TRAFFIC IMPACT ANALYSIS

MOWAT

JURISDICTION: CITY OF MARYSVILLE, WA
LOCATION: 51ST AVENUE NE, NORTH OF 160TH STREET NE

Prepared for:
M-51 Industrial, LLC
PO Box 3884
Bellevue, Washington 98009

Prepared by:
Kimley»Horn

May 2023
090223024

Kimley»Horn

TRAFFIC IMPACT ANALYSIS

FOR

MOWAT

Prepared for:
M-51 Industrial, LLC
PO Box 3884
Bellevue, Washington 98009

Prepared by:
Kimley-Horn and Associates, Inc.
2828 Colby Avenue
Suite 200
Everett, Washington 98201
(425) 708-8275

Kimley»Horn

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

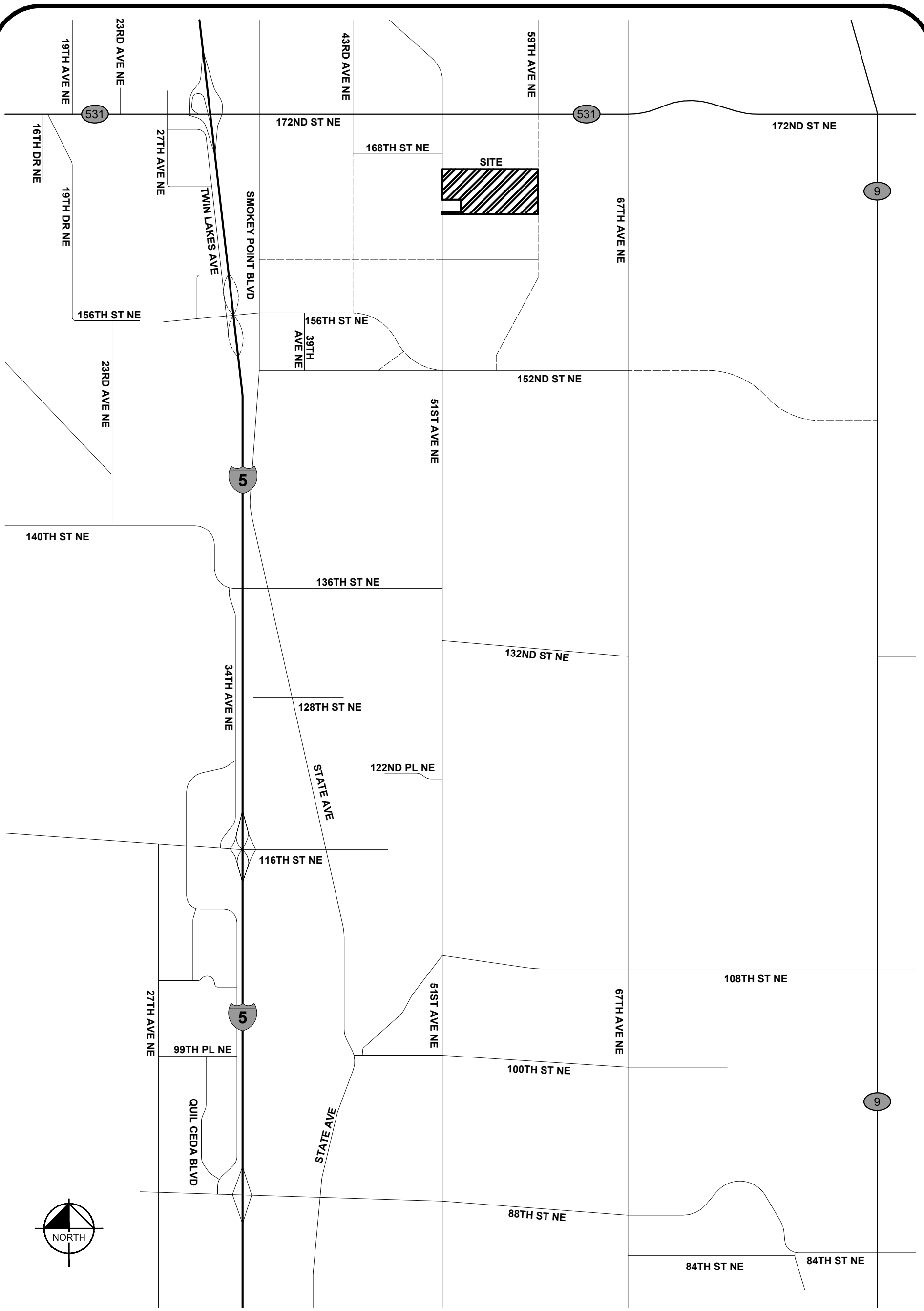
1. DEVELOPMENT IDENTIFICATION

Kimley-Horn and Associates, Inc. has been retained to provide a traffic impact analysis for the Mowat development. This report is intended to provide the City of Marysville with the necessary traffic generation, trip distribution, intersection analysis, and mitigation fee determination to facilitate their review of the development. The Mowat development is located on the east side of 51st Avenue NE, north of 160th Street NE. A site vicinity map is included in **Figure 1**. The development is proposed to consist of four warehouse buildings, each consisting of 258,824 square feet (SF) of space. The site is currently undeveloped. The development will primarily access the City of Marysville street network via two proposed access drives connected to 51st Avenue NE. A site plan has been provided in **Appendix A**.

Brad Lincoln, responsible for this report and traffic analysis, is a licensed professional engineer (Civil) in the State of Washington and member of the Washington State section of the Institute of Transportation Engineers (ITE).

2. METHODOLOGY

Congestion at intersections and along arterials is generally measured in terms of level of service (LOS). In accordance with *Highway Capacity Manual (HCM), 6th Edition* by the Transportation Research Board, road facilities and intersections are rated between LOS A and LOS F, with LOS A being free flow and LOS F being forced flow or over-capacity conditions. The LOS at signalized, roundabout, and all-way stop-controlled intersections is based on the average delay of all approaches. The LOS for two-way stop-controlled intersections is based on average delays for the critical stopped approach. Geometric characteristics and conflicting traffic movements are taken into consideration when determining LOS values. A summary of the intersection LOS criteria is included in **Table 1**.



MOWAT

CITY OF MARYSVILLE

LEGEND

DEVELOPMENT SITE

FIGURE 1

VICINITY MAP

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Table 1: Level of Service Criteria

Level of Service[1]	Expected Delay	Intersection Control Delay (Seconds per Vehicle)	
		Unsignalized Intersections	Signalized Intersections
A	Little/No Delay	≤10	≤10
B	Short Delays	>10 and ≤15	>10 and ≤20
C	Average Delays	>15 and ≤25	>20 and ≤35
D	Long Delays	>25 and ≤35	>35 and ≤55
E	Very Long Delays	>35 and ≤50	>55 and ≤80
F	Extreme Delays[2]	>50	>80

The LOS at two-way stop-controlled intersections is based on the average delay for the stopped approach with the highest delay. The LOS at all-way stop-controlled intersections and signalized intersections is based on the average delay for all vehicles. The LOS analysis for unsignalized and signalized intersections has been performed utilizing the *Synchro 11* software. City of Marysville identifies acceptable level of service for intersections as LOS D for all intersections.

The trip generation calculations for the development are based on average trip generation rates published in the ITE *Trip Generation Manual, 11th Edition (2021)*. The opening year has been estimated for the year 2026, which accounts for a 3-year construction window. The horizon year has therefore been evaluated for the year 2032.

[1] **Source:** *Highway Capacity Manual, 6th Edition.*
LOS A: Free-flow traffic conditions, with minimal delay to stopped vehicles (no vehicle is delayed longer than one cycle at signalized intersection).
LOS B: Generally stable traffic flow conditions.
LOS C: Occasional back-ups may develop, but delay to vehicles is short term and still tolerable.
LOS D: During short periods of the peak hour, delays to approaching vehicles may be substantial but are tolerable during times of less demand (i.e. vehicles delayed one cycle or less at signal).
LOS E: Intersections operate at or near capacity, with long queues developing on all approaches and long delays.
LOS F: Jammed conditions on all approaches with excessively long delays and vehicles unable to move at times.
[2] When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in the intersection.

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3. TRIP GENERATION

The Mowat development is proposed to include four warehouse buildings, each consisting of 258,824 square feet (SF) of space. The site is currently undeveloped. The trip generation calculations have been performed using data published by the ITE *Trip Generation Manual, 11st Edition* (*2021*). The average trip generation rates for ITE Land Use Codes (LUC) 150, Warehousing, have been used for the trip generation calculations. The trip generation calculations for the Mowat development are summarized in **Table 2**.

Table 2: Trip Generation Summary

1,035,296 SF Warehousing	Average Daily Trips			AM Peak-Hour Trips			PM Peak-Hour Trips		
	In	Out	Total	In	Out	Total	In	Out	Total
Generation Rate	1.71 trips per 1,000 SF			0.17 trips per 1,000 SF			0.18 trips per 1,000 SF		
Splits	50%	50%	100%	77%	23%	100%	28%	72%	100%
Trips	885.20	885.16	1,770.36	135.52	40.48	176.00	52.20	134.16	186.36

The Mowat development is anticipated to generate approximately 1,770 new average daily trips (ADT) with 176 new AM peak-hour trips and approximately 186 new PM peak-hour trips. The trip generation calculations are provided in **Appendix B**.

4. TRIP DISTRIBUTION

The trip distribution for the Mowat development is based on distributions established by the City of Marysville. The trip distributions have been established for the opening year and horizon year conditions.

The trip distribution for the 2026 opening year is:

- 57% along 172nd Street NE
  - 31% to and from the west
  - 26% to and from the east
- 15% to and from the west along 152nd Street NE
- 20% to and from the south along 51st Avenue NE
- 8% to and from the east along 152nd Street NE

The trip distribution for the 2032 horizon year is:

- 24% along 172nd Street NE
  - 12% to and from the west
  - 12% to and from the east
- 8% to and from the north along 51st Avenue NE
- 43% along 152nd Street NE
  - 30% to and from the west along 152nd Street NE
  - 13% to and from the east along 152nd Street NE
- 25% to and from the south along 51st Avenue NE

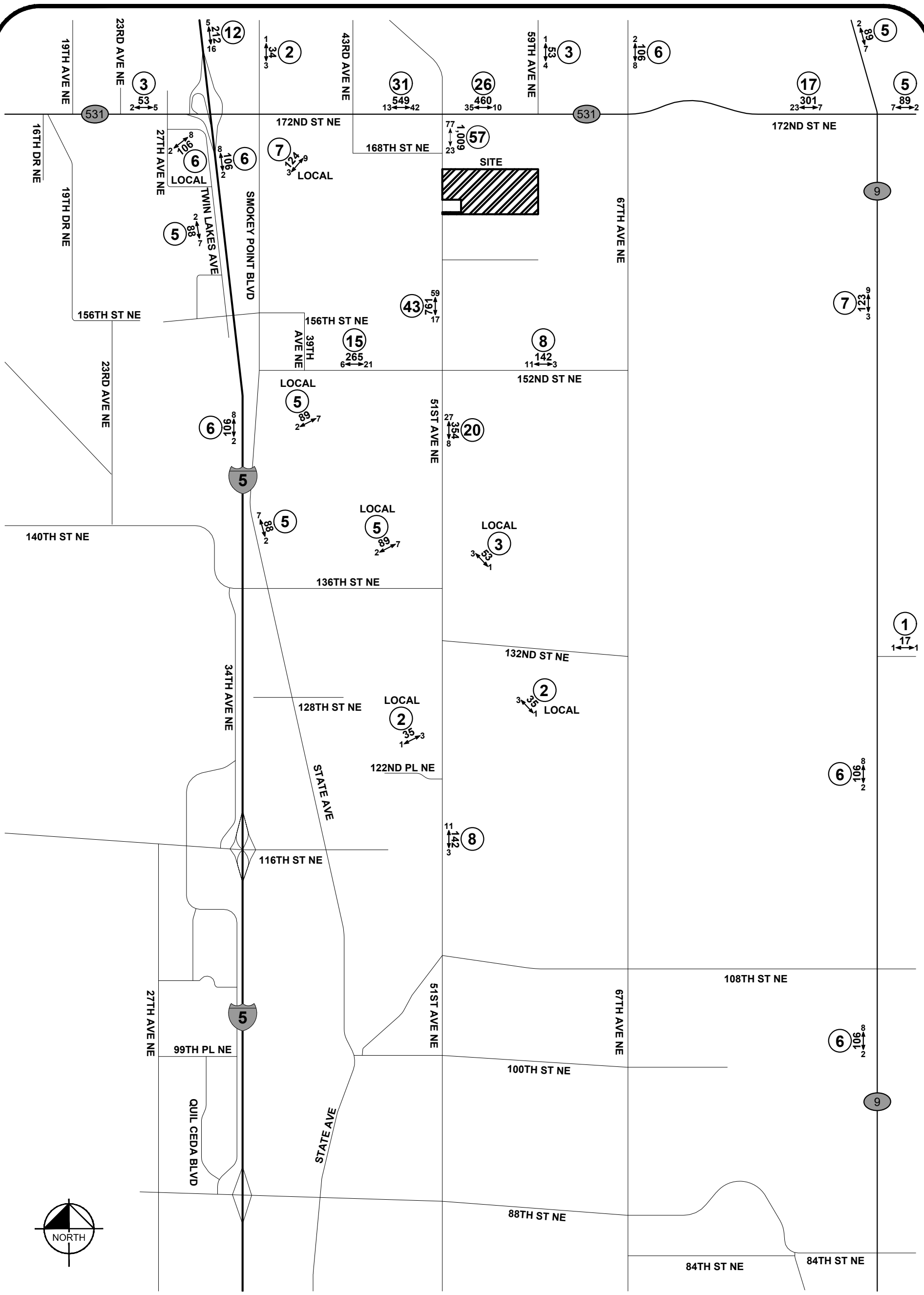
Detailed trip distributions for the opening year for the AM peak-hour and PM peak-hour are shown in **Figure 2**, and **Figure 3**, respectively. Detailed trip distributions for the horizon year for the AM peak-hour and PM peak-hour are shown in **Figure 4** and **Figure 5**, respectively.

5. INTERSECTION LEVEL OF SERVICE ANALYSIS

The following intersections have been analyzed based on an impact of 25 trips generated by the development:

1. Smokey Point Boulevard at 156th Street NE
2. 51st Avenue NE at 152nd Street NE
3. 51st Avenue NE at 160th Street NE

The intersections have been analyzed for the weekday PM peak-hour.



MOWAT

CITY OF MARYSVILLE

LEGEND

AWDT
AM ↔ PEAK — NEW DAILY TRAFFIC / NEW PEAK-HOUR TRIPS

(XX) — TRIP DISTRIBUTION %

FIGURE 2

2026 OPENING YEAR
TRIP DISTRIBUTION
AM PEAK–HOUR

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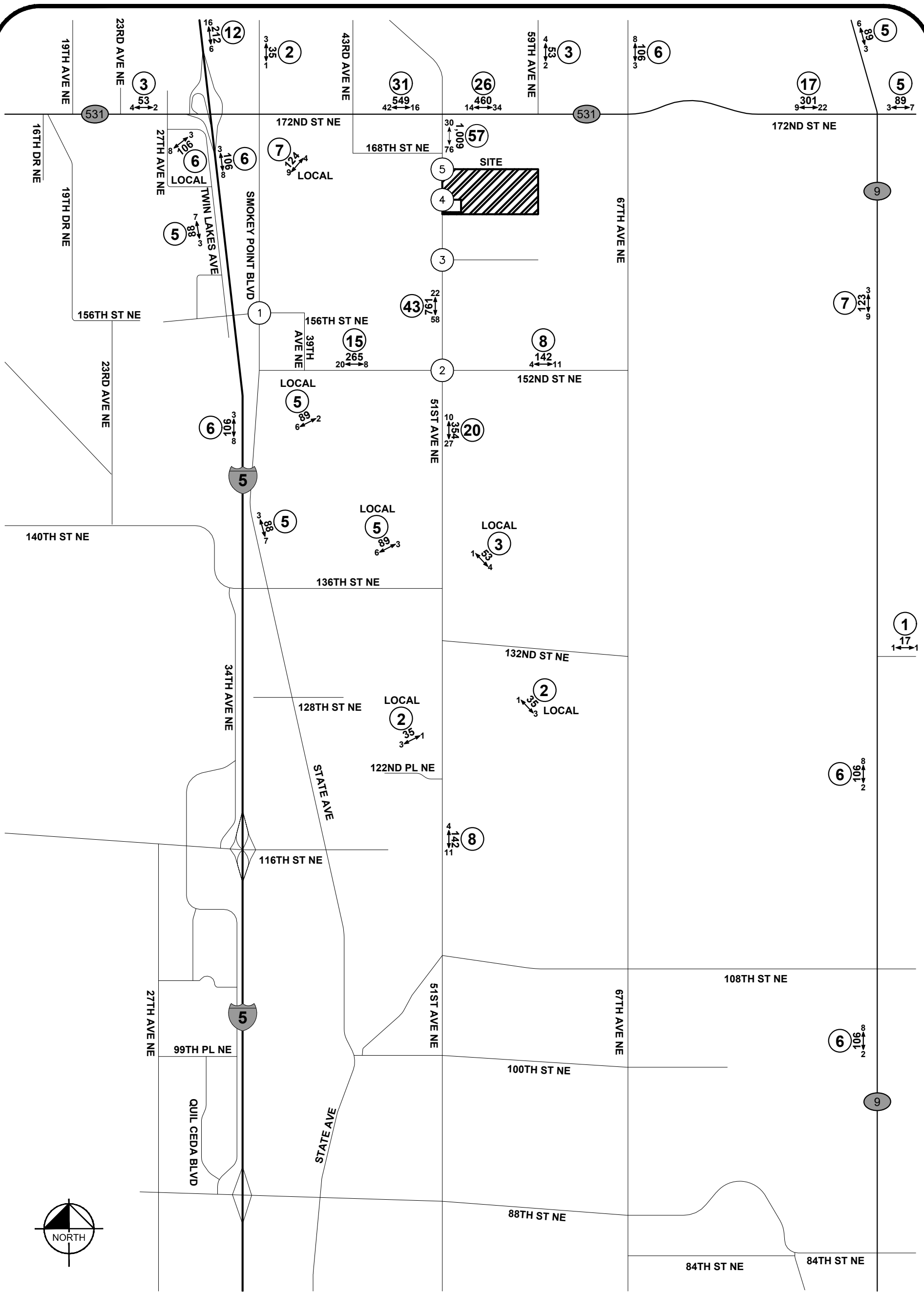

MOWAT

CITY OF MARYSVILLE

LEGEND

AWDT / PM ↔ PEAK	NEW DAILY TRAFFIC NEW PEAK-HOUR TRIPS
XX	TRIP DISTRIBUTION %
X	STUDY INTERSECTION

FIGURE 3

2026 OPENING YEAR
TRIP DISTRIBUTION
PM PEAK–HOUR

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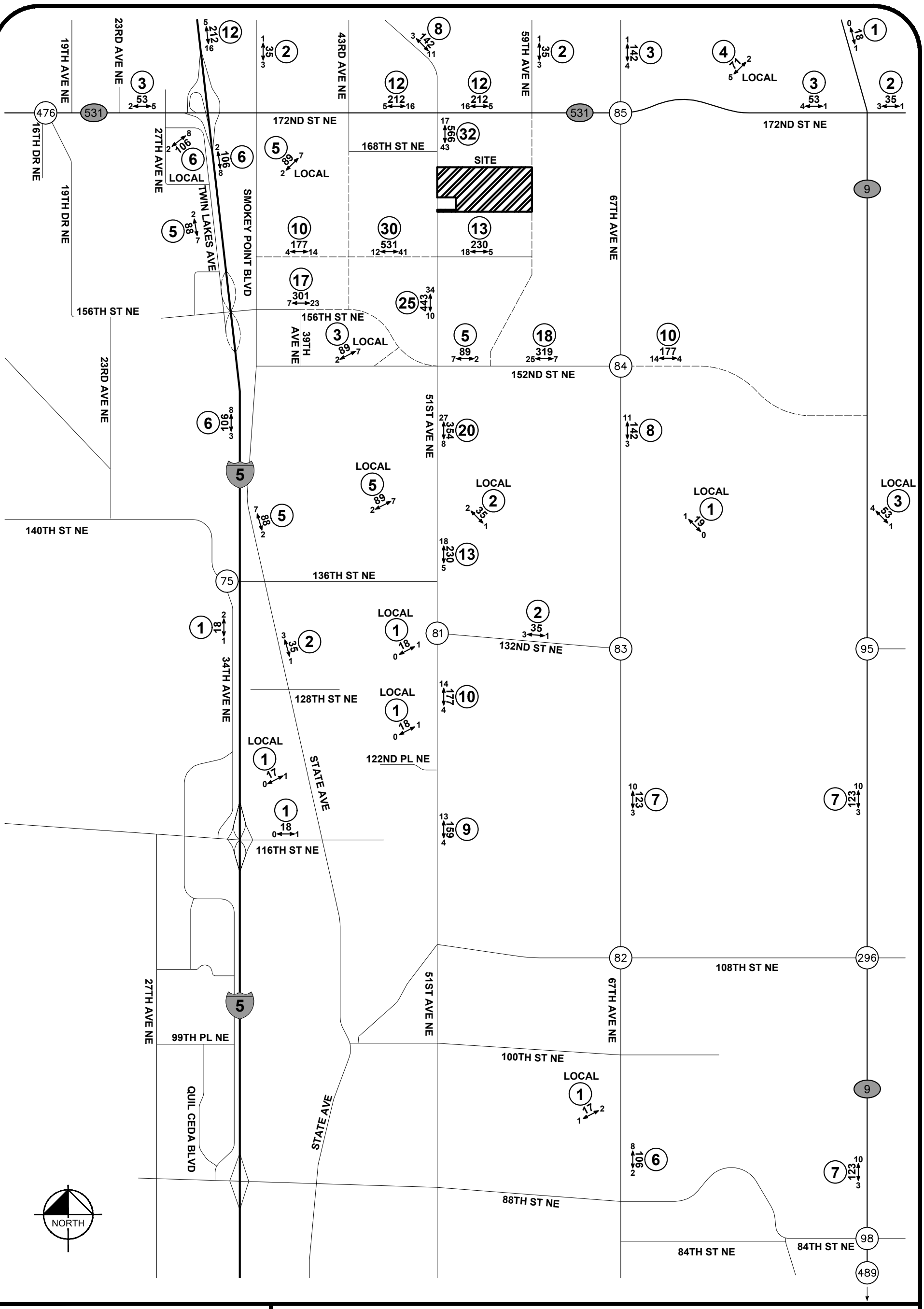

MOWAT

CITY OF MARYSVILLE

LEGEND

AWDT
AM ↔ PEAK — NEW DAILY TRAFFIC / NEW PEAK-HOUR TRIPS

XX — TRIP DISTRIBUTION %

X — SNO CO. KEY INTERSECTION

FIGURE 4

2032 HORIZON YEAR TRIP DISTRIBUTION AM PEAK–HOUR

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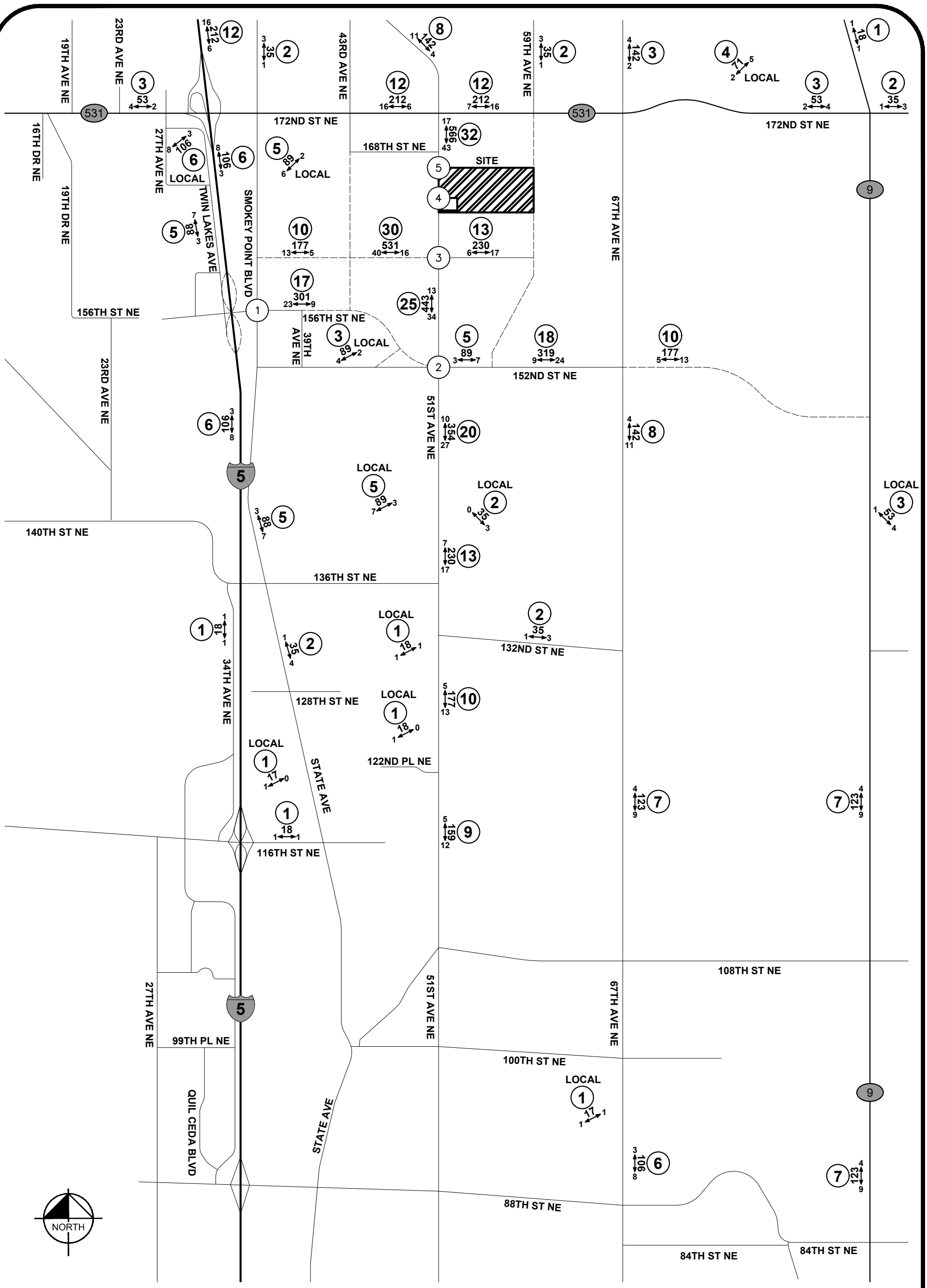

MOWAT

CITY OF MARYSVILLE

LEGEND

AWDT
PM ↔ PEAK — NEW DAILY TRAFFIC / NEW PEAK-HOUR TRIPS

(XX) — TRIP DISTRIBUTION %

(X) — STUDY INTERSECTION

FIGURE 5

2032 HORIZON YEAR TRIP DISTRIBUTION PM PEAK–HOUR

Kimley»Horn

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5.1 Turning Movement Calculations

5.1.1 Snohomish County Intersections

The interlocal agreement between the City of Marysville and Snohomish County requires detailed development trip turning movement data at Snohomish County key intersections impacted with three or more directional trips on an approach or departure. The Mowat development will impact 11 key intersections during the AM peak-hour and PM Peak-hour. The AM peak-hour key intersection impacts are shown in tabular form in **Table 3** and the PM peak-hour key intersection impacts are shown in tabular form in **Table 4**.

Table 3: Key Intersection Volumes – AM Peak Hour

Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#75: 140th St NE/34th Ave NE at 136th St NE	0	0	0	1	0	0	0	0	2	0	0	0
#81: 51st Ave at 132nd St NE	0	0	3	0	0	0	0	15	0	1	4	0
#82: 67th Ave NE at 108th St NE	0	0	0	0	0	0	0	10	0	0	3	0
#83: 67th Ave NE at 132nd St NE	1	0	0	0	0	0	0	10	0	0	3	0
#84: 67th Ave NE at 152nd St NE	0	14	0	0	4	3	11	0	0	0	0	0
#85: 67th Ave NE at 172nd St NE	1	4	0	0	9	0	0	0	0	0	0	4
#95: SR-9 at 132nd St NE	0	0	0	0	0	0	0	10	0	0	3	0
#98: SR-9 at 84th St NE	0	0	0	0	0	0	0	10	0	0	3	0
#296: SR-9 at 108th St NE	0	0	0	0	0	0	0	10	0	0	3	0
#476: 19th Dr NE at SR-531	0	5	0	0	2	0	0	0	0	0	0	0
#489: SR-9 at 60th St NE	0	0	0	0	0	0	0	10	0	0	3	0

Table 4: Key Intersection Volumes – PM Peak Hour

Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#75: 140th St NE/34th Ave NE at 136th St NE	0	0	0	1	0	0	0	0	1	0	0	0
#81: 51st Ave at 132nd St NE	0	0	1	0	0	0	0	5	0	3	13	0
#82: 67th Ave NE at 108th St NE	0	0	0	0	0	0	0	4	0	0	9	0
#83: 67th Ave NE at 132nd St NE	1	0	0	0	0	0	0	4	0	0	11	0
#84: 67th Ave NE at 152nd St NE	0	5	0	0	13	11	4	0	0	0	0	0
#85: 67th Ave NE at 172nd St NE	4	9	0	0	4	0	0	0	0	0	0	2
#95: SR-9 at 132nd St NE	0	0	0	0	0	0	0	4	0	0	9	0
#98: SR-9 at 84th St NE	0	0	0	0	0	0	0	4	0	0	9	0
#296: SR-9 at 108th St NE	0	0	0	0	0	0	0	4	0	0	9	0
#476: 19th Dr NE at SR-531	0	2	0	0	4	0	0	0	0	0	0	0
#489: SR-9 at 60th St NE	0	0	0	0	0	0	0	4	0	0	9	0

The key intersection impacts are also shown in graphical form in **Figure 6** for the AM and PM peak-hours.

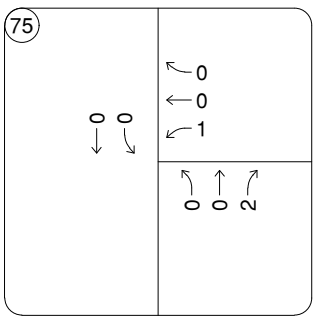
5.1.2 Intersection Volumes

The existing PM peak-hour turning movements at the study intersections were collected by the independent count firm Traffic Data Gathering (TDG) on March 7, 2023. The 2023 existing turning movements at the study intersections are shown in **Figure 7**. The count data is included in **Appendix C**.

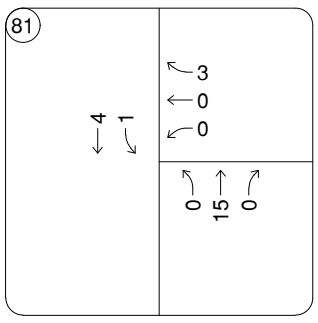
The future analysis has been performed for an opening year of 2026, which represents when the development is expected to be constructed and occupied. The 2026 opening year baseline turning movements have been calculated by applying a 3% annually compounding growth rate applied to the 2023 existing turning movements. Additionally, the trips generated by the Cascade Commerce Center have been included as pipeline trips. The 2026 opening year baseline turning movements at the study intersections are shown in **Figure 8**. The 2026 opening year future with development turning movements at the study intersections have been calculated by adding the trips generated by the development to the 2026 opening year baseline turning movements. The 2026 opening year future with development turning movements are shown in **Figure 9**. The pipeline data is included with the existing count data in **Appendix C**.

The study intersections have also been analyzed for the 2032 horizon year conditions (baseline and with development). The horizon year analysis accounts for the typical 6-year concurrency period after the expected opening year. The 2032 horizon year baseline turning movements have been calculated using the same 3% annually compounding growth rate and trips from the Cascade Commerce Center development. The 2032 horizon year baseline turning movements at the study intersections are shown in **Figure 10**. The 2032 horizon year future with development turning movements at the study intersections have been calculated by adding the trips generated by the development to the 2032 horizon year baseline turning movements. The 2032 horizon year future with development turning movements are shown in **Figure 11**. The turning movement calculations are included in **Appendix D**.

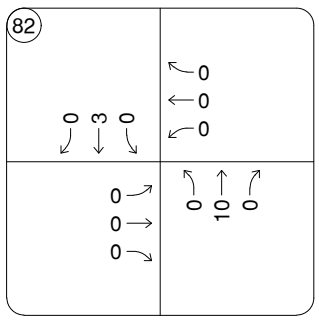
140TH STREET NE/34TH AVENUE NE @
136TH STREET NE



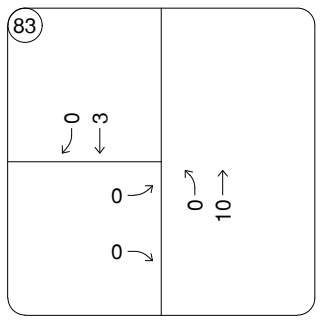
51ST AVENUE NE @
132ND STREET NE



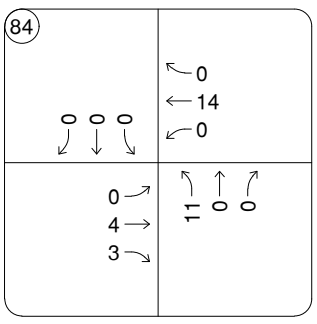
67TH AVENUE NE @
108TH STREET NE



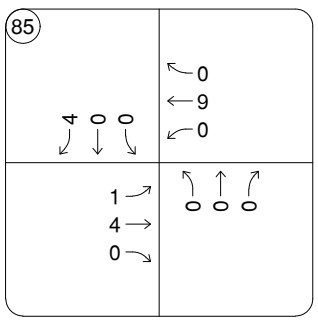
67TH AVENUE NE @
132ND STREET NE



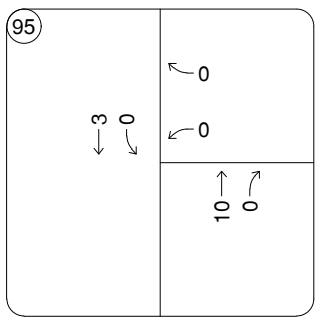
67TH AVENUE NE @
152ND STREET NE



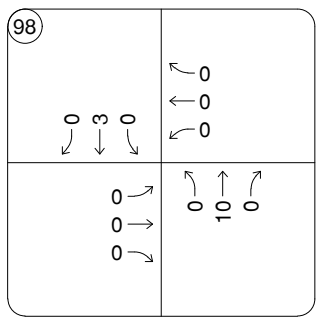
67TH AVENUE NE @
172ND STREET NE



SR-9 @
132ND STREET NE



SR-9 @
84TH STREET NE



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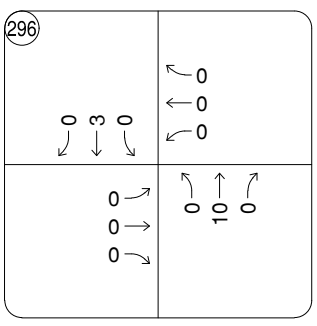
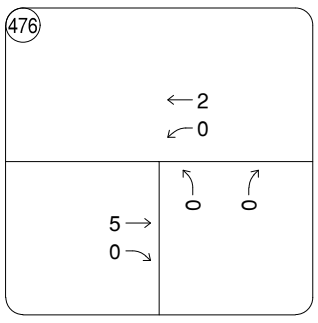
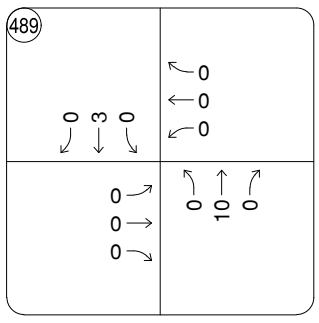


19TH DRIVE NE @
SR-531



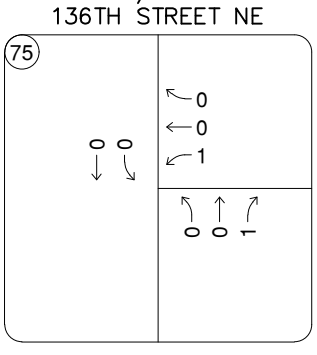
SR-9 @
60TH STREET NE



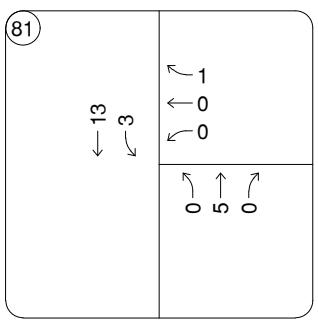
AM PEAK-HOUR

PM PEAK-HOUR

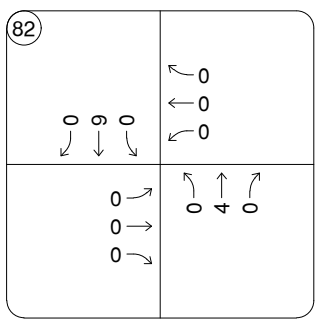
140TH STREET NE/34TH AVENUE NE @
136TH STREET NE



51ST AVENUE NE @
132ND STREET NE



67TH AVENUE NE @
108TH STREET NE



67TH AVENUE NE @
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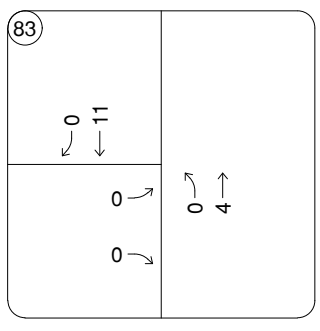
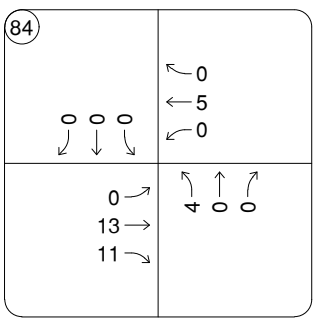


67TH AVENUE NE @
152ND STREET NE



67TH AVENUE NE @
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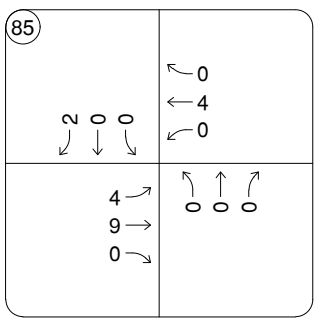
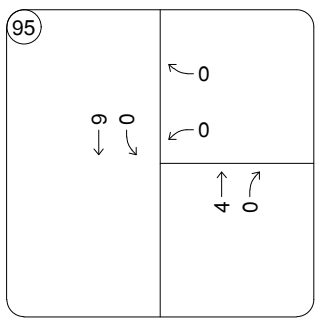


SR-9 @
132ND STREET NE



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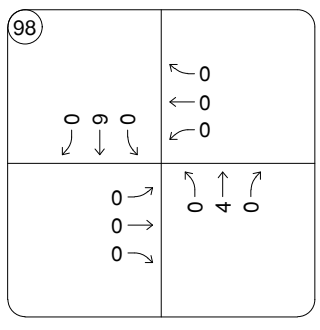
84TH STREET NE



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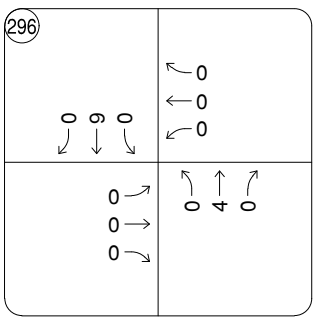
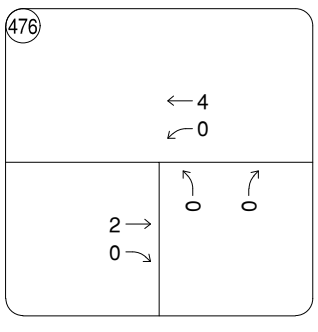
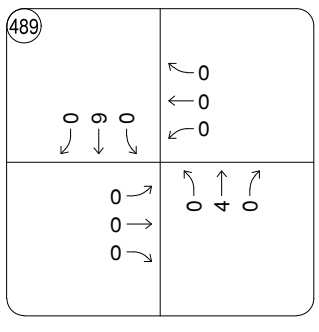


19TH DRIVE NE @
SR-531



SR-9 @
60TH STREET NE



MOWAT

CITY OF MARYSVILLE

LEGEND

XX → AM PEAK-HOUR TURNING MOVEMENT VOLUMES

FIGURE 6

KEY INTERSECTION
TRIP DISTRIBUTION
AM PEAK–HOUR

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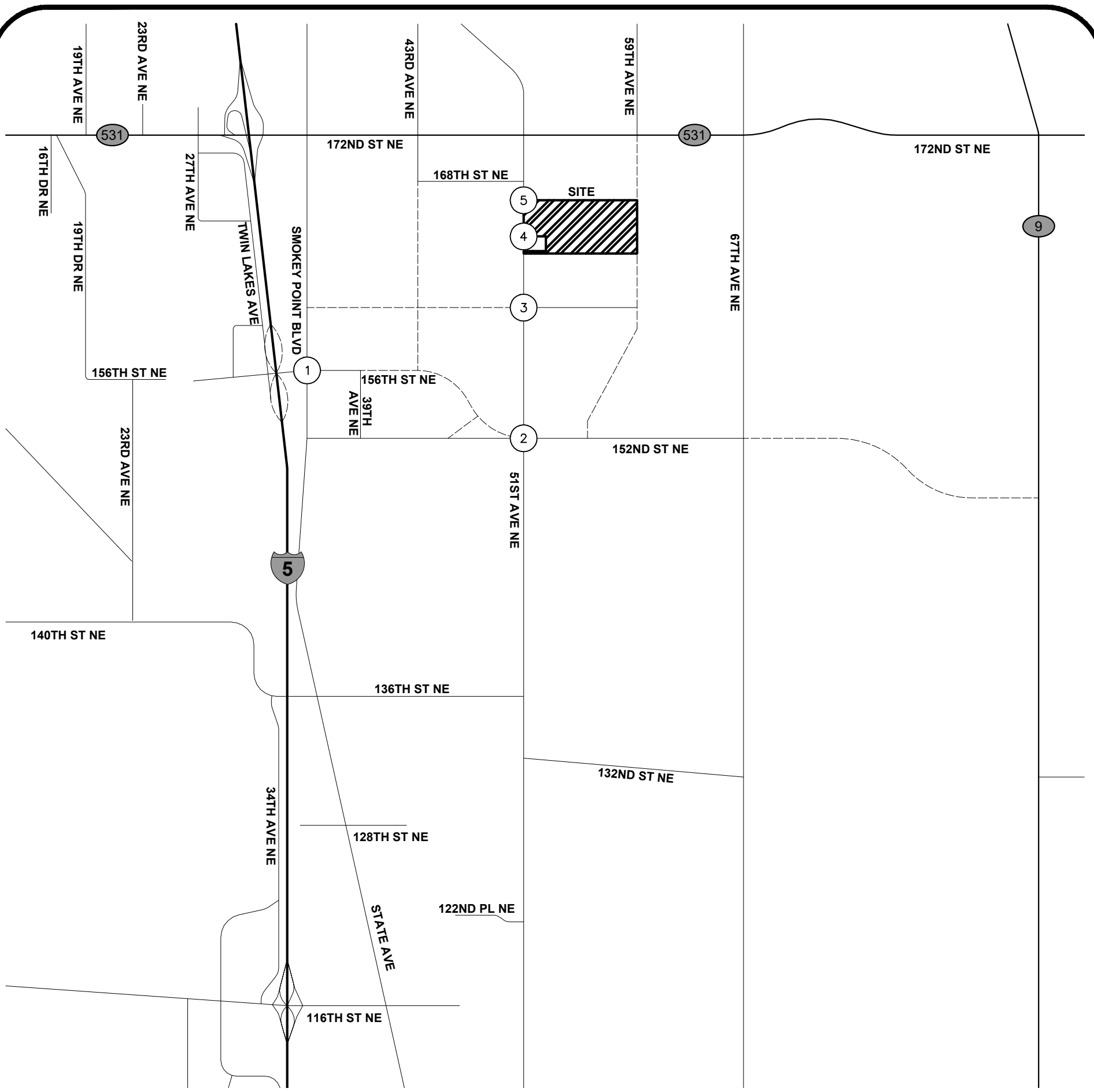
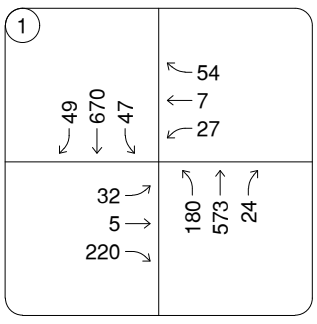


SMOKEY POINT BLVD @
156TH STREET NE



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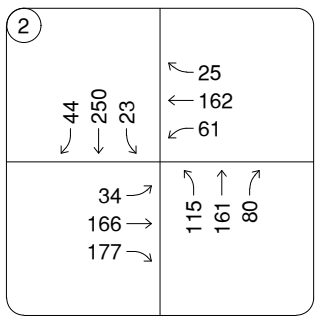
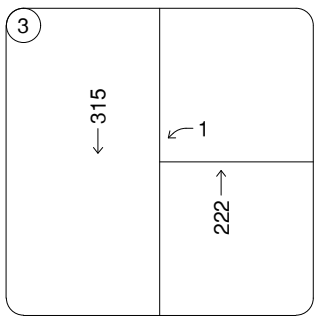
152ND STREET NE



51ST AVENUE NE @
160TH STREET NE



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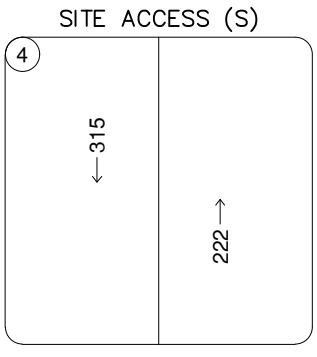

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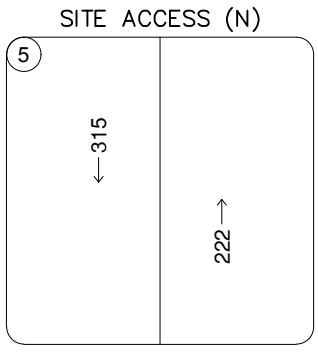


MOWAT

CITY OF MARYSVILLE

LEGEND

XX → PM PEAK-HOUR TURNING MOVEMENT VOLUMES

(X) STUDY INTERSECTION

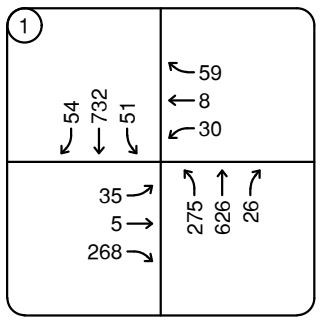
FIGURE 7

2023 EXISTING TURNING MOVEMENTS

Kimley»Horn

19TH AVE NE
23RD AVE NE
43RD AVE NE
59TH AVE NE
531
172ND ST NE
16TH DR NE
27TH AVE NE
168TH ST NE
SITE
19TH DR NE
TWIN LAKES AVE
SMOKEY POINT BLVD
67TH AVE NE
9
156TH ST NE
39TH AVE NE
152ND ST NE
23RD AVE NE
51ST AVE NE
5
140TH ST NE
136TH ST NE
132ND ST NE
34TH AVE NE
128TH ST NE
122ND PL NE
STATE AVE
116TH ST NE

SMOKEY POINT BLVD @
156TH STREET NE



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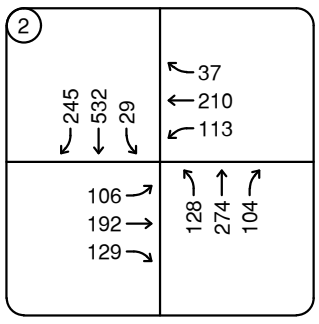
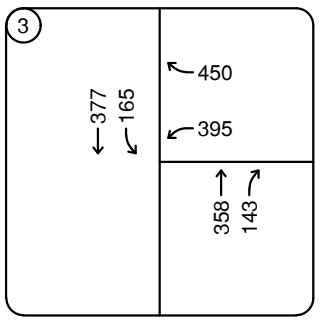
152ND STREET NE



51ST AVENUE NE @
160TH STREET NE



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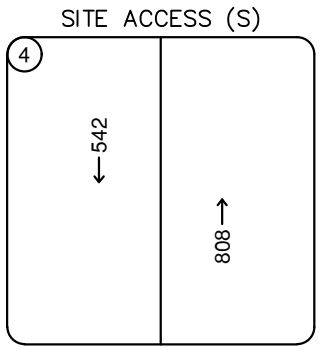

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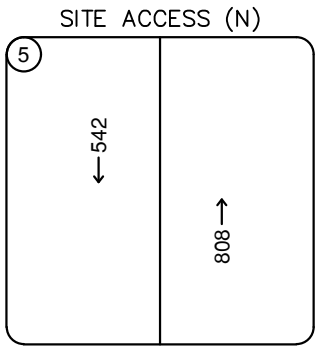
SITE ACCESS (N)



NORTH

MOWAT

CITY OF MARYSVILLE

LEGEND

XX → PM PEAK-HOUR TURNING MOVEMENT VOLUMES

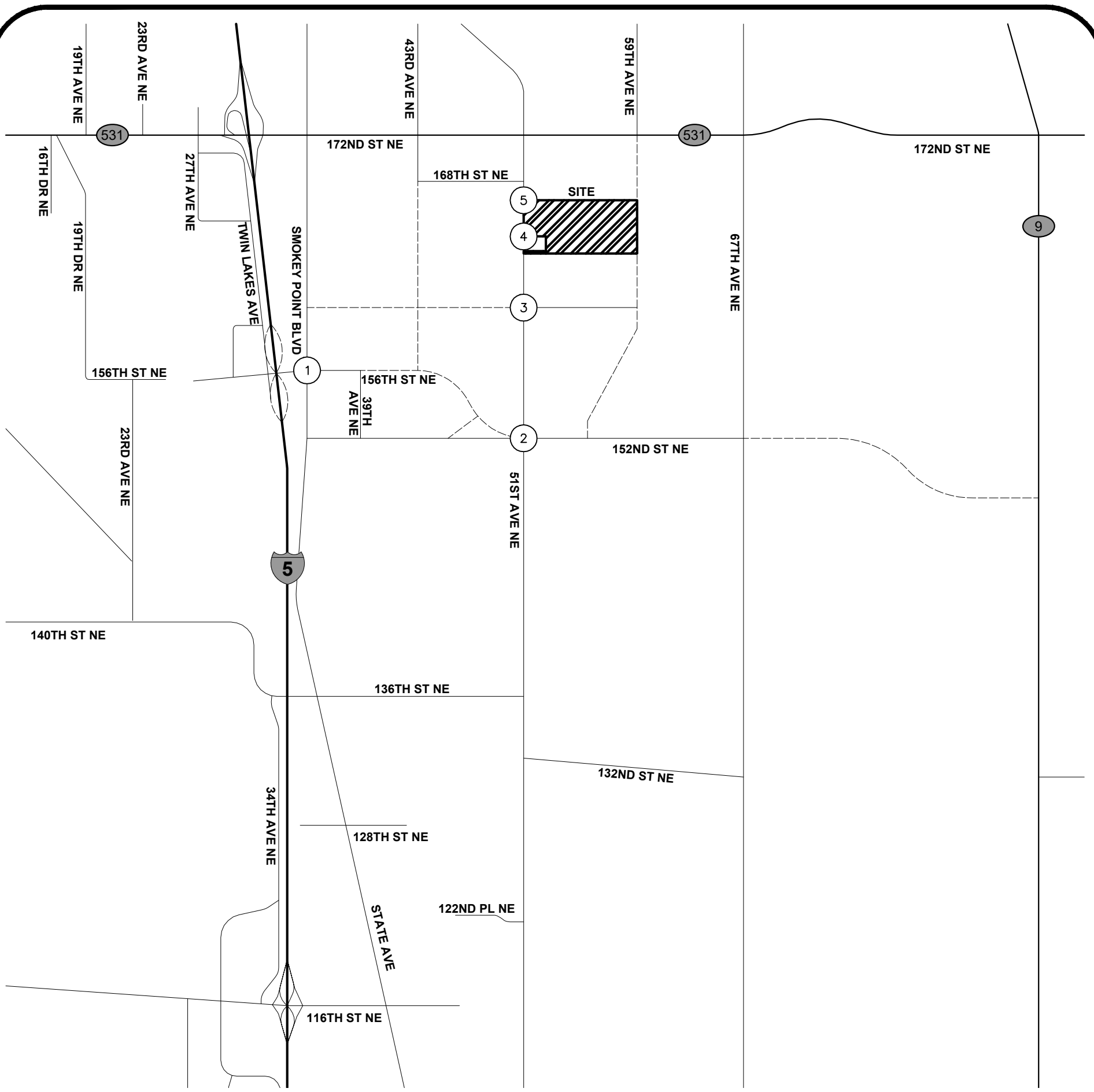
(X) STUDY INTERSECTION

FIGURE 8

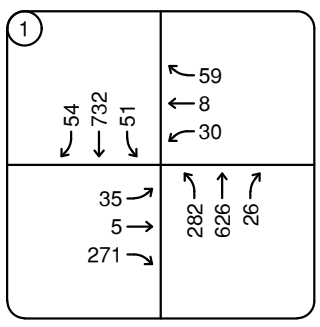
2026 OPENING–YEAR BASELINE TURNING MOVEMENTS

Kimley»Horn

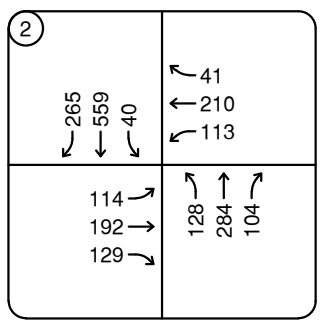
Date: April 28, 2023 - 1:04pm / User: Joey.Miller
Path: K:\SNO_TPTO\2023\25-024 Mowat\Figures\Mowat - Figures.dwg / Xref:



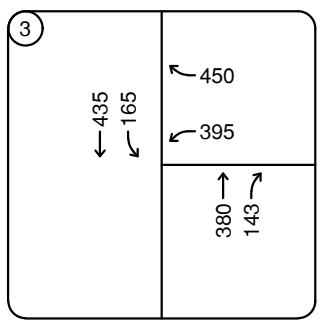
SMOKEY POINT BLVD @
156TH STREET NE



51ST AVENUE NE @
152ND STREET NE



51ST AVENUE NE @
160TH STREET NE



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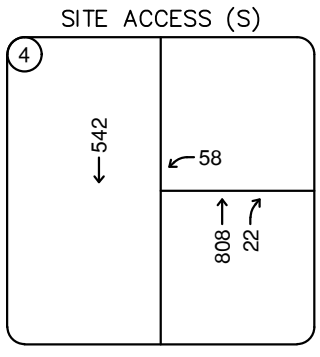
SITE ACCESS (S)



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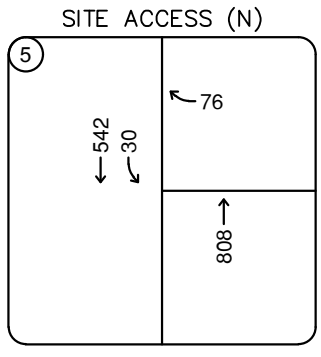
SITE ACCESS (N)



MOWAT

CITY OF MARYSVILLE

LEGEND

XX → PM PEAK-HOUR TURNING MOVEMENT VOLUMES

(X) STUDY INTERSECTION

FIGURE 9

2026 OPENING–YEAR
FUTURE WITH DEVELOPMENT
TURNING MOVEMENTS

Kimley»Horn

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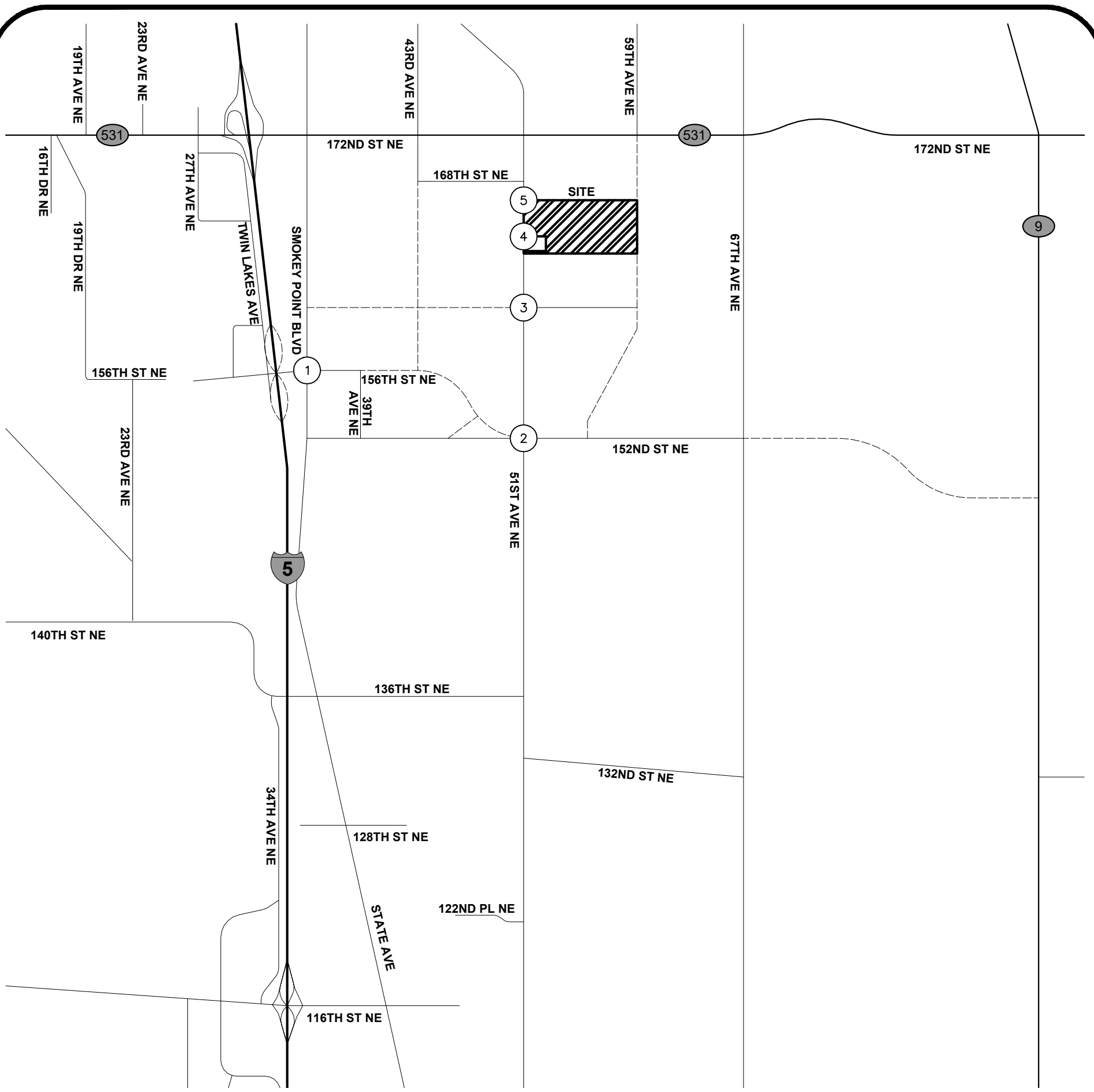
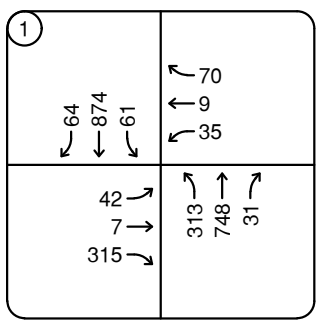


SMOKEY POINT BLVD @
156TH STREET NE



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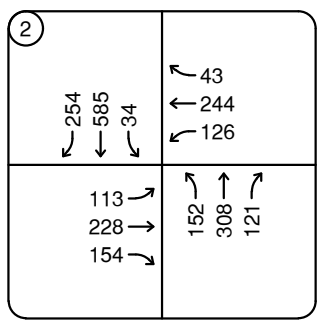
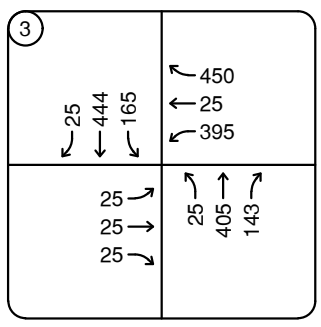
152ND STREET NE



51ST AVENUE NE @
160TH STREET NE



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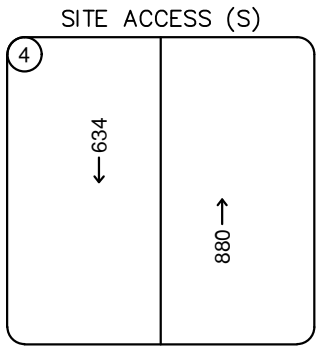

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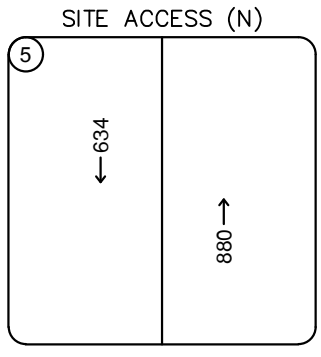
SITE ACCESS (N)



MOWAT

CITY OF MARYSVILLE

LEGEND

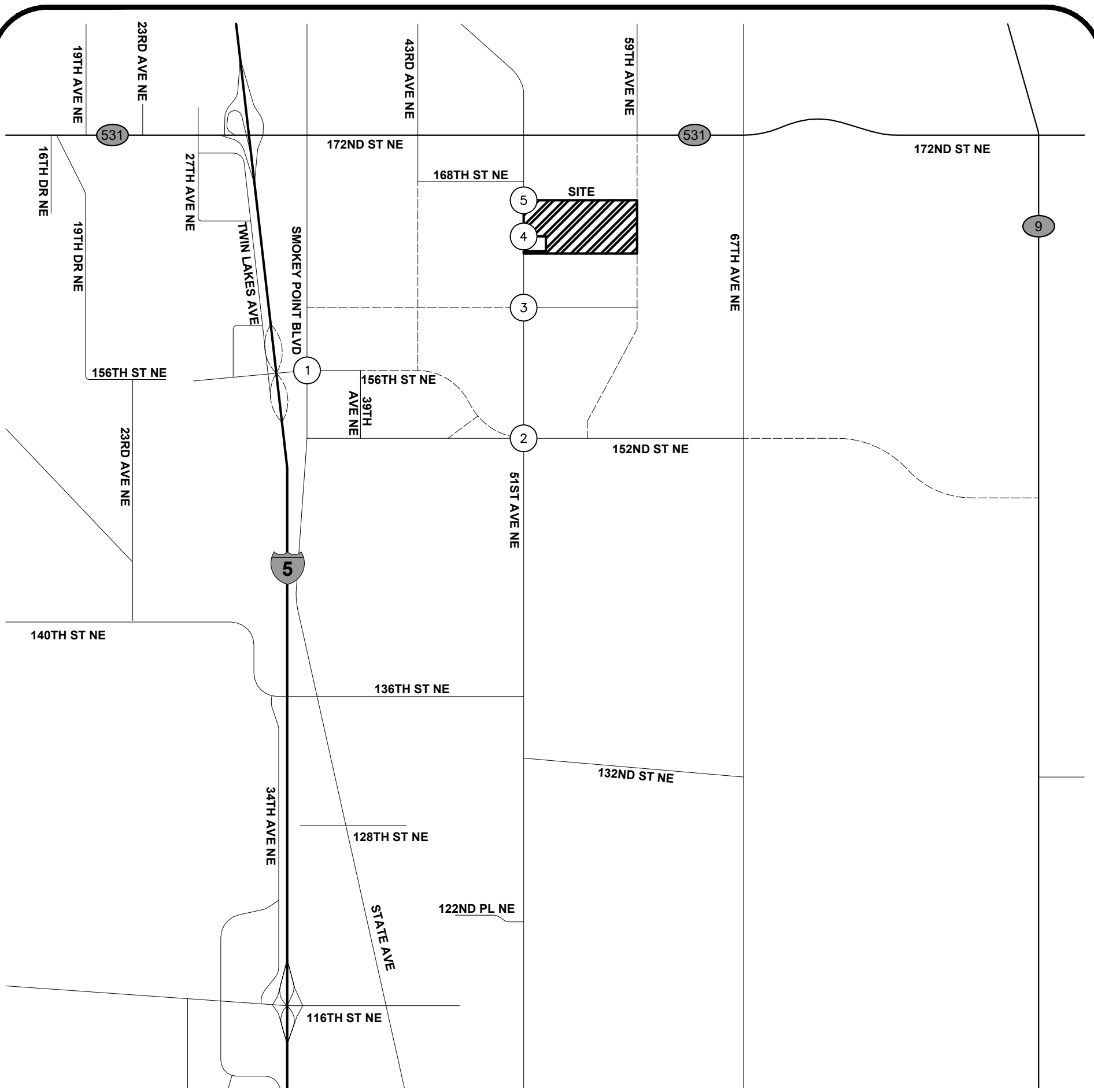
XX → PM PEAK-HOUR TURNING MOVEMENT VOLUMES

(X) STUDY INTERSECTION

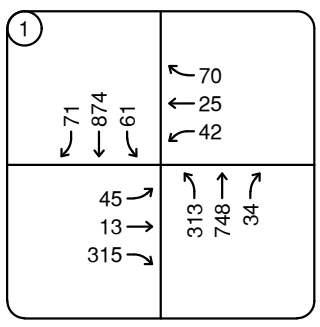
FIGURE 10

2032 HORIZON–YEAR BASELINE TURNING MOVEMENTS

Kimley»Horn



SMOKEY POINT BLVD @
156TH STREET NE



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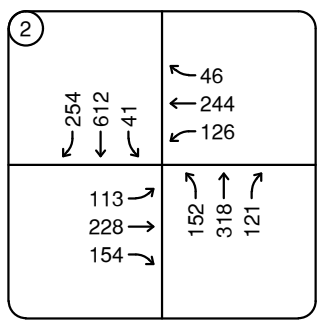
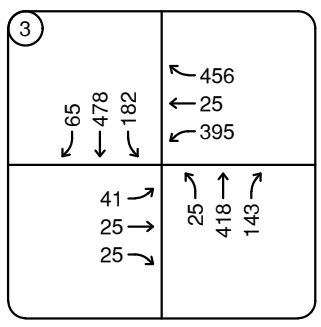


51ST AVENUE NE @
160TH STREET NE



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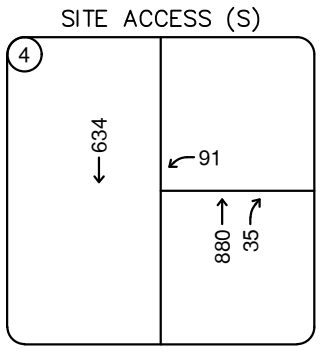

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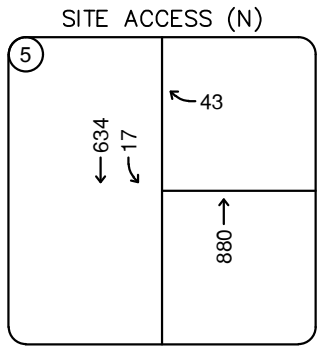
SITE ACCESS (N)



MOWAT

CITY OF MARYSVILLE

LEGEND

XX → PM PEAK-HOUR TURNING MOVEMENT VOLUMES

(X) STUDY INTERSECTION

FIGURE 11

2032 HORIZON–YEAR
FUTURE WITH DEVELOPMENT
TURNING MOVEMENTS

Kimley»Horn

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5.2 Level of Service Calculations

The 2023 existing level of service calculations have been performed utilizing the existing channelization, existing intersection control and peak-hour factors and heavy vehicle factors from the 2023 turning movement counts. The intersections of 152nd Street NE and 160th Street NE at 51st Avenue NE are both identified to be signalized. These intersections have been analyzed without and with the signal improvements. The level of service summary is included in **Table 5** for the PM peak-hour.

Table 5: Level of Service Summary – PM Peak Hour

Intersection	Approach	2023 Existing Conditions		2026 Baseline Opening-Year Conditions		2026 Future w Development Opening-Year Conditions		2032 Baseline Horizon-Year Conditions		2032 Future w Development Horizon-Year Conditions	
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1. Smokey Point Blvd at 156th St NE	Signalized	B	12.9 sec	B	17.2 sec	B	17.3 sec	B	19.4 sec	B	19.6 sec
2. 51st Ave NE at 152nd St NE	All-Way Stop Control	C	21.0 sec	**F**	**---**[3]	**F**	**---**[3]	-	-	-	-
- Left Turn Lane	Signalized	-	-	C	34.8 sec	D	40.6 sec	C	28.8 sec	C	29.9 sec
3. 51st Ave NE at 160th St NE	Two-Way Stop Control	B	12.6 sec	**F**	**---**[3]	**F**	**---**[3]	-	-	-	-
- Left Turn Lane	Signalized	-	-	C	23.1 sec	C	26.4 sec	C	26.2 sec	C	28.6 sec
4. 51st Ave NE at Site Access (S)	Two-Way Stop Control	-	-	-	-	C	22.1 sec	-	-	D	30.3 sec
5. 51st Ave NE at Site Access (N)	Two-Way Stop Control	-	-	-	-	C	18.6 sec	-	-	C	18.5 sec

The analysis shows that the study intersections currently operate at LOS C or better during the PM peak-hour. In the 2026 opening-year baseline and future with development conditions, all study intersections are anticipated to operate at LOS D or better with the development after converting intersections 51st Avenue NE at 152nd Street NE and 51st Avenue at 160th Street NE to signalized intersections with left turn lanes. The site access driveways are anticipated to operate at acceptable LOS D or better under the 2026 opening-year and 2032 horizon-year future with development conditions during the PM peak-hour with the addition of a storage lane provided for the south access drive. The intersection LOS calculations are provided in the **Appendix E**.

[3] Delay exceeds 300 seconds.

6. TRANSPORTATION IMPACT FEES

The City of Marysville has interlocal agreements with Snohomish County and WSDOT for transportation impact fees. These transportation impact fees are based on the area wide traffic mitigation fee or actual impacts to improvement projects.

6.1 City of Marysville

The City of Marysville traffic mitigation fees have been calculated using the commercial rates of $2,220 per PM peak-hour trip. The development is anticipated to generate 186.36 new PM peak-hour trips. Therefore, the City of Marysville traffic mitigation fees for the Mowat development are $413,719.20.

6.2 Snohomish County

The City of Marysville and Snohomish County have an interlocal agreement that provides for the payment of traffic mitigation for impacts to Snohomish County roadways by City of Marysville developments. Traffic mitigation fees are based on predetermined area impacts or impacts to actual improvement projects. The Mowat development is location in Transportation Service Area (TSA) A. The only Snohomish County improvement project in the area that is impacted by the development is 67th Avenue NE at 152nd Street NE. This improvement project is anticipated to be impacted by more than 3 directional PM peak-hour trips. The commercial development is located in sub-area CI-MA-1, resulting in a proportionate share of 20% of total daily trips. The development is anticipated to generate 1,770.36 ADTs resulting in a proportionate share of 354 ADTs. Snohomish County traffic mitigation fee schedule shows a rate of $157 per ADT, resulting in a total Snohomish County mitigation fee of $55,578.00.

6.3 Washington State Department of Transportation

WSDOT mitigation fees are based on impacts to the I-5 and 156th Street NE interchange, as identified in the Connecting Washington interactive map. This project is labeled as funded by the state of Washington. WSDOT transportation impact fees should therefore not be required for the Mowat development.

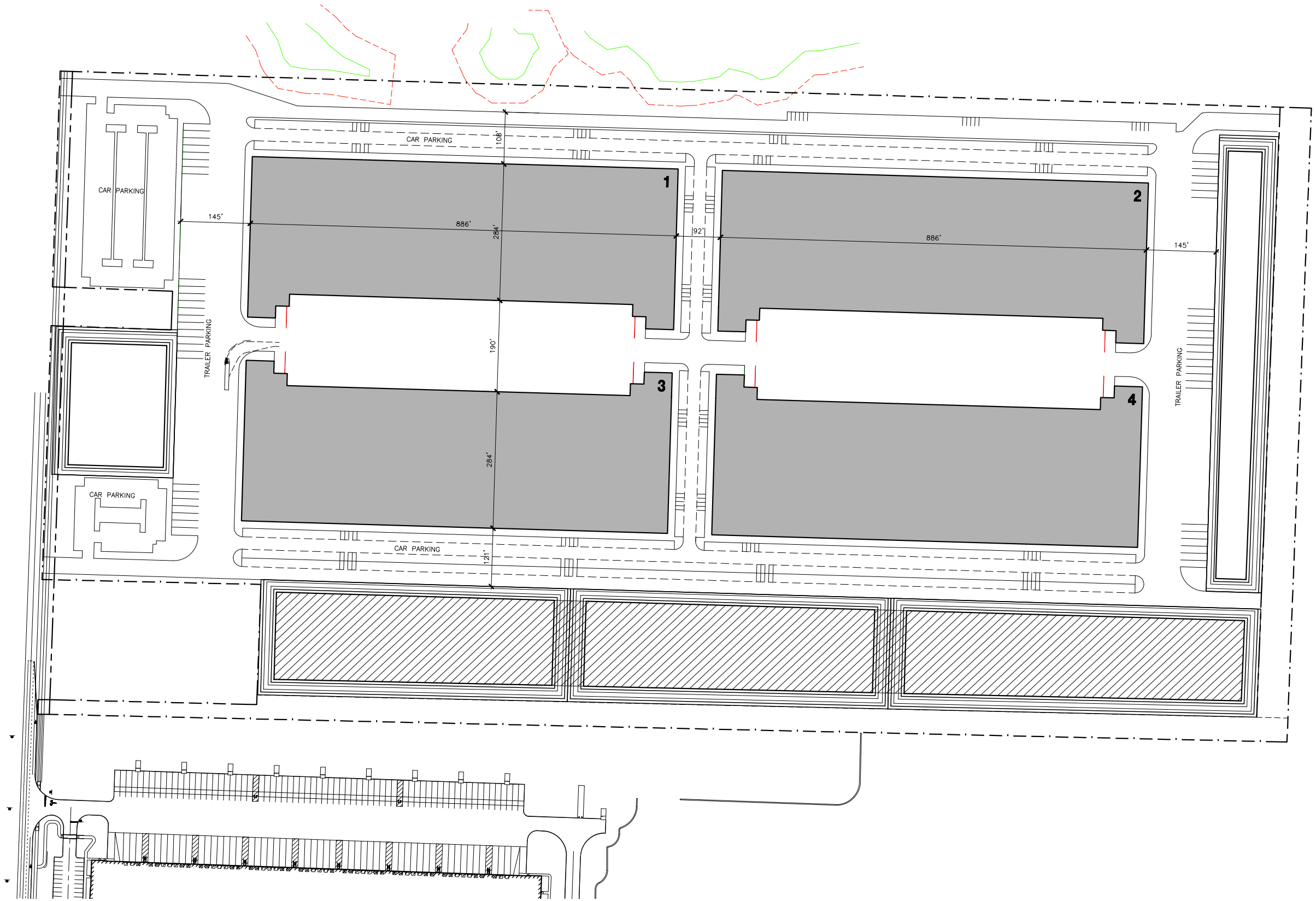
7. CONCLUSIONS

The Mowat development is proposed to consist of four warehouse buildings, each consisting of 258,824 SF of space. The site is currently undeveloped. The development is anticipated to generate 1,770 new ADTs with 176 new AM peak-hour trips and 186 new PM peak-hour trips. All study intersections currently operate at LOS D or better and will continue to operate at LOS D or better during the PM peak-hour during the 2027 baseline and 2027 future with development conditions with the proposed mitigation measures applied to the three intersections along 51st Avenue NE. The current Marysville transportation impact mitigation fees are $413,719.20 with Snohomish County transportation fees resulting in $55,578.00 for a total transportation mitigation fee of $469,297.20; however, the actual fee will be determined when a complete building permit application is filed.

APPENDIX A

SITE PLAN

OVERALL SITE AREA		+/- XXXXX S.F.			
BUILDING STATISTICS					
#	AREA	DOCK DOORS	D/I DOORS	CAR STALLS	TRAILER STALLS
1	258,824 S.F.	47	2	438 (1.69/1,000)	26
2	258,824 S.F.	47	2	315 (1.22/1,000)	26
3	258,824 S.F.	47	2	398 (1.54/1,000)	26
4	258,824 S.F.	47	2	327 1.26/1,000)	26
TOTAL 1,035,296 S.F.					



16 SITE PLAN
Scale: 1"=100'-0"

	date
	revision
	no.
21-079 job no.	date
drawn	
checked	

Proposed Building for
Mowat Partners
Project M-51
Marysville, Washington

LANCE MUELLER & ASSOCIATES
ARCHITECTS AIA
130 LAKESIDE • SUITE 250 • SEATTLE, WA 98122 • (206) 325-2553

SITE PLAN – SCHEME 10

sheet
SP-10

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12/30/2022

A-1

APPENDIX B

TRIP GENERATION CALCULATIONS

Mowat
090223024

Trip Generation for: **Weekday**
(a.k.a.): **Average Weekday Daily Trips (AWDT)**

									NET EXTERNAL TRIPS BY TYPE											
									IN BOTH DIRECTIONS						DIRECTIONAL ASSIGNMENTS					
			Gross Trips				Internal Crossover		TOTAL	PASS-BY		DIVERTED LINK		NEW	PASS-BY		DIVERTED LINK		NEW	
LAND USES	VARIABLE	ITE LU code	Trip Rate	% IN	% OUT	In+Out (Total)	% of Gross Trips	Trips In+Out (Total)	In+Out (Total)	% of Ext. Trips	In+Out (Total)	% of Ext. Trips	In+Out (Total)	In+Out (Total)	In	Out	In	Out	In	Out
Warehousing (Building 1)	258.824 K SF	150	1.71	50%	50%	442.59	0%	0	442.59	0%	0	0%	0	442.59	0	0	0	0	221.30	221.29
Warehousing (Building 2)	258.824 K SF	150	1.71	50%	50%	442.59	0%	0	442.59	0%	0	0%	0	442.59	0	0	0	0	221.30	221.29
Warehousing (Building 3)	258.824 K SF	150	1.71	50%	50%	442.59	0%	0	442.59	0%	0	0%	0	442.59	0	0	0	0	221.30	221.29
Warehousing (Building 4)	258.824 K SF	150	1.71	50%	50%	442.59	0%	0	442.59	0%	0	0%	0	442.59	0	0	0	0	221.30	221.29
Totals						1770.36		0	1770.36		0		0	1770.36	0	0	0	0	885.20	885.16

Trip Generation for: **Weekday, Peak Hour of Adjacent Street Traffic, One Hour between 7 and 9 AM**
(a.k.a.): **Weekday AM Peak Hour**

									NET EXTERNAL TRIPS BY TYPE											
									IN BOTH DIRECTIONS						DIRECTIONAL ASSIGNMENTS					
			Gross Trips				Internal Crossover		TOTAL	PASS-BY		DIVERTED LINK		NEW	PASS-BY		DIVERTED LINK		NEW	
LAND USES	VARIABLE	ITE LU code	Trip Rate	% IN	% OUT	In+Out (Total)	% of Gross Trips	Trips In+Out (Total)	In+Out (Total)	% of Ext. Trips	In+Out (Total)	% of Ext. Trips	In+Out (Total)	In+Out (Total)	In	Out	In	Out	In	Out
Warehousing (Building 1)	258.824 K SF	150	0.17	77%	23%	44.00	0%	0	44.00	0%	0	0%	0	44.00	0	0	0	0	33.88	10.12
Warehousing (Building 2)	258.824 K SF	150	0.17	77%	23%	44.00	0%	0	44.00	0%	0	0%	0	44.00	0	0	0	0	33.88	10.12
Warehousing (Building 3)	258.824 K SF	150	0.17	77%	23%	44.00	0%	0	44.00	0%	0	0%	0	44.00	0	0	0	0	33.88	10.12
Warehousing (Building 4)	258.824 K SF	150	0.17	77%	23%	44.00	0%	0	44.00	0%	0	0%	0	44.00	0	0	0	0	33.88	10.12
Totals						176.00		0	176.00		0		0	176.00	0	0	0	0	135.52	40.48

Trip Generation for: **Weekday, Peak Hour of Adjacent Street Traffic, One Hour between 4 and 6 PM**
(a.k.a.): **Weekday PM Peak Hour**

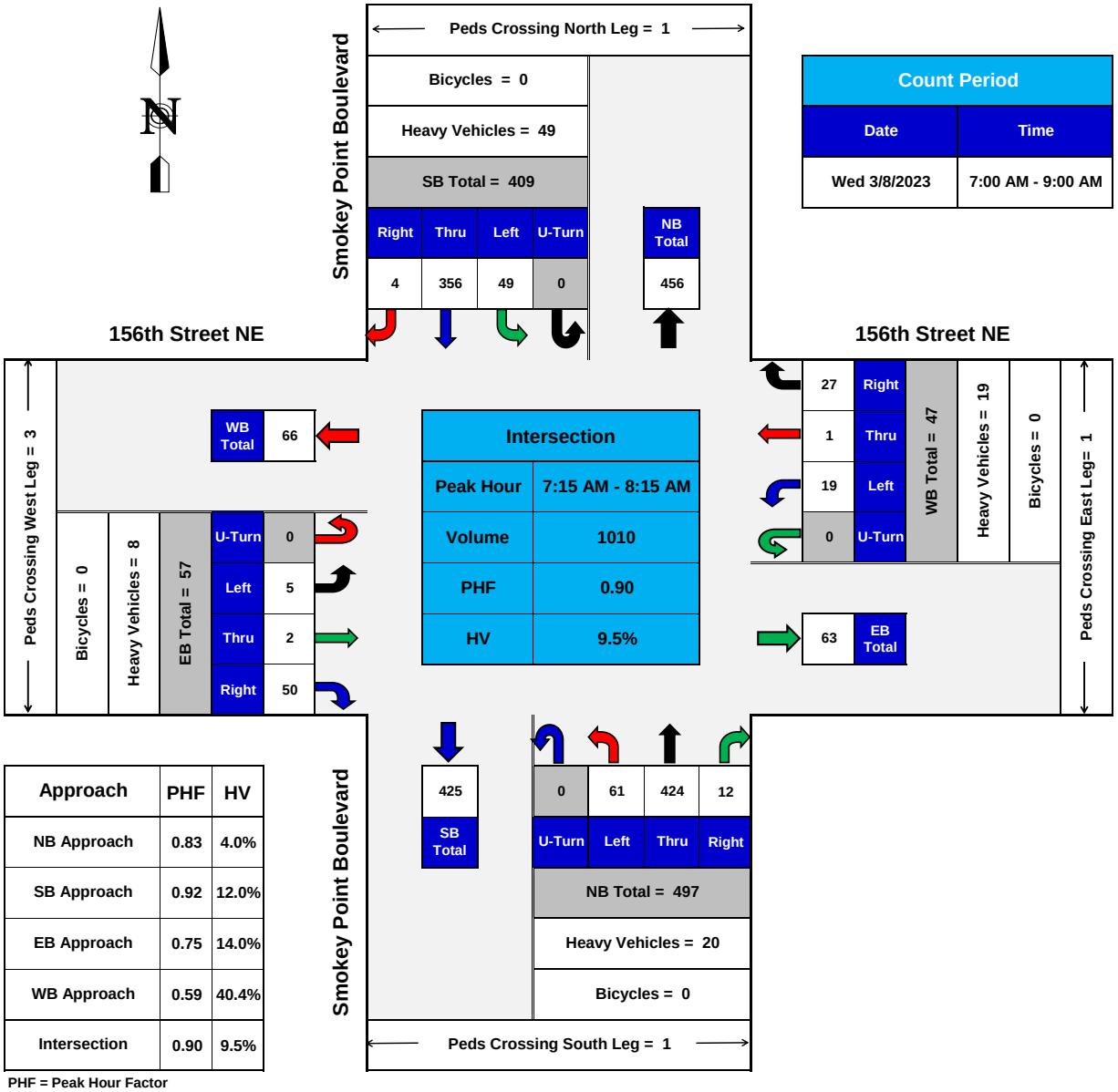
									NET EXTERNAL TRIPS BY TYPE											
									IN BOTH DIRECTIONS						DIRECTIONAL ASSIGNMENTS					
			Gross Trips				Internal Crossover		TOTAL	PASS-BY		DIVERTED LINK		NEW	PASS-BY		DIVERTED LINK		NEW	
LAND USES	VARIABLE	ITE LU code	Trip Rate	% IN	% OUT	In+Out (Total)	% of Gross Trips	Trips In+Out (Total)	In+Out (Total)	% of Ext. Trips	In+Out (Total)	% of Ext. Trips	In+Out (Total)	In+Out (Total)	In	Out	In	Out	In	Out
Warehousing (Building 1)	258.824 K SF	150	0.18	28%	72%	46.59	0%	0	46.59	0%	0	0%	0.00	46.59	0	0	0	0	13.05	33.54
Warehousing (Building 2)	258.824 K SF	150	0.18	28%	72%	46.59	0%	0	46.59	0%	0	0%	0.00	46.59	0	0	0	0	13.05	33.54
Warehousing (Building 3)	258.824 K SF	150	0.18	28%	72%	46.59	0%	0	46.59	0%	0	0%	0.00	46.59	0	0	0	0	13.05	33.54
Warehousing (Building 4)	258.824 K SF	150	0.18	28%	72%	46.59	0%	0	46.59	0%	0	0%	0.00	46.59	0	0	0	0	13.05	33.54
Totals	1,035.296 K SF					186.36		0	186.36		0		0.00	186.36	0	0	0	0	52.20	134.16

APPENDIX C

COUNT AND PIPELINE DATA

Smokey Point Boulevard @ 156th Street NE

Marysville, WA



Count Period	
Date	Time
Wed 3/8/2023	7:00 AM - 9:00 AM

Approach	PHF	HV
NB Approach	0.83	4.0%
SB Approach	0.92	12.0%
EB Approach	0.75	14.0%
WB Approach	0.59	40.4%
Intersection	0.90	9.5%

PHF = Peak Hour Factor
HV = Heavy Vehicles

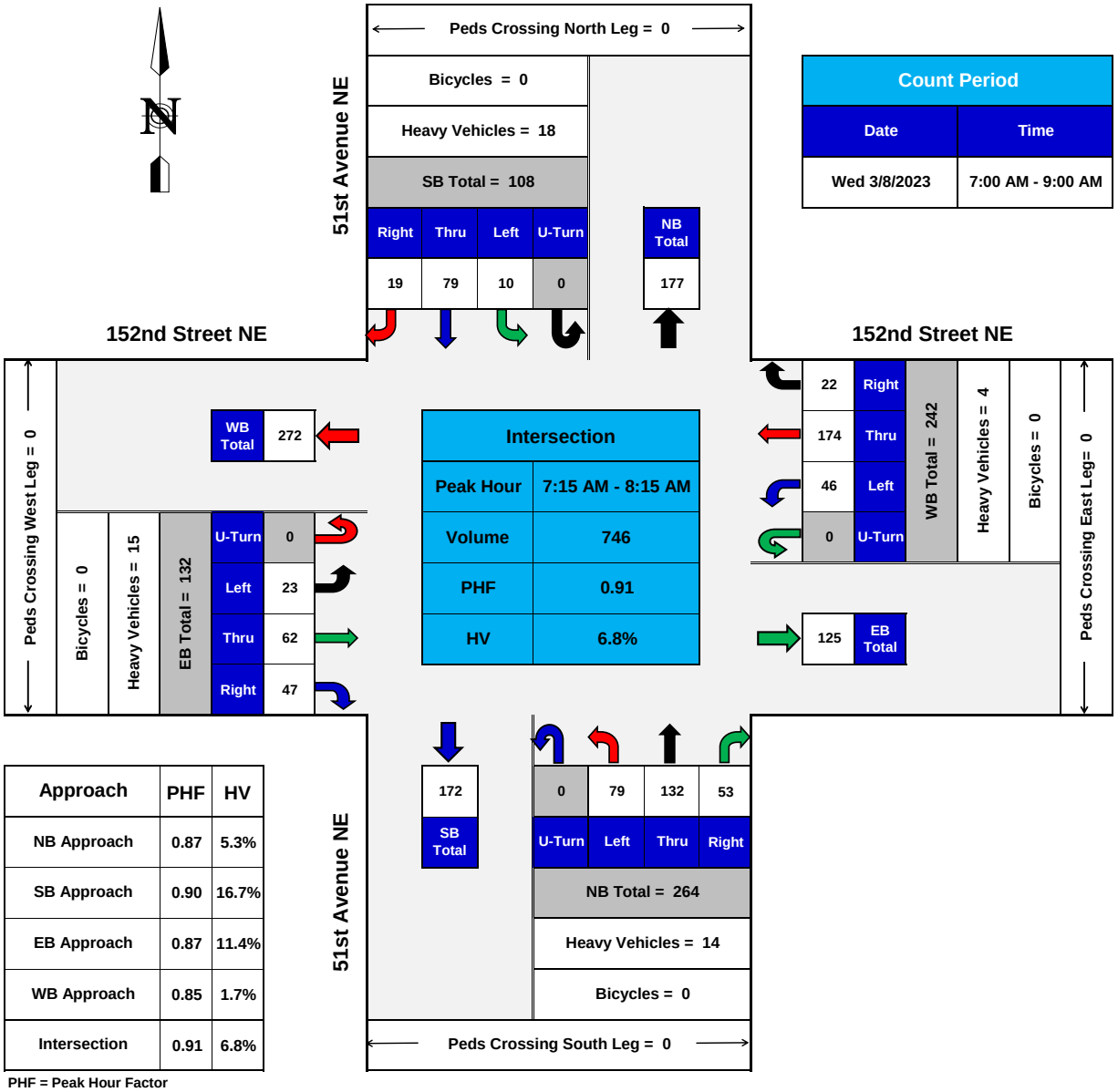
TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

DTG TRAFFIC DATA GATHERING

51st Avenue NE @ 152nd Street NE

Marysville, WA



Approach	PHF	HV
NB Approach	0.87	5.3%
SB Approach	0.90	16.7%
EB Approach	0.87	11.4%
WB Approach	0.85	1.7%
Intersection	0.91	6.8%

PHF = Peak Hour Factor
HV = Heavy Vehicles

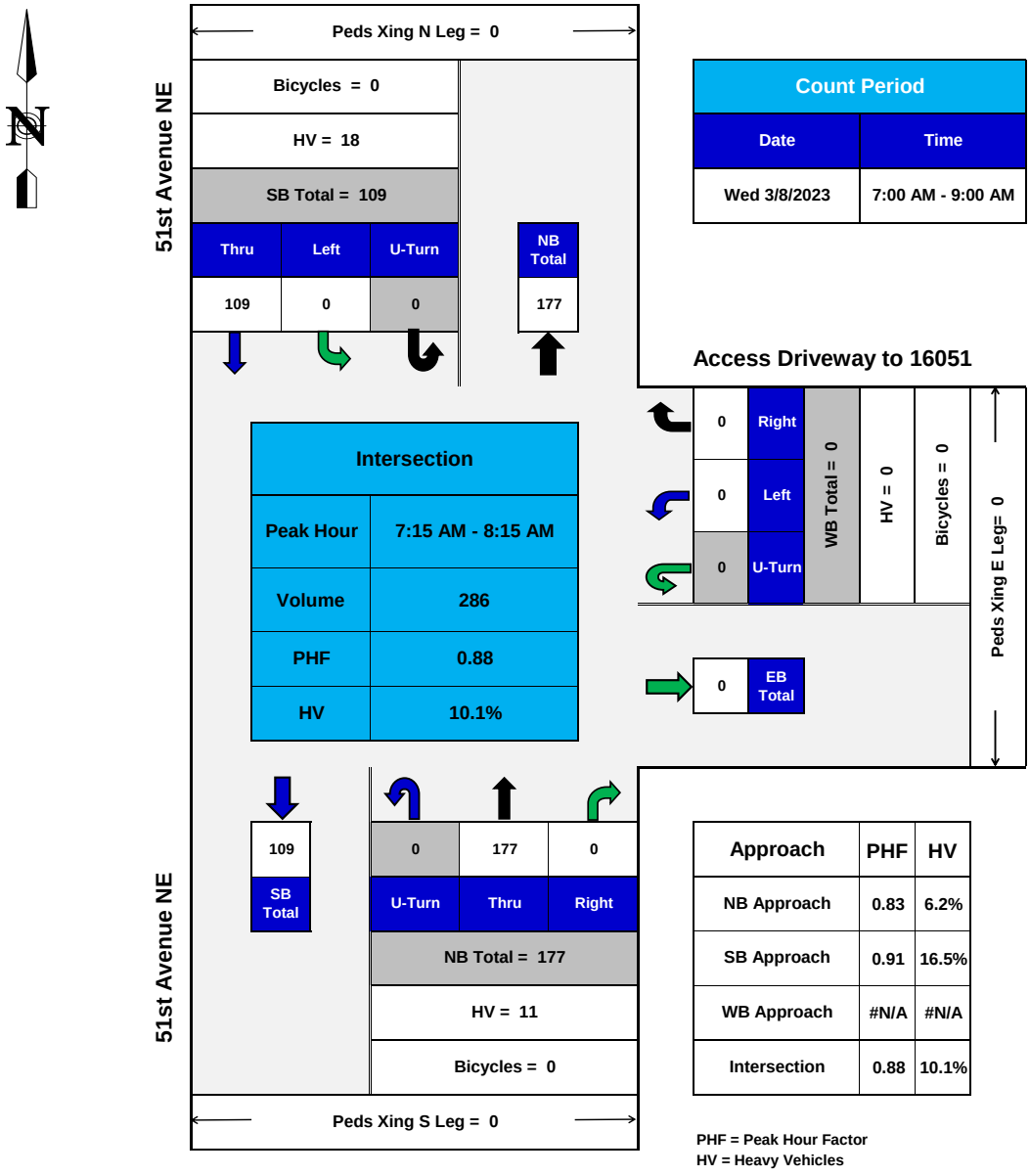
TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

TRAFFIC DATA GATHERING

Access Driveway to 16051 @ 51st Avenue NE

Marysville, WA



Approach	PHF	HV
NB Approach	0.83	6.2%
SB Approach	0.91	16.5%
WB Approach	#N/A	#N/A
Intersection	0.88	10.1%

PHF = Peak Hour Factor
HV = Heavy Vehicles

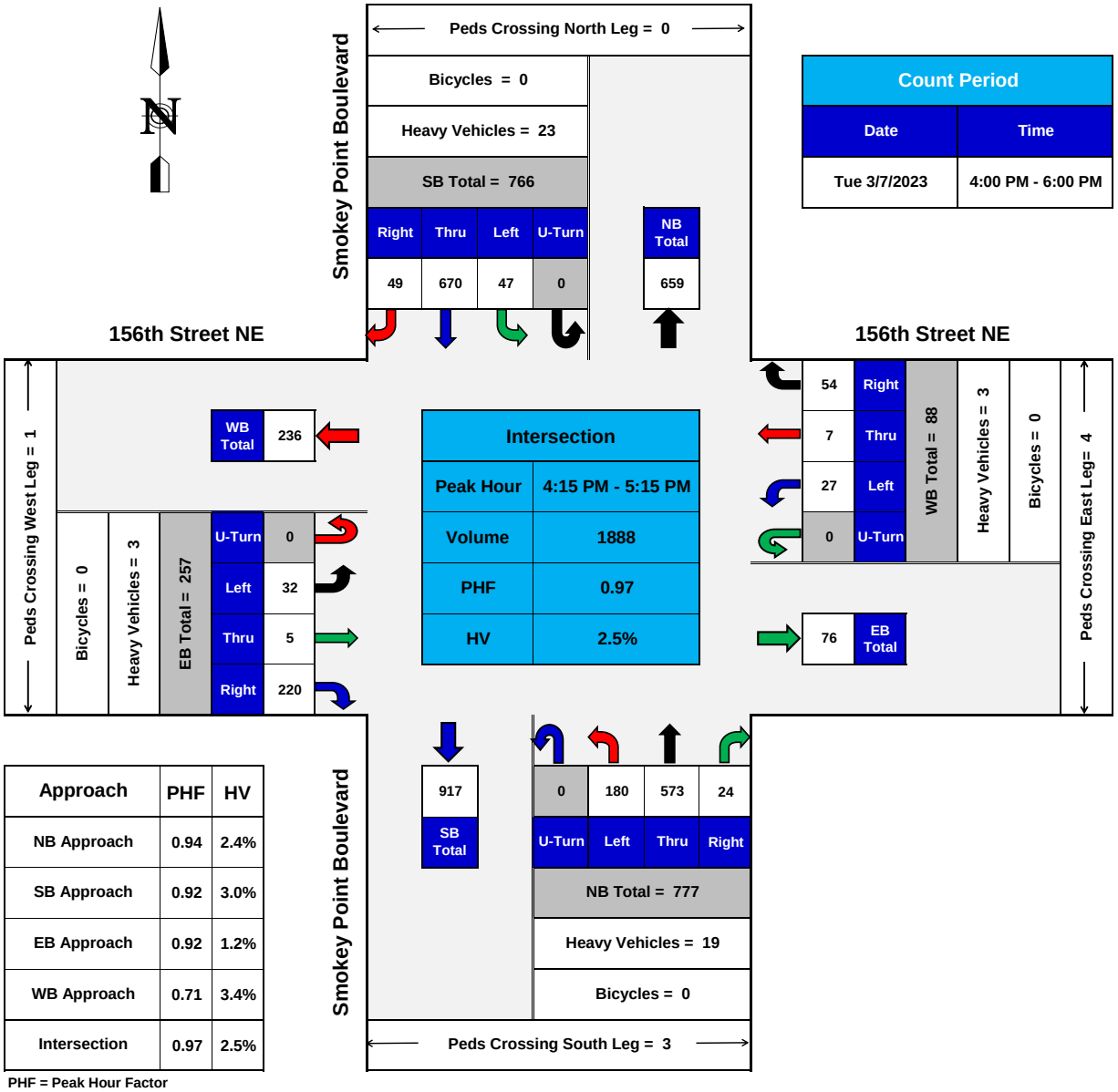
TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

TRAFFIC DATA GATHERING

Smokey Point Boulevard @ 156th Street NE

Marysville, WA



Approach	PHF	HV
NB Approach	0.94	2.4%
SB Approach	0.92	3.0%
EB Approach	0.92	1.2%
WB Approach	0.71	3.4%
Intersection	0.97	2.5%

PHF = Peak Hour Factor
HV = Heavy Vehicles

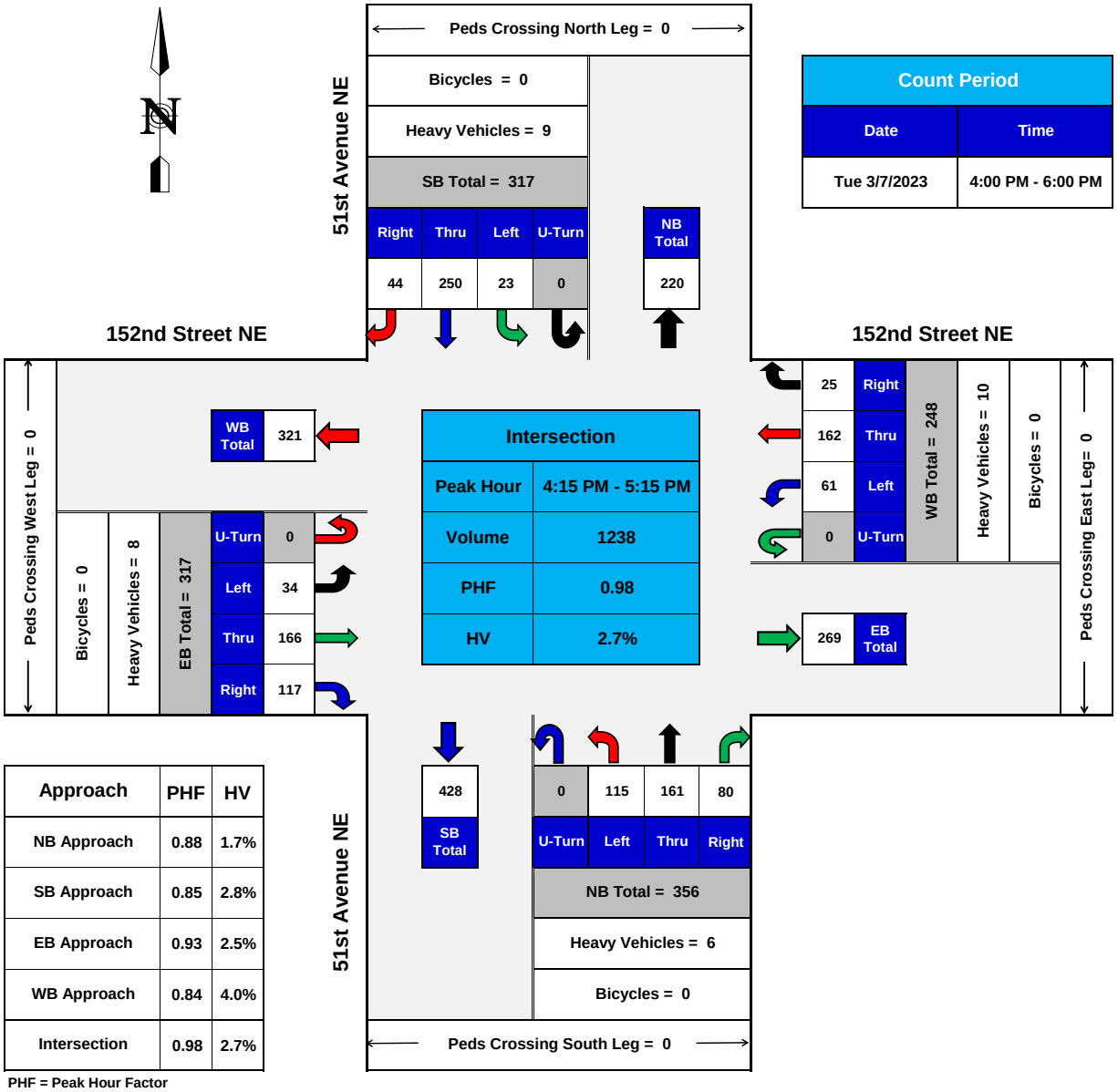
TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

TRAFFIC DATA GATHERING

51st Avenue NE @ 152nd Street NE

Marysville, WA



Approach	PHF	HV
NB Approach	0.88	1.7%
SB Approach	0.85	2.8%
EB Approach	0.93	2.5%
WB Approach	0.84	4.0%
Intersection	0.98	2.7%

PHF = Peak Hour Factor
HV = Heavy Vehicles

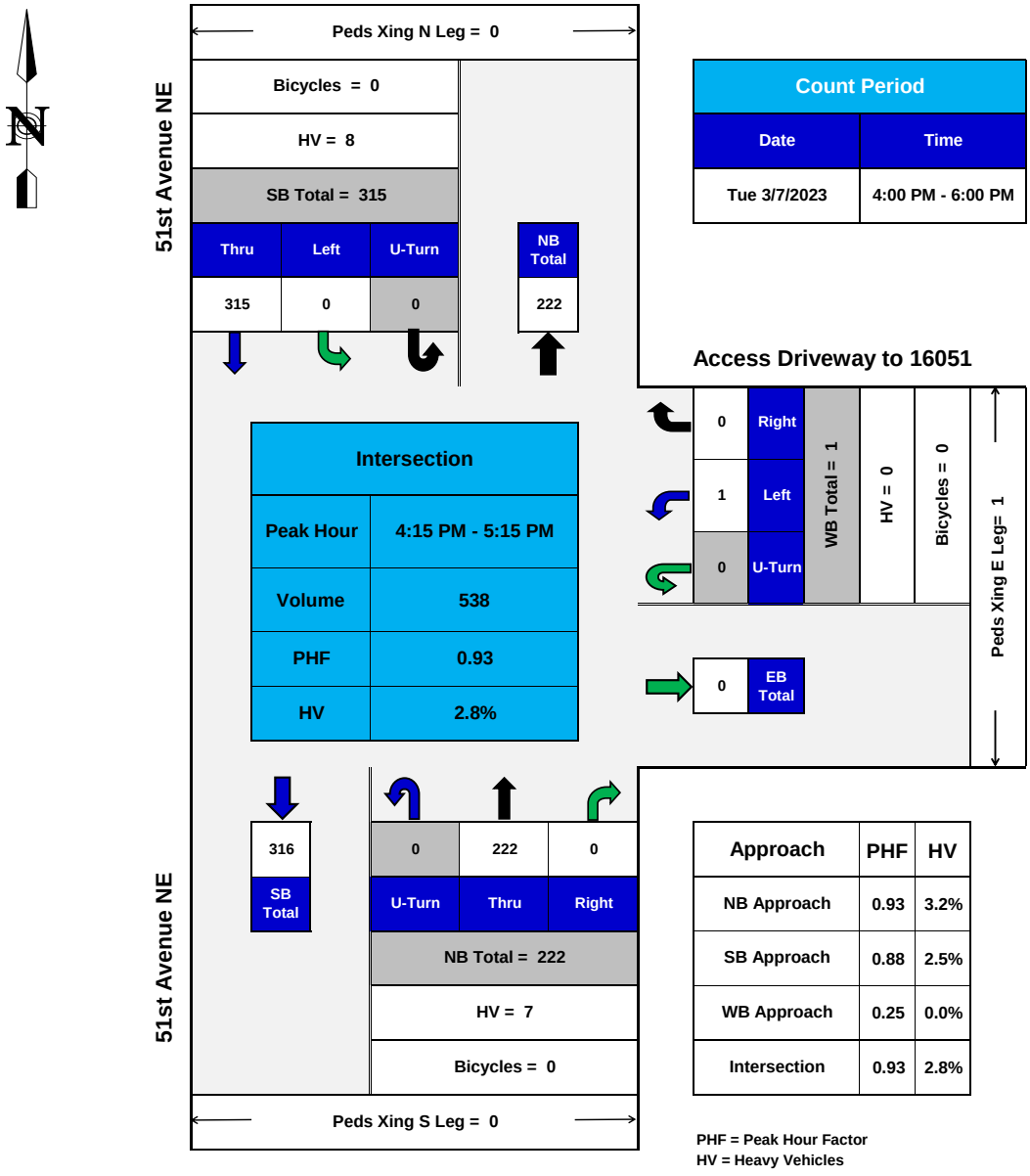
TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

TRAFFIC DATA GATHERING

Access Driveway to 16051 @ 51st Avenue NE

Marysville, WA



Approach	PHF	HV
NB Approach	0.93	3.2%
SB Approach	0.88	2.5%
WB Approach	0.25	0.0%
Intersection	0.93	2.8%

PHF = Peak Hour Factor
HV = Heavy Vehicles

TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

TRAFFIC DATA GATHERING

Opening Year

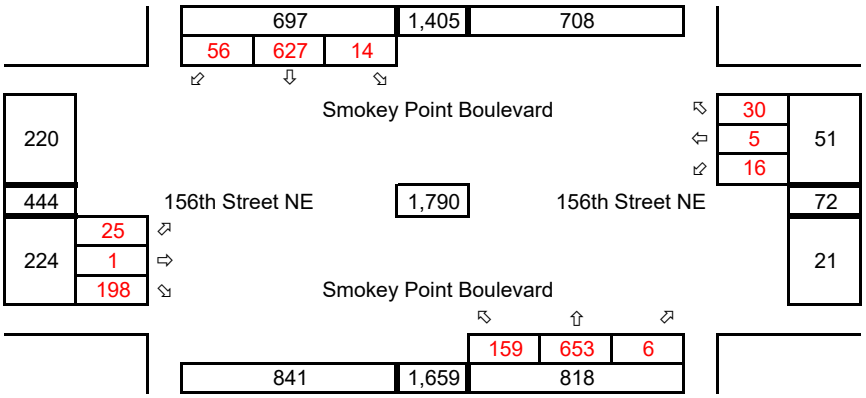
17 156th St NE at Smokey Pt Blv

Synchro ID: 17

Existing
Average Weekday
PM Peak Hour

Year: **8/12/2020**

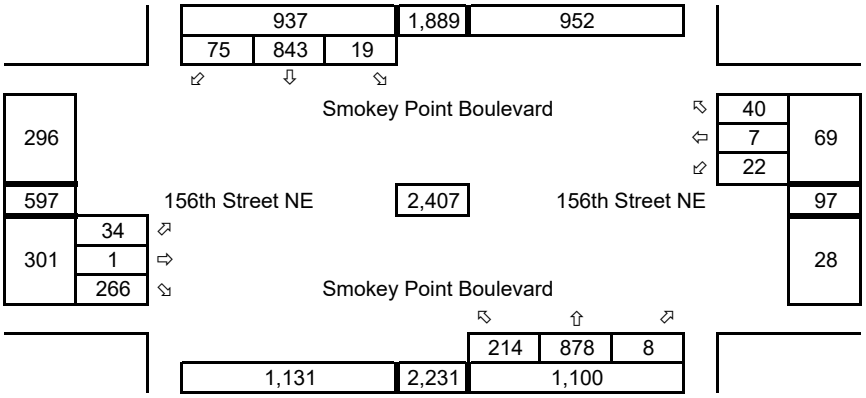
Data Source: **TDG**



North

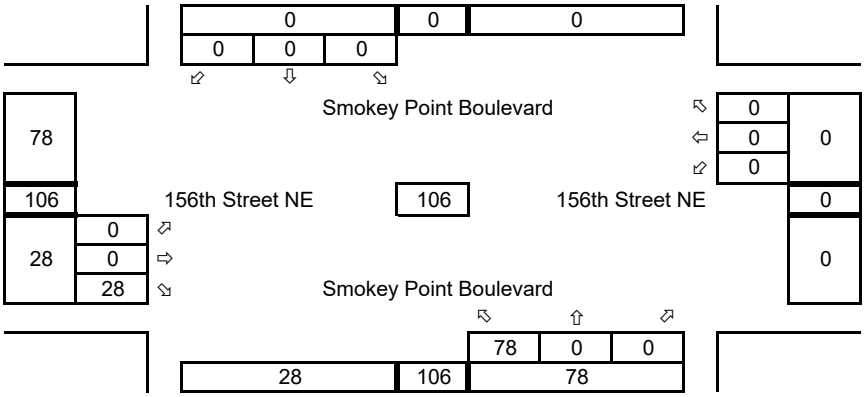
Baseline
Average Weekday
PM Peak Hour

Year: 2030
Growth Rate = 3.0%
Years of Growth = 10
Total Growth = 1.3439



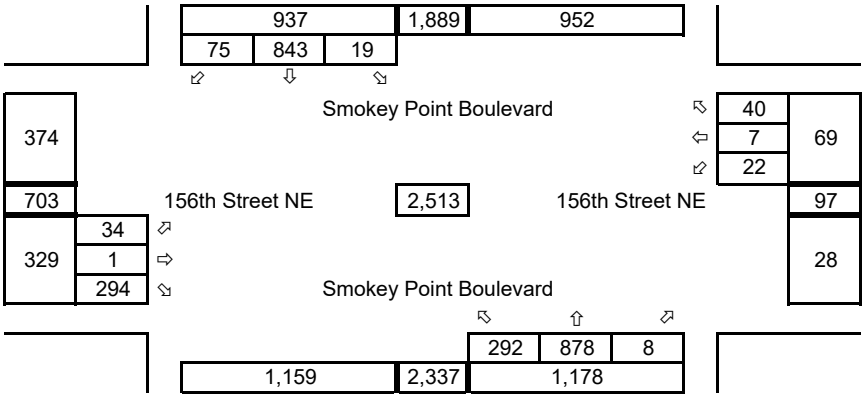
North

Development Trips
Average Weekday
PM Peak Hour



North

Opening w Development
Average Weekday
PM Peak Hour



North

Opening Year

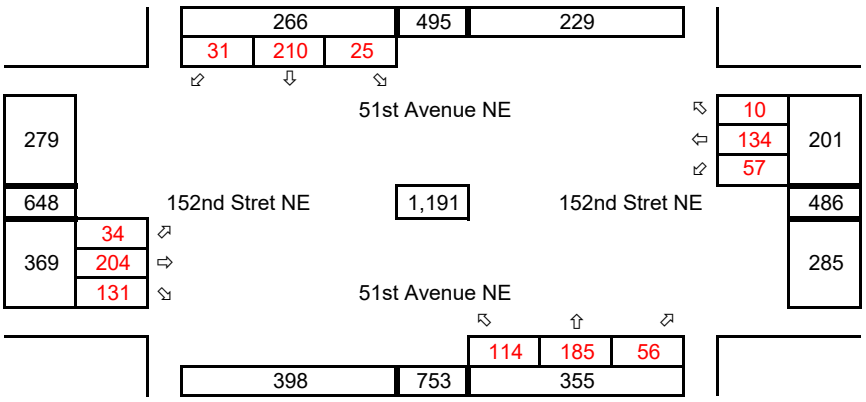
19 152nd St NE at 51st Ave NE

Synchro ID: 19

Existing
Average Weekday
PM Peak Hour

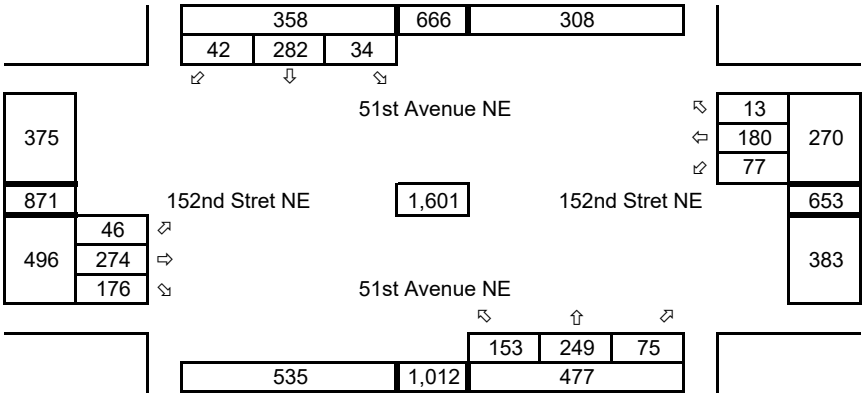
Year: **8/12/2020**

Data Source: **TDG**

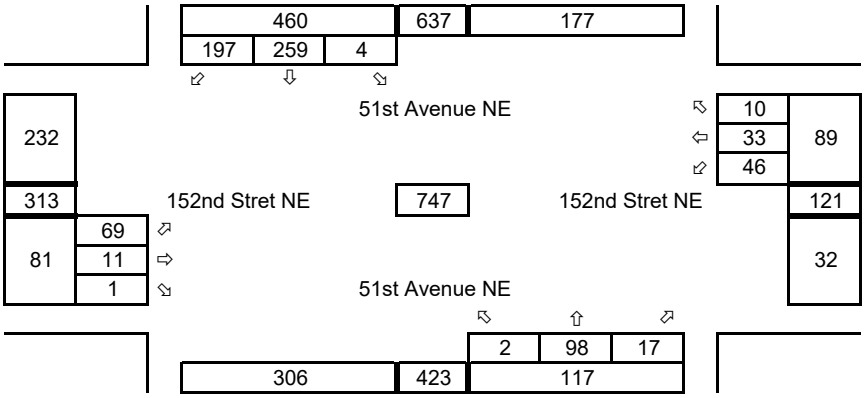


Baseline
Average Weekday
PM Peak Hour

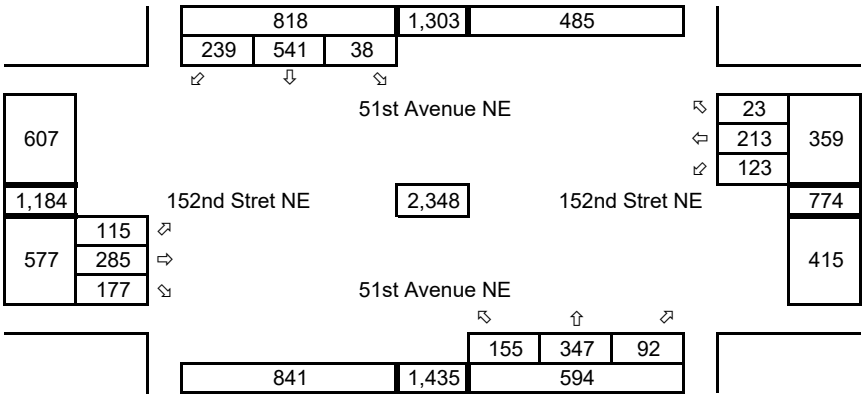
Year: 2030
Growth Rate = 3.0%
Years of Growth = 10
Total Growth = 1.3439



Development Trips
Average Weekday
PM Peak Hour



Opening w Development
Average Weekday
PM Peak Hour



Opening Year

15 160th St NE at 51st Ave NE

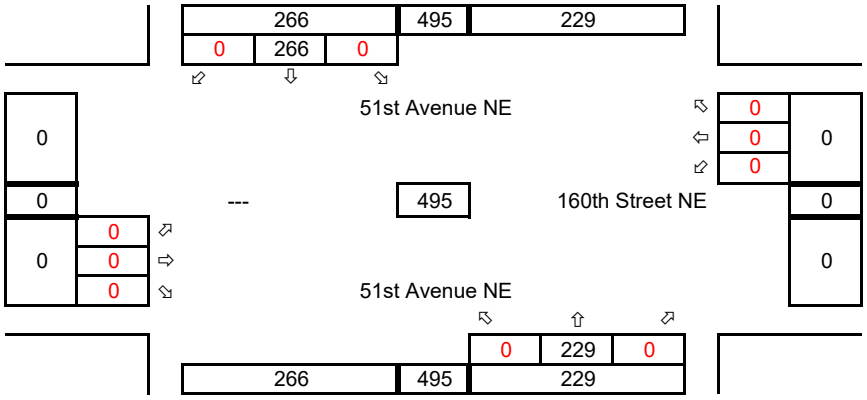
Synchro ID: 15

Existing
Average Weekday
PM Peak Hour

Year: **8/12/2020**

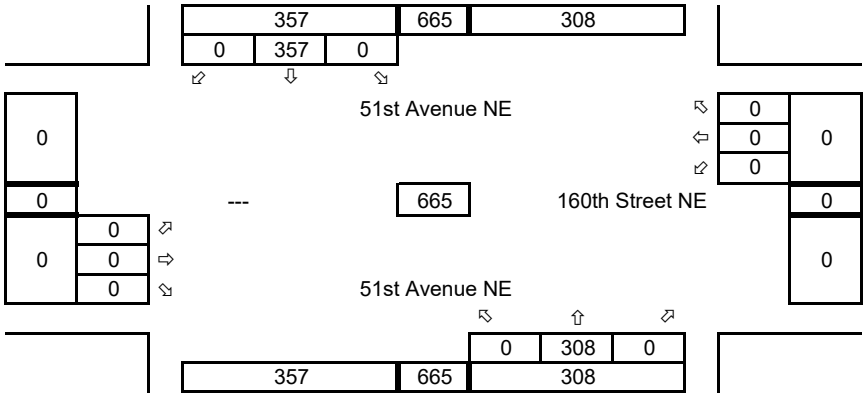
Data Source: **TDG**

Based on count from 152nd Street NE at 51st Avenue NE since there are not any commercial driveways between the intersections.

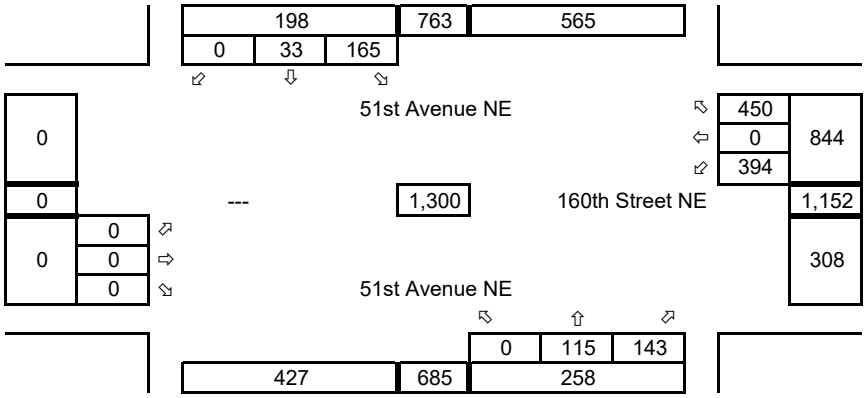


Baseline
Average Weekday
PM Peak Hour

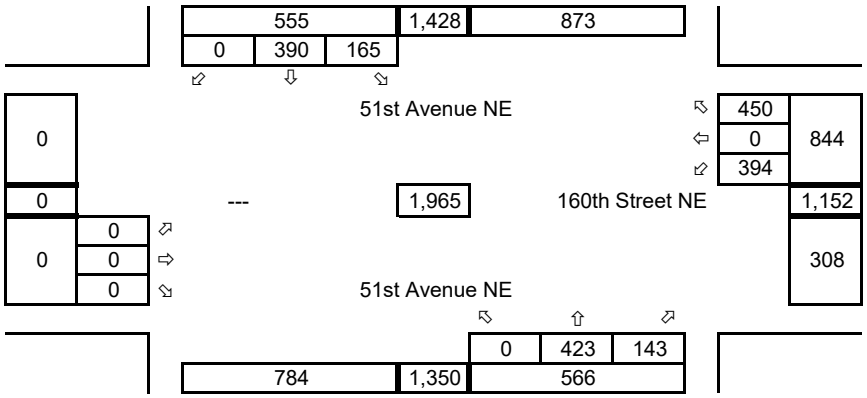
Year: 2030
Growth Rate = 3.0%
Years of Growth = 10
Total Growth = 1.3439



Development Trips
Average Weekday
PM Peak Hour



Opening w Development
Average Weekday
PM Peak Hour



APPENDIX D

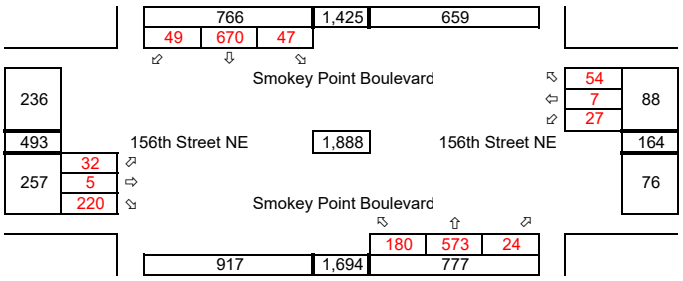
TURNING MOVEMENT CALCULATIONS

Synchro ID: 1

Existing
Average Weekday
PM Peak-Hour

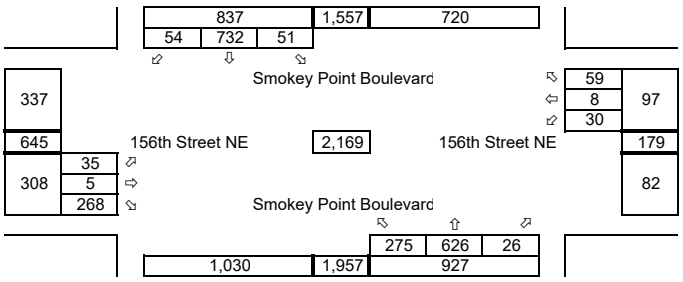
Year: **3/7/2023**

Data Source: **TDG**

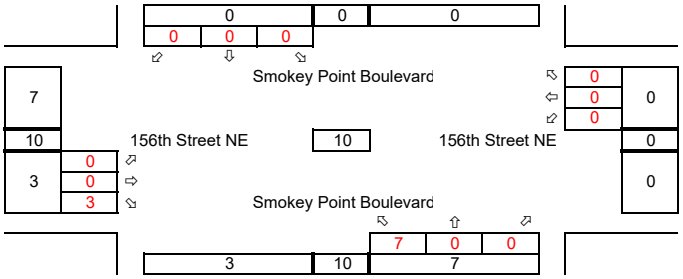


Future without Development
Average Weekday
PM Peak-Hour

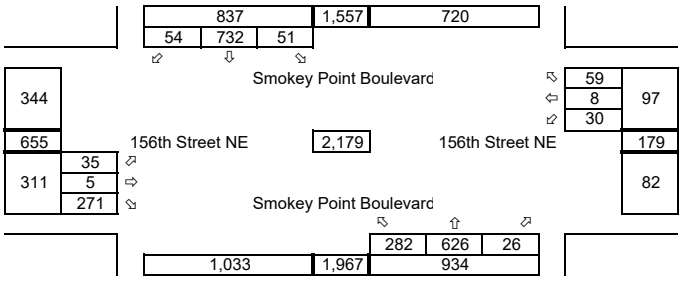
Year: 2026
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak-Hour

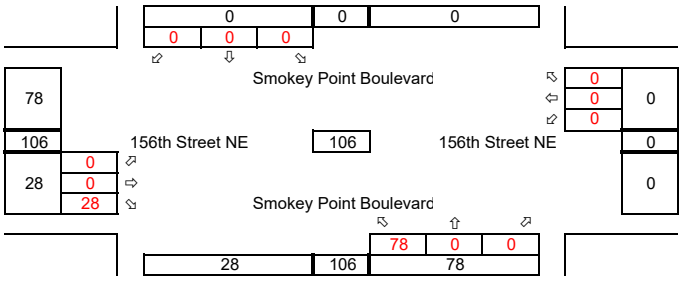


Future with Development
Average Weekday
PM Peak-Hour



Pipeline Trips
Average Weekday
PM Peak-Hour

Cascade Commerce Center

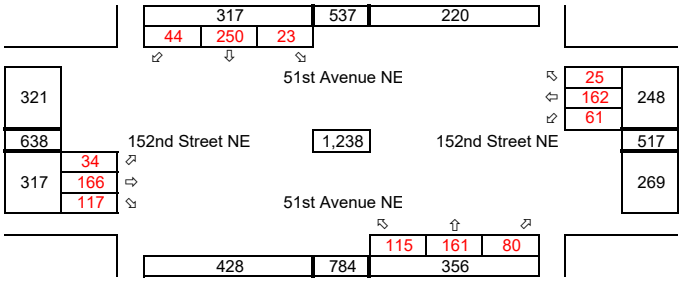


Synchro ID: 2

Existing
Average Weekday
PM Peak-Hour

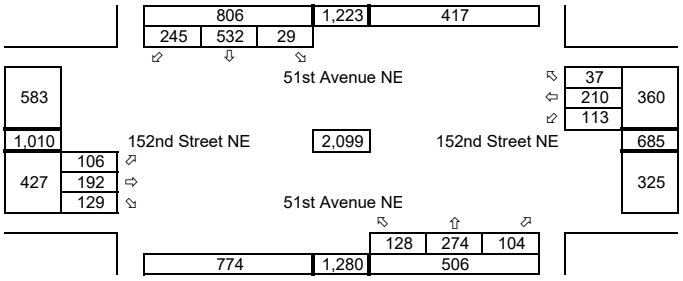
Year: **3/7/2023**

Data Source: **TDG**

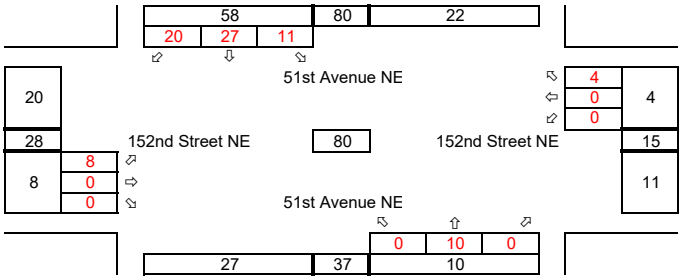


Future without Development
Average Weekday
PM Peak-Hour

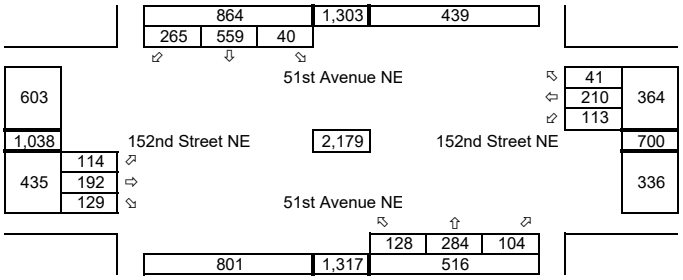
Year: 2026
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak-Hour

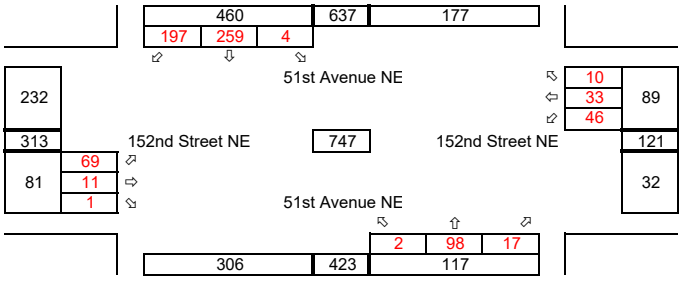


Future with Development
Average Weekday
PM Peak-Hour



Pipeline Trips
Average Weekday
PM Peak-Hour

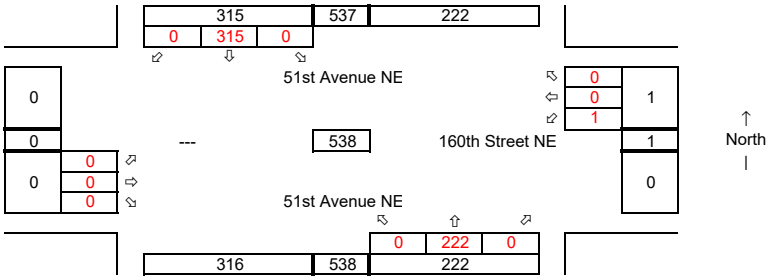
Cascade Commerce Center



Synchro ID: 3
Existing
Average Weekday
PM Peak-Hour

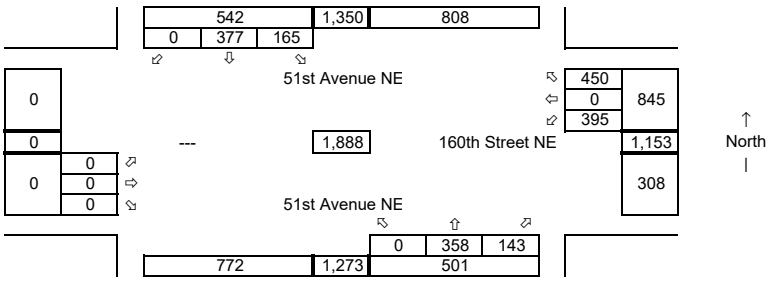
Year: **3/7/2023**

Data Source: **TDG**

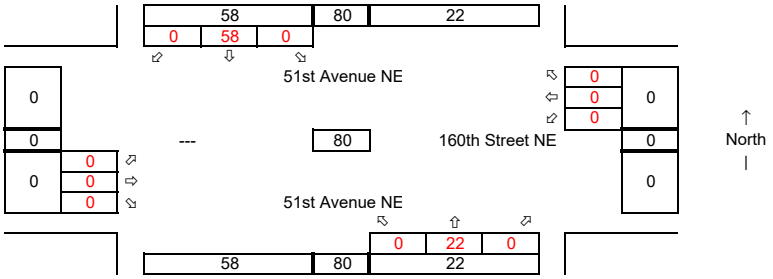


Future without Development
Average Weekday
PM Peak-Hour

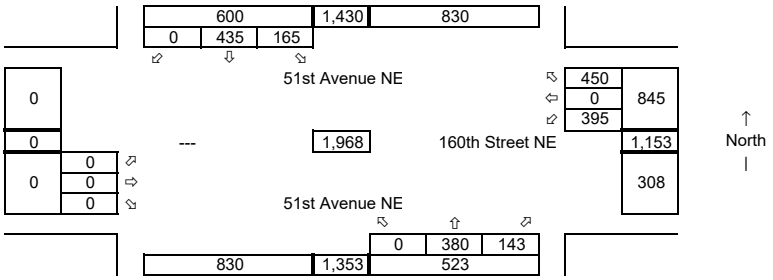
Year: 2026
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak-Hour

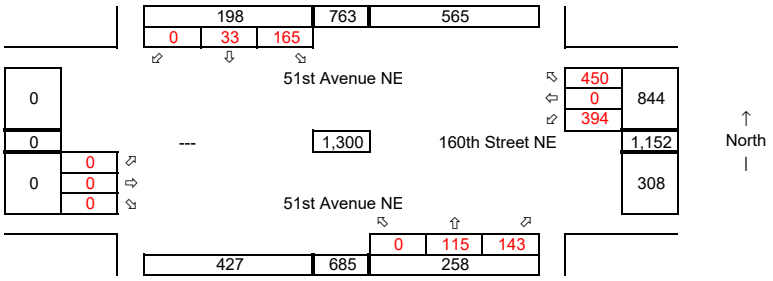


Future with Development
Average Weekday
PM Peak-Hour



Pipeline Trips
Average Weekday
PM Peak-Hour

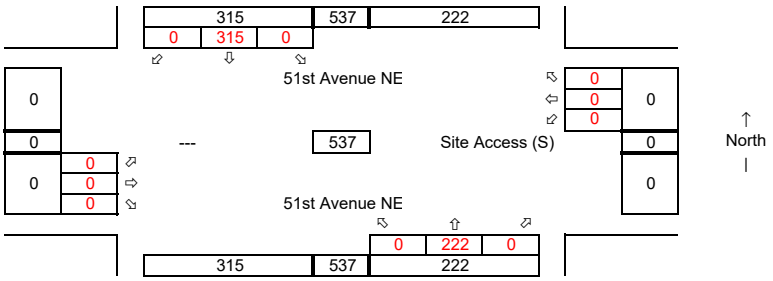
Cascade Commerce Center



Synchro ID: 4
Existing
Average Weekday
PM Peak-Hour

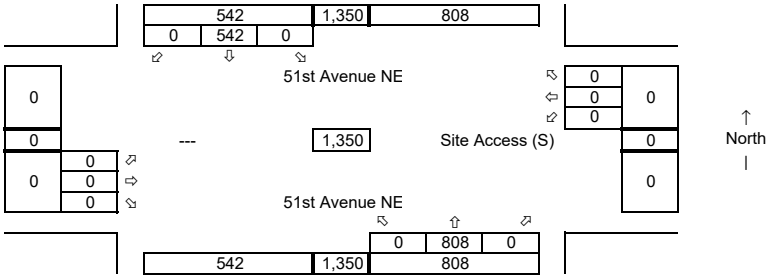
Year: **3/7/2023**

Data Source: **TDG**

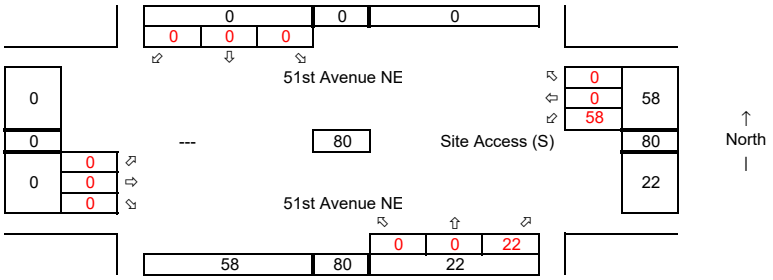


Future without Development
Average Weekday
PM Peak-Hour

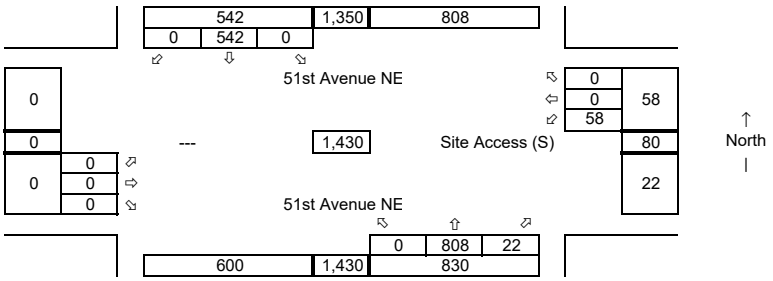
Year: 2026
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak-Hour

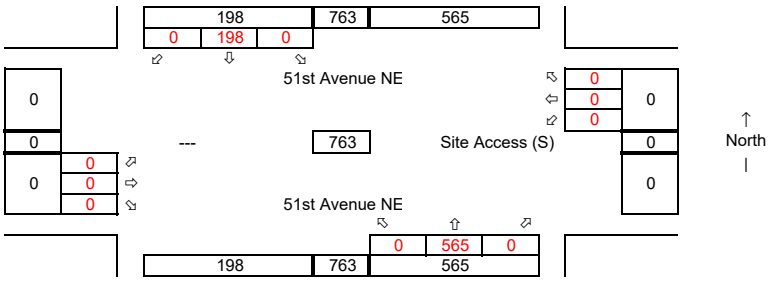


Future with Development
Average Weekday
PM Peak-Hour



Pipeline Trips
Average Weekday
PM Peak-Hour

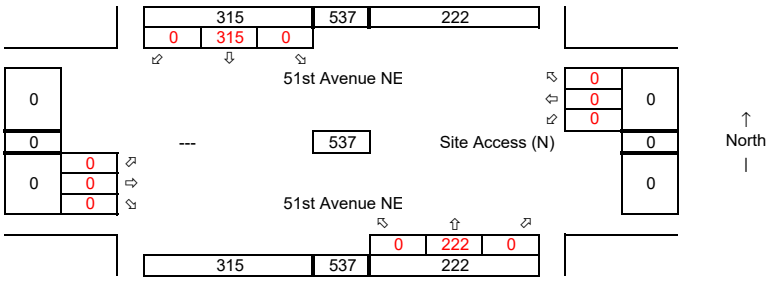
Cascade Commerce Center



Synchro ID: 5
Existing
Average Weekday
PM Peak-Hour

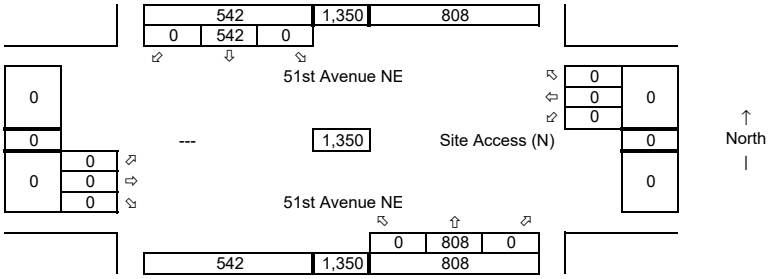
Year: **3/7/2023**

Data Source: **TDG**

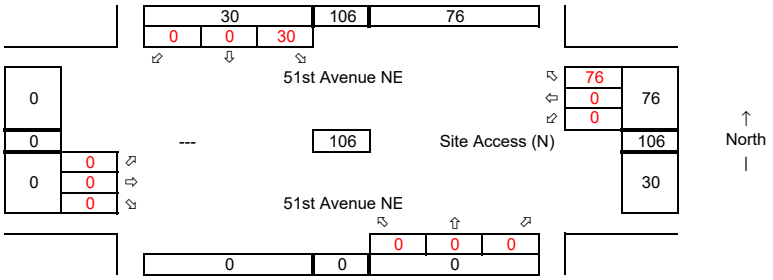


Future without Development
Average Weekday
PM Peak-Hour

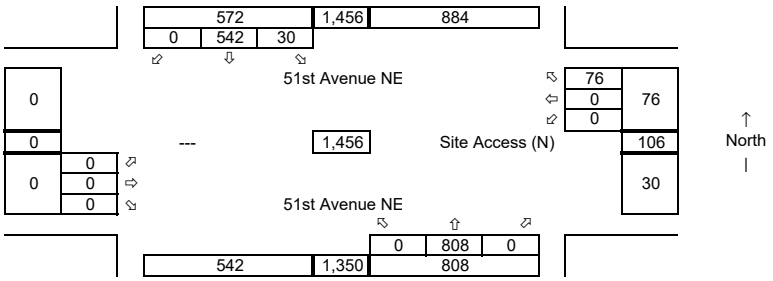
Year: 2026
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak-Hour

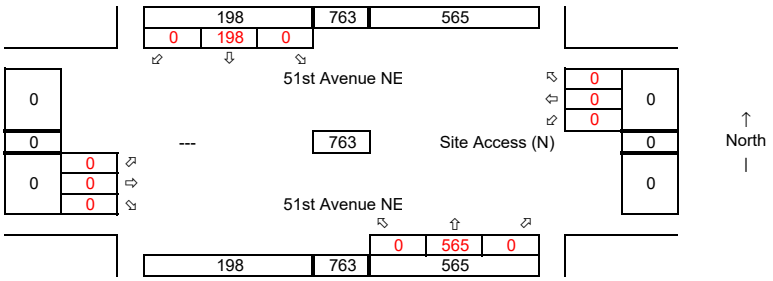


Future with Development
Average Weekday
PM Peak-Hour



Pipeline Trips
Average Weekday
PM Peak-Hour

Cascade Commerce Center

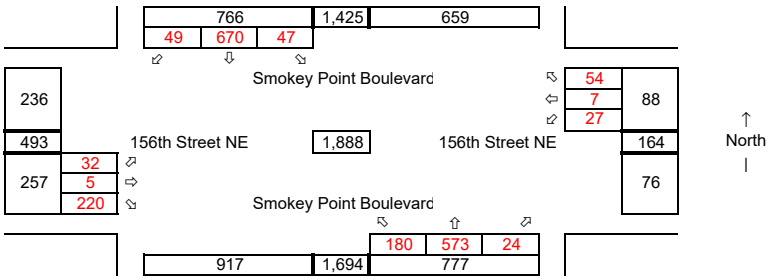


Synchro ID: 1

Existing
Average Weekday
PM Peak-Hour

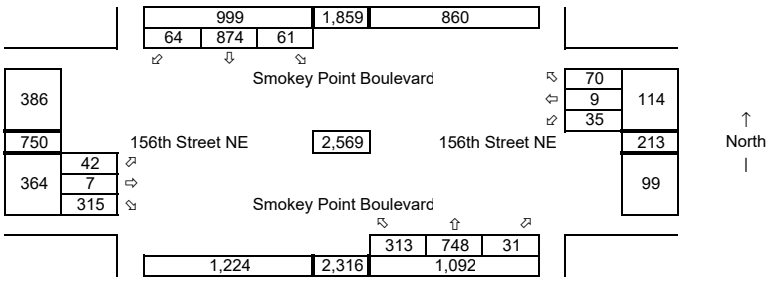
Year: **3/7/2023**

Data Source: **TDG**

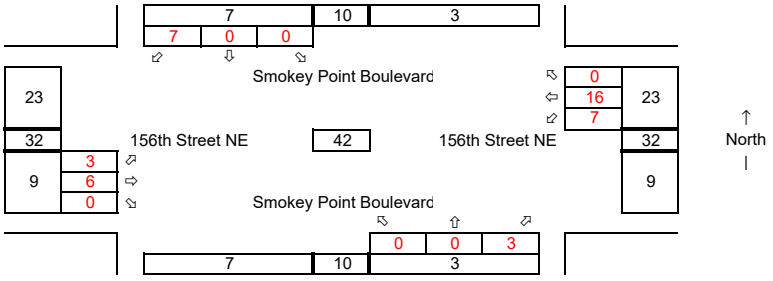


Future without Development
Average Weekday
PM Peak-Hour

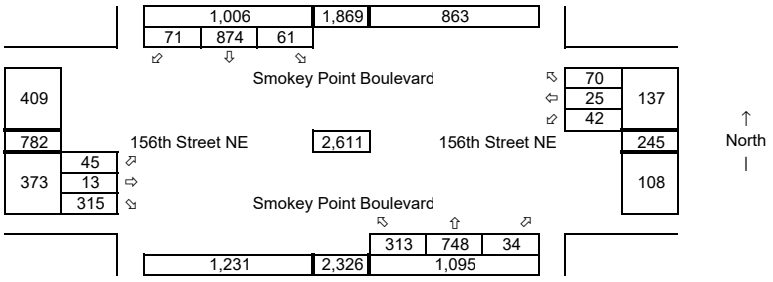
Year: 2032
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Average Weekday
PM Peak-Hour

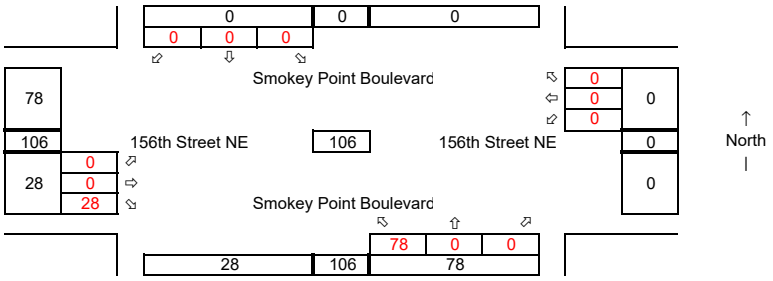


Future with Development
Average Weekday
PM Peak-Hour



Pipeline Trips
Average Weekday
PM Peak-Hour

Cascade Commerce Center

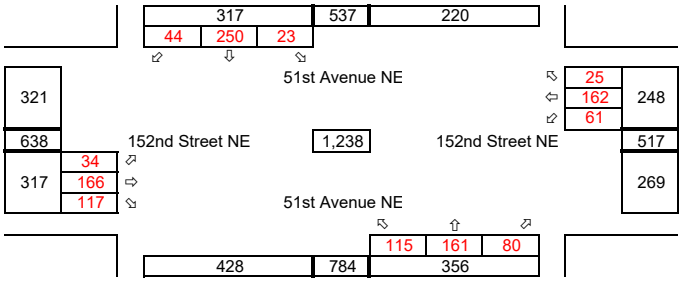


Synchro ID: 2

Existing
Average Weekday
PM Peak-Hour

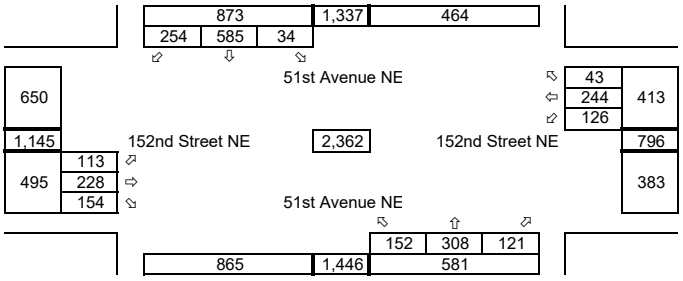
Year: **3/7/2023**

Data Source: **TDG**

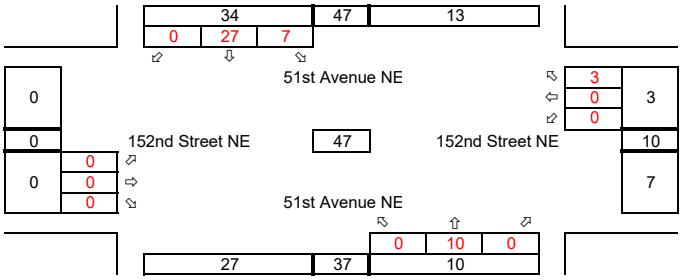


Future without Development
Average Weekday
PM Peak-Hour

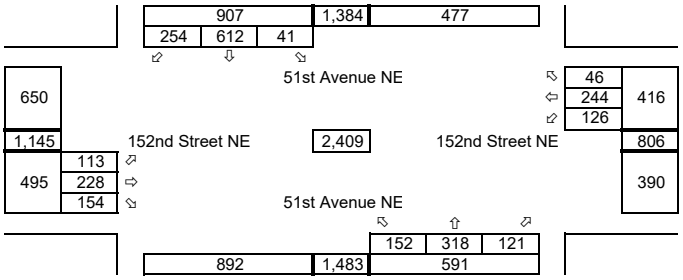
Year: 2032
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Average Weekday
PM Peak-Hour

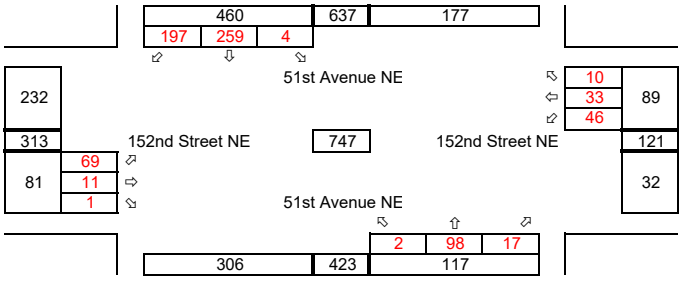


Future with Development
Average Weekday
PM Peak-Hour



Pipeline Trips
Average Weekday
PM Peak-Hour

Cascade Commerce Center

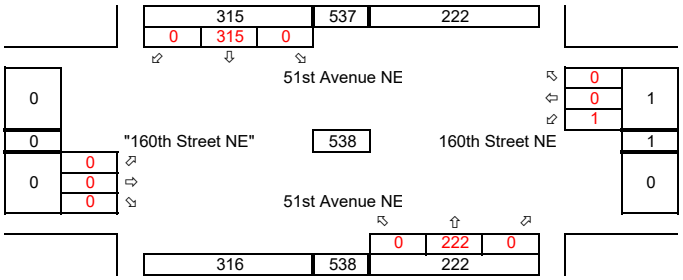


Synchro ID: 3

Existing
Average Weekday
PM Peak-Hour

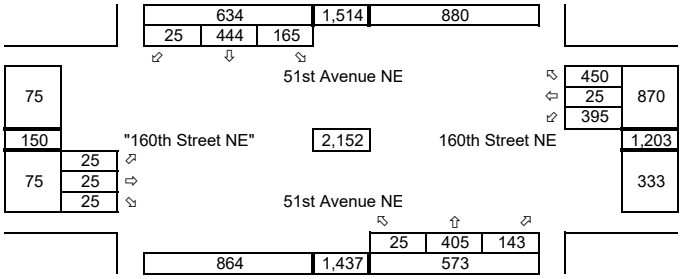
Year: **3/7/2023**

Data Source: **TDG**

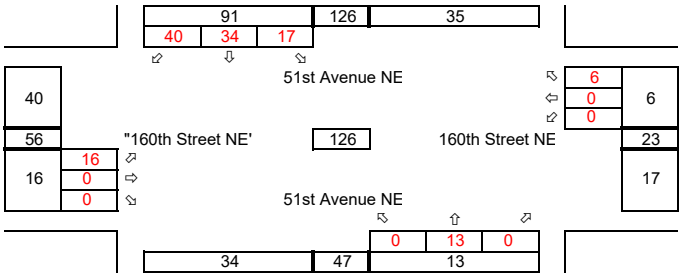


Future without Development
Average Weekday
PM Peak-Hour

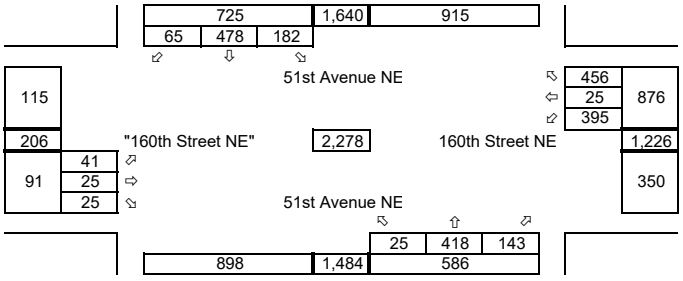
Year: 2032
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Average Weekday
PM Peak-Hour



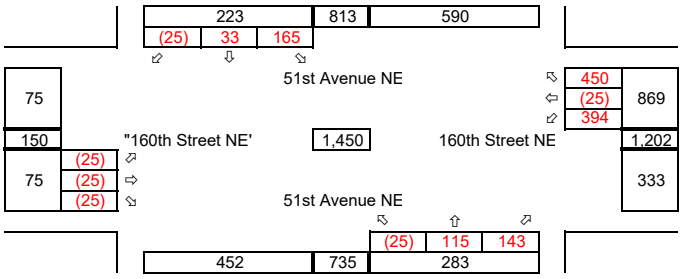
Future with Development
Average Weekday
PM Peak-Hour



Pipeline Trips
Average Weekday
PM Peak-Hour

Cascade Commerce Center

(25) Trips added to turning movements with no volume to generate delay scenarios

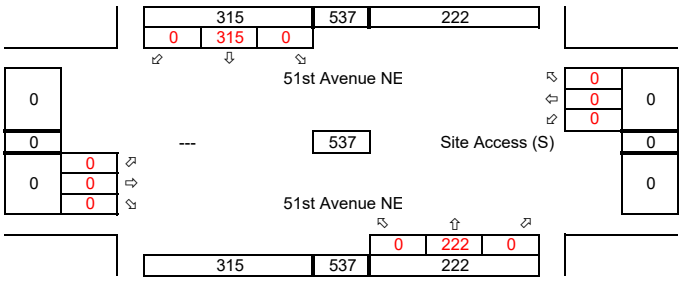


Synchro ID: 4

Existing
Average Weekday
PM Peak-Hour

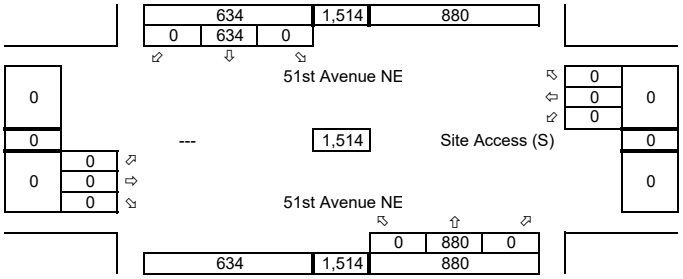
Year: **3/7/2023**

Data Source: **TDG**

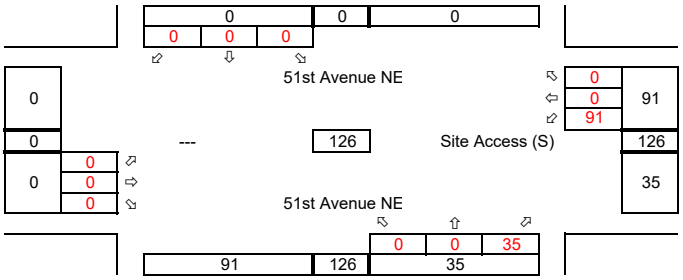


Future without Development
Average Weekday
PM Peak-Hour

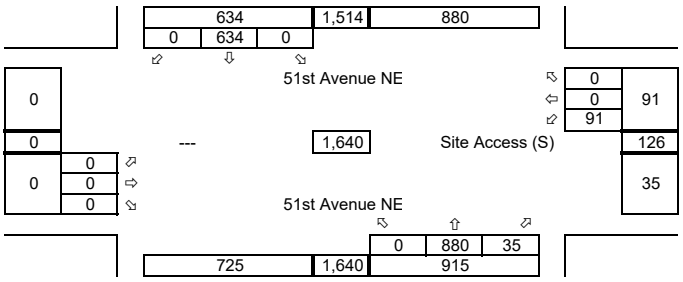
Year: 2032
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Average Weekday
PM Peak-Hour

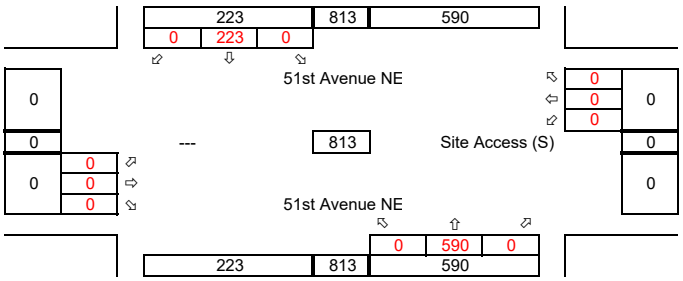


Future with Development
Average Weekday
PM Peak-Hour



Pipeline Trips
Average Weekday
PM Peak-Hour

Cascade Commerce Center

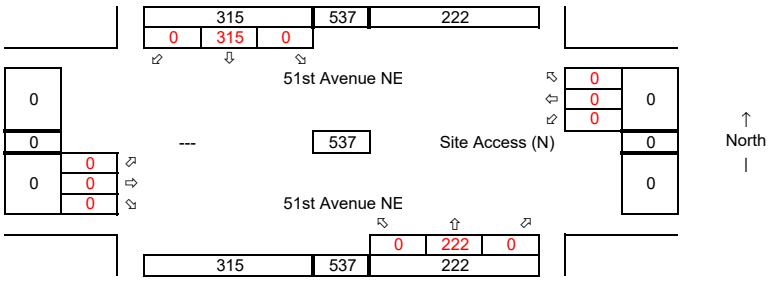


Synchro ID: 5

Existing
Average Weekday
PM Peak-Hour

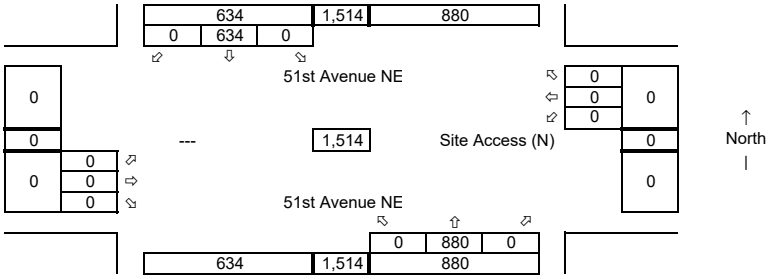
Year: **3/7/2023**

Data Source: **TDG**

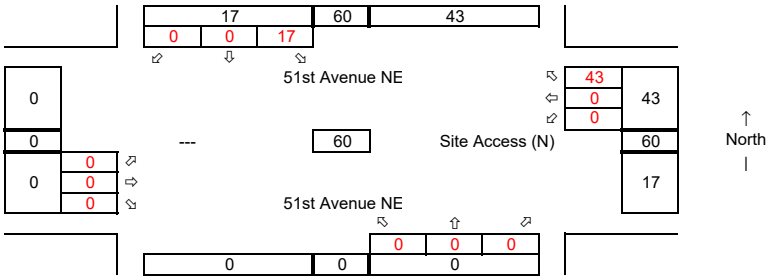


Future without Development
Average Weekday
PM Peak-Hour

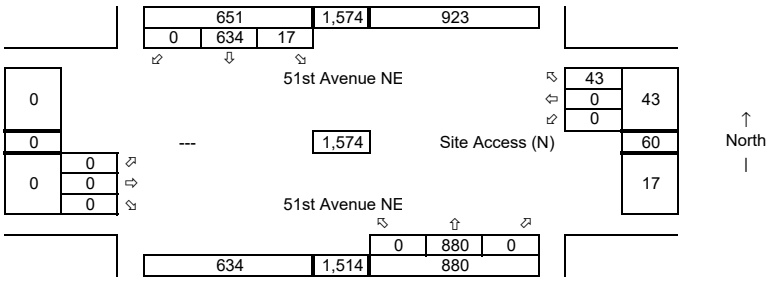
Year: 2032
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Average Weekday
PM Peak-Hour

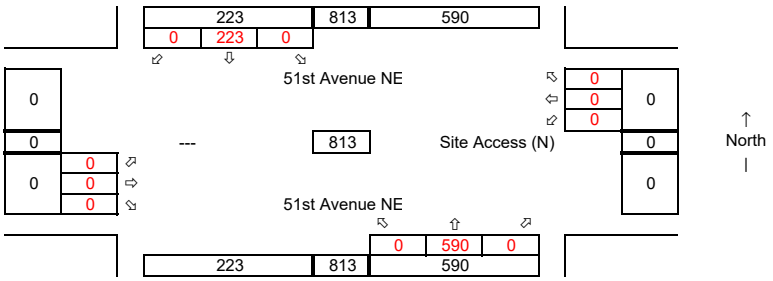


Future with Development
Average Weekday
PM Peak-Hour



Pipeline Trips
Average Weekday
PM Peak-Hour

Cascade Commerce Center



APPENDIX E

LEVEL OF SERVICE CALCULATIONS

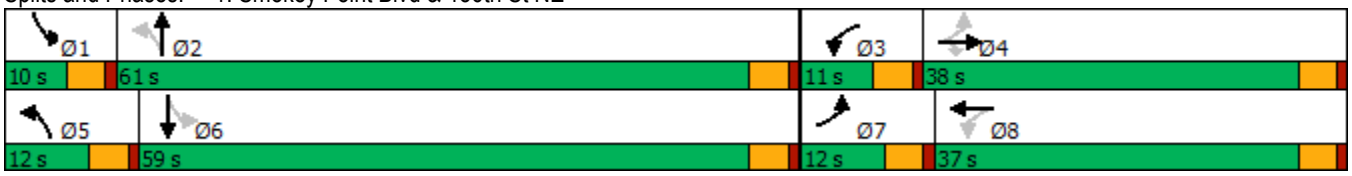
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	5	220	27	7	54	180	573	24	47	670	49
Future Volume (vph)	32	5	220	27	7	54	180	573	24	47	670	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	100		0	200		0	100		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.867			0.994			0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1845	1568	1752	1599	0	1752	3484	0	1752	3470	0
Flt Permitted	0.686			0.754			0.225			0.419		
Satd. Flow (perm)	1265	1845	1568	1391	1599	0	415	3484	0	773	3470	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			227		56			5			8	
Link Speed (mph)		35			25			40			40	
Link Distance (ft)		1346			860			921			851	
Travel Time (s)		26.2			23.5			15.7			14.5	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	5	227	28	63	0	186	616	0	48	742	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.5	5.0	5.0	4.5	5.0		4.5	5.0		4.5	5.0	
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	12.0	38.0	38.0	11.0	37.0		12.0	61.0		10.0	59.0	
Total Split (%)	10.0%	31.7%	31.7%	9.2%	30.8%		10.0%	50.8%		8.3%	49.2%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	9.6	7.0	7.0	9.0	6.8		29.1	25.1		23.6	17.8	
Actuated g/C Ratio	0.19	0.14	0.14	0.18	0.13		0.58	0.50		0.47	0.35	
v/c Ratio	0.11	0.02	0.55	0.10	0.24		0.41	0.36		0.10	0.60	
Control Delay	16.9	23.4	10.0	16.9	12.1		9.0	11.1		6.9	16.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.9	23.4	10.0	16.9	12.1		9.0	11.1		6.9	16.4	
LOS	B	C	B	B	B		A	B		A	B	
Approach Delay		11.1			13.6			10.6			15.8	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)	8	1	0	7	2		13	50		3	70	
Queue Length 95th (ft)	27	11	54	24	33		67	137		22	178	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1266			780			841			771	
Turn Bay Length (ft)	200		200	100			200			100		
Base Capacity (vph)	348	1293	1167	312	1105		449	3315		474	3259	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.09	0.00	0.19	0.09	0.06		0.41	0.19		0.10	0.23	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 50.4
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 12.9 Intersection LOS: B
Intersection Capacity Utilization 49.7% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1: Smokey Point Blvd & 156th St NE



Intersection	
Intersection Delay, s/veh	21
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	34	166	117	61	162	25	115	161	80	23	250	44
Future Vol, veh/h	34	166	117	61	162	25	115	161	80	23	250	44
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	2
Mvmt Flow	35	169	119	62	165	26	117	164	82	23	255	45
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	20.6	17.8	23.8	20.9
HCM LOS	C	C	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	32%	11%	25%	7%
Vol Thru, %	45%	52%	65%	79%
Vol Right, %	22%	37%	10%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	356	317	248	317
LT Vol	115	34	61	23
Through Vol	161	166	162	250
RT Vol	80	117	25	44
Lane Flow Rate	363	323	253	323
Geometry Grp	1	1	1	1
Degree of Util (X)	0.689	0.619	0.511	0.623
Departure Headway (Hd)	6.832	6.891	7.275	6.938
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	527	524	493	518
Service Time	4.891	4.95	5.34	5
HCM Lane V/C Ratio	0.689	0.616	0.513	0.624
HCM Control Delay	23.8	20.6	17.8	20.9
HCM Lane LOS	C	C	C	C
HCM 95th-tile Q	5.3	4.2	2.9	4.2

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	0	222	0	0	315
Future Vol, veh/h	1	0	222	0	0	315
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	1	0	239	0	0	339

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	578	239	0	0	239	0
Stage 1	239	-	-	-	-	-
Stage 2	339	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	476	797	-	-	1322	-
Stage 1	798	-	-	-	-	-
Stage 2	719	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	476	797	-	-	1322	-
Mov Cap-2 Maneuver	476	-	-	-	-	-
Stage 1	798	-	-	-	-	-
Stage 2	719	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.6	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	476	1322	-
HCM Lane V/C Ratio	-	-	0.002	-	-
HCM Control Delay (s)	-	-	12.6	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	5	268	30	8	59	275	626	26	51	732	54
Future Volume (vph)	35	5	268	30	8	59	275	626	26	51	732	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	100		0	200		0	100		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.867			0.994			0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1845	1568	1752	1599	0	1752	3484	0	1752	3470	0
Flt Permitted	0.623			0.754			0.175			0.396		
Satd. Flow (perm)	1149	1845	1568	1391	1599	0	323	3484	0	730	3470	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			276		61			5			7	
Link Speed (mph)		35			25			40			40	
Link Distance (ft)		1346			860			921			851	
Travel Time (s)		26.2			23.5			15.7			14.5	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	5	276	31	69	0	284	672	0	53	811	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	10.0		7.0	10.0	
Minimum Split (s)	12.0	25.0	25.0	12.0	25.0		12.0	25.0		12.0	25.0	
Total Split (s)	12.0	30.0	30.0	12.0	30.0		26.0	65.0		13.0	52.0	
Total Split (%)	10.0%	25.0%	25.0%	10.0%	25.0%		21.7%	54.2%		10.8%	43.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	13.4	11.2	11.2	12.4	8.9		44.0	37.8		30.7	23.0	
Actuated g/C Ratio	0.19	0.16	0.16	0.18	0.13		0.63	0.54		0.44	0.33	
v/c Ratio	0.13	0.02	0.57	0.11	0.27		0.54	0.36		0.12	0.71	
Control Delay	25.3	33.0	10.3	25.2	15.1		13.0	12.2		8.6	25.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	25.3	33.0	10.3	25.2	15.1		13.0	12.2		8.6	25.2	
LOS	C	C	B	C	B		B	B		A	C	
Approach Delay		12.3			18.2			12.4			24.2	
Approach LOS		B			B			B			C	
Queue Length 50th (ft)	12	2	0	10	3		54	105		9	165	
Queue Length 95th (ft)	41	13	72	37	43		143	173		26	281	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1266			780			841			771	
Turn Bay Length (ft)	200		200	100			200			100		
Base Capacity (vph)	285	713	775	286	655		667	2918		457	2507	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.13	0.01	0.36	0.11	0.11		0.43	0.23		0.12	0.32	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 69.8
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 17.2 Intersection LOS: B
Intersection Capacity Utilization 58.3% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1: Smokey Point Blvd & 156th St NE

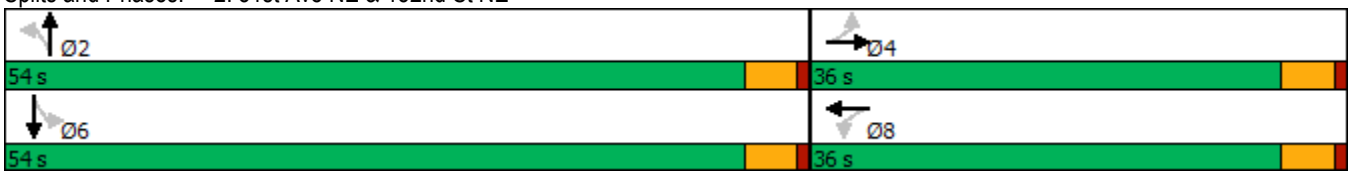
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	192	129	113	210	37	128	274	104	29	532	245
Future Volume (vph)	106	192	129	113	210	37	128	274	104	29	532	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.959			0.986			0.972			0.959	
Flt Protected		0.988			0.985			0.987			0.998	
Satd. Flow (prot)	0	1748	0	0	1792	0	0	1770	0	0	1771	0
Flt Permitted		0.788			0.690			0.625			0.973	
Satd. Flow (perm)	0	1394	0	0	1255	0	0	1121	0	0	1726	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			7			23			39	
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		728			787			763			2653	
Travel Time (s)		14.2			15.3			13.0			45.2	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	436	0	0	367	0	0	517	0	0	823	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	36.0	36.0		36.0	36.0		54.0	54.0		54.0	54.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		60.0%	60.0%		60.0%	60.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		27.5			27.5			41.2			41.2	
Actuated g/C Ratio		0.35			0.35			0.53			0.53	
v/c Ratio		0.86			0.82			0.86			0.89	
Control Delay		42.2			41.9			32.1			29.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		42.2			41.9			32.1			29.3	
LOS		D			D			C			C	
Approach Delay		42.2			41.9			32.1			29.3	
Approach LOS		D			D			C			C	
Queue Length 50th (ft)		206			177			218			356	
Queue Length 95th (ft)		#392			#342			#432			#618	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		648			707			683			2573	
Turn Bay Length (ft)												
Base Capacity (vph)		604			534			751			1158	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.72			0.69			0.69			0.71	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 78.2
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 34.8 Intersection LOS: C
Intersection Capacity Utilization 112.8% ICU Level of Service H
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: 51st Ave NE & 152nd St NE



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	395	450	358	143	165	377
Future Volume (vph)	395	450	358	143	165	377
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.961			
Flt Protected	0.950					0.985
Satd. Flow (prot)	1752	1568	1773	0	0	1817
Flt Permitted	0.950					0.622
Satd. Flow (perm)	1752	1568	1773	0	0	1147
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		484	34			
Link Speed (mph)	25		40			40
Link Distance (ft)	1250		2653			680
Travel Time (s)	34.1		45.2			11.6
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	425	484	539	0	0	582
Turn Type	pm+pt	Perm	NA		pm+pt	NA
Protected Phases	3		2		1	6
Permitted Phases	8	8			6	
Detector Phase	3	8	2		1	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	22.5	22.5	22.5		9.5	22.5
Total Split (s)	28.0	28.0	52.5		9.5	62.0
Total Split (%)	31.1%	31.1%	58.3%		10.6%	68.9%
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	4.5	4.5	4.5			4.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	Min		None	Min
Act Effct Green (s)	22.3	22.3	53.0			53.0
Actuated g/C Ratio	0.26	0.26	0.63			0.63
v/c Ratio	0.92	0.63	0.48			0.81
Control Delay	59.0	6.9	9.5			23.1
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	59.0	6.9	9.5			23.1
LOS	E	A	A			C
Approach Delay	31.2		9.5			23.1
Approach LOS	C		A			C
Queue Length 50th (ft)	236	0	131			218
Queue Length 95th (ft)	#414	79	202			#428
Internal Link Dist (ft)	1170		2573			600
Turn Bay Length (ft)						
Base Capacity (vph)	497	792	1189			796

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.86	0.61	0.45			0.73

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 84.5
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.92
Intersection Signal Delay: 23.1 Intersection LOS: C
Intersection Capacity Utilization 89.6% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: 51st Ave NE & 160th St NE

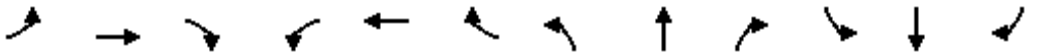
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	5	271	30	8	59	282	626	26	51	732	54
Future Volume (vph)	35	5	271	30	8	59	282	626	26	51	732	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	100		0	200		0	100		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.867			0.994			0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1845	1568	1752	1599	0	1752	3484	0	1752	3470	0
Flt Permitted	0.623			0.754			0.175			0.396		
Satd. Flow (perm)	1149	1845	1568	1391	1599	0	323	3484	0	730	3470	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			279		61			5			7	
Link Speed (mph)		35			25			40			40	
Link Distance (ft)		1346			860			921			851	
Travel Time (s)		26.2			23.5			15.7			14.5	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	5	279	31	69	0	291	672	0	53	811	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	10.0		7.0	10.0	
Minimum Split (s)	12.0	25.0	25.0	12.0	25.0		12.0	25.0		12.0	25.0	
Total Split (s)	12.0	30.0	30.0	12.0	30.0		26.0	65.0		13.0	52.0	
Total Split (%)	10.0%	25.0%	25.0%	10.0%	25.0%		21.7%	54.2%		10.8%	43.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	13.4	11.2	11.2	12.5	8.9		44.4	38.2		30.7	23.1	
Actuated g/C Ratio	0.19	0.16	0.16	0.18	0.13		0.63	0.54		0.44	0.33	
v/c Ratio	0.13	0.02	0.58	0.11	0.27		0.55	0.35		0.12	0.71	
Control Delay	25.4	33.0	10.3	25.3	15.2		13.4	12.1		8.6	25.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	25.4	33.0	10.3	25.3	15.2		13.4	12.1		8.6	25.4	
LOS	C	C	B	C	B		B	B		A	C	
Approach Delay		12.4			18.3			12.5			24.4	
Approach LOS		B			B			B			C	
Queue Length 50th (ft)	12	2	0	10	3		56	105		9	166	
Queue Length 95th (ft)	41	13	73	37	43		149	173		26	281	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1266			780			841			771	
Turn Bay Length (ft)	200		200	100			200			100		
Base Capacity (vph)	284	709	774	285	652		665	2909		455	2496	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.13	0.01	0.36	0.11	0.11		0.44	0.23		0.12	0.32	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 70.2
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 17.3 Intersection LOS: B
Intersection Capacity Utilization 58.7% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1: Smokey Point Blvd & 156th St NE



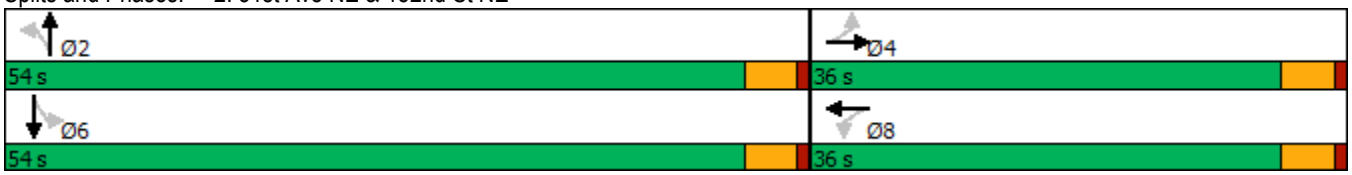
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	192	129	113	210	41	128	284	104	40	559	265
Future Volume (vph)	114	192	129	113	210	41	128	284	104	40	559	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.960			0.985			0.973			0.959	
Flt Protected		0.987			0.985			0.988			0.998	
Satd. Flow (prot)	0	1748	0	0	1790	0	0	1773	0	0	1771	0
Flt Permitted		0.763			0.683			0.607			0.960	
Satd. Flow (perm)	0	1351	0	0	1241	0	0	1089	0	0	1703	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			8			22			39	
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		728			787			763			2653	
Travel Time (s)		14.2			15.3			13.0			45.2	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	444	0	0	371	0	0	527	0	0	881	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	36.0	36.0		36.0	36.0		54.0	54.0		54.0	54.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		60.0%	60.0%		60.0%	60.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		29.4			29.4			45.7			45.7	
Actuated g/C Ratio		0.35			0.35			0.54			0.54	
v/c Ratio		0.91			0.85			0.88			0.94	
Control Delay		51.1			45.6			35.1			36.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		51.1			45.6			35.1			36.5	
LOS		D			D			D			D	
Approach Delay		51.1			45.6			35.1			36.5	
Approach LOS		D			D			D			D	
Queue Length 50th (ft)		226			189			233			415	
Queue Length 95th (ft)		#413			#350			#456			#702	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		648			707			683			2573	
Turn Bay Length (ft)												
Base Capacity (vph)		531			478			662			1037	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.84			0.78			0.80			0.85	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 84.3
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 40.6 Intersection LOS: D
Intersection Capacity Utilization 113.6% ICU Level of Service H
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: 51st Ave NE & 152nd St NE



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	395	450	380	143	165	435
Future Volume (vph)	395	450	380	143	165	435
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.963			
Flt Protected	0.950					0.986
Satd. Flow (prot)	1752	1568	1776	0	0	1819
Flt Permitted	0.950					0.611
Satd. Flow (perm)	1752	1568	1776	0	0	1127
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		478	42			
Link Speed (mph)	25		40			40
Link Distance (ft)	1250		2653			680
Travel Time (s)	34.1		45.2			11.6
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	425	484	563	0	0	645
Turn Type	Prot	Perm	NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases		8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	22.5	22.5	22.5		22.5	22.5
Total Split (s)	28.0	28.0	62.0		62.0	62.0
Total Split (%)	31.1%	31.1%	68.9%		68.9%	68.9%
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	4.5	4.5	4.5			4.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min		Min	Min
Act Effct Green (s)	22.4	22.4	49.4			49.4
Actuated g/C Ratio	0.28	0.28	0.61			0.61
v/c Ratio	0.88	0.62	0.51			0.94
Control Delay	51.5	6.9	10.0			38.8
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	51.5	6.9	10.0			38.8
LOS	D	A	A			D
Approach Delay	27.8		10.0			38.8
Approach LOS	C		A			D
Queue Length 50th (ft)	236	3	138			278
Queue Length 95th (ft)	#414	83	212			#547
Internal Link Dist (ft)	1170		2573			600
Turn Bay Length (ft)						
Base Capacity (vph)	523	803	1307			822

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.81	0.60	0.43			0.78

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 81.1
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 26.4 Intersection LOS: C
Intersection Capacity Utilization 93.9% ICU Level of Service F
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: 51st Ave NE & 160th St NE

Intersection	
Int Delay, s/veh	0.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	58	0	808	22	0	542
Future Vol, veh/h	58	0	808	22	0	542
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	63	0	878	24	0	589

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1479	890	0	0	902	0
Stage 1	890	-	-	-	-	-
Stage 2	589	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	138	342	-	-	754	-
Stage 1	401	-	-	-	-	-
Stage 2	554	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	138	342	-	-	754	-
Mov Cap-2 Maneuver	273	-	-	-	-	-
Stage 1	401	-	-	-	-	-
Stage 2	554	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	22.1	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	273	754	-
HCM Lane V/C Ratio	-	-	0.231	-	-
HCM Control Delay (s)	-	-	22.1	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.9	0	-

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	76	808	0	30	542
Future Vol, veh/h	0	76	808	0	30	542
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	83	878	0	33	589

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1533	878	0	0	878	0
Stage 1	878	-	-	-	-	-
Stage 2	655	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	128	347	-	-	769	-
Stage 1	406	-	-	-	-	-
Stage 2	517	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	120	347	-	-	769	-
Mov Cap-2 Maneuver	120	-	-	-	-	-
Stage 1	406	-	-	-	-	-
Stage 2	484	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.6	0	0.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	347	769	-
HCM Lane V/C Ratio	-	-	0.238	0.042	-
HCM Control Delay (s)	-	-	18.6	9.9	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.9	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	7	315	35	9	70	313	748	31	61	874	64
Future Volume (vph)	42	7	315	35	9	70	313	748	31	61	874	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	100		0	200		0	100		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.867			0.994			0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1845	1568	1752	1599	0	1752	3484	0	1752	3470	0
Flt Permitted	0.704			0.753			0.133			0.348		
Satd. Flow (perm)	1299	1845	1568	1389	1599	0	245	3484	0	642	3470	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			325		72			5			7	
Link Speed (mph)		35			25			40			40	
Link Distance (ft)		1346			860			921			851	
Travel Time (s)		26.2			23.5			15.7			14.5	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	7	325	36	81	0	323	803	0	63	967	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	10.0		7.0	10.0	
Minimum Split (s)	12.0	25.0	25.0	12.0	25.0		12.0	25.0		12.0	25.0	
Total Split (s)	12.0	30.0	30.0	12.0	30.0		26.0	65.0		13.0	52.0	
Total Split (%)	10.0%	25.0%	25.0%	10.0%	25.0%		21.7%	54.2%		10.8%	43.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	12.9	9.3	9.3	12.9	9.3		54.3	44.9		38.0	30.3	
Actuated g/C Ratio	0.16	0.12	0.12	0.16	0.12		0.67	0.56		0.47	0.38	
v/c Ratio	0.17	0.03	0.69	0.14	0.33		0.63	0.41		0.15	0.74	
Control Delay	30.7	39.0	13.5	30.3	16.2		20.8	12.7		8.6	26.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	30.7	39.0	13.5	30.3	16.2		20.8	12.7		8.6	26.3	
LOS	C	D	B	C	B		C	B		A	C	
Approach Delay		15.9			20.6			15.0			25.3	
Approach LOS		B			C			B			C	
Queue Length 50th (ft)	18	3	0	15	5		87	132		10	235	
Queue Length 95th (ft)	52	18	83	46	49		227	220		30	357	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1266			780			841			771	
Turn Bay Length (ft)	200		200	100			200			100		
Base Capacity (vph)	250	615	739	257	581		587	2685		428	2179	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.17	0.01	0.44	0.14	0.14		0.55	0.30		0.15	0.44	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 80.5
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 19.4 Intersection LOS: B
Intersection Capacity Utilization 65.0% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: Smokey Point Blvd & 156th St NE

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	228	154	126	244	43	152	308	121	34	585	254
Future Volume (vph)	113	228	154	126	244	43	152	308	121	34	585	254
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	150		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.940			0.977			0.958			0.955	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1734	0	1752	1802	0	1752	1767	0	1752	1767	0
Flt Permitted	0.400			0.250			0.180			0.452		
Satd. Flow (perm)	738	1734	0	461	1802	0	332	1767	0	834	1767	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		41			11			35			39	
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		728			787			763			2653	
Travel Time (s)		14.2			15.3			13.0			45.2	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	115	390	0	129	293	0	155	437	0	35	856	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	36.0	36.0		36.0	36.0		54.0	54.0		54.0	54.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		60.0%	60.0%		60.0%	60.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)	22.3	22.3		22.3	22.3		49.9	49.9		49.9	49.9	
Actuated g/C Ratio	0.27	0.27		0.27	0.27		0.61	0.61		0.61	0.61	
v/c Ratio	0.57	0.77		1.02	0.58		0.76	0.40		0.07	0.78	
Control Delay	36.4	34.7		118.0	28.9		43.1	9.9		8.9	19.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	36.4	34.7		118.0	28.9		43.1	9.9		8.9	19.4	
LOS	D	C		F	C		D	A		A	B	
Approach Delay		35.1			56.1			18.6			19.0	
Approach LOS		D			E			B			B	
Queue Length 50th (ft)	50	162		~68	122		50	91		6	271	
Queue Length 95th (ft)	103	259		#169	197		#198	197		23	#647	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		648			707			683			2573	
Turn Bay Length (ft)	150			150			150			100		
Base Capacity (vph)	288	702		180	710		203	1098		511	1099	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.40	0.56		0.72	0.41		0.76	0.40		0.07	0.78	

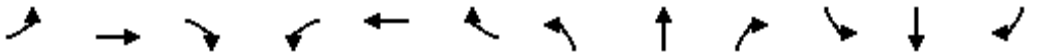
Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 81.2
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 28.8 Intersection LOS: C
Intersection Capacity Utilization 98.1% ICU Level of Service F
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: 51st Ave NE & 152nd St NE



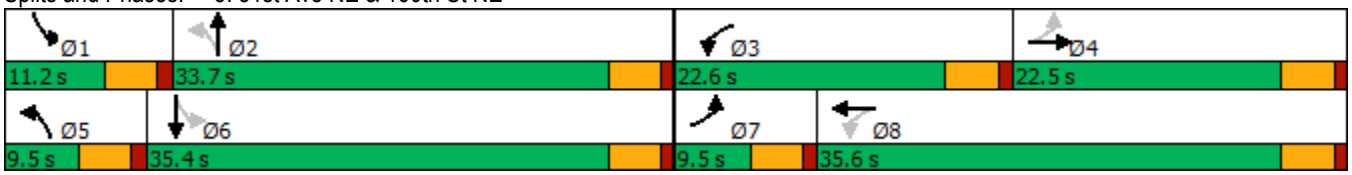
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	25	25	395	25	450	25	405	143	165	444	25
Future Volume (vph)	25	25	25	395	25	450	25	405	143	165	444	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.925			0.858			0.961			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1723	0	1752	1584	0	1770	1773	0	1752	1831	0
Flt Permitted	0.635			0.421			0.369			0.159		
Satd. Flow (perm)	1183	1723	0	777	1584	0	687	1773	0	293	1831	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			395			21			3	
Link Speed (mph)		30			25			40			40	
Link Distance (ft)		874			1250			2653			680	
Travel Time (s)		19.9			34.1			45.2			11.6	
Peak Hour Factor	0.92	0.92	0.92	0.93	0.92	0.93	0.92	0.93	0.93	0.93	0.93	0.92
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	54	0	425	511	0	27	589	0	177	504	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		22.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5		22.6	35.6		9.5	33.7		11.2	35.4	
Total Split (%)	10.6%	25.0%		25.1%	39.6%		10.6%	37.4%		12.4%	39.3%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	10.5	8.0		25.3	21.9		34.5	29.4		39.8	37.4	
Actuated g/C Ratio	0.14	0.11		0.34	0.29		0.46	0.39		0.53	0.50	
v/c Ratio	0.13	0.26		0.87	0.69		0.07	0.83		0.62	0.55	
Control Delay	18.9	22.7		41.6	11.5		11.8	35.0		23.7	20.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	18.9	22.7		41.6	11.5		11.8	35.0		23.7	20.3	
LOS	B	C		D	B		B	C		C	C	
Approach Delay		21.4			25.2			34.0			21.1	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	8	13		169	38		6	256		44	155	
Queue Length 95th (ft)	23	44		#290	150		22	#530		#130	#399	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		794			1170			2573			600	
Turn Bay Length (ft)	150			150			150			150		
Base Capacity (vph)	205	439		510	894		388	712		287	911	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.13	0.12		0.83	0.57		0.07	0.83		0.62	0.55	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 75.2
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 26.2 Intersection LOS: C
Intersection Capacity Utilization 79.5% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: 51st Ave NE & 160th St NE



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	13	315	42	25	70	313	748	34	61	874	71
Future Volume (vph)	45	13	315	42	25	70	313	748	34	61	874	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	100		0	200		0	100		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.890			0.993			0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1845	1568	1752	1642	0	1752	3480	0	1752	3466	0
Flt Permitted	0.694			0.749			0.132			0.347		
Satd. Flow (perm)	1280	1845	1568	1382	1642	0	243	3480	0	640	3466	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			325		72			5			8	
Link Speed (mph)		35			25			40			40	
Link Distance (ft)		1346			860			921			851	
Travel Time (s)		26.2			23.5			15.7			14.5	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	13	325	43	98	0	323	806	0	63	974	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	10.0		7.0	10.0	
Minimum Split (s)	12.0	25.0	25.0	12.0	25.0		12.0	25.0		12.0	25.0	
Total Split (s)	12.0	30.0	30.0	12.0	30.0		26.0	65.0		13.0	52.0	
Total Split (%)	10.0%	25.0%	25.0%	10.0%	25.0%		21.7%	54.2%		10.8%	43.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	12.9	9.3	9.3	12.9	9.3		54.9	45.6		38.5	30.8	
Actuated g/C Ratio	0.16	0.11	0.11	0.16	0.11		0.68	0.56		0.47	0.38	
v/c Ratio	0.19	0.06	0.69	0.17	0.39		0.63	0.41		0.15	0.74	
Control Delay	31.1	39.5	13.5	30.9	20.6		21.0	12.6		8.6	26.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	31.1	39.5	13.5	30.9	20.6		21.0	12.6		8.6	26.3	
LOS	C	D	B	C	C		C	B		A	C	
Approach Delay		16.5			23.8			15.0			25.2	
Approach LOS		B			C			B			C	
Queue Length 50th (ft)	20	7	0	18	13		88	133		10	238	
Queue Length 95th (ft)	55	26	84	53	65		228	221		30	361	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1266			780			841			771	
Turn Bay Length (ft)	200		200	100			200			100		
Base Capacity (vph)	247	609	736	254	591		583	2661		428	2157	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.19	0.02	0.44	0.17	0.17		0.55	0.30		0.15	0.45	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 81.1
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 19.6 Intersection LOS: B
Intersection Capacity Utilization 65.4% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: Smokey Point Blvd & 156th St NE

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	228	154	126	244	46	152	318	121	41	612	254
Future Volume (vph)	113	228	154	126	244	46	152	318	121	41	612	254
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	150		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.940			0.976			0.959			0.956	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1734	0	1752	1800	0	1752	1769	0	1752	1769	0
Flt Permitted	0.395			0.250			0.163			0.445		
Satd. Flow (perm)	729	1734	0	461	1800	0	301	1769	0	821	1769	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		41			12			34			37	
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		728			787			763			2653	
Travel Time (s)		14.2			15.3			13.0			45.2	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	115	390	0	129	296	0	155	447	0	42	883	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	36.0	36.0		36.0	36.0		54.0	54.0		54.0	54.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		60.0%	60.0%		60.0%	60.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)	22.3	22.3		22.3	22.3		49.9	49.9		49.9	49.9	
Actuated g/C Ratio	0.27	0.27		0.27	0.27		0.61	0.61		0.61	0.61	
v/c Ratio	0.57	0.77		1.02	0.59		0.84	0.41		0.08	0.80	
Control Delay	36.9	34.7		118.0	28.9		56.5	10.0		9.0	20.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	36.9	34.7		118.0	28.9		56.5	10.0		9.0	20.8	
LOS	D	C		F	C		E	B		A	C	
Approach Delay		35.2			56.0			22.0			20.2	
Approach LOS		D			E			C			C	
Queue Length 50th (ft)	50	162		~68	123		55	94		8	290	
Queue Length 95th (ft)	103	259		#169	198		#208	203		27	#683	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		648			707			683			2573	
Turn Bay Length (ft)	150			150			150			100		
Base Capacity (vph)	284	702		180	710		184	1099		504	1100	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.40	0.56		0.72	0.42		0.84	0.41		0.08	0.80	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 81.2
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 29.9 Intersection LOS: C
Intersection Capacity Utilization 99.5% ICU Level of Service F
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: 51st Ave NE & 152nd St NE

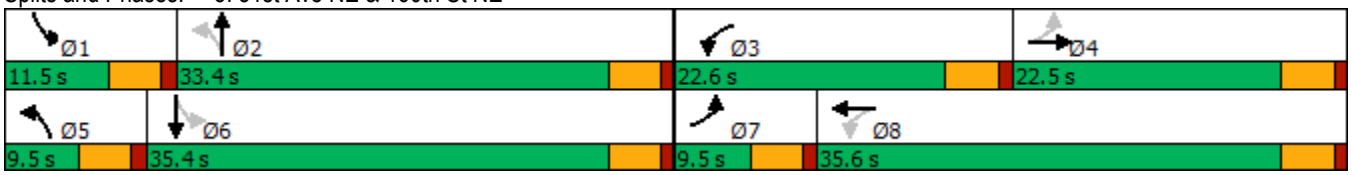
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	25	25	395	25	456	25	418	143	182	478	65
Future Volume (vph)	41	25	25	395	25	456	25	418	143	182	478	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.925			0.858			0.962			0.982	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1723	0	1752	1584	0	1770	1775	0	1752	1814	0
Flt Permitted	0.656			0.415			0.293			0.147		
Satd. Flow (perm)	1222	1723	0	766	1584	0	546	1775	0	271	1814	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			373			20			8	
Link Speed (mph)		30			25			40			40	
Link Distance (ft)		874			1250			2653			680	
Travel Time (s)		19.9			34.1			45.2			11.6	
Peak Hour Factor	0.92	0.92	0.92	0.93	0.92	0.93	0.92	0.93	0.93	0.93	0.93	0.92
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%	2%	3%	3%	3%	3%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	54	0	425	517	0	27	603	0	196	585	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		22.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5		22.6	35.6		9.5	33.4		11.5	35.4	
Total Split (%)	10.6%	25.0%		25.1%	39.6%		10.6%	37.1%		12.8%	39.3%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	11.1	8.6		25.9	20.7		34.4	29.4		40.2	37.7	
Actuated g/C Ratio	0.15	0.11		0.34	0.27		0.45	0.39		0.53	0.50	
v/c Ratio	0.21	0.25		0.87	0.74		0.08	0.87		0.70	0.65	
Control Delay	20.2	22.0		41.4	14.4		12.6	38.7		29.0	23.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.2	22.0		41.4	14.4		12.6	38.7		29.0	23.4	
LOS	C	C		D	B		B	D		C	C	
Approach Delay		21.2			26.6			37.5			24.8	
Approach LOS		C			C			D			C	
Queue Length 50th (ft)	14	13		169	58		6	268		50	191	
Queue Length 95th (ft)	33	44		#284	170		23	#571		#175	#525	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		794			1170			2573			600	
Turn Bay Length (ft)	150			150			150			150		
Base Capacity (vph)	215	434		508	875		328	697		281	901	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.21	0.12		0.84	0.59		0.08	0.87		0.70	0.65	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 76.1
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 28.6 Intersection LOS: C
Intersection Capacity Utilization 86.1% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: 51st Ave NE & 160th St NE



Intersection	
Int Delay, s/veh	1.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	91	0	880	35	0	634
Future Vol, veh/h	91	0	880	35	0	634
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	99	0	957	38	0	689

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1665	976	0	0	995	0
Stage 1	976	-	-	-	-	-
Stage 2	689	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	106	305	-	-	695	-
Stage 1	365	-	-	-	-	-
Stage 2	498	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	106	305	-	-	695	-
Mov Cap-2 Maneuver	239	-	-	-	-	-
Stage 1	365	-	-	-	-	-
Stage 2	498	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	30.3	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	239	695	-
HCM Lane V/C Ratio	-	-	0.414	-	-
HCM Control Delay (s)	-	-	30.3	0	-
HCM Lane LOS	-	-	D	A	-
HCM 95th %tile Q(veh)	-	-	1.9	0	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	43	880	0	17	634
Future Vol, veh/h	0	43	880	0	17	634
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	47	957	0	18	689

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1682	957	0	0	957	0
Stage 1	957	-	-	-	-	-
Stage 2	725	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	104	313	-	-	719	-
Stage 1	373	-	-	-	-	-
Stage 2	479	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	100	313	-	-	719	-
Mov Cap-2 Maneuver	100	-	-	-	-	-
Stage 1	373	-	-	-	-	-
Stage 2	459	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.5	0	0.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	313	719	-
HCM Lane V/C Ratio	-	-	0.149	0.026	-
HCM Control Delay (s)	-	-	18.5	10.1	0
HCM Lane LOS	-	-	C	B	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-