To accommodate the side-running LRT on N 7th Street, the number of through lanes on northbound N 7th Street was decreased from two in 2040 No Build conditions to one in 2040 Build conditions. The reduction in through capacity on N 7th Street from Lyndale Avenue to TH 55 (Olson Memorial Highway) results in queues that block upstream intersections and exacerbate the issue at TH 55 (Olson Memorial Highway)/N 7th Street/N 6th Avenue.

Appendix A

Existing Conditions: AM Peak Hour Traffic Volumes

Intersection	ID	Eastbound				Westbound				Northbound				Southbound						Northeastbound			
		Left	Thru	Right	Right 2	Left 2	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Thru 2	Right	Right2	Left 2	Left	Thru	Right
Oak Grove Pkwy / Xylon Ave	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 101st Ave N	2	68	-	41	-	-	-	-	-	-	33	179	-	-	-	314	-	204	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Winnetka Ave N	3	1	-	5	-	-	-	-	-	-	3	209	-	-	-	354	-	1	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Oak Grove Pkwy	4	-	-	-	-	30	-	-	43	-	-	169	128	-	55	300	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 99th Ave N	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / TH 610 WB Ramps	6	-	-	-	-	480	-	-	115	-	-	182	71	-	27	303	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / TH 610 EB Ramps	7	-	-	-	-	177	-	-	104	-	-	149	204	-	140	643	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 94th Ave N	8	37	8	53	-	15	-	8	29	-	45	287	15	-	45	660	-	115	-	-	-	-	-
CSAH 103 (W Broadway Ave) / CSAH 30 (93rd Ave N)	9	107	224	55	-	61	-	259	32	-	64	208	41	-	26	415	-	287	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 92nd Ave N	10	13	0	12	-	4	-	1	10	-	20	290	0	-	9	429	-	93	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Setzler Pkwy	11	56	2	47	-	45	-	3	39	-	55	215	13	-	21	351	-	73	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 89th Ave N	12	14	-	7	-	-	-	-	-	-	19	269	-	-	-	354	-	89	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Maplebrook Pkwy	13	24	1	7	-	26	-	3	13	-	4	251	7	-	9	338	-	14	-	-	-	-	-
CSAH 103 (W Broadway Ave) / CSAH 109 (85th Ave N)	14	58	342	91	-	131	-	556	58	-	74	146	69	-	46	213	-	112	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 84th Ave N	15	9	0	4	-	3	-	0	8	-	1	272	18	-	52	374	-	9	-	-	-	-	-
CSAH 103 (W Broadway Ave) / College Park Dr	16	2	-	17	-	-	-	-	-	-	5	290	-	-	-	375	-	6	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 82nd Ave N	17	8	-	17	-	-	-	-	-	-	10	287	-	-	-	388	-	4	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Candlewood Dr	18	-	-	-	-	64	-	-	24	-	-	273	27	-	15	390	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 78th Ave N	19	1	1	3	-	12	-	2	32	-	1	267	4	-	8	440	-	6	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Shopping Center Access	20	6	2	5	-	2	-	2	0	-	8	266	4	-	4	442	-	9	-	-	-	-	-
CSAH 103 (W Broadway Ave) / CSAH 130 (Brooklyn Blvd) / CSAH 152	21	49	200	24	-	69	-	270	54	-	36	175	53	-	56	248	-	145	-	-	-	-	-
CSAH 130 (Brooklyn Blvd) / Shopping Center Access (west of CSAH 103)	22	6	234	34	-	25	-	423	3	-	26	3	37	-	2	4	-	3	-	-	-	-	-
CSAH 152 (Brooklyn Blvd) / Shopping Center Access (east of CSAH 103)	23	2	306	1	-	2	-	386	5	-	3	0	3	-	4	0	-	4	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 76th Ave N	24	16	7	7	-	25	-	21	30	-	22	218	19	-	25	266	-	50	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 75th Ave N	25	1	1	13	-	32	-	7	12	-	21	246	8	-	13	284	-	1	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 74th Ave N	26	2	4	75	-	6	-	4	3	-	45	270	6	-	3	315	-	11	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 73rd Ave N	27	14	17	12	-	16	-	36	7	-	12	300	23	-	13	362	-	22	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 73rd Ave N	28	32	4	35	-	21	-	17	32	-	45	678	11	-	28	874	-	66	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 71st Ave N	29	63	62	29	-	316	-	120	49	-	71	622	248	-	56	774	-	100	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 71st Ave N	30	240	16	110	-	3	-	19	7	-	163	88	0	-	4	83	-	303	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / I-94 WB Ramps	31	-	-	-	-	107	-	-	397	-	-	544	296	-	94	1025	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / I-94 EB Ramps	32	-	-	-	-	316	-	-	106	-	-	734	174	-	302	830	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 63rd Ave N	33	106	114	69	-	183	-	166	238	-	66	564	158	-	138	903	-	105	-	-	-	-	-
63rd Ave N /Lousiana Blvd	34	0	206	7	-	97	-	238	2	-	5	1	82	-	1	0	-	2	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / CSAH 10 (Bass Lake Rd)	35	116	178	353	-	57	-	195	78	-	261	594	45	-	74	932	-	149	-	-	-	-	-
CSAH 10 (Bass Lake Rd) / Sherburne Ave	36	1	560	16	-	86	-	510	4	-	3	2	85	-	2	1	-	1	-	-	-	-	-
CSAH 10 (Bass Lake Rd) / Adair Ave N	37	50	236	11	-	3	-	295	13	-	4	2	2	-	5	2	-	31	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / Wilshire Blvd	38	3	3	14	-	151	-	11	65	-	15	832	135	-	58	1261	-	23	-	-	-	-	-
Wilshire Blvd / Lakeland Ave N	39	-	-	-	-	45	-	-	4	-	-	1	14	-	6	0	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / Corvallis Ave N	40	40	10	131	-	37	-	21	22	-	67	920	11	-	12	1371	-	43	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 47th Ave N	41	9	0	64	-	59	-	2	5	-	37	984	15	-	4	1529	-	6	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / TH 100 Southbound Ramps	42	-	-	-	-	231	-	-	198	-	-	838	-	-	-	676	-	976	-	-	-	-	-
CSAH 81 (Bottineau Blvd)/ TH 100 Northbound Ramps	43	14	175	0	-	-	-	-	368	-	-	456	201	-	155	752	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / CSAH 9 (42nd Ave N)	44	60	188	151	-	52	-	214	79	-	145	519	32	-	52	647	-	52	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 41st Ave N	45	44	9	11	-	3	-	11	9	-	42	643	4	-	8	793	-	49	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 40th Ave N	46	48	29	9	-	41	-	51	91	-	3	550	19	-	40	734	-	33	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 36th Ave N	47	67	70	135	-	53	-	183	75	-	85	430	23	-	21	684	-	79	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 35th Ave N	48	45	-	72	-	-	-	-	-	-	55	493	-	-	-	739	-	133	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / Abbott Ave N	49	168	-	102	-	-	-	-	-	-	69	380	-	-	-	509	-	302	-	-	-	-	-
CSAH 81 (W Broadway Ave) / 29th Ave N	50	49	9	47	-	11	-	18	10	-	-	293	10	-	29	437	-	20	-	-	-	-	-
CSAH 81 (W Broadway Ave) / 26th Ave N	51	17	43	8	-	5	-	59	32	-	3	245	9	-	50	461	-	-	-	-	-	-	-
CSAH 81 (W Broadway Ave) / CSAH 2 (Penn Ave N) / McNair Ave	52	12	402	63	1	9	18	199	27	-	62	114	9	-	52	142	-	6	6	2	4	3	-
CSAH 81 (W Broadway Ave) / Logan Ave N	53	4	462	-	-	-	-	227	7	-	-	-	-	-	26	-	-	26	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Knox Ave N	54	4	522	10	-	27	-	247	1	-	3	3	22	-	-	3	-	3	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Irving Ave N	55	1	543	9	-	1	-	263	34	-	4	1	8	-	18	18	-	7	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Girard Ave N	56	36	515	18	-	98	-	284	124	-	10	47	108	-	10	9	-	4	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Fremont Ave N	57	-	567	66	-	12	-	473	-	-	-	-	-	-	65	203	-	33	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Emerson Ave N	58	17	615	-	-	-	-	373	29	-	112	149	23	-	-	-	-	-	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Dupont Ave N	59	20	610	8	-	8	-	360	16	-	8	5	5	-	31	9	-	34	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Bryant Ave N	60	14	623	9	-	14	-	366	26	-	12	5	21	-	11	32	-	6	-	-	-	-	-

Existing Conditions: AM Peak Hour Traffic Volumes

Intersection	ID	Eastbound				Westbound				Northbound				Southbound						Northeastbound			
		Left	Thru	Right	Right 2	Left 2	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Thru 2	Right	Right2	Left 2	Left	Thru	Right
CSAH 81 (W Broadway Ave) / Aldrich Ave N	61	9	623	23	-	28	-	395	27	-	10	3	22	-	10	11	-	1	-	-	-	-	-
CSAH 81 (W Broadway Ave) / N Lyndale Ave	62	25	576	54	-	108	-	386	40	-	34	127	62	-	163	215	-	30	-	-	-	-	-
N Lyndale Ave / N 18th Ave	63	20	5	15	-	10	-	10	20	-	40	160	15	-	15	315	-	55	-	-	-	-	-
N Lyndale Ave / N 14th Ave	64	10	0	45	-	15	-	5	5	-	45	200	5	-	5	315	-	20	-	-	-	-	-
N Lyndale Ave / Plymouth Ave N	65	30	210	50	-	200	-	195	35	-	35	185	140	-	45	290	-	40	-	-	-	-	-
N 7th St / W Lyndale Ave	66	-	230	195	-	15	-	290	-	-	-	-	-	-	725	715	-	190	-	-	-	-	-
N 7th St / E Lyndale Ave	67	90	865	-	-	-	-	105	145	-	200	525	30	-	-	-	-	-	-	-	-	-	-
N 7th St / Oak Lake Ave N	68	85	745	65	-	5	-	205	55	-	15	240	5	-	100	190	-	30	-	-	-	-	-
TH 55 (Olson Memorial Highway) / W Lyndale Ave	69	-	600	210	210	155	155	515	-	-	-	-	-	-	180	225	225	265	-	-	-	-	-
TH 55 (Olson Memorial Highway) / E Lyndale Ave	70	190	590	-	-	-	-	365	25	-	460	540	400	-	-	-	-	-	-	-	-	-	-
TH 55 (Olson Memorial Highway) / Oak Lake Ave N	71	230	675	85	-	20	-	205	15	-	35	65	50	-	10	70	-	150	-	-	-	-	-
TH 55 (Olson Memorial Highway) / N 7th St / N 6th St	72	-	360	375	-	65	-	155	30	-	75	235	40	-	65	845	-	10	-	-	-	-	-

Existing Conditions: PM Peak Hour Traffic Volumes

Intersection	ID	Eastbound				Westbound				Northbound				Southbound						Northeastbound			
		Left	Thru	Right	Right 2	Left 2	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Thru 2	Right	Right2	Left 2	Left	Thru	Right
Oak Grove Pkwy / Xylon Ave	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 101st Ave N	2	185	-	96	-	-	-	-	-	-	56	442	-	-	-	290	-	120	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Winnetka Ave N	3	1	-	8	-	-	-	-	-	-	5	493	-	-	-	385	-	1	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Oak Grove Pkwy	4	-	-	-	-	104	-	-	119	-	-	379	216	-	120	266	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 99th Ave N	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / TH 610 WB Ramps	6	-	-	-	-	230	-	-	162	-	-	433	119	-	69	301	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / TH 610 EB Ramps	7	-	-	-	-	161	-	-	177	-	-	375	362	-	140	391	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 94th Ave N	8	97	3	71	-	19	-	3	42	-	47	598	6	-	11	491	-	50	-	-	-	-	-
CSAH 103 (W Broadway Ave) / CSAH 30 (93rd Ave N)	9	237	514	48	-	55	-	171	60	-	28	354	112	-	130	316	-	135	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 92nd Ave N	10	29	3	37	-	2	-	1	7	-	14	458	8	-	17	388	-	14	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Setzler Pkwy	11	29	3	22	-	34	-	3	23	-	18	428	65	-	40	366	-	21	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 89th Ave N	12	47	-	27	-	-	-	-	-	-	11	464	-	-	-	399	-	23	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Maplebrook Pkwy	13	16	8	9	-	23	-	4	12	-	10	447	37	-	12	387	-	27	-	-	-	-	-
CSAH 103 (W Broadway Ave) / CSAH 109 (85th Ave N)	14	137	1225	140	-	176	-	586	47	-	121	310	362	-	92	253	-	74	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 84th Ave N	15	9	0	3	-	52	-	0	92	-	7	692	40	-	44	517	-	8	-	-	-	-	-
CSAH 103 (W Broadway Ave) / College Park Dr	16	6	-	20	-	-	-	-	-	-	46	738	-	-	-	556	-	18	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 82nd Ave N	17	9	-	21	-	-	-	-	-	-	31	775	-	-	-	566	-	10	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Candlewood Dr	18	-	-	-	-	67	-	-	28	-	-	778	112	-	29	559	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 78th Ave N	19	13	4	17	-	6	-	2	40	-	15	837	16	-	21	593	-	12	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Shopping Center Access	20	96	7	64	-	29	-	4	39	-	66	733	45	-	26	510	-	80	-	-	-	-	-
CSAH 103 (W Broadway Ave) / CSAH 130 (Brooklyn Blvd) / CSAH 152	21	262	532	60	-	155	-	415	116	-	91	466	165	-	114	320	-	169	-	-	-	-	-
CSAH 130 (Brooklyn Blvd) / Shopping Center Access (west of CSAH 103)	22	58	687	95	-	89	-	538	48	-	65	19	116	-	51	17	-	48	-	-	-	-	-
CSAH 152 (Brooklyn Blvd) / Shopping Center Access (east of CSAH 103)	23	33	766	12	-	6	-	645	33	-	9	0	3	-	23	0	-	32	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 76th Ave N	24	111	27	62	-	45	-	43	57	-	48	554	61	-	78	324	-	133	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 75th Ave N	25	9	10	89	-	25	-	10	13	-	83	641	43	-	17	404	-	10	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 74th Ave N	26	6	2	161	-	7	-	2	8	-	79	753	21	-	5	503	-	10	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 73rd Ave N	27	60	32	16	-	13	-	50	30	-	12	763	25	-	41	582	-	48	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 73rd Ave N	28	86	39	68	-	46	-	32	32	-	38	1390	40	-	29	920	-	50	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 71st Ave N	29	124	213	60	-	347	-	130	85	-	47	1259	583	-	55	879	-	100	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 71st Ave N	30	596	31	224	-	0	-	17	5	-	173	199	2	-	14	225	-	372	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / I-94 WB Ramps	31	-	-	-	-	175	-	-	585	-	-	1304	366	-	92	1194	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / I-94 EB Ramps	32	-	-	-	-	360	-	-	177	-	-	1493	214	-	416	953	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 63rd Ave N	33	136	239	67	-	230	-	215	251	-	76	1320	343	-	234	972	-	107	-	-	-	-	-
63rd Ave N /Lousiana Blvd	34	1	334	12	-	80	-	318	0	-	3	0	107	-	1	0	-	1	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / CSAH 10 (Bass Lake Rd)	35	348	441	374	-	64	-	305	108	-	430	1283	132	-	138	837	-	294	-	-	-	-	-
CSAH 10 (Bass Lake Rd) / Sherburne Ave	36	10	990	28	-	150	-	850	29	-	15	2	150	-	23	5	-	14	-	-	-	-	-
CSAH 10 (Bass Lake Rd) / Adair Ave N	37	49	654	5	-	5	-	410	16	-	4	1	6	-	28	0	-	63	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / Wilshire Blvd	38	21	13	38	-	98	-	6	85	-	18	1739	164	-	65	1190	-	20	-	-	-	-	-
Wilshire Blvd / Lakeland Ave N	39	-	-	-	-	20	-	-	24	-	-	0	45	-	27	0	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / Corvallis Ave N	40	65	27	136	-	21	-	23	30	-	100	1805	34	-	30	1240	-	56	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 47th Ave N	41	7	4	60	-	37	-	3	3	-	70	1929	57	-	6	1376	-	15	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / TH 100 Southbound Ramps	42	-	-	-	-	192	-	-	292	-	-	1764	-	-	-	744	-	729	-	-	-	-	-
CSAH 81 (Bottineau Blvd)/ TH 100 Northbound Ramps	43	50	154	4	-	-	-	-	999	-	-	715	229	-	98	838	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / CSAH 9 (42nd Ave N)	44	84	188	176	-	67	-	214	129	-	214	785	101	-	151	615	-	80	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 41st Ave N	45	107	9	55	-	25	-	11	43	-	76	950	16	-	35	745	-	78	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 40th Ave N	46	60	29	24	-	70	-	51	85	-	19	897	49	-	96	670	-	59	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 36th Ave N	47	131	70	166	-	42	-	183	84	-	133	750	60	-	58	587	-	119	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 35th Ave N	48	134	-	134	-	-	-	-	-	-	97	809	-	-	-	696	-	99	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / Abbott Ave N	49	338	-	147	-	-	-	-	-	-	38	568	-	-	-	670	-	160	-	-	-	-	-
CSAH 81 (W Broadway Ave) / 29th Ave N	50	38	33	41	-	12	-	12	20	-	-	531	14	-	83	525	-	33	-	-	-	-	-
CSAH 81 (W Broadway Ave) / 26th Ave N	51	17	95	15	-	7	-	71	74	-	17	455	8	-	102	471	-	1	-	-	-	-	-
CSAH 81 (W Broadway Ave) / CSAH 2 (Penn Ave N) / McNair Ave	52	27	377	94	1	14	-	343	89	-	143	306	39	-	100	238	-	12	12	3	17	14	-
CSAH 81 (W Broadway Ave) / Logan Ave N	53	32	498	-	-	-	-	451	32	-	-	-	-	-	23	-	-	22	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Knox Ave N	54	9	620	14	-	27	-	512	3	-	7	1	15	-	21	2	-	17	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Irving Ave N	55	15	629	17	-	9	-	529	16	-	7	16	7	-	27	10	-	14	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Girard Ave N	56	15	619	29	-	142	-	527	12	-	15	21	167	-	16	28	-	12	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Fremont Ave N	57	-	730	72	-	35	-	626	-	-	-	-	-	-	117	141	-	55	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Emerson Ave N	58	54	793	-	-	-	-	541	90	-	120	222	61	-	-	-	-	-	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Dupont Ave N	59	34	808	12	-	16	-	576	40	-	7	5	18	-	28	20	-	48	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Bryant Ave N	60	19	828	7	-	16	-	564	59	-	52	8	23	-	32	7	-	16	-	-	-	-	-

Existing Conditions: PM Peak Hour Traffic Volumes

Intersection	ID	Eastbound				Westbound				Northbound				Southbound						Northeastbound			
		Left	Thru	Right	Right 2	Left 2	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Thru 2	Right	Right2	Left 2	Left	Thru	Right
CSAH 81 (W Broadway Ave) / Aldrich Ave N	61	12	825	46	-	63	-	576	21	-	47	31	74	-	36	35	-	16	-	-	-	-	-
CSAH 81 (W Broadway Ave) / N Lyndale Ave	62	91	767	77	-	99	-	556	92	-	53	198	94	-	170	225	-	51	-	-	-	-	-
N Lyndale Ave / N 18th Ave	63	40	15	40	-	20	-	10	25	-	40	280	25	-	20	325	-	55	-	-	-	-	-
N Lyndale Ave / N 14th Ave	64	10	5	45	-	10	-	5	10	-	35	325	20	-	10	360	-	15	-	-	-	-	-
N Lyndale Ave / Plymouth Ave N	65	50	290	65	-	300	-	270	55	-	30	275	210	-	50	315	-	50	-	-	-	-	-
N 7th St / W Lyndale Ave	66	-	205	205	-	35	-	450	-	-	-	-	-	-	330	660	-	125	-	-	-	-	-
N 7th St / E Lyndale Ave	67	145	390	-	-	-	-	255	430	-	230	1055	20	-	-	-	-	-	-	-	-	-	-
N 7th St / Oak Lake Ave N	68	50	325	35	-	10	-	615	105	-	15	285	10	-	150	275	-	55	-	-	-	-	-
TH 55 (Olson Memorial Highway) / W Lyndale Ave	69	-	870	345	345	160	160	775	-	-	-	-	-	-	120	205	205	190	-	-	-	-	-
TH 55 (Olson Memorial Highway) / E Lyndale Ave	70	405	585	-	-	-	-	680	55	-	415	845	215	-	-	-	-	-	-	-	-	-	-
TH 55 (Olson Memorial Highway) / Oak Lake Ave N	71	255	520	25	-	20	-	425	15	-	55	85	20	-	10	30	-	255	-	-	-	-	-
TH 55 (Olson Memorial Highway) / N 7th St / N 6th St	72	-	290	260	-	55	-	295	65	-	140	665	95	-	45	465	-	25	-	-	-	-	-

2040 No Build Conditions: AM Peak Hour Traffic Volumes

Intersection	ID	Eastbound				Westbound				Northbound				Southbound						Northeastbound			
		Left	Thru	Right	Right 2	Left 2	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Thru 2	Right	Right2	Left 2	Left	Thru	Right
Oak Grove Pkwy / Xylon Ave	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 101st Ave N	2	72	-	43	-	-	-	-	-	-	401	629	-	-	-	317	-	244	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Winnetka Ave N	3	236	-	171	-	-	-	-	-	-	25	794	-	-	-	260	-	100	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Oak Grove Pkwy	4	-	-	-	-	51	-	-	71	-	-	748	177	-	21	410	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 99th Ave N	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / TH 610 WB Ramps	6	-	-	-	-	689	-	-	360	-	-	565	136	-	56	405	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / TH 610 EB Ramps	7	-	-	-	-	262	-	-	337	-	-	364	327	-	331	763	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 94th Ave N	8	50	3	47	-	43	-	10	106	-	34	535	11	-	24	924	-	77	-	-	-	-	-
CSAH 103 (W Broadway Ave) / CSAH 30 (93rd Ave N)	9	72	598	70	-	233	-	427	69	21	100	439	368	-	96	751	-	167	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 92nd Ave N	10	0	0	16	-	0	-	0	133	-	0	795	13	-	0	950	-	125	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Setzler Pkwy	11	86	0	16	-	19	-	0	71	19	15	626	4	25	22	852	-	67	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 89th Ave N	12	-	-	21	-	-	-	-	-	-	0	664	-	-	-	798	-	108	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Maplebrook Pkwy	13	32	0	0	-	4	-	0	57	-	1	561	2	14	26	763	-	16	-	-	-	-	-
CSAH 103 (W Broadway Ave) / CSAH 109 (85th Ave N)	14	178	304	85	-	276	-	596	142	4	157	244	162	-	68	312	-	387	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 84th Ave N	15	0	0	12	-	0	-	0	11	-	0	556	73	-	0	667	-	10	-	-	-	-	-
CSAH 103 (W Broadway Ave) / College Park Dr	16	2	-	6	-	-	-	-	-	-	1	554	-	-	73	601	-	4	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 82nd Ave N	17	6	-	5	-	-	-	-	-	-	3	549	-	-	-	604	-	3	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Candlewood Dr	18	-	-	-	-	40	-	-	46	28	0	506	31	-	31	578	-	0	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 78th Ave N	19	0	0	11	-	0	-	0	94	-	0	471	18	-	0	638	-	8	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Shopping Center Access	20	14	2	13	-	5	-	1	0	-	8	462	6	13	6	623	-	7	-	-	-	-	-
CSAH 103 (W Broadway Ave) / CSAH 130 (Brooklyn Blvd) / CSAH 152	21	102	209	35	-	79	-	249	83	-	42	291	58	-	92	340	-	209	-	-	-	-	-
CSAH 130 (Brooklyn Blvd) / Shopping Center Access (west of CSAH 103)	22	4	284	38	-	30	-	466	4	-	45	3	56	-	6	9	-	7	-	-	-	-	-
CSAH 152 (Brooklyn Blvd) / Shopping Center Access (east of CSAH 103)	23	3	351	5	-	1	-	399	4	-	5	0	4	-	6	0	-	7	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 76th Ave N	24	25	15	10	-	31	-	24	40	-	26	326	43	-	49	346	-	59	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 75th Ave N	25	1	1	20	-	38	-	8	17	-	25	377	18	-	25	360	-	2	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 74th Ave N	26	2	6	91	-	7	-	4	6	-	34	412	9	-	6	399	-	13	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 73rd Ave N	27	28	16	11	-	13	-	53	16	-	9	411	16	-	27	412	-	58	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 73rd Ave N	28	25	4	48	-	46	-	37	37	-	98	830	18	-	33	1138	-	79	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 71st Ave N	29	111	104	48	-	368	-	163	73	-	105	762	285	-	94	964	-	174	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 71st Ave N	30	302	19	162	-	3	-	24	7	-	248	127	0	-	4	100	-	332	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / I-94 WB Ramps	31	-	-	-	-	121	-	-	506	-	-	646	276	-	119	1261	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / I-94 EB Ramps	32	-	-	-	-	318	-	-	115	-	-	807	184	-	395	987	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 63rd Ave N	33	109	161	89	-	246	-	213	265	-	61	617	173	-	162	1039	-	104	-	-	-	-	-
63rd Ave N /Lousiana Blvd	34	0	257	14	-	96	-	282		-	13	0	101	-	1	0	-	4	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / CSAH 10 (Bass Lake Rd)	35	113	182	350	-	56	-	209	69	-	281	669	47	-	89	1098	-	187	-	-	-	-	-
CSAH 10 (Bass Lake Rd) / Sherburne Ave	36	1	535	18	-	104	-	568	5	-	5	2	107	-	3	1	-	1	-	-	-	-	-
CSAH 10 (Bass Lake Rd) / Adair Ave N	37	44	261	13	-	3	-	299	10	-	4	2	2	-	5	2	-	31	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / Wilshire Blvd	38	3	4	15	-	149	-	8	64	-	14	930	146	-	75	1407	-	22	-	-	-	-	-
Wilshire Blvd / Lakeland Ave N	39	-	-	-	-	40	-	-	4	-	-	1	15	-	7	0	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / Corvallis Ave N	40	45	10	135	-	37	-	19	22	-	53	1023	12	-	15	1513	-	43	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 47th Ave N	41	8	0	71	-	58	-	3	4	-	30	1076	16	-	5	1674	-	6	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / TH 100 Southbound Ramps	42	-	-	-	-	122	-	-	64	-	-	1058	-	-	-	776	-	1027	-	-	-	-	-
CSAH 81 (Bottineau Blvd)/ TH 100 Northbound Ramps	43	15	142	0	-	-	-	-	393	-	-	650	135	-	132	766	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / CSAH 9 (42nd Ave N)	44	66	188	165	-	57	-	214	86	159	159	569	35	57	57	708	-	57	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 41st Ave N	45	48	9	12	-	3	-	11	10	46	46	705	4	9	9	867	-	54	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 40th Ave N	46	53	29	10	-	45	-	51	100	3	3	602	21	44	44	803	-	36	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 36th Ave N	47	73	70	148	-	58	-	183	82	93	93	471	25	23	23	749	-	86	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 35th Ave N	48	49	-	79	-	-	-	-	-	60	60	540	-	-	-	810	-	145	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / Abbott Ave N	49	184	-	112	-	-	-	-	-	75	75	416	-	-	-	558	-	331	-	-	-	-	-
CSAH 81 (W Broadway Ave) / 29th Ave N	50	51	9	49	-	12	-	18	10	0	0	307	10	30	30	456	-	21	-	-	-	-	-
CSAH 81 (W Broadway Ave) / 26th Ave N	51	18	43	8	-	5	-	59	33	3	3	256	9	52	52	482	-	-	-	-	-	-	-
CSAH 81 (W Broadway Ave) / CSAH 2 (Penn Ave N) / McNair Ave	52	14	419	65	1	10	-	208	28	66	66	114	9	54	54	142	-	6	5	-	-	-	-
CSAH 81 (W Broadway Ave) / Logan Ave N	53	4	481	-	-	0	-	237	7	-	-	-	-	27	27	-	-	27	1	4	3	-	-
CSAH 81 (W Broadway Ave) / Knox Ave N	54	4	546	10	-	28	-	257	1	3	3	3	23	0	0	3	-	3	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Irving Ave N	55	1	569	9	-	1	-	274	36	4	4	2	8	19	19	19	-	7	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Girard Ave N	56	38	539	19	-	103	-	297	130	10	10	56	113	10	10	10	-	4	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Fremont Ave N	57	-	593	69	-	13	-	495	-	-	-	-	-	68	68	216	-	35	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Emerson Ave N	58	18	643	-	-	-	-	391	30	117	117	157	24	-	-	-	-	-	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Dupont Ave N	59	21	638	8	-	8	-	377	17	8	8	5	5	32	32	9	-	36	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Bryant Ave N	60	15	651	9	-	15	-	383	27	13	13	6	22	12	12	33	-	6	-	-	-	-	-

2040 No Build Conditions: AM Peak Hour Traffic Volumes

Intersection	ID	Eastbound				Westbound				Northbound				Southbound						Northeastbound			
		Left	Thru	Right	Right 2	Left 2	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Thru 2	Right	Right2	Left 2	Left	Thru	Right
CSAH 81 (W Broadway Ave) / Aldrich Ave N	61	9	652	24	-	29	-	414	28	10	10	4	23	10	10	12	-	1	-	-	-	-	-
CSAH 81 (W Broadway Ave) / N Lyndale Ave	62	26	603	56	-	113	-	404	42	36	36	134	65	170	170	232	-	31	-	-	-	-	-
N Lyndale Ave / N 18th Ave	63	25	10	20	-	15	-	15	25	45	45	170	20	20	20	330	-	60	-	-	-	-	-
N Lyndale Ave / N 14th Ave	64	15	0	50	-	20	-	10	10	50	50	210	10	10	10	330	-	25	-	-	-	-	-
N Lyndale Ave / Plymouth Ave N	65	35	220	55	-	210	-	205	40	40	40	195	150	50	50	305	-	45	-	-	-	-	-
N 7th St / W Lyndale Ave	66	-	245	205	-	20	-	300	-	-	-	-	-	760	760	750	-	205	-	-	-	-	-
N 7th St / E Lyndale Ave	67	100	905	-	-	-	-	110	160	210	210	550	35	-	-	-	-	-	-	-	-	-	-
N 7th St / Oak Lake Ave N	68	90	780	70	-	10	-	215	60	20	20	255	10	105	105	200	-	35	-	-	-	-	-
TH 55 (Olson Memorial Highway) / W Lyndale Ave	69	-	630	220	220	165	165	540	-	-	-	-	-	190	190	240	240	270	-	-	-	-	-
TH 55 (Olson Memorial Highway) / E Lyndale Ave	70	200	620	-	-	-	-	385	30	485	485	565	425	-	-	-	-	-	-	-	-	-	-
TH 55 (Olson Memorial Highway) / Oak Lake Ave N	71	245	710	90	-	25	-	215	20	40	40	70	55	15	15	75	-	160	-	-	-	-	-
TH 55 (Olson Memorial Highway) / N 7th St / N 6th St	72	-	380	400	-	75	-	165	35	80	80	250	45	70	70	885	-	15	-	-	-	-	-

2040 No Build Conditions: PM Peak Hour Traffic Volumes

Intersection	ID	Eastbound				Westbound				Northbound				Southbound						Northeastbound			
		Left	Thru	Right	Right 2	Left 2	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Thru 2	Right	Right2	Left 2	Left	Thru	Right
Oak Grove Pkwy / Xylon Ave	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 101st Ave N	2	173	-	350	-	-	-	-	-	-	200	750	-	-	-	256	-	363	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Winnetka Ave N	3	150	-	225	-	-	-	-	-	-	201	800	-	-	-	481	-	125	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Oak Grove Pkwy	4	-	-	-	-	128	-	-	105	-	-	896	316	-	144	562	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 99th Ave N	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / TH 610 WB Ramps	6	-	-	-	-	391	-	-	252	-	-	960	171	-	140	550	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / TH 610 EB Ramps	7	-	-	-	-	348	-	-	530	-	-	601	318	-	420	521	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 94th Ave N	8	64	3	68	-	16	-	1	27	-	31	828	12	-	27	795	-	47	-	-	-	-	-
CSAH 103 (W Broadway Ave) / CSAH 30 (93rd Ave N)	9	241	988	89	-	366	-	274	87	50	25	543	326	-	229	580	-	70	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 92nd Ave N	10	0	0	34	-	3	-	0	1	-	0	943	109	-	0	1027	-	58	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Setzler Pkwy	11	37	0	4	-	10	-	1	45	11	3	936	16	34	103	888	-	39	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 89th Ave N	12	-	-	74	-	-	-	-	-	-	-	966	-	-	-	879	-	34	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Maplebrook Pkwy	13	26	3	2	-	14	-	2	41	-	1	852	15	47	57	811	-	38	-	-	-	-	-
CSAH 103 (W Broadway Ave) / CSAH 109 (85th Ave N)	14	434	1151	465	-	351	-	475	96	52	257	338	731	-	229	133	-	465	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 84th Ave N	15	0	0	12	-	0	-	0	145	-	0	1233	65	-	0	988	-	13	-	-	-	-	-
CSAH 103 (W Broadway Ave) / College Park Dr	16	5	0	8	-	0	-	0	0	10	14	1234	0	59	0	932	-	10	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 82nd Ave N	17	0	-	16	-	-	-	-	-	-	0	1258	-	-	-	934	-	16	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Candlewood Dr	18	0	0	0	-	54	-	0	101	23	0	1150	71	7	56	887	-	0	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 78th Ave N	19	0	0	30	-	0	-	0	74	-	0	1170	55	-	0	930	-	34	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Shopping Center Access	20	100	6	49	-	35	-	3	62	-	67	1014	58	49	39	771	-	101	-	-	-	-	-
CSAH 103 (W Broadway Ave) / CSAH 130 (Brooklyn Blvd) / CSAH 152	21	402	593	66	-	140	-	421	154	-	110	583	177	-	153	453	-	249	-	-	-	-	-
CSAH 130 (Brooklyn Blvd) / Shopping Center Access (west of CSAH 103)	22	74	892	125	-	96	-	631	53	-	76	20	126	-	43	14	-	43	-	-	-	-	-
CSAH 152 (Brooklyn Blvd) / Shopping Center Access (east of CSAH 103)	23	38	866	19	-	7	-	657	27	-	18	0	6	-	24	0	-	40	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 76th Ave N	24	115	39	73	-	89	-	84	111	-	55	644	98	-	111	409	-	139	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 75th Ave N	25	10	15	96	-	47	-	21	23	-	95	764	68	-	29	530	-	12	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 74th Ave N	26	3	1	151	-	20	-	3	11	-	94	913	34	-	4	663	-	6	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 73rd Ave N	27	182	21	8	-	3	-	33	48	-	6	811	6	-	60	642	-	132	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 73rd Ave N	28	69	81	142	-	77	-	64	30	-	92	1828	100	-	30	1181	-	47	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 71st Ave N	29	217	303	83	-	323	-	185	164	-	65	1639	594	-	107	1106	-	187	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 71st Ave N	30	547	36	421	-	0	-	20	5	-	314	271	3	-	11	304	-	338	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / I-94 WB Ramps	31	-	-	-	-	179	-	-	771	-	-	1527	339	-	109	1403	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / I-94 EB Ramps	32	-	-	-	-	335	-	-	187	-	-	1679	210	-	499	1083	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 63rd Ave N	33	148	298	67	-	289	-	263	301	-	91	1440	447	-	269	1044	-	105	-	-	-	-	-
63rd Ave N /Lousiana Blvd	34	2	389	36	-	76	-	382	1	-	12	2	124	-	0	0	-	1	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / CSAH 10 (Bass Lake Rd)	35	405	453	413	-	71	-	299	129	-	411	1444	132	-	151	944	-	305	-	-	-	-	-
CSAH 10 (Bass Lake Rd) / Sherburne Ave	36	9	1034	30	-	188	-	795	32	-	16	2	210	-	27	7	-	14	-	-	-	-	-
CSAH 10 (Bass Lake Rd) / Adair Ave N	37	44	686	6	-	4	-	437	15	-	5	1	6	-	24	1	-	57	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / Wilshire Blvd	38	17	8	28	-	105	-	4	86	-	14	1884	153	-	66	1343	-	19	-	-	-	-	-
Wilshire Blvd / Lakeland Ave N	39	-	-	-	-	17	-	-	20	-	-	1	33	-	20	0	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / Corvallis Ave N	40	47	18	92	-	23	-	20	32	-	74	1972	33	-	34	1392	-	50	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 47th Ave N	41	6	2	40	-	40	-	2	3	-	58	2070	55	-	7	1485	-	15	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / TH 100 Southbound Ramps	42	-	-	-	-	92	-	-	269	-	-	1914	-	-	-	816	-	749	-	-	-	-	-
CSAH 81 (Bottineau Blvd)/ TH 100 Northbound Ramps	43	51	134	4	-	-	-	-	1080	-	-	783	195	-	92	816	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / CSAH 9 (42nd Ave N)	44	92	188	193	-	73	-	214	141	234	234	859	110	165	165	673	-	88	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 41st Ave N	45	117	9	60	-	27	-	11	47	83	83	1039	18	38	38	816	-	85	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 40th Ave N	46	66	29	26	-	77	-	51	93	21	21	981	54	105	105	733	-	65	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 36th Ave N	47	143	70	182	-	46	-	183	92	145	145	821	66	63	63	643	-	130	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 35th Ave N	48	147	-	147	-	-	-	-	-	106	106	885	-	-	-	763	-	108	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / Abbott Ave N	49	370	-	161	-	-	-	-	-	42	42	621	-	-	-	735	-	175	-	-	-	-	-
CSAH 81 (W Broadway Ave) / 29th Ave N	50	40	33	42	-	13	-	12	21	-	-	553	15	87	87	543	-	35	-	-	-	-	-
CSAH 81 (W Broadway Ave) / 26th Ave N	51	18	95	16	-	7	-	71	77	18	18	477	8	107	107	493	-	1	-	-	-	-	-
CSAH 81 (W Broadway Ave) / CSAH 2 (Penn Ave N) / McNair Ave	52	29	395	97	1	15	28	359	93	150	150	306	41	105	105	238	-	13	12	3	17	15	-
CSAH 81 (W Broadway Ave) / Logan Ave N	53	33	523	-	-	-	-	472	33	-	-	-	-	24	24	-	-	23	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Knox Ave N	54	9	649	15	-	28	-	537	3	7	7	1	16	22	22	2	-	18	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Irving Ave N	55	16	658	18	-	9	-	554	17	7	7	17	7	28	28	11	-	15	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Girard Ave N	56	16	647	30	-	149	-	551	13	16	16	23	175	17	17	30	-	13	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Fremont Ave N	57	-	764	75	-	37	-	655	-	-	-	-	-	122	122	154	-	58	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Emerson Ave N	58	56	830	-	-	-	-	566	94	126	126	237	64	-	-	-	-	-	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Dupont Ave N	59	36	845	13	-	17	-	603	42	7	7	5	19	29	29	21	-	50	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Bryant Ave N	60	20	866	7	-	17	-	591	62	54	54	10	24	33	33	8	-	17	-	-	-	-	-

2040 No Build Conditions: PM Peak Hour Traffic Volumes

Intersection	ID	Eastbound				Westbound				Northbound				Southbound						Northeastbound			
		Left	Thru	Right	Right 2	Left 2	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Thru 2	Right	Right2	Left 2	Left	Thru	Right
CSAH 81 (W Broadway Ave) / Aldrich Ave N	61	13	862	48	-	66	-	604	22	49	49	33	77	38	38	38	-	17	-	-	-	-	-
CSAH 81 (W Broadway Ave) / N Lyndale Ave	62	95	801	81	-	104	-	584	96	55	55	210	98	178	178	265	-	53	-	-	-	-	-
N Lyndale Ave / N 18th Ave	63	45	20	45	-	25	-	15	30	45	45	295	30	25	25	340	-	60	-	-	-	-	-
N Lyndale Ave / N 14th Ave	64	15	10	50	-	15	-	10	15	40	40	340	25	15	15	375	-	20	-	-	-	-	-
N Lyndale Ave / Plymouth Ave N	65	55	305	70	-	315	-	285	60	35	35	290	220	55	55	330	-	55	-	-	-	-	-
N 7th St / W Lyndale Ave	66	-	215	215	-	40	-	475	-	-	-	-	-	350	350	695	-	135	-	-	-	-	-
N 7th St / E Lyndale Ave	67	155	410	-	-	-	-	270	450	245	245	1105	25	-	-	-	-	-	-	-	-	-	-
N 7th St / Oak Lake Ave N	68	55	340	40	-	15	-	645	110	20	20	300	15	160	160	290	-	55	-	-	-	-	-
TH 55 (Olson Memorial Highway) / W Lyndale Ave	69	-	910	365	365	170	170	815	-	-	-	-	-	130	130	215	215	200	-	-	-	-	-
TH 55 (Olson Memorial Highway) / E Lyndale Ave	70	425	615	-	-	-	-	715	60	440	440	890	225	-	-	-	-	-	-	-	-	-	-
TH 55 (Olson Memorial Highway) / Oak Lake Ave N	71	270	545	25	-	25	-	445	20	60	60	90	25	15	15	30	-	270	-	-	-	-	-
TH 55 (Olson Memorial Highway) / N 7th St / N 6th St	72	-	310	275	-	60	-	310	70	150	150	700	100	50	50	490	-	30	-	-	-	-	-

2040 Build Conditions: AM Peak Hour Traffic Volumes

Intersection	ID	Eastbound				Westbound				Northbound				Southbound						Northeastbound			
		Left	Thru	Right	Right 2	Left 2	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Thru 2	Right	Right2	Left 2	Left	Thru	Right
Oak Grove Pkwy / Xylon Ave	1	205	545	465	-	105	-	265	80	-	265	55	70	-	55	30	-	195	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 101st Ave N	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Winnetka Ave N	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Oak Grove Pkwy	4	81	3	43	-	47	-	25	63	-	400	567	145	-	21	412	-	367	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 99th Ave N	5	52	121	75	-	24	-	137	0	-	271	1062	70	-	12	345	-	148	-	-	-	-	-
CSAH 103 (W Broadway Ave) / TH 610 WB Ramps	6	-	-	-	-	742	-	-	598	-	-	806	81	-	73	371	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / TH 610 EB Ramps	7	-	-	-	-	282	-	-	463	-	-	424	340	-	291	821	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 94th Ave N	8	52	3	47	-	43	-	10	111	-	37	601	12	-	30	974	-	99	-	-	-	-	-
CSAH 103 (W Broadway Ave) / CSAH 30 (93rd Ave N)	9	79	553	118	-	470	-	459	80	31	95	491	328	-	76	876	-	111	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 92nd Ave N	10	0	0	20	-	0	-	0	262	-	0	794	10	-	0	1373	-	122	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Setzler Pkwy	11	91	0	21	-	26	-	0	78	19	15	611	4	24	29	1239	-	101	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 89th Ave N	12	-	-	21	-	-	-	-	-	-	-	649	-	-	-	1197	-	108	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Maplebrook Pkwy	13	36	0	0	-	3	-	0	62	-	1	537	2	14	55	1111	-	38	-	-	-	-	-
CSAH 103 (W Broadway Ave) / CSAH 109 (85th Ave N)	14	216	287	96	-	181	-	604	168	4	226	156	135	-	119	422	-	573	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 84th Ave N	15	0	0	13	-	0	-	0	11	-	0	510	86	-	0	691	-	12	-	-	-	-	-
CSAH 103 (W Broadway Ave) / College Park Dr	16	2	0	7	-	0	-	0	0	3	1	507	0	-	87	611	-	4	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 82nd Ave N	17	0	-	10	-	-	-	-	-	-	0	511	-	-	-	615	-	6	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Candlewood Dr	18	0	0	0	-	33	-	0	41	40	26	464	30	6	40	487	-	92	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 78th Ave N	19	0	0	10	-	0	-	0	88	-	0	446	19	-	0	552	-	8	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Shopping Center Access	20	0	0	28	-	0	-	0	5	-	0	460	14	-	0	546	-	16	-	-	-	-	-
CSAH 103 (W Broadway Ave) / CSAH 130 (Brooklyn Blvd) / CSAH 152	21	94	238	28	-	74	-	262	89	-	34	255	54	36	86	302	-	150	-	-	-	-	-
CSAH 130 (Brooklyn Blvd) / Shopping Center Access (west of CSAH 103)	22	4	291	35	-	31	-	458	4	-	41	3	63	-	6	9	-	7	-	-	-	-	-
CSAH 152 (Brooklyn Blvd) / Shopping Center Access (east of CSAH 103)	23	3	370	5	-	3	-	413	4	-	5	0	5	-	7	0	-	7	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 76th Ave N	24	25	15	10	-	30	-	24	39	-	24	279	38	-	45	323	-	42	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 75th Ave N	25	3	1	111	-	40	-	8	15	-	59	323	17	-	19	326	-	12	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 74th Ave N	26	0	0	0	-	7	-	0	10	-	0	389	9	-	12	465	-	0	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 73rd Ave N	27	28	15	12	-	15	-	53	18	-	8	353	14	-	15	406	-	53	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 73rd Ave N	28	26	4	44	-	42	-	36	36	-	96	812	16	-	35	1130	-	84	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 71st Ave N	29	113	95	47	-	344	-	161	72	-	106	739	270	-	92	956	-	168	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 71st Ave N	30	257	20	180	-	3	-	25	7	-	241	110	0	-	5	173	-	311	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / I-94 WB Ramps	31	-	-	-	-	117	-	-	506	-	-	609	264	-	120	1227	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / I-94 EB Ramps	32	-	-	-	-	366	-	-	123	-	-	746	161	-	397	970	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 63rd Ave N	33	149	174	83	-	216	-	282	289	-	83	473	191	-	160	895	-	281	-	-	-	-	-
63rd Ave N /Lousiana Blvd	34	109	272	14	-	97	-	293	256	-	13	0	100	-	34	0	-	20	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / CSAH 10 (Bass Lake Rd)	35	124	184	443	-	70	-	214	79	-	229	533	39	-	73	976	-	150	-	-	-	-	-
CSAH 10 (Bass Lake Rd) / Sherburne Ave	36	1	638	20	-	105	-	483	5	-	5	2	110	-	3	1	-	1	-	-	-	-	-
CSAH 10 (Bass Lake Rd) / Adair Ave N	37	45	237	13	-	3	-	330	12	-	4	2	2	-	5	2	-	29	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / Wilshire Blvd	38	13	4	15	-	148	-	8	59	-	15	729	157	-	71	1316	-	102	-	-	-	-	-
Wilshire Blvd / Lakeland Ave N	39	-	-	-	-	39	-	-	87	-	-	1	15	-	17	0	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / Corvallis Ave N	40	43	10	132	-	37	-	19	25	-	52	833	12	-	15	1423	-	41	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 47th Ave N	41	7	0	66	-	58	-	3	4	-	30	886	16	-	5	1581	-	6	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / TH 100 Southbound Ramps	42	-	-	-	-	124	-	-	74	-	-	858	-	-	-	734	-	971	-	-	-	-	-
CSAH 81 (Bottineau Blvd)/ TH 100 Northbound Ramps	43	9	132	-	-	-	-	-	362	-	-	487	165	-	128	730	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / CSAH 9 (42nd Ave N)	44	66	188	165	-	57	-	214	86	159	159	569	35	57	57	708	-	57	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 41st Ave N	45	48	9	12	-	3	-	11	10	46	46	705	4	9	9	867	-	54	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 40th Ave N	46	53	29	10	-	45	-	51	100	3	3	602	21	44	44	803	-	36	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 36th Ave N	47	73	70	148	-	58	-	183	82	93	93	471	25	23	23	749	-	86	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 35th Ave N	48	49	-	79	-	-	-	-	-	60	60	540	-	-	-	810	-	145	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / Abbott Ave N	49	184	-	112	-	-	-	-	-	75	75	416	-	-	-	558	-	331	-	-	-	-	-
CSAH 81 (W Broadway Ave) / 29th Ave N	50	51	8	49	-	12	-	16	10	-	-	307	10	30	30	456	-	21	-	-	-	-	-
CSAH 81 (W Broadway Ave) / 26th Ave N	51	18	38	8	-	5	-	52	33	3	3	256	9	52	52	482	-	-	-	-	-	-	-
CSAH 81 (W Broadway Ave) / CSAH 2 (Penn Ave N) / McNair Ave	52	14	419	65	-	10	-	208	28	66	66	101	9	54	54	125	-	6	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Logan Ave N	53	4	481	-	-	-	-	237	7	-	-	-	-	27	27	-	-	27	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Knox Ave N	54	4	546	10	-	28	-	257	1	3	3	2	23	0	0	2	-	3	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Irving Ave N	55	1	569	9	-	1	-	274	36	4	4	2	8	19	19	19	-	7	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Girard Ave N	56	38	539	19	-	103	-	297	130	10	10	56	113	10	10	10	-	4	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Fremont Ave N	57	-	593	69	-	13	-	495	-	-	-	-	-	68	68	216	-	35	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Emerson Ave N	58	18	643	-	-	-	-	391	30	117	117	157	24	-	-	-	-	-	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Dupont Ave N	59	21	638	8	-	8	-	377	17	8	8	5	5	32	32	9	-	36	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Bryant Ave N	60	15	651	9	-	15	-	383	27	13	13	6	22	12	12	33	-	6	-	-	-	-	-

2040 Build Conditions: AM Peak Hour Traffic Volumes

Intersection	ID	Eastbound				Westbound				Northbound				Southbound						Northeastbound			
		Left	Thru	Right	Right 2	Left 2	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Thru 2	Right	Right2	Left 2	Left	Thru	Right
CSAH 81 (W Broadway Ave) / Aldrich Ave N	61	9	652	24	-	29	-	414	28	10	10	4	23	10	10	12	-	1	-	-	-	-	-
CSAH 81 (W Broadway Ave) / N Lyndale Ave	62	26	603	56	-	113	-	404	42	36	36	134	65	170	170	232	-	31	-	-	-	-	-
N Lyndale Ave / N 18th Ave	63	25	10	20	-	15	-	15	25	45	45	170	20	20	20	330	-	60	-	-	-	-	-
N Lyndale Ave / N 14th Ave	64	15	0	50	-	20	-	10	10	50	50	210	10	10	10	330	-	25	-	-	-	-	-
N Lyndale Ave / Plymouth Ave N	65	35	220	55	-	210	-	205	40	40	40	195	150	50	50	305	-	45	-	-	-	-	-
N 7th St / W Lyndale Ave	66	-	245	205	-	20	-	300	-	-	-	-	-	760	760	750	-	205	-	-	-	-	-
N 7th St / E Lyndale Ave	67	100	905	-	-	-	-	110	160	210	210	550	35	-	-	-	-	-	-	-	-	-	-
N 7th St / Oak Lake Ave N	68	90	780	70	-	10	-	215	60	20	20	255	10	105	105	200	-	35	-	-	-	-	-
TH 55 (Olson Memorial Highway) / W Lyndale Ave	69	-	630	220	220	165	165	540	-	-	-	-	-	190	190	240	240	270	-	-	-	-	-
TH 55 (Olson Memorial Highway) / E Lyndale Ave	70	200	620	-	-	-	-	385	30	485	485	565	425	-	-	-	-	-	-	-	-	-	-
TH 55 (Olson Memorial Highway) / Oak Lake Ave N	71	245	710	90	-	25	-	215	20	40	40	70	55	15	15	75	-	160	-	-	-	-	-
TH 55 (Olson Memorial Highway) / N 7th St / N 6th St	72	-	380	400	-	75	-	165	35	80	80	250	45	70	70	885	-	15	-	-	-	-	-

2040 Build Conditions: PM Peak Hour Traffic Volumes

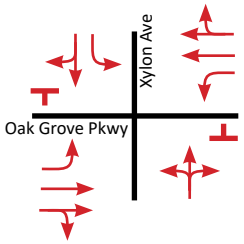
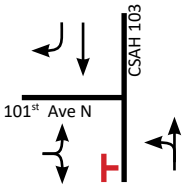
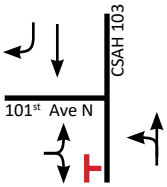
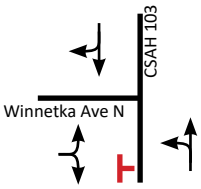
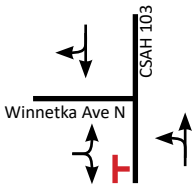
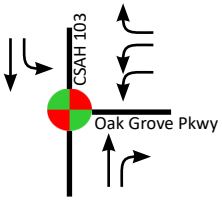
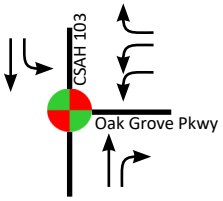
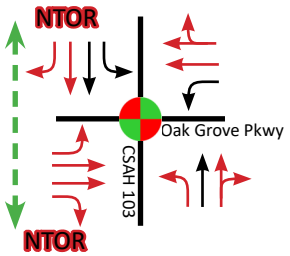
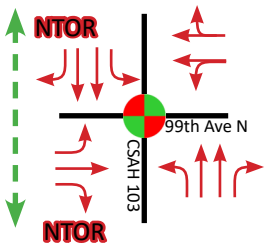
Intersection	ID	Eastbound				Westbound				Northbound				Southbound						Northeastbound			
		Left	Thru	Right	Right 2	Left 2	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Thru 2	Right	Right2	Left 2	Left	Thru	Right
Oak Grove Pkwy / Xylon Ave	1	160	435	370	-	175	-	445	135	-	355	70	95	-	70	40	-	260	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 101st Ave N	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Winnetka Ave N	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Oak Grove Pkwy	4	291	28	300	-	129	-	19	94	-	241	564	322	-	135	384	-	414	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 99th Ave N	5	116	165	276	-	5	-	167	65	-	106	1006	20	-	5	824	-	42	-	-	-	-	-
CSAH 103 (W Broadway Ave) / TH 610 WB Ramps	6	-	-	-	-	416	-	-	617	-	-	708	358	-	470	557	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / TH 610 EB Ramps	7	-	-	-	-	416	-	-	565	-	-	707	358	-	470	545	-	-	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 94th Ave N	8	61	3	77	-	18	-	1	32	-	32	973	12	-	28	901	-	50	-	-	-	-	-
CSAH 103 (W Broadway Ave) / CSAH 30 (93rd Ave N)	9	216	946	112	-	475	-	272	79	69	33	722	449	-	219	705	-	72	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 92nd Ave N	10	0	0	41	-	0	-	0	5	-	0	1268	129	-	0	1287	-	74	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Setzler Pkwy	11	47	0	5	-	11	-	1	57	11	3	1259	17	34	119	1131	-	44	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 89th Ave N	12	-	-	74	-	-	-	-	-	-	-	1290	-	-	-	1124	-	34	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Maplebrook Pkwy	13	48	3	3	-	15	-	2	78	-	1	1117	13	47	73	1030	-	48	-	-	-	-	-
CSAH 103 (W Broadway Ave) / CSAH 109 (85th Ave N)	14	563	1329	585	-	245	-	413	133	109	374	435	542	-	295	189	-	564	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 84th Ave N	15	0	0	12	-	0	-	0	140	-	0	1320	23	-	0	1114	-	14	-	-	-	-	-
CSAH 103 (W Broadway Ave) / College Park Dr	16	5	0	8	-	0	-	0	0	13	19	1274	0	64	0	1001	-	12	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 82nd Ave N	17	0	-	15	-	-	-	-	-	-	0	1306	-	-	-	1002	-	20	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Candlewood Dr	18	0	0	8	-	46	-	0	102	137	1	1198	74	6	64	945	-	2	-	-	-	-	-
CSAH 103 (W Broadway Ave) / 78th Ave N	19	0	0	31	-	0	-	0	67	-	0	1342	58	-	0	1027	-	110	-	-	-	-	-
CSAH 103 (W Broadway Ave) / Shopping Center Access	20	0	0	147	-	0	-	0	95	-	0	1305	103	-	0	942	-	116	-	-	-	-	-
CSAH 103 (W Broadway Ave) / CSAH 130 (Brooklyn Blvd) / CSAH 152	21	440	572	62	-	134	-	414	190	-	92	587	152	191	173	450	-	275	-	-	-	-	-
CSAH 130 (Brooklyn Blvd) / Shopping Center Access (west of CSAH 103)	22	75	900	120	-	101	-	622	58	-	72	21	130	-	44	14	-	41	-	-	-	-	-
CSAH 152 (Brooklyn Blvd) / Shopping Center Access (east of CSAH 103)	23	38	839	20	-	8	-	684	30	-	18	0	6	-	24	0	-	36	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 76th Ave N	24	107	39	78	-	97	-	84	103	-	50	621	90	-	114	389	-	143	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 75th Ave N	25	14	15	247	-	48	-	21	22	-	91	730	63	-	29	522	-	13	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 74th Ave N	26	0	0	0	-	19	-	3	14	-	68	870	25	-	4	807	-	6	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 73rd Ave N	27	201	22	8	-	3	-	30	59	-	5	704	8	-	52	650	-	124	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 73rd Ave N	28	84	93	126	-	73	-	57	29	-	62	1704	104	-	34	1141	-	53	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 71st Ave N	29	191	284	78	-	322	-	200	133	-	68	1546	530	-	102	1038	-	200	-	-	-	-	-
CSAH 130 (W Broadway Ave) / 71st Ave N	30	480	36	400	-	0	-	21	4	-	287	219	3	-	12	301	-	347	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / I-94 WB Ramps	31	-	-	-	-	188	-	-	768	-	-	1376	398	-	110	1328	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / I-94 EB Ramps	32	-	-	-	-	329	-	-	191	-	-	1583	226	-	511	1005	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 63rd Ave N	33	142	304	73	-	265	-	261	303	-	71	1202	355	-	292	922	-	120	-	-	-	-	-
63rd Ave N /Lousiana Blvd	34	21	420	40	-	84	-	355	43	-	11	2	117	-	225	0	-	99	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / CSAH 10 (Bass Lake Rd)	35	352	463	432	-	79	-	309	124	-	408	1157	127	-	137	858	-	259	-	-	-	-	-
CSAH 10 (Bass Lake Rd) / Sherburne Ave	36	9	1027	32	-	194	-	751	31	-	14	2	195	-	25	7	-	13	-	-	-	-	-
CSAH 10 (Bass Lake Rd) / Adair Ave N	37	43	672	5	-	5	-	456	17	-	4	1	6	-	24	1	-	52	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / Wilshire Blvd	38	87	8	28	-	100	-	4	82	-	14	1523	145	-	63	1276	-	30	-	-	-	-	-
Wilshire Blvd / Lakeland Ave N	39	-	-	-	-	15	-	-	33	-	-	1	32	-	93	0	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / Corvallis Ave N	40	45	18	93	-	22	-	20	32	-	74	1605	33	-	34	1320	-	52	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 47th Ave N	41	5	2	44	-	39	-	2	3	-	53	1704	51	-	6	1416	-	13	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / TH 100 Southbound Ramps	42	-	-	-	-	82	-	-	228	-	-	1580	-	-	-	787	-	712	-	-	-	-	-
CSAH 81 (Bottineau Blvd)/ TH 100 Northbound Ramps	43	25	142	4	-	-	-	-	968	-	3	587	310	-	96	773	-	-	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / CSAH 9 (42nd Ave N)	44	92	188	193	-	73	-	214	141	234	234	859	110	165	165	673	-	88	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 41st Ave N	45	117	9	60	-	27	-	11	47	83	83	1039	18	38	38	816	-	85	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 40th Ave N	46	66	29	26	-	77	-	51	93	21	21	981	54	105	105	733	-	65	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 36th Ave N	47	143	70	182	-	46	-	183	92	145	145	821	66	63	63	643	-	130	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / 35th Ave N	48	147	-	147	-	-	-	-	-	106	106	885	-	-	-	763	-	108	-	-	-	-	-
CSAH 81 (Bottineau Blvd) / Abbott Ave N	49	370	-	161	-	-	-	-	-	42	42	621	-	-	-	735	-	175	-	-	-	-	-
CSAH 81 (W Broadway Ave) / 29th Ave N	50	40	33	42	-	13	-	12	21	-	-	553	15	87	87	543	-	35	-	-	-	-	-
CSAH 81 (W Broadway Ave) / 26th Ave N	51	21	95	16	-	7	-	71	77	18	18	477	8	107	107	493	-	1	-	-	-	-	-
CSAH 81 (W Broadway Ave) / CSAH 2 (Penn Ave N) / McNair Ave	52	29	395	98	-	-	-	359	93	150	150	323	56	105	105	251	-	-	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Logan Ave N	53	33	523	-	-	-	-	472	33	-	-	-	-	24	24	-	-	23	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Knox Ave N	54	9	649	15	-	28	-	537	3	22	22	1	16	22	22	2	-	18	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Irving Ave N	55	28	658	18	-	9	-	554	17	7	7	20	7	28	28	32	-	15	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Girard Ave N	56	16	647	30	-	149	-	551	13	16	16	23	175	17	17	30	-	13	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Fremont Ave N	57	-	764	75	-	37	-	655	-	-	-	-	-	122	122	154	-	58	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Emerson Ave N	58	92	830	-	-	-	-	566	94	126	126	237	64	-	-	-	-	-	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Dupont Ave N	59	-	845	13	-	-	-	603	42	-	-	-	19	29	29	21	-	50	-	-	-	-	-
CSAH 81 (W Broadway Ave) / Bryant Ave N	60	20	866	7	-	34	-	591	62	61	61	15	24	33	33	8	-	17	-	-	-	-	-

2040 Build Conditions: PM Peak Hour Traffic Volumes

Intersection	ID	Eastbound				Westbound				Northbound				Southbound						Northeastbound			
		Left	Thru	Right	Right 2	Left 2	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Thru 2	Right	Right2	Left 2	Left	Thru	Right
CSAH 81 (W Broadway Ave) / Aldrich Ave N	61	13	862	48	-	66	-	604	22	49	49	33	77	38	38	38	-	17	-	-	-	-	-
CSAH 81 (W Broadway Ave) / N Lyndale Ave	62	95	801	81	-	104	-	584	96	55	55	210	98	178	178	265	-	53	-	-	-	-	-
N Lyndale Ave / N 18th Ave	63	45	20	45	-	25	-	15	30	45	45	295	30	25	25	340	-	60	-	-	-	-	-
N Lyndale Ave / N 14th Ave	64	15	10	50	-	15	-	10	15	40	40	340	25	15	15	375	-	20	-	-	-	-	-
N Lyndale Ave / Plymouth Ave N	65	55	305	70	-	315	-	285	60	35	35	290	220	55	55	330	-	55	-	-	-	-	-
N 7th St / W Lyndale Ave	66	-	215	215	-	40	-	475	-	-	-	-	-	350	350	695	-	135	-	-	-	-	-
N 7th St / E Lyndale Ave	67	155	410	-	-	-	-	270	450	245	245	1105	25	-	-	-	-	-	-	-	-	-	-
N 7th St / Oak Lake Ave N	68	55	340	40	-	15	-	645	110	20	20	300	15	160	160	290	-	55	-	-	-	-	-
TH 55 (Olson Memorial Highway) / W Lyndale Ave	69	-	910	365	365	170	170	815	-	-	-	-	-	130	130	215	215	200	-	-	-	-	-
TH 55 (Olson Memorial Highway) / E Lyndale Ave	70	425	615	-	-	-	-	715	60	440	440	890	225	-	-	-	-	-	-	-	-	-	-
TH 55 (Olson Memorial Highway) / Oak Lake Ave N	71	270	545	25	-	25	-	445	20	60	60	90	25	15	15	30	-	270	-	-	-	-	-
TH 55 (Olson Memorial Highway) / N 7th St / N 6th St	72	-	310	275	-	60	-	310	70	150	150	700	100	50	50	490	-	30	-	-	-	-	-

Appendix B

BLRT - Intersection Layout Table

#	Intersection	Existing Conditions	No Build Conditions	Build Conditions	Notes
1	Oak Grove Pkwy / Xylon Ave	N/A	N/A		
2	CSAH 103 (W Broadway Ave) / 101st Ave N			N/A	
3	CSAH 103 (W Broadway Ave) / Winnetka Ave N			N/A	
4	CSAH 103 (W Broadway Ave) / Oak Grove Pkwy	 S Prot / W Prot	 S Prot / W Prot	 N-S Prot / E-W Prot	Non-revenue crossing NTOR only when LRT approaching
5	CSAH 103 (W Broadway Ave) / 99th Ave N	N/A	N/A	 N-S Prot / E-W Prot	

Legend

N

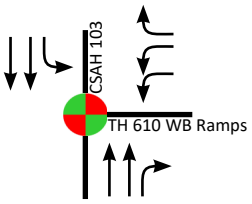
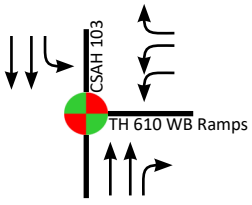
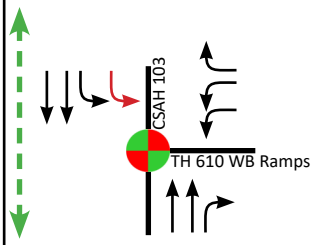
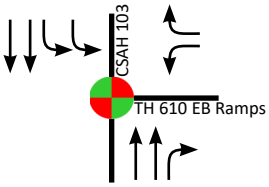
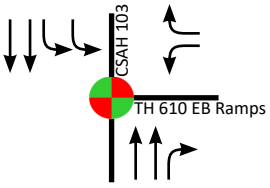
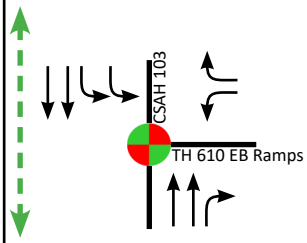
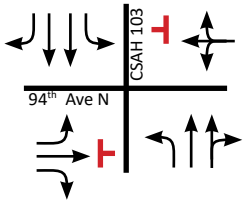
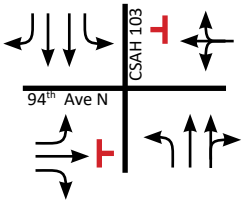
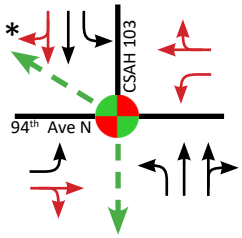
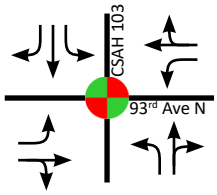
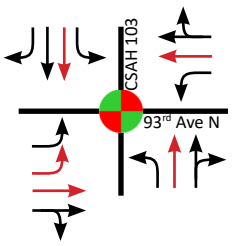
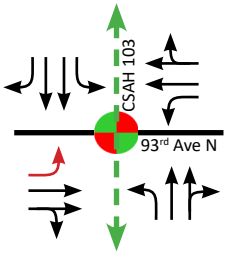
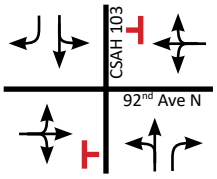
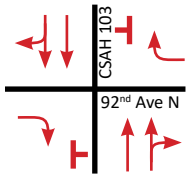
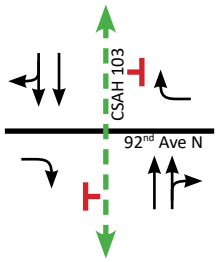
NOT TO SCALE

Traffic Signal	
Stop Control	
Lane Use	
Lane Use Change	

No Turn on Red	NTOR
Freight Rail	
LRT	
Channelized Right-Turn	

Perm	Permissive Left-Turn Phase
Prot+Perm	Protected/Permissive Left-Turn Phase
Prot	Protected Left-Turn Phase
FYA	Flashing Yellow Arrow Left-Turn Phase

BLRT- Intersection Layout Table

#	Intersection	Existing Conditions	No Build Conditions	Build Conditions	Notes
6	CSAH 103 (W Broadway Ave) / TH 610 WB Ramps	 S Prot / W Prot	 S Prot / W Prot	 S Prot / W Prot	
7	CSAH 103 (W Broadway Ave) / TH 610 EB Ramps	 S Prot / W Perm	 S Prot / W Perm	 S Prot / W Perm	
8	CSAH 103 (W Broadway Ave) / 94th Ave N			 N-S Prot / E-W Prot	*NTOR when LRT approaching
9	CSAH 103 (W Broadway Ave) / CSAH 30 (93rd Ave N)	 N-S Prot / E-W Prot	 N-S Prot / E-W Prot	 N-S Prot / E-W Prot	
10	CSAH 103 (W Broadway Ave) / 92nd Ave N				Intersection converted to right-in right-out in 2040 No Build conditions

Legend

N

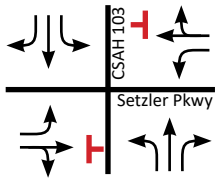
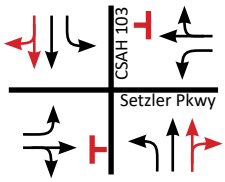
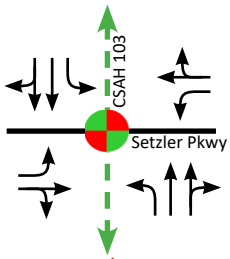
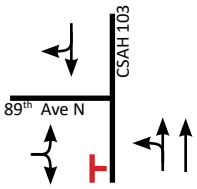
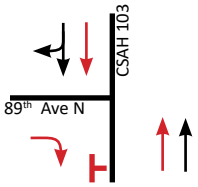
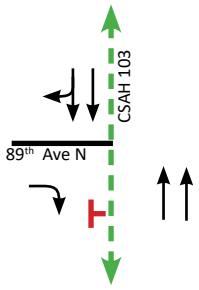
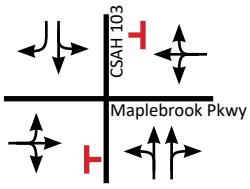
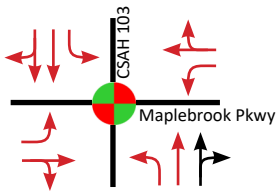
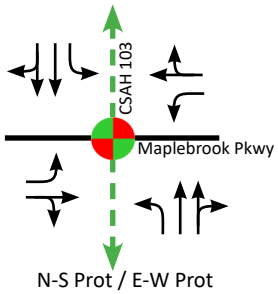
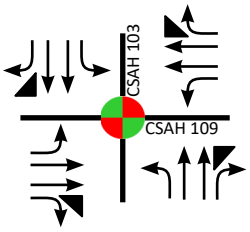
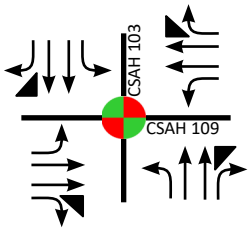
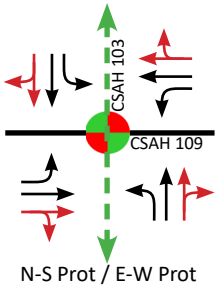
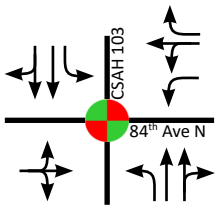
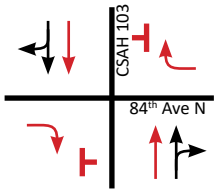
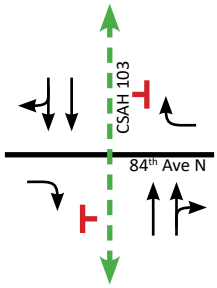
NOT TO SCALE

Traffic Signal	
Stop Control	
Lane Use	
Lane Use Change	

No Turn on Red	NTOR
Freight Rail	
LRT	
Channelized Right-Turn	

Perm	Permissive Left-Turn Phase
Prot+Perm	Protected/Permissive Left-Turn Phase
Prot	Protected Left-Turn Phase
FYA	Flashing Yellow Arrow Left-Turn Phase

BLRT- Intersection Layout Table

#	Intersection	Existing Conditions	No Build Conditions	Build Conditions	Notes
11	CSAH 103 (W Broadway Ave) / Setzler Pkwy			 N-S Prot / E-W Prot	
12	CSAH 103 (W Broadway Ave) / 89th Ave N				Intersection converted to right-in right-out in 2040 No Build conditions
13	CSAH 103 (W Broadway Ave) / Maplebrook Pkwy		 N-S Prot / E-W Prot	 N-S Prot / E-W Prot	
14	CSAH 103 (W Broadway Ave) / CSAH 109 (85th Ave N)	 N-S Prot / E-W Prot	 N-S Prot / E-W Prot	 N-S Prot / E-W Prot	
15	CSAH 103 (W Broadway Ave) / 84th Ave N	 N-S Prot / E-W Perm			Intersection converted to right-in right-out in 2040 No Build conditions

Legend

N

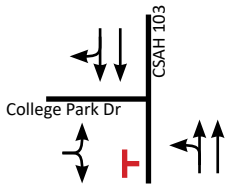
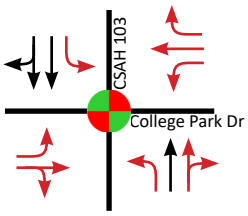
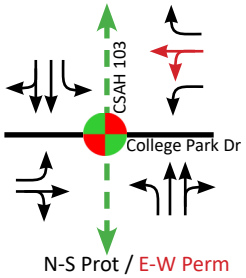
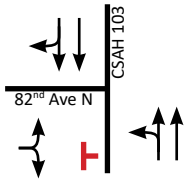
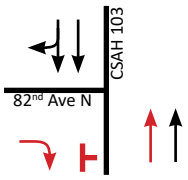
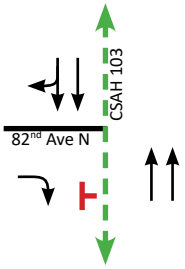
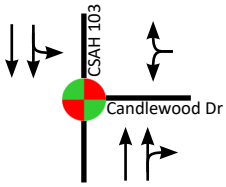
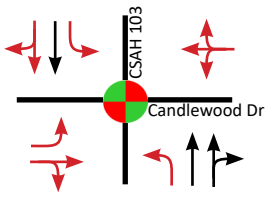
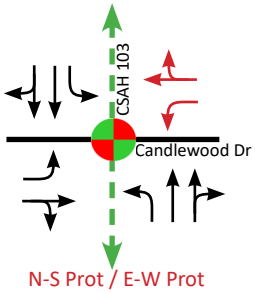
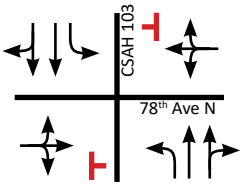
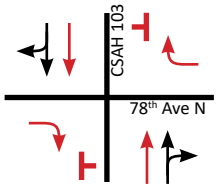
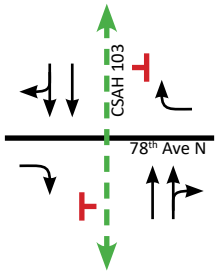
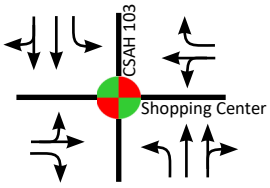
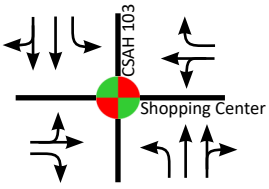
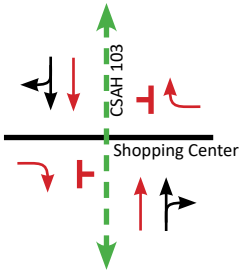
NOT TO SCALE

Traffic Signal	
Stop Control	
Lane Use	
Lane Use Change	

No Turn on Red	NTOR
Freight Rail	
LRT	
Channelized Right-Turn	

Perm	Permissive Left-Turn Phase
Prot+Perm	Protected/Permissive Left-Turn Phase
Prot	Protected Left-Turn Phase
FYA	Flashing Yellow Arrow Left-Turn Phase

BLRT- Intersection Layout Table

#	Intersection	Existing Conditions	No Build Conditions	Build Conditions	Notes
16	CSAH 103 (W Broadway Ave) / College Park Dr		 N-S Prot / E-W Prot	 N-S Prot / E-W Perm	
17	CSAH 103 (W Broadway Ave) / 82nd Ave N				Intersection converted to right-in right-out in 2040 No Build conditions
18	CSAH 103 (W Broadway Ave) / Candlewood Dr	 S FYA / W Prot	 N-S FYA / E-W Perm	 N-S Prot / E-W Prot	
19	CSAH 103 (W Broadway Ave) / 78th Ave N				Intersection converted to right-in right-out in 2040 No Build conditions
20	CSAH 103 (W Broadway Ave) / Shopping Center Access	 N-S Prot / E-W Perm	 N-S Prot / E-W Perm		Intersection converted to right-in right-out in 2040 Build conditions

Legend

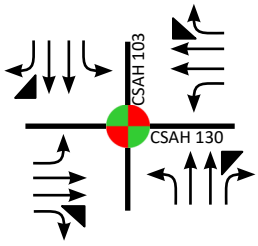
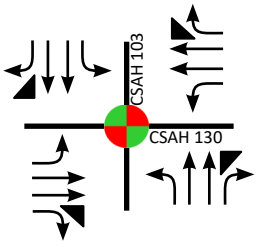
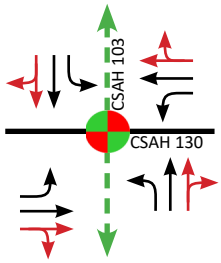
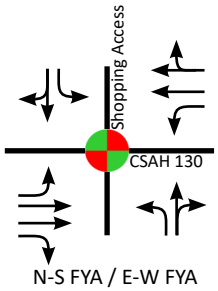
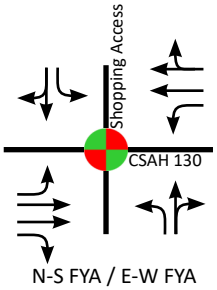
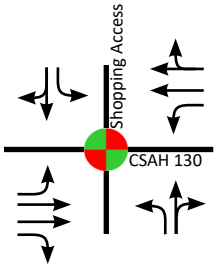
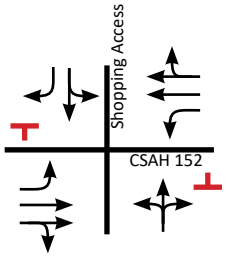
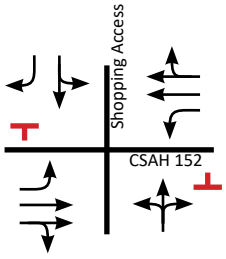
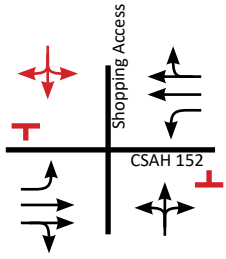
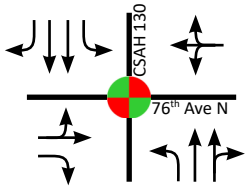
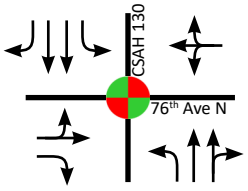
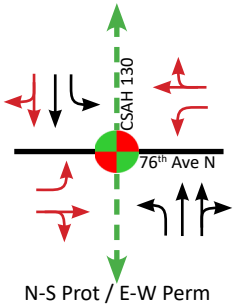
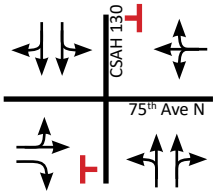
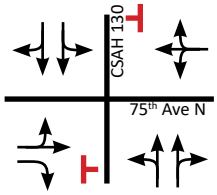
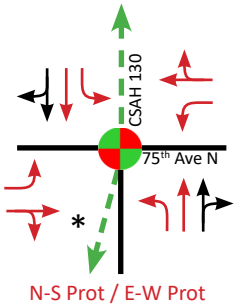
NOT TO SCALE

Traffic Signal	
Stop Control	
Lane Use	
Lane Use Change	

No Turn on Red	NTOR
Freight Rail	
LRT	
Channelized Right-Turn	

Perm	Permissive Left-Turn Phase
Prot+Perm	Protected/Permissive Left-Turn Phase
Prot	Protected Left-Turn Phase
FYA	Flashing Yellow Arrow Left-Turn Phase

BLRT- Intersection Layout Table

#	Intersection	Existing Conditions	No Build Conditions	Build Conditions	Notes
21	CSAH 103 (W Broadway Ave) / CSAH 130 (Brooklyn Blvd)/CSAH 152	 N-S Prot / E-W Prot	 N-S Prot / E-W Prot	 N-S Prot / E-W Prot	
22	CSAH 130 (Brooklyn Blvd) / Shopping Center Access (west of CSAH 103)	 N-S FYA / E-W FYA	 N-S FYA / E-W FYA	 N-S FYA / E-W FYA	
23	CSAH 152 (Brooklyn Blvd) / Shopping Center Access (east of CSAH 103)				
24	CSAH 130 (W Broadway Ave) / 76th Ave N	 N-S Prot / E-W Perm	 N-S Prot / E-W Perm	 N-S Prot / E-W Perm	
25	CSAH 130 (W Broadway Ave) / 75th Ave N			 N-S Prot / E-W Prot	*NTOR only when LRT approaching

Legend

N

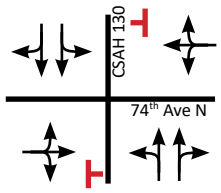
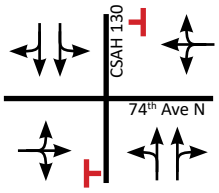
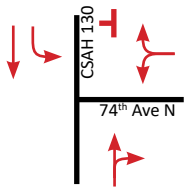
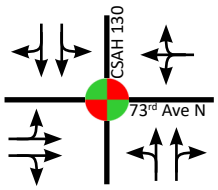
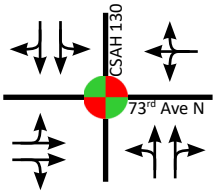
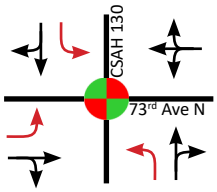
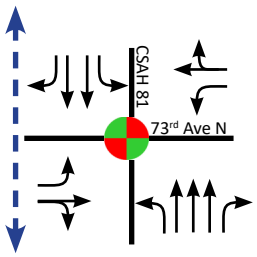
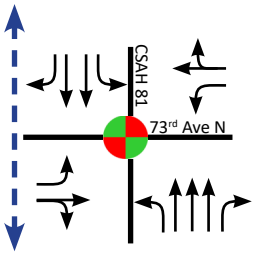
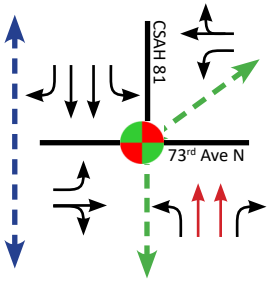
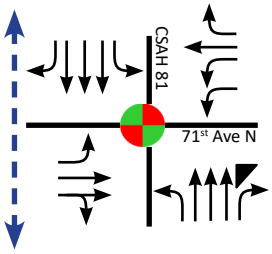
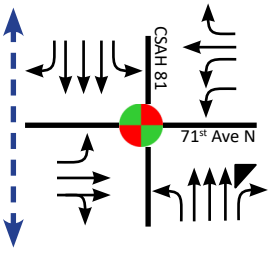
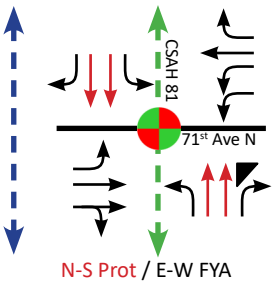
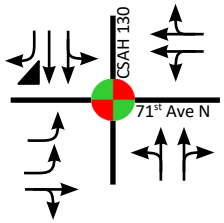
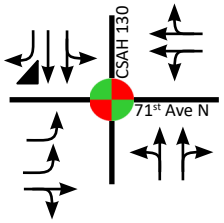
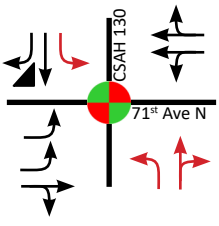
NOT TO SCALE

Traffic Signal	
Stop Control	
Lane Use	
Lane Use Change	

No Turn on Red	NTOR
Freight Rail	
LRT	
Channelized Right-Turn	

Perm	Permissive Left-Turn Phase
Prot+Perm	Protected/Permissive Left-Turn Phase
Prot	Protected Left-Turn Phase
FYA	Flashing Yellow Arrow Left-Turn Phase

BLRT- Intersection Layout Table

#	Intersection	Existing Conditions	No Build Conditions	Build Conditions	Notes
26	CSAH 130 (W Broadway Ave) / 74th Ave N				
27	CSAH 130 (W Broadway Ave) / 73rd Ave N	 N-S Perm / E-W Perm	 N-S Perm / E-W Perm	 N-S Perm / E-W Perm	
28	CSAH 81 (Bottineau Blvd) / 73rd Ave N	 N-S FYA / E-W FYA	 N-S FYA / E-W FYA	 N-S FYA / E-W FYA	LRT grade-separated over CSAH 81
29	CSAH 81 (Bottineau Blvd) / 71st Ave N	 N-S FYA/ E-W FYA	 N-S FYA / E-W FYA	 N-S Prot / E-W FYA	
30	CSAH 130 (W Broadway Ave) / 71st Ave N	 N Prot+Perm / S Perm / W Perm/ E Prot	 N Prot+Perm / S Perm / W Perm/ E Prot	 N Prot+Perm / S Perm / W Perm/ E Prot	

Legend

N

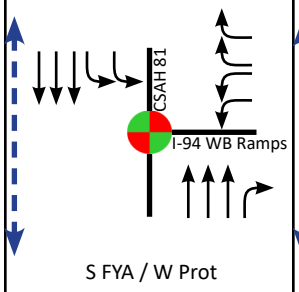
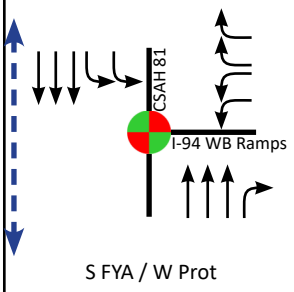
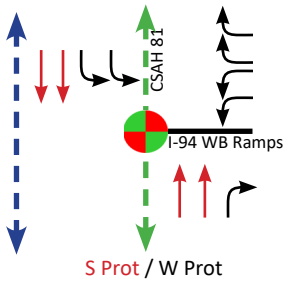
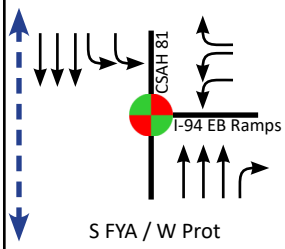
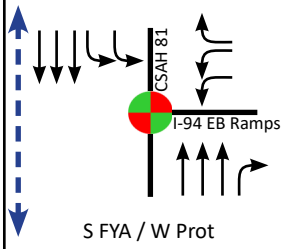
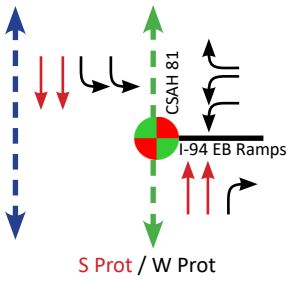
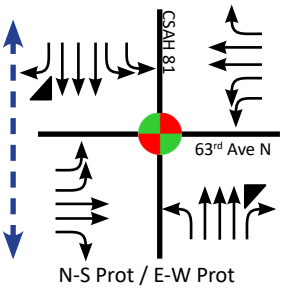
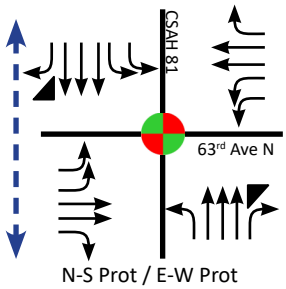
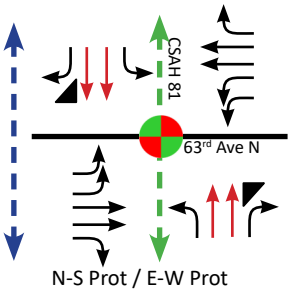
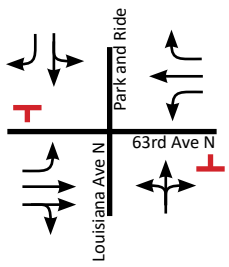
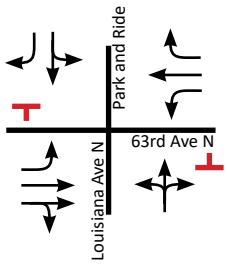
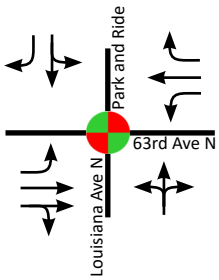
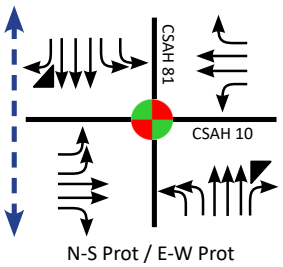
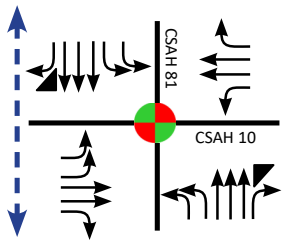
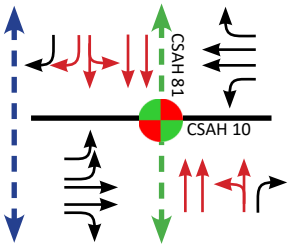
NOT TO SCALE

Traffic Signal	
Stop Control	
Lane Use	
Lane Use Change	

No Turn on Red	NTOR
Freight Rail	
LRT	
Channelized Right-Turn	

Perm	Permissive Left-Turn Phase
Prot+Perm	Protected/Permissive Left-Turn Phase
Prot	Protected Left-Turn Phase
FYA	Flashing Yellow Arrow Left-Turn Phase

BLRT- Intersection Layout Table

#	Intersection	Existing Conditions	No Build Conditions	Build Conditions	Notes
31	CSAH 81 (Bottineau Blvd) / I-94 WB Ramps				
32	CSAH 81 (Bottineau Blvd) / I-94 EB Ramps				
33	CSAH 81 (Bottineau Blvd) / 63rd Ave N				
34	63rd Ave N / Lousiana Ave N / Park and Ride				
35	CSAH 81 (Bottineau Blvd) / CSAH 10 (Bass Lake Rd)			Scenario 1 	In Scenario 1, NB/ SB CSAH 81 grade-separated from Bass Lake Road. In Scenario 2, lane geometry and phasing are identical to 2040 No Build conditions

Legend

N

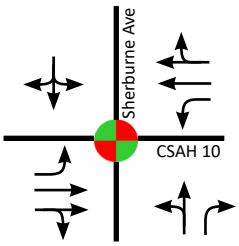
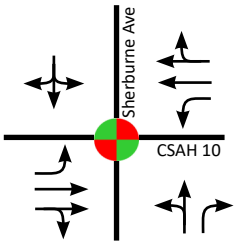
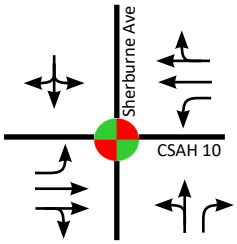
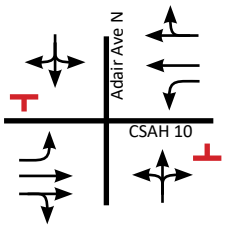
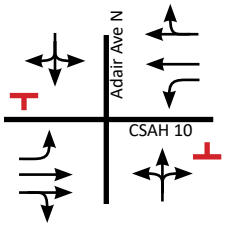
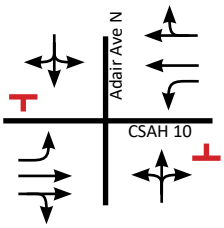
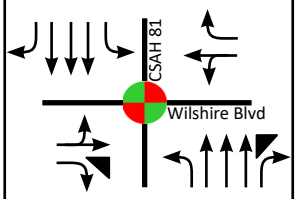
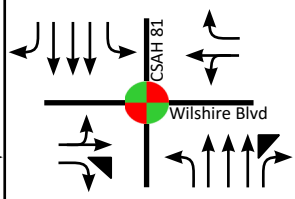
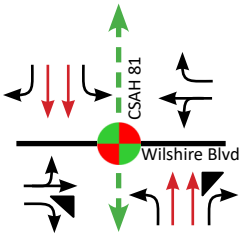
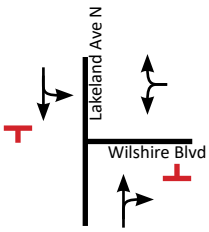
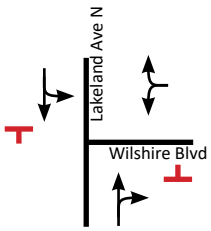
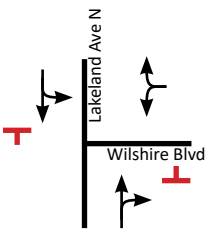
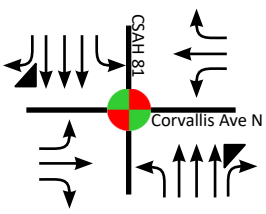
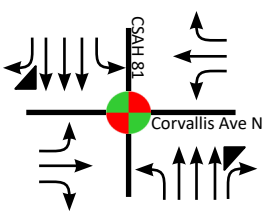
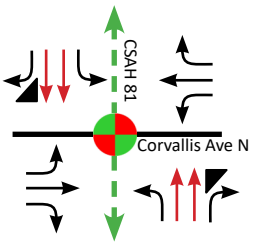
NOT TO SCALE

Traffic Signal	
Stop Control	
Lane Use	
Lane Use Change	

No Turn on Red	NTOR
Freight Rail	
LRT	
Channelized Right-Turn	

Perm	Permissive Left-Turn Phase
Prot+Perm	Protected/Permissive Left-Turn Phase
Prot	Protected Left-Turn Phase
FYA	Flashing Yellow Arrow Left-Turn Phase

BLRT- Intersection Layout Table

#	Intersection	Existing Conditions	No Build Conditions	Build Conditions	Notes
36	Sherburne Ave / CSAH 10 (Bass Lake Rd)	 N-S Perm / E-W FYA	 N-S Perm / E-W FYA	 N-S Perm / E-W FYA	
37	CSAH 10 (Bass Lake Rd) / Adair Ave N				
38	CSAH 81 (Bottineau Blvd) / Wilshire Blvd	 N-S Prot / E-W Perm	 N-S Prot / E-W Perm	Scenario 1  N-S Prot / E-W Perm	In Scenario 2, lane geometry and phasing are identical to 2040 No Build conditions
39	Wilshire Blvd / Lakeland Ave N				
40	CSAH 81 (Bottineau Blvd) / Corvallis Ave N	 N-S Prot/ E-W Prot+Perm	 N-S Prot/ E-W Prot+Perm	 N-S Prot/ E-W Prot+Perm	

Legend

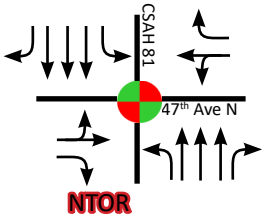
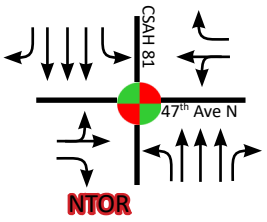
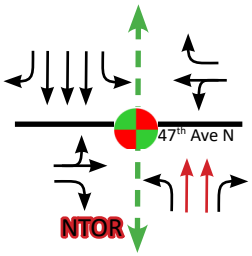
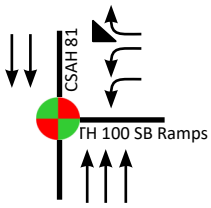
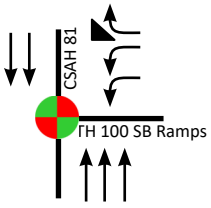
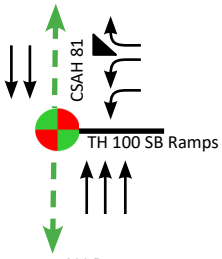
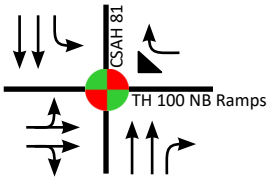
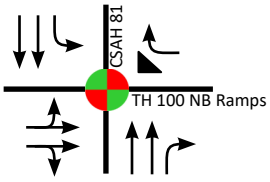
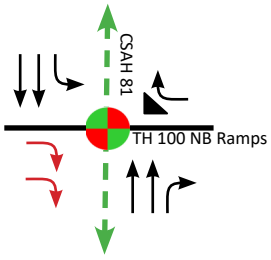
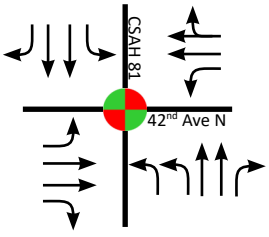
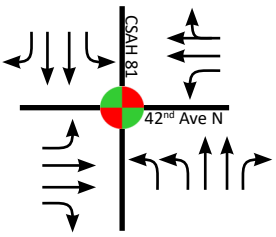
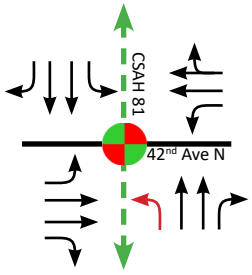
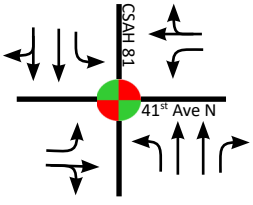
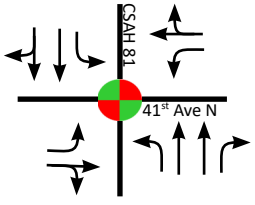
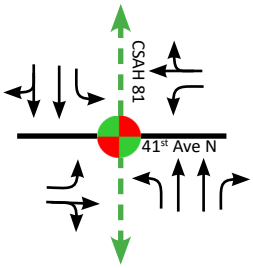
NOT TO SCALE

Traffic Signal	
Stop Control	
Lane Use	
Lane Use Change	

No Turn on Red	NTOR
Freight Rail	
LRT	
Channelized Right-Turn	

Perm	Permissive Left-Turn Phase
Prot+Perm	Protected/Permissive Left-Turn Phase
Prot	Protected Left-Turn Phase
FYA	Flashing Yellow Arrow Left-Turn Phase

BLRT- Intersection Layout Table

#	Intersection	Existing Conditions	No Build Conditions	Build Conditions	Notes
41	CSAH 81 (Bottineau Blvd) / 47th Ave N	 N-S Prot / E-W Perm	 N-S Prot / E-W Perm	 N-S Prot / E-W Perm	
42	CSAH 81 (Bottineau Blvd) / TH 100 Southbound Ramps	 W Prot	 W Prot	 W Prot	
43	CSAH 81 (Bottineau Blvd) / TH 100 Northbound Ramps	 S Prot / E Prot	 S Prot / E Prot	 S Prot / E Prot	
44	CSAH 81 (Bottineau Blvd) / CSAH 9 (42nd Ave N)	 N-S Prot / E-W Prot	 N-S Prot / E-W Prot	 N-S Prot / E-W Prot	
45	CSAH 81 (Bottineau Blvd) / 41st Ave N	 N-S Prot / E-W Perm	 N-S Prot / E-W Perm	 N-S Prot / E-W Perm	

Legend

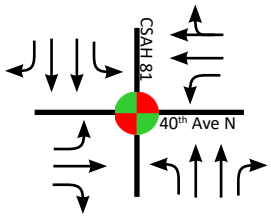
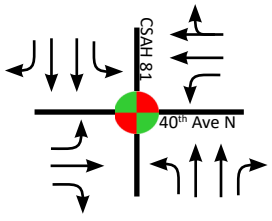
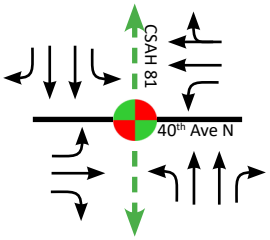
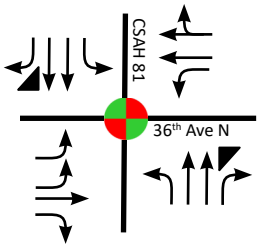
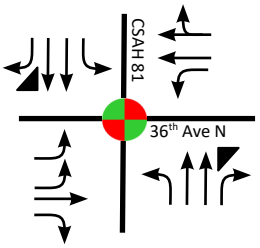
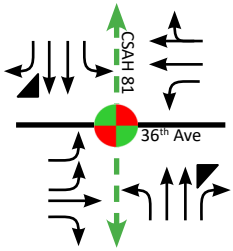
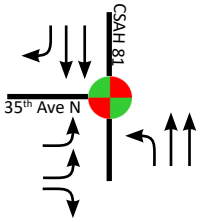
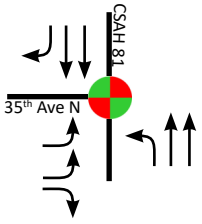
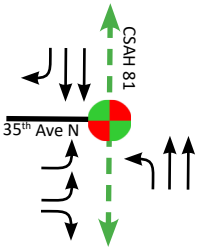
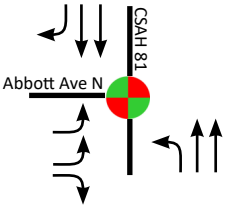
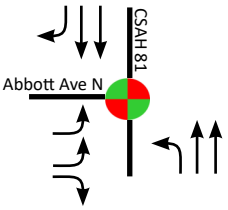
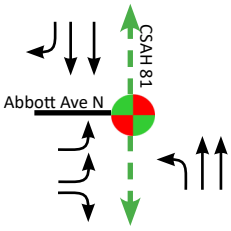
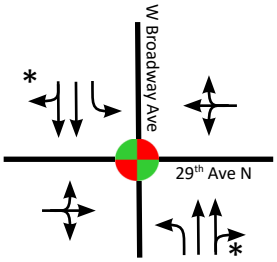
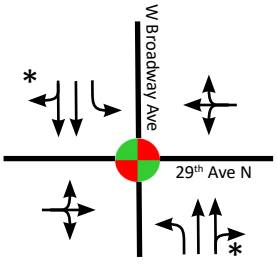
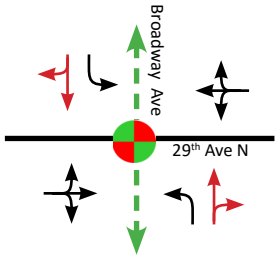
NOT TO SCALE

Traffic Signal	
Stop Control	
Lane Use	
Lane Use Change	

No Turn on Red	NTOR
Freight Rail	
LRT	
Channelized Right-Turn	

Perm	Permissive Left-Turn Phase
Prot+Perm	Protected/Permissive Left-Turn Phase
Prot	Protected Left-Turn Phase
FYA	Flashing Yellow Arrow Left-Turn Phase

BLRT- Intersection Layout Table

#	Intersection	Existing Conditions	No Build Conditions	Build Conditions	Notes
46	CSAH 81 (Bottineau Blvd) / 40th Ave N	 N-S Prot / E-W Perm	 N-S Prot / E-W Perm	 N-S Prot / E-W Perm	
47	CSAH 81 (Bottineau Blvd) / 36th Ave N	 N-S Prot / E-W Prot	 N-S Prot / E-W Prot	 N-S Prot / E-W Prot	
48	CSAH 81 (Bottineau Blvd) / 35th Ave N	 N FYA / E Prot	 N FYA / E Prot	 N Prot / E Prot	
49	CSAH 81 (Bottineau Blvd) / Abbott Ave N	 N Prot / E Prot	 N Prot / E Prot	 N Prot / E Prot	LRT grade-separated at Abbott Ave N
50	CSAH 81 (W Broadway Ave) / 29th Ave N	 N-S Perm / E-W Perm	 N-S Perm / E-W Perm	 N-S Prot / E-W Perm	*South of intersection, on-street parking is permitted in outside lane in NB direction during AM peak hour and in SB direction during PM peak hour

Legend

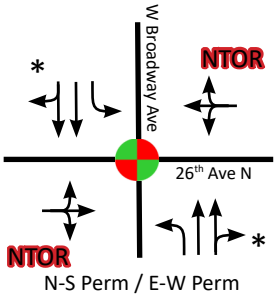
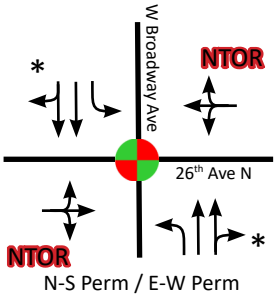
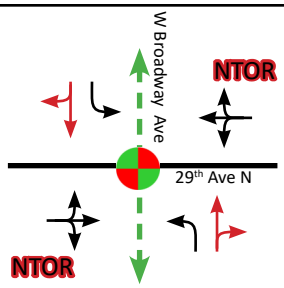
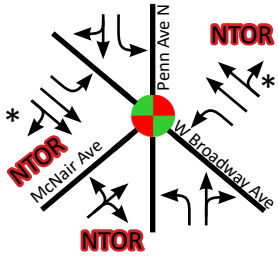
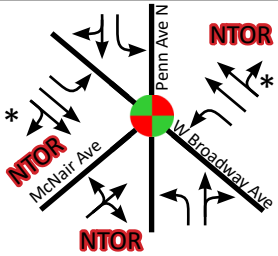
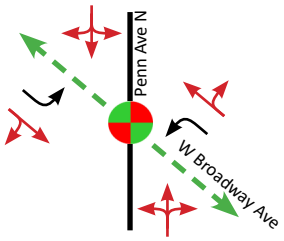
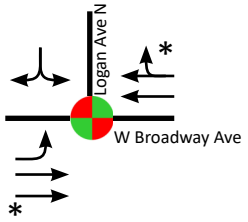
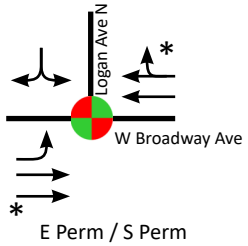
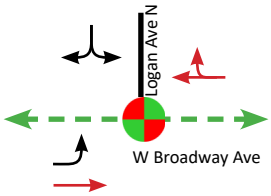
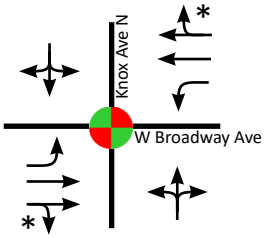
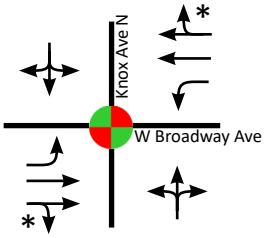
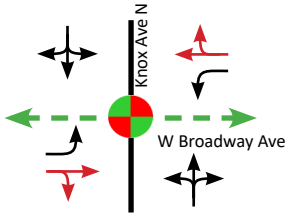
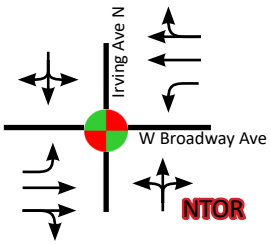
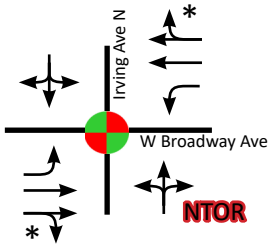
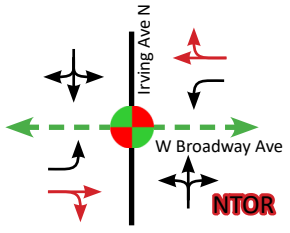
NOT TO SCALE

Traffic Signal	
Stop Control	
Lane Use	
Lane Use Change	

No Turn on Red	NTOR
Freight Rail	
LRT	
Channelized Right-Turn	

Perm	Permissive Left-Turn Phase
Prot+Perm	Protected/Permissive Left-Turn Phase
Prot	Protected Left-Turn Phase
FYA	Flashing Yellow Arrow Left-Turn Phase

BLRT- Intersection Layout Table

#	Intersection	Existing Conditions	No Build Conditions	Build Conditions	Notes
51	CSAH 81 (W Broadway Ave) / 26th Ave N	 N-S Perm / E-W Perm	 N-S Perm / E-W Perm	 N-S Prot / E-W Perm	*South of intersection, on-street parking is permitted in outside lane in NB direction during AM peak hour and in SB direction during PM peak hour
52	CSAH 81 (W Broadway Ave) / CSAH 2 (Penn Ave N) / McNair Ave	 N-S Prot+Perm / NW-SE Prot+Perm / NE Prot	 N-S Prot+Perm / NW-SE Prot+Perm / NE Prot	 N-S Prot+Perm / NW-SE Prot	*On-street parking permitted in outside lane in northwest-bound direction during AM peak hour and in southeast-bound direction during PM peak hour McNair Ave access closed in 2040 Build conditions
53	CSAH 81 (W Broadway Ave) / Logan Ave N	 E Perm / S Perm	 E Perm / S Perm	 E Prot / S Perm	*On-street parking permitted in outside lane in WB direction during AM peak hour and in EB direction during PM peak hour Eastbound left turn lane added in 2040 Build conditions to provide storage for vehicles with protected only left turn phasing (not shown in layout)
54	CSAH 81 (W Broadway Ave) / Knox Ave N	 N-S Perm / E-W Perm	 N-S Perm / E-W Perm	 N-S Perm / E-W Prot	*On-street parking permitted in outside lane in WB direction during AM peak hour and in EB direction during PM peak hour Eastbound left turn lane added in 2040 Build conditions to provide storage for vehicles with protected only left turn phasing (not shown in layout)
55	CSAH 81 (W Broadway Ave) / Irving Ave N	 N-S Perm / E-W Perm	 N-S Perm / E-W Perm	 N-S Perm / E-W Prot	*On-street parking permitted in outside lane in WB direction during AM peak hour and in EB direction during PM peak hour

Legend

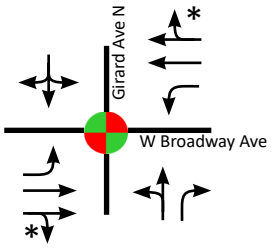
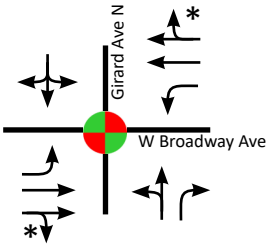
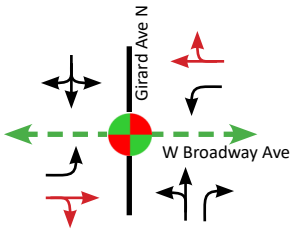
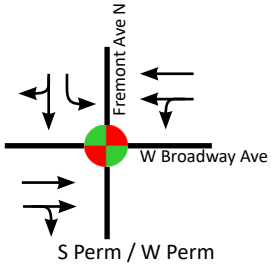
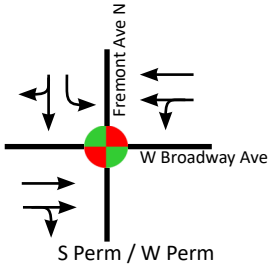
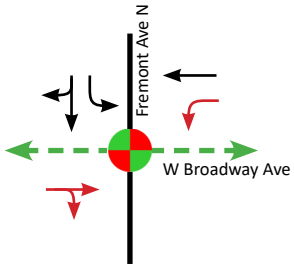
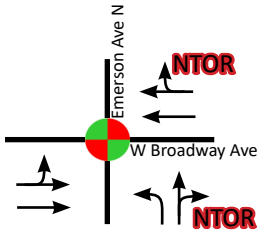
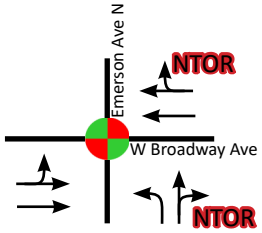
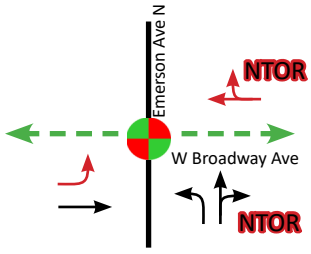
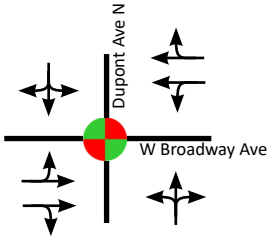
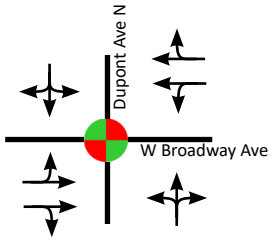
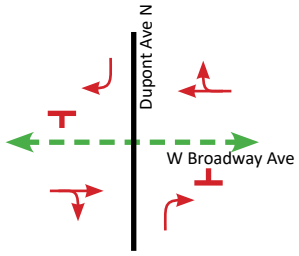
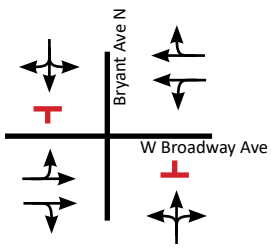
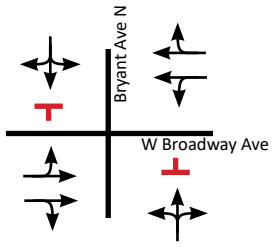
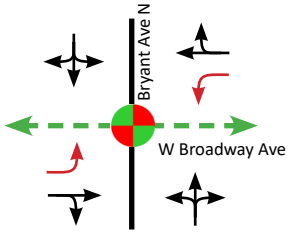
NOT TO SCALE

Traffic Signal	
Stop Control	
Lane Use	
Lane Use Change	

No Turn on Red	NTOR
Freight Rail	
LRT	
Channelized Right-Turn	

Perm	Permissive Left-Turn Phase
Prot+Perm	Protected/Permissive Left-Turn Phase
Prot	Protected Left-Turn Phase
FYA	Flashing Yellow Arrow Left-Turn Phase

BLRT- Intersection Layout Table

#	Intersection	Existing Conditions	No Build Conditions	Build Conditions	Notes
56	CSAH 81 (W Broadway Ave) / Girard Ave N	 N-S Perm / E Perm / W Prot+Perm	 N-S Perm / E Perm / W Prot+Perm	 N-S Perm / E-W Prot	*On-street parking permitted in outside lane in WB direction during AM peak hour and in EB direction west of intersection during PM peak hour
57	CSAH 81 (W Broadway Ave) / Fremont Ave N	 S Perm / W Perm	 S Perm / W Perm	 S Perm / W Prot	
58	CSAH 81 (W Broadway Ave) / Emerson Ave N	 N Perm / E Perm	 N Perm / E Perm	 N Perm / E Prot	
59	CSAH 81 (W Broadway Ave) / Dupont Ave N	 N-S Perm / E-W Perm	 N-S Perm / E-W Perm		Intersection converted to right-in right-out in 2040 Build conditions
60	CSAH 81 (W Broadway Ave) / Bryant Ave N			 N-S Perm / E-W Prot	

Legend

N

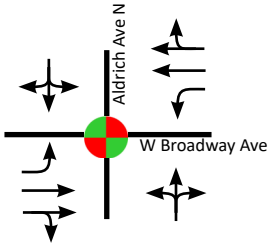
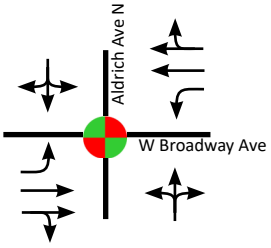
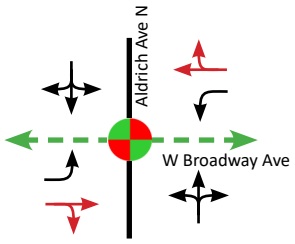
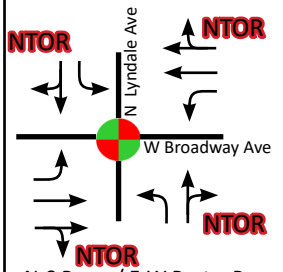
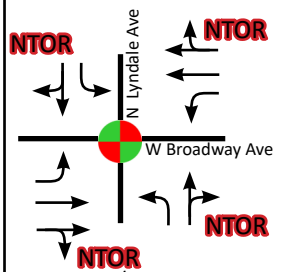
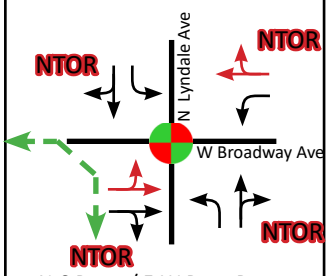
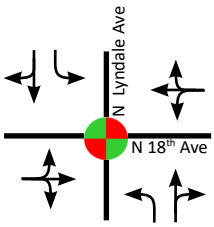
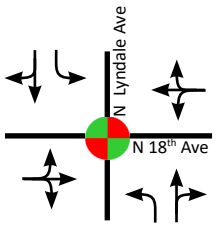
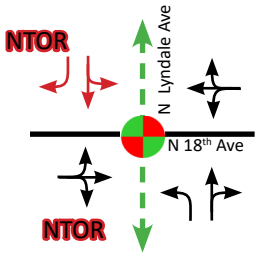
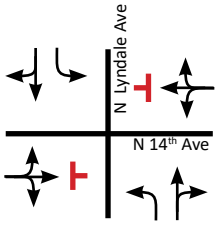
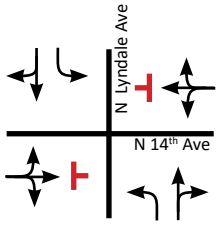
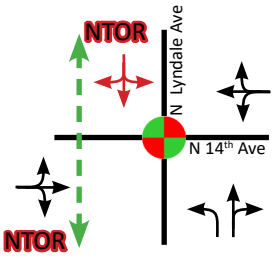
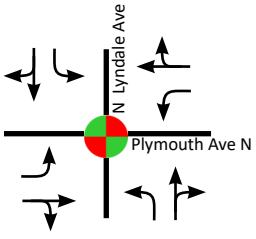
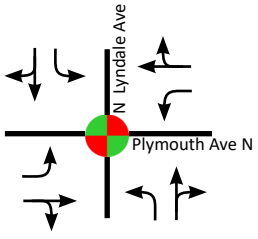
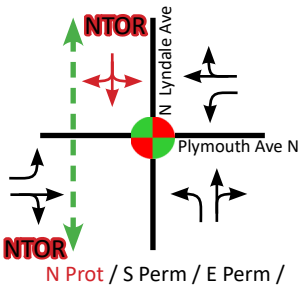
NOT TO SCALE

Traffic Signal	
Stop Control	
Lane Use	
Lane Use Change	

No Turn on Red	NTOR
Freight Rail	
LRT	
Channelized Right-Turn	

Perm	Permissive Left-Turn Phase
Prot+Perm	Protected/Permissive Left-Turn Phase
Prot	Protected Left-Turn Phase
FYA	Flashing Yellow Arrow Left-Turn Phase

BLRT- Intersection Layout Table

#	Intersection	Existing Conditions	No Build Conditions	Build Conditions	Notes
61	CSAH 81 (W Broadway Ave) / Aldrich Ave N	 N-S Perm / E Perm / W Prot+Perm	 N-S Perm / E Perm / W Prot+Perm	 N-S Perm / E-W Prot	
62	CSAH 81 (W Broadway Ave) / N Lyndale Ave	 N-S Perm / E-W Prot + Perm	 N-S Perm / E-W Prot + Perm	 N-S Perm / E-W Prot+Perm	
63	N Lyndale Ave / N 18th Ave	 N-S Perm / E-W Perm	 N-S Perm / E-W Perm	 N Prot / S Perm / E-W Perm	
64	N Lyndale Ave / N 14th Ave			 N Prot / S Perm / E-W Perm	Northbound left turn lane added in 2040 Build conditions to provide storage for vehicles with protected only left turn phasing (not shown in layout)
65	N Lyndale Ave / Plymouth Ave N	 N-S Perm / E-W Perm	 N-S Perm / E-W Perm	 N Prot / S Perm / E Perm / W Prot+Perm	WB converted to Prot+Perm for PM peak hour only in 2040 Build conditions

Legend

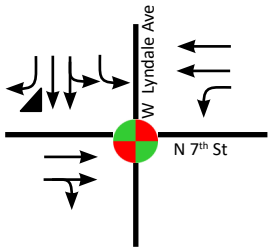
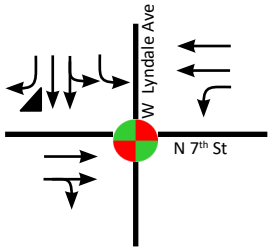
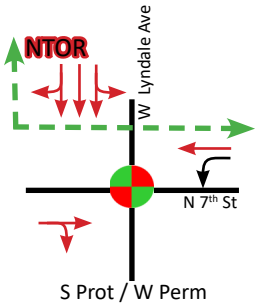
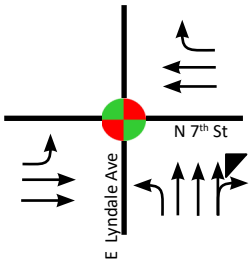
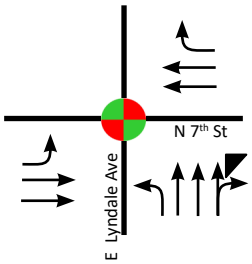
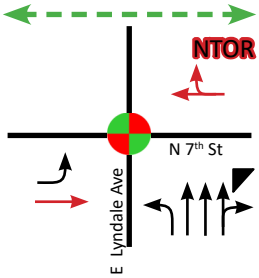
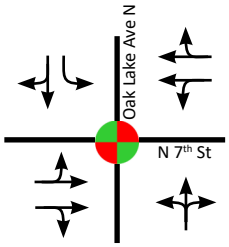
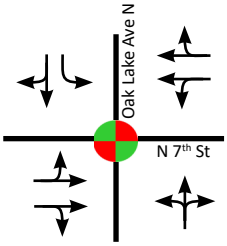
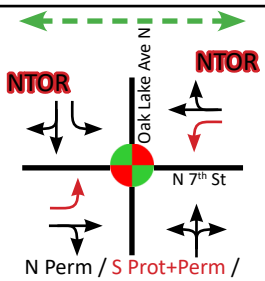
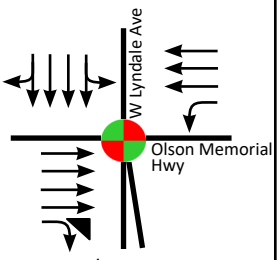
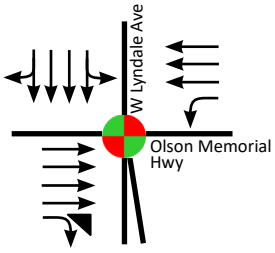
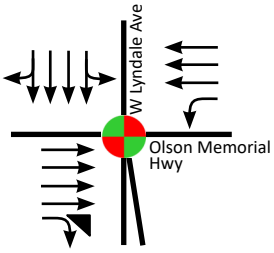
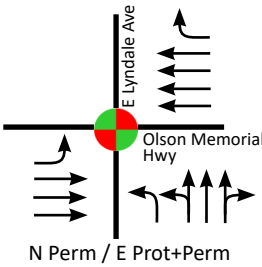
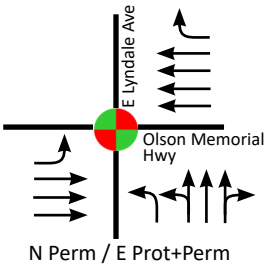
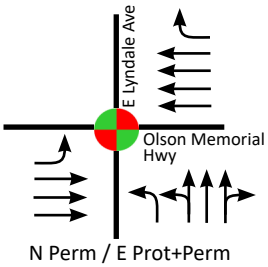
NOT TO SCALE

Traffic Signal	
Stop Control	
Lane Use	
Lane Use Change	

No Turn on Red	NTOR
Freight Rail	
LRT	
Channelized Right-Turn	

Perm	Permissive Left-Turn Phase
Prot+Perm	Protected/Permissive Left-Turn Phase
Prot	Protected Left-Turn Phase
FYA	Flashing Yellow Arrow Left-Turn Phase

BLRT- Intersection Layout Table

#	Intersection	Existing Conditions	No Build Conditions	Build Conditions	Notes
66	N 7th St / W Lyndale Ave	 S Prot / W Perm	 S Prot / W Perm	 S Prot / W Perm	
67	N 7th St / E Lyndale Ave	 N Prot / E Perm	 N Prot / E Perm	 N Prot / E Prot	
68	N 7th St / Oak Lake Ave N	 N-S Perm / E-W Perm	 N-S Perm / E-W Perm	 N Perm / S Prot+Perm / E Prot / W Perm	SB converted to Prot+Perm for PM peak hour only in 2040 Build conditions
69	Olson Memorial Highway (TH 55) / W Lyndale Ave	 S Prot / W Prot+Perm	 S Prot / W Prot+Perm	 S Prot / W Prot+Perm	
70	Olson Memorial Highway (TH 55) / E Lyndale Ave	 N Perm / E Prot+Perm	 N Perm / E Prot+Perm	 N Perm / E Prot+Perm	

Legend

N

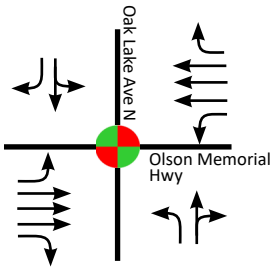
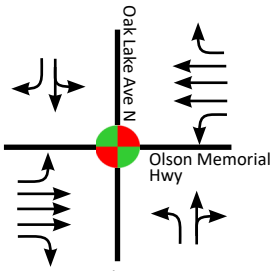
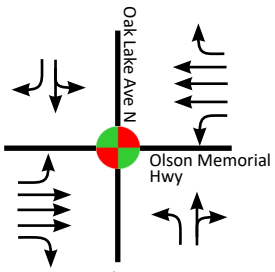
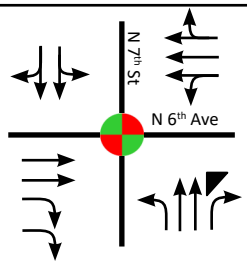
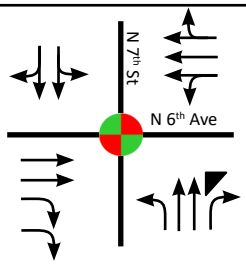
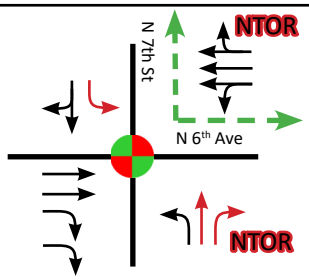
NOT TO SCALE

Traffic Signal	
Stop Control	
Lane Use	
Lane Use Change	

No Turn on Red	NTOR
Freight Rail	
LRT	
Channelized Right-Turn	

Perm	Permissive Left-Turn Phase
Prot+Perm	Protected/Permissive Left-Turn Phase
Prot	Protected Left-Turn Phase
FYA	Flashing Yellow Arrow Left-Turn Phase

BLRT- Intersection Layout Table

#	Intersection	Existing Conditions	No Build Conditions	Build Conditions	Notes
71	Olson Memorial Highway (TH 55) / Oak Lake Ave N	 N-S Perm / E-W Prot+Perm	 N-S Perm / E-W Prot+Perm	 N-S Perm / E-W Prot+Perm	
72	Olson Memorial Highway (TH 55) / N 7th St / N 6th Ave	 N Prot + Perm / S Perm / W Perm	 N Prot + Perm / S Perm / W Perm	 N Prot+Perm / S Prot / W Perm	WB assumed to operate Prot only in AM peak hour in 2040 Build conditions

Legend

N

NOT TO SCALE

Traffic Signal	
Stop Control	
Lane Use	
Lane Use Change	

No Turn on Red	NTOR
Freight Rail	
LRT	
Channelized Right-Turn	

Perm	Permissive Left-Turn Phase
Prot+Perm	Protected/Permissive Left-Turn Phase
Prot	Protected Left-Turn Phase
FYA	Flashing Yellow Arrow Left-Turn Phase

Technical Memorandum

METRO Blue Line LRT Extension (BLRT)
5514 West Broadway Avenue, Suite 200, Crystal, MN 55428 www.bluelineext.org

MEMORANDUM

To:	Gina Mitchell FAA Dakota-Minnesota Airport District Office Community Planner
From:	Nick Landwer, Director of Design and Engineering, Blue Line Extension Metropolitan Council
CC:	Bridget Rief, MAC
Date:	March 16, 2023
Subject:	BLRT Adjacent to Crystal Airport – Runway 6L/24R Runway Protection Zone (RPZ) Analysis

Introduction

The new alignment of the METRO Blue Line Extension Light Rail Transit (BLRT) project is planned to extend the existing Blue Line from Target Field Station through North Minneapolis and northwest to its prior terminus in Brooklyn Park. This memo follows up on the guidance given at a meeting between the Metropolitan Council, MAC and the FAA on August 10, 2021.The purpose of this memorandum is to provide the necessary information for the FAA and MNDOT to determine if the BLRT is still a compatible use within the Crystal Airport's Runway 24R departure Runway Protection Zone (RPZ). This memo serves as an update to the 2014 RPZ Analysis for the proposed BLRT adjacent to Crystal Airport and provides:

- background data about the current BLRT project and its relation to Crystal Airport,
- a summary of changes since the 2014 RPZ Analysis,
- a review of alternatives, and
- a recommendation of a preferred alternative.

A FAA Form 7460-1, Notice of Proposed Construction or Alteration will be filed separately through the FAA's Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) website.

Background

The BLRT began project development in 2012 and achieved 90% design in 2017. In December of 2018 after protracted efforts with BNSF Railway failed to create an agreement to utilize a portion of the BNSF Railway for part of the project's LRT alignment, the project generally suspended design and permitting efforts. The BLRT restarted planning and conceptual design work in August 2020 with the aim to develop a mitigation alignment that does not require BNSF Railway property. As such, the newly proposed BLRT guideway has been shifted out of the BNSF corridor approximately 80 feet to the east into the median of Bottineau Boulevard (County Road 81). The project will be publishing its Route Modification Report in April and is currently coordinating with the FTA regarding the Environmental Reevaluation process.

Crystal Airport is a Regional General Aviation Airport that is owned and operated by the Metropolitan Airports Commission (MAC). The Airport has two sets of parallel runways in a crossing configuration, three of which are paved. The runway of focus in this analysis is Runway 6L/24R. Some key information for Runway 6L/24R is presented in **Table 1** below. Since the former BLRT was proposed through the RPZ for this runway, the project provided a RPZ analysis in 2014 to the FAA. The new alignment continues to travel through the RPZ, approximately 80 feet closer to the runway. After a meeting August 10, 2021 with representatives of the Metropolitan Airport Commission (MAC) and the FAA, a number of next steps were determined including updating the 2014 RPZ analysis and submitting a new 7460-1 permit request to the FAA. The 2014 RPZ analysis has been updated accordingly below.

Table 1. Runway 6L/24R Characteristics

Item	Dimension
Runway Length	2,500 feet
Runway Width	75 feet
Runway lighting	Medium intensity runway edge lights
Visual Glide Slope Indicator	4-box Visual Approach Slope Indicator (both ends)
Runway Design Code (RDC)	B-II Small-5000
Approach/Departure RPZ	
Inner Width	250 feet
Outer Width	450 feet
Length	1,000 feet
Instrument Approach Procedure?	No

Changes Since the 2014 RPZ Analysis

There have been two primary changes since the 2014 RPZ analysis was completed: 1) Turf Runway 6R/24L was shortened and 2) the proposed BLRT transitway was shifted approximately 80 feet closer to Crystal Airport.

- The overall length of the turf runway, Runway 6R/24L, was shortened from 2,123 feet to 1,669 feet. This reduced runway length was achieved by shifting both runway ends. The Runway 6R end was shifted approximately 300 feet to the northeast. As a result, the Runway 6R RPZ no longer extends beyond Airport property and does not overlie Bottineau Boulevard.
- The planned BLRT guideway has been shifted approximately 80 feet northeast to be within the median of Bottineau Boulevard. There are no changes anticipated to the BLRT vehicles or overhead contact system (OCS).

Alternatives

The 2014 RPZ analysis defined several alternatives for light rail to pass by the airport. The preferred alternative was for the BLRT transitway to be placed within the BNSF ROW. **Table 2** summarizes the 2014 RPZ analysis alternatives and presents the new alternative (Alternative A) that is being considered.

Table 2. BLRT Alternatives

Exhibits of Alternatives 1, 2, 3, 3A, 4 and 5 can be found in **Appendix A.**

Alternative	Brief Description
Alternative 1 – Transitway within the Existing BNSF ROW	Slight realignment of BNSF tracks west to accommodate transitway within the existing BNSF ROW. This was the preferred alternative.
Alternative 2 – Transitway Tunnel Below RPZ	Tunneling the transitway and adjacent BNSF tracks. Challenges with ground water, vertical curves, reduced passenger comfort/experience, extended tunnel required to accommodate freight rail requirements, BLRT station impacts, and anticipated opposition from BNSF.
Alternative 3 – Realign Transitway Outside RPZ	Realign the transitway around the RPZ. Challenges include crossing the existing BNSF rail lines, reduced passenger comfort/experience, acquisition of residential properties, reconfiguration of neighborhood roadways, and impacts to the neighborhood.
Alternative 3A – Realign Transitway and Freight Outside RPZ	Realigns both the transitway and freight rail lines around the RPZ. Similar to Alternative 3, challenges include reduced passenger comfort/experience, acquisition of residential properties, reconfiguration of neighborhood roadways, impacts to the neighborhood, and anticipated opposition from BNSF.
Alternative 4 – Shorten Runway 6L/24R with Alternative 1 LRT Alignment Concept	Reduce the Runway 6L/24R length by approximately 390 feet resulting in an overall length of approximately 2,110 feet, which is below the runway length requirements for the existing aircraft fleet using the Airport. This reduction in runway length would effectively close the runway, which is needed to provide adequate crosswind coverage for the aircraft fleet using the Airport.

Alternative	Brief Description
Alternative 5 – Shift Runway 6L/24R 390 feet Northeast with Alternative 1 LRT Alignment Concept	Retains the current runway length and shifts the runway along its current runway centerline 390 feet north east. Shifting the runway to the northeast would increase the number of residential properties within the Runway 24R end RPZs (incompatible land use) and the Minnesota State Safety Zone A and B areas (violation of statutory airport zoning codes).
Alternative 6 – Close Runway 6L/24R	Completely close the runway. This would result in periods of time that crosswind coverage is not met at the Airport. Also, FAA grant money has been used for improvements on the runway and therefore the runway is required to remain open for 20 years from the date of the FAA grant money unless the Sponsor repays the prorated amount.
Alternative 7 – Realign Runway 6L/24R	There is not sufficient land available to realign or skew the runway enough to eliminate the RPZ issues.
Alternative 8 – Stop LRT and Obtain Clearance to Proceed	This alternative would require LRT operations to be coordinated with air traffic operations. The airport traffic control tower at Crystal Airport is not staffed 24 hours a day and therefore would not provide a viable alternative during all LRT operations. Additionally, stopping the LRT for Airport operations would negatively affect duration of the LRT within the RPZ, operational reliability of the LRT, and reduced passenger experience.
Alternative 9 – Bus Bridging	The LRT would stop short of the RPZ, bus the passengers around the RPZ, where passengers would resume the LRT trip. This would cause considerable inconvenience to LRT passengers and add about 7.5 minutes per trip. This alternative does not meet the LRT's purpose and need.
Alternative A - Transitway within the Bottineau Boulevard Median	**This alternative is similar to Alternative 1, with the LRT being shifted approximately 80 feet northeast and locating the guideway within the median of the existing Bottineau Boulevard median.**

Analysis

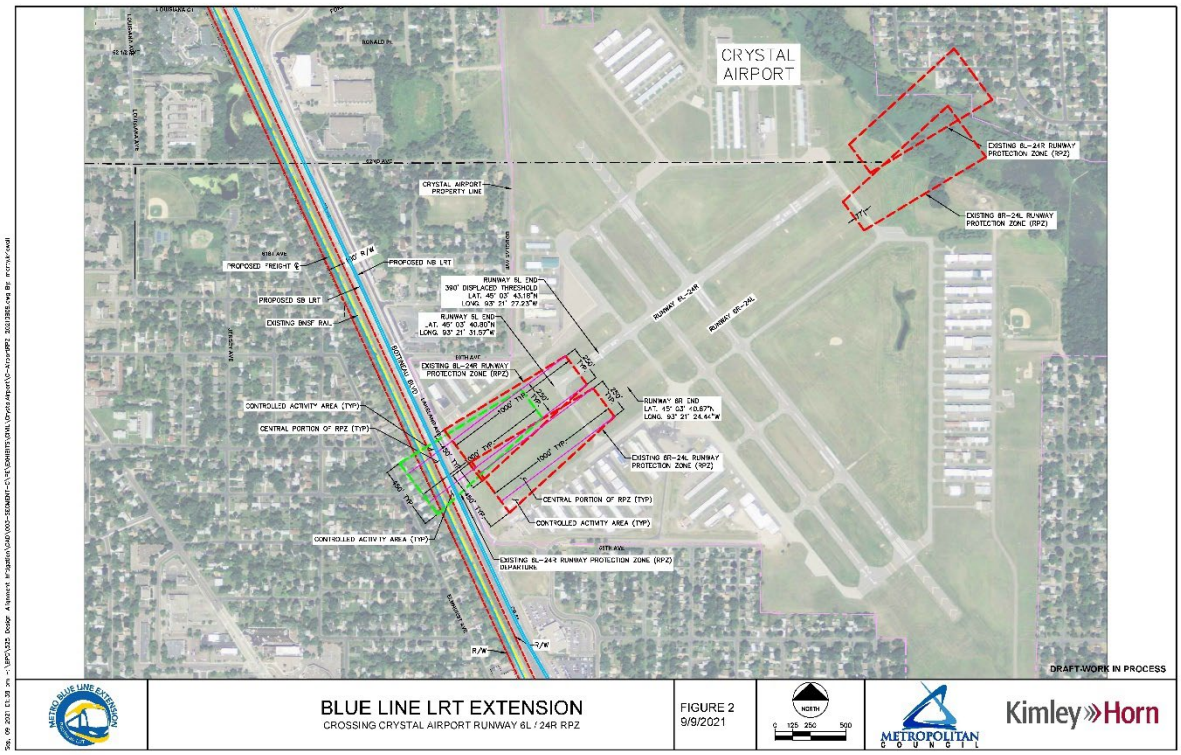
For clarity, there are two RPZs on the southwest end of Runway 6L/24R: The Runway 6L approach RPZ and the Runway 24R departure RPZ. The RPZ that extends off Airport property and overlies Bottineau Boulevard is the Runway 24R departure RPZ. The Runway 6L approach RPZ is completely within Airport property and is not collocated with the departure RPZ because the landing threshold has been displaced from the physical end of the runway.

The newly defined alternative, Alternative A, shifts the BLRT transitway 80 feet to the northeast, locating it within the median of Bottineau Boulevard (see **Figure 1**). This alternative is very similar to Alternative 1, described above, in that it is an at grade transitway with 16-foot-tall LRT vehicles and a 23'-tall OCS to supply power. With the northeasterly shift of the BLRT transitway, the length of the BLRT transitway within the RPZ is reduced slightly to approximately 415 feet. This results in a minor reduction in the amount of time a train is within the RPZ to 5.1 seconds. The frequency of operations would remain the same; 12 minutes between trains during the morning and evening peak periods and 15 minutes during the daytime and overnight hours.

Poles supporting the OCS will be spaced approximately 200 feet on center. Pole location is subject to final design, but it is anticipated that a pole will be located 80 feet on either side of the extended runway centerline. Approximately 2 to 3 poles are anticipated to be within the RPZ. The BLRT transitway varies in distance from the Runway 6L runway end. At its closest point, on the northwesterly side of the extended runway centerline, the BLRT transitway is approximately 925 feet from the runway end. At its furthest point, on the southeasterly side of the extended runway centerline, the BLRT transitway is approximately 1,80 feet from the runway end.

Shifting the transitway closer to the airport does affect the potential impacts the OCS has on the airport airspace. A FAA Form 7460-1, Notice of Proposed Construction or Alteration will be filed separately. This will be filed through the FAA's Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) website. Through this process, a Notice of Determination will be provided indicating whether the poles represent a hazard to air navigation.

Figure 1. Proposed Alternative BLRT



Preferred Alternative

Since the 2014 RPZ Analysis was completed, it has been determined that Alternative 1 is infeasible. Any alternative that utilizes BNSF property is not a viable alternative. Alternatives that extend travel time between LRT stations or negatively impact rider comfort or convenience are also not viable. Alternative A, the new alternative defined in this memorandum, is the only remaining viable alternative and therefore the preferred alternative.

Summary

The addition of the BLRT transitway within the median of Bottineau Boulevard is consistent with existing land uses within the RPZ. Because there is already a highway and freight corridor within the Runway 24R departure RPZ, the proposed alternative does not represent a new use. With the BLRT transitway shifted approximately 80 feet to the northeast, the length of the transitway within the RPZ is reduced from the previously preferred alternative and therefore, the amount of time trains are within the RPZ is reduced.

Appendix A

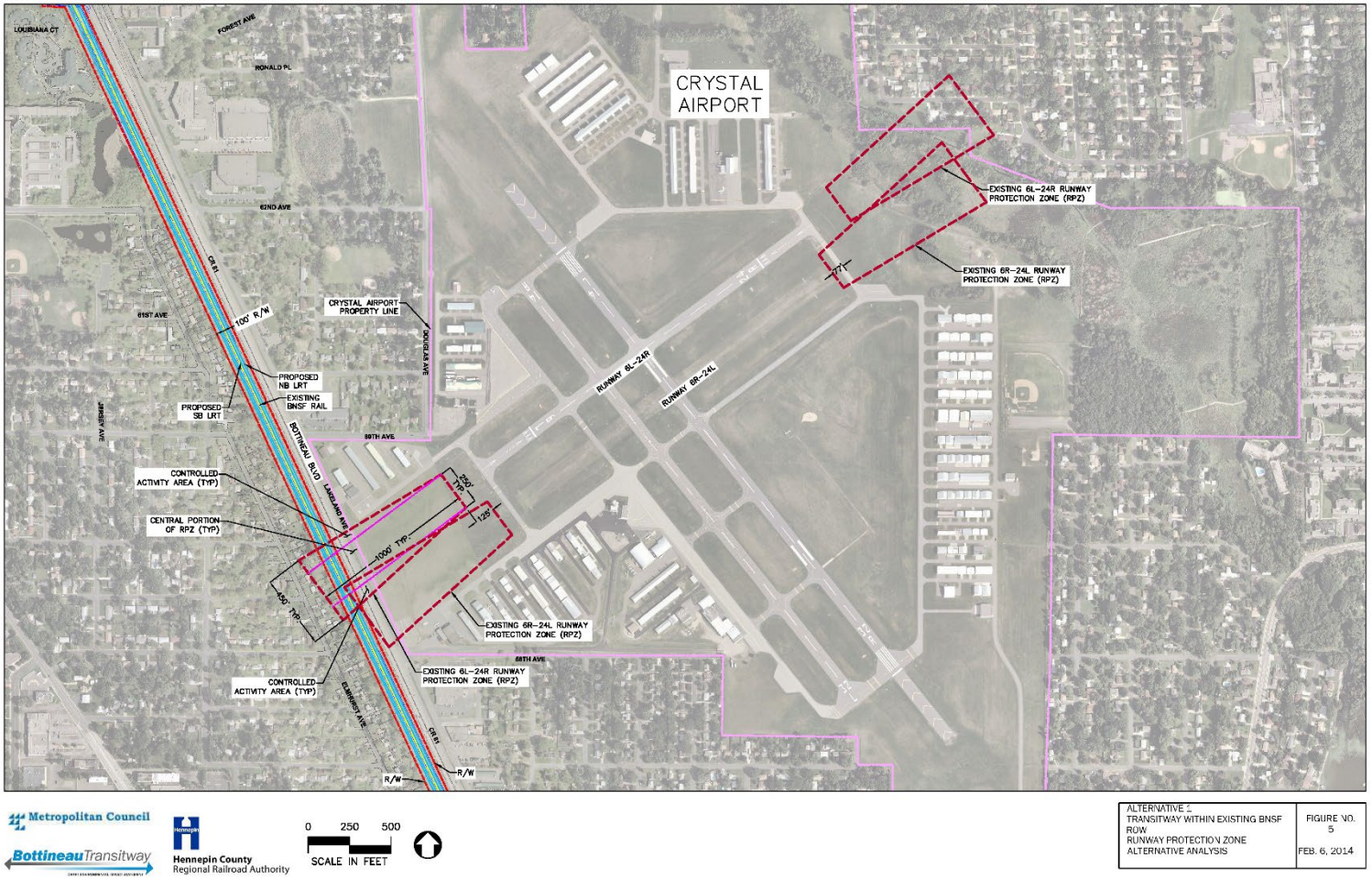


Figure 2: Alternative 1

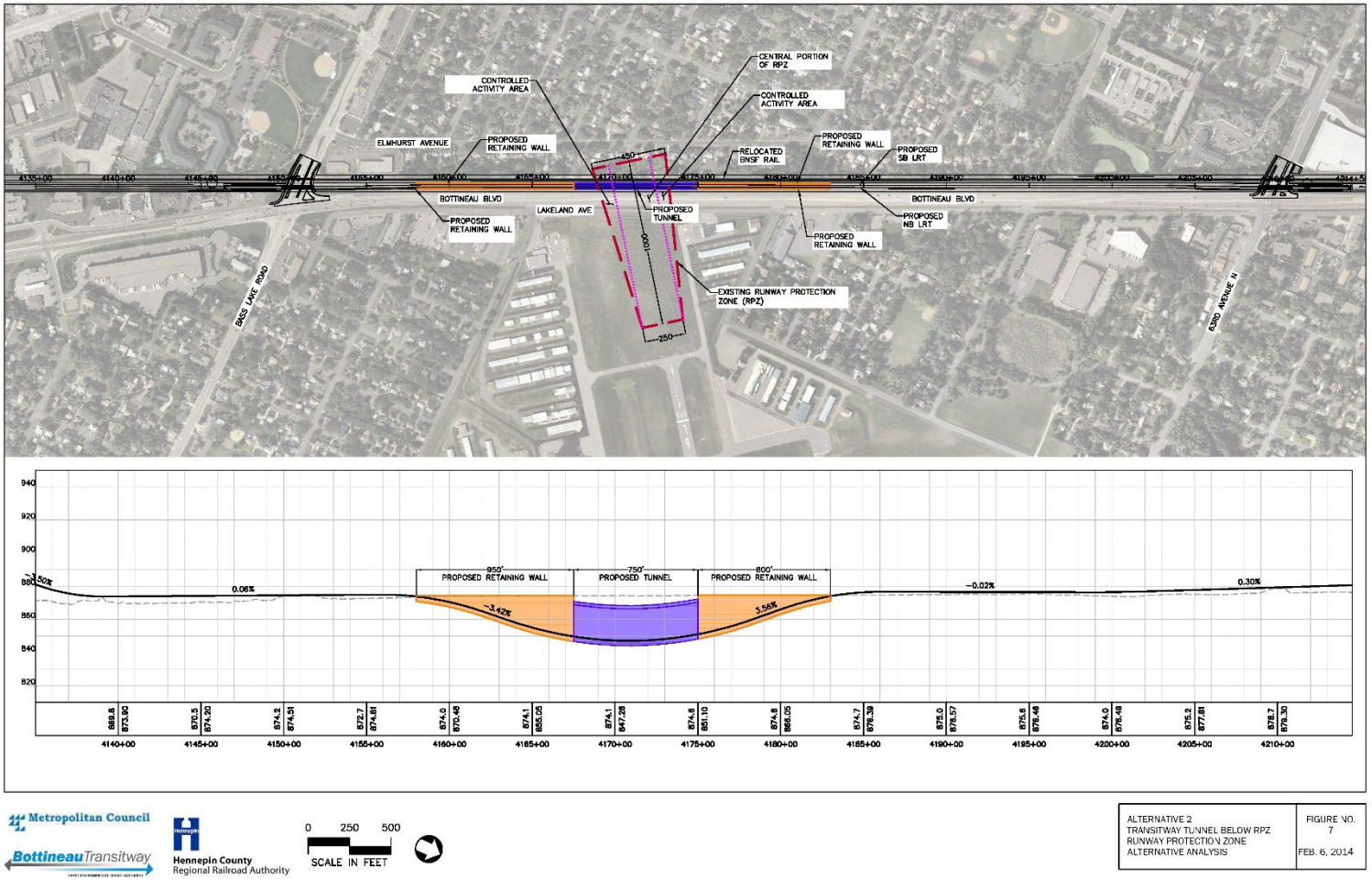


Figure 3: Alternative 2

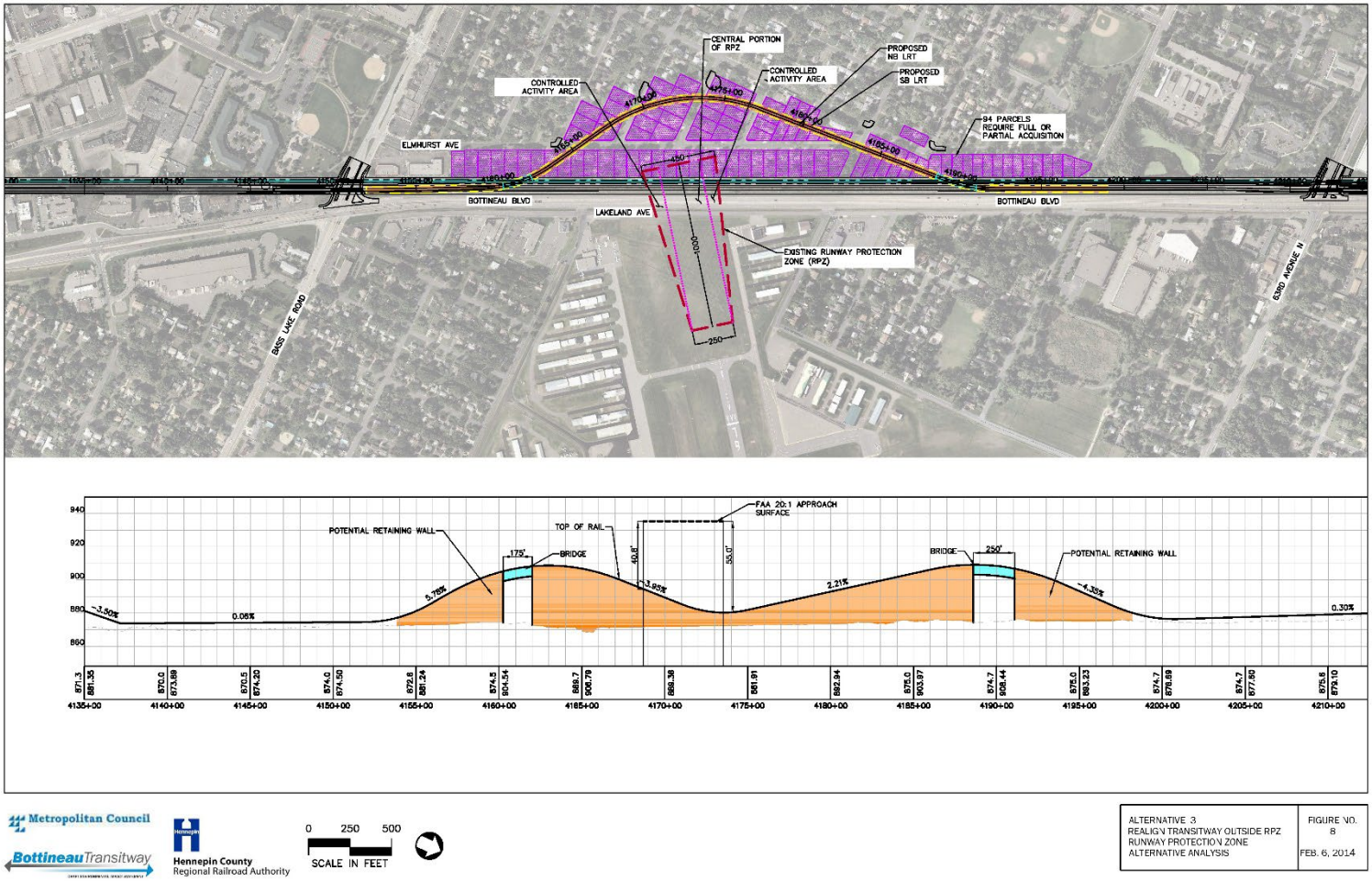


Figure 4: Alternative 3

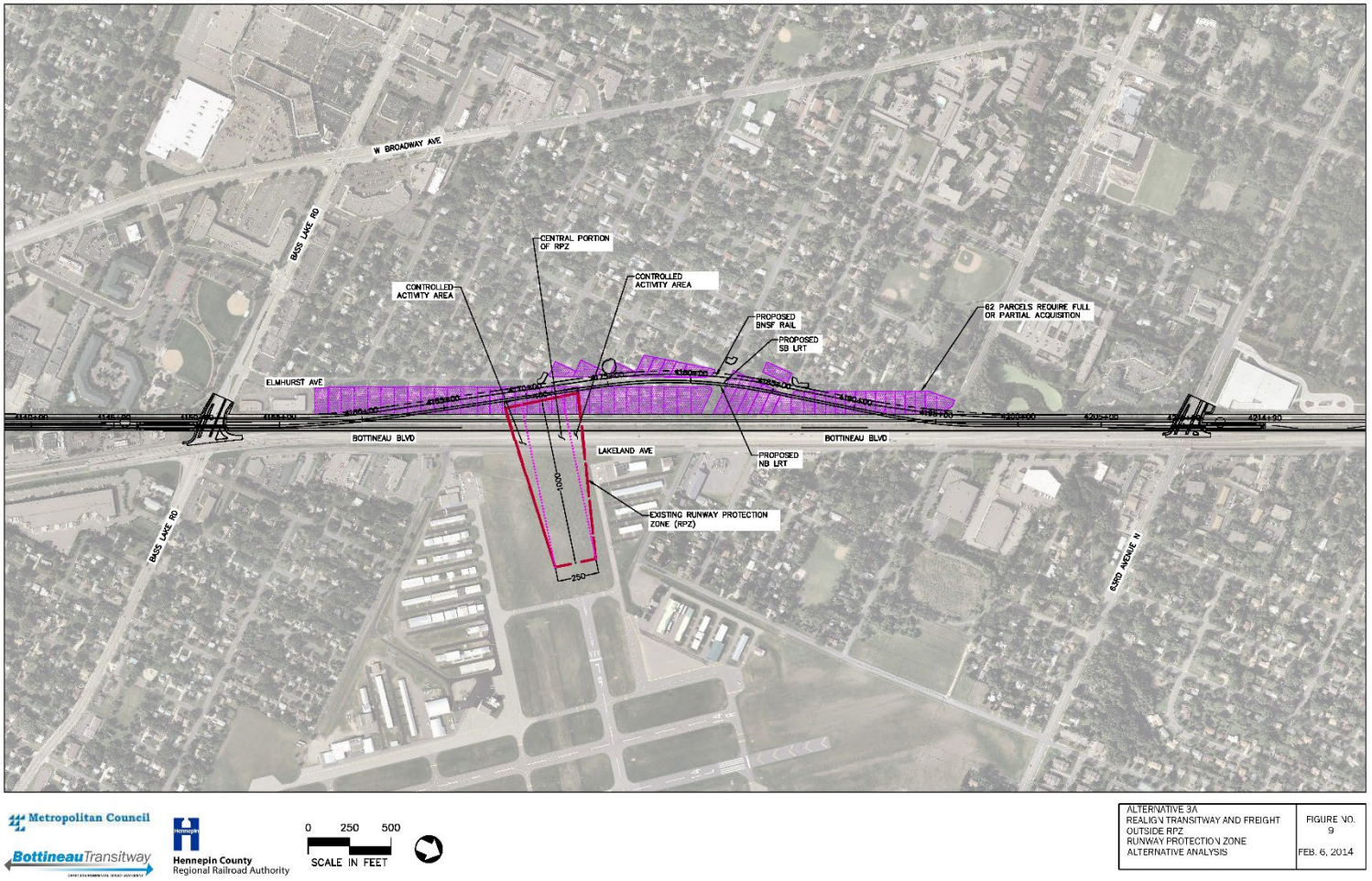


Figure 5: Alternative 3A

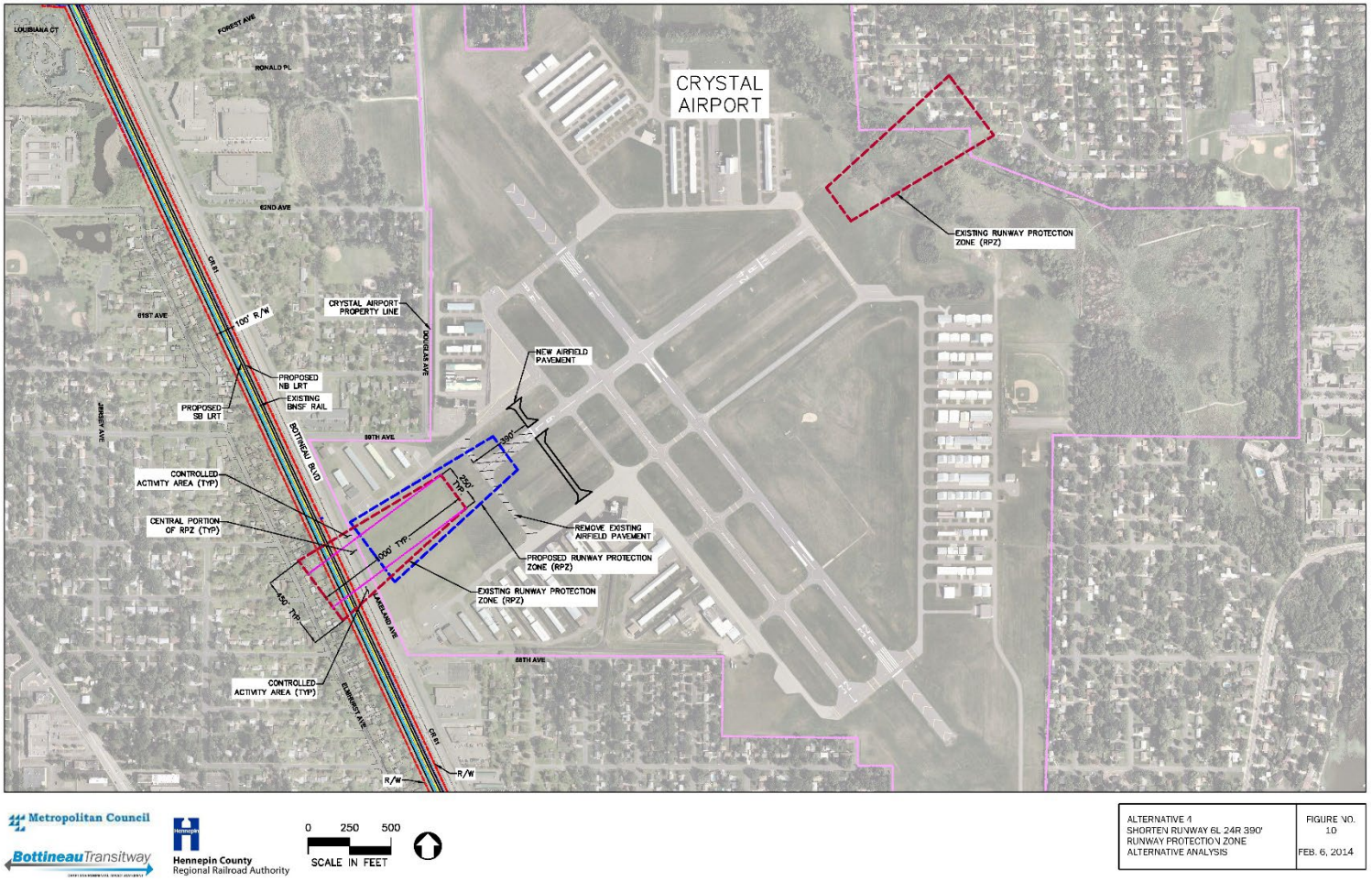


Figure 6: Alternative 4

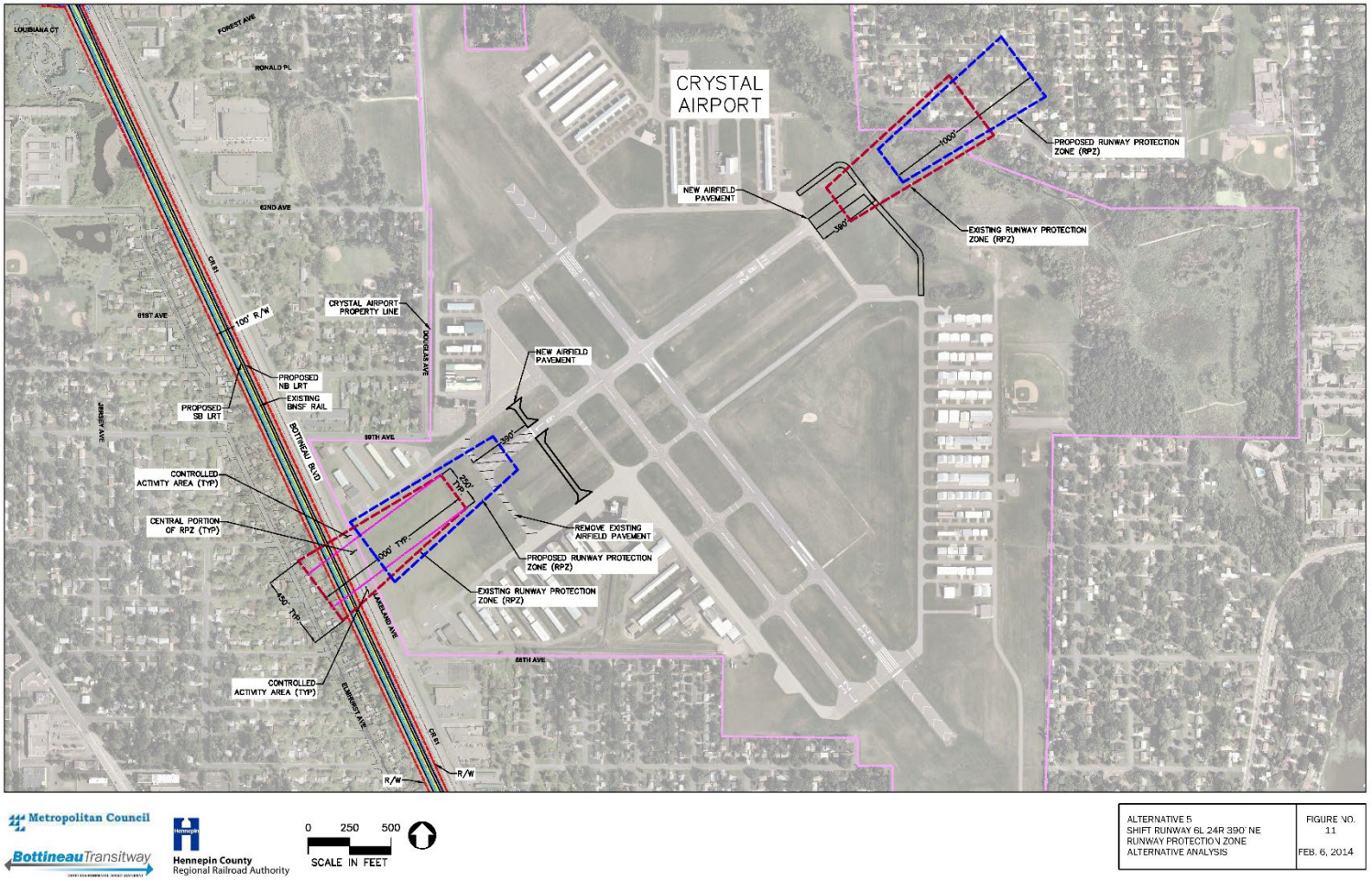
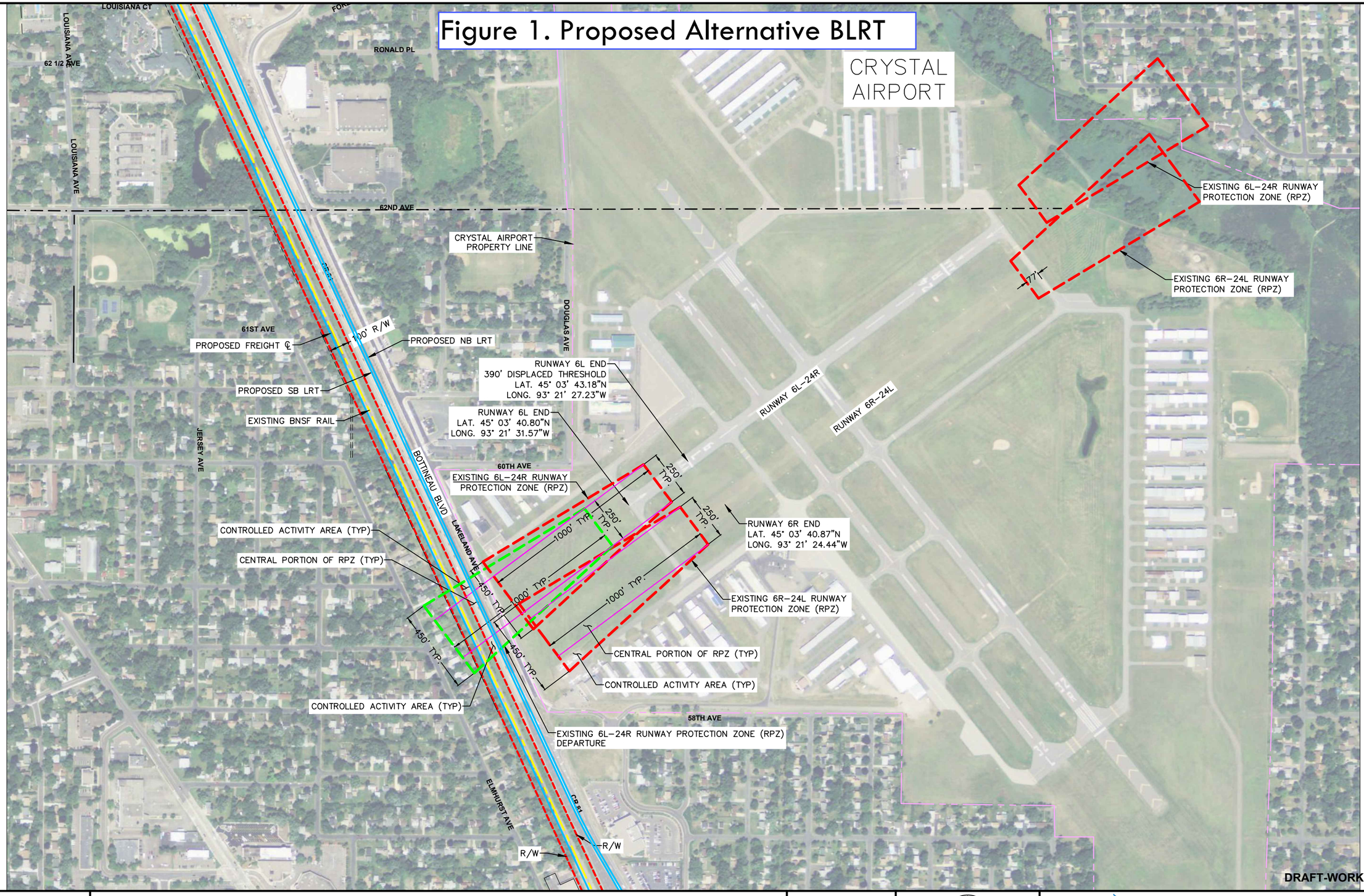


Figure 7: Alternative 5

Figure 1. Proposed Alternative BLRT



DRAFT-WORK IN PROCESS

BLUE LINE LRT EXTENSION

CROSSING CRYSTAL AIRPORT RUNWAY 6L / 24R RPZ

FIGURE 2
9/9/2021

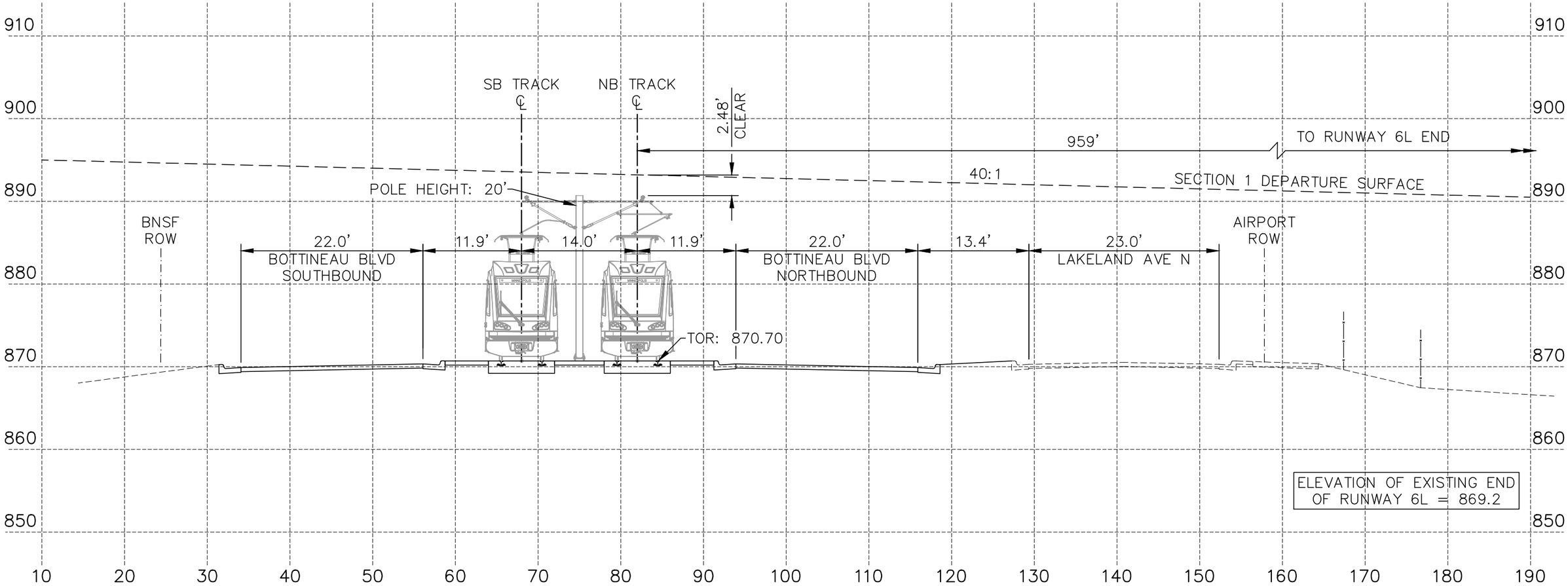
NORTH
0 125 250 500

METROPOLITAN COUNCIL

Kimley»Horn

Sep. 09 2021 01:38 pm H:\BPO\525_Design_Alignment_Mitigation\CAD\003-SEGMENT-C\PE\EXHIBITS\CIVIL\CrystalAirport\C-AirportRPZ_20210909.dwg By: marty.kriewall

Figure 2. Proposed Alternative BLRT

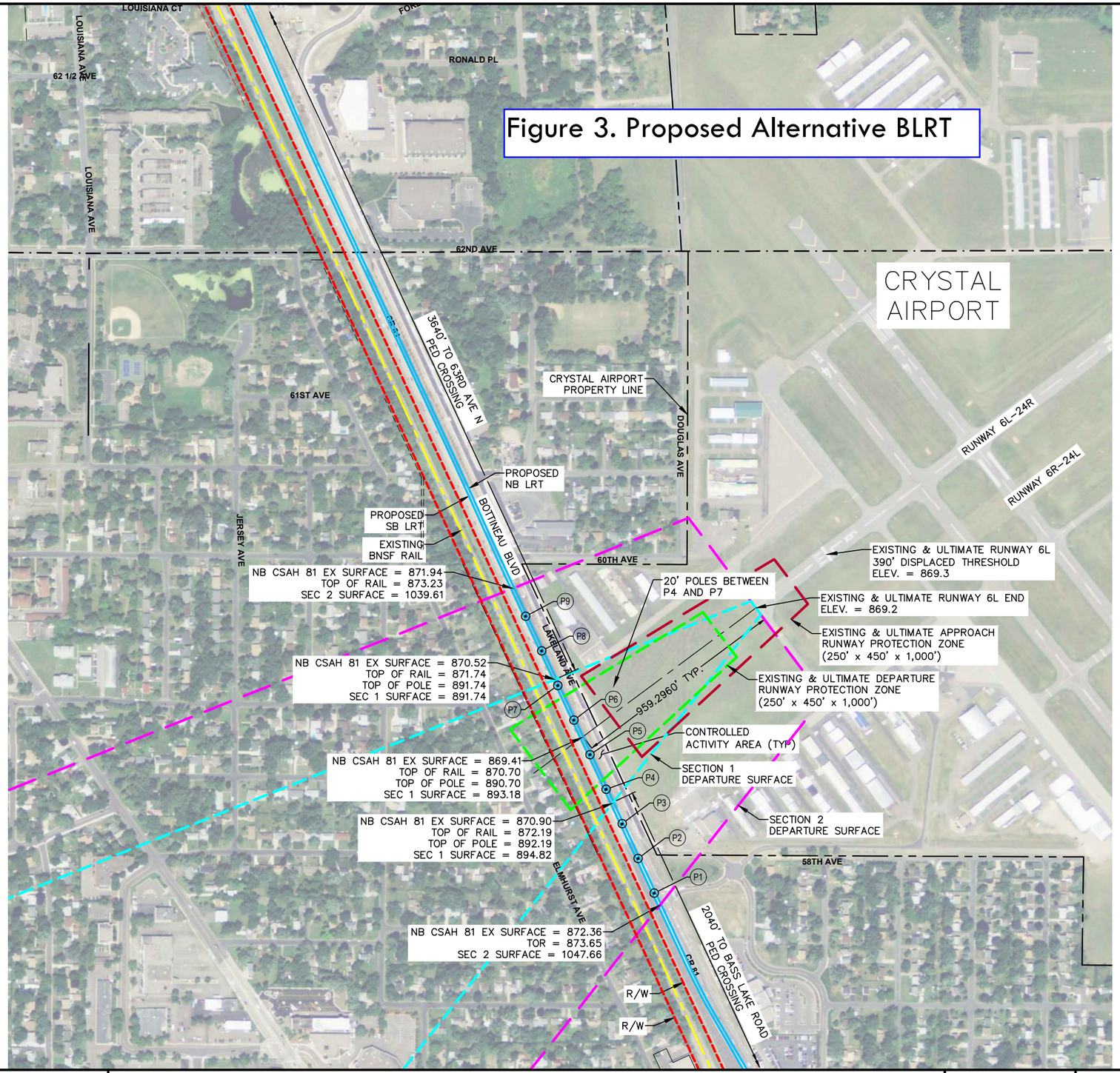


DRAFT-WORK IN PROCESS

METRO BLUE LINE EXTENSION	BLUE LINE LRT EXTENSION PREFERRED ALTERNATIVE WITHIN RUNWAY PROTECTION ZONE	FIGURE 2 4/17/2023		METROPOLITAN COUNCIL Kimley»Horn

Apr, 17 2023 01:10 pm H:\BPO\525_Design_Alignment_Mitigation\CAD\003-SEGMENT-C\PE\EXHIBITS\CIVIL\CrystalAirport\C-AirportRPZ-COORDS_20230412.dwg By: Marty.Kriewall

Figure 3. Proposed Alternative BLRT



POLE NO.	TOP OF RAIL T.O.R.	TOP OF POLE T.O.P.	SECTION 1 ELEVATION	SECTION 2 ELEVATION	PENETRATION	CLEARANCE
P1	873.49	893.49	–	1029.49	N	136.00
P2	873.05	893.05	–	977.71	N	84.66
P3	872.55	892.55	–	925.93	N	33.38
P4	872.04	892.04	894.69	–	N	2.65
P5	871.50	891.50	893.82	–	N	2.32
P6	871.45	891.45	892.94	–	N	1.49
P7	871.61	891.61	892.06	–	N	0.45
P8	872.47	892.47	–	938.28	N	45.81
P9	873.01	893.01	–	994.40	N	101.39

CATENARY POLES P4 THRU P7 ARE REDUCED TO 20' HEIGHT. POLES OUTSIDE SECTION 1 DEPARTURE SURFACE WILL BEGIN A TRANSITION BACK TO STANDARD 25' HEIGHT.

DRAFT-WORK IN PROCESS

BLUE LINE LRT EXTENSION

CRITICAL POINTS AT RPZ

FIGURE 1
4/18/2023

NORTH
0 125 250 500

METROPOLITAN COUNCIL

Kimley»Horn

Apr, 18 2023 11:35 am H:\BPO\525_Design_Alignment_Mitigation\CAD\003-SEGMENT-C\PE\EXHIBITS\CIVIL\CrystalAirport\C-AirportRPZ-COORDS_20230412.dwg By: Marty.Kriewall

U.S. Department
of Transportation
**Federal Aviation
Administration**

Federal Aviation Administration
Dakota-Minnesota Airports District Office
Bismarck Office
2301 University Drive, Building 23B
Bismarck, ND 58504

Federal Aviation Administration
Dakota-Minnesota Airports District Office
Minneapolis Office
6020 28th Avenue South, Suite 102
Minneapolis, MN 55450

July 19, 2023

Mr. Nick Landwer, Director of Design & Engineering
Metropolitan Council
Metro Blue Line Extension LRT Extension
5514 West Broadway Ave. Suite 200
Crystal, MN 55428

Crystal Airport (MIC) Runway Protection Zone Alternatives Analysis – Blue Line Light Rail Transit

Dear Mr. Landwer:

The FAA Dakota-Minnesota Airports District Office (ADO) has obtained FAA Regional concurrence on the conclusions of the updated 2023 Crystal Airport Runway Protection Zone Alternatives Analysis (RPZ AA) for revisions to the Blue Line alignment (formerly known as the Bottineau Transitway). When the Final EIS is available, the FAA ADO will want to ensure the proposed project is consistent with the findings of the RPZ AA.

If you have any questions or would like to discuss this information further, please feel welcome to contact Gina Mitchell, Community Planner, at (612) 253-4641 or gina.mitchell@faa.gov .

Sincerely,

E. Lindsay Terry
Manager
Dakota-Minnesota Airports District Office

cc Anshu Singh, FTA (email)
Bill Wheeler, FTA (email)
Elizabeth Breiseth, FTA (email)
Bridget Rief, Metropolitan Airports Commission (email)
Eric Gilles, Metropolitan Airports Commission (email)
Anna Walker, FAA (email)
Nancy Nistler, FAA (email)
John Fleming, MnDOT (email)
Dan Boerner, MnDOT (email)

enc Figures 1-3 Proposed Alternative BLRT

MnDOT Safety Zones and Clear Zones

Existing Crystal Airport Safety Zones:

Zone A: shall contain no buildings, temporary structures, exposed transmission lines, or other similar land use structural hazards, and shall be restricted to those uses which will not create, attract, or bring together an assembly of persons thereon. Permitted uses may include, but are not limited to, such uses as agriculture (seasonal crops), horticulture, raising of livestock, animal husbandry, wildlife habitat, light outdoor recreation (nonspectator), cemeteries, and auto parking.

Zone B: shall be restricted in use as follows. Each use shall be on a site whose area shall not be less than three acres. Each use shall not create, attract, or bring together a site population that would exceed 15 times that of the site acreage. Each site shall have no more than one building plot upon which any number of structures may be erected.

Zone C: No use shall be made of any land in any of the safety zones which creates or causes interference with the operation of radio or electronic facilities on the airport or with radio or electronic communications between the airport and aircraft, makes it difficult for pilots to distinguish between airport lights and other lights, results in glare in the eyes of pilots using the airport, impairs visibility in the vicinity of the airport, or otherwise endangers the landing, taking off, or maneuvering of aircraft.

Note: Zones A and B are derived from President's Airport Commission that predates FAA AC 150-5300 13, Zone C is from Air Commerce Act of 1926