APPENDIX D

TRAFFIC AND TRANSPORTATION ANALYSIS

Stantec

Technical Memo

To:	John Slack, RLA, ASLA Perkins and Will	From:	John Hagen, PE, PTOE, Stantec Bryan Benjamin, PE, Stantec
File:	Lowry Avenue NE Corridor Plan: Transportation/Traffic Analysis Stantec #193802636	Date:	January 23, 2015

Reference: Lowry Avenue NE Corridor – Transportation/Traffic Analysis

The purpose of this technical memorandum is to summarize the results of the transportation/traffic analysis that was completed as part Lowry Avenue NE Corridor Plan. In addition to an existing and forecast year 2035 traffic analysis, this technical memorandum will also summarize the results of the crash analysis and parking analysis that was completed as part of the corridor plan.

INTRODUCTION

The Lowry Avenue NE corridor is an important east-west transportation route across the eastern side of Hennepin County, and is also a key corridor in the life of business of Northeast Minneapolis. The study area includes a roughly 2.2 mile section of Lowry Avenue NE from the Marshall Avenue NE on the west to Stinson Parkway NE on the east. Lowry Avenue NE is a Hennepin County facility that also carries the designation of County State Aid Highway (CSAH) 153. The County has identified Lowry Avenue NE as a B-Minor Arterial in their *2030 Hennepin County Transportation System Plan*. Lowry Avenue NE is a four-lane undivided roadway (with peak hour parking restrictions) west of Central Avenue NE and a two-lane undivided roadway (with parking on both sides) east of Central Avenue NE.

EXISTING CONDITIONS

Existing average daily traffic volumes (ADT) along the Lowry Avenue NE corridor are shown in Table 1.

Table 1 – Existing (2007) ADT Volumes

Segment	Existing Average Daily Traffic Volumes (2007)
West of Marshall Street NE	15,800
Marshall Street NE to Central Avenue NE	13,800
Central Avenue NE to Johnson Street NE	10,400
Johnson Street NE to Stinson Boulevard	8,400

Source: MnDOT

While more current (year 2011) traffic volumes were available from MnDOT for the study corridor, the year 2007 traffic volumes (from MnDOT) were used as a base for the traffic volume forecasts since the year 2011 traffic counts were taken while the Lowry Avenue bridge over the Mississippi River was under construction. The 2011 traffic counts were not considered representative of the existing traffic volumes along Lowry Avenue NE since they were considerably lower than the 2007 volumes due to the bridge closure.

ROADWAY CAPACITY – EXISTING CONDITIONS

Before a detailed traffic analysis was performed at the key intersections along the Lowry Avenue NE corridor, a planning-level review of the existing roadway capacity was completed in order identify any capacity deficiencies along Lowry Avenue NE. Congestion along a roadway is judged to exist when the ratio of traffic volume to roadway capacity (v/c ratio) approaches or exceeds 1.0. The ratio of volume to capacity provides a measure of congestion along a stretch of roadway and can help identify where roadway improvements might be needed. However, since it does not provide an accurate basis for determining the need for specific intersection improvements, a detailed traffic analysis at the key intersections is also required.

Table 2 provides a method to evaluate roadway capacity for various types of roadways. For each roadway type, the typical planning level average daily traffic (ADT) capacity ranges are listed. These volume ranges are based upon guidance from the Highway Capacity Manual. A range is used since the maximum capacity of any roadway design (v/c = 1.0) is a theoretical measure that can be affected by its functional classification, traffic peaking, access spacing, speed, and other roadway characteristics. Further, to define a facility's "daily capacity", it is recommended that the top of each facility type's volume range be used.

Table 2 – Roadway Traffic Capacity Planning-Level Daily Thresholds

Cross Section	Maximum Two-way Average Daily Traffic Volumes
Two-lane undivided urban	8,000 – 12,000
Three-lane undivided urban (center two-way left-turn lane)	14,000 – 17,000
Four-lane undivided urban	18,000 – 22,000
Four-lane divided urban	28,000 – 32,000

Notes:
Undivided – An undivided roadway does not have a raised median separating opposing traffic or left-turn lanes for turning traffic.
Divided – A divided roadway has a raised median separating opposing traffic, left-turn lanes, and right-turn lanes.
Urban – An urban design implies lower speeds, more cross streets/accesses, and cross streets/accesses with higher volumes.

It is important to remember that the traffic volume thresholds shown in Table 2 are for planning- level purposes only. While Table 2 is a good guide, there are existing two-lane roads that are accommodating higher daily traffic volumes than shown in this table.

A comparative look at the planning-level capacity thresholds shown in Table 2 versus the existing ADT volumes along Lowry Avenue NE will provide a good indication whether the existing roadway is

over, near, or under capacity assuming existing traffic volumes. Table 3 shows existing (2007) ADTs, as well as the v/c ratios for the corridor. If a v/c ratio is higher than 1.0, the roadway is considered over capacity and will likely experience routine congestion. The commonly used capacity threshold for an undivided street such as Lowry Avenue NE is a maximum ADT of 8,000 to 12,000 vehicles per day in the two-lane portion east of Central Avenue and 18,000 to 22,000 in the four-lane portion west of Central Avenue. The mobility goal of the Lowry Avenue NE corridor is minimize congestion so that the volume-to-capacity ratio does not exceed 1.0 under existing and future conditions.

Table 3 – Existing (2007) ADT Volumes and Roadway Design Capacity

Segment *(existing roadway section)*	**Existing Average Daily Traffic Volumes**	**Design Capacity (ADT)**	**Existing Volume to Capacity Ratio**
West of Marshall Street NE *(four-lane undivided)*	15,800	22,000	0.72
Marshall Street NE to Central Avenue NE *(four-lane undivided)*	13,800	22,000	0.63
Central Avenue NE to Johnson Street NE *(two-lane undivided)*	10,400	12,000	0.87
Johnson Street NE to Stinson Boulevard *(two-lane undivided)*	8,400	12,000	0.70

As shown in Table 3, the Lowry Avenue NE corridor is currently under the capacity of the existing four-lane undivided street west of Central Avenue NE and under the capacity of the existing two-lane undivided street to the east of Central Avenue NE.

INTERSECTION TRAFFIC OPERATIONS – EXISTING CONDITIONS

In order to determine how the key intersections currently operate with existing traffic control and lane configurations, a traffic operations analysis was completed at key intersections along the Lowry Avenue NE corridor. Existing year 2013 turning movement counts were collected by the City of Minneapolis at the following key intersections:

- Lowry Avenue NE at Marshall Street NE
- Lowry Avenue NE at 2nd Street NE
- Lowry Avenue NE at University Avenue NE
- Lowry Avenue NE at Washington Street NE
- Lowry Avenue NE at Monroe Street NE
- Lowry Avenue NE at Central Avenue NE
- Lowry Avenue NE at Johnson Street NE

The existing traffic volumes and lane configuration at the key study intersections are shown in the Figures 1a through 1e.

Hennepin County

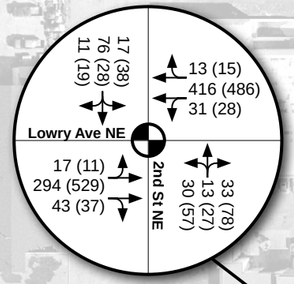
LOWRY AVENUE NE CORRIDOR STUDY: Existing & Future No-Build Conditions

Figure 1a

Project No. : 193802636/Graphics/Transportation/Lowry Ave NE Corridor Study Existing & Future No-Build Conditions.indd

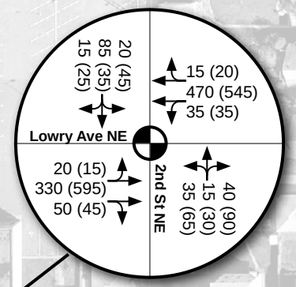
Stantec Floodplain collective TooleDesignGroup

Existing Conditions



B*/B*

Forecast Year 2035 No-Build Conditions

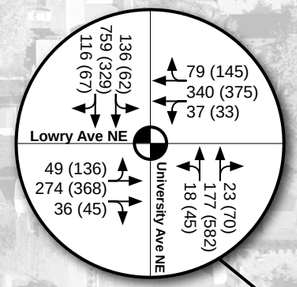


B**/B**

LOWRY AVE NE

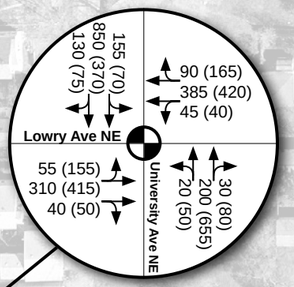
13,800 [15,900]

Existing Conditions



C*/C*

Forecast Year 2035 No-Build Conditions



C**/C**

2nd St NE

3rd St NE

University Ave NE

LEGEND

xx	AM Peak
(xx)	PM Peak
15,800	Existing (2007) Daily Traffic Volumes
[18,200]	Year 2035 Daily Traffic Volumes
⌖	Signalized Intersection
x/x	AM LOS/PM LOS

LOS LEGEND

- **A** Free Flow Traffic (Little to no delay)
- **B** Reasonably Free Flow (Low delays)
- **C** Stable Flow (Moderate delays)
- **D** Traffic Operations Near Capacity (Limit of acceptable delay)
- **E** Traffic Operations at Capacity (Unacceptable delays)
- **F** Traffic Operations Breakdown (Unacceptable delays)
- * Based on Existing Signal Timing
- ** Based on Optimized Signal Timing

Figure 1b

Hennepin County

LOWRY AVENUE NE CORRIDOR STUDY: Existing & Future No-Build Conditions

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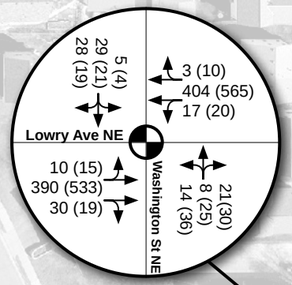
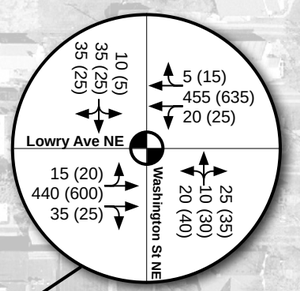
Existing Conditions



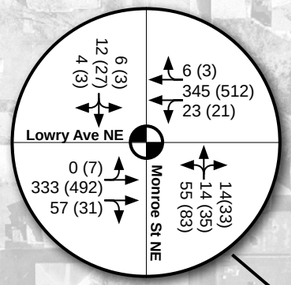
B*/C*

Forecast Year 2035 No-Build Conditions



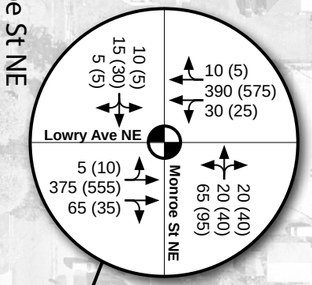
A**/B**

Existing Conditions



B*/B*

Forecast Year 2035 No-Build Conditions



B**/B**

13,800 [15,900]

LOWRY AVE NE

Washington St NE

Jefferson St NE

Madison St NE

Howard St NE

Monroe St NE

LEGEND

xx	AM Peak
(xx)	PM Peak
15,800	Existing (2007) Daily Traffic Volumes
[18,200]	Year 2035 Daily Traffic Volumes
◓	Signalized Intersection
x/x	AM LOS/PM LOS

N W E S

0 100 200 Feet

LOS LEGEND

A	Free Flow Traffic (Little to no delay)
B	Reasonably Free Flow (Low delays)
C	Stable Flow (Moderate delays)
D	Traffic Operations Near Capacity (Limit of acceptable delay)
E	Traffic Operations at Capacity (Unacceptable delays)
F	Traffic Operations Breakdown (Unacceptable delays)
*	Based on Existing Signal Timing
**	Based on Optimized Signal Timing

Figure 1c

Hennepin County

LOWRY AVENUE NE CORRIDOR STUDY: Existing & Future No-Build Conditions

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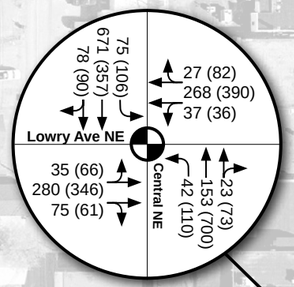
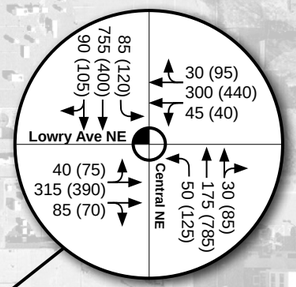
Existing Conditions



C*/E*

Forecast Year 2035 No-Build Conditions



C**/C**

13,800 [15,900]

10,400 [12,000]

LOWRY AVE NE

Quincy St NE

Jackson St NE

Central Ave NE

Polk St NE

LEGEND	
xx	AM Peak
(xx)	PM Peak
15,800	Existing (2007) Daily Traffic Volumes
[18,200]	Year 2035 Daily Traffic Volumes
◐	Signalized Intersection
x/x	AM LOS/PM LOS

N W E S 0 100 200 Feet

LOS LEGEND	
A	Free Flow Traffic (Little to no delay)
B	Reasonably Free Flow (Low delays)
C	Stable Flow (Moderate delays)
D	Traffic Operations Near Capacity (Limit of acceptable delay)
E	Traffic Operations at Capacity (Unacceptable delays)
F	Traffic Operations Breakdown (Unacceptable delays)
*	Based on Existing Signal Timing
**	Based on Optimized Signal Timing

Figure 1d

Hennepin County

LOWRY AVENUE NE CORRIDOR STUDY: Existing & Future No-Build Conditions

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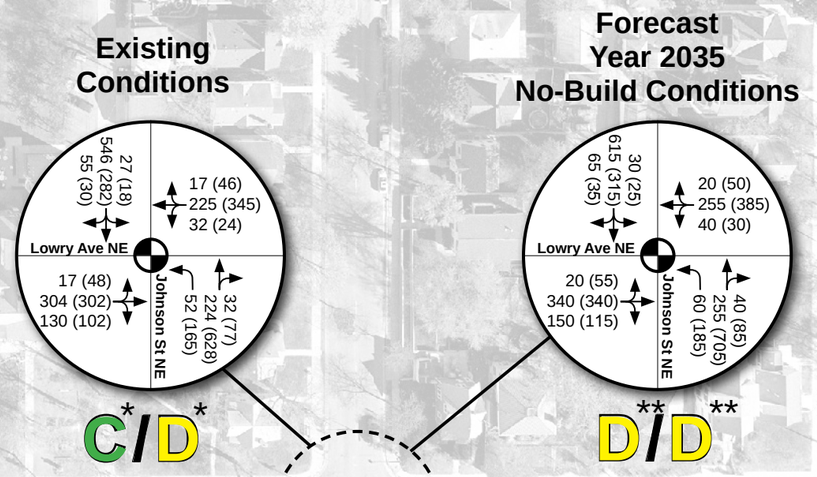

10,400 [12,000]

LOWRY AVE NE

8,400 [9,700]

Buchanan St NE

Lincoln St NE

Johnson St NE

Hayes St NE

LEGEND

xx	AM Peak
(xx)	PM Peak
15,800	Existing (2007) Daily Traffic Volumes
[18,200]	Year 2035 Daily Traffic Volumes
	Signalized Intersection
x/x	AM LOS/PM LOS

N W E S 0 100 200 Feet

LOS LEGEND

A	Free Flow Traffic (Little to no delay)
B	Reasonably Free Flow (Low delays)
C	Stable Flow (Moderate delays)
D	Traffic Operations Near Capacity (Limit of acceptable delay)
E	Traffic Operations at Capacity (Unacceptable delays)
F	Traffic Operations Breakdown (Unacceptable delays)
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**	Based on Optimized Signal Timing

Figure 1e

Hennepin County

LOWRY AVENUE NE CORRIDOR STUDY: Existing & Future No-Build Conditions

Project No. : 193802636/Graphics/Transportation/Lowry Ave NE Corridor Study Existing & Future No-Build Conditions.indd

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Level of service (LOS) is a measure of the effectiveness of an intersection. The LOS system rates the intersection using the letters A through F, with A being least congested and F being most congested. At LOS C, roads remain safely below, but efficiently close to capacity, and posted speed is maintained. LOS D is a common design goal for urban streets during peak hours. A summary of the LOS thresholds from the Highway Capacity Manual is shown in Table 4.

Table 4 – Highway Capacity Manual Level of Service and Control Delay

Level of Service	Signalized Intersection Average Control Delay per Vehicle (seconds)	Unsignalized Intersection Average Control Delay per Vehicle (seconds)	Description of Traffic Conditions
A	**≤ 10**	**≤ 10**	**Free Flow Traffic** – Low delays; at traffic signals most vehicles do not stop; **Acceptable LOS**
B	**> 10 and ≤ 20**	**> 10 and ≤ 15**	**Reasonably Free Flow** – Low delays; at traffic signals some vehicles must stop; **Acceptable LOS**
C	**> 20 and ≤ 35**	**> 15 and ≤ 25**	**Stable Flow** – Moderate delays; at traffic signals some cycle failures; many vehicles must stop; **Acceptable LOS**
D	**> 35 and ≤ 55**	**> 25 and ≤ 35**	**Traffic Operations Near Capacity** – Moderate delays; at traffic signals cycle failures become noticeable; many more vehicles must stop; **Limit of acceptable LOS**
E	**> 55 and ≤ 80**	**> 35 and ≤ 50**	**Traffic Operations at Capacity** – Significant delays; at traffic signals cycle failures are frequent; most vehicles required to stop; **Unacceptable LOS**
F	**> 80**	**> 50**	**Traffic Operations Breakdown** – Significant delays; at traffic signals many cycle failures occur; most or all vehicles must stop; **Unacceptable LOS**

Results of the existing traffic analysis at the key study intersections along the Lowry Avenue NE corridor are shown in Table 5.

Table 5 – Intersection LOS, delay, and queue by approach
Existing 2013 Traffic Volumes

Intersection (Control)	Approach	A.M. Peak				P.M. Peak			
		LOS	Delay (sec)	Queue (ft) (1)	Int. LOS (delay)	LOS	Delay (sec)	Queue (ft) (1)	Int. LOS (delay)
Lowry Avenue NE at Marshall Street NE (Traffic Signal)	EB	B	13.0	155’	B (19.0s)	A	11.0	120’	D (54.2s)
	WB	B	18.0	144’		B	19.4	200’	
	NB	C	32.7	187’		**F**	**117.3**	**1294’**	
	SB	B	19.6	308’		**E**	**63.0**	**290’**	
Lowry Avenue NE at 2nd Street NE (Traffic Signal)	EB	A	9.1	163’	B (12.8s)	A	9.1	149’	B (15.3s)
	WB	B	12.1	120’		B	19.9	188’	
	NB	B	17.7	73’		B	16.7	116’	
	SB	C	25.6	111’		C	25.6	81’	
Lowry Avenue NE at University Avenue NE (Traffic Signal)	EB	B	16.5	161’	C (28.0s)	B	10.2	130’	C (24.3s)
	WB	C	25.4	218’		D	42.5	259’	
	NB	B	14.0	139’		C	21.8	210’	
	SB	B	19.3	257’		C	23.7	282’	
Lowry Avenue NE at Washington Street NE (Traffic Signal)	EB	B	13.6	166’	B (17.5s)	B	17.8	150’	C (21.5s)
	WB	C	23.6	173’		C	27.2	221’	
	NB	A	9.4	38’		B	11.7	67’	
	SB	B	10.0	52’		A	9.3	41’	
Lowry Avenue NE at Monroe Street NE (Traffic Signal)	EB	A	6.2	66’	B (15.2s)	A	5.3	65’	B (10.6s)
	WB	C	24.0	156’		B	10.6	141’	
	NB	B	19.3	80’		C	27.2	137’	
	SB	B	17.4	39’		C	25.8	49’	
Lowry Avenue NE at Central Avenue NE (Traffic Signal)	EB	D	40.3	282’	C (27.4s)	D	49.5	291’	**E (59.7s)**
	WB	D	46.4	307’		**F**	**109.5**	**985’**	
	NB	B	13.1	84’		B	17.9	241’	
	SB	B	17.4	245’		B	14.7	152’	
Lowry Avenue NE at Johnson Street NE (Traffic Signal)	EB	C	22.8	229’	C (24.1s)	D	43.9	501’	D (37.5s)
	WB	D	35.4	316’		C	31.7	376’	
	NB	B	19.6	144’		D	43.8	718’	
	SB	C	22.5	381’		B	18.4	186’	

(1) Represents the longest reported 95th-percentile vehicular queue on each intersection approach.

As shown in Table 5, with the exception of the Lowry Avenue NE intersection with Central Avenue NE, each of the key intersections currently operate at an acceptable overall intersection LOS D or better during the a.m. and p.m. peak hour assuming existing traffic control and lane configuration. While the Lowry Avenue NE intersection with Central Avenue NE currently operates at an overall LOS C during the a.m. peak period under existing traffic control and lane configuration, the intersection currently has an unacceptable overall LOS E during the p.m. peak hour. If the existing traffic signal timing were optimized, the traffic operations at the Lowry Avenue NE intersection with Central Avenue NE will likely improve back to acceptable LOS D or better during the p.m. peak hour.

Therefore, the existing traffic control and lane configuration at the key intersections (with some traffic signal timing improvements at the Lowry Avenue NE intersection with Central Avenue NE) accommodate the existing a.m. and p.m. peak hour traffic volumes.

CRASH ANALYSIS

A crash analysis was completed along the Lowry Avenue NE corridor using data provided by Hennepin County for a three-year period from January 1, 2010 to December 31, 2012. The analysis was conducted using widely accepted crash analysis methodologies. The purpose of this analysis was to review and identify crash patterns, trends, types of crashes, and critical condition circumstances and factors. The crash analysis included a detailed review of crashes at the seven key intersections along Lowry Avenue NE (Marshall Avenue NE, 2nd Street NE, University Avenue NE, Washington Street NE, Monroe Street NE, Central Avenue NE, and Johnson Street NE) and the following four segments along the corridor:

- Marshall Avenue NE to University Avenue NE
- University Avenue NE to Central Avenue NE
- Central Avenue NE to Johnson Street NE
- Johnson Street NE to Stinson Boulevard).

A summary of the crash analysis at the key intersections and the four study segements along the Lowry Avenue NE corridor is provided in the following sections.

Intersection Specific

Lowry Ave NE intersection with Marshall Street NE

Crash Patterns: The predominant crash patterns, trends, types of crashes, critical condition circumstances, and factors identified on this intersection for the seven (7) crashes occurring during the three-year period from 2010 through 2012, are summarized as follows:

- There were no fatal crashes, one non-incapacitating injury crash, and one possible injury crash
- Two of the crashes (29 percent) were “left turn into traffic” and two others (29 percent) were listed as “right angle”
- Five of the crashes (71 percent) occurred in 2012 and the other two were in 2010
- Four of the crashes (57 percent) occurred in the afternoon

Crash Rates: Hennepin County Public Works calculated the three-year crash rate for the Lowry Ave NE intersection with Marshall Street NE and compared it to the three-year Minneapolis Average Crash Rate for similar intersections and the three-year Critical Crash Rate. The results are shown in Table 6.

Table 6 – Lowry Avenue NE at Marshall Street NE Crash Analysis Results

Intersection	Total Crashes	Crash Rates		
		Int.	3-yr Minneapolis Average Crash Rate for Intersection Type from 2007 - 2009	3-yr Ave Critical Crash Rate* from 2010 - 2012
Lowry Avenue NE at Marshall Street NE	7	0.38	0.87	1.54

** Critical crash rates give an indication of the statistical significance of the intersection crash rate. Locations with a crash rate above the critical crash rate, are considered to be in need of safety improvements because there is a high probability (99.5 percent) that conditions at this location are contributing to the higher crash rate.*

- As shown in Table 6, the crash rate at the Lowry Ave NE / Marshall Street NE intersection of 0.38 crashes per million entering vehicles (MEV) is below the average Minneapolis crash rate of 0.87.
- The crash rate at the Lowry Ave NE / Marshall Street NE intersection is also below the critical crash rate of 1.54.

Conclusions: Based on these crash patterns, trends, and factors, the crash analysis conclusions for the Lowry Ave NE intersection with Marshall Street NE are summarized as follows:

- The crash rate is lower than the 3-year Minneapolis average crash rate for similar intersections.
- The crash rate is lower than the 3-year average critical crash rate.
- This intersection does not appear to have a safety problem.

It should be noted, however, that the Lowry Avenue Bridge immediately to the west of the Lowry Avenue/Marshall Street intersection was closed during the majority of the 2010 to 2012 time frame that this crash analysis was conducted. As a result of the bridge closure, the traffic volumes and pattern at this intersection from 2010 to 2012 were substantially different than what is typical at the intersection. Therefore, the crash data from the next available three-year time period (2007 – 2009) may be a better representation of the crash experience at this intersection.

- During the three-year period from 2007 to 2009 revealed that the Lowry Avenue/Marshall Street intersection's reported crash rates was 1.01 crashes per MEV was higher than the average Minneapolis crash rate of 0.87, but was below the critical crash rate of 1.51.
- Although there were a number of crashes at the Lowry Avenue NE intersection with Marshall Street NE, the crash rate at this location was below the critical crash rate for similar

intersections, and thus it is not anticipated that improvements to this intersection will significantly reduce crashes that have been reported at this location.

Lowry Avenue NE intersection with 2nd Street NE

Crash Patterns: The predominant crash patterns, trends, types of crashes, critical condition circumstances, and factors identified on this intersection for the four (4) crashes occurring during the three-year period from 2010 through 2012, are summarized as follows:

- There were no fatal crashes, two non-incapacitating injury crashes, and one possible injury crash
- Three of the crashes (75 percent) were "right angle"
- Two of the crashes (50 percent) occurred in 2012
- Three of the crashes (75 percent) occurred in the afternoon

***Crash Rates*:** Hennepin County Public Works calculated the three-year crash rate for the Lowry Avenue NE intersection with 2nd Street NE and compared it to the three-year Minneapolis Average Crash Rate for similar intersections and the three-year Critical Crash Rate. The results are shown in Table 7.

Table 7 – Lowry Avenue NE at 2nd Street NE Crash Analysis Results

Intersection	Total Crashes	Crash Rates		
		Int.	3-yr Minneapolis Average Crash Rate for Intersection Type from 2007 - 2009	3-yr Ave Critical Crash Rate* from 2010 - 2012
Lowry Avenue NE at 2nd Street NE	4	0.28	0.87	1.62

** Critical crash rates give an indication of the statistical significance of the intersection crash rate. Locations with a crash rate above the critical crash rate, are considered to be in need of safety improvements because there is a high probability (99.5 percent) that conditions at this location are contributing to the higher crash rate.*

- As shown in Table 7, the crash rate at the Lowry Avenue NE intersection with 2nd Street NE of 0.28 crashes per million entering vehicles (MEV) is below the average Minneapolis crash rate of 0.87.
- The crash rate at the Lowry Ave NE intersection with 2nd Street NE is also below the critical crash rate of 1.62.

Conclusions: Based on these crash patterns, trends, and factors, the crash analysis conclusions for the Lowry Avenue NE intersection with 2nd Street NE are summarized as follows:

- The crash rate is lower than the 3-year Minneapolis average crash rate for similar intersections.
- The crash rate is lower than the 3-year average critical crash rate.

- This intersection does not appear to have a safety problem.

Lowry Avenue NE intersection with University Avenue NE

***Crash Patterns*:** The predominant crash patterns, trends, types of crashes, critical condition circumstances, and factors identified on this intersection for the twenty-nine (29) crashes occurring during the three-year period from 2010 through 2012, are summarized as follows:

- There were no fatal crashes and 10 possible injury crashes
- Nine of the crashes (31 percent) were "left turn into traffic," five of the crashes (17 percent) were "rear end," and another five (17 percent) were listed as "sideswipe passing"
- Twelve of the crashes (41 percent) occurred in 2012, 10 of the crashes (35 percent) were in 2011, seven of the crashes (24 percent) were in 2010
- Twenty-two of the crashes (76 percent) occurred in the afternoon

***Crash Rates*:** Hennepin County Public Works calculated the three-year crash rate for the Lowry Avenue NE intersection with University Avenue NE and compared it to the three-year Minneapolis Average Crash Rate for similar intersections and the three-year Critical Crash Rate. The results are shown in Table 8.

Table 8 – Lowry Avenue NE at University Avenue NE Crash Analysis Results

Intersection	Total Crashes	Crash Rates		
		Int.	3-yr Minneapolis Average Crash Rate for Intersection Type from 2007 - 2009	3-yr Ave Critical Crash Rate* from 2010 - 2012
Lowry Avenue NE at University Avenue NE	29	1.15	0.87	1.45

** Critical crash rates give an indication of the statistical significance of the intersection crash rate. Locations with a crash rate above the critical crash rate, are considered to be in need of safety improvements because there is a high probability (99.5 percent) that conditions at this location are contributing to the higher crash rate.*

- As shown in Table 8, the crash rate at the Lowry Ave NE intersection with University Avenue NE intersection of 1.15 crashes per million entering vehicles (MEV) is above the average Minneapolis crash rate of 0.87.
- The crash rate at the Lowry Avenue NE intersection with University Avenue NE is below the critical crash rate of 1.54.

***Conclusions*:** Based on these crash patterns, trends, and factors, the crash analysis conclusions for the Lowry Avenue NE intersection with University Avenue NE are summarized as follows:

- The crash rate is higher than the 3-year Minneapolis average crash rate for similar intersections.
- The crash rate is lower than the 3-year average critical crash rate.

- Although there were a number of crashes at the Lowry Avenue NE intersection with University Avenue NE, the crash rate at this location was below the critical crash rate for similar intersections, and thus it is not anticipated that improvements to this intersection will significantly reduce crashes that have been reported at this location.

Lowry Ave NE intersection with Washington Street NE

***Crash Patterns*:** The predominant crash patterns, trends, types of crashes, critical condition circumstances, and factors identified on this intersection for the five (5) crashes occurring during the three-year period from 2010 through 2012, are summarized as follows:

- There were no fatal crashes and one non-incapacitating injury crash
- Two of the five crashes (40 percent) were identified "right angle" crashes
- Three of the crashes (60 percent) occurred in 2012 and the other two were in 2010
- Four of the crashes (80 percent) occurred in the afternoon

***Crash Rates*:** Hennepin County Public Works calculated the three-year crash rate for the Lowry Avenue NE with Washington Street NE and compared it to the three-year Minneapolis Average Crash Rate for similar intersections and the three-year Critical Crash Rate. The results are shown in Table 9.

Table 9 – Lowry Avenue NE at Washington Street NE Crash Analysis Results

Intersection	Total Crashes	Crash Rates		
		Int.	3-yr Minneapolis Average Crash Rate for Intersection Type from 2007 - 2009	3-yr Ave Critical Crash Rate* from 2010 - 2012
Lowry Avenue NE at Washington Street NE	5	0.43	0.87	1.69

** Critical crash rates give an indication of the statistical significance of the intersection crash rate. Locations with a crash rate above the critical crash rate, are considered to be in need of safety improvements because there is a high probability (99.5 percent) that conditions at this location are contributing to the higher crash rate.*

- As shown in Table 9, the crash rate at the Lowry Avenue NE intersection with Washington Street NE of 0.43 crashes per million entering vehicles (MEV) is below the average Minneapolis crash rate of 0.87.
- The crash rate at the Lowry Avenue NE intersection with Washington Street NE intersection is also below the critical crash rate of 1.69.

***Conclusions*:** Based on these crash patterns, trends, and factors, the crash analysis conclusions for the Lowry Avenue NE intersection with Washington Street NE are summarized as follows:

- The crash rate is lower than the 3-year Minneapolis average crash rate for similar intersections.

- The crash rate is lower than the 3-year average critical crash rate.
- This intersection does not appear to have a safety problem.

Lowry Avenue NE Intersection with Monroe Street NE

***Crash Patterns*:** The predominant crash patterns, trends, types of crashes, critical condition circumstances, and factors identified on this intersection for the ten (10) crashes occurring during the three-year period from 2010 through 2012, are summarized as follows:

- There were no fatal crashes, one non-incapacitating injury crash, and four possible injury crashes
- Four of the crashes (40 percent) were "rear end", and three were identified as "right angle" crashes
- Six of the crashes (60 percent) occurred in 2010, three crashes (30 percent) occurred in 2011
- Seven of the crashes (70 percent) occurred in the afternoon

***Crash Rates*:** Hennepin County Public Works calculated the three-year crash rate for the Lowry Avenue NE intersection with Monroe Street NE and compared it to the three-year Minneapolis Average Crash Rate for similar intersections and the three-year Critical Crash Rate. The results are shown in Table 10.

Table 10 – Lowry Avenue NE at Monroe Street NE Crash Analysis Results

Intersection	Total Crashes	Crash Rates		
		Int.	3-yr Minneapolis Average Crash Rate for Intersection Type from 2007 - 2009	3-yr Ave Critical Crash Rate* from 2010 - 2012
Lowry Avenue NE at Monroe Street NE	10	0.86	0.87	1.69

** Critical crash rates give an indication of the statistical significance of the intersection crash rate. Locations with a crash rate above the critical crash rate, are considered to be in need of safety improvements because there is a high probability (99.5 percent) that conditions at this location are contributing to the higher crash rate.*

- As shown in Table 10, the crash rate at the Lowry Avenue NE intersection with Monroe Street NE intersection of 0.86 crashes per million entering vehicles (MEV) is just below the average Minneapolis crash rate of 0.87.
- The crash rate at the Lowry Avenue NE intersection with Monroe Street NE intersection is also below the critical crash rate of 1.69.

***Conclusions*:** Based on these crash patterns, trends, and factors, the crash analysis conclusions for the Lowry Avenue NE intersection with Monroe Street NE intersection are summarized as follows:

- The crash rate is lower than the 3-year Minneapolis average crash rate for similar intersections.

- The crash rate is lower than the 3-year average critical crash rate.
- This intersection does not appear to have a safety problem.

Lowry Avenue NE intersection with Central Avenue NE

***Crash Patterns*:** The predominant crash patterns, trends, types of crashes, critical condition circumstances, and factors identified on this intersection for the thirty-four (34) crashes occurring during the three-year period from 2010 through 2012, are summarized as follows:

- There were no fatal crashes, one non-incapacitating injury crash, and nine possible injury crashes
- Twelve of the crashes (35 percent) were "rear end" and eight others (24 percent) were listed as "right angle"
- Thirteen of the crashes (38 percent) occurred in 2012 with 12 crashes (35 percent) in 2011 and nine crashes (27 percent) in 2010
- Twenty of the crashes (59 percent) occurred in the afternoon

***Crash Rates*:** Hennepin County Public Works calculated the three-year crash rate for the Lowry Avenue NE intersection with Central Avenue NE and compared it to the three-year Minneapolis Average Crash Rate for similar intersections and the three-year Critical Crash Rate. The results are shown in Table 11.

Table 11 – Lowry Avenue NE at Central Avenue NE Crash Analysis Results

Intersection	Total Crashes	Crash Rates		
		Int.	3-yr Minneapolis Average Crash Rate for Intersection Type from 2007 - 2009	3-yr Ave Critical Crash Rate* from 2010 - 2012
Lowry Avenue NE at Central Avenue NE	34	**1.28**	0.73	1.25

** Critical crash rates give an indication of the statistical significance of the intersection crash rate. Locations with a crash rate above the critical crash rate, are considered to be in need of safety improvements because there is a high probability (99.5 percent) that conditions at this location are contributing to the higher crash rate.*

- As shown in Table 11, the crash rate at the Lowry Avenue NE intersection with Central Avenue NE of 1.28 crashes per million entering vehicles (MEV) is above the average Minneapolis crash rate of 0.73.
- The crash rate at the Lowry Avenue NE intersection with Central Avenue NE is also above the critical crash rate of 1.25.

***Conclusions*:** Based on these crash patterns, trends, and factors, the crash analysis conclusions for the Lowry Avenue NE intersection with Central Avenue NE are summarized as follows:

- The crash rate is higher than the 3-year Minneapolis average crash rate for similar intersections.
- The crash rate is also higher than the 3-year average critical crash rate.
- Locations with a crash rate above a local critical crash rate are considered to be in need of safety improvements because there is a high probability that existing conditions at the intersection are contributing to the higher crash rate.

Lowry Avenue NE intersection with Johnson Street NE

***Crash Patterns*:** The predominant crash patterns, trends, types of crashes, critical condition circumstances, and factors identified on this intersection for the twenty-two (22) crashes occurring during the three-year period from 2010 through 2012, are summarized as follows:

- There were no fatal crashes, one non-incapacitating injury crash, and four possible injury crashes
- Eight of the crashes (36 percent) were “rear end” and six (27 percent) were listed as “right angle”
- Nine of the crashes (41 percent) occurred in 2012, seven (32 percent) in 2010 and six (27 percent) were in 2011
- Eleven of the crashes (50 percent) occurred in the afternoon

***Crash Rates*:** Hennepin County Public Works calculated the three-year crash rate for the Lowry Avenue NE intersection with Johnson Street NE and compared it to the three-year Minneapolis Average Crash Rate for similar intersections and the three-year Critical Crash Rate. The results are shown in Table 12.

Table 12 – Lowry Avenue NE at Johnson Street NE Crash Analysis Results

Intersection	Total Crashes	Crash Rates		
		Int.	3-yr Minneapolis Average Crash Rate for Intersection Type from 2007 - 2009	3-yr Ave Critical Crash Rate* from 2010 - 2012
Lowry Avenue NE at Johnson Street NE	22	1.21	0.87	1.34

** Critical crash rates give an indication of the statistical significance of the intersection crash rate. Locations with a crash rate above the critical crash rate, are considered to be in need of safety improvements because there is a high probability (99.5 percent) that conditions at this location are contributing to the higher crash rate.*

- As shown in Table 7, the crash rate at the Lowry Avenue NE intersection with Johnson Street NE of 1.21 crashes per million entering vehicles (MEV) is above the average Minneapolis crash rate of 0.87.

- The crash rate at the Lowry Avenue NE intersection with Johnson Street NE intersection is below the critical crash rate of 1.34.

Conclusions: Based on these crash patterns, trends, and factors, the crash analysis conclusions for the Lowry Avenue NE intersection with Johnson Street NE intersection are summarized as follows:

- The crash rate is higher than the 3-year Minneapolis average crash rate for similar intersections.
- The crash rate is lower than the 3-year average critical crash rate.
- Although there were a number of crashes at the Lowry Avenue NE intersection with Johnson Street NE, the crash rate at this location was below the critical crash rate for similar intersections, and thus it is not anticipated that improvements to this intersection will significantly reduce crashes that have been reported at this location.

CORRIDOR-SPECIFIC CRASH ANALYSIS

Lowry Avenue NE between Marshall Street NE and University Avenue NE

Crash Patterns: The predominant crash patterns, trends, types of crashes, critical condition circumstances, and factors identified on this segment for the four (4) crashes occurring during the three-year period from 2010 through 2012, are summarized as follows:

- There were no fatal crashes and one possible injury crash
- Two of the four crashes were identified as “right angle” crashes
- Three of the crashes (75 percent) occurred in 2012 and the other one was in 2011
- Four of the crashes (75 percent) occurred in the afternoon

Crash Rates: Hennepin County Public Works calculated the three-year crash rate for the Lowry Avenue NE segment between Marshall Street NE and University Avenue NE and compared it to the three-year Minneapolis Average Crash Rate for similar segments and the three-year Critical Crash Rate. The results are shown in Table 13.

Table 13 – Lowry Avenue NE between Marshall Street NE and University Avenue NE Roadway Segment Crash Analysis Results

Segment	Total Crashes	Crash Rates		
		Subject Segment	3-yr Minneapolis Average Crash Rate for Intersection Type from 2007 - 2009	3-yr Ave Critical Crash Rate* from 2010 - 2012
Marshall Street NE to University Avenue NE	4	0.94	4.09	7.14

** Critical crash rates give an indication of the statistical significance of the segment crash rate. Locations with a crash rate above the critical crash rate, are considered to be in need of safety improvements because there is a high probability (99.5 percent) that conditions at this location are contributing to the higher crash rate.*

- As shown in Table 13, the crash rate for the Marshall Street NE to TH 47 (University Ave) segment of 0.94 crashes per million vehicle miles (MVM) is below the average Minneapolis crash rate of 4.09.
- The crash rate for the Marshall Street NE to TH 47 (University Ave) segment is below the critical crash rate of 7.14.

***Conclusions*:** Based on these crash patterns, trends, and factors, the crash analysis conclusions for the Lowry Avenue NE segment between Marshall Street NE to University Avenue NE are summarized as follows:

- The crash rate is lower than the 3-year Minneapolis average crash rate for similar segments.
- The crash rate is lower than the 3-year average critical crash rate.
- This segment does not appear to have a safety problem.

Lowry Avenue NE Segment between University Avenue NE and Central Avenue NE

***Crash Patterns*:** The predominant crash patterns, trends, types of crashes, critical condition circumstances, and factors identified on this segment for the fifteen (15) crashes occurring during the three-year period from 2010 through 2012, are summarized as follows:

- There were no fatal crashes, two non-incapacitating injury crashes, and five possible injury crashes
- Five of the crashes (33 percent) were “right angle” and four (27 percent) were listed as “rear end”
- Six of the crashes (40 percent) occurred in 2012, five of the crashes (33 percent) happened in 2011, and four crashes (27 percent) were recorded in 2010
- Nine of the crashes (60 percent) occurred in the afternoon

***Crash Rates*:** Hennepin County Public Works calculated the three-year crash rate for the Lowry Avenue NE segment between University Avenue NE and Central Avenue NE and compared it to the three-year Minneapolis Average Crash Rate for similar segments and the three-year Critical Crash Rate. The results are shown in Table 14.

Table 14 – Lowry Avenue NE between University Avenue NE and Central Avenue NE Roadway Segment Crash Analysis Results				
Segment	**Total Crashes**	**Crash Rates**		
		Subject Segment	**3-yr Minneapolis Average Crash Rate for Intersection Type from 2007 - 2009**	**3-yr Ave Critical Crash Rate* from 2010 - 2012**
University Avenue NE to Central Avenue NE	15	2.18	4.09	6.54

** Critical crash rates give an indication of the statistical significance of the segment crash rate. Locations with a crash rate above the critical crash rate, are considered to be in need of safety improvements because there is a high probability (99.5 percent) that conditions at this location are contributing to the higher crash rate.*

- As shown in Table 14, the crash rate for the Lowry Avenue NE roadway segment between University Avenue NE and Central Avenue NE of 2.18 crashes per million vehicle miles (MVM) is below the average Minneapolis crash rate of 4.09.
- The crash rate for the Lowry Avenue NE roadway segment between University Avenue NE and Central Avenue NE is also below the critical crash rate of 6.54.

***Conclusions*:** Based on these crash patterns, trends, and factors, the crash analysis conclusions for the Lowry Avenue roadway segment between University Avenue NE and Central Avenue NE are summarized as follows:

- The crash rate is lower than the 3-year Minneapolis average crash rate for similar segments.
- The crash rate is lower than the 3-year average critical crash rate.
- This segment does not appear to have a safety problem.

Lowry Avenue NE Segment between Central Avenue NE and Johnson Street NE

***Crash Patterns*:** The predominant crash patterns, trends, types of crashes, critical condition circumstances, and factors identified on this segment for the twenty-seven (27) crashes occurring during the three-year period from 2010 through 2012, are summarized as follows:

- There were no fatal crashes, one non-incapacitating injury crash, and five possible injury crashes
- Eight of the crashes (30 percent) were “right angle” and seven (26 percent) were listed as “rear end”
- Twelve of the crashes (44 percent) occurred in 2010, 11 of the crashes (41 percent) happened in 2012, and four crashes (15 percent) were recorded in 2011
- Seventeen of the crashes (63 percent) occurred in the afternoon

***Crash Rates*:** Hennepin County Public Works calculated the three-year crash rate for the Lowry Avenue NE roadway segment between Central Avenue NE and Johnson Street NE and compared it to the three-year Minneapolis Average Crash Rate for similar segments and the three-year Critical Crash Rate. The results are shown in Table 15.

Table 15 – Lowry Avenue NE between Central Avenue NE and Johnson Street NE Roadway Segment Crash Analysis Results				
Segment	**Total Crashes**	**Crash Rates**		
		Subject Segment	**3-yr Minneapolis Average Crash Rate for Intersection Type from 2007 - 2009**	**3-yr Ave Critical Crash Rate* from 2010 - 2012**
Central Avenue NE to Johnson Street NE	27	**6.37**	3.16	5.80

** Critical crash rates give an indication of the statistical significance of the segment crash rate. Locations with a crash rate above the critical crash rate, are considered to be in need of safety improvements because there is a high probability (99.5 percent) that conditions at this location are contributing to the higher crash rate.*

- As shown in Table 15, the crash rate for the Lowry Avenue NE roadway segment between Central Avenue NE and Johnson Street NE of 6.37 crashes per million vehicle miles (MVM) is above the average Minneapolis crash rate of 3.16.
- The crash rate for the Lowry Avenue NE roadway segment between Central Avenue NE and Johnson Street NE is also above the critical crash rate of 5.80.

***Conclusions*:** Based on these crash patterns, trends, and factors, the crash analysis conclusions for the Lowry Avenue NE roadway segment between Central Avenue and Johnson Street NE are summarized as follows:

- The crash rate is higher than the 3-year Minneapolis average crash rate for similar segments.
- The crash rate is higher than the 3-year average critical crash rate.
- Segments with a crash rate above a local critical crash rate are considered to be in need of safety improvements because there is a high probability that existing conditions along the roadway segment are contributing to the higher crash rate.

Lowry Avenue Segment between Johnson Street NE and Stinson Parkway

***Crash Patterns*:** The predominant crash patterns, trends, types of crashes, critical condition circumstances, and factors identified on this segment for the five (5) crashes occurring during the three-year period from 2010 through 2012, are summarized as follows:

- There were no fatal crashes and two possible injury crashes
- Two of the crashes (40 percent) were “rear end” crashes
- Three of the crashes (60 percent) occurred in 2012, one of the crashes (20 percent) happened in 2011, and one crash (20 percent) was recorded in 2010
- Three of the crashes (60 percent) occurred in the afternoon

***Crash Rates*:** Hennepin County Public Works calculated the three-year crash rate for the Lowry Avenue NE roadway segment between Johnson Street NE and Stinson Parkway and compared it to

the three-year Minneapolis Average Crash Rate for similar segments and the three-year Critical Crash Rate. The results are shown in Table 16.

Table 16 – Lowry Avenue NE between Johnson Street NE and Stinson Parkway Roadway Segment Crash Analysis Results

Segment	Total Crashes	Crash Rates		
		Subject Segment	3-yr Minneapolis Average Crash Rate for Intersection Type from 2007 - 2009	3-yr Ave Critical Crash Rate* from 2010 - 2012
Johnson Street NE to Stinson Parkway	5	1.53	3.16	6.10

** Critical crash rates give an indication of the statistical significance of the segment crash rate. Locations with a crash rate above the critical crash rate, are considered to be in need of safety improvements because there is a high probability (99.5 percent) that conditions at this location are contributing to the higher crash rate.*

- As shown in Table 16, the crash rate for the Lowry Avenue NE roadway segment between Johnson Street NE and Stinson Parkway of 1.53 crashes per million vehicle miles (MVM) is below the average Minneapolis crash rate of 3.16.
- The crash rate for the Lowry Avenue NE roadway segment between Johnson Street NE and Stinson Parkway is also below the critical crash rate of 6.10.

***Conclusions*:** Based on these crash patterns, trends, and factors, the crash analysis conclusions for the Lowry Avenue NE roadway segment between Johnson Street NE and Stinson Boulevard Parkway are summarized as follows:

- The crash rate is lower than the 3-year Minneapolis average crash rate for similar segments.
- The crash rate is lower than the 3-year average critical crash rate.
- This segment does not appear to have a safety problem.

PARKING ANALYSIS

Parking in the Lowry Avenue NE Corridor is provided mainly by on-street parallel parking and private parking lots which are usually dedicated to one particular building. The on-street parking is controlled by time limits during the on and off peak time of day.

Many of the private parking lots were established prior to the current zoning regulations. These older lots lack the amenities of landscaping, screening and setbacks required by the current code. The multitude of private parking lots, each with their own driveway on Lowry Avenue NE results in a negative impact to traffic and also to pedestrian activity on the sidewalks. Many of the small lots are inconvenient to the users as their turning movements are tight and there is no overflow capability during busy times. Unlike most commercial corridors, access to convenient, available parking has not been defined as a major issue within the Lowry Avenue NE Corridor.

Table 17 shows the total number of existing on-street parking spaces that are currently provided along the Lowry Avenue NE corridor.

Table 17: Existing On-Street Parking Supply along Lowry Avenue NE Corridor

Segment	Existing Number of On-Street Parking Spaces on Lowry Avenue NE
Marshall Street NE to University Avenue NE	51 – North Side 50 – South Side
University Avenue NE to Central Avenue NE	87 – North Side 71 – South Side
Central Avenue NE to Johnson Street NE	55 – North Side 51 – South Side
Johnson Street NE to Stinson Parkway	73 – North Side 69 – South Side
Totals	**507 Parking Spaces (266 north side & 241 south side)**

PARKING DEMAND

A parking demand study was completed in April 2014 during the weekday hours of 10:00 a.m. to 1:00 p.m. in commercial areas, weekday evening between the hours of 6:00 to 9:00 p.m. in residential areas, and on a Sunday morning between the hours of 9:00 a.m. to 12:00 noon near existing churches. Based on input from the community, an additional parking demand study was conducted in the vicinity of an existing Mosque (near the Central Avenue NE intersection) on a Friday afternoon between the hours of 11:00 a.m. to 2:00 p.m. to capture parking demand in the area as a result of a typical Friday afternoon prayer service.

The results of the parking demand study are shown in Tables 18 through 21, and are briefly summarized below.

Marshall Avenue NE to University Avenue NE: Little to no on-street parking demand, except for commercial parking demand near the University Avenue NE intersection.

University Avenue NE to Central Avenue NE: Little to no on-street parking demand, except for commercial parking demand near the University Avenue NE and Central Avenue NE intersections.

Central Avenue NE to Johnson Street NE: Little to no on-street parking demand, except for commercial parking demand near the Central Avenue NE intersection and church parking demand on the south side of Lowry Avenue NE between Taylor and Fillmore Streets NE.

Johnson Street NE to Stinson Boulevard NE: Little to no on-street parking demand, except for residential parking demand on the south side of Lowry Avenue NE near the Stinson Boulevard NE and park-related parking demand near Windom Park.

Future Parking Needs

Future parking strategies should seek to provide a convenient and adequate parking supply without allowing it to dominate the streetscape. Creative solutions should be explored to meet parking requirements such as consolidating parking into efficient shared underground or structured parking facilities, reducing parking requirements for new buildings where employees are provided transit passes, as well as, encouraging property owners to combine surface parking lots in the rear of their buildings and to connect them to side streets, reducing access points on Lowry Avenue NE where vehicle and pedestrian conflicts could occur.

Table 18 - Commercial Area Parking Demand (Typical Weekday)			
Lowry Avenue NE Segment		**Parking Supply**	**Parking Demand**
From	**To**	**# Stalls Available (North Side)**	**Average # Stalls Utilized (North Side) 10:00 a.m.-1:00 p.m.**
Marshall St NE	Grand St NE	9	0
Grand St NE	California St NE	6	0
California St NE	1st St NE	8	0
1st St NE	2nd St NE	7	0
2nd St NE	3rd St NE	11	0
3rd St NE	University Ave NE	10	1
University Ave NE	4th St NE	8	1
4th St NE	5th St NE	5	0
5th St NE	6th St NE	8	0
6th St NE	7th St NE	5	0
7th St NE	Washington St NE	4	0
Washington St NE	Jefferson St NE	4	0
Howard St NE	Monroe St NE	3	0
Monroe St NE	Quincy St NE	11	0
Jackson St NE	Central Ave NE	13	1
Central Ave NE	Polk St NE	9	0
Totals		**121**	**3%**

Lowry Avenue NE Segment		**Parking Supply**	**Parking Demand**
From	**To**	**# Stalls Available (South Side)**	**Average # Stalls Utilized (South Side) 10:00 a.m.-1:00 p.m.**
Marshall St NE	Grand St NE	8	0
Grand St NE	California St NE	6	0
California St NE	1st St NE	9	0
1st St NE	2nd St NE	10	0
2nd St NE	3rd St NE	10	0
3rd St NE	University Ave NE	7	0
University Ave NE	4th St NE	9	0
4th St NE	5th St NE	6	0
5th St NE	6th St NE	8	0
6th St NE	7th St NE	3	0
7th St NE	Washington St NE	6	0
Washington St NE	Jefferson St NE	9	0
Howard St NE	Monroe St NE	0	0
Monroe St NE	Quincy St NE	7	0
Jackson St NE	Central Ave NE	7	1
Central Ave NE	Polk St NE	13	0
Totals		**118**	**1%**

Table 19 - Residential Area Parking Demand (Typical Weekday)

Lowry Avenue NE Segment		Parking Supply	Parking Demand
From	To	# Stalls Available (North Side)	Average # Stalls Utilized (North Side) 6-9:00 p.m.
Jefferson St NE	Madison St NE	7	0
Madison St NE	Howard St NE	6	0
Quincy St NE	Jackson St NE	13	1
Polk St NE	Taylor St NE	9	7
Buchanan St NE	Lincoln St NE	8	0
Lincoln St NE	Johnson St NE	3	1
Johnson St NE	Hayes St NE	19	0
Hayes St NE	Garfield St NE	10	1
Cleveland St NE	Benjamin St NE	9	0
Benjamin St NE	McKinley St NE	9	1
McKinley St NE	Stinson Blvd	9	0
Totals		**102**	**11%**

Lowry Avenue NE Segment		Parking Supply	Parking Demand
From	To	# Stalls Available (South Side)	Average # Stalls Utilized (South Side) 6-9:00 p.m.
Jefferson St NE	Madison St NE	4	0
Madison St NE	Howard St NE	4	0
Quincy St NE	Jackson St NE	8	0
Polk St NE	Taylor St NE	12	2
Buchanan St NE	Lincoln St NE	0	0
Lincoln St NE	Johnson St NE	0	0
Johnson St NE	Hayes St NE	20	0
Hayes St NE	Garfield St NE	8	0
Cleveland St NE	Benjamin St NE	8	0
Benjamin St NE	McKinley St NE	9	0
McKinley St NE	Stinson Blvd	8	1
Totals		**81**	**3%**

Table 20 - Church Area Parking Demand (Typical Sunday)			
Lowry Avenue NE Segment		**Parking Supply**	**Parking Demand**
From	**To**	**# Stalls Available (North Side)**	**Average # Stalls Utilized (North Side) 9:00 a.m.-1:00 p.m.**
Taylor St NE	Fillmore St NE	10	4
Fillmore St NE	Pierce St NE	8	2
Pierce St NE	Buchanan St NE	8	1
Garfield St NE	Arthur St NE	9	1
Arthur St NE	Cleveland St NE	8	1
Totals		**43**	**22%**

Lowry Avenue NE Segment		**Parking Supply**	**Parking Demand**
From	**To**	**# Stalls Available (South Side)**	**Average # Stalls Utilized (South Side) 9:00 a.m.-1:00 p.m.**
Taylor St NE	Fillmore St NE	12	6
Fillmore St NE	Pierce St NE	10	2
Pierce St NE	Buchanan St NE	4	1
Garfield St NE	Arthur St NE	7	1
Arthur St NE	Cleveland St NE	9	1
Totals		**42**	**25%**

Table 21 - Mosque Parking Demand (Typical Friday Midday)			
Lowry Avenue NE Segment		**Parking Supply**	**Parking Demand**
From	**To**	**# Stalls Available (North Side)**	**# Stalls Utilized (North Side) 11:00 a.m.-2:00 p.m.**
Quincy St NE	Jackson St NE	13	0
Jackson St NE	Central Ave NE	13	7
Central Ave NE	Polk St NE	9	1
Polk St NE	Taylor St NE	9	6
Totals		**44**	**30%**
Lowry Avenue NE Segment		**Parking Supply**	**Parking Demand**
From	**To**	**# Stalls Available (South Side)**	**# Stalls Utilized (North Side) 11:00 a.m.-2:00 p.m.**
Quincy St NE	Jackson St NE	8	0
Jackson St NE	Central Ave NE	7	3
Central Ave NE	Polk St NE	13	2
Polk St NE	Taylor St NE	12	2
Totals		**40**	**19%**

FUTURE CONDITIONS

YEAR 2035 TRAFFIC VOLUME FORECASTS

A review of the historic traffic volumes along the Lowry Avenue NE corridor between 1985 and 2013 revealed that traffic volumes have increased an average of 0.2 percent per year over this 28 year timeframe. Based on input provided by Hennepin County and City of Minneapolis staff, it was decided that an annual growth rate of 0.5 percent per year should be used in the development of the forecast traffic volumes used in this study. Therefore, forecast year 2035 traffic volumes were developed by adding a 0.5 percent per year annual growth rate to the existing traffic volumes. The resultant forecast year 2035 No-Build traffic volumes are shown in Table 22.

Table 22 – Existing (2007) & Forecast Year 2035 No-Build ADT Volumes

Segment	Average Daily Traffic Volumes	
	Existing Year (2007)	Forecast Year 2035
West of Marshall Street NE	15,800	18,200
Marshall Street NE to Central Avenue NE	13,800	15,900
Central Avenue NE to Johnson Street NE	10,400	12,000
Johnson Street NE to Stinson Boulevard	8,400	9,700

Source: MnDOT and Stantec

Roadway Capacity – Forecast Year 2035 No-Build Conditions

Similar to the earlier existing conditions analysis, a planning-level review of the existing roadway capacity was also completed in order identify any future capacity deficiencies along Lowry Avenue NE corridor.

A comparative look at the planning-level capacity thresholds shown previously in Table 2 versus the existing ADT and forecast year 2035 No-Build volumes along Lowry Avenue NE will provide a good indication whether the existing roadway is over, near, or under capacity assuming existing and forecast year 2035 traffic volumes. Table 23 shows existing (2007) and forecast year 2035 No-Build ADTs, as well as the v/c ratios for the corridor. If a v/c ratio is higher than 1.0, the roadway is considered over capacity and will likely experience routine congestion. The mobility goal of the Lowry Avenue NE corridor is minimize congestion so that the volume-to-capacity ratio does not exceed 1.0 under existing and future conditions.

Table 23 – Existing (2007) & Forecast Year 2035 No-Build ADT Volumes and Roadway Design Capacity

Segment *(existing roadway section)*	Average Daily Traffic Volumes		Design Capacity (ADT)	Volume to Capacity Ratio	
	Existing Year 2007	Forecast Year 2035 No-Build		Existing Year 2007	Forecast Year 2035 No-Build
West of Marshall Street NE *(four-lane undivided)*	15,800	18,200	22,000	0.72	0.83
Marshall Street NE to Central Avenue NE *(four-lane undivided)*	13,800	15,900	22,000	0.63	0.63
Central Avenue NE to Johnson Street NE *(two-lane undivided)*	10,400	12,000	12,000	0.87	1.00
Johnson Street NE to Stinson Boulevard *(two-lane undivided)*	8,400	9,700	12,000	0.70	0.81

As shown in Table 23, the Lowry Avenue NE corridor is currently under the capacity of the existing four-lane undivided street west of Central Avenue NE and under the capacity of the existing two-lane undivided street to the east of Central Avenue NE. Assuming year 2035 No-Build traffic volumes, the existing four-lane undivided street west of Central Avenue NE and two-lane undivided street to the east of Central Avenue NE will continue to operate at or below the planning-level capacity of the existing roadway.

Intersection traffic operations – Forecast Year 2035 No-Build Conditions

In order to determine how the existing traffic control and lane configuration at the key study intersections along the Lowry Avenue NE corridor will be able to accommodate the forecast year 2035 No-Build traffic volumes, a traffic operations analysis was completed at key intersections along the corridor. The results of the forecast year 2035 No-Build traffic analysis at the key study intersections along the Lowry Avenue NE corridor are shown in Table 24.

Table 24 – Intersection LOS, delay, and queue by approach
Forecast Year 2035 No-Build Traffic Volumes

Intersection (Control)	Approach	A.M. Peak				P.M. Peak			
		LOS	Delay (sec)	Queue (ft) (1)	Int. LOS (delay)	LOS	Delay (sec)	Queue (ft) (1)	Int. LOS (delay)
Lowry Avenue NE at Marshall Street NE (Traffic Signal)	EB	B	17.6	195’	B (18.9s)	B	17.2	167’	C (28.6s)
	WB	B	15.1	130’		C	29.5	214’	
	NB	C	30.3	1176’		D	39.2	516’	
	SB	B	19.3	320’		C	26.3	141’	
Lowry Avenue NE at 2nd Street NE (Traffic Signal)	EB	A	6.4	92’	B (10.4s)	B	13.5	154’	B (13.3s)
	WB	A	9.9	102’		B	11.3	157’	
	NB	B	15.6	78’		B	14.5	112’	
	SB	C	21.7	107’		C	22.2	84’	
Lowry Avenue NE at University Avenue NE (Traffic Signal)	EB	B	19.4	188’	C (22.9s)	B	12.7	178’	C (24.0s)
	WB	C	27.6	183’		B	19.3	208’	
	NB	B	16.5	147’		C	31.5	297’	
	SB	C	23.3	318’		C	34.6	435’	
Lowry Avenue NE at Washington Street NE (Traffic Signal)	EB	A	9.3	173’	A (8.3s)	A	9.9	128’	B (10.7s)
	WB	A	5.6	66’		B	10.2	107’	
	NB	B	14.6	49’		B	17.5	79‘	
	SB	B	16.1	65’		B	14.9	50’	
Lowry Avenue NE at Monroe Street NE (Traffic Signal)	EB	A	9.1	125’	B (10.8s)	A	8.0	91’	B (10.8s)
	WB	A	9.2	111’		B	10.9	144’	
	NB	C	23.2	100’		B	19.5	115’	
	SB	C	25.1	46’		B	18.3	56’	
Lowry Avenue NE at Central Avenue NE (Traffic Signal)	EB	C	20.8	231’	C (23.6s)	B	18.4	189’	C (26.6s)
	WB	C	31.7	269’		D	41.6	463’	
	NB	B	17.1	110’		C	26.1	306’	
	SB	C	23.2	314’		C	21.0	180’	
Lowry Avenue NE at Johnson Street NE (Traffic Signal)	EB	**E**	**56.9**	**600’**	D (39.1s)	F	122.9	1486’	D (54.1s)
	WB	**F**	**81.7**	**544’**		D	53.9	521’	
	NB	B	17.5	155’		C	21.6	434’	
	SB	B	17.7	348’		B	14.9	160’	

(1) Represents the longest reported 95th-percentile vehicular queue on each intersection approach.

As shown in Table 24, the existing traffic control and lane configuration at the key study intersections will be able to accommodate the forecast year 2035 no-build traffic volumes, assuming that the traffic signal timing is optimized. Therefore, the existing traffic control and lane configuration at the key intersections can accommodate the forecast year 2035 No-Build a.m. and p.m. peak hour traffic volumes, with traffic signal timing improvements along the Lowry Avenue NE Corridor.

FORECAST YEAR 2035 BUILD CONDITIONS

Recommended Roadway Sections

Based on technical review, stakeholder and Community Advisory Team input, as well as direction from the Technical Advisory Team and the Steering Committee, the following two roadway section concepts were selected as the preferred roadway section alternatives for Lowry Avenue NE from the eight considered:

- Wider Sidewalks (Concept C) – West of Central Avenue NE
- Bicycle Lanes with Wider Sidewalks, Parking (Concept E) – East of Central Avenue NE

Wider Sidewalks (Concept C) – West of Central Avenue NE:

The attached Figure 2 shows the recommended roadway section of Lowry Avenue NE west of Central Avenue. As shown in Figure 2, this recommended roadway section consists of a three-lane roadway (one 11-foot lane in each direction separated with a 12-foot center two-way left-turn lane). By narrowing the existing roadway section from four-lanes to the recommended three-lane section, the sidewalk and boulevard areas on each side of the roadway can be expanded to approximately 11 feet in order to provide a wider pedestrian realm along Lowry Avenue NE to the west of Central Avenue NE.

Bicycle Lanes with Wider Sidewalks, Parking and Bicycle Facilities (Concept E) – East of Central Avenue NE:

The attached Figure 3 shows the recommended roadway section of Lowry Avenue NE east of Central Avenue. As shown in Figure 3, this recommended roadway section consists of a two-lane roadway with bicycle lanes (one 11-foot travel lane and one 6-foot bicycle lane in each direction), and optional parking at selected locations. By narrowing the existing roadway section from four-lanes to the recommended two-lane section with bicycle lanes, the sidewalk and boulevard areas on each side of the roadway can be expanded to approximately 14 feet in order to provide a wider pedestrian realm along Lowry Avenue NE to the east of Central Avenue NE.

West of Central // Concept C: Wider Sidewalks

Roadway Characteristics

- Sidewalk width increases by moving the curb line and narrowing the roadway
- 12-foot sidewalk area allows people to walk comfortably side-by-side, provides sufficient clearance for people with disabilities, and allows space for utilities and amenities
- Center left-turn lane provides space for left-turning vehicles
- On-street parking eliminated
- No dedicated bicycle facility

East of Central // Concept E: Wider Sidewalks, Parking and Bicycle Facilities

Recommended Intersection Improvements

Based on the results of the traffic analysis at the key intersections, the existing traffic control and lane configuration can accommodate the existing and forecast year 2035 traffic volumes at acceptable levels of service. Therefore, any recommended improvements at the key study intersections are therefore based on non-capacity-related needs such as turning of heavy trucks, potential mitigation of high crash locations, and improved accommodations of other transportation modes (i.e. – pedestrians, bicycles, and transit).

Of the six key study intersections, intersection improvements were identified at following three intersections:

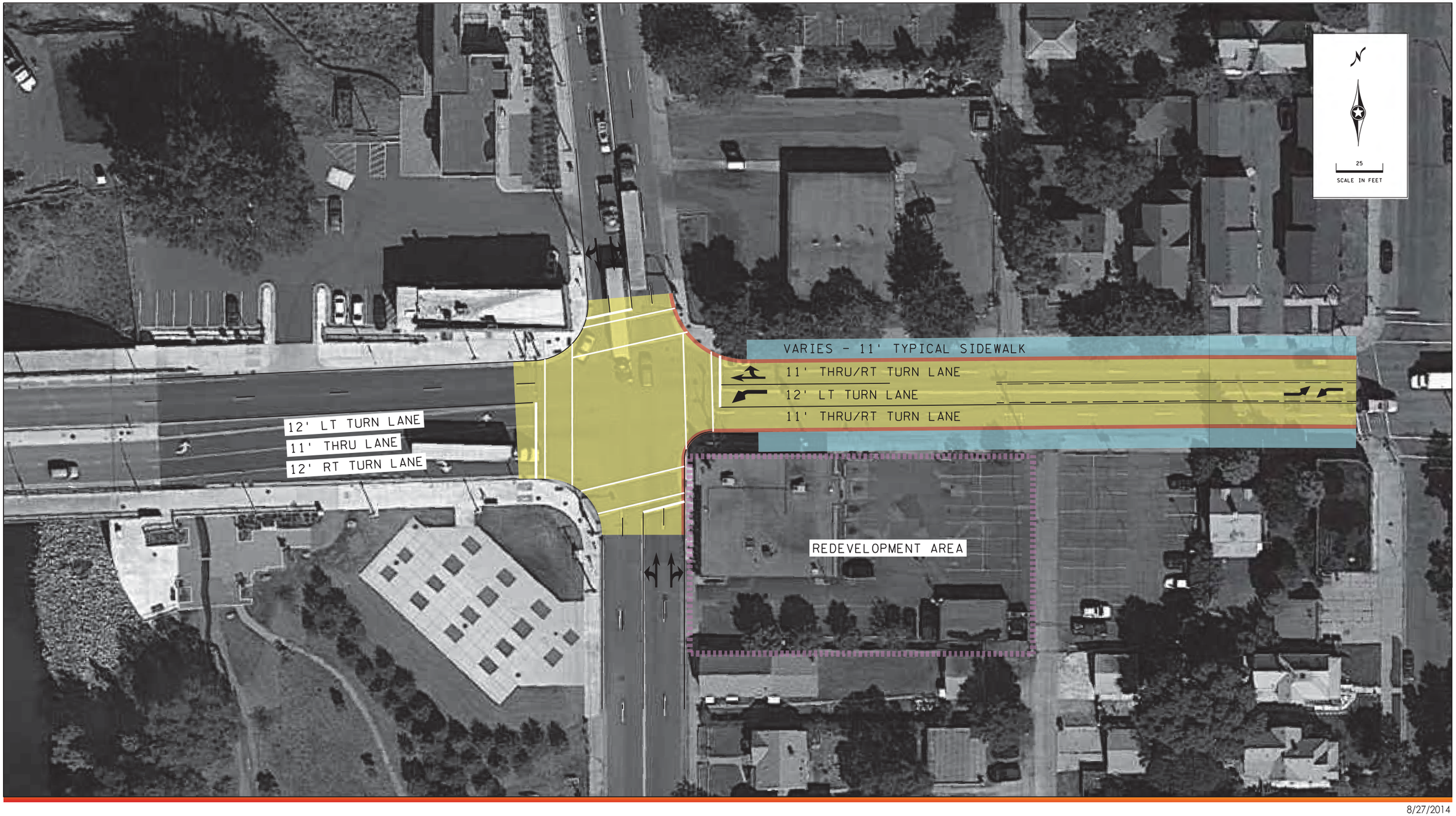
- Lowry Avenue NE at Marshall Street NE
- Lowry Avenue NE at University Avenue NE
- Lowry Avenue NE at Central Avenue NE

Lowry Avenue NE at Marshall Street NE

The attached Figure 4 shows the recommended intersection improvements at the Lowry Avenue NE intersection with Marshall Street NE. As shown in Figure 4, the east leg of the Lowry Avenue NE intersection with Marshall Street NE will be reconfigured to provide one lane of traffic in each direction on Lowry Avenue NE as well as a westbound left-turn lane. The sidewalk and boulevard area on both sides of Lowry Avenue NE (east of Marshall Street NE) will be widened to approximately 11 feet. The radius in the northeast corner of the intersection is also increased in order to better facilitate west- to northbound truck movements from Lowry Avenue NE to Marshall Street NE. The proposed lane configuration on the Marshall Street NE approaches to the Lowry Avenue NE intersection will remain unchanged.

Lowry Avenue NE at University Avenue NE

The attached Figure 5 shows the recommended intersection improvements at the Lowry Avenue NE intersection with University Avenue NE. As shown in Figure 5, the alignment of Lowry Avenue NE is shifted to the south in order to better facilitate the large trucks making the south- to westbound right-turns from the Shoreham Yards intermodal freight facility (which is located along University Avenue north of Lowry Avenue NE) to I-94 east of the study area. The Lowry Avenue NE approaches to the intersection will be revised to provide one lane of traffic in each direction as well as west- and eastbound left-turn lanes at the University Avenue NE intersection. The sidewalk and boulevard area on both sides of Lowry Avenue NE will be widened and parking bays will be provided in all four quadrants of the intersection with near side bus pull-outs provided on the Lowry Avenue NE approaches to the intersection. The corner radii at the intersection, particularly in the northwest quadrant of the intersection, will also be increased in order to better facilitate truck turning movements at the intersection. The proposed lane configuration on the University Avenue NE approaches to the Lowry Avenue NE intersection will remain unchanged.



8/27/2014

LOWRY AVENUE AT MARSHALL STREET- INTERSECTION ALTERNATIVE A

Hennepin County

HENNEPIN COUNTY
LOWRY AVENUE NE CORRIDOR STUDY

PARKING BAY (2 SPACES)

VARIES - 11' TYPICAL SIDEWALK

11' THRU

12' LT TURN LANE

11' THRU/RT TURN LANE

N LOWRY AVE

PARKING BAY (3 SPACES)/
BUS STOP

VARIES - 11' TYPICAL SIDEWALK

11' THRU/RT TURN LANE

12' LT TURN LANE

11' THRU LANE

N

25

SCALE IN FEET

REDEVELOPMENT AREA

PARKING BAY (4 SPACES)/
BUS STOP

REDEVELOPMENT AREA

UNIVERSITY AVE NE

PARKING BAY (5 SPACES)

REDEVELOPMENT AREA

REDEVELOPMENT AREA

REDEVELOPMENT AREA

8/27/2014

LOWRY AVENUE AT UNIVERSITY AVENUE - INTERSECTION ALTERNATIVE B

Hennepin County

HENNEPIN COUNTY
LOWRY AVENUE NE CORRIDOR STUDY

Hennepin

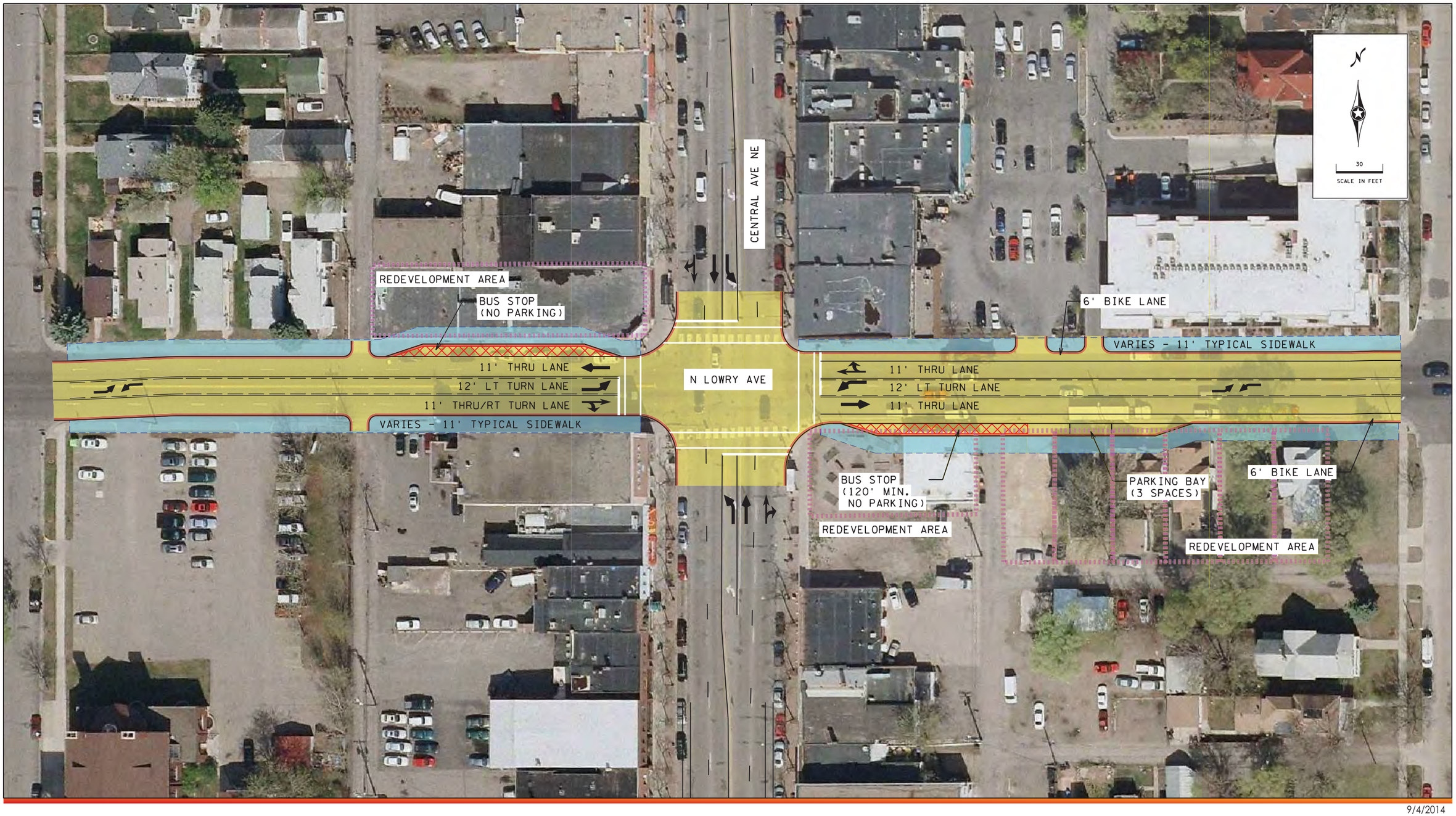
Minneapolis
City of Lakes

MWMO
MISSISSIPPI WATERSHED MANAGEMENT ORGANIZATION

Lowry Avenue NE at Central Avenue NE

The attached Figure 6 shows the recommended intersection improvements at the Lowry Avenue NE intersection with Central Avenue NE. As shown in Figure 6, the alignment of Lowry Avenue NE is shifted slightly to the north on the west side of Central Avenue NE and slightly to the south on the east side of the intersection. The Lowry Avenue NE approaches to the intersection will be revised to provide one lane of traffic in each direction as well as west- and eastbound left-turn lanes at the Central Avenue NE intersection. The sidewalk and boulevard area on both sides of Lowry Avenue NE will be widened, a parking bay will be provided in the southeast quadrant of the intersection, and far side bus pull-outs will be provided for the west- and eastbound busses. The corner radii at the intersection, in three of the four quadrants of the intersection, will also be increased in order to better facilitate truck turning movements at the intersection. The proposed lane configuration on the Central Avenue NE approaches to the Lowry Avenue NE intersection will remain unchanged.

Safety will be improved at the Lowry Avenue NE intersection with Central Avenue NE with the addition of left-turn lanes on the west- and eastbound Lowry Avenue NE approaches to the intersection. The proposed left-turn lanes on Lowry Avenue NE will remove left-turning vehicles from through traffic, thus reducing conflicts. The proposed center left-turn lanes on Lowry Avenue will also improve safety by improving sight distance for left-turn turning vehicles.



9/4/2014

LOWRY AVENUE AT CENTRAL AVENUE - INTERSECTION ALTERNATIVE D OPTION 1

Hennepin County

HENNEPIN COUNTY
LOWRY AVENUE NE CORRIDOR STUDY

Hennepin

Minneapolis
City of Lakes

MWMO
MISSISSIPPI WATERSHED MANAGEMENT ORGANIZATION

BUILD CONDITIONS ANALYSIS

Year 2035 Build Road Capacity

A comparative look at the planning-level capacity thresholds versus the forecast year 2035 Build volumes along Lowry Avenue NE will provide a good indication whether the proposed roadway sections can accommodate the forecast year 2035 traffic volumes. Table 25 shows forecast year 2035 build volumes as well as the v/c ratios for the corridor. If a v/c ratio is greater than 1.0, the roadway is considered over capacity and will likely experience routine congestion.

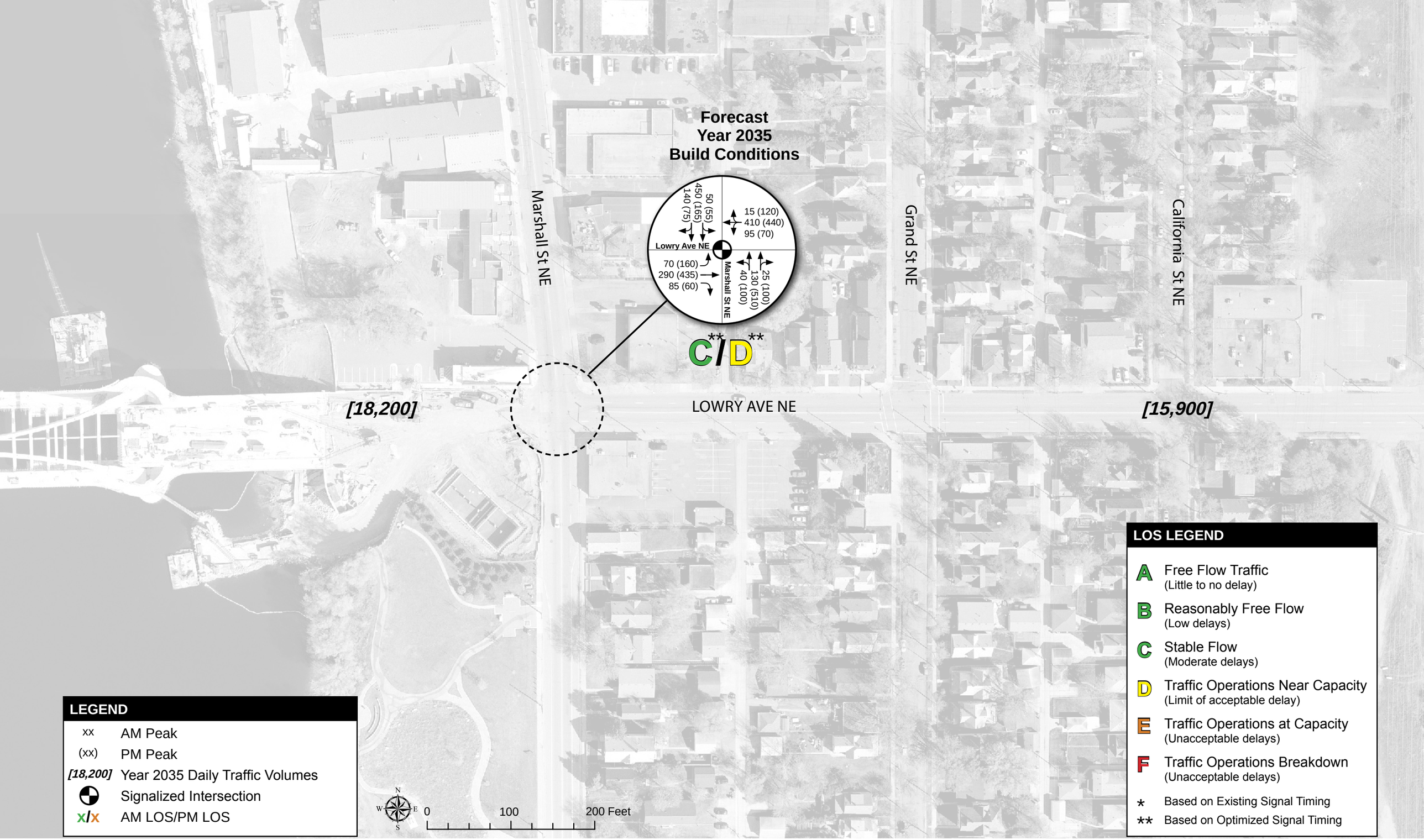
Table 25 – Forecast Year 2035 Build ADT Volumes and Roadway Design Capacity

Segment *(proposed roadway section)*	**Forecast Year 2035 Build Average Daily Traffic Volumes**	**Design Capacity (ADT)**	**Forecast Year 2035 Build Volume to Capacity Ratio**
West of Marshall Street NE *(four-lane undivided)*	18,200	22,000	0.83
Marshall Street NE to Central Avenue NE *(three-lane undivided)*	15,900	17,000	0.94
Central Avenue NE to Johnson Street NE *(two-lane undivided)*	12,000	12,000	1.00
Johnson Street NE to Stinson Boulevard *(two-lane undivided)*	9,700	12,000	0.81

As shown in Table 25, the Lowry Avenue NE corridor will be under the capacity of the proposed three-lane undivided street section between Marshall Avenue NE and Central Avenue NE and at or under the capacity of the proposed two-lane undivided street to the east of Central Avenue NE.

Intersection traffic operations – Forecast Year 2035 No-Build Conditions

In order to determine if the recommended intersection and roadway section improvements will be able to accommodate the forecast year 2035 traffic volumes, a build conditions analysis was completed at the key study intersections. The forecast year 2035 build conditions traffic volumes and lane configurations at the key study intersections are shown in the attached Figures 7a through 7e. The results of the year 2035 build conditions analysis at the key intersections are shown in Table 26.



LEGEND

xx	AM Peak
(xx)	PM Peak
[18,200]	Year 2035 Daily Traffic Volumes
	Signalized Intersection
x/x	AM LOS/PM LOS

LOS LEGEND

A	Free Flow Traffic (Little to no delay)
B	Reasonably Free Flow (Low delays)
C	Stable Flow (Moderate delays)
D	Traffic Operations Near Capacity (Limit of acceptable delay)
E	Traffic Operations at Capacity (Unacceptable delays)
F	Traffic Operations Breakdown (Unacceptable delays)
*	Based on Existing Signal Timing
**	Based on Optimized Signal Timing

Figure 7a

LOWRY AVENUE NE CORRIDOR STUDY: Future Build Conditions

Hennepin County

Project No. : 193802636/Graphics/Transportation/Lowry Ave NE Corridor Study Future Build Conditions.indd

Stantec · Floodplain collective · TooleDesignGroup

Figure 7b

LOWRY AVENUE NE CORRIDOR STUDY: Future Build Conditions

Hennepin County

Project No. : 193802636/Graphics/Transportation/Lowry Ave NE Corridor Study Future Build Conditions.indd

Stantec · Floodplain collective · TooleDesignGroup

Figure 7c

LOWRY AVENUE NE CORRIDOR STUDY: Future Build Conditions

Hennepin County

Project No. : 193802636/Graphics/Transportation/Lowry Ave NE Corridor Study Future Build Conditions.indd

Stantec · Floodplain collective · Toole Design Group

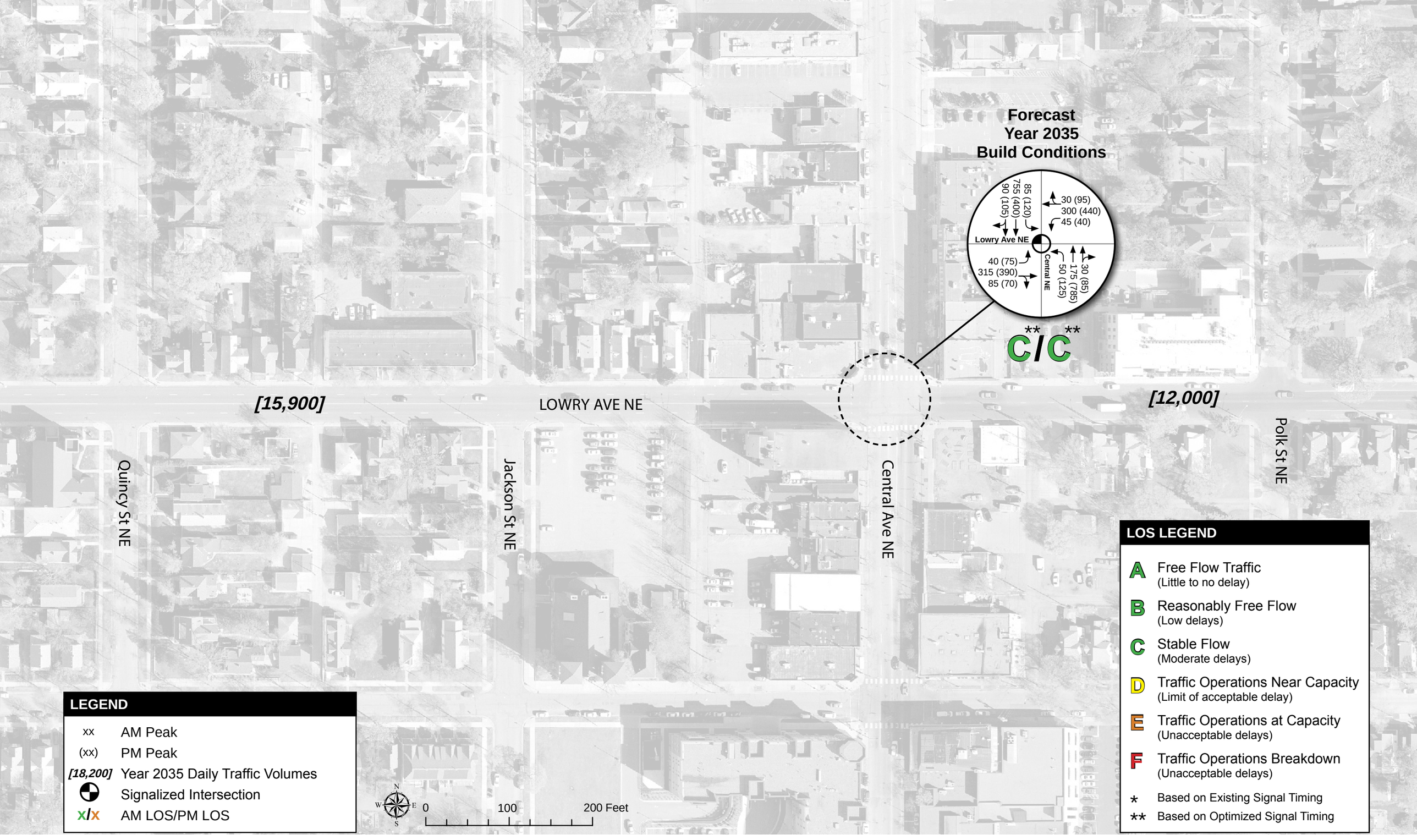


Figure 7d

LOWRY AVENUE NE CORRIDOR STUDY: Future Build Conditions

Hennepin County

Project No. : 193802636/Graphics/Transportation/Lowry Ave NE Corridor Study Future Build Conditions.indd

Stantec · Floodplain collective · Toole Design Group

LEGEND

xx	AM Peak
(xx)	PM Peak
[18,200]	Year 2035 Daily Traffic Volumes
	Signalized Intersection
x/x	AM LOS/PM LOS

LOS LEGEND

A	Free Flow Traffic (Little to no delay)
B	Reasonably Free Flow (Low delays)
C	Stable Flow (Moderate delays)
D	Traffic Operations Near Capacity (Limit of acceptable delay)
E	Traffic Operations at Capacity (Unacceptable delays)
F	Traffic Operations Breakdown (Unacceptable delays)
*	Based on Existing Signal Timing
**	Based on Optimized Signal Timing

Figure 7e

Hennepin County

LOWRY AVENUE NE CORRIDOR STUDY: Future Build Conditions

Project No. : 193802636/Graphics/Transportation/Lowry Ave NE Corridor Study Future Build Conditions.indd

Stantec · Floodplain collective · Toole Design Group

Table 26 – Intersection LOS, delay, and queue by approach Forecast Year 2035 Build Traffic Volumes									
Intersection (Control)	**Approach**	**A.M. Peak**				**P.M. Peak**			
		LOS	**Delay (sec)**	**Queue (ft) (1)**	**Int. LOS (delay)**	**LOS**	**Delay (sec)**	**Queue (ft) (1)**	**Int. LOS (delay)**
Lowry Avenue NE at Marshall Street NE (Traffic Signal)	EB	B	14.6	177’	C (21.4s)	C	26.1	262’	D (39.6s)
	WB	B	17.4	217’		D	36.1	403’	
	NB	D	40.0	201’		D	35.9	452’	
	SB	C	23.5	342’		**F**	**88.3**	**774’**	
Lowry Avenue NE at 2nd Street NE (Traffic Signal)	EB	A	9.6	165’	B (11.6s)	B	13.0	302’	B (14.0s)
	WB	A	9.3	146’		B	10.0	186’	
	NB	B	16.6	100’		C	22.1	137’	
	SB	C	24.3	115’		C	29.5	101’	
Lowry Avenue NE at University Avenue NE (Traffic Signal)	EB	B	19.1	196’	C (31.8s)	C	29.7	354’	D (39.3s)
	WB	D	54.4	591’		B	16.1	313’	
	NB	C	20.8	168’		D	43.4	357’	
	SB	C	28.6	355’		**E**	**75.5**	**838’**	
Lowry Avenue NE at Washington Street NE (Traffic Signal)	EB	B	10.7	180’	B (10.3s)	A	8.1	136’	A (9.7s)
	WB	A	8.6	145’		A	8.2	156’	
	NB	B	15.7	48’		C	24.7	96’	
	SB	B	14.9	60’		B	18.6	49’	
Lowry Avenue NE at Monroe Street NE (Traffic Signal)	EB	B	12.4	174’	B (12.9s)	A	9.6	189’	B (12.5s)
	WB	B	10.6	165’		B	10.6	216’	
	NB	C	23.0	89’		C	29.7	140’	
	SB	C	25.3	51’		C	27.1	55’	
Lowry Avenue NE at Central Avenue NE (Traffic Signal)	EB	B	18.7	229’	C (23.2s)	C	30.3	340’	C (28.9s)
	WB	C	33.4	289’		D	39.3	432’	
	NB	B	17.1	103’		C	26.1	328’	
	SB	C	22.8	287’		C	22.2	181’	
Lowry Avenue NE at Johnson Street NE (Traffic Signal)	EB	D	39.5	418’	C (34.8s)	**E**	**77.9**	**922’**	D (43.2s)
	WB	**E**	**73.0**	**492’**		D	52.4	522’	
	NB	B	18.4	144’		C	24.8	481’	
	SB	C	22.3	465’		B	16.2	187’	

(1) Represents the longest reported 95th-percentile vehicular queue on each intersection approach.

As shown in Table 26, all of the key intersections will continue to operate at an acceptable overall intersection LOS D or better during the a.m. and p.m. peak hour assuming proposed intersection and roadway section improvements. Therefore, the proposed intersection and roadway sections will be able to accommodate the forecast year 2035 Build traffic volumes.

CONCLUSIONS AND RECOMMENDATIONS

Based on the transportation/traffic analysis that was completed as part Lowry Avenue NE Corridor Plan, the following conclusions and recommendations are offered for consideration:

EXISTING CONDITIONS

- The Lowry Avenue NE corridor is currently under the capacity of the existing four-lane undivided street west of Central Avenue NE and under the capacity of the existing two-lane undivided street to the east of Central Avenue NE.

- With the exception of the Lowry Avenue NE intersection with Central Avenue NE, each of the key intersections currently operate at an acceptable overall intersection LOS D or better during the a.m. and p.m. peak hour assuming existing traffic control and lane configuration.
    - While the Lowry Avenue NE intersection with Central Avenue NE currently operates at an overall LOS C during the a.m. peak period under existing traffic control and lane configuration, the intersection currently has an unacceptable overall LOS E during the p.m. peak hour.
    - If the existing traffic signal timing were optimized, the traffic operations at the Lowry Avenue NE intersection with Central Avenue NE will likely improve back to acceptable LOS D or better during the p.m. peak hour.

- Based on the crash analysis, the following Lowry Avenue NE intersections were found to have crash rates higher than the City of Minneapolis average for similar intersection types:
    - Lowry Avenue NE at Marshall Avenue NE
    - Lowry Avenue NE at University Avenue NE
    - Lowry Avenue NE at Central Avenue NE
    - Lowry Avenue NE at Johnson Street NE

  However, upon further investigation, only the Central Avenue intersection had a crash rate higher than the critical crash rate for similar facility types, and therefore is considered in need of safety improvements.

- Based on a review of the existing parking demand along the Lowry Avenue NE corridor, the following conclusions can be drawn:
    - Marshall Avenue NE to University Avenue NE: Little to no on-street parking demand, except for commercial parking demand near the University Avenue NE intersection.
    - University Avenue NE to Central Avenue NE: Little to no on-street parking demand, except for commercial parking demand near the University Avenue NE and Central Avenue NE intersections.

- Central Avenue NE to Johnson Street NE: Little to no on-street parking demand, except for commercial parking demand near the Central Avenue NE intersection and church parking demand on the south side of Lowry Avenue NE between Taylor and Fillmore Streets NE.
- Johnson Street NE to Stinson Boulevard NE: Little to no on-street parking demand, except for residential parking demand on the south side of Lowry Avenue NE near the Stinson Boulevard NE and park-related parking demand near Windom Park.

Future parking strategies should seek to provide a convenient and adequate parking supply without allowing it to dominate the streetscape. Creative solutions should be explored to meet parking requirements such as consolidating parking into efficient shared underground or structured parking facilities, reducing parking requirements for new buildings where employees are provided transit passes, as well as, encouraging property owners to combine surface parking lots in the rear of their buildings and to connect them to side streets allowing for the reduction of parking demand on Lowry Avenue NE.

FORECAST YEAR 2035 NO-BUILD CONDITIONS

- Assuming year 2035 No-Build traffic volumes, the existing four-lane undivided street west of Central Avenue NE and two-lane undivided street to the east of Central Avenue NE will continue to operate at or below the planning-level capacity of the existing roadway.

- Based on the results of the traffic analysis at the key intersections, the existing traffic control and lane configuration can accommodate the existing and forecast year 2035 No-Build traffic volumes at acceptable levels of service. Therefore, any recommended improvements at the key study intersections are therefore based on non-capacity-related needs such as turning of heavy trucks, potential mitigation of high crash locations, and improved accommodations of other transportation modes (i.e. – pedestrians, bicycles, and transit).

FORECAST YEAR 2035 BUILD CONDITIONS

- Based on technical review, stakeholder and Community Advisory Team input, as well as direction from the Technical Advisory Team and the Steering Committee, the following two roadway section concepts were selected as the preferred roadway section alternatives for Lowry Avenue NE from the eight considered:
  - Wider Sidewalks (Concept C) – West of Central Avenue NE
  - Bicycle Lanes with Wider Sidewalks, Parking and Bicycle Facilities (Concept E) – East of Central Avenue NE

- With the proposed three-lane undivided street section west of Central Avenue NE and the proposed two-lane undivided street to the east of Central Avenue NE, the Lowry Avenue NE corridor will be under or at capacity assuming the forecast year 2035 build traffic volumes.

- Of the six key study intersections, intersection improvements were identified at following three intersections:
    - Lowry Avenue NE intersection with Marshall Street NE:
        - The east leg of the Lowry Avenue NE intersection with Marshall Street NE will be reconfigured to provide one lane of traffic in each direction on Lowry Avenue NE as well as a westbound left-turn lane.
        - The sidewalk and boulevard area on both sides of Lowry Avenue NE (east of Marshall Street NE) will be widened to approximately 11 feet.
        - The radius in the northeast corner of the intersection is also increased in order to better facilitate west- to northbound truck movements from Lowry Avenue NE to Marshall Street NE.
        - The proposed lane configuration on the Marshall Street NE approaches to the Lowry Avenue NE intersection will remain unchanged.
    - Lowry Avenue NE intersection with University Avenue NE:
        - The alignment of Lowry Avenue NE is shifted to the south in order to better facilitate the large trucks traveling to/from the Shoreham Yards intermodal freight facility.
        - The Lowry Avenue NE approaches to the intersection will be revised to provide one lane of traffic in each direction as well as west- and eastbound left-turn lanes at the University Avenue NE intersection.
        - The sidewalk and boulevard area on both sides of Lowry Avenue NE will be widened and parking bays will be provided in all four quadrants of the intersection with near side bus pull-outs provided on the Lowry Avenue NE approaches to the intersection.
        - The corner radii at the intersection, particularly in the northwest quadrant of the intersection, will also be increased in order to better facilitate truck turning movements at the intersection.
        - The proposed lane configuration on the University Avenue NE approaches to the Lowry Avenue NE intersection will remain unchanged.
    - Lowry Avenue NE intersection with Central Avenue NE:
        - The alignment of Lowry Avenue NE is shifted slightly to the north on the west side of Central Avenue NE and slightly to the south on the east side of the intersection.
        - The Lowry Avenue NE approaches to the intersection will be revised to provide one lane of traffic in each direction as well as west- and eastbound left-turn lanes at the Central Avenue NE intersection.
        - The sidewalk and boulevard area on both sides of Lowry Avenue NE will be widened, a parking bay will be provided in the southeast quadrant of the intersection, and far side bus pull-outs will be provided on the downstream Lowry Avenue NE legs from the intersection.

  - The corner radii at the intersection, in three of the four quadrants of the intersection, will also be increased in order to better facilitate truck turning movements at the intersection.
  - The proposed lane configuration on the Central Avenue NE approaches to the Lowry Avenue NE intersection will remain unchanged.
  - Safety will be improved at the Lowry Avenue NE intersection with Central Avenue NE with the addition of left-turn lanes on the west- and eastbound Lowry Avenue NE approaches to the intersection.
    - The proposed left-turn lanes on Lowry Avenue NE will remove left-turning vehicles from through traffic, thus reducing conflicts.
    - The proposed center left-turn lanes on Lowry Avenue will also improve safety by improving sight distance for left-turn turning vehicles

- Based on the results of the forecast year 2035 build conditions traffic analysis at the key intersections, all of the key intersections will continue to operate at an acceptable overall intersection LOS D or better during the a.m. and p.m. peak hour assuming proposed intersection and roadway section improvements.

- Therefore, the proposed intersection and roadway sections will be able to accommodate the forecast year 2035 Build traffic volumes.

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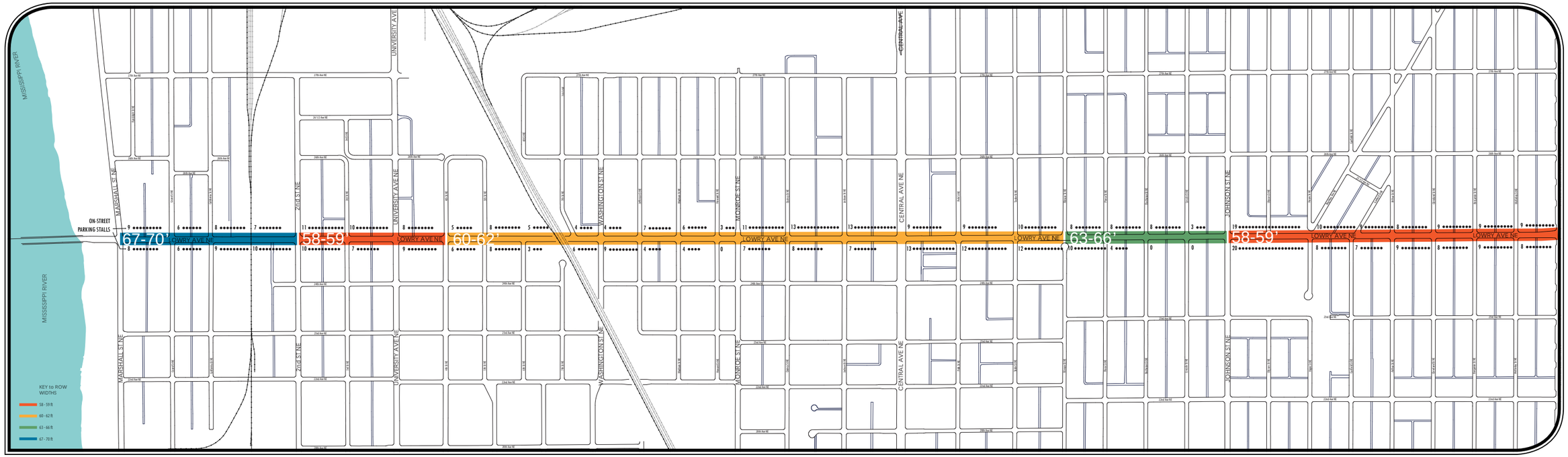
Lowry Avenue NE Corridor Study
Preliminary Parking Study Results:
Weekday Midday

Lowry Avenue NE Segment		Total Stalls Available (North Side)	Stalls Occupied (North Side) 10am-11am	Stalls Occupied (North Side) 11am-12pm	Stalls Occupied (North Side) 12pm-1pm
From	To				
Marshall St NE	Grand St NE	9	0.0%	0.0%	0.0%
Grand St NE	California St NE	6	0.0%	0.0%	0.0%
California St NE	1st St NE	8	0.0%	0.0%	0.0%
1st St NE	2nd St NE	7	0.0%	0.0%	0.0%
2nd St NE	3rd St NE	11	0.0%	0.0%	9.1%
3rd St NE	University Ave NE	10	0.0%	10.0%	30.0%
University Ave NE	4th St NE	8	25.0%	0.0%	0.0%
4th St NE	5th St NE	5	0.0%	0.0%	0.0%
5th St NE	6th St NE	8	0.0%	0.0%	0.0%
6th St NE	7th St NE	5	0.0%	0.0%	0.0%
7th St NE	Washington St NE	4	0.0%	0.0%	0.0%
Washington St NE	Jefferson St NE	4	0.0%	0.0%	0.0%
Howard St NE	Monroe St NE	3	0.0%	0.0%	0.0%
Monroe St NE	Quincy St NE	11	0.0%	0.0%	0.0%
Jackson St NE	Central Ave NE	13	15.4%	7.7%	0.0%
Central Ave NE	Polk St NE	9	0.0%	0.0%	0.0%
Totals		121	3.3%	1.7%	3.3%

Lowry Avenue NE Segment		Total Stalls Available (South Side)	Stalls Occupied (South Side) 10am-11am	Stalls Occupied (South Side) 11am-12pm	Stalls Occupied (South Side) 12pm-1pm
From	To				
Marshall St NE	Grand St NE	8	0.0%	0.0%	0.0%
Grand St NE	California St NE	6	0.0%	0.0%	0.0%
California St NE	1st St NE	9	0.0%	0.0%	0.0%
1st St NE	2nd St NE	10	0.0%	0.0%	0.0%
2nd St NE	3rd St NE	10	0.0%	0.0%	0.0%
3rd St NE	University Ave NE	7	0.0%	0.0%	0.0%
University Ave NE	4th St NE	9	0.0%	0.0%	0.0%
4th St NE	5th St NE	6	0.0%	0.0%	0.0%
5th St NE	6th St NE	8	0.0%	0.0%	0.0%
6th St NE	7th St NE	3	0.0%	0.0%	0.0%
7th St NE	Washington St NE	6	0.0%	0.0%	0.0%
Washington St NE	Jefferson St NE	9	0.0%	0.0%	0.0%
Howard St NE	Monroe St NE	0	-	-	-
Monroe St NE	Quincy St NE	7	0.0%	0.0%	0.0%
Jackson St NE	Central Ave NE	7	14.3%	0.0%	0.0%
Central Ave NE	Polk St NE	13	0.0%	0.0%	0.0%
Totals		118	0.8%	0.0%	0.0%



ON-STREET PARKING + ROW WIDTHS

LOWRY CORRIDOR STUDY

Hennepin County

Stantec

Project # 193802636 / 05.02.14

N

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L R CORRIDOR Y W

Lowry Avenue NE Corridor Study
Preliminary Parking Study Results:
Weekday Evening

Lowry Avenue NE Segment		Total Stalls Available (North Side)	Stalls Occupied (North Side) 6pm-7pm	Stalls Occupied (North Side) 7pm-8pm	Stalls Occupied (North Side) 8pm-9pm
From	To				
Jefferson St NE	Madison St NE	7	0.0%	0.0%	0.0%
Madison St NE	Howard St NE	6	0.0%	0.0%	0.0%
Quincy St NE	Jackson St NE	13	0.0%	7.7%	15.4%
Polk St NE	Taylor St NE	9	77.8%	77.8%	66.7%
Buchanan St NE	Lincoln St NE	8	0.0%	0.0%	12.5%
Lincoln St NE	Johnson St NE	3	0.0%	66.7%	66.7%
Johnson St NE	Hayes St NE	19	0.0%	0.0%	0.0%
Hayes St NE	Garfield St NE	10	10.0%	10.0%	10.0%
Cleveland St NE	Benjamin St NE	9	0.0%	0.0%	0.0%
Benjamin St NE	McKinley St NE	9	11.1%	11.1%	11.1%
McKinley St NE	Stinson Blvd	9	0.0%	0.0%	11.1%
Totals		102	8.8%	11.8%	13.7%

Lowry Avenue NE Segment		Total Stalls Available (South Side)	Stalls Occupied (South Side) 6pm-7pm	Stalls Occupied (South Side) 7pm-8pm	Stalls Occupied (South Side) 8pm-9pm
From	To				
Jefferson St NE	Madison St NE	4	0.0%	0.0%	0.0%
Madison St NE	Howard St NE	4	0.0%	0.0%	0.0%
Quincy St NE	Jackson St NE	8	0.0%	0.0%	0.0%
Polk St NE	Taylor St NE	12	16.7%	16.7%	8.3%
Buchanan St NE	Lincoln St NE	0	-	-	-
Lincoln St NE	Johnson St NE	0	-	-	-
Johnson St NE	Hayes St NE	20	0.0%	0.0%	0.0%
Hayes St NE	Garfield St NE	8	12.5%	0.0%	0.0%
Cleveland St NE	Benjamin St NE	8	0.0%	0.0%	0.0%
Benjamin St NE	McKinley St NE	9	0.0%	0.0%	0.0%
McKinley St NE	Stinson Blvd	8	25.0%	0.0%	0.0%
Totals		81	6.2%	2.5%	1.2%

Lowry Avenue NE Corridor Study
Preliminary Parking Study Results:
Sunday Morning

Lowry Avenue NE Segment		Total Stalls Available (North Side)	Stalls Occupied (North Side) 9:30-10:30am	Stalls Occupied (North Side) 10:30-11:30am	Stalls Occupied (North Side) 11:30-12:30pm
From	To				
Taylor St NE	Fillmore St NE	10	50.0%	40.0%	40.0%
Fillmore St NE	Pierce St NE	8	12.5%	37.5%	25.0%
Pierce St NE	Buchanan St NE	8	12.5%	0.0%	12.5%
Garfield St NE	Arthur St NE	9	0.0%	22.2%	22.2%
Arthur St NE	Cleveland St NE	8	0.0%	25.0%	25.0%
Totals		43	16.3%	25.6%	25.6%

Lowry Avenue NE Segment		Total Stalls Available (South Side)	Stalls Occupied (South Side) 9:30-10:30am	Stalls Occupied (South Side) 10:30-11:30am	Stalls Occupied (South Side) 11:30-12:30pm
From	To				
Taylor St NE	Fillmore St NE	12	75.0%	41.7%	41.7%
Fillmore St NE	Pierce St NE	10	20.0%	20.0%	10.0%
Pierce St NE	Buchanan St NE	4	0.0%	25.0%	25.0%
Garfield St NE	Arthur St NE	7	14.3%	14.3%	0.0%
Arthur St NE	Cleveland St NE	9	0.0%	11.1%	22.2%
Totals		42	28.6%	23.8%	21.4%

Lowry Avenue NE Corridor Study
Preliminary Parking Study Results:
Friday Afternoon

Lowry Avenue NE Segment		Total Stalls Available (North Side)	Stalls Occupied (North Side) 11am-12pm	Stalls Occupied (North Side) 12pm-1pm	Stalls Occupied (North Side) 1pm-2pm
From	To				
Quincy St NE	Jackson St NE	13	0.0%	0.0%	0.0%
Jackson St NE	Central Ave NE	13	30.8%	76.9%	46.2%
Central Ave NE	Polk St NE	9	0.0%	22.2%	0.0%
Polk St NE	Taylor St NE	9	66.7%	66.7%	55.6%
Totals		44	22.7%	40.9%	25.0%

Lowry Avenue NE Segment		Total Stalls Available (South Side)	Stalls Occupied (South Side) 11am-12pm	Stalls Occupied (South Side) 12pm-1pm	Stalls Occupied (South Side) 1pm-2pm
From	To				
Quincy St NE	Jackson St NE	8	0.0%	0.0%	0.0%
Jackson St NE	Central Ave NE	7	0.0%	71.4%	57.1%
Central Ave NE	Polk St NE	13	0.0%	23.1%	30.8%
Polk St NE	Taylor St NE	12	16.7%	16.7%	25.0%
Totals		40	5.0%	25.0%	27.5%

Stantec

Memo

Lowry Avenue – Existing Truck Turning Movements at Key Intersections

Existing Truck Turning Movements:

Attached, are pdfs of the existing truck turning movements at the following key intersections along Lowry Avenue:

- Marshall Avenue
- University Avenue
- Central Avenue

As discussed at the PMT meeting in March 2014, the WB-50 design vehicle as a baseline for each intersection (based on the City of Minneapolis current practice along their MSA routes). The WB-62 and WB-67 design vehicles were then used for specific turning movements (eastbound to northbound left turn and southbound to westbound right turn) at the University Avenue intersection since the NHS truck route designation follows University to the north of Lowry Avenue and Lowry Avenue west of University Avenue.

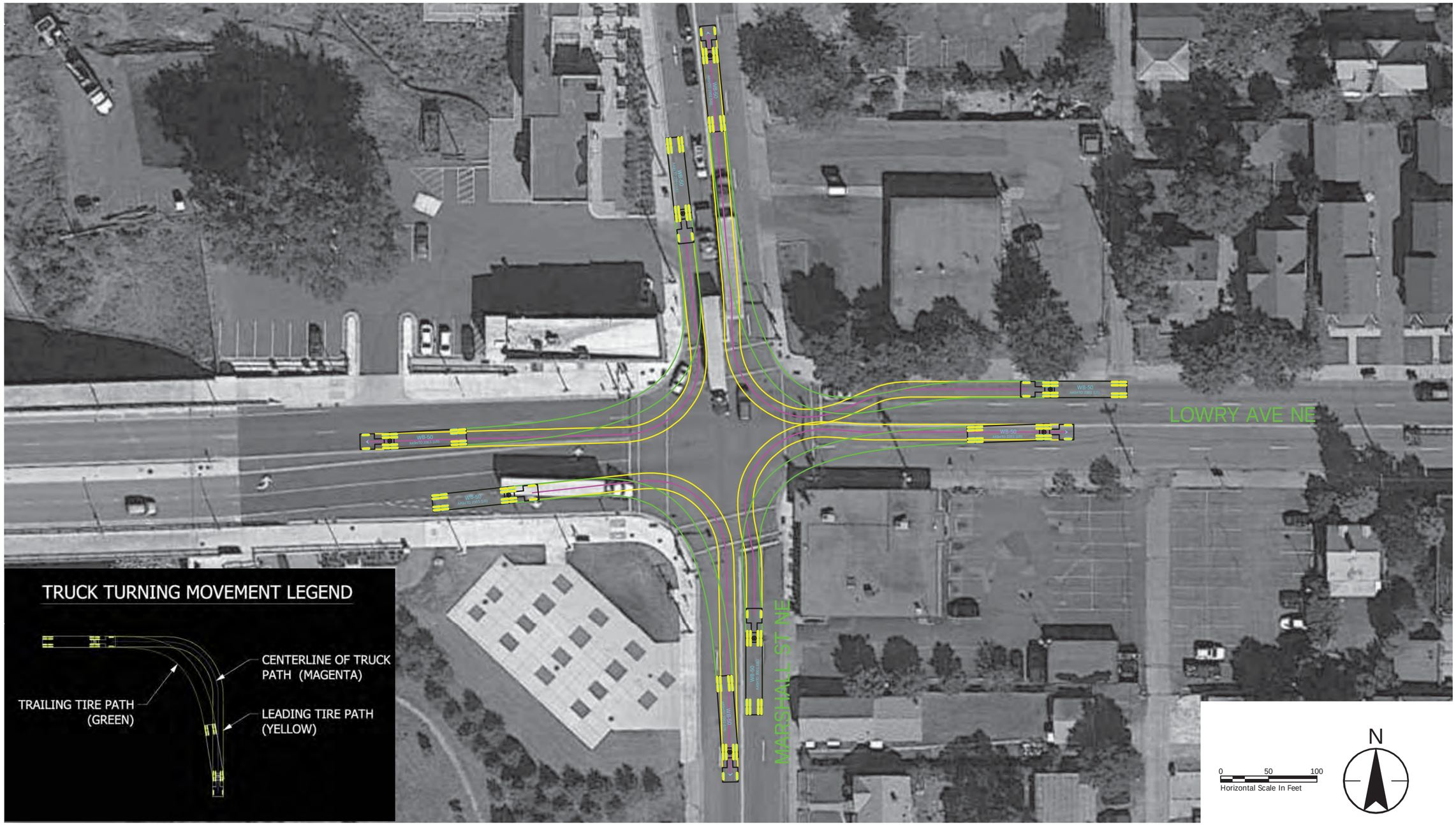
A review of the attached truck turning movement figures revealed the following:

1) Lowry Ave/Marshall St Intersection: Trucks can easily maneuver the NW and SW corners of the intersection, due to the revised curb radii and roadway geometrics along Lowry Avenue west of the intersection as a result of the Lowry Avenue Bridge project (see Figure 1). As shown in Figures 1 through 3, trucks turning between Marshall and Lowry Avenue east of the intersection can make their movements with minimal encroachment into oncoming lanes, but will not likely be able to stay in their respective lane when turning (unless they turn from the inside lane – measured from the roadway centerline – to inside lane).

2) Lowry Ave/University Ave Intersection: Right-turning WB-50s have a difficult time maneuvering the existing intersections without either encroaching into oncoming traffic, or having the back-ends of their trailers hop the curbs/sidewalks in the corners of the intersection (See Figure 4). Left-turning WB-50s currently will have to either turn from the inside lane to the outside/curb lane, or from the outside/curb lane to the outside/curb lane in order to minimize off-tracking of their trailer into opposing traffic lanes (see Figures 5 and 6).

   As shown in Figures 7 and 8, the WB-62s and WB-67s have difficulties turning to/from the north and west approaches of the intersection without significant encroachment into oncoming traffic and/or the curb/sidewalk in the northwest corner of the intersection.

3) Lowry Ave/Central Ave Intersection: As shown in Figures 9 and 10, trucks have minimal difficulty maneuvering the Lowry Ave/Central Ave. This is likely due to the wider roadway 5-lane section on the Central Avenue approaches to the intersections.



TRUCK TURNING MOVEMENTS - LOWRY AVENUE AT MARSHALL AVENUE (WB-50)

GOOGLE EARTH IMAGE

HENNEPIN COUNTY

LOWRY AVENUE NE CORRIDOR STUDY

FIGURE 1

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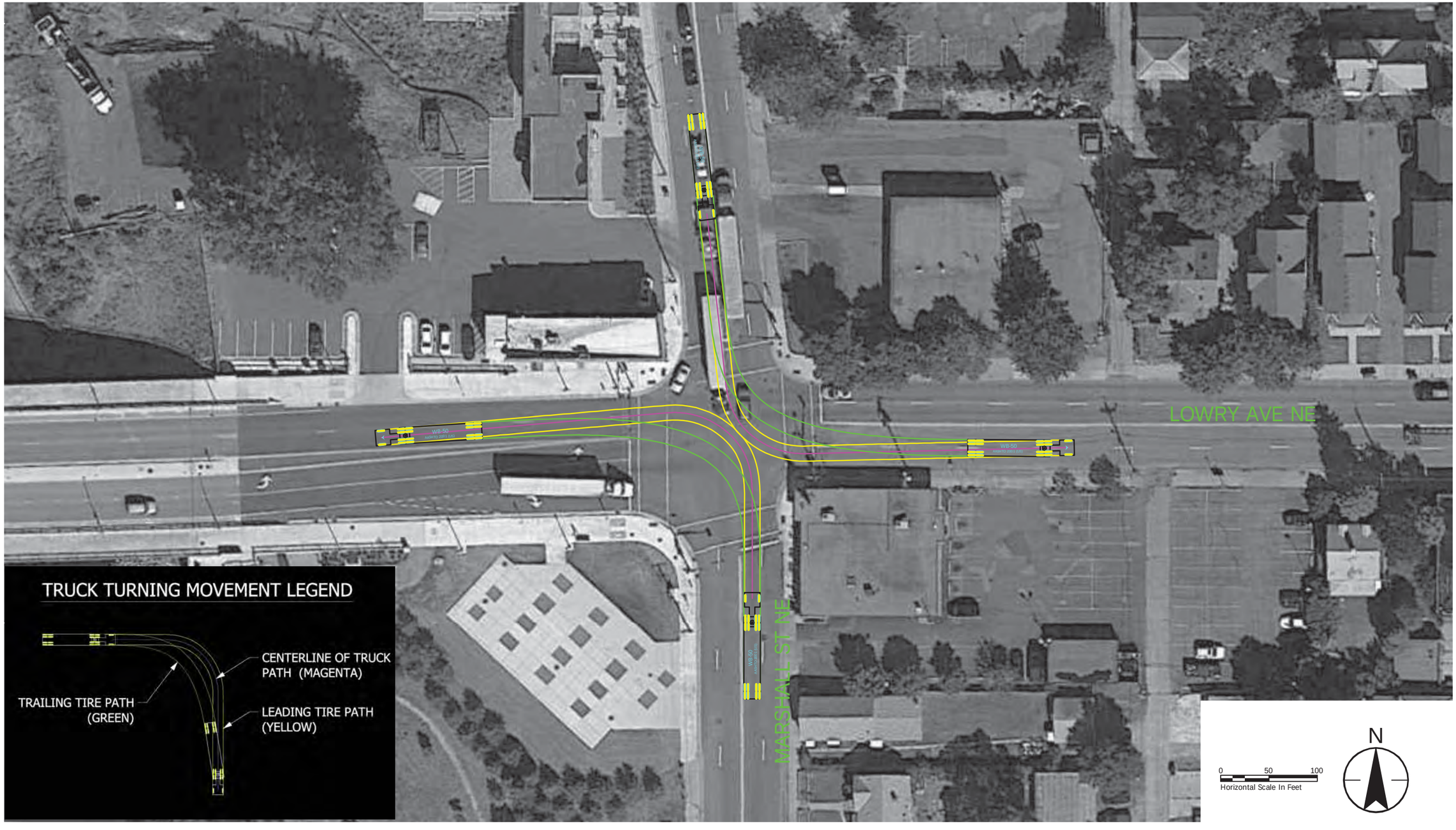

TRUCK TURNING MOVEMENTS - LOWRY AVENUE AT MARSHALL AVENUE (WB-50)

GOOGLE EARTH IMAGE

HENNEPIN COUNTY

LOWRY AVENUE NE CORRIDOR STUDY

FIGURE 2

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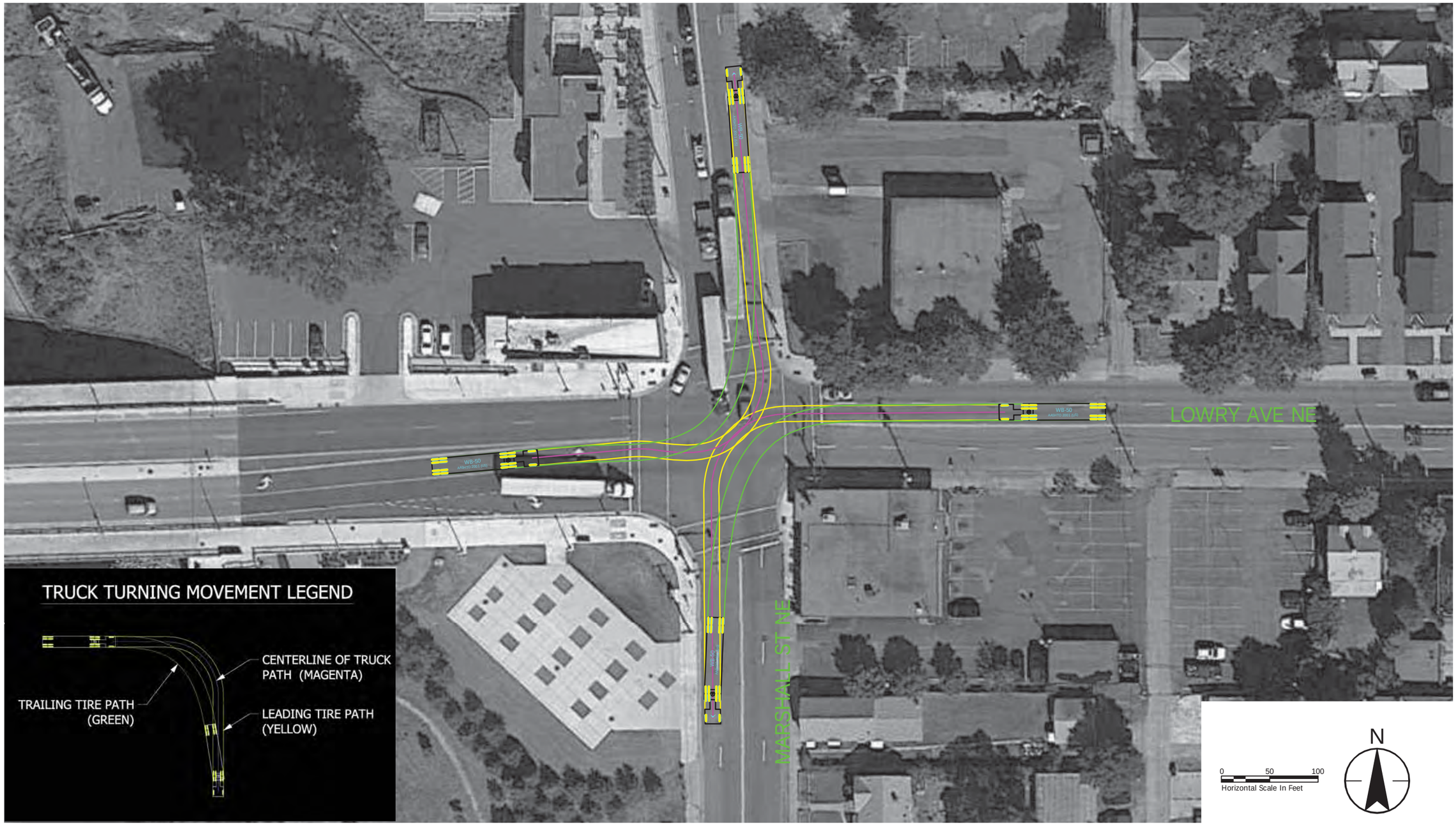

TRUCK TURNING MOVEMENTS - LOWRY AVENUE AT MARSHALL AVENUE (WB-50)

GOOGLE EARTH IMAGE

HENNEPIN COUNTY

LOWRY AVENUE NE CORRIDOR STUDY

FIGURE 3

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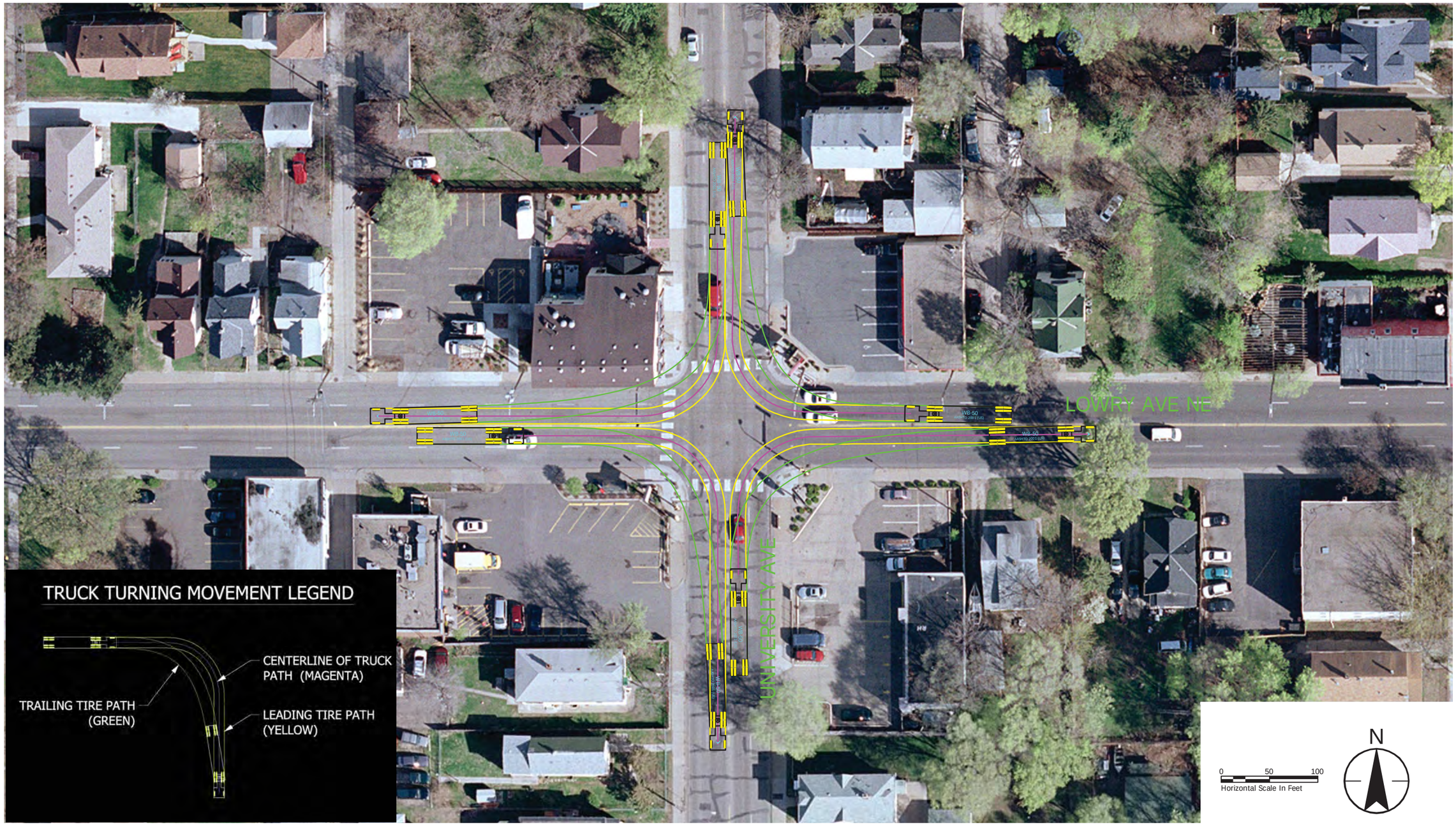

TRUCK TURNING MOVEMENTS - LOWRY AVENUE AT UNIVERSITY AVENUE (WB-50)

HENNEPIN COUNTY

LOWRY AVENUE NE CORRIDOR STUDY

FIGURE 4

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TRUCK TURNING MOVEMENTS - LOWRY AVENUE AT UNIVERSITY AVENUE (WB-50)

HENNEPIN COUNTY

LOWRY AVENUE NE CORRIDOR STUDY

FIGURE 5

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TRUCK TURNING MOVEMENTS - LOWRY AVENUE AT UNIVERSITY AVENUE (WB-50)

HENNEPIN COUNTY

LOWRY AVENUE NE CORRIDOR STUDY

FIGURE 6

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TRUCK TURNING MOVEMENTS - LOWRY AVENUE AT UNIVERSITY AVENUE (WB-62)

HENNEPIN COUNTY

LOWRY AVENUE NE CORRIDOR STUDY

FIGURE 7

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TRUCK TURNING MOVEMENTS - LOWRY AVENUE AT UNIVERSITY AVENUE (WB-67)

HENNEPIN COUNTY

LOWRY AVENUE NE CORRIDOR STUDY

FIGURE 8

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TRUCK TURNING MOVEMENTS - LOWRY AVENUE AT CENTRAL AVENUE (WB-50)

HENNEPIN COUNTY

LOWRY AVENUE NE CORRIDOR STUDY

FIGURE 9

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TRUCK TURNING MOVEMENTS - LOWRY AVENUE AT CENTRAL AVENUE (WB-50)

HENNEPIN COUNTY

LOWRY AVENUE NE CORRIDOR STUDY

FIGURE 10

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TRUCK TURNING MOVEMENTS - LOWRY AVENUE AT CENTRAL AVENUE (WB-50)

HENNEPIN COUNTY

LOWRY AVENUE NE CORRIDOR STUDY

FIGURE 11

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