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10 Degrees
Traffic Impact Analysis

Jurisdiction: City of Marysville

September 2022

090222183

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ATTACHMENTS

1. DEVELOPMENT IDENTIFICATION

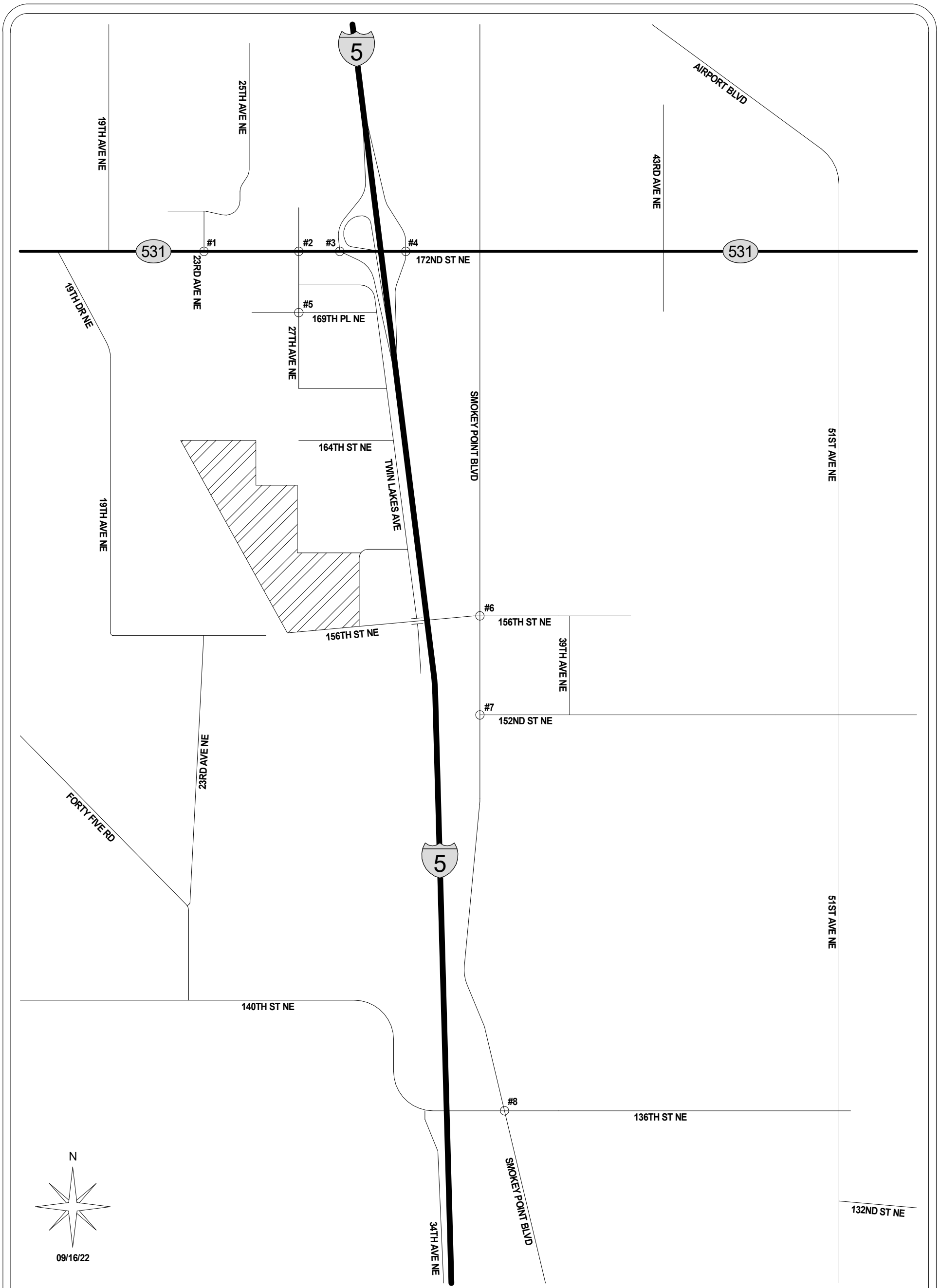
Kimley-Horn and Associates, Inc. has been retained to provide a traffic impact analysis for the proposed 10 Degrees development and address comments from City of Marysville staff. It is important to note that this report includes attachments that were completed when the report was originally completed under Gibson Traffic Consultants, Inc. This report is intended to provide the City of Marysville, Snohomish County, and the Washington State Department of Transportation (WSDOT) with the necessary trip generation, trip distribution and level of service information to facilitate their reviews of the development. The 10 Degrees development is located south of 172nd Street NE and west of Twin Lake Avenue. A site vicinity map is included in Figure 1. The development is proposed to consist of up to 336 residential units split between detached and attached units.

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 ITE.

2. METHODOLOGY

The analysis contained in this report is based on the City of Marysville traffic impact analysis guidelines, which requires the analysis of intersections impacted with 25 or more PM peak-hour trips. The trip generation calculations are based on average trip generation rates published in the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10th Edition (2017)*. The trip distribution is based on the approved distributions provided by the City of Marysville for all development types in the area.

The level of service analysis at the study intersections has been performed in accordance with the *Highway Capacity Manual* (HCM) *6th Edition*. Congestion is generally measured in terms of level of service (LOS). 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. A summary of the level of service criteria is included in Table 1.



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LEGEND

DEVELOPMENT SITE

#XX — STUDY INTERSECTION

FIGURE 1

SITE VICINITY MAP

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 level of service at two-way stop-controlled intersections is based on the average delay for the stop approach with the highest delay. The level of service at all-way stop-controlled intersections, roundabouts, and signalized intersections is based on the average delay for all vehicles. The level of service analysis has been performed utilizing the *Synchro 11.1, Build 0* software for signalized and stop-controlled intersections. The level of service analysis for roundabout intersection has been performed using the *Sidra Version 8.0.7.7948* software. The City of Marysville *Traffic Impact Analysis Guidelines* identify acceptable level of service as LOS E for stop-controlled and signalized intersections along the 172nd Street NE and Smokey Point Boulevard corridors. WSDOT has a level of service threshold of LOS D for SR-531 (172nd Street NE) and City of Marysville staff has requested the use of LOS D as the threshold for intersections along 172nd Street NE. Intersections not located on these corridors have a level of service standard LOS D.

[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.

3. TRIP GENERATION

The trip generation calculations for the 10 Degrees development are based on data published by the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual, 10th Edition (2017).* The average trip generation rates for following ITE Land Use Codes have been used in the trip generation calculations:

- ITE Land Use Code 210, Single-Family Detached Housing – 166 units
- ITE Land Use Code 220, Multifamily Housing (Low-Rise) – 170 units

The trip generation calculations have been performed for the weekday and Saturday. The weekday trip generation calculations for the 10 Degrees development are summarized in Table 2.

Table 2: Trip Generation Summary - Weekday

Land Use	Units	Average Daily Trips	AM Peak-Hour Trips			PM Peak-Hour Trips		
			Inbound	Outbound	Total	Inbound	Outbound	Total
Single-Family Detached Housing	166	1,567.04	30.71	92.13	122.84	104.58	61.42	166.00
Multifamily Housing (Low-Rise)	170	1,244.40	17.99	60.21	78.20	59.98	35.22	95.20
TOTAL		**2,811.44**	**47.80**	**152.34**	**201.04**	**164.56**	**96.64**	**261.20**

The 10 Degrees development is anticipated to generate approximately 12,811 average daily trips with 201 AM peak-hour trips and 261 PM peak-hour trips. It is important to note that the City of Marysville utilizes a rate of 1.00 trip per unit for the PM peak-hour trip generation, as opposed to the ITE trip generation rate of 0.99 trips per unit. The Saturday trip generation for the 10 Degrees development is summarized in Table 3.

Table 3: Trip Generation Summary - Saturday

Land Use	Units	Average Daily Trips	Peak-Hour Trips		
			Inbound	Outbound	Total
Single-Family Detached Housing	166	1,583.64	83.37	71.01	154.38
Multifamily Housing (Low-Rise)	170	1,383.80	74.97	44.03	119.00
TOTAL		**2,967.44**	**158.34**	**115.04**	**273.38**

The 10 Degrees development is anticipated to generate approximately 2,967 average Saturday daily trips with 273 trips generated during the peak-hour. The trip generation calculations are included in the attachments.

4. TRIP DISTRIBUTION

The trip distribution for the 10 Degrees development is based on distributions provided by the City of Marysville for new developments in the site vicinity. The trip distribution has been evaluated for the 2024 Opening Year conditions and the 2030 Horizon Year conditions.

4.1 2024 Opening Year

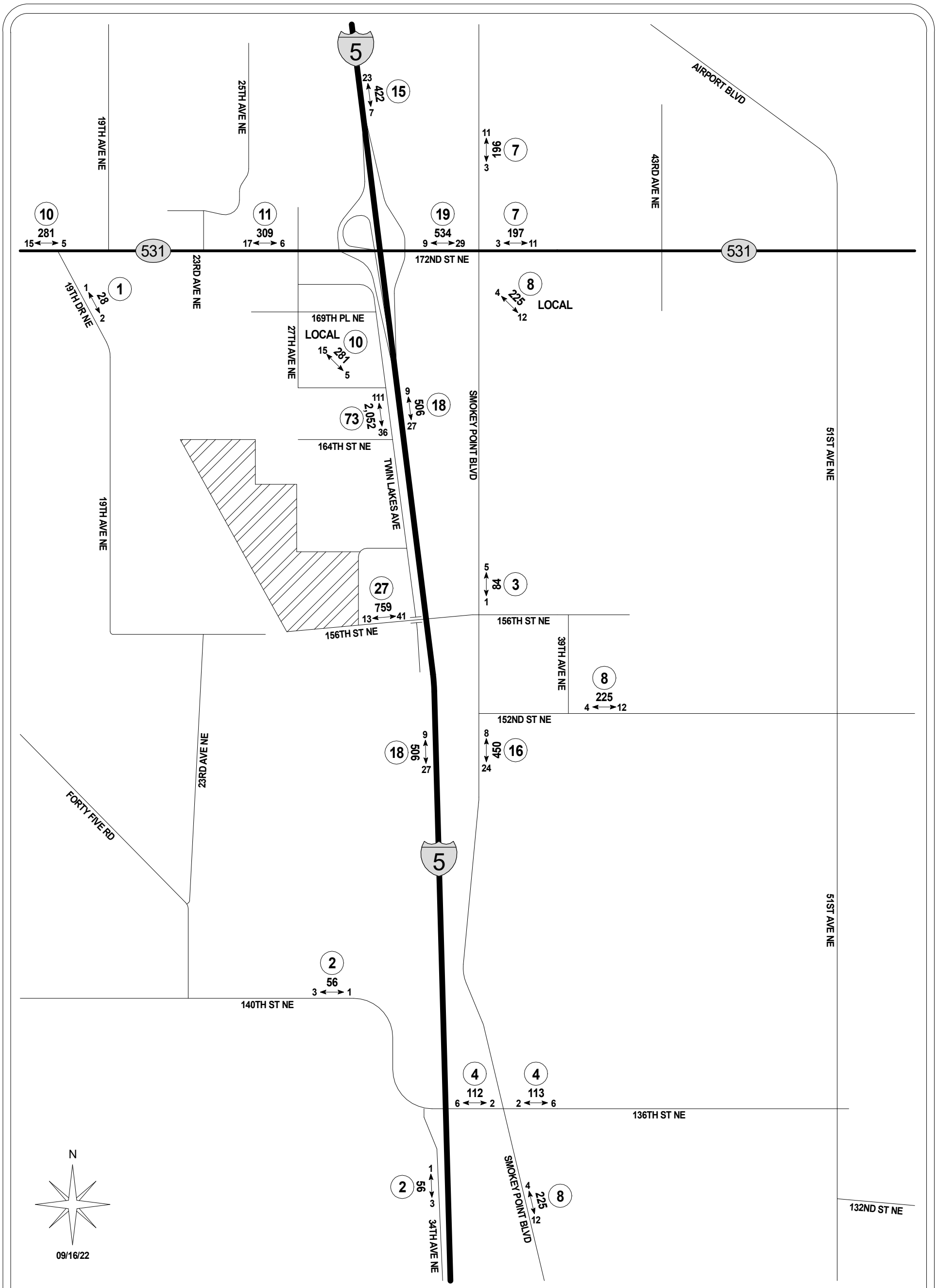
The opening year trip distribution is based on the existing roadway network. It is anticipated that 30% of the trips generated by the development will travel along 172nd Street NE, eleven percent to and from the west and nineteen percent to and from the east. Approximately 27% of the trips generated by the development will travel to and from the east along 156th Street NE. It is estimated that 33% of the trips generated by the development will travel along Interstate-5, fifteen percent to and from the north and eighteen percent to and from the south. The remaining 10% of the trips generated by the development will be to and from local retail areas in the site vicinity. Detailed trip distributions are shown in Figure 2 and Figure 3 for the weekday AM and PM peak-hours, respectively. A detailed trip distribution for the Saturday peak-hour is shown in Figure 4.

4.2 2030 Horizon Year

The horizon year distribution considers future roadway improvements, particularly new roadways south of 172nd Street NE and east of Twin Lakes Avenue and a full Interstate-5 interchange with 156th Street NE. These new roadways and the Interstate-5 interchange are anticipated to cause trips to divert from 172nd Street NE to 156th Street SE. It is anticipated that 45% of the trips generated by the development will travel along 156th Street NE, including the eighteen percent traveling to and from the south along Interstate-5 and the twenty-seven percent that will travel along City of Marysville roadways east of Interstate-5. It is estimated that 15% of the trips generated by the development will travel to and from the north along Interstte-5. These trips could use the new access to Interstate-5 at 156th Street NE, but have been assigned along 172nd Street NE to maximize the impact of the trips generated by the development to the intersections along the 172nd Street NE corridor. Approximately 30% of the trips generated by the development will travel along 172nd Street NE, eleven percent to and from the west and nineteen percent to and from the east. It is to and from the south along Twin Lake Avenue. The remaining 10% of the trips generated by the development will travel to and from local retail areas. The horizon year trip distributions for the weekday AM and PM peak-hours are shown in Figure 5 and Figure 6, respectively, and the horizon year distribution for the Saturday peak-hour is shown in Figure 7.

4.3 Snohomish County Key Intersection Impacts

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 trips from the 10 Degrees development will impact 2 key intersections during the weekday AM and PM peak-hours. The turning movement volumes at the key intersections are shown in graphical and tabular form in the attachments.



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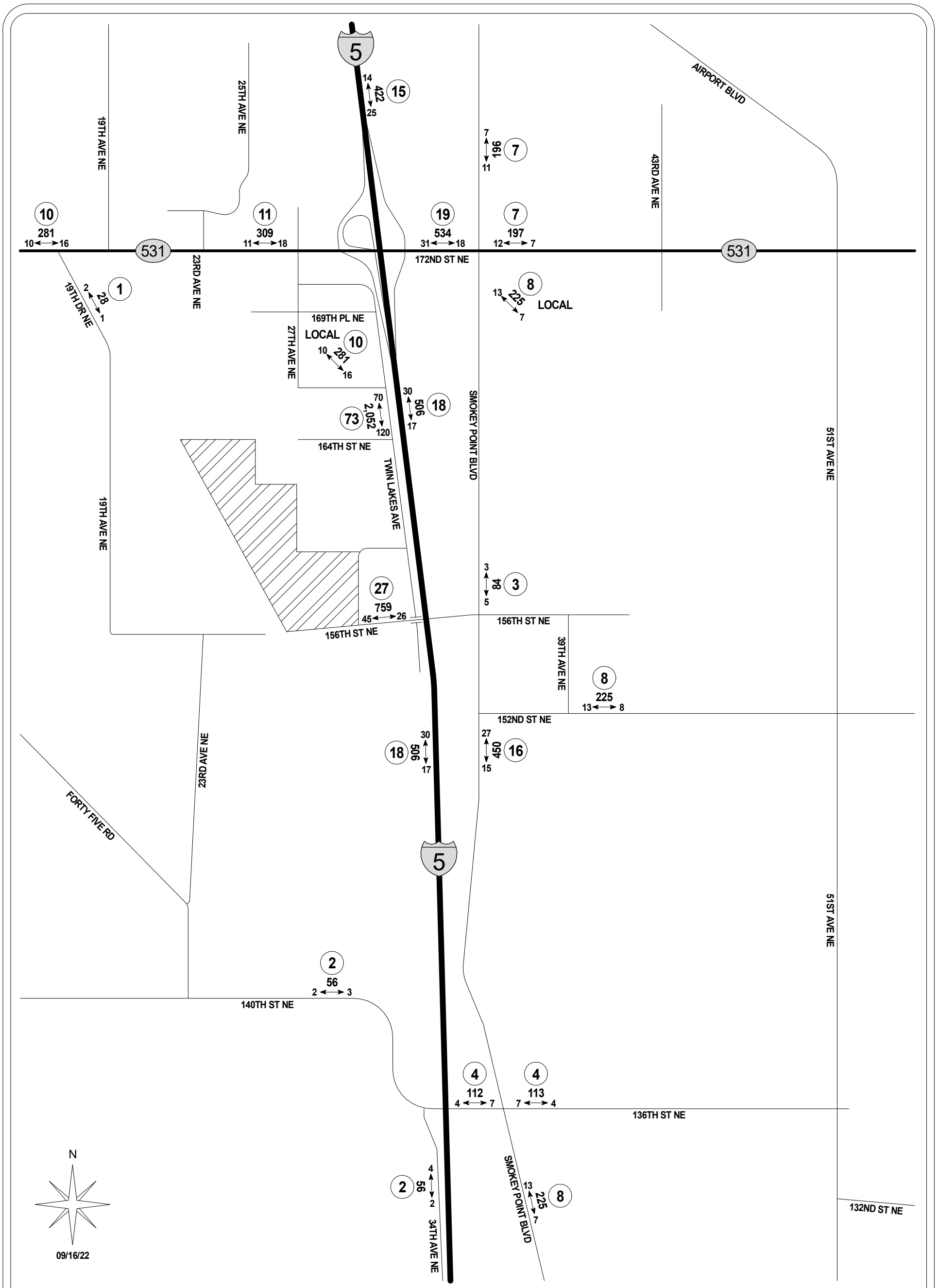
WEEKDAY AM ⟷ PEAK — NEW DAILY TRAFFIC / NEW PEAK-HOUR TRIPS

(XX) — TRIP DISTRIBUTION %

FIGURE 2

2024 OPENING YEAR TRIP DISTRIBUTION WEEKDAY AM PEAK-HOUR



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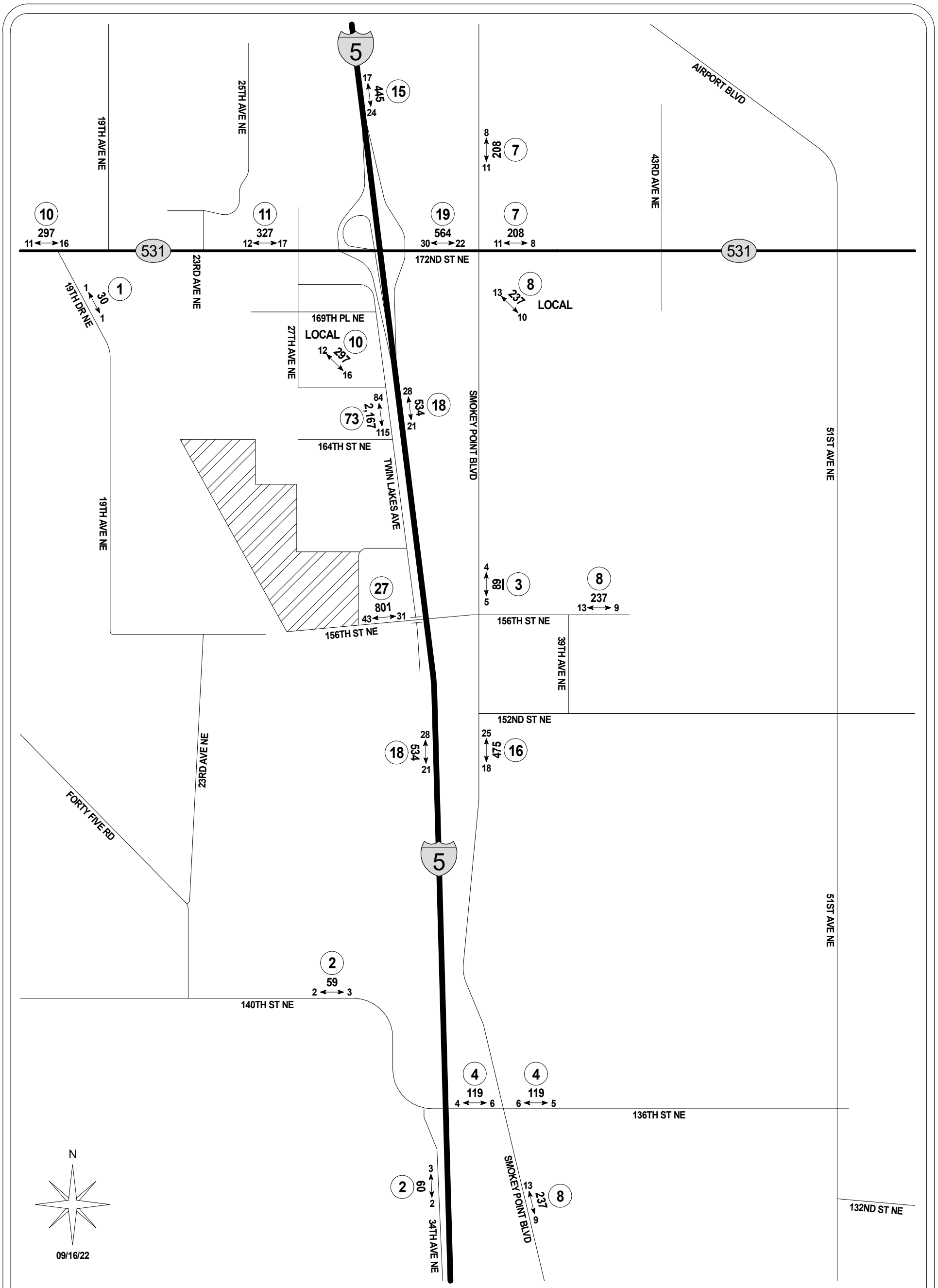
WEEKDAY PM ↔ PEAK — NEW DAILY TRAFFIC / NEW PEAK-HOUR TRIPS

(XX) — TRIP DISTRIBUTION %

FIGURE 3

2024 OPENING YEAR TRIP DISTRIBUTION WEEKDAY PM PEAK-HOUR



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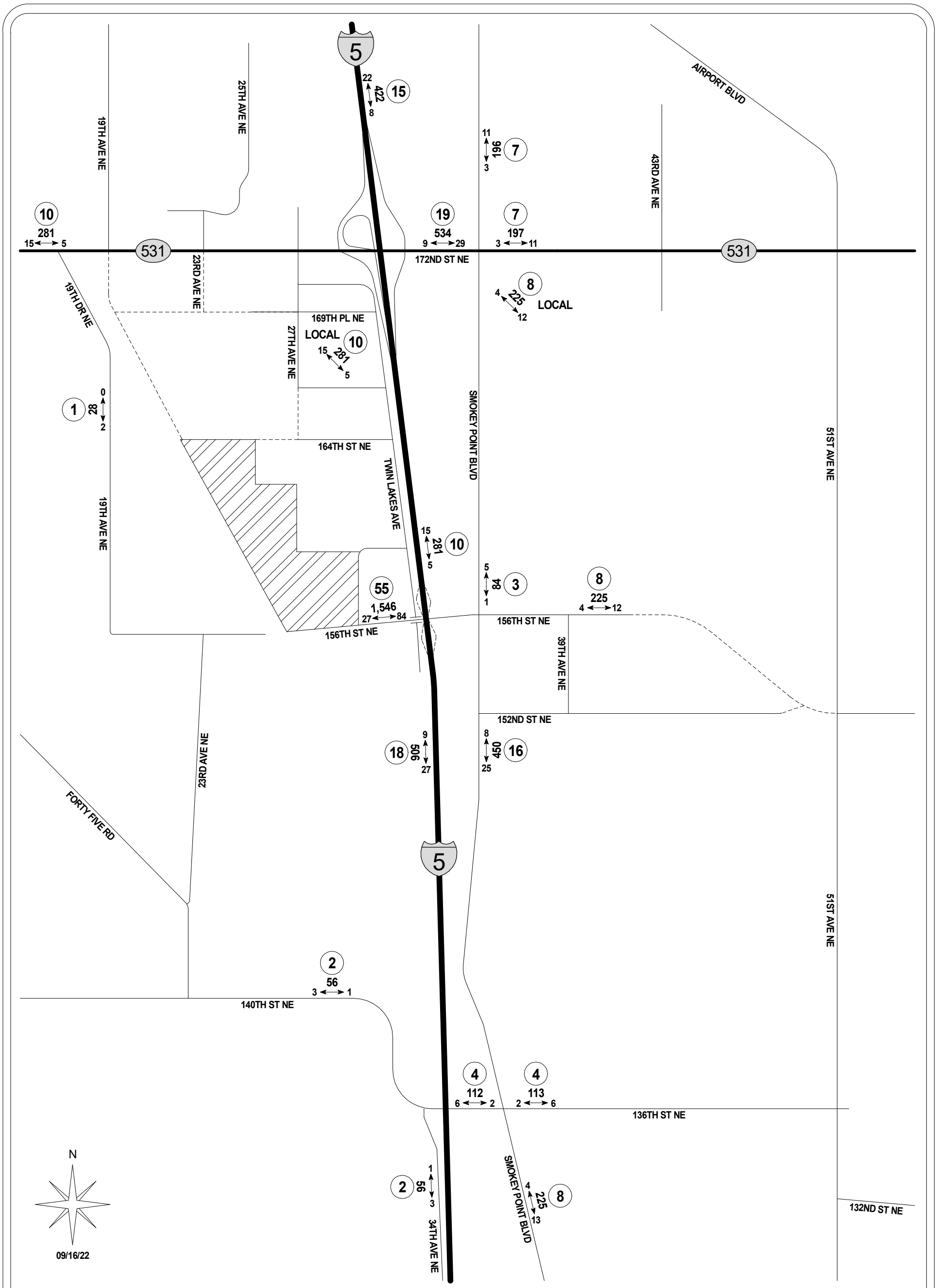
SATURDAY ⟷ PEAK — NEW DAILY TRAFFIC / NEW PEAK-HOUR TRIPS

(XX) — TRIP DISTRIBUTION %

FIGURE 4

2024 OPENING YEAR TRIP DISTRIBUTION SATURDAY PEAK-HOUR



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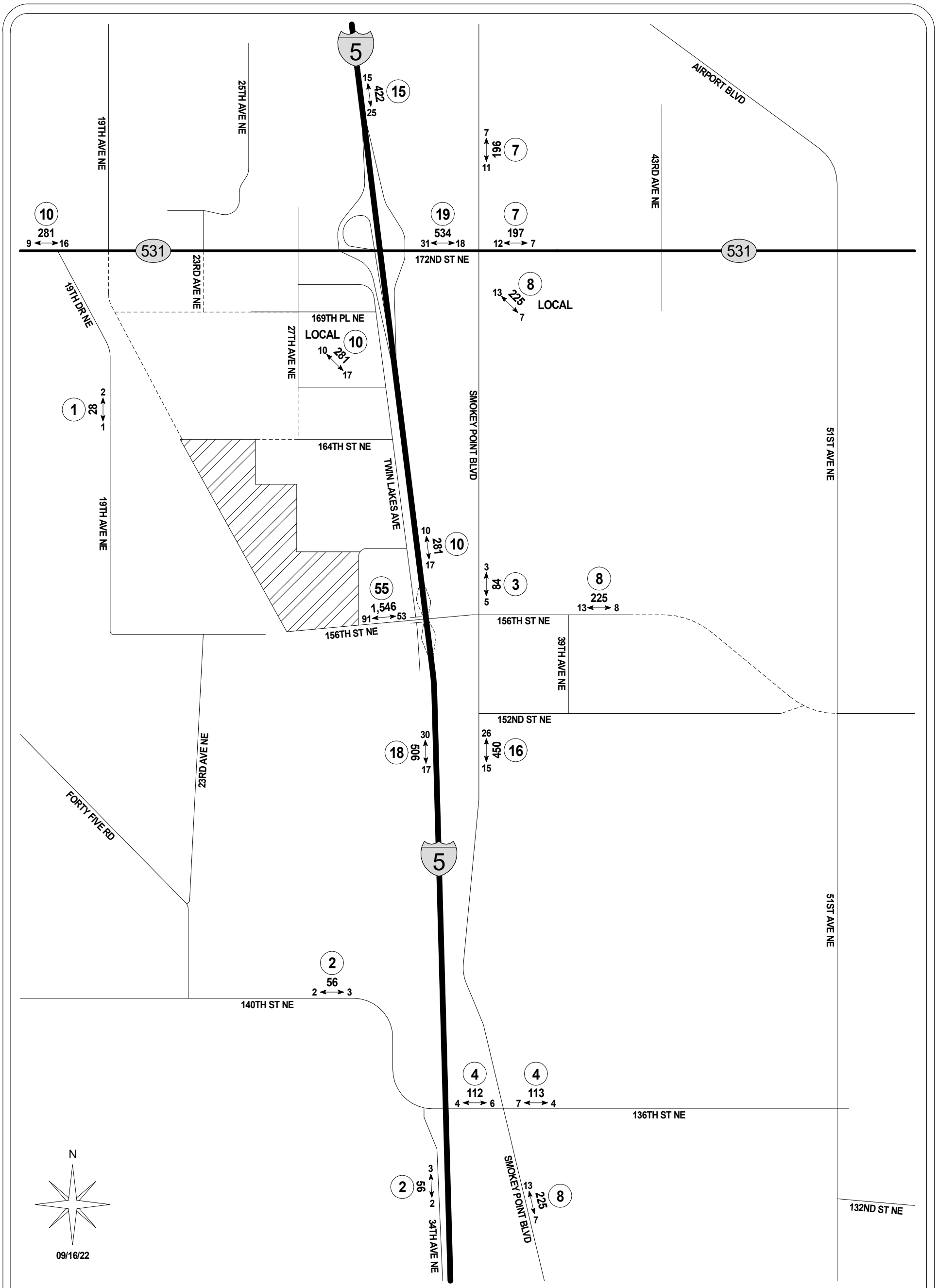
WEEKDAY AM ⟷ PEAK
NEW DAILY TRAFFIC
NEW PEAK-HOUR TRIPS

(XX) TRIP DISTRIBUTION %

FIGURE 5

2030 HORIZON YEAR TRIP DISTRIBUTION WEEKDAY AM PEAK-HOUR



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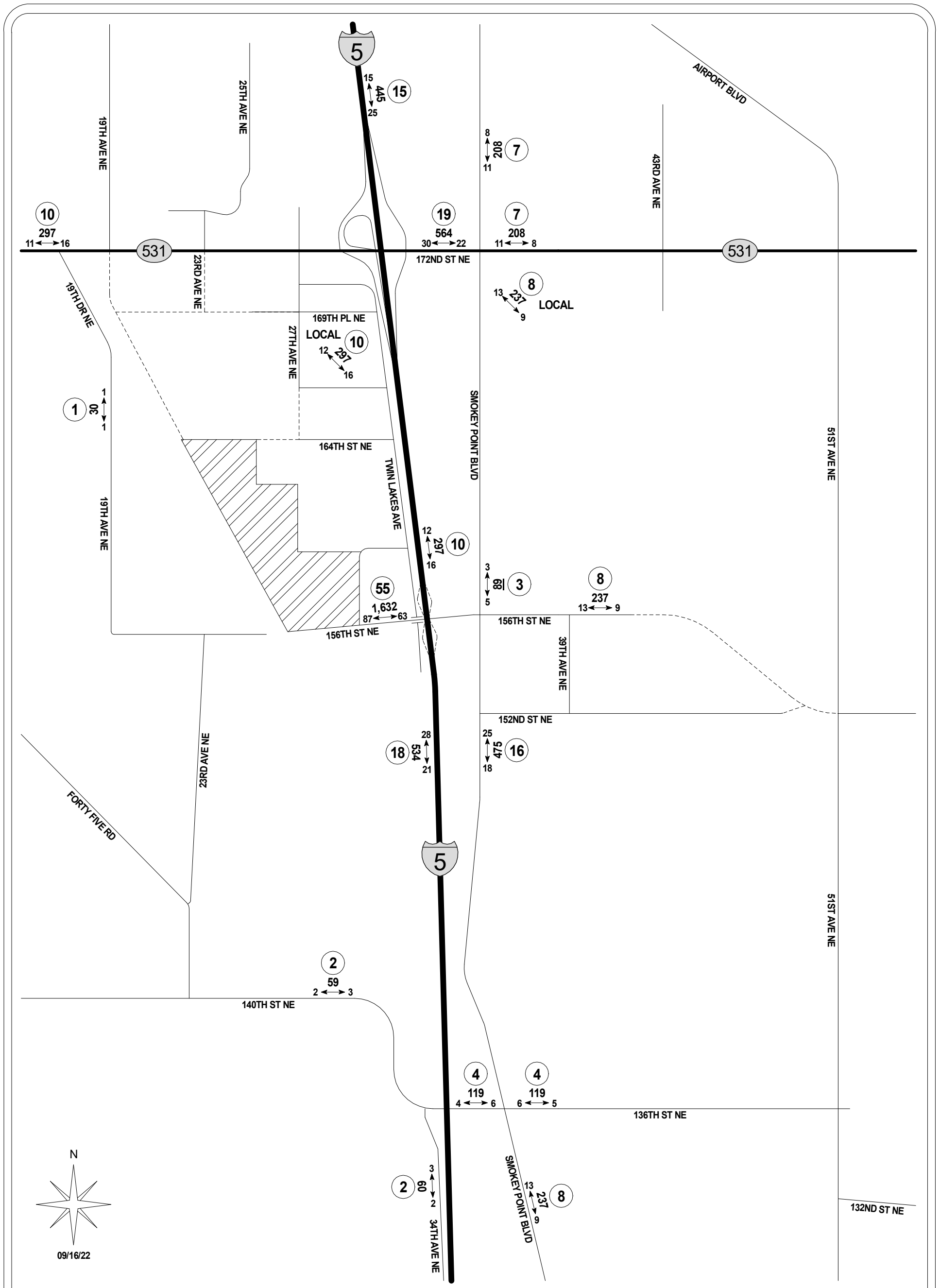
WEEKDAY PM ↔ PEAK — NEW DAILY TRAFFIC / NEW PEAK-HOUR TRIPS

(XX) — TRIP DISTRIBUTION %

FIGURE 6

2030 HORIZON YEAR TRIP DISTRIBUTION WEEKDAY PM PEAK-HOUR



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SATURDAY ⟷ PEAK — NEW DAILY TRAFFIC / NEW PEAK-HOUR TRIPS

(XX) — TRIP DISTRIBUTION %

FIGURE 7

2030 HORIZON YEAR TRIP DISTRIBUTION SATURDAY PEAK-HOUR

5. INTERSECTION LEVEL OF SERVICE ANALYSIS

The City of Marysville typically requires analysis at intersections impacted with 25 peak-hour trips. Intersection analysis has been performed at the following intersections:

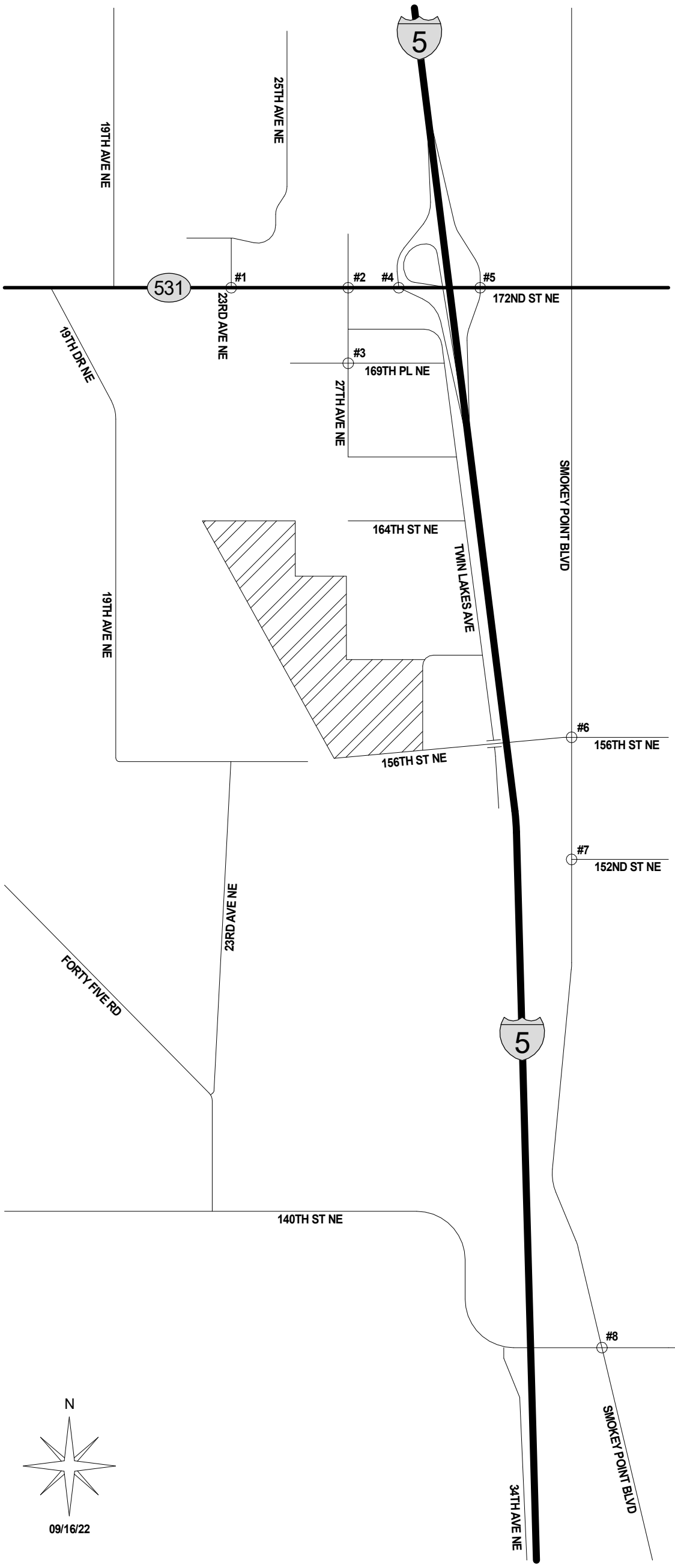
1. 172nd Street NE at 23rd Avenue NE – Roundabout
2. 172nd Street NE at 27th Avenue NE – Signalized
3. 169th Place NE at 27th Avenue NE – Signalized
4. 172nd Street NE at I-5 Southbound Ramps – Signalized
5. 172nd Street NE at I-5 Northbound Ramps – Signalized
6. 156th Street NE at Smokey Point Boulevard – Signalized
7. 152nd Street NE at Smokey Point Boulevard – Signalized
8. 136th Street NE at Smokey Point Boulevard – Signalized

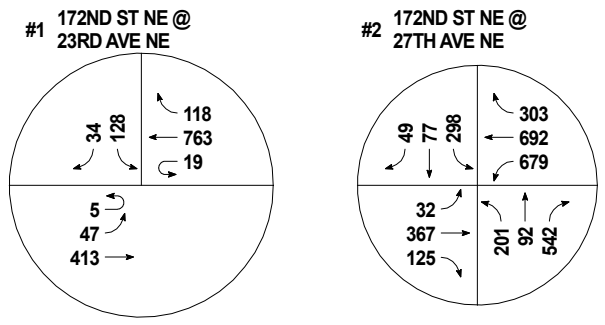
The study intersections have been analyzed for the 2021 existing conditions, the 2024 Opening Year conditions, and the 2030 Horizon Year conditions during the weekday PM peak-hour and Saturday peak-hour. The 10 Degrees development is anticipated to be constructed in the year 2023, but the year 2024 has been chosen for the Opening Year to account for delays. The 2030 Horizon Year accounts for a 6-year period beyond the opening date. All of the study intersections have been analyzed for the Weekday PM peak-hour, but only intersections #1 through #3 have been analyzed for the Saturday peak-hour.

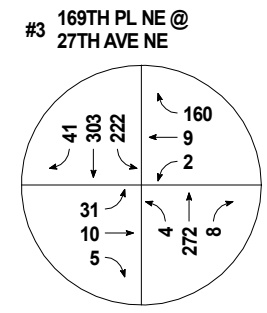
It is important to note that there is a proposed connection along the 19th Avenue NE corridor south of 172nd Street NE. This connection is likely dependent on development in the area that has not been submitted or reviewed as of the date of this report. The southern connection of the 23rd Avenue NE is also dependent on development in the area. However, there has been more development submitted to the City of Marysville along that corridor. The analysis in this report therefore assumes the 23rd Avenue NE connection, as opposed to a connection at 19th Avenue NE.

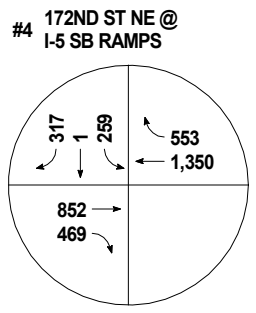
5.1 Turning Movement Calculations

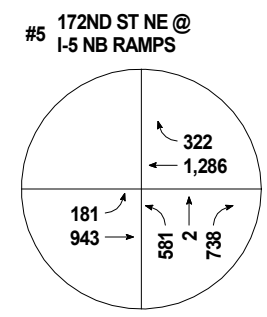
The existing weekday PM peak-hour (occurring between 4:00 and 6:00 PM) and existing Saturday mid-day (occurring between 11:00 AM and 1:00 PM) turning movements at the study intersections were collected by the independent count firm Traffic Data Gathering (TDG) in July 2021. The 2024 and 2030 baseline turning movements at the study intersections have been calculated by applying a 3% annually compounding growth rate to the existing turning movements. The 2024 and 2030 future with development turning movements at the study intersections have been calculated by adding the trips generated by the development to the 2024 and 2030 baseline turning movements. It is important to note that the trips generated by the development have generally been assigned to the study intersections to maximize the impacts of the development to represent a conservatively high analysis of the impacts of the 10 Degrees development. One example of this is the assignment of trips traveling to and from the north along Interstate-5 to the 172nd Street NE corridor under the 2030 horizon year conditions. The turning movement calculations, including detailed distributions of the trips generated by the development, are shown in the attachments. The following figures identify the turning movements for each scenario:

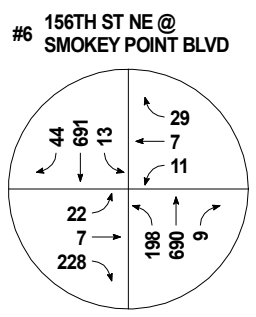


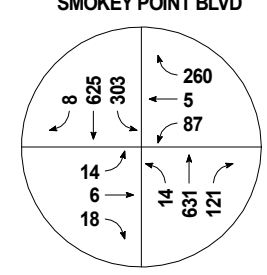


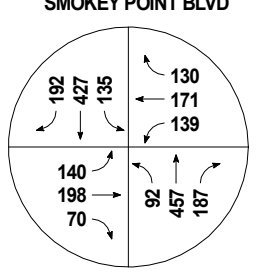












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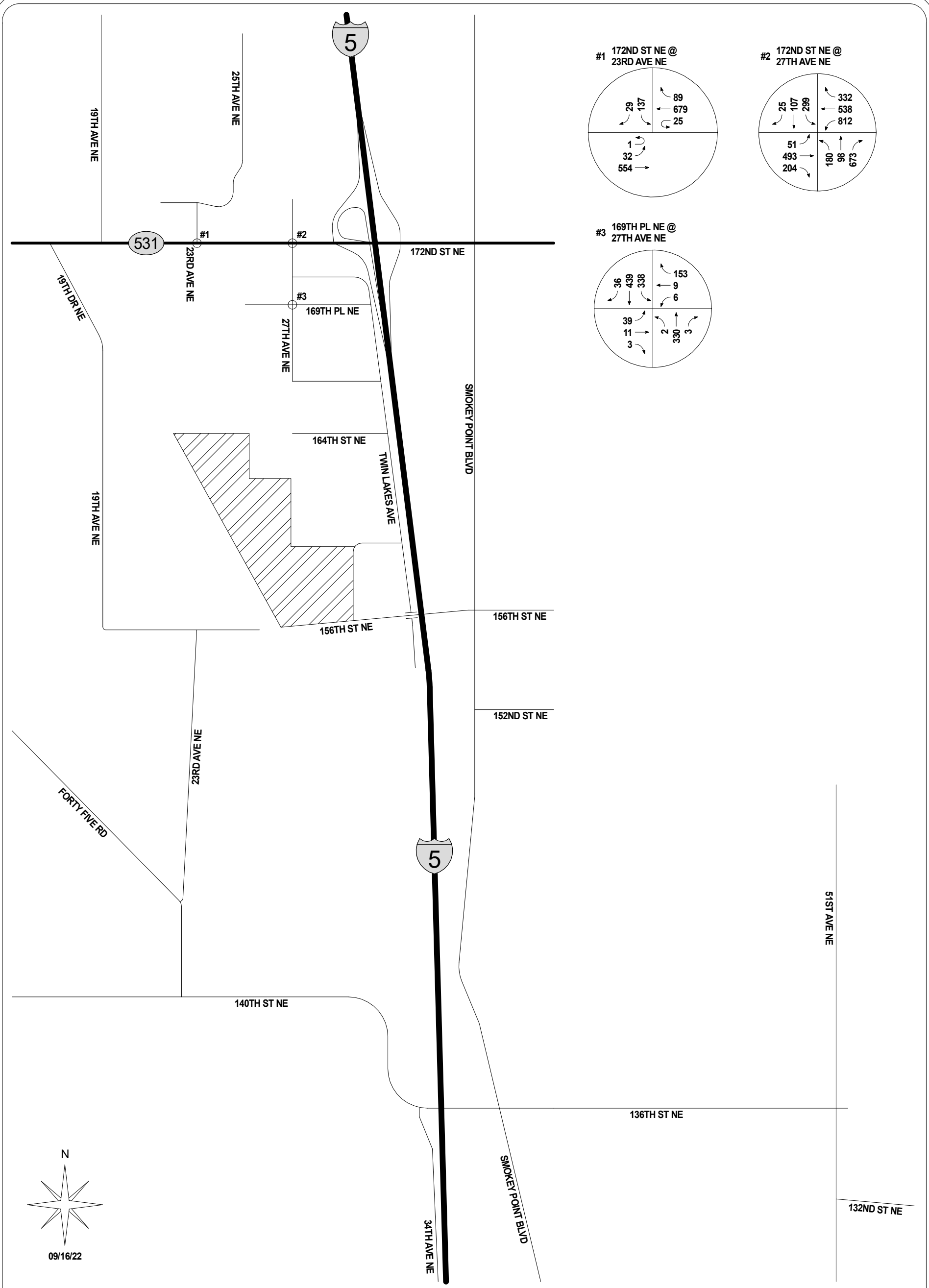
XXX → WEEKDAY PM PEAK-HOUR TURNING MOVEMENT VOLUMES

FIGURE 8

2021 EXISTING TURNING MOVEMENTS WEEKDAY PM PEAK-HOUR



#1 172ND ST NE @ 23RD AVE NE

#2 172ND ST NE @ 27TH AVE NE

#3 169TH PL NE @ 27TH AVE NE

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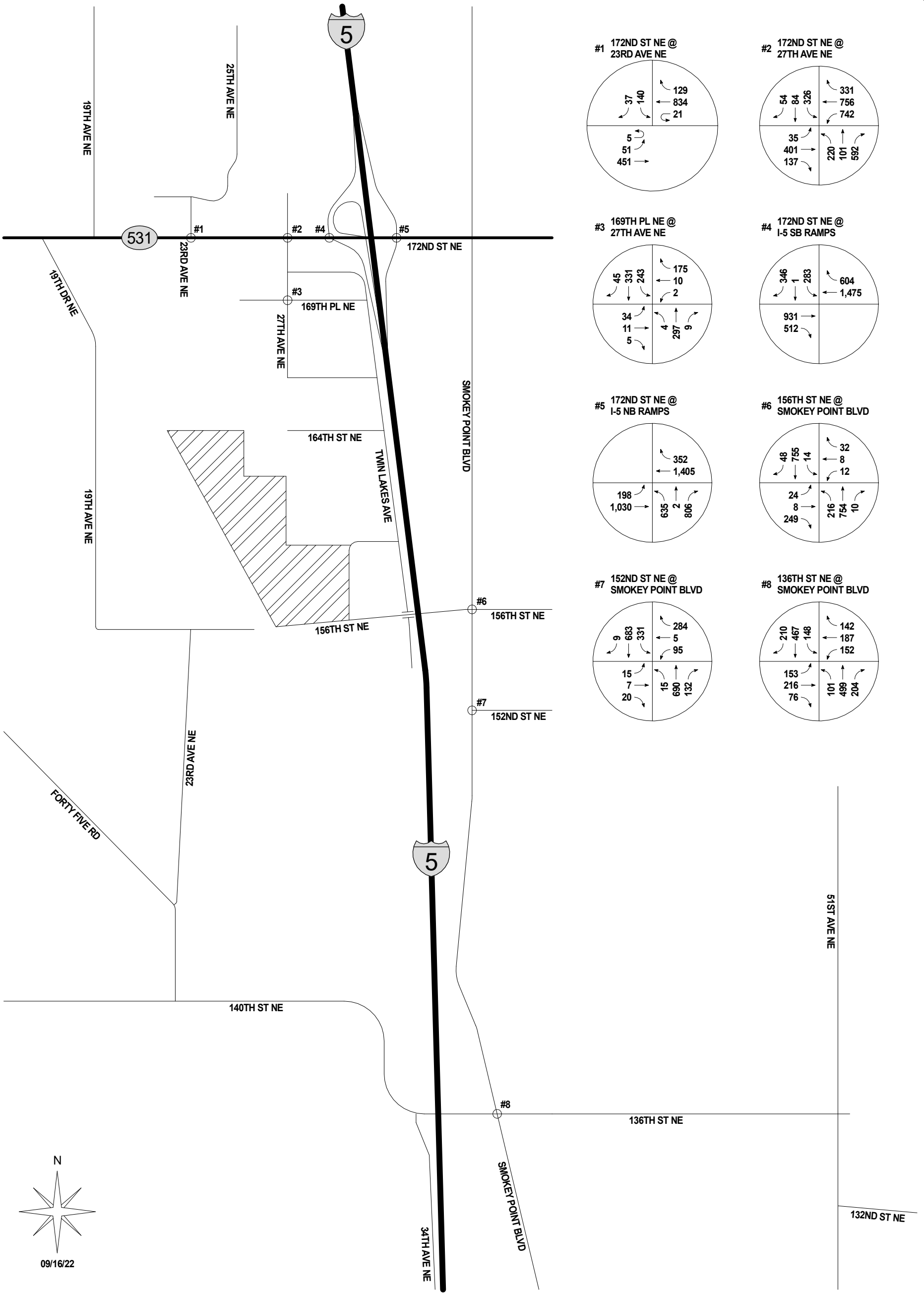
XXX → SATURDAY PEAK-HOUR TURNING MOVEMENT VOLUMES

FIGURE 9

2021 EXISTING TURNING MOVEMENTS SATURDAY PEAK-HOUR



#1 172ND ST NE @ 23RD AVE NE

#2 172ND ST NE @ 27TH AVE NE

#3 169TH PL NE @ 27TH AVE NE

#4 172ND ST NE @ I-5 SB RAMPS

#5 172ND ST NE @ I-5 NB RAMPS

#6 156TH ST NE @ SMOKEY POINT BLVD

#7 152ND ST NE @ SMOKEY POINT BLVD

#8 136TH ST NE @ SMOKEY POINT BLVD

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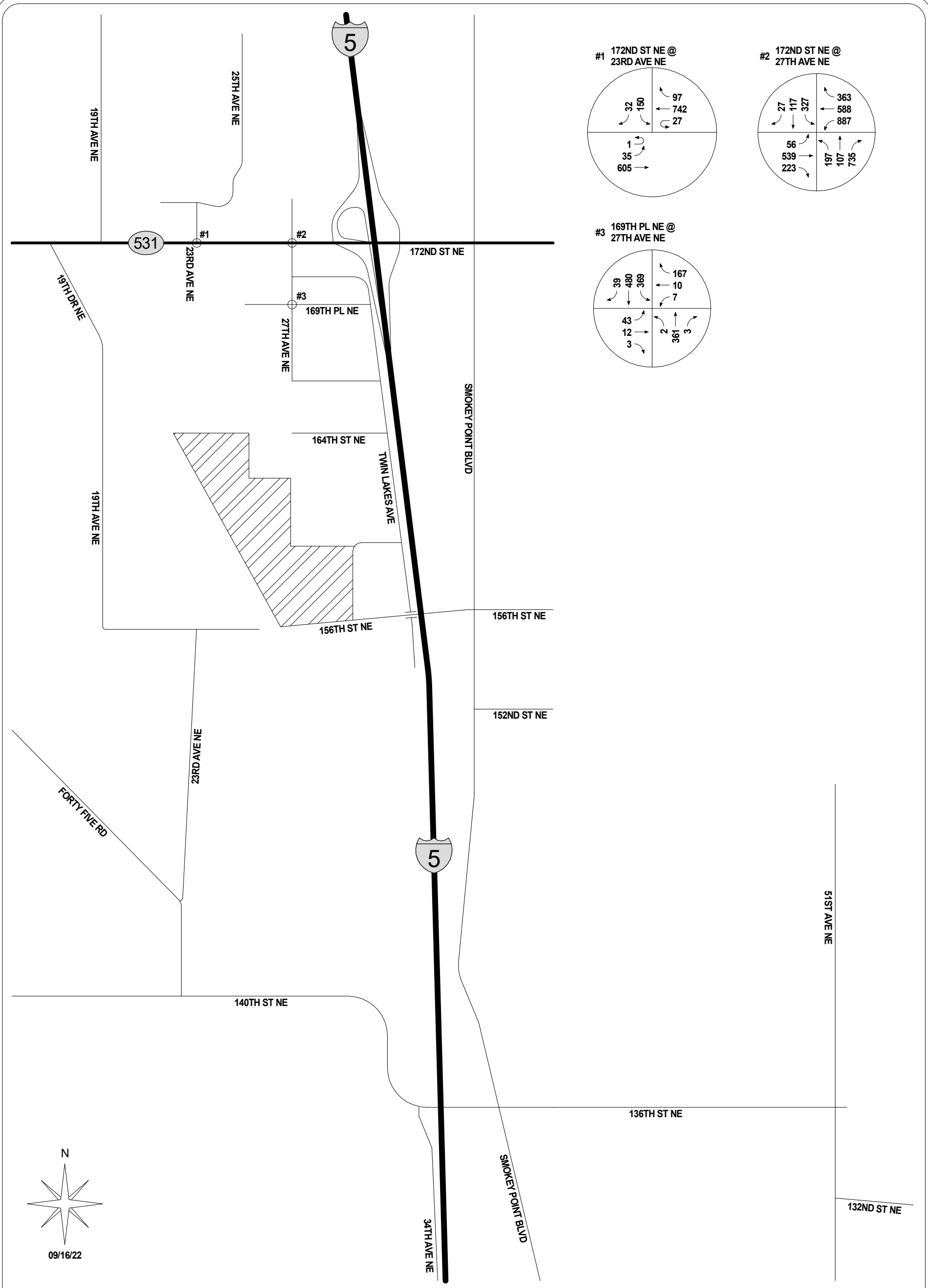
XXX → WEEKDAY PM PEAK-HOUR TURNING MOVEMENT VOLUMES

FIGURE 10

2024 BASELINE TURNING MOVEMENTS WEEKDAY PM PEAK-HOUR



#1 172ND ST NE @ 23RD AVE NE

#2 172ND ST NE @ 27TH AVE NE

#3 169TH PL NE @ 27TH AVE NE

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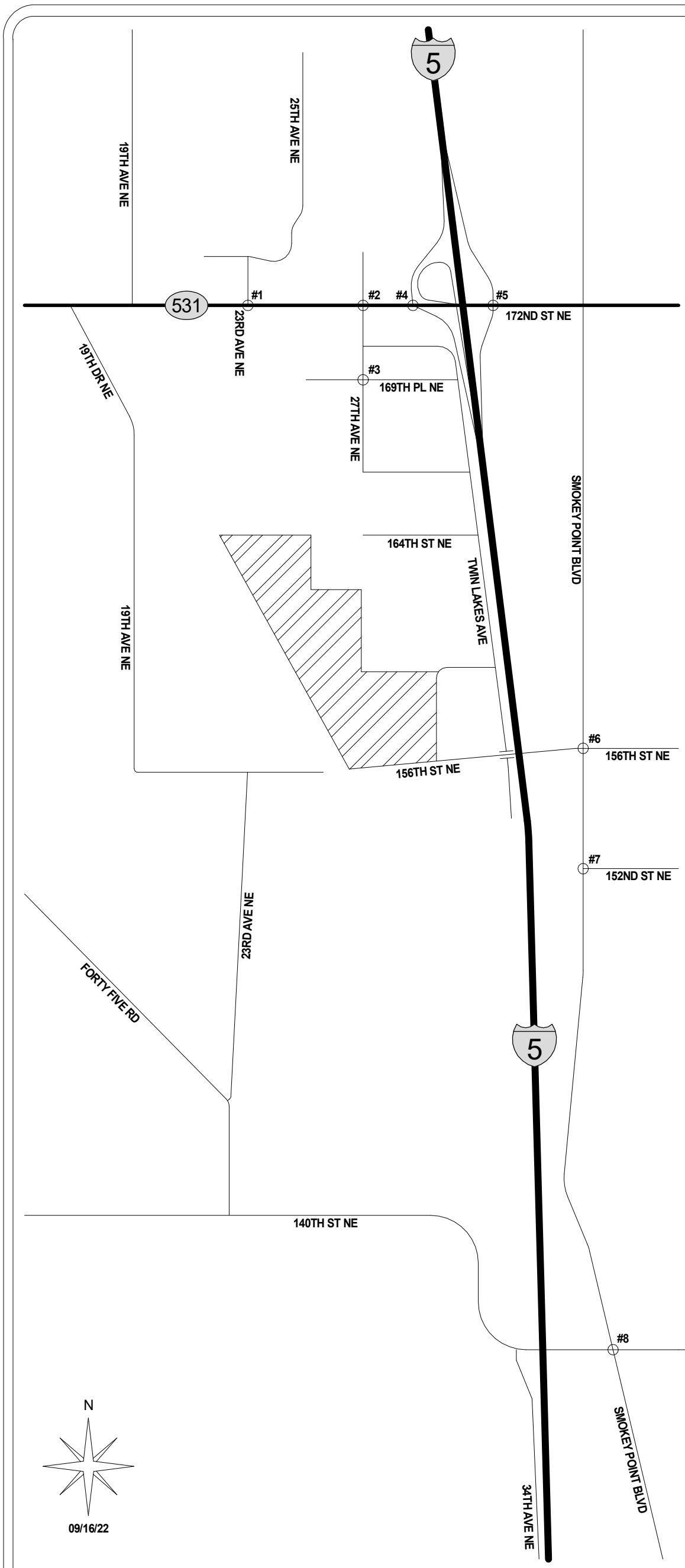
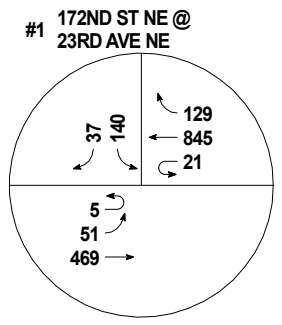
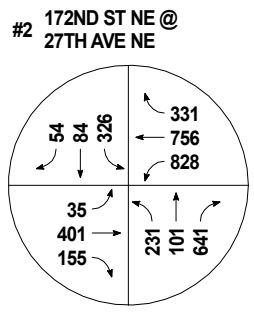
XXX → SATURDAY PEAK-HOUR TURNING MOVEMENT VOLUMES

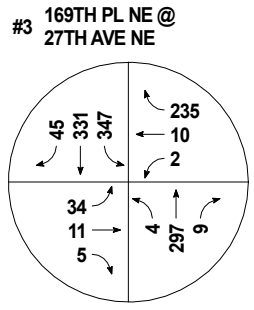
FIGURE 11

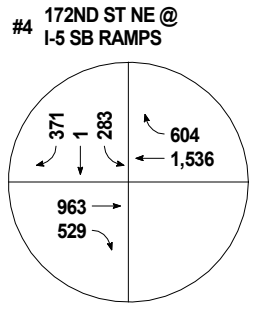
2024 BASELINE TURNING MOVEMENTS SATURDAY PEAK-HOUR

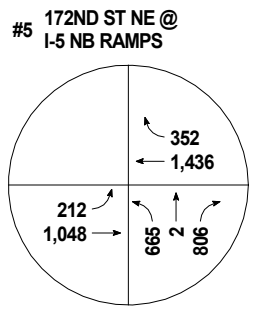


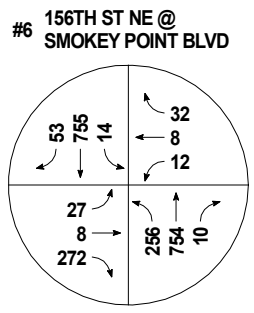


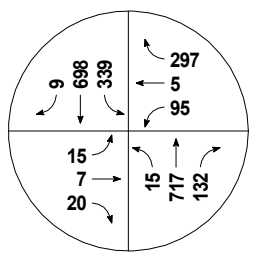


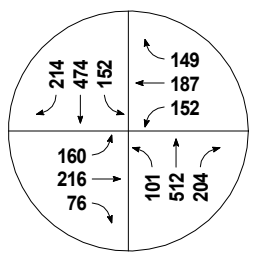












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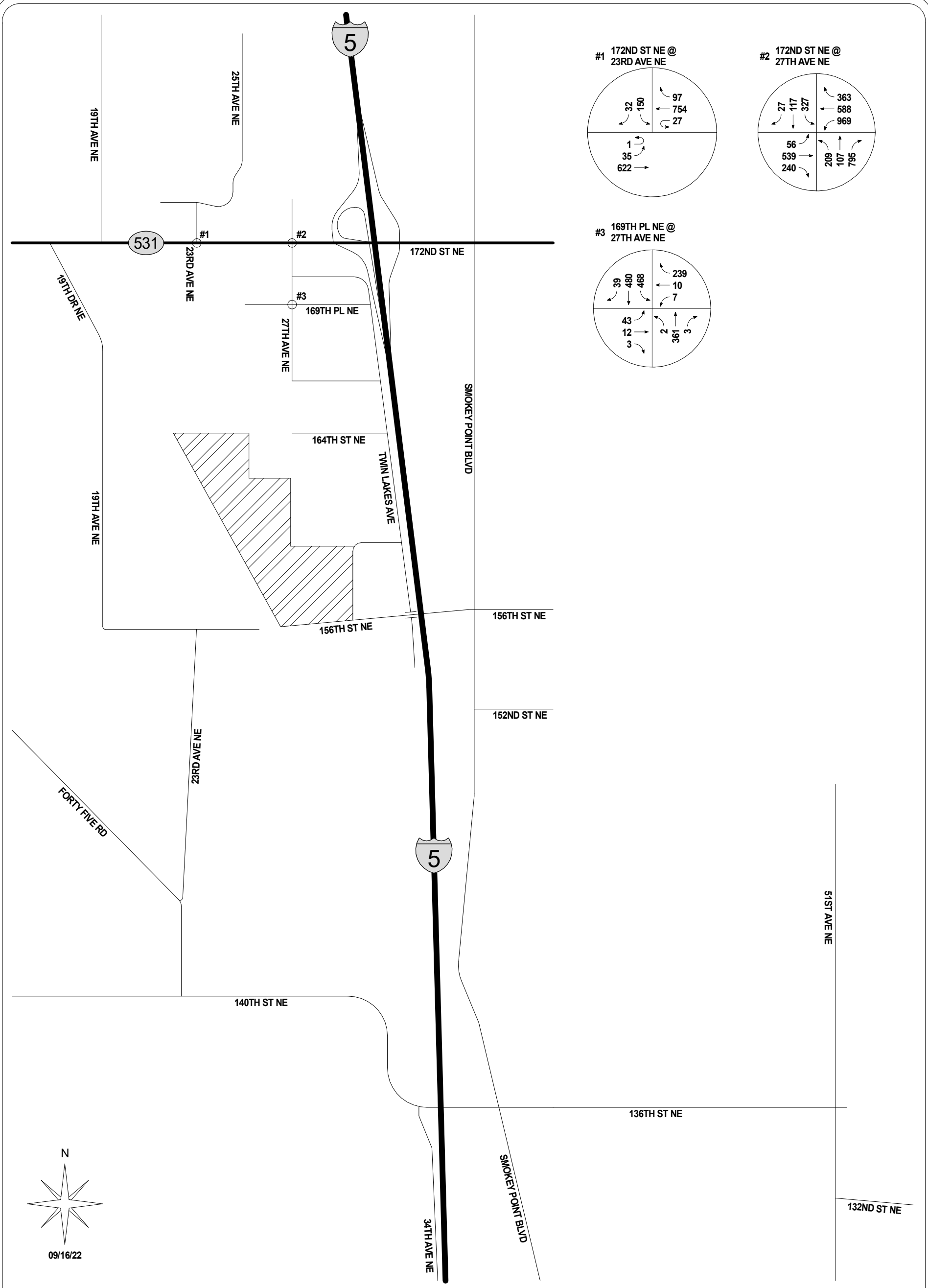
XXX → WEEKDAY PM PEAK-HOUR TURNING MOVEMENT VOLUMES

FIGURE 12

2024 OPENING YEAR TURNING MOVEMENTS WEEKDAY PM PEAK-HOUR



#1 172ND ST NE @ 23RD AVE NE

#2 172ND ST NE @ 27TH AVE NE

#3 169TH PL NE @ 27TH AVE NE

Kimley»Horn

TRAFFIC IMPACT STUDY
KH #090222183

10 DEGREES

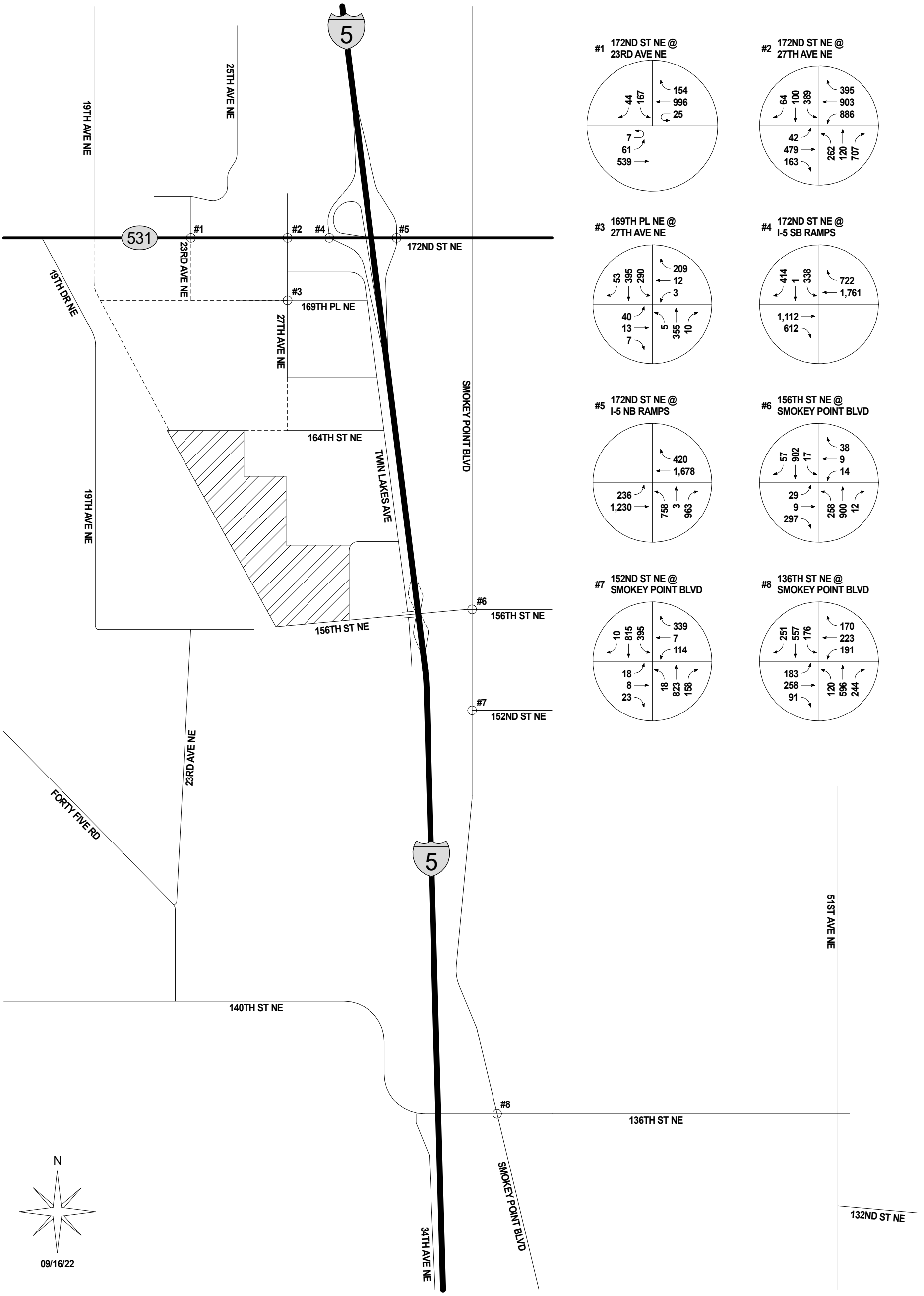
CITY OF MARYSVILLE

LEGEND

XXX → SATURDAY PEAK-HOUR TURNING MOVEMENT VOLUMES

FIGURE 13

2024 OPENING YEAR TURNING MOVEMENTS SATURDAY PEAK-HOUR



Kimley»Horn

TRAFFIC IMPACT STUDY
KH #090222183

10 DEGREES

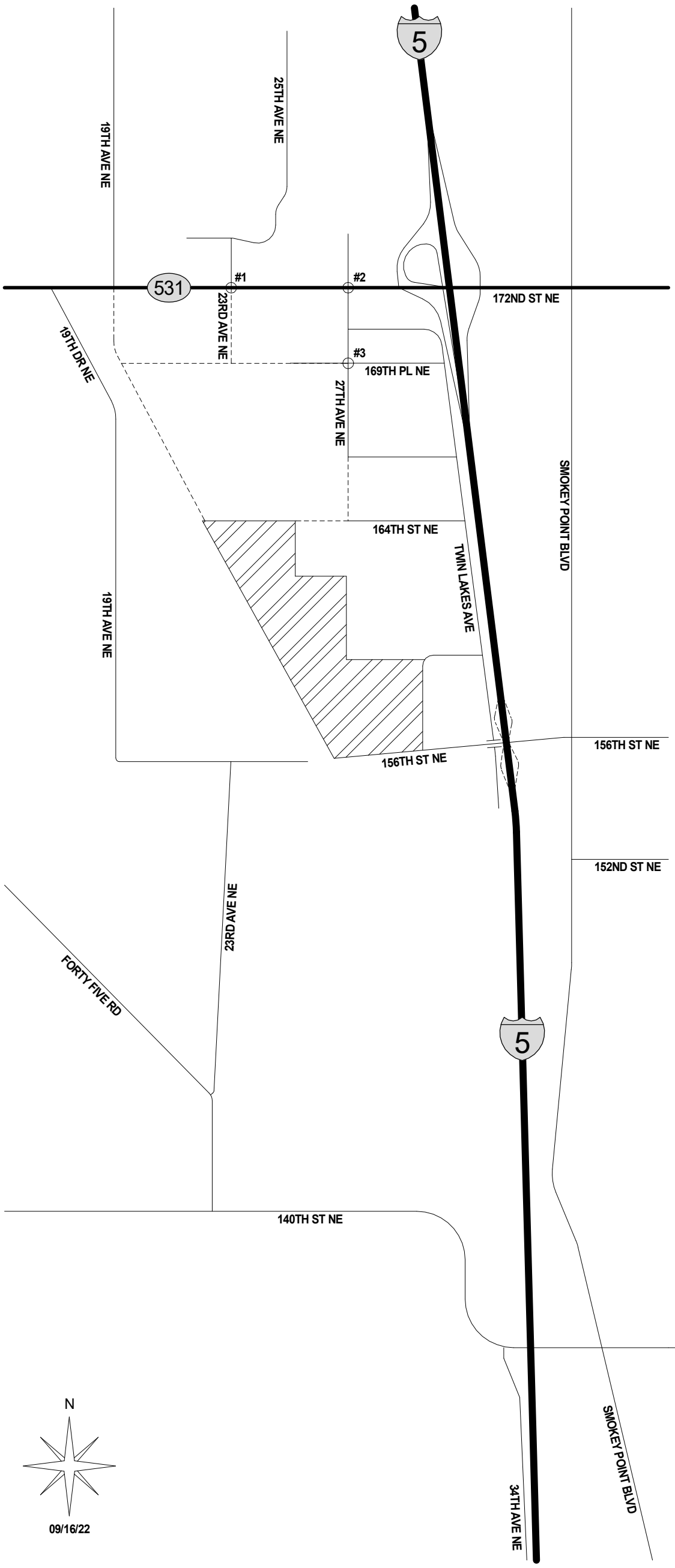
CITY OF MARYSVILLE

LEGEND

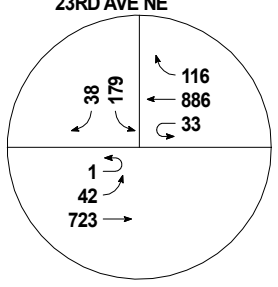
XXX → WEEKDAY PM PEAK-HOUR TURNING MOVEMENT VOLUMES

FIGURE 14

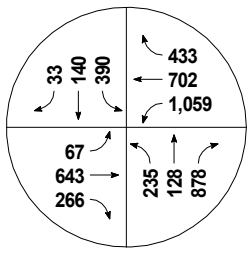
2030 BASELINE TURNING MOVEMENTS WEEKDAY PM PEAK-HOUR



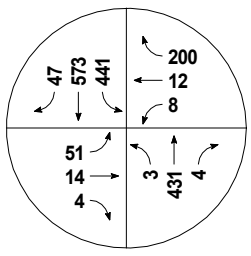
#1 172ND ST NE @ 23RD AVE NE



#2 172ND ST NE @ 27TH AVE NE



#3 169TH PL NE @ 27TH AVE NE



Kimley»Horn

TRAFFIC IMPACT STUDY
KH #090222183

10 DEGREES

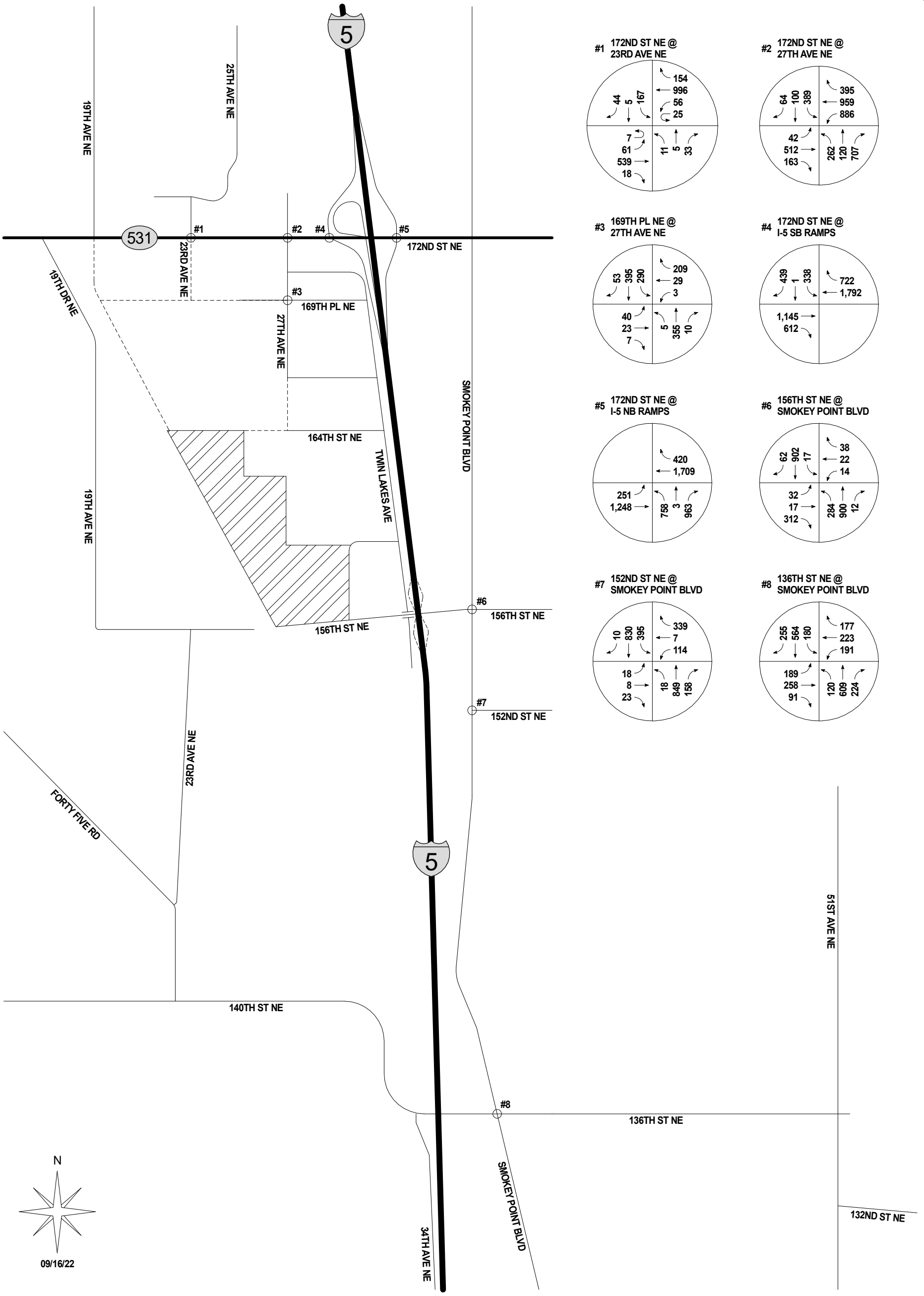
CITY OF MARYSVILLE

LEGEND

XXX → SATURDAY PEAK-HOUR TURNING MOVEMENT VOLUMES

FIGURE 15

2030 BASELINE TURNING MOVEMENTS SATURDAY PEAK-HOUR



#1 172ND ST NE @ 23RD AVE NE

#2 172ND ST NE @ 27TH AVE NE

#3 169TH PL NE @ 27TH AVE NE

#4 172ND ST NE @ I-5 SB RAMPS

#5 172ND ST NE @ I-5 NB RAMPS

#6 156TH ST NE @ SMOKEY POINT BLVD

#7 152ND ST NE @ SMOKEY POINT BLVD

#8 136TH ST NE @ SMOKEY POINT BLVD

Kimley»Horn

TRAFFIC IMPACT STUDY
KH #090222183

10 DEGREES

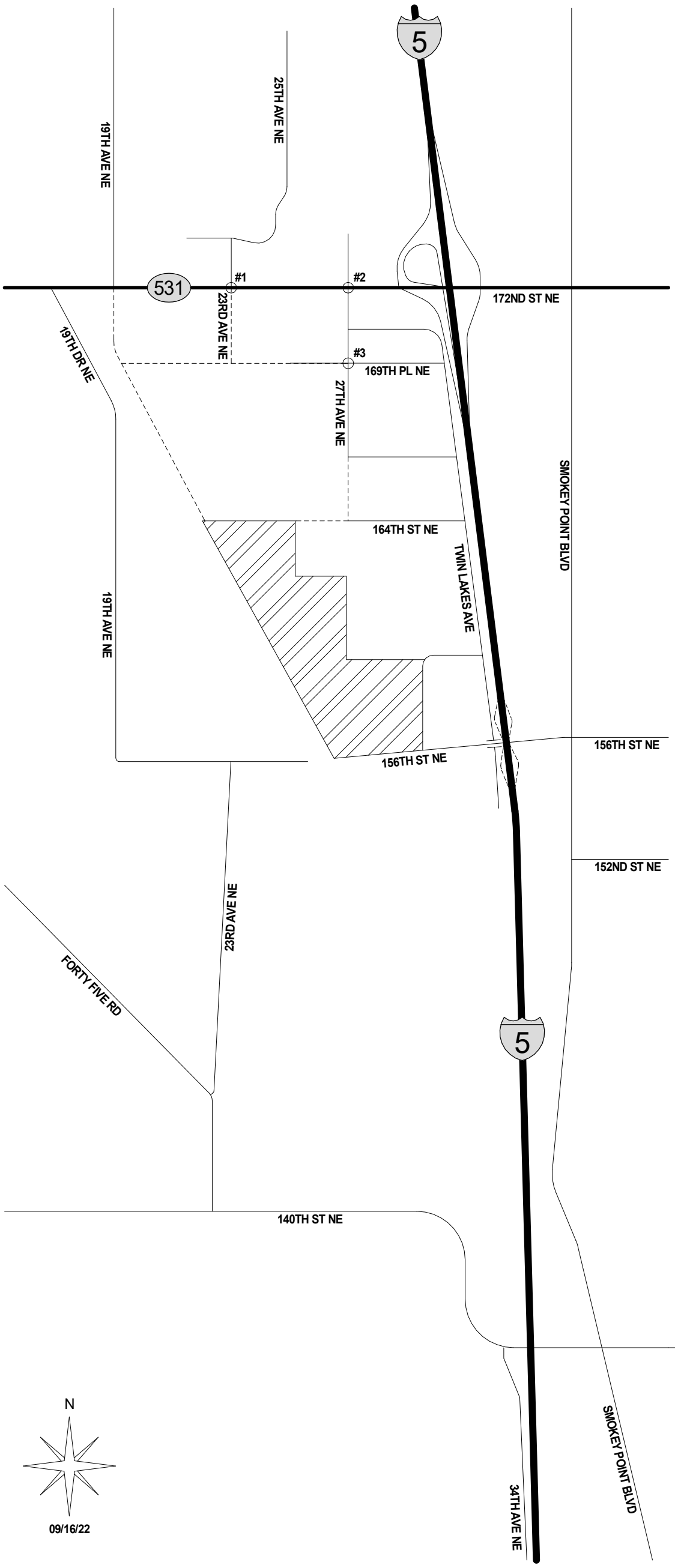
CITY OF MARYSVILLE

LEGEND

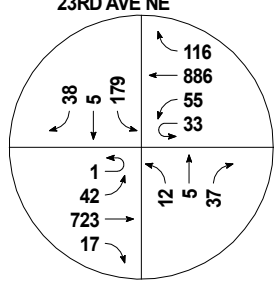
XXX → WEEKDAY PM PEAK-HOUR TURNING MOVEMENT VOLUMES

FIGURE 16

2030 HORIZON YEAR TURNING MOVEMENTS WEEKDAY PM PEAK-HOUR



#1 172ND ST NE @ 23RD AVE NE



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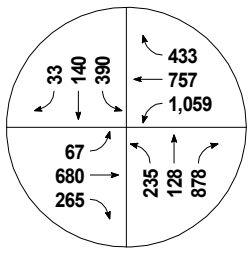
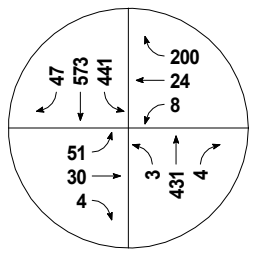


#3 169TH PL NE @ 27TH AVE NE



Kimley»Horn

TRAFFIC IMPACT STUDY
KH #090222183

10 DEGREES

CITY OF MARYSVILLE

LEGEND

XXX → SATURDAY PEAK-HOUR TURNING MOVEMENT VOLUMES

FIGURE 17

2030 HORIZON YEAR TURNING MOVEMENTS SATURDAY PEAK-HOUR

5.2 Level of Service Calculations

The level of service calculations have been performed utilizing the existing channelization, existing intersection control, heavy vehicle factors, and peak-hour factors from the turning movement counts. The parameters have been used for the 2021 existing, 2024 opening year, and 2030 horizon year conditions. It is important to note that the southern leg of the intersection of 172nd Street NE at 23rd Avenue NE is included under the 2030 horizon conditions, but is not anticipated to be constructed as part of the development. The southern leg is anticipated to be constructed as part of adjacent developments. The weekday level of service analysis is summarized in Table 4.

Table 4: Level of Service Summary – Weekday PM Peak-Hour

Intersection	Control	2021 Existing Conditions		2024 Baseline Conditions		2024 Opening Year Conditions		2030 Baseline Conditions		2030 Horizon Year Conditions	
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1. 172nd Street NE at 23rd Avenue NE	Roundabout	A	5.6 sec	A	5.8 sec	A	5.8 sec	A	6.5 sec	A	7.5 sec
2. 172nd Street NE at 27th Avenue NE	Signal	D	45.4 sec	D	50.2 sec	D	54.5 sec	E	66.6 sec	E	68.2 sec
3. 169th Place NE at 27th Avenue NE	Signal	A	7.8 sec	A	8.0 sec	A	8.4 sec	A	8.7 sec	A	9.3 sec
4. 172nd Street NE at I-5 Southbound Ramps	Signal	B	13.9 sec	B	16.0 sec	B	18.4 sec	C	25.6 sec	C	28.9 sec
5. 172nd Street NE at I-5 Northbound Ramps	Signal	C	22.4 sec	C	23.7 sec	C	24.7 sec	C	27.8 sec	C	28.6 sec
6. 156th Street NE at Smokey Point Boulevard	Signal	B	12.9 sec	B	13.1 sec	B	13.3 sec	B	13.9 sec	B	15.4 sec
7. 152nd Street NE at Smokey Point Boulevard	Signal	B	14.1 sec	B	15.3 sec	B	15.7 sec	C	23.2 sec	C	24.4 sec
8. 136th Street NE at Smokey Point Boulevard	Signal	C	26.2 sec	C	28.6 sec	C	29.1 sec	D	35.6 sec	D	36.5 sec

The level of service analysis of the Saturday peak-hour is summarized in Table 5.

Table 5: Level of Service Summary – Saturday Peak-Hour

Intersection	Control	2021 Existing Conditions		2024 Baseline Conditions		2024 Opening Year Conditions		2030 Baseline Conditions		2030 Horizon Year Conditions	
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1. 172nd Street NE at 23rd Avenue NE	Roundabout	A	5.5 sec	A	5.7 sec	A	5.7 sec	A	6.4 sec	A	7.7 sec
2. 172nd Street NE at 27th Avenue NE	Signal	E	55.1 sec	E	66.6 sec	E	78.4 sec	F	109.6 sec	F	113.8 sec
3. 169th Place NE at 27th Avenue NE	Signal	A	8.7 sec	A	9.2 sec	B	10.0 sec	B	10.8 sec	B	11.5 sec

5.3 Future Roadway Improvements

The intersection of 172nd Street NE at 27th Avenue NE is anticipated to operate at LOS E under the 2030 baseline and horizon year conditions during the weekday PM peak-hour. The City of Marysville and WSDOT typically use weekday operations to determine whether or not a development should be considered concurrent. City of Marysville staff also evaluates the Saturday operations in the 172nd Street NE area, but City of Marysville staff has identified that operations below LOS D during the Saturday peak-hour would not be utilized for the concurrency evaluation. The intersection of 172nd Street NE at 27th Avenue NE is anticipated to operate at LOS F under the 2030 baseline and horizon year conditions during the Saturday peak-hour.

The 156th Street NE interchange is anticipated to reduce the volumes at the 172nd Street NE interchange and the surrounding intersections, including the intersection with 27th Avenue NE. City of Marysville staff has identified that a 25% diversion is applicable for the 172nd Street NE corridor. The diversion is based on the eastbound and westbound through vehicles at the intersection of 172nd Street NE at 23rd Avenue NE and the northbound right-turn and westbound left-turn vehicles at the intersection of 172nd Street NE at 27th Avenue NE. These are the trips that are most likely to be impacted by a diversion with the 156th Street NE interchange and roadway connections between 172nd Street NE and 156th Street NE. The turning movement calculations with this diversion are included with the attachments.

The intersection of 172nd Street NE at 27th Avenue NE has been analyzed with the diversion of trips and it anticipated to operate at LOS D during the weekday PM peak-hour under the 2030 baseline and 2030 horizon year conditions. The intersection would therefore operate acceptably according to City of Marysville and WSDOT standards for the purposes of making a concurrency determination. The intersection is anticipated to operate at LOS E during the Saturday peak-hour under the 2030 baseline and 2030 horizon year conditions. This level of service should be considered acceptable since the Saturday peak-hour is not the basis for making a concurrency determination. The level of service calculations are included with this response.

6. TRAFFIC MITIGATION FEES

The City of Marysville has an interlocal agreement with Snohomish County that provides for the payment of traffic mitigation fees to Snohomish County for City of Marysville developments. The City of Marysville also has an understanding with WSDOT for the payment of traffic mitigation fees.

6.1 City of Marysville

The City of Marysville traffic mitigation fees have been calculated using the residential rate of $6,300 per residential PM peak-hour trip. The 10 Degrees development is proposed to generate 261.20 new PM peak-hour trips, resulting in a traffic mitigation fee of $1,645,560.00. The fees for each of the unit types are:

- Single-Family Detached Housing – 166 Units
  - Total Fee - $1,045,800.00
  - Fee per Unit - $6,300.00
- Multifamily Housing (Low-Rise) – 170 Units
  - Total Fee - $599,760.00
  - Fee per Unit - $3,528.00

It is important to note that these traffic mitigation fees do not include any credits for roadways constructed as part of this development. It is possible that traffic mitigation fees will not be required to be paid if the on-site roadway costs that are creditable to City of Marysville traffic mitigation fees are more than the calculated traffic mitigation fees.

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 10 Degrees development is located in CI-MA-1, which has a 20% impact identified in the *Snohomish County Traffic Worksheet and Traffic Study Requirements for Development in the City of Marysville* document. The current Snohomish County fee for developments located in the City of Marysville is $185 per daily trip. A 20% impact is equivalent to 562.288 daily trips, resulting in a Snohomish County traffic mitigation fee of $104,023.28. The fee for each of the unit types are:

- Single-Family Detached Housing – 166 Units
  - Daily Trips – 1,567.04
  - Total Fee - $57,980.48
  - Fee per Unit - $349.28
- Multifamily Housing (Low-Rise) – 170 Units
  - Daily Trips – 1,244.40
  - Total Fee - $46,042.80
  - Fee per Unit - $270.84

6.3 Washington State Department of Transportation

There are two major WSDOT improvements in the site vicinity that are impacted by trips generated by the 10 Degrees development. These improvements are the 172nd Street NE/SR-531 corridor improvements and the 156th Street NE interchange with Interstate-5. Both of these improvements are identified as funded as part of the Connecting Washington legislation. Payment of WSDOT traffic mitigation fees should therefore not be a condition of the 10 Degrees development.

7. CONCLUSIONS

The 10 Degrees development is proposed to consist of up to 166 single-family detached units and 170 multifamily housing (low-rise) units. The development is anticipated to generate approximately 2,811 average daily trips with 201 AM peak-hour trips and 261 PM peak-hour trips. The development is anticipated to generate approximately 2,967 average Saturday daily trips with 273 trips generated during the Saturday peak-hour. The study intersections are anticipated to operate at acceptable levels of service, particularly with the planned roadway improvements in the site vicinity and the roadway connectivity that will be included as part of the 10 Degrees development.

The development will have City of Marysville traffic mitigation fees of $1,645,560.00 and Snohomish County traffic mitigation fees of $104,023.28. There are on-site roadways that will be constructed as part of the 10 Degrees development that are creditable to the City of Marysville traffic mitigation fees. These roadway costs could be larger than the City of Marysville traffic mitigation fees, meaning a traffic mitigation fee does not need to be paid to the City of Marysville. WSDOT traffic mitigation fees should not be required for the 10 Degrees development since the major WSDOT improvements in the site vicinity are identified as funded under the Connecting Washington legislation.

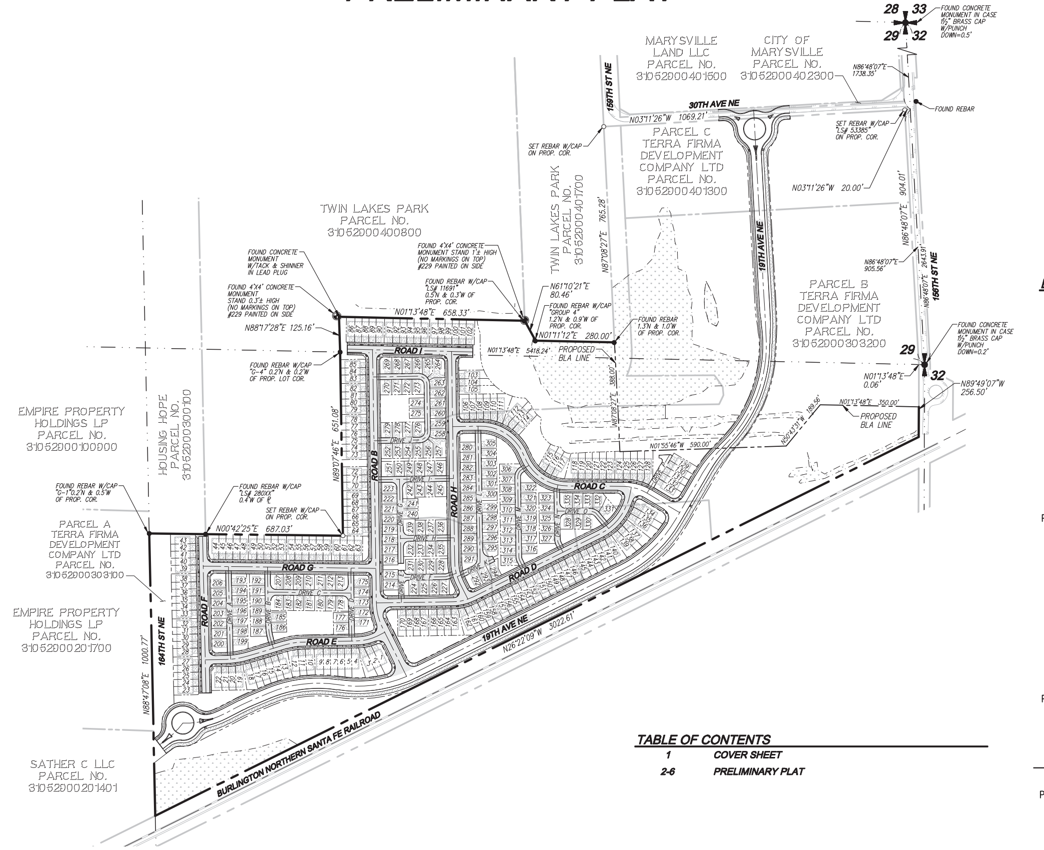
Site Plan

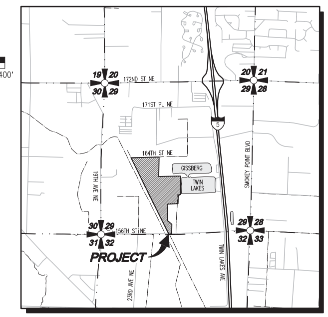
SW 1/4 OF THE SE 1/4, SEC 29, TWN 31 N, RGE 5 E, W.M., CITY OF MARYSVILLE, SNOHOMISH COUNTY, WASHINGTON

MARYSVILLE 10 DEGREES

PRELIMINARY PLAT

SCALE: 1" = 200'





VICINITY MAP
SCALE: 1"=2000'

SURVEY INFORMATION

LEGAL DESCRIPTION

PARCEL A:
PARCEL A OF SNOHOMISH COUNTY BOUNDARY LINE ADJUSTMENT NO. BLA 179-93 RECORDED UNDER AUDITOR'S FILE NO. 9603180555, BEING A PORTION OF PARCEL A OF EXEMPT 20 ACRE SEGREGATION ESTABLISHED BY DECLARATION OF SEGREGATION RECORDED UNDER AUDITOR'S FILE NO. 9104230242 AND CORRECTION UNDER 9109130489, AND OF PARCEL B OF SNOHOMISH COUNTY BOUNDARY LINE ADJUSTMENT NO. 178-93 RECORDED UNDER AUDITOR'S FILE NO. 9603180554, RECORDS OF SNOHOMISH COUNTY, WASHINGTON, SITUATED WITHIN THE SOUTH HALF OF SECTION 29, TOWNSHIP 31 NORTH, RANGE S EAST OF THE WILLAMETTE MERIDIAN;

EXCEPT THOSE PORTIONS CONVEYED TO CITY OF MARYSVILLE BY DEEDS RECORDED UNDER AUDITOR'S FILE NO. 200710160330 AND 200911100594, RECORDS OF SNOHOMISH COUNTY, WASHINGTON.

SITUATE IN THE COUNTY OF SNOHOMISH, STATE OF WASHINGTON.

PARCEL B:
PARCEL B OF SNOHOMISH COUNTY BOUNDARY LINE ADJUSTMENT NO. BLA 179-93 RECORDED UNDER AUDITOR'S FILE NO. 9603180555, RECORDS OF SNOHOMISH COUNTY, WASHINGTON, BEING A PORTION OF THE SOUTH HALF OF SECTION 29, TOWNSHIP 31 NORTH, RANGE S EAST OF THE WILLAMETTE MERIDIAN.

SITUATE IN THE COUNTY OF SNOHOMISH, STATE OF WASHINGTON.

PARCEL C:
PARCEL 1 OF CITY OF MARYSVILLE BOUNDARY LINE ADJUSTMENT NO. BLA 03-005 RECORDED UNDER AUDITOR'S FILE NO. 200307155002, RECORDS OF SNOHOMISH COUNTY, WASHINGTON, BEING A PORTION OF THE SOUTHWEST QUARTER OF SOUTHEAST QUARTER OF SECTION 29, TOWNSHIP 31 NORTH, RANGE S EAST OF THE WILLAMETTE MERIDIAN, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

PARCEL D OF SNOHOMISH COUNTY BOUNDARY LINE ADJUSTMENT NO. 177-93 RECORDED UNDER AUDITOR'S FILE NO. 9603180553; EXCEPT THE EASTERLY 92.04 FEET THEREOF CONVEYED TO SCOTT R. HUISH, ET AT BY DEED RECORDED UNDER AUDITOR'S FILE NO. 200306190872;

EXCEPT THE EAST 30 FEET THEREOF CONVEYED TO CITY OF MARYSVILLE BY DEED RECORDED UNDER AUDITOR'S FILE NO. 200911100595. SITUATE IN THE COUNTY OF SNOHOMISH, STATE OF WASHINGTON.

HORIZONTAL DATUM

NAD 83/2011
WASHINGTON STATE COORDINATES-NORTH ZONE

VERTICAL DATUM

NORTH AMERICAN VERTICAL DATUM-1988

BASIS OF BEARING

NAD83/91 FROM GPS OBSERVATION
MONUMENTED CENTERLINE OF THE NORTH LINE OF THE NORTHEAST QUARTER OF SECTION 27 (BEARING = N 87°48'12" W)

BENCHMARK

BENCHMARK
SNOHOMISH COUNTY BENCHMARK NO. LW04
FOUND MONUMENT IN CASE WITH 1" BRASS DISC BEING THE WEST QUARTER CORNER OF SECTION 29, TOWNSHIP 31 NORTH, RANGE 5 EAST, W.M.
ELEVATION=129.54'

RESTRICTIONS

1. THIS SITE IS SUBJECT TO RESERVATIONS AND RECITALS CONTAINED IN THE DEED RECORDED UNDER SNOHOMISH COUNTY AUDITOR'S FILE NO. 5668. (SURVEYOR'S NOTE: BLANKET IN NATURE.)
2. THIS SITE IS SUBJECT TO CONDEMNATION OF ACCESS TO STATE OF HIGHWAY NUMBER SR 5 AND OF LIGHT, VIEW AND AIR BY DECREE IN FAVOR OF THE STATE OF WASHINGTON, AS DISCLOSED BY SUPERIOR CASE CAUSE NUMBER 60448 AND 90719. (SURVEYOR'S NOTE: BLANKET IN NATURE.)
3. THIS SITE IS SUBJECT TO TERMS, COVENANTS AND PROVISIONS OF CITY OF MARYSVILLE RECOVERY CONTRACT NO. 271, AS DISCLOSED BY INSTRUMENT RECORDED UNDER SNOHOMISH COUNTY AUDITOR'S FILE NO. 200610260422. (SURVEYOR'S NOTE: BLANKET IN NATURE.)
4. THIS SITE IS SUBJECT TO A LOCATION OF CREEK, AS DISCLOSED BY SURVEY RECORDED UNDER SNOHOMISH COUNTY AUDITOR'S FILE NO. 9904015001. (SURVEYOR'S NOTE: BLANKET IN NATURE.)
5. THIS SITE IS SUBJECT TO ANY QUESTION THAT MAY ARISE DUE TO SHIFTING AND CHANGING IN THE COURSE, BOUNDARIES OR HIGHWATER LINE OF UNNAMED CREEK. (SURVEYOR'S NOTE: BLANKET IN NATURE.)
6. THIS SITE IS SUBJECT TO A DRAINAGE AND SLOPE EASEMENT, AS DISCLOSED BY INSTRUMENT RECORDED UNDER SNOHOMISH COUNTY AUDITOR'S FILE NO. 201010190528. (SURVEYOR'S NOTE: PLOTTED.)
7. THIS SITE IS SUBJECT TO TERMS, COVENANTS AND PROVISIONS OF A NATIVE GROWTH PROTECTION AREA/EASEMENT, AS DISCLOSED BY INSTRUMENT RECORDED UNDER SNOHOMISH COUNTY AUDITOR'S FILE NO. 201112190431. (SURVEYOR'S NOTE: PLOTTED.)

SURVEY NOTES

1. PRECISION OF CONTROL TRAVERSE IS AT HIGHER LEVEL THAN MINIMUM STANDARDS REQUIRED BY WAC 332-130-090.
2. FIELD SURVEY CONDUCTED USING A COMBINATION OF GPS USING THE WASHINGTON STATE REFERENCE NETWORK (WSRN) AND/OR A 5 SECOND DIRECT READING TOTAL STATION. METHOD: GPS, TRAVERSE AND RADIAL SURVEY.
3. ALL DISTANCES ARE IN FEET.
4. THIS SURVEY REPRESENTS VISIBLE PHYSICAL IMPROVEMENT CONDITIONS EXISTING ON JUNE 28, 2020. ALL SURVEY CONTROL INDICATED AS "FOUND" WAS RECOVERED FOR THIS PROJECT IN JUNE OF 2020.
5. THIS SURVEY WAS CONDUCTED ACCORDING TO THE DESCRIPTION SHOWN, FURNISHED BY CHICAGO TITLE INSURANCE COMPANY, GUARANTEE NO. 500050438, DATED OCTOBER 20, 2020. THE EASEMENTS SHOWN OR NOTED HEREON RELATE TO THIS COMMITMENT.
6. THE WETLAND LOCATIONS AND SETBACK LINES WERE PROVIDED BY THE CLIENT. NORTH PEAK ASSOCIATES LLC DID NOT LOCATE THE WETLAND LOCATIONS, AND DOES NOT PURPORT TO SHOW THE WETLAND LOCATIONS OR APPLICABLE SETBACKS AS IF SURVEYED BY THIS FIRM.

CONTACT LIST

DEVELOPER/OWNER:
PULTE GROUP
3535 FACTORIA BLVD SE
SUITE 600
BELLEVUE, WASHINGTON 98006
CONTACT: RYAN KOHLMANN
PHONE: (425) 922-9805
EMAIL: ryan.kohlmann@pultegroup.com

SURVEYOR:
NORTH PEAK ASSOCIATES LLC
17270 WOODINVILLE REDMOND RD NE
SUITE 705
WOODINVILLE, WASHINGTON 98072
CONTACT: RICHARD VAN MOURIK, PLS
PHONE: (206) 601-4682
EMAIL: richv@northpeakassociates.com

CIVIL ENGINEER:
LDC, INC.
20210 142ND AVENUE NE
WOODINVILLE, WASHINGTON 98072
CONTACT: JESSE JARRELL, PE
PHONE: (425) 806-1869
FAX: (425) 482-2893
EMAIL: jjarrell@ldccorp.com

LANDSCAPE ARCHITECT:
ORIGIN DESIGN GROUP LLC
1031 185TH AVE NE
SNOHOMISH, WA 98290
CONTACT: KRYSTAL LOWE
PHONE: (425) 346-1905
EMAIL: origindg@gmail.com

WETLAND BIOLOGIST
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FALL CITY, WASHINGTON 98024
CONTACT: ED SEWALL
PHONE: (253) 859-0515
EMAIL: esewall@sewallwc.com

GEOTECHNICAL ENGINEER:
EARTH SOLUTIONS NW LLC
15365 NE 90TH ST, STE 100
REDMOND, WA 98052
CONTACT: KYLE KELLEY
PHONE: (425) 449-4704
EMAIL: henryw@esnw.com

EARTHWORK QUANTITIES

CUT:	0 CY	
FILL:	300,000 CY	
NET:	300,000 CY	
DISTURBED AREA:	1,749,098 SF	(40.15 AC)

CUT/FILL AMOUNTS DO NOT INCLUDE YARDAGE APPROVED THROUGH 2019 EC&G PERMIT.
THE ABOVE QUANTITIES ARE FOR PERMITTING PURPOSES. CONTRACTOR TO VERIFY.

TABLE OF CONTENTS

PROJECT INFORMATION

TAX PARCELS:	31052900303100
SITE ADDRESS:	2703 156TH ST NE MARYSVILLE, WA 98270
TOTAL SITE AREA:	2,003,397 SF (45.99 AC)
NET SITE AREA:	1,383,467 SF (31.76 AC)
PROPOSED DENSITY:	7.28 UNITS/ACRE = 335 UNITS
EXISTING ZONING:	R12 MULTI-FAMILY AND COMMUNITY BUSINESS
PROPOSED ZONING:	R12 MULTI-FAMILY
PROPOSED LAND USE:	TOWNHOMES AND DETACHED SINGLE FAMILY
PROPOSED LOTS:	335
PROPOSED UNITS:	335
TOWNHOMES:	170
DETACHED SINGLE FAMILY:	165
BUILDING SETBACKS:	
FRONT:	10'
GARAGE:	20' / 0' FROM ALLEY
SIDE:	5'
SIDE NEAR ROAD:	10' INTERNAL / 15' ARTERIAL
REAR:	10' / 0' FROM ALLEY
WETLAND BUFFER:	15'
WATER:	CITY OF MARYSVILLE
SEWER:	CITY OF MARYSVILLE
POWER:	SNOHOMISH COUNTY PUD NO. 1
GAS:	PUGET SOUND ENERGY
TELEPHONE:	FRONTIER
CABLE:	COMCAST
SCHOOL DISTRICT:	LAKEWOOD SCHOOL DISTRICT NO. 306
FIRE DISTRICT:	MARYSVILLE FIRE DISTRICT RFA

LEGEND AND ABBREVIATIONS

EXISTING SYMBOLS

SYMBOL	DESCRIPTION
	FOUND REBAR W/ CAP AS NOTED
	SET REBAR W/ CAP
	SOIL LOG
	CULVERT
	CATCH BASIN
	MONITOR WELL
	WATER VALVE
	FIRE HYDRANT
	SEWER MANHOLE
	POWER POLE
	CONIFEROUS TREE
	DECIDUOUS TREE

PROPOSED STORM SYMBOLS

SYMBOL	DESCRIPTION
	SD CAP
	TYPE 1 CATCH BASIN, GRATED LID
	TYPE 1 CATCH BASIN, SOLID LID
	TYPE 2 CATCH BASIN, GRATED LID
	TYPE 2 CATCH BASIN, SOLID LID
	BEEHIVE MANHOLE COVER
	SQUARE YARD DRAIN
	ROUND YARD DRAIN
	STORM CLEAN OUT
	STORM PIPE

PROPOSED SEWER SYMBOLS

SYMBOL	DESCRIPTION
	SEWER CAP
	SEWER CLEANOUT
	SEWER MANHOLE
	SEWER PIPE

PROPOSED SURVEY SYMBOLS

SYMBOL	DESCRIPTION
	SURVEY MONUMENT IN PROPOSED ROAD

ABBREVIATIONS

CB	CATCH BASIN
℄	CENTERLINE
CMP	CORRUGATED METAL PIPE
CP	CONCRETE PIPE
EL	ELEVATION
EXIST.	EXISTING
FL	FLOWLINE
IE	INVERT ELEVATION
LCPE	LINE CORRUGATED POLYETHYLENE
PL	PROPERTY LINE
PP	POWER POLE
PVC	POLYVINYL CHLORIDE PIPE
R/W	RIGHT-OF-WAY
STA	STATION
SD	STORM DRAIN
SS	SANITARY SEWER
SSMH	SANITARY SEWER MANHOLE
SWPE	SOLID WALL POLYETHYLENE PIPE
TYP	TYPICAL
TBR	TO BE REMOVED
A	ALDER
B	BIRCH
C	CEDAR
COT	COTTONWOOD
CH	CHERRY
WIL	WILLOW
DEC	DECIDUOUS

PROPOSED WATER SYMBOLS

SYMBOL	DESCRIPTION
	WATER CAP
	CONCRETE BLOCKING
	BUTTERFLY VALVE
	11° BEND
	45° BEND
	90° BEND
	22° BEND
	VALVE
	HYDRANT ASSEMBLY
	BLOW-OFF VALVE
	REDUCER
	AIR-VAC ASSEMBLY
	WATER METER
	WATER PIPE

PARKING INFORMATION

REQUIRED PARKING SPACES:	2 OFF STREET PARKING SPACES PER UNIT
PROVIDED PARKING SPACES:	TOWNHOME - 4 SPACES SINGLE FAMILY DETACHED - 3 SPACES 1,175 TOTAL PARKING SPACES

DISCLAIMER

TOPOGRAPHIC SURVEY INFORMATION CONTAINED ON THESE PLANS HAS BEEN PROVIDED BY NORTH PEAK ASSOCIATES LLC. LDC, INC. (LAND DEVELOPMENT CONSULTANTS, INC.) ASSUMES NO LIABILITY AS TO THE ACCURACY AND COMPLETENESS OF THIS DATA. ANY DISCREPANCIES FOUND BETWEEN WHAT IS SHOWN ON THE PLANS AND WHAT IS NOTED IN THE FIELD SHOULD BE BROUGHT IMMEDIATELY TO THE ATTENTION OF THE ENGINEER.

PA__-___

Call 2 Business Days Before You Dig
811 or 1-800-424-5555
Utilities Underground Location Center

REVISIONS

NO.	DATE	DESCRIPTION	BY

LDC | Surveying Engineering Planning
Woodinville: 20210 142nd Avenue NE, Woodinville, WA 98072
Kent: 1851 Central Pl S, #101, Kent, WA 98030
T 425.806.1869 www.LDCcorp.com F 425.482.2893

PULTE GROUP
MARYSVILLE 10 DEGREES
COVER SHEET

JESSE A. JARRELL, STATE OF WASHINGTON, 45844, REGISTERED PROFESSIONAL ENGINEER, 8-18-21

JOB NUMBER:	C21150
DRAWING NAME:	C21150PP-CS-PL
DESIGNER:	JAJ
DRAFTING BY:	RCR
DATE:	8-18-21
SCALE:	1"=200'
JURISDICTION:	MARYSVILLE

PP-01
SHEET 1 OF 6

Drawing: P:\Civil\2021\C21-150 Marysville 10 Degrees\Drawings\Pre-Plat\C21150PP-CS-PL.dwg Plotted: Aug 18, 2021 - 2:35pm

Trip Generation Calculations

10 Degrees
GTC #21-190

Trip Generation for: Development 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		NEW	PASS-BY		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)	In+Out (Total)	In	Out	In	Out
Single-Family Detached Housing	166 units	210	9.44	50%	50%	1,567.04	0%	0.00	1,567.04	0%	0.00	1,567.04	0.00	0.00	783.52	783.52
Multifamily Housing (Low-Rise)	170 units	220	7.32	50%	50%	1,244.40	0%	0.00	1,244.40	0%	0.00	1,244.40	0.00	0.00	622.20	622.20
Total						2,811.44		0.00	2,811.44		0.00	2,811.44	0.00	0.00	1,405.72	1,405.72

10 Degrees
GTC #21-190

Trip Generation for: **Development Peak 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		NEW	PASS-BY		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)	In+Out (Total)	In	Out	In	Out
Single-Family Detached Housing	166 units	210	0.74	25%	75%	122.84	0%	0.00	122.84	0%	0.00	122.84	0.00	0.00	30.71	92.13
Multifamily Housing (Low-Rise)	170 units	220	0.46	23%	77%	78.20	0%	0.00	78.20	0%	0.00	78.20	0.00	0.00	17.99	60.21
Total						201.04		0.00	201.04		0.00	201.04	0.00	0.00	48.70	152.34

10 Degrees
GTC #21-190

Trip Generation for: **Development Peak 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		NEW	PASS-BY		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)	In+Out (Total)	In	Out	In	Out
Single-Family Detached Housing	166 units	210	1.00	63%	37%	166.00	0%	0.00	166.00	0%	0.00	166.00	0.00	0.00	104.58	61.42
Multifamily Housing (Low-Rise)	170 units	220	0.56	63%	37%	95.20	0%	0.00	95.20	0%	0.00	95.20	0.00	0.00	59.98	35.22
Total						261.20		0.00	261.20		0.00	261.20	0.00	0.00	164.56	96.64

10 Degrees
GTC #21-190

Trip Generation for: Development Saturday
(a.k.a.): Average Saturday Daily Trips

									NET EXTERNAL TRIPS BY TYPE							
									IN BOTH DIRECTIONS				DIRECTIONAL ASSIGNMENTS			
			Gross Trips				Internal Crossover		TOTAL	PASS-BY		NEW	PASS-BY		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)	In+Out (Total)	In	Out	In	Out
Single-Family Detached Housing	166 units	210	9.54	50%	50%	1,583.64	0%	0.00	1,583.64	0%	0.00	1,583.64	0.00	0.00	791.82	791.82
Multifamily Housing (Low-Rise)	170 units	220	8.14	50%	50%	1,383.80	0%	0.00	1,383.80	0%	0.00	1,383.80	0.00	0.00	691.90	691.90
Total						2,967.44		0.00	2,967.44		0.00	2,967.44	0.00	0.00	1,483.72	1,483.72

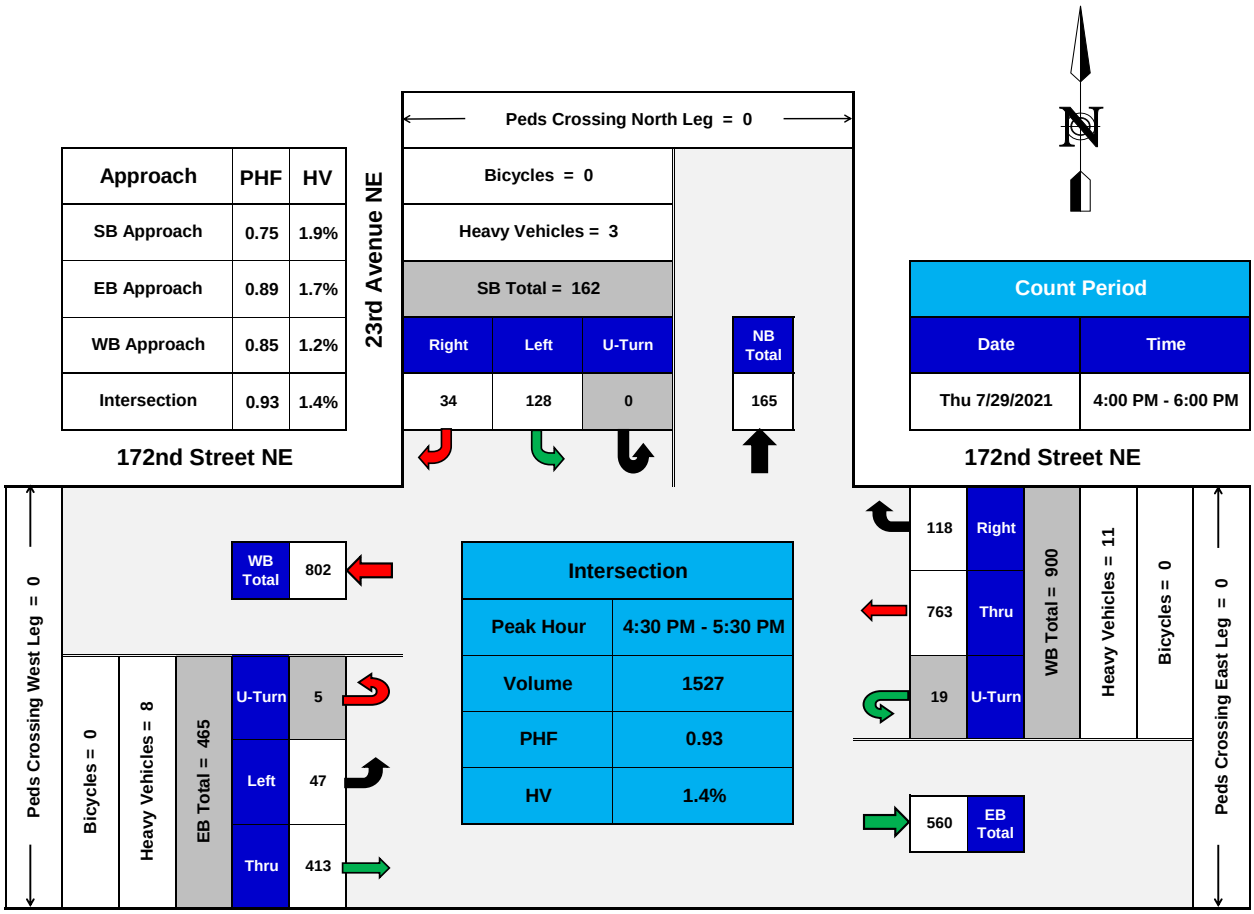
Trip Generation for: Development Peak Saturday, Peak Hour of Generator
(a.k.a.): Saturday PM Peak Hour

									NET EXTERNAL TRIPS BY TYPE							
									IN BOTH DIRECTIONS				DIRECTIONAL ASSIGNMENTS			
			Gross Trips				Internal Crossover		TOTAL	PASS-BY		NEW	PASS-BY		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)	In+Out (Total)	In	Out	In	Out
Single-Family Detached Housing	166 units	210	0.93	54%	46%	154.38	0%	0.00	154.38	0%	0.00	154.38	0.00	0.00	83.37	71.01
Multifamily Housing (Low-Rise)	170 units	220	0.70	63%	37%	119.00	0%	0.00	119.00	0%	0.00	119.00	0.00	0.00	74.97	44.03
Total						273.38		0.00	273.38		0.00	273.38	0.00	0.00	158.34	115.04

Weekday PM Peak-Hour Turning Movement Calculations

172nd Street NE @ 23rd Avenue NE

Marysville, Wa



PHF = Peak Hour Factor
HV = Heavy Vehicles

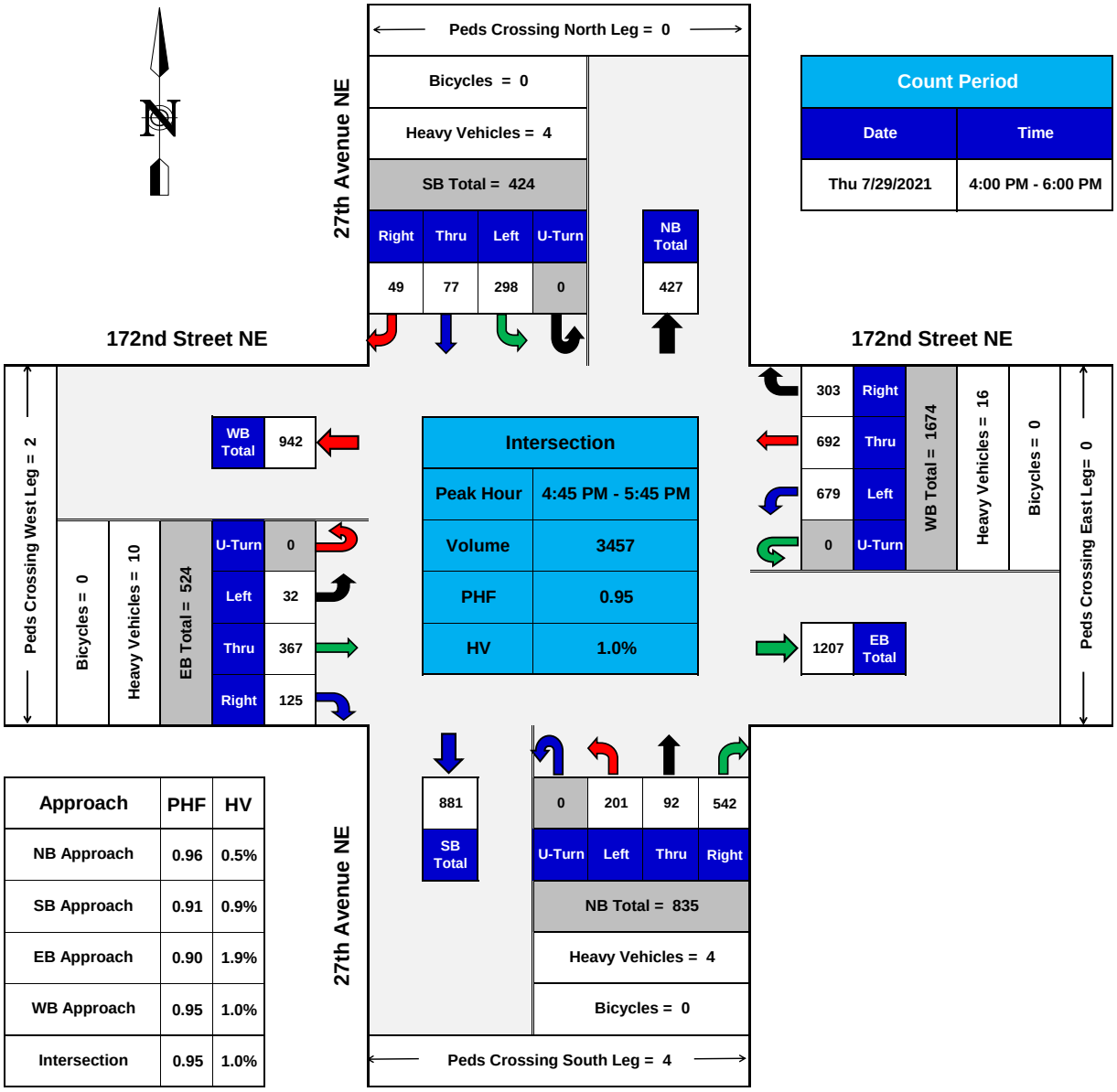
TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

TRAFFIC DATA GATHERING

172nd Street NE @ 27th Avenue NE

Marysville, Wa



Approach	PHF	HV
NB Approach	0.96	0.5%
SB Approach	0.91	0.9%
EB Approach	0.90	1.9%
WB Approach	0.95	1.0%
Intersection	0.95	1.0%

PHF = Peak Hour Factor
HV = Heavy Vehicles

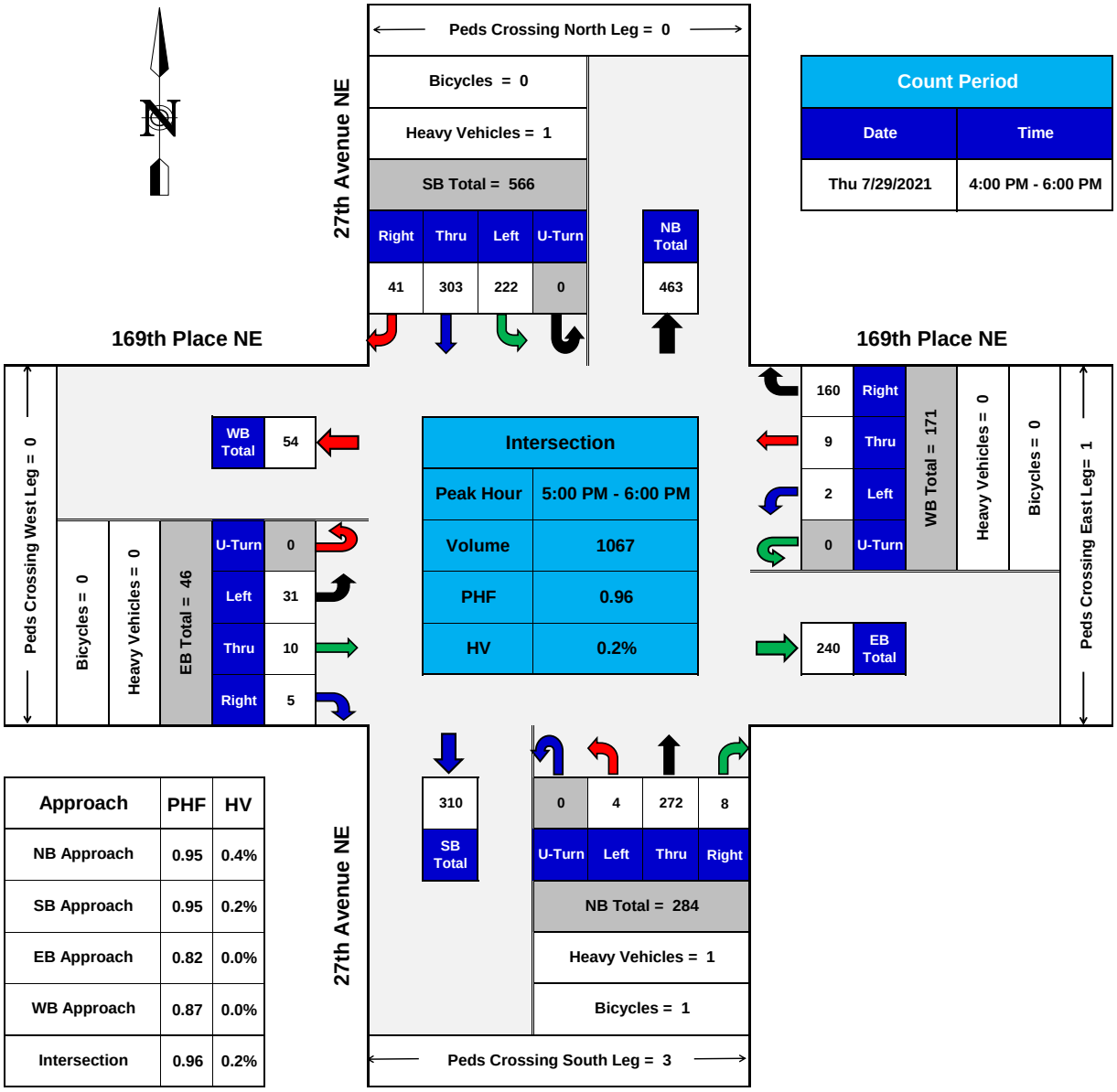
TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

TRAFFIC DATA GATHERING

169th Place NE @ 27th Avenue NE

Marysville, Wa



Approach	PHF	HV
NB Approach	0.95	0.4%
SB Approach	0.95	0.2%
EB Approach	0.82	0.0%
WB Approach	0.87	0.0%
Intersection	0.96	0.2%

PHF = Peak Hour Factor
HV = Heavy Vehicles

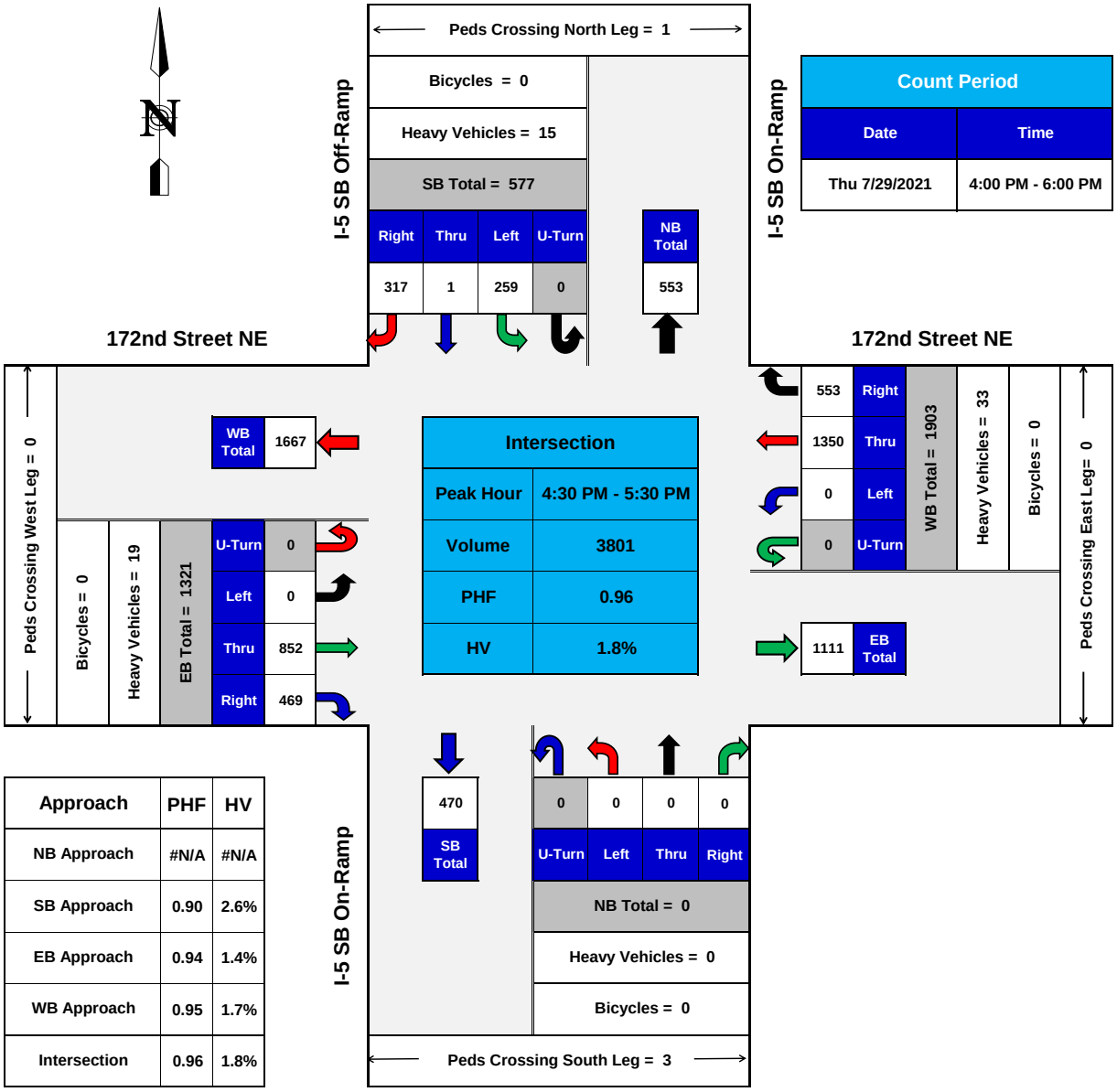
TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

TRAFFIC DATA GATHERING

172nd Street NE @ I-5 SB Ramps

Marysville, Wa



Approach	PHF	HV
NB Approach	#N/A	#N/A
SB Approach	0.90	2.6%
EB Approach	0.94	1.4%
WB Approach	0.95	1.7%
Intersection	0.96	1.8%

PHF = Peak Hour Factor
HV = Heavy Vehicles

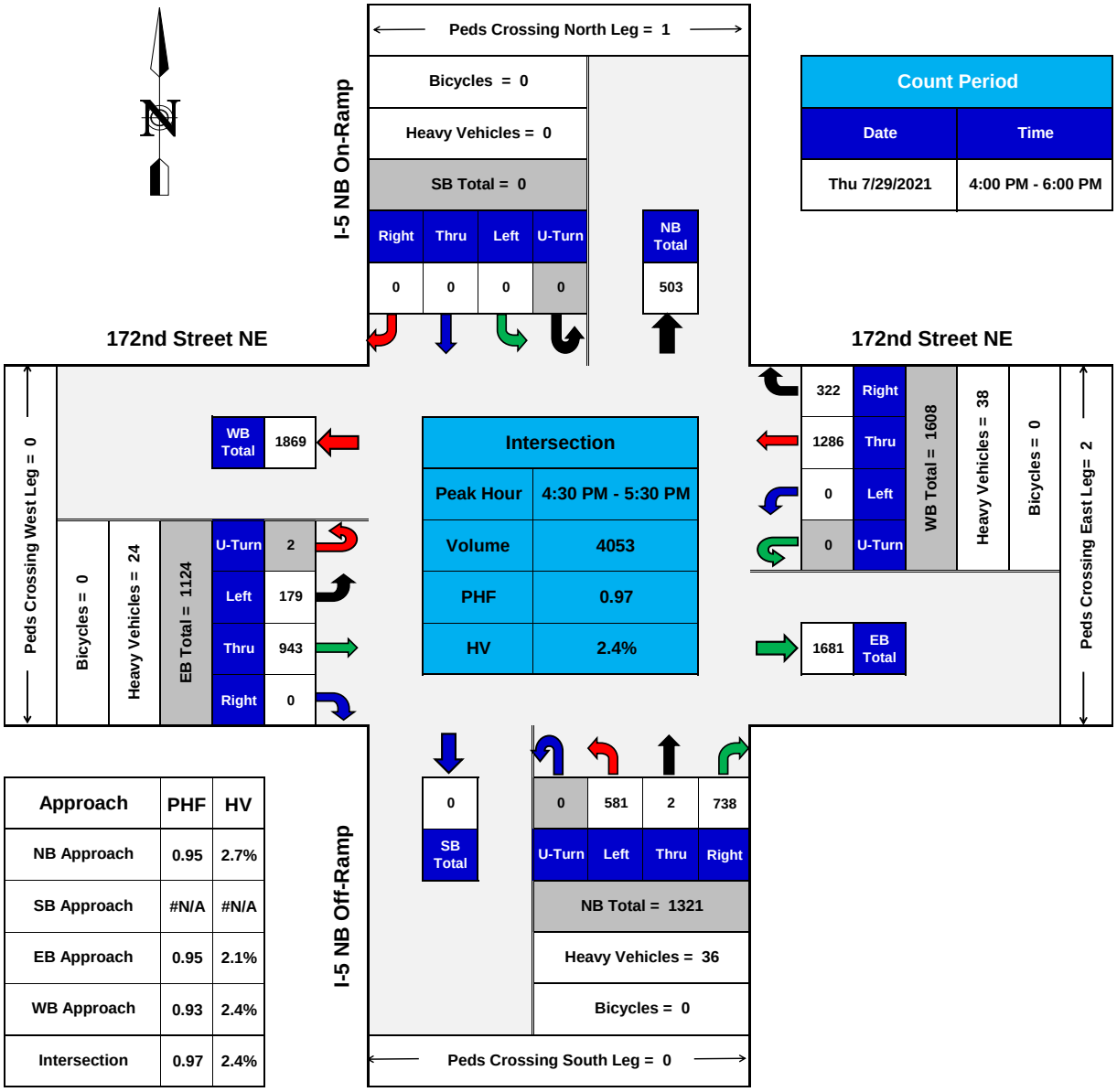
TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

TRAFFIC DATA GATHERING

172nd Street NE @ I-5 NB Ramps

Marysville, Wa



Approach	PHF	HV
NB Approach	0.95	2.7%
SB Approach	#N/A	#N/A
EB Approach	0.95	2.1%
WB Approach	0.93	2.4%
Intersection	0.97	2.4%

PHF = Peak Hour Factor
HV = Heavy Vehicles

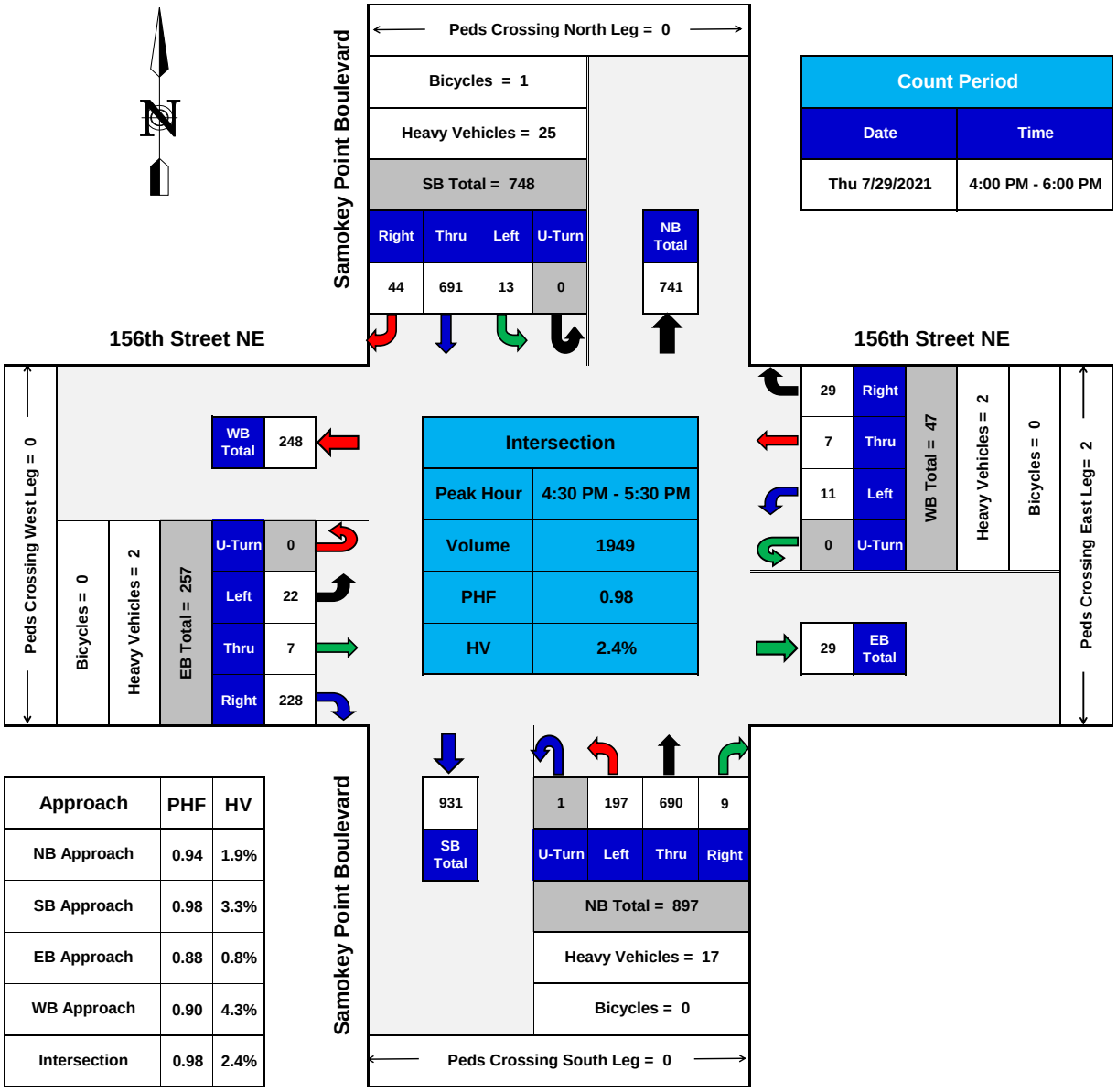
TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

TRAFFIC DATA GATHERING

156th Street NE @ Smokey Point Boulevard

Marysville, Wa



Approach	PHF	HV
NB Approach	0.94	1.9%
SB Approach	0.98	3.3%
EB Approach	0.88	0.8%
WB Approach	0.90	4.3%
Intersection	0.98	2.4%

PHF = Peak Hour Factor
HV = Heavy Vehicles

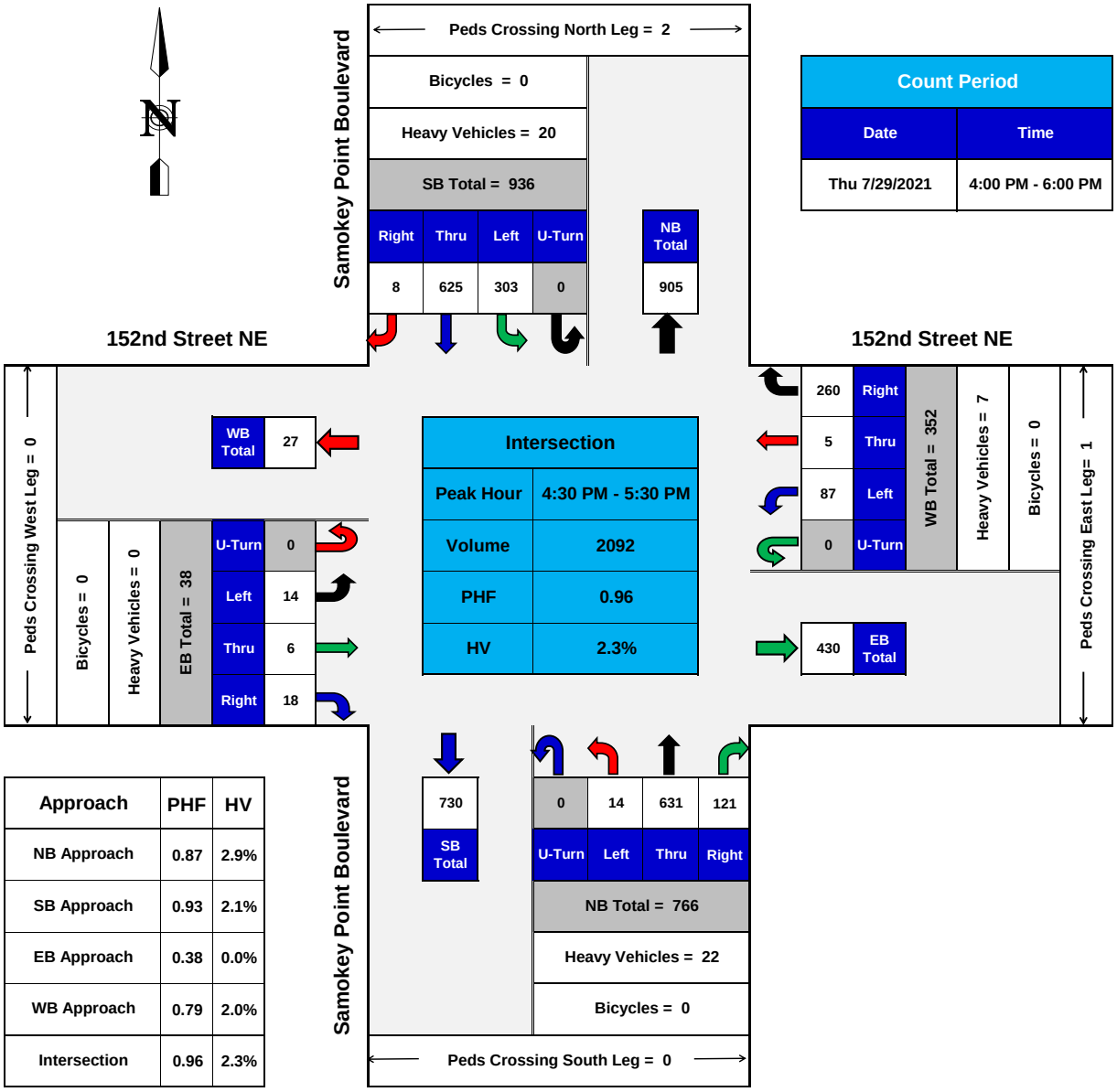
TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

TRAFFIC DATA GATHERING

152nd Street NE @ Smokey Point Boulevard

Marysville, Wa



Approach	PHF	HV
NB Approach	0.87	2.9%
SB Approach	0.93	2.1%
EB Approach	0.38	0.0%
WB Approach	0.79	2.0%
Intersection	0.96	2.3%

PHF = Peak Hour Factor
HV = Heavy Vehicles

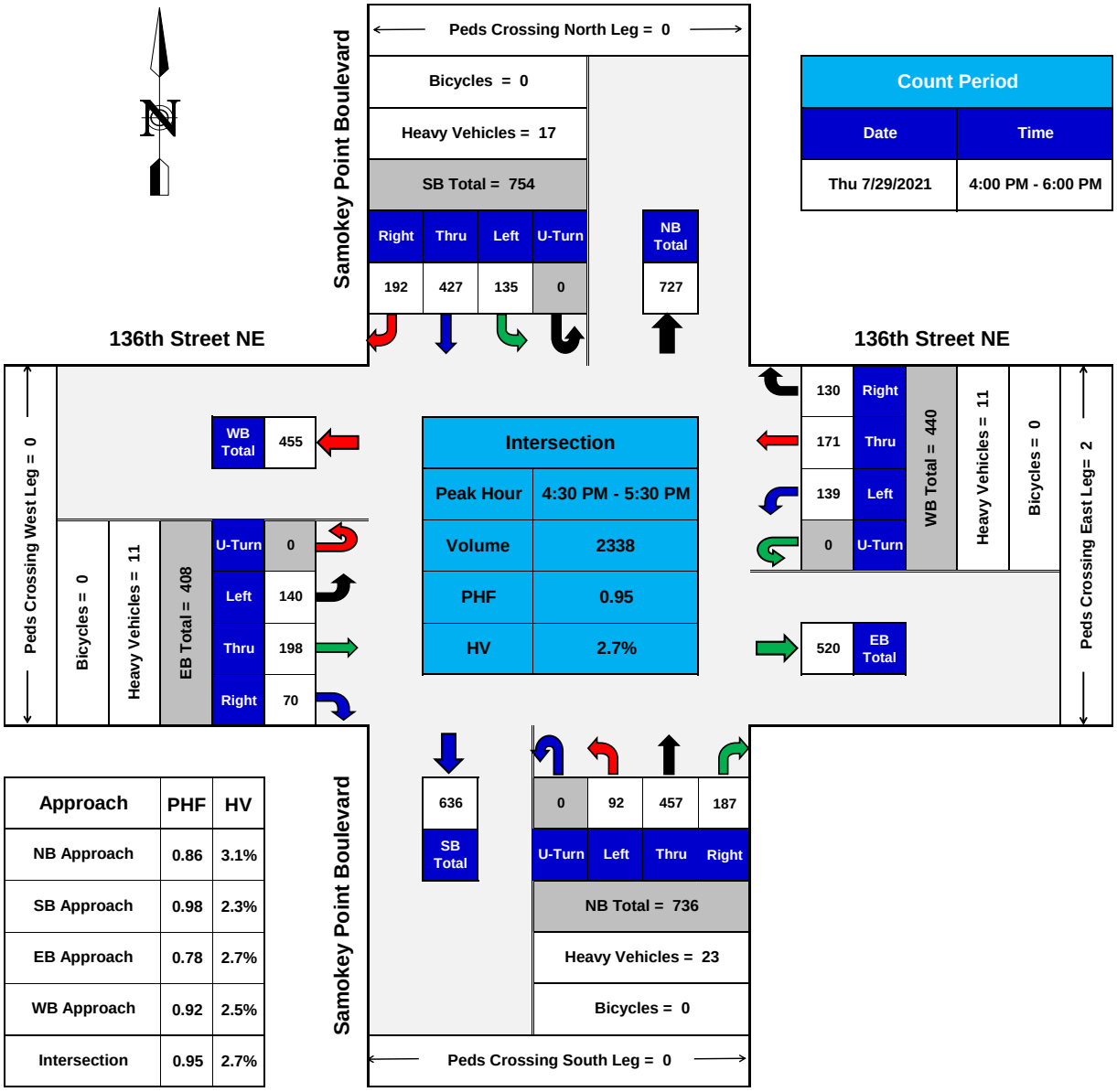
TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

TRAFFIC DATA GATHERING

136th Street NE @ Smokey Point Boulevard

Marysville, Wa



Approach	PHF	HV
NB Approach	0.86	3.1%
SB Approach	0.98	2.3%
EB Approach	0.78	2.7%
WB Approach	0.92	2.5%
Intersection	0.95	2.7%

PHF = Peak Hour Factor
HV = Heavy Vehicles

TURNING MOVEMENTS DIAGRAM

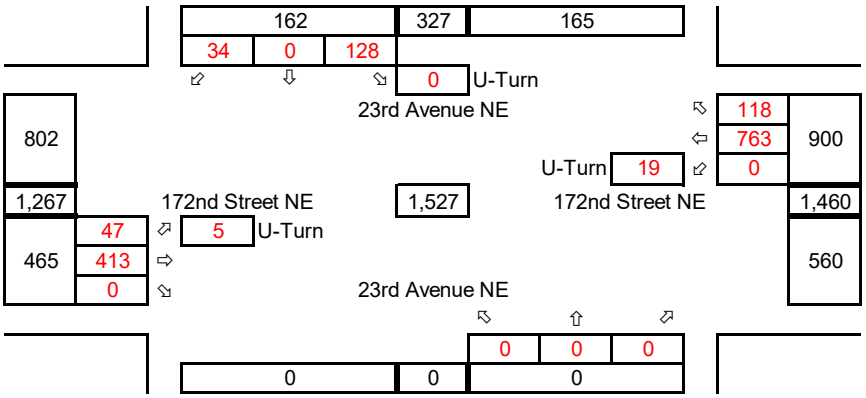
PEAK HOUR SUMMARY

TRAFFIC DATA GATHERING

Synchro ID: 1
Existing
Average Weekday
PM Peak-Hour

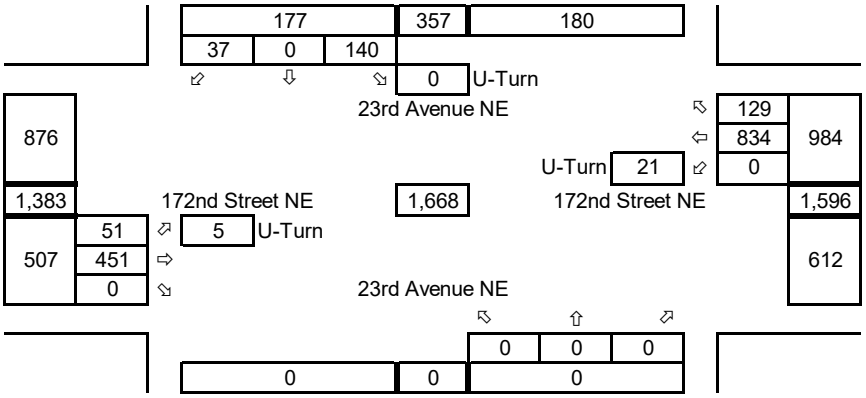
Year: **7/29/2021**

Data Source: **TDG**

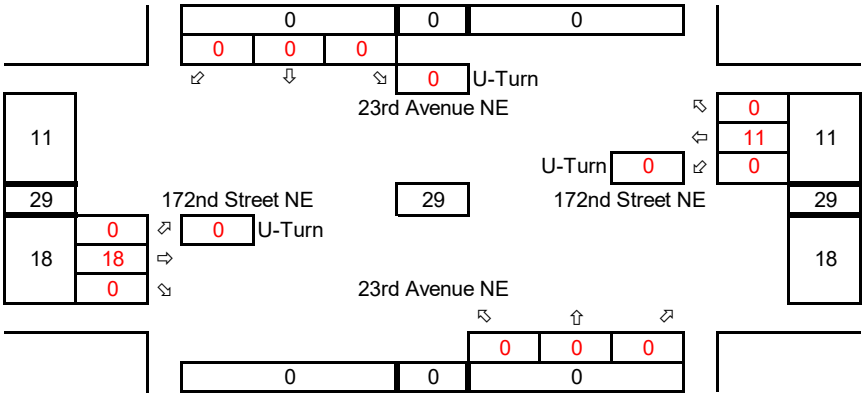


Future without Development
Average Weekday
PM Peak Hour

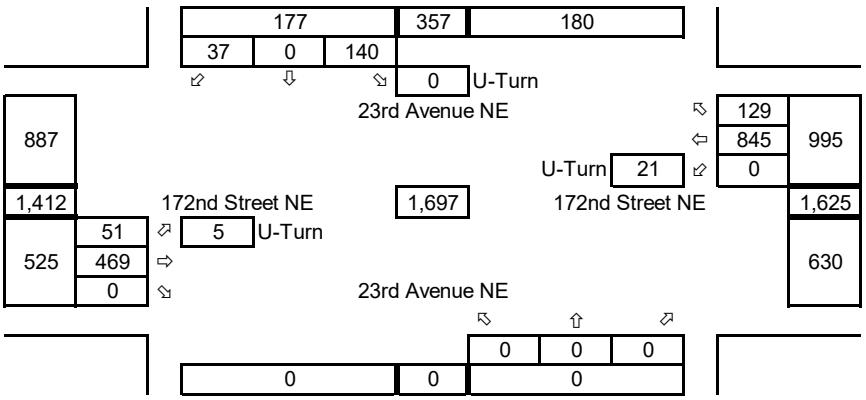
Year: 2024
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak Hour



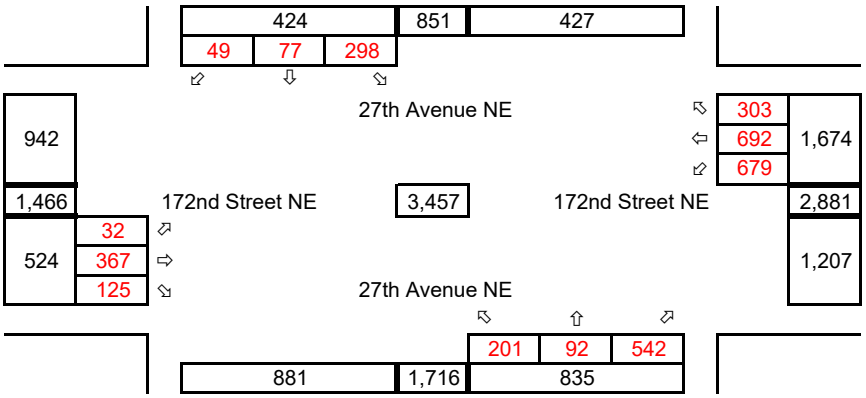
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 2
Existing
Average Weekday
PM Peak-Hour

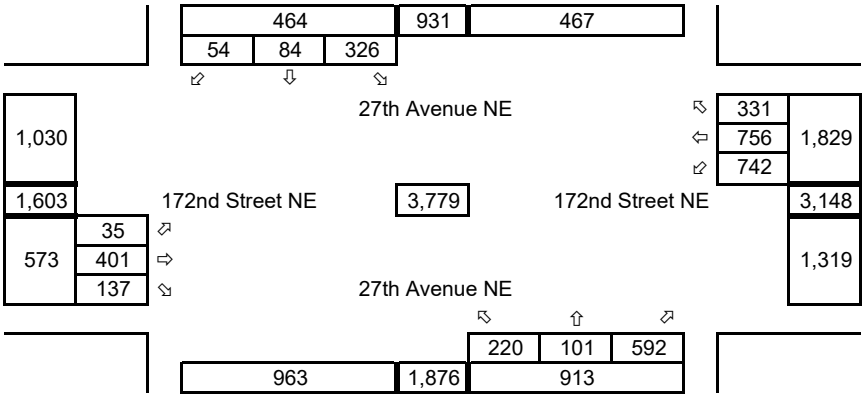
Year: **7/29/2021**

Data Source: **TDG**

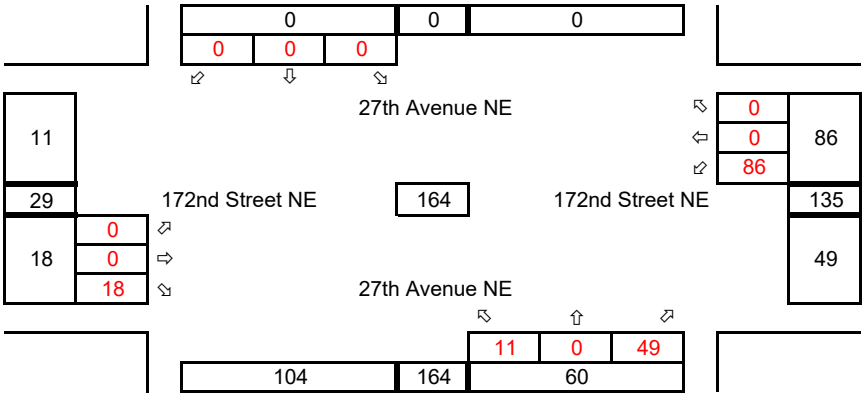


Future without Development
Average Weekday
PM Peak Hour

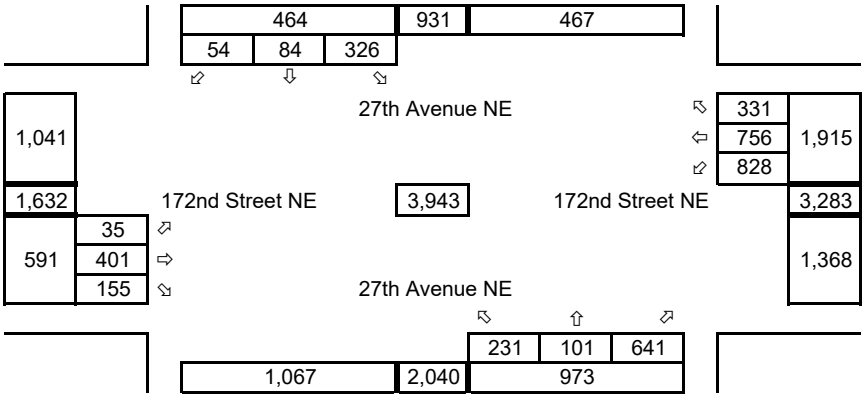
Year: 2024
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak Hour



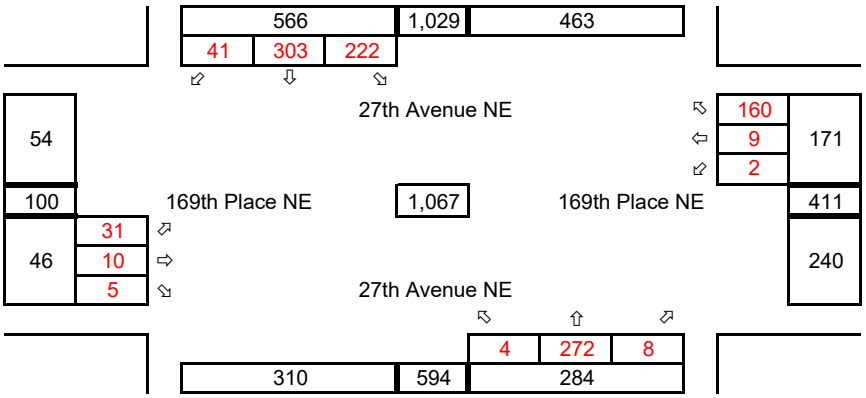
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 3
Existing
Average Weekday
PM Peak-Hour

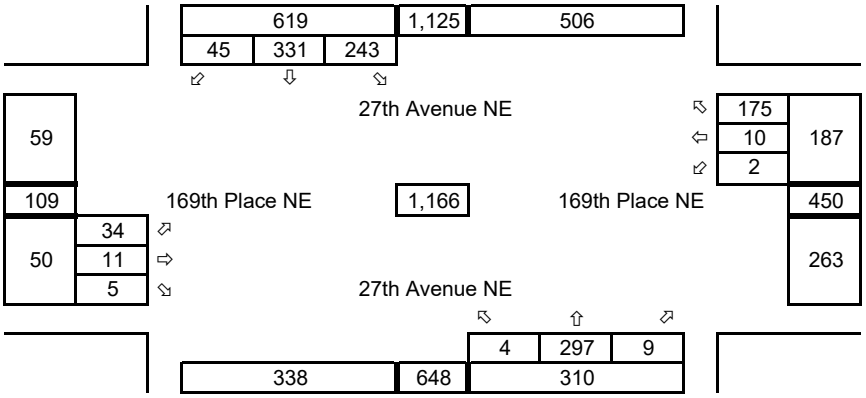
Year: **7/29/2021**

Data Source: **TDG**

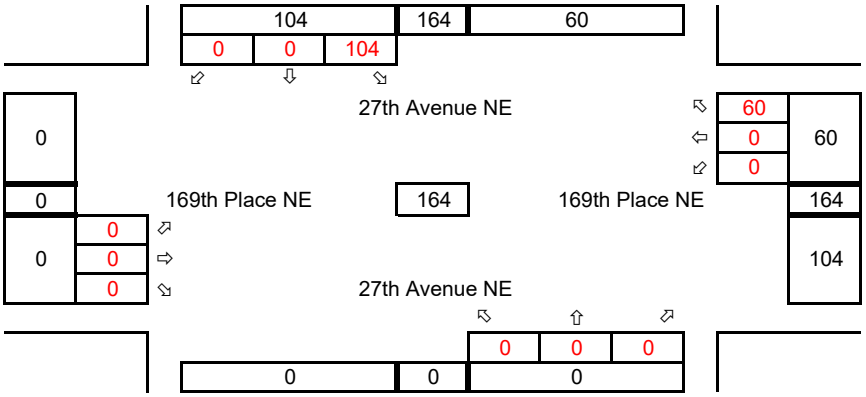


Future without Development
Average Weekday
PM Peak Hour

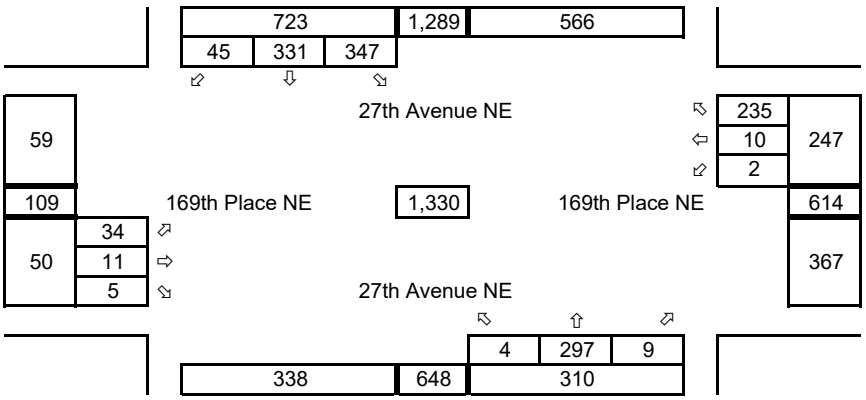
Year: 2024
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak Hour



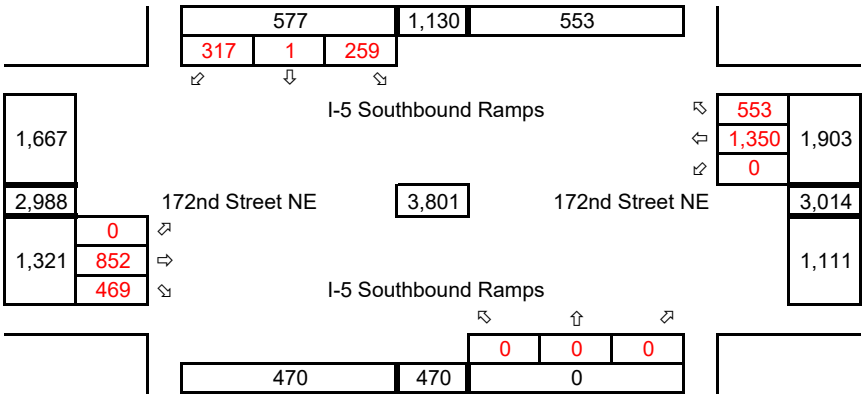
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 4
Existing
Average Weekday
PM Peak-Hour

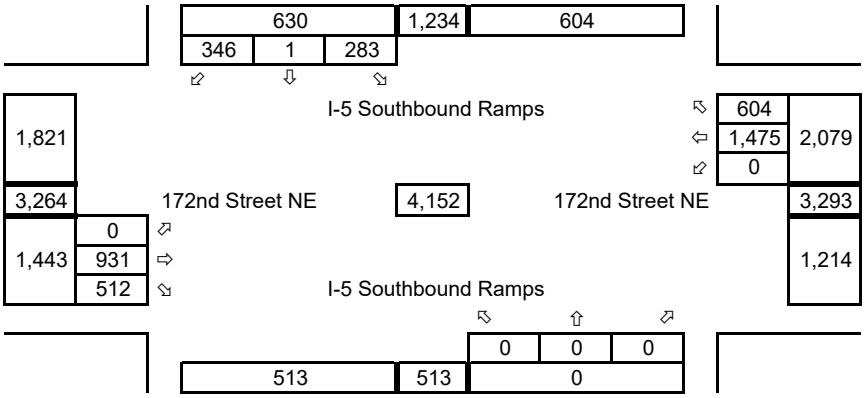
Year: **7/29/2021**

Data Source: **TDG**

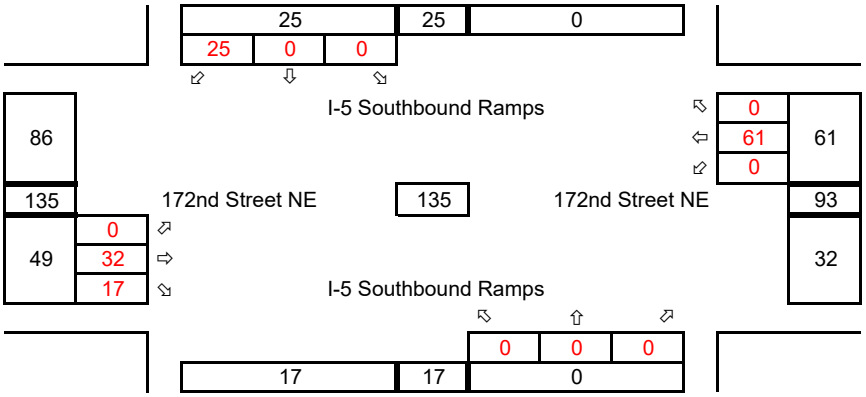


Future without Development
Average Weekday
PM Peak Hour

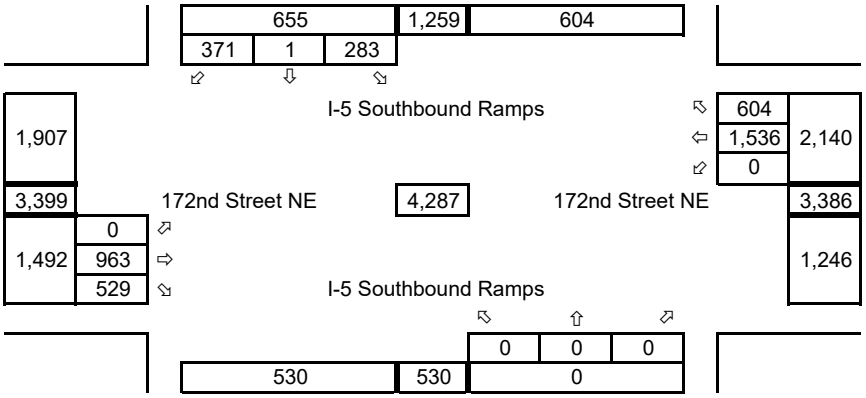
Year: 2024
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak Hour



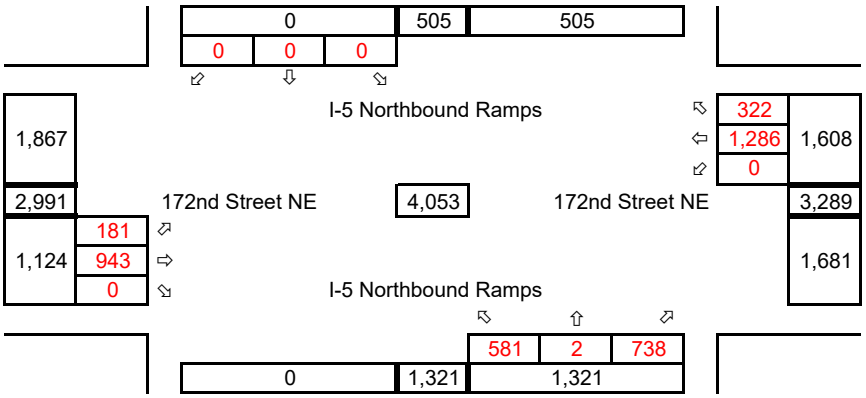
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 5
Existing
Average Weekday
PM Peak-Hour

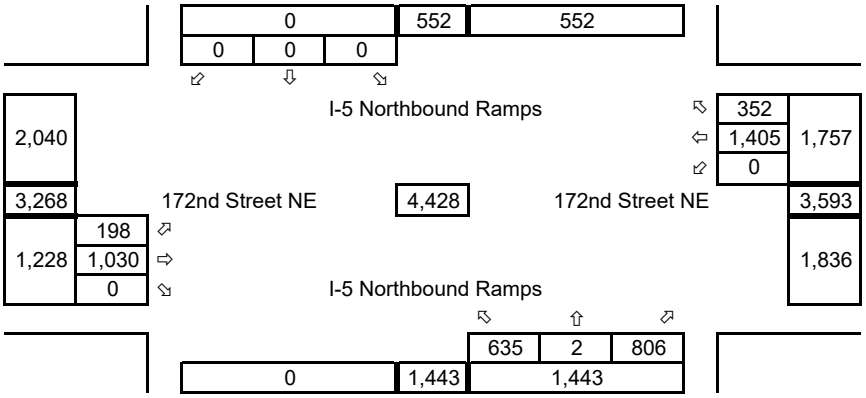
Year: **7/29/2021**

Data Source: **TDG**

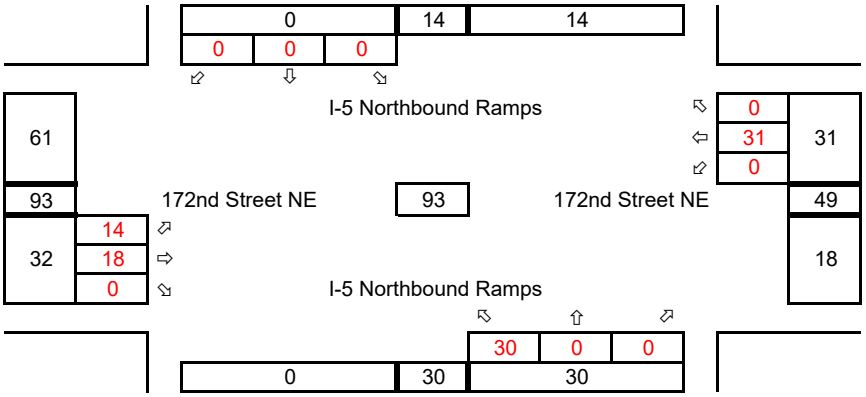


Future without Development
Average Weekday
PM Peak Hour

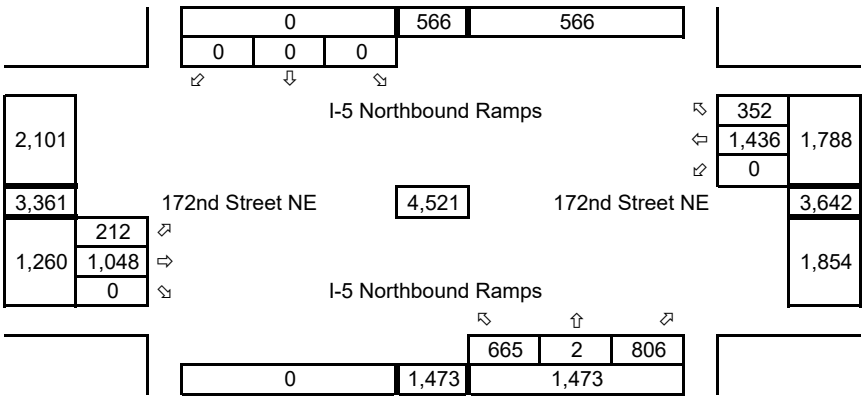
Year: 2024
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak Hour



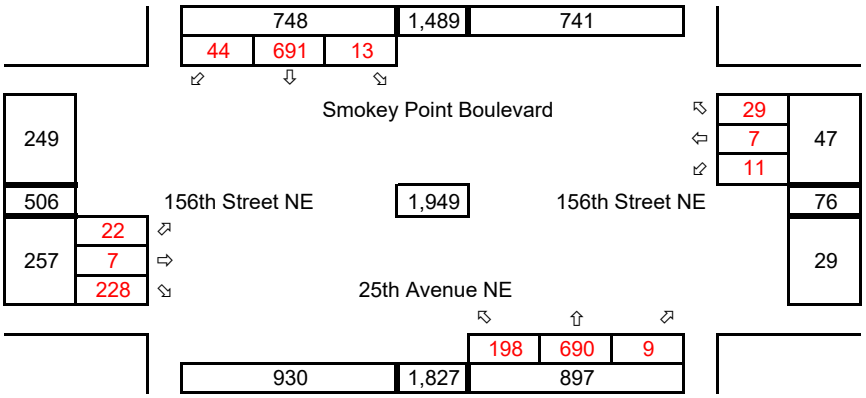
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 6
Existing
Average Weekday
PM Peak-Hour

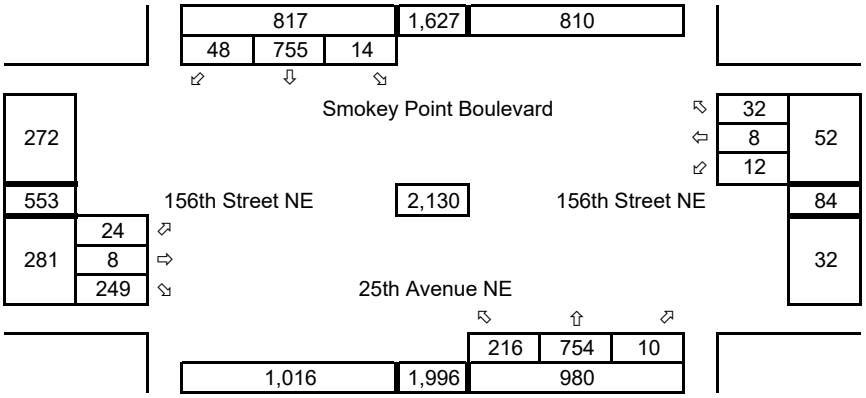
Year: **7/29/2021**

Data Source: **TDG**

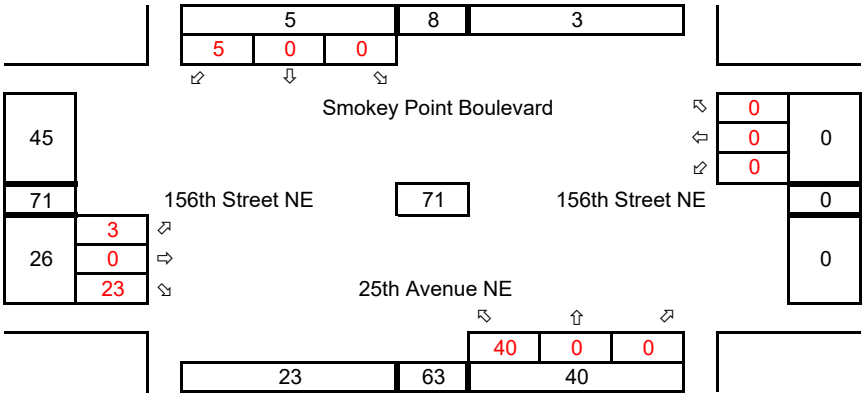


Future without Development
Average Weekday
PM Peak Hour

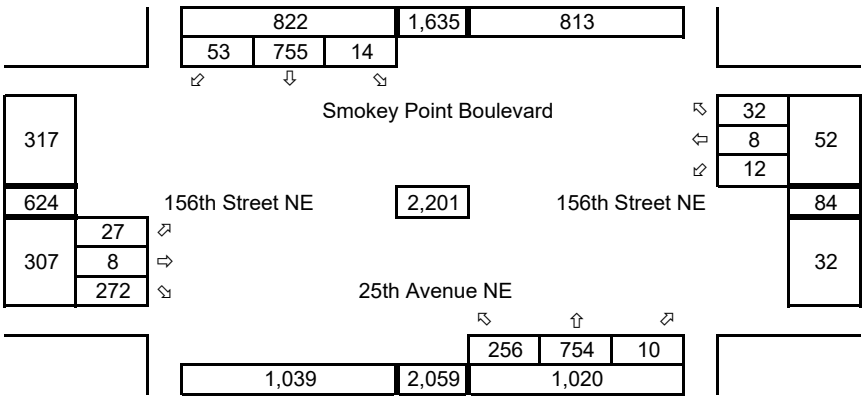
Year: 2024
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak Hour



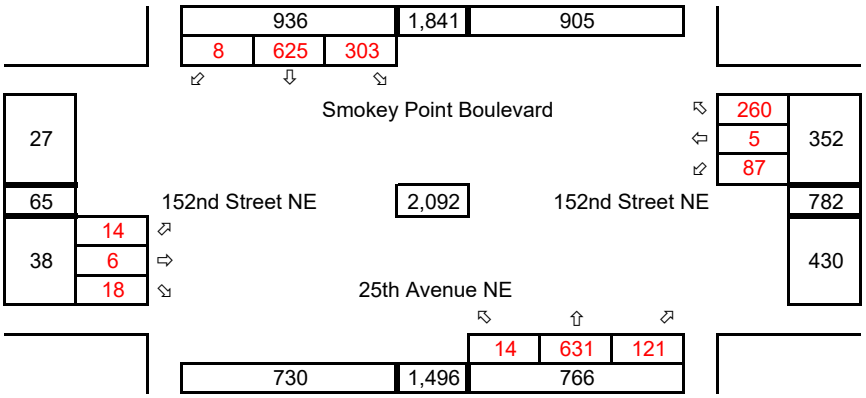
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 7
Existing
Average Weekday
PM Peak-Hour

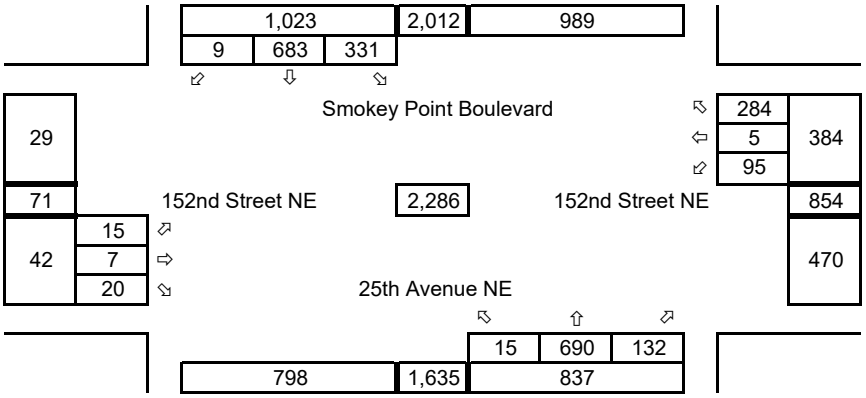
Year: **7/29/2021**

Data Source: **TDG**

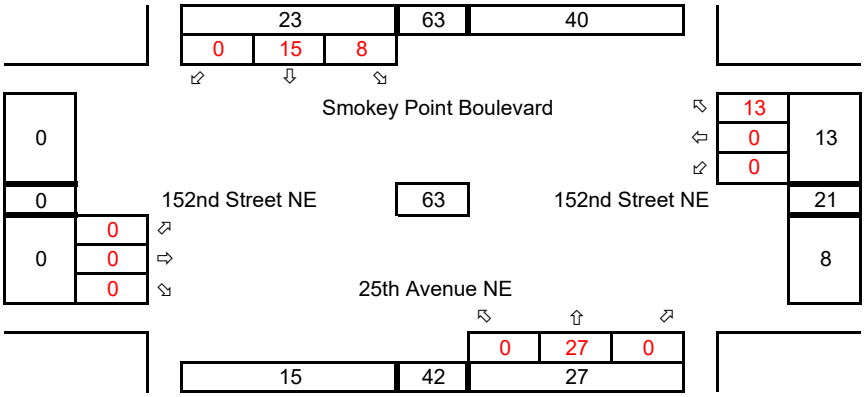


Future without Development
Average Weekday
PM Peak Hour

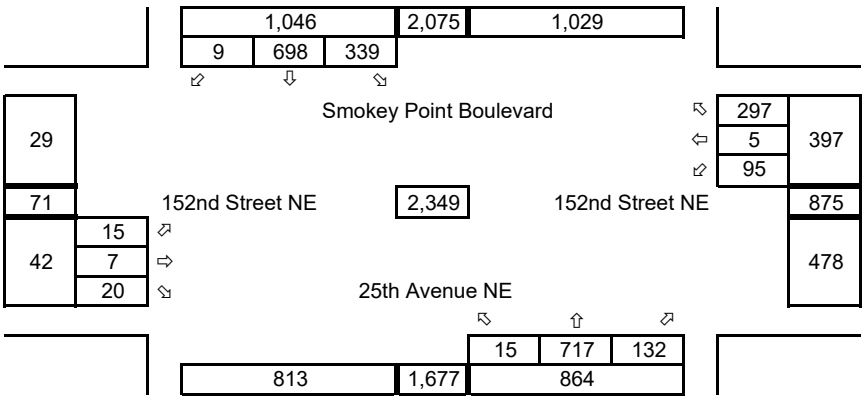
Year: 2024
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak Hour



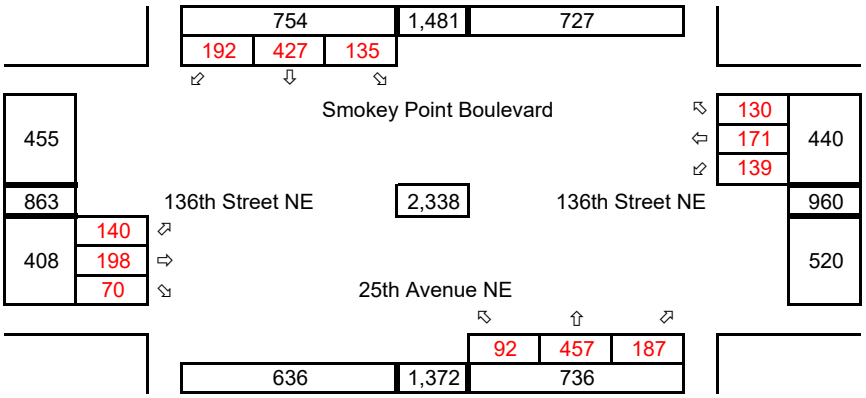
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 8
Existing
Average Weekday
PM Peak-Hour

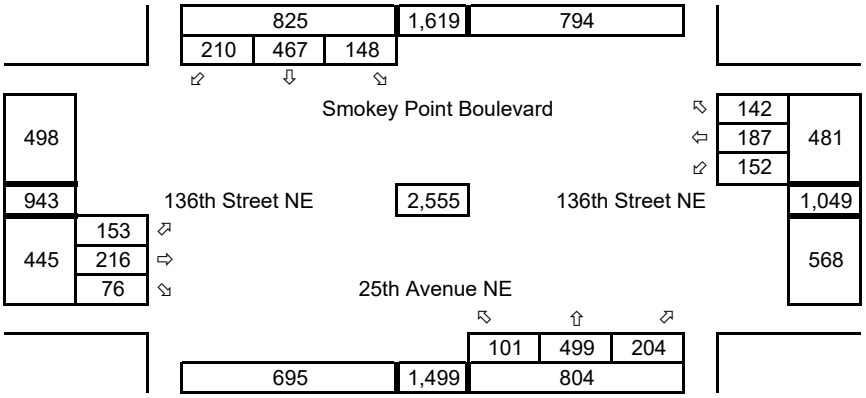
Year: **7/29/2021**

Data Source: **TDG**

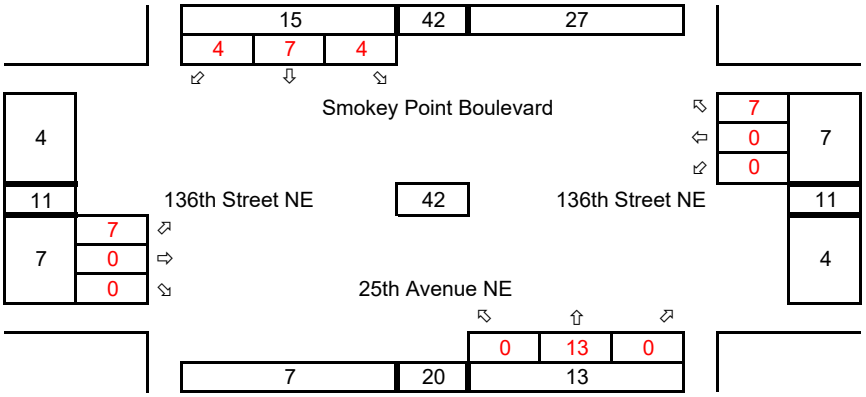


Future without Development
Average Weekday
PM Peak Hour

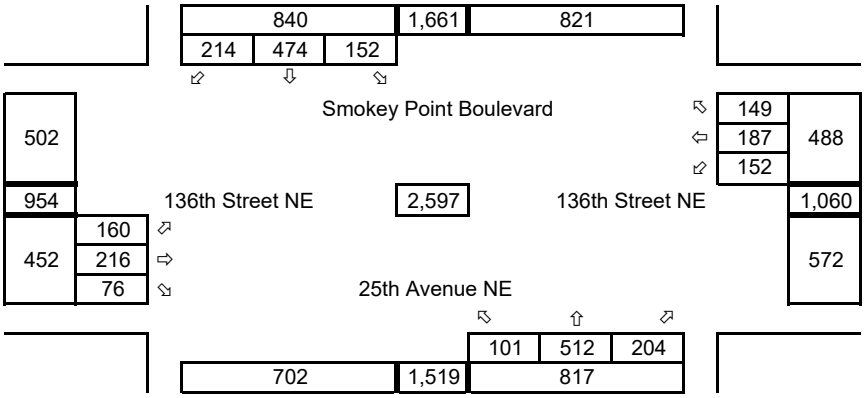
Year: 2024
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak Hour



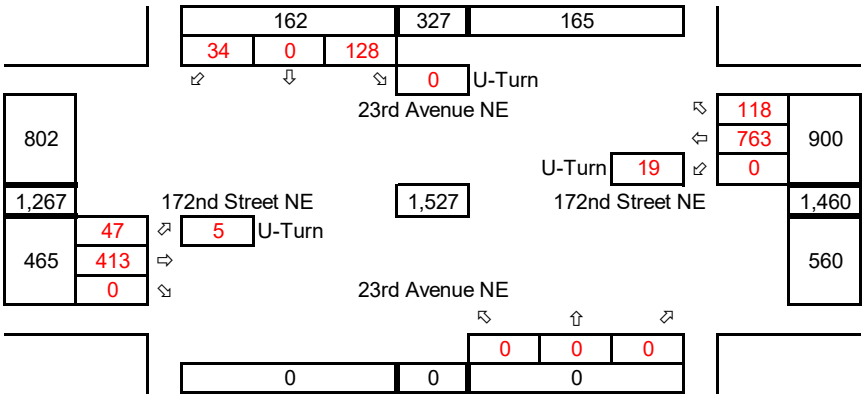
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 1
Existing
Average Weekday
PM Peak-Hour

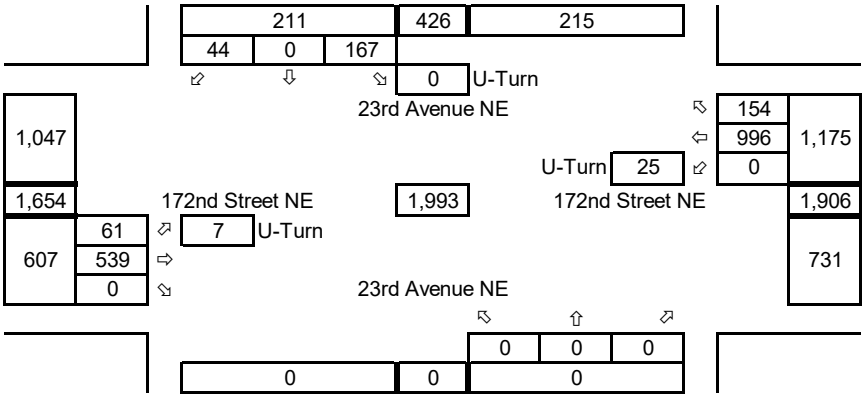
Year: **7/29/2021**

Data Source: **TDG**

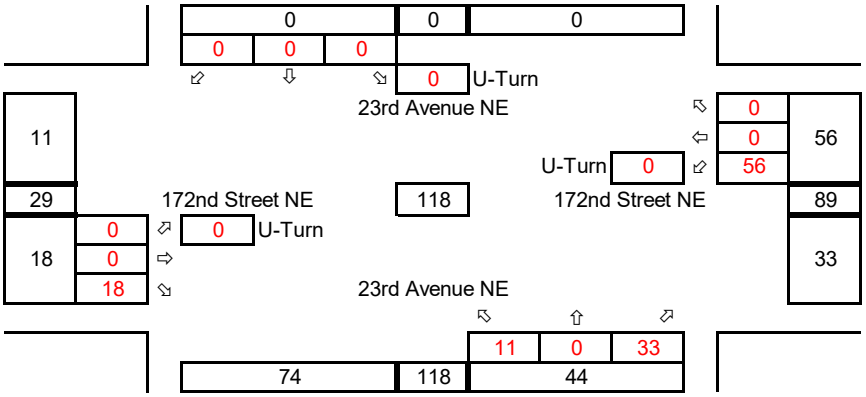


Future without Development
Average Weekday
PM Peak Hour

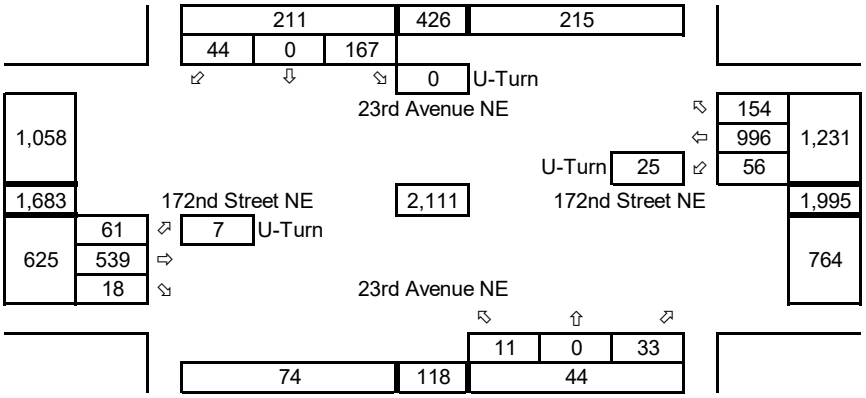
Year: 2030
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Average Weekday
PM Peak Hour



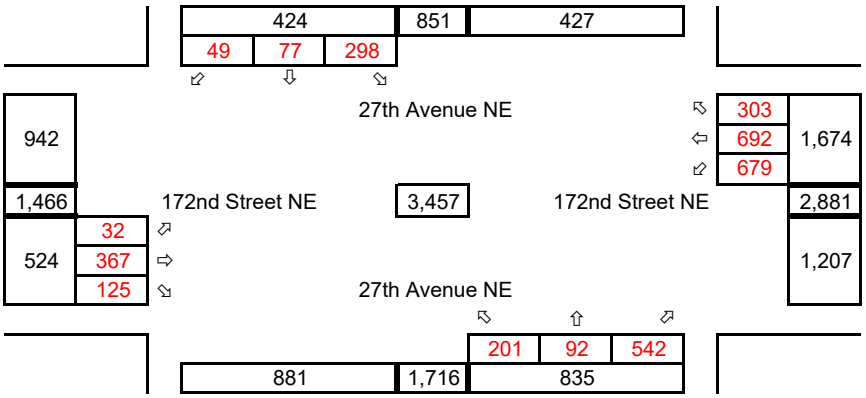
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 2
Existing
Average Weekday
PM Peak-Hour

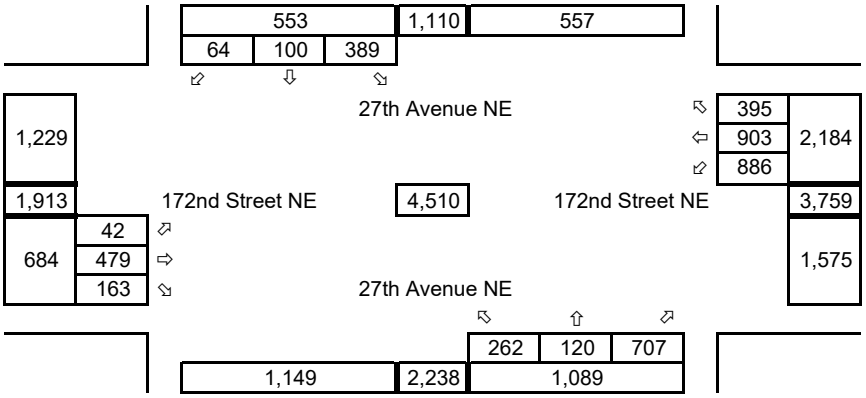
Year: **7/29/2021**

Data Source: **TDG**

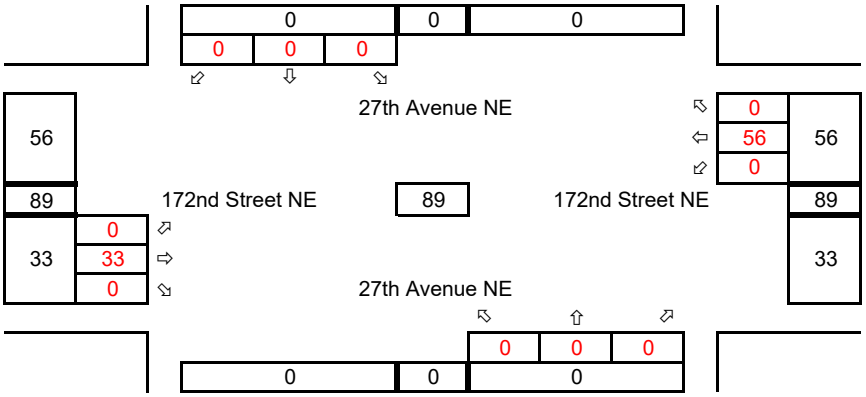


Future without Development
Average Weekday
PM Peak Hour

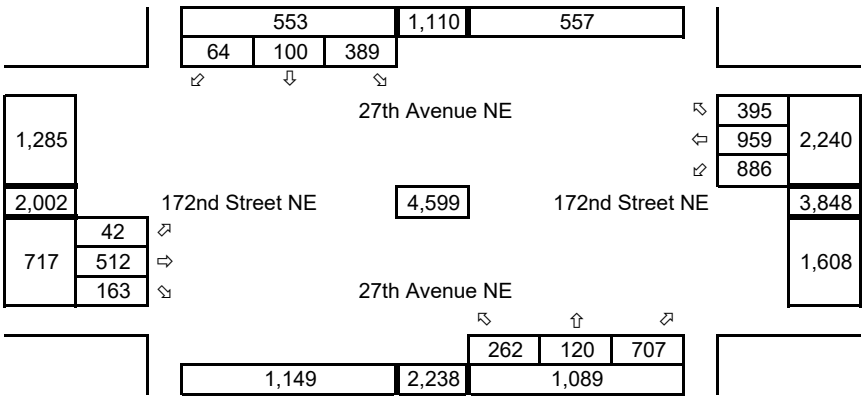
Year: 2030
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Average Weekday
PM Peak Hour



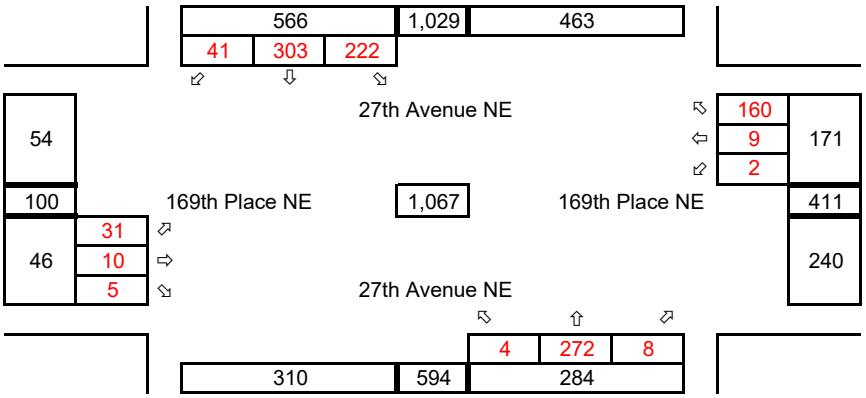
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 3
Existing
Average Weekday
PM Peak-Hour

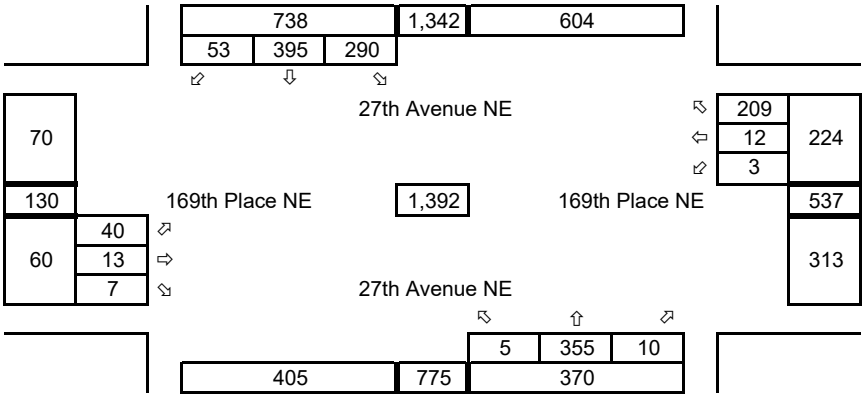
Year: **7/29/2021**

Data Source: **TDG**

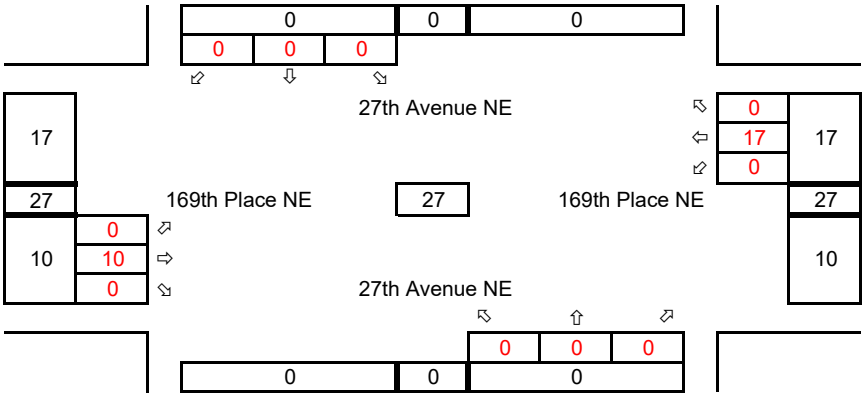


Future without Development
Average Weekday
PM Peak Hour

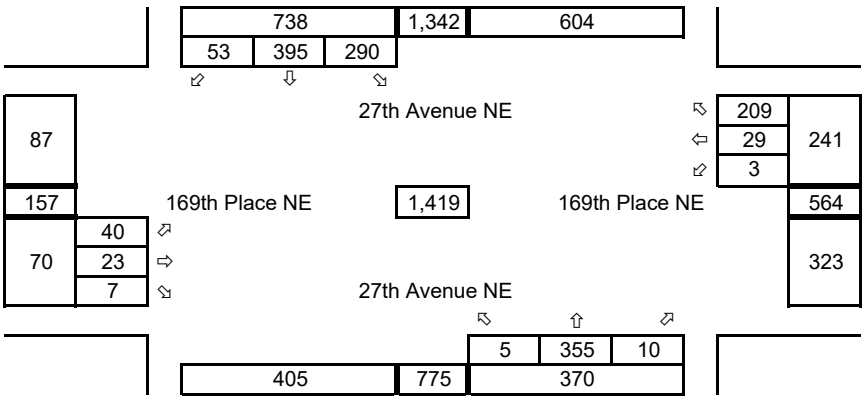
Year: 2030
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Average Weekday
PM Peak Hour



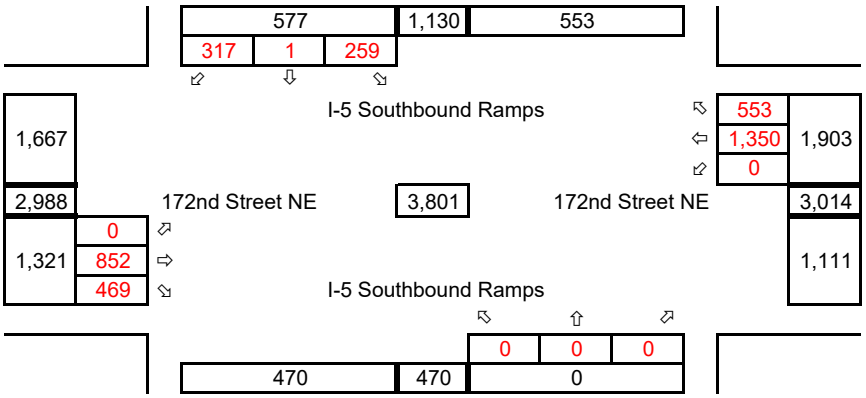
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 4
Existing
Average Weekday
PM Peak-Hour

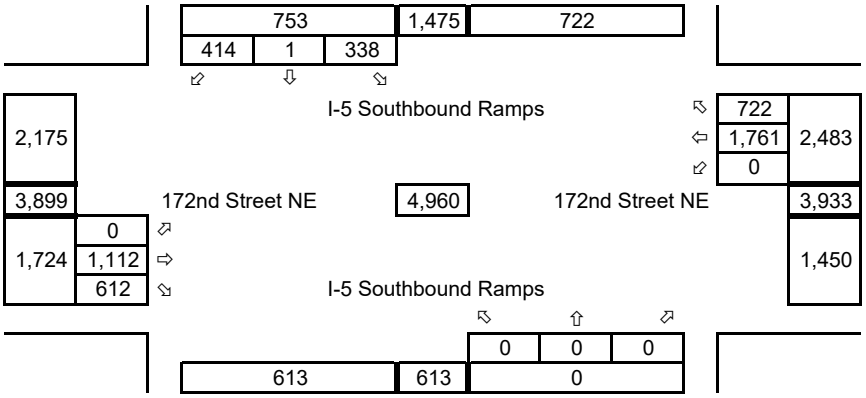
Year: **7/29/2021**

Data Source: **TDG**

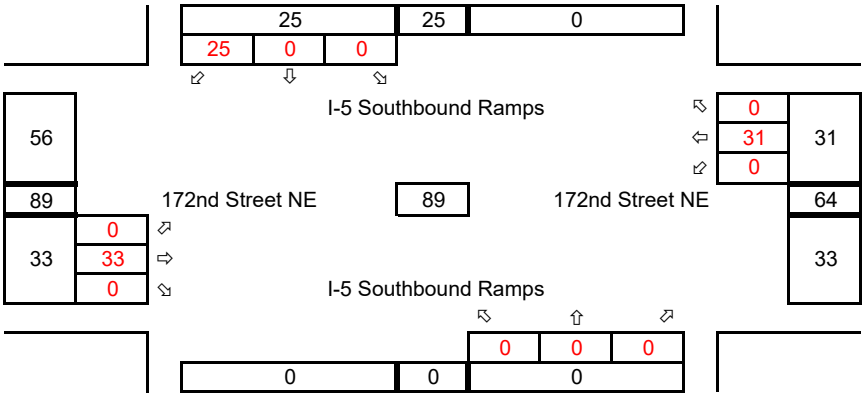


Future without Development
Average Weekday
PM Peak Hour

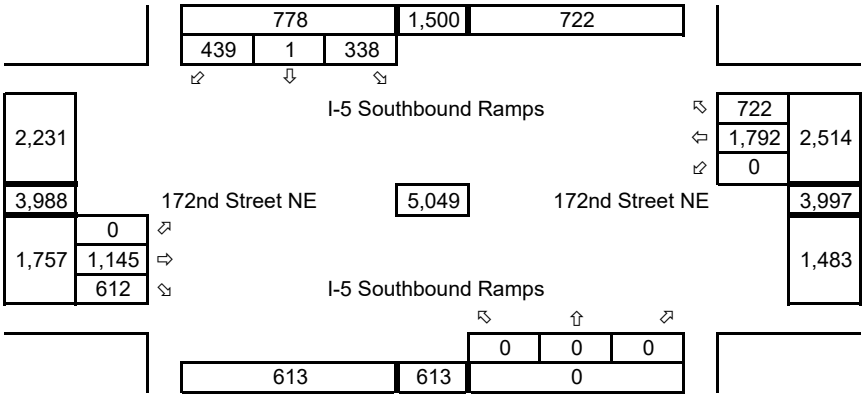
Year: 2030
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Average Weekday
PM Peak Hour



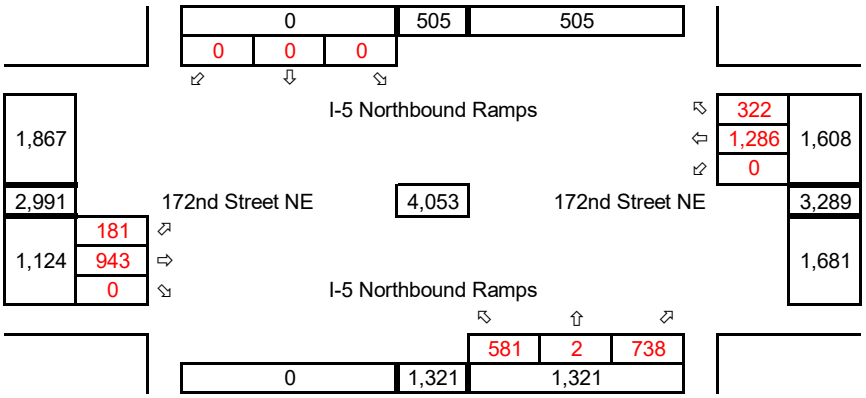
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 5
Existing
Average Weekday
PM Peak-Hour

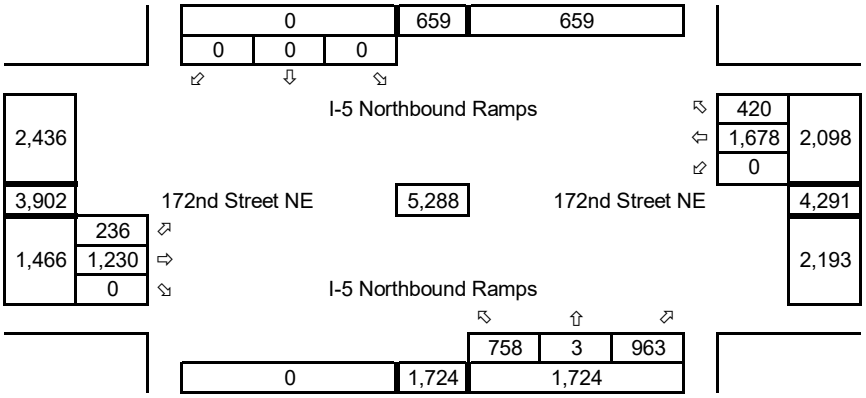
Year: **7/29/2021**

Data Source: **TDG**

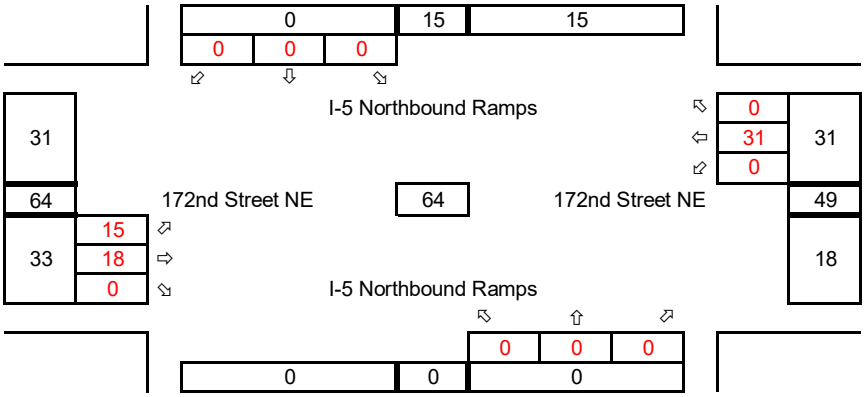


Future without Development
Average Weekday
PM Peak Hour

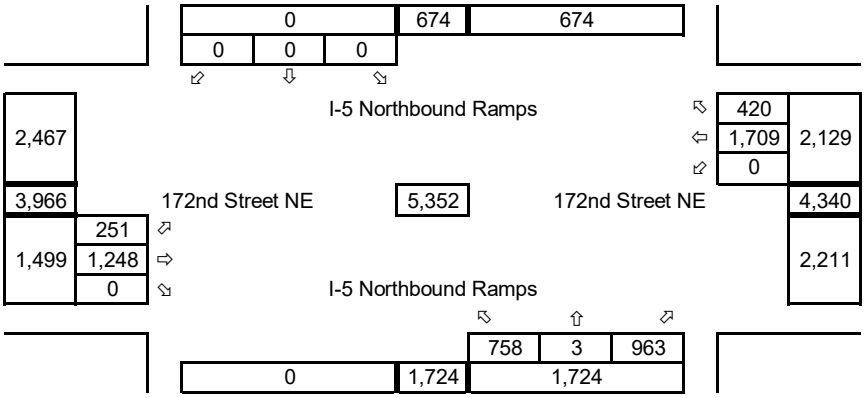
Year: 2030
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Average Weekday
PM Peak Hour



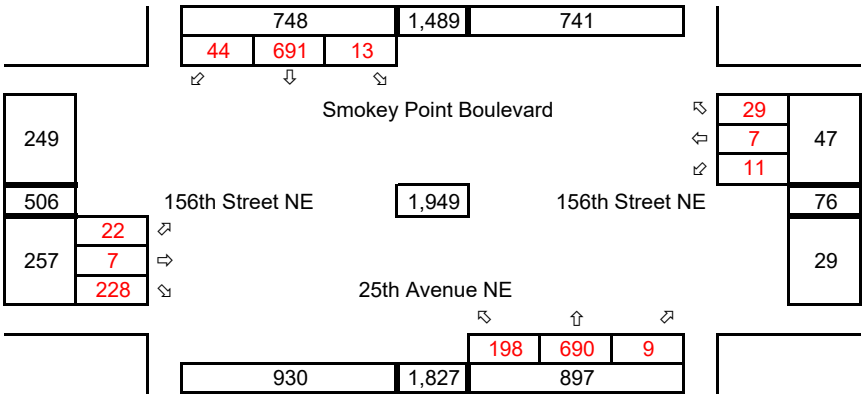
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 6
Existing
Average Weekday
PM Peak-Hour

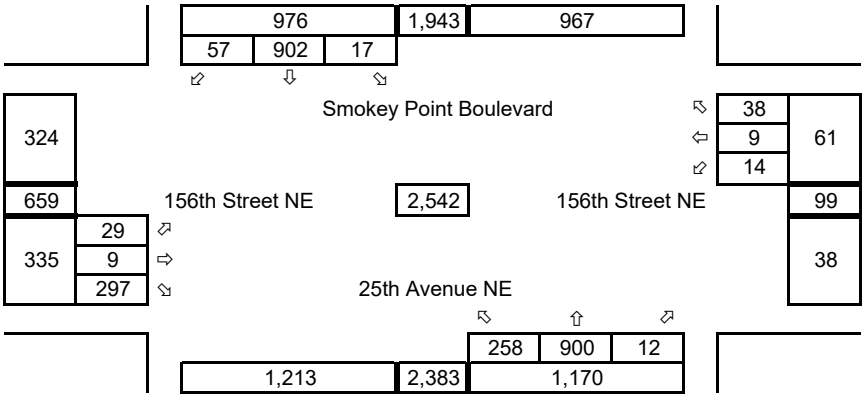
Year: **7/29/2021**

Data Source: **TDG**

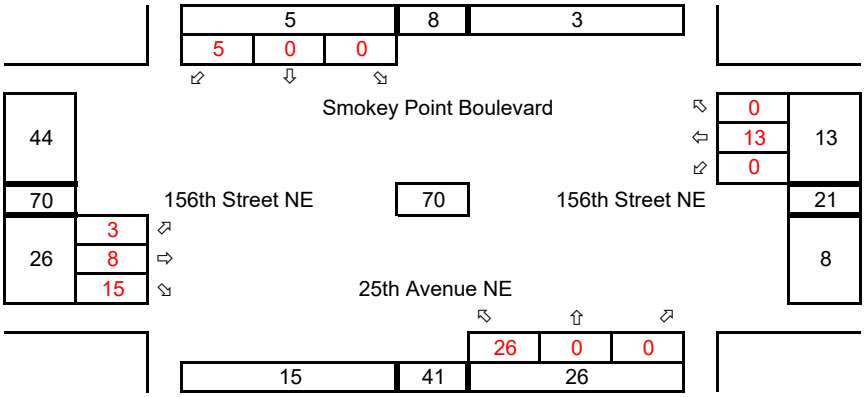


Future without Development
Average Weekday
PM Peak Hour

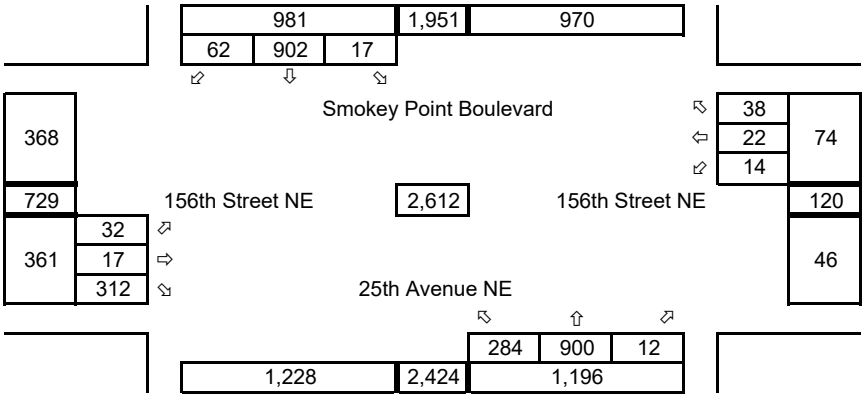
Year: 2030
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Average Weekday
PM Peak Hour



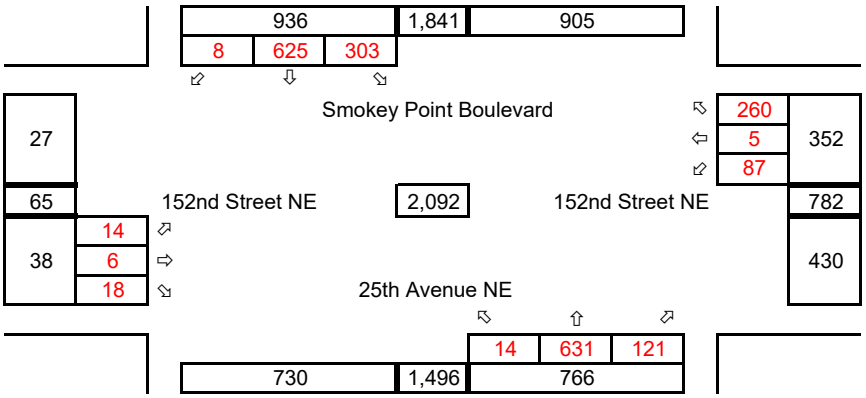
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 7
Existing
Average Weekday
PM Peak-Hour

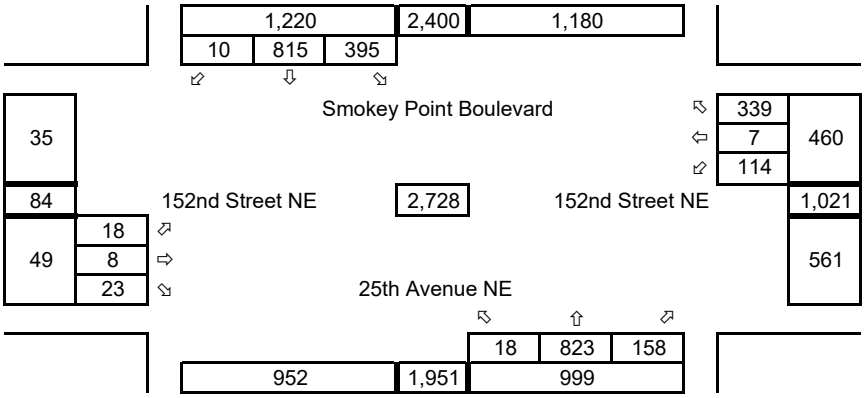
Year: **7/29/2021**

Data Source: **TDG**

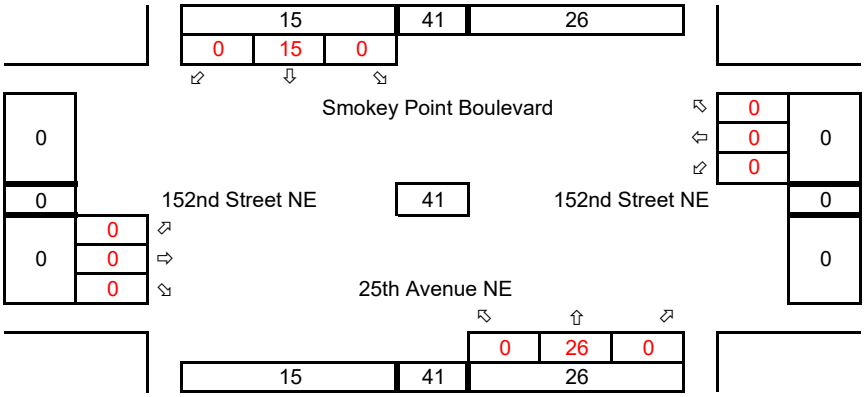


Future without Development
Average Weekday
PM Peak Hour

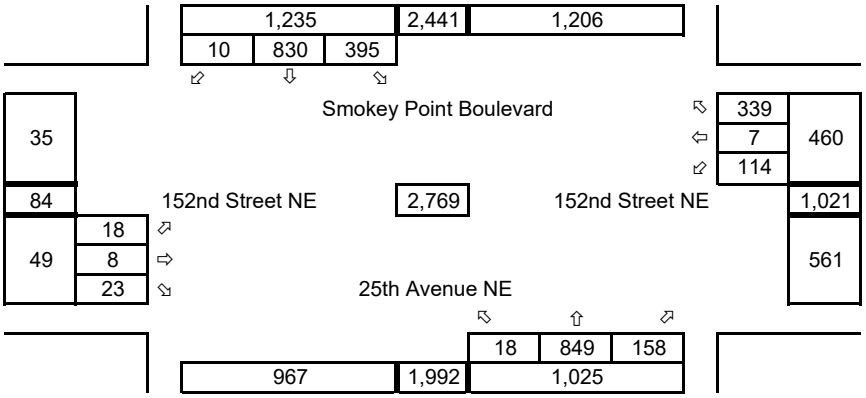
Year: 2030
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Average Weekday
PM Peak Hour



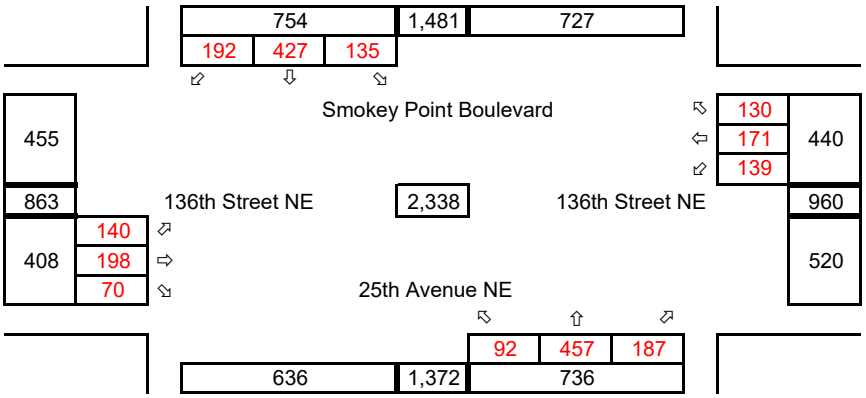
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 8
Existing
Average Weekday
PM Peak-Hour

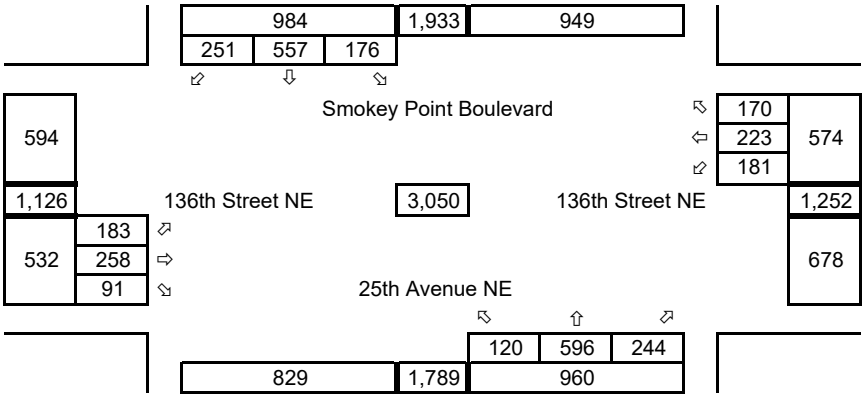
Year: **7/29/2021**

Data Source: **TDG**

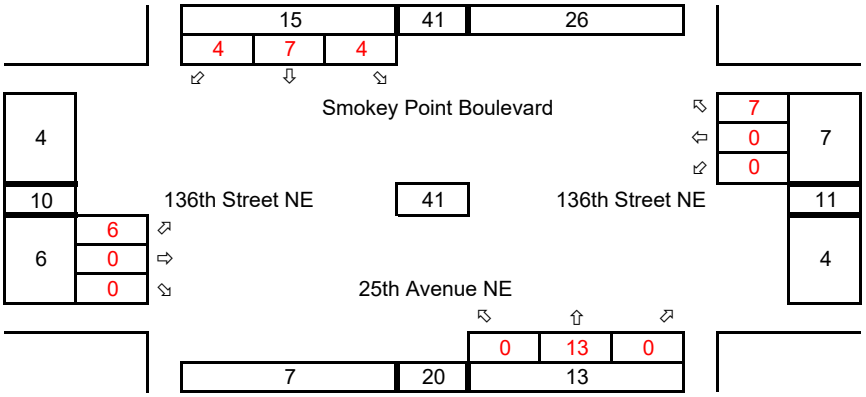


Future without Development
Average Weekday
PM Peak Hour

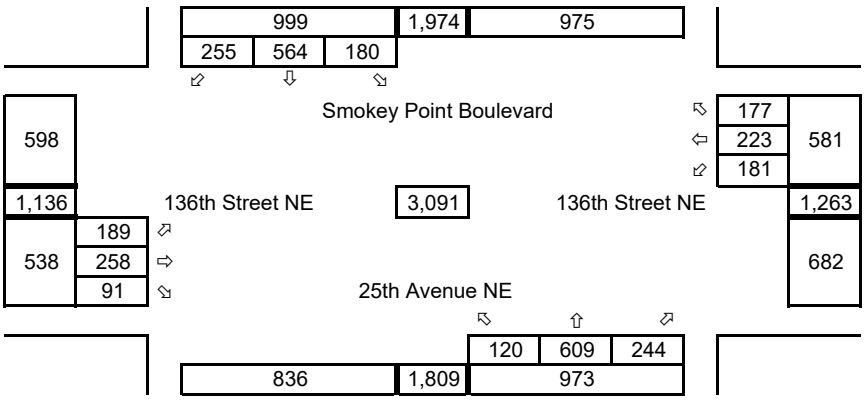
Year: 2030
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Average Weekday
PM Peak Hour



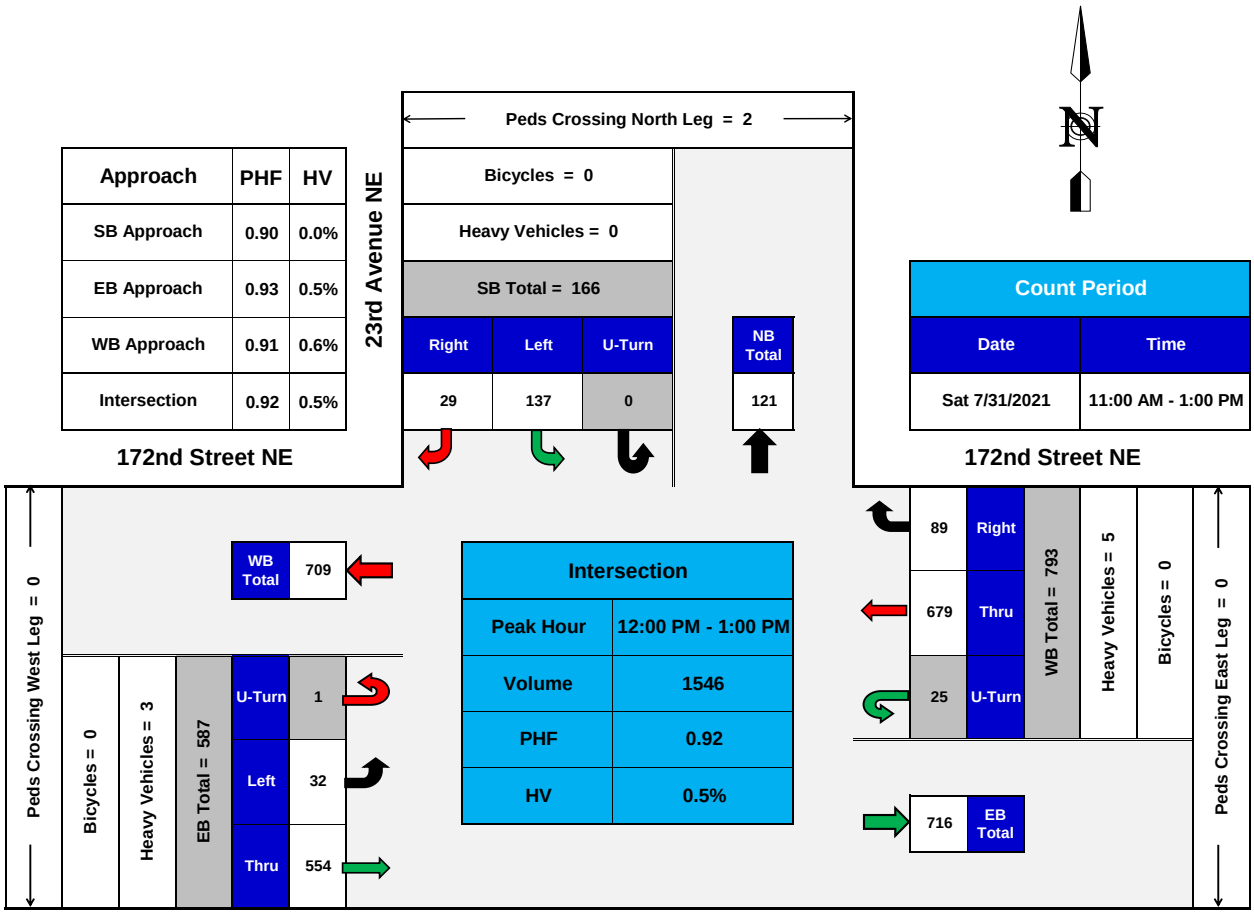
Future with Development
Average Weekday
PM Peak Hour



Saturday Peak-Hour Turning Movement Calculations

172nd Street NE @ 23rd Avenue NE

Marysville, Wa



PHF = Peak Hour Factor
HV = Heavy Vehicles

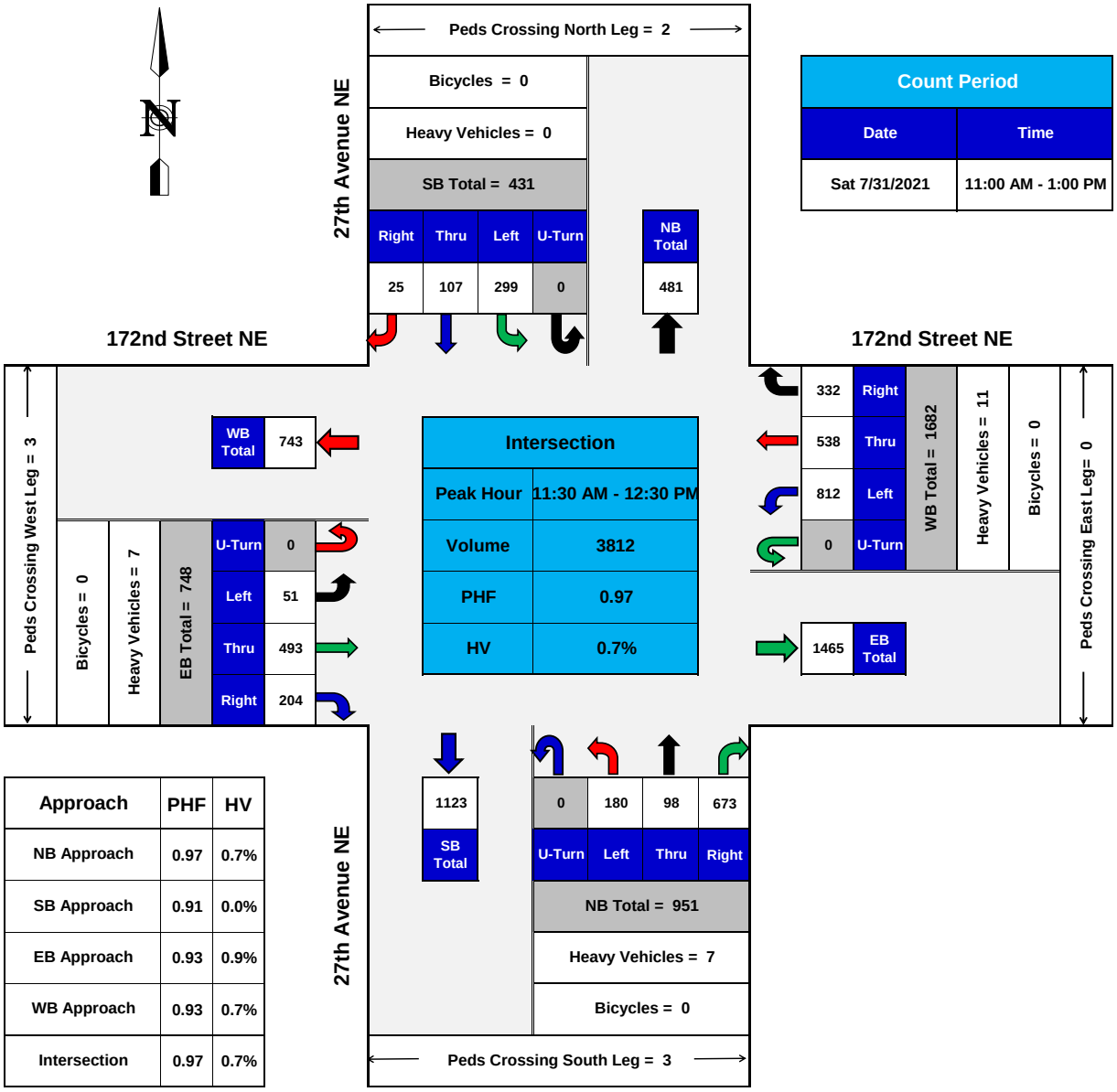
TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

DTG TRAFFIC DATA GATHERING

172nd Street NE @ 27th Avenue NE

Marysville, Wa



Approach	PHF	HV
NB Approach	0.97	0.7%
SB Approach	0.91	0.0%
EB Approach	0.93	0.9%
WB Approach	0.93	0.7%
Intersection	0.97	0.7%

PHF = Peak Hour Factor
HV = Heavy Vehicles

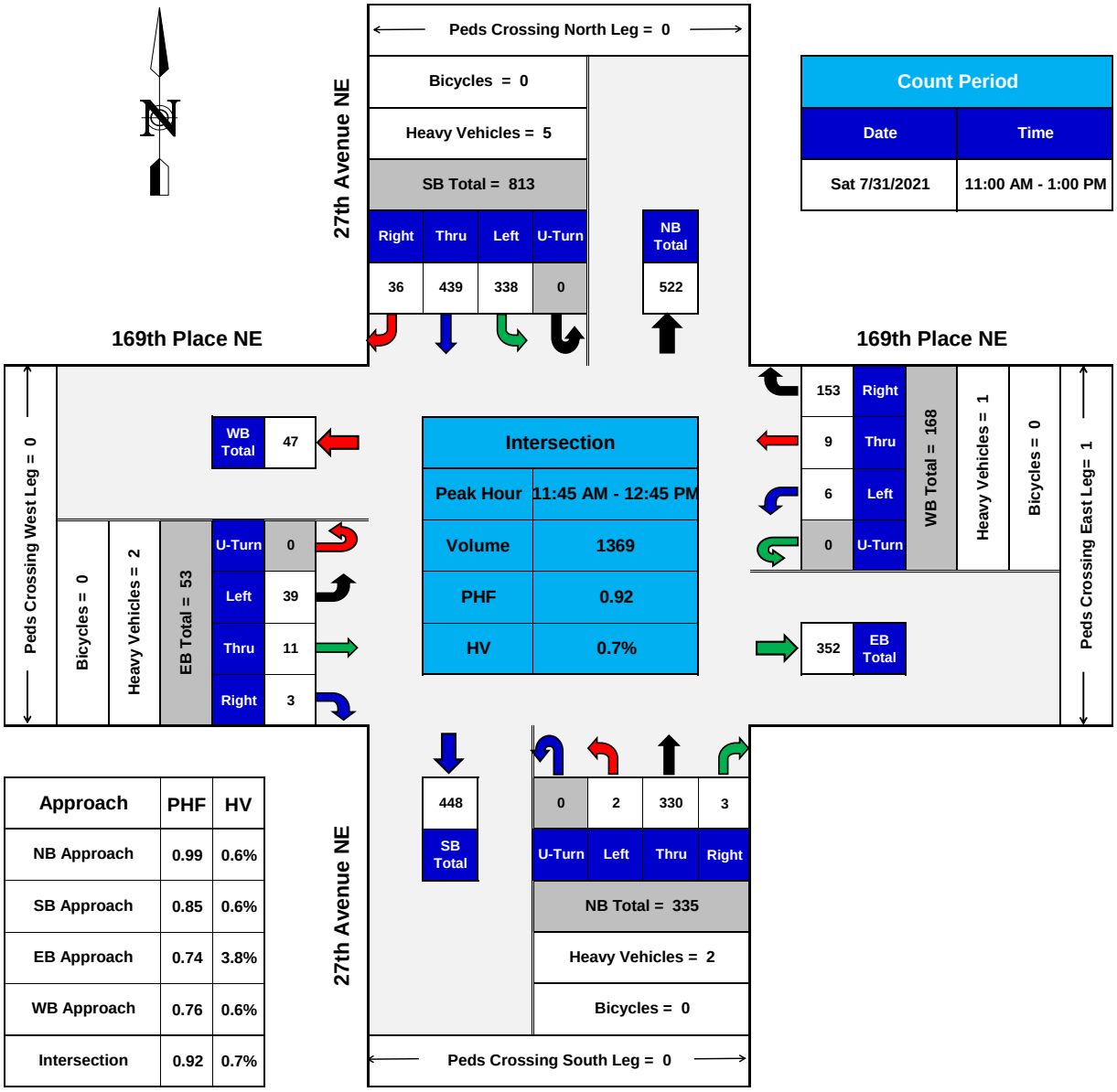
TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

TRAFFIC DATA GATHERING

169th Place NE @ 27th Avenue NE

Marysville, Wa



Approach	PHF	HV
NB Approach	0.99	0.6%
SB Approach	0.85	0.6%
EB Approach	0.74	3.8%
WB Approach	0.76	0.6%
Intersection	0.92	0.7%

PHF = Peak Hour Factor
HV = Heavy Vehicles

TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

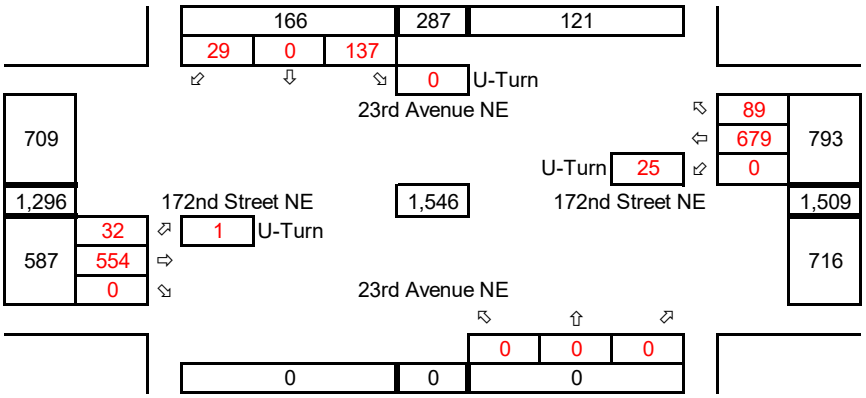
TRAFFIC DATA GATHERING

Opening Year | 1 23rd Ave NE at 172nd St NE | **Saturday Peak-Hour**

Synchro ID: 1
Existing
Saturday
Peak-Hour

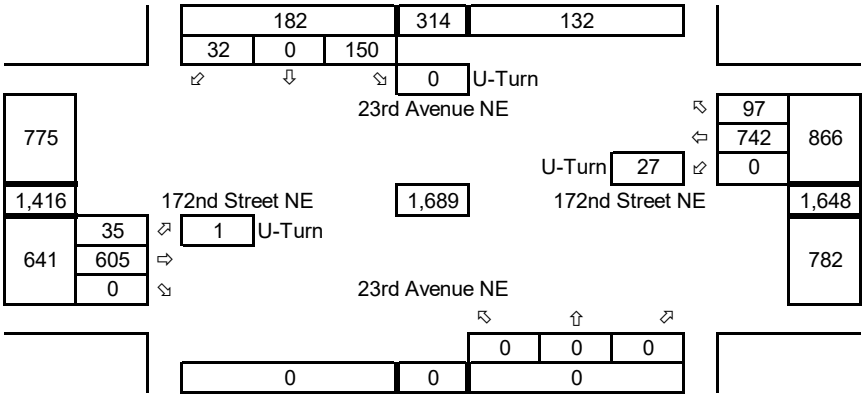
Year: **7/31/2021**

Data Source: **TDG**

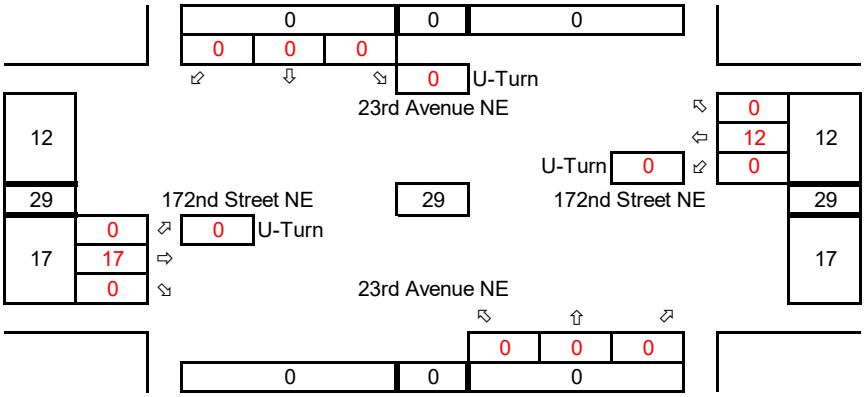


Future without Development
Saturday
PM Peak Hour

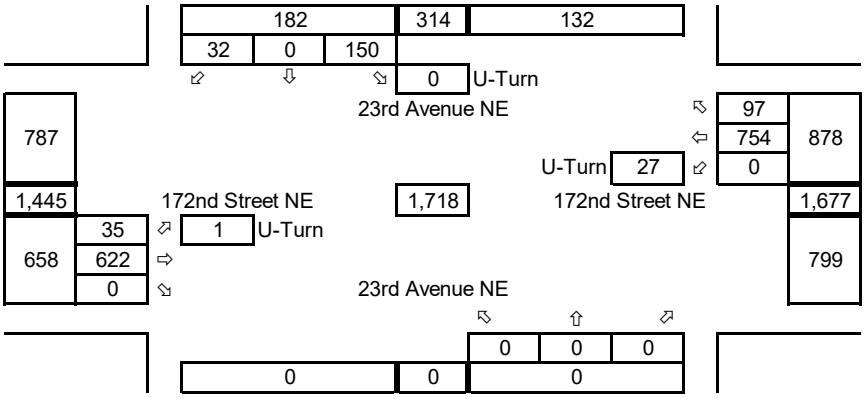
Year: 2024
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Saturday
PM Peak Hour



Future with Development
Saturday
PM Peak Hour

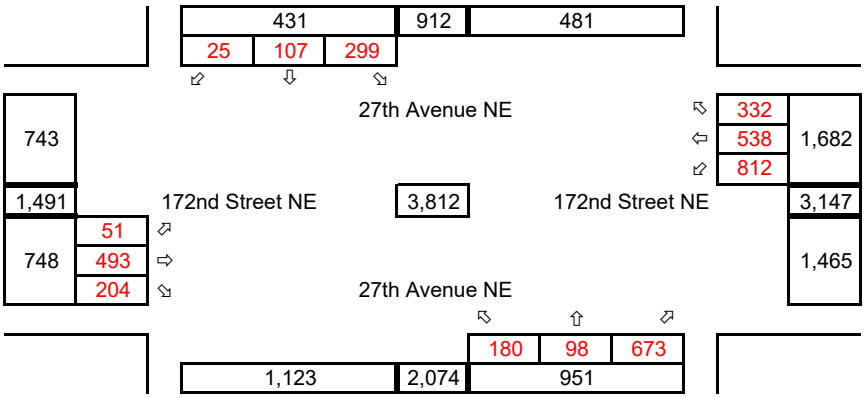


Opening Year 2 27th Ave NE at 172nd St NE **Saturday Peak-Hour**

Synchro ID: 2
Existing
Saturday
Peak-Hour

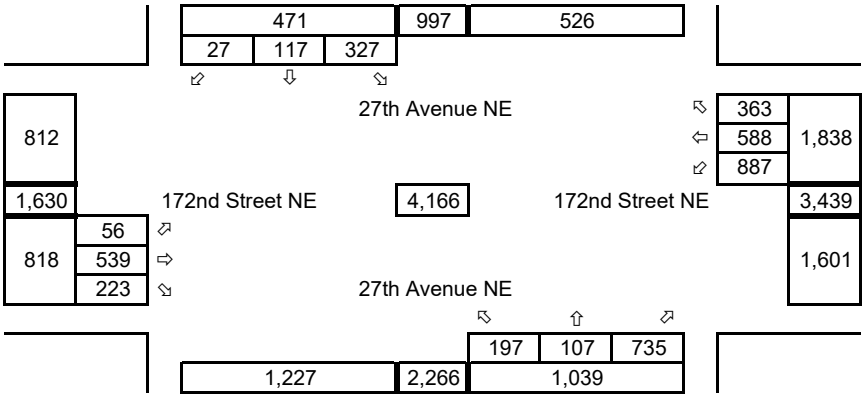
Year: **7/31/2021**

Data Source: **TDG**

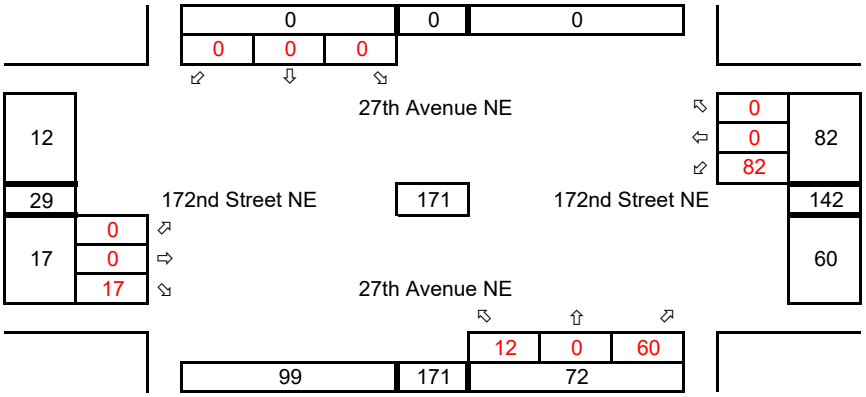


Future without Development
Saturday
PM Peak Hour

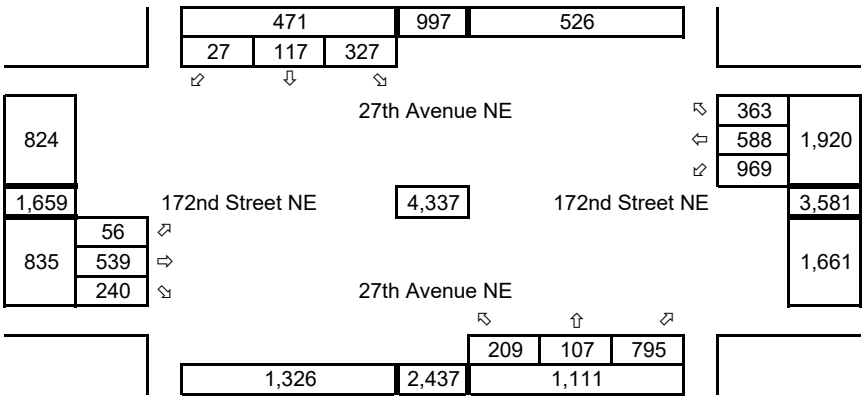
Year: 2024
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Saturday
PM Peak Hour



Future with Development
Saturday
PM Peak Hour

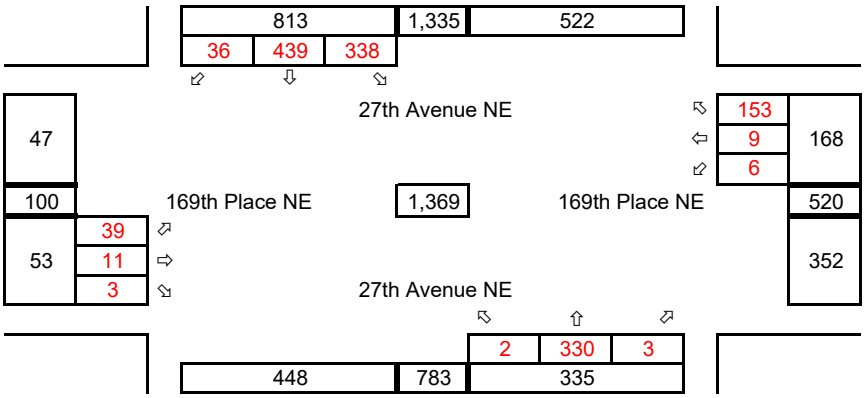


Opening Year 3 27th Ave NE at 169th Pl NE **Saturday Peak-Hour**

Synchro ID: 3
Existing
Saturday
Peak-Hour

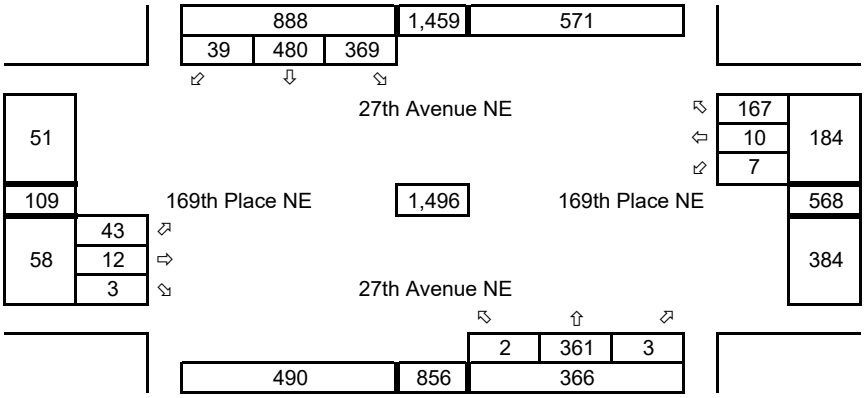
Year: **7/31/2021**

Data Source: **TDG**

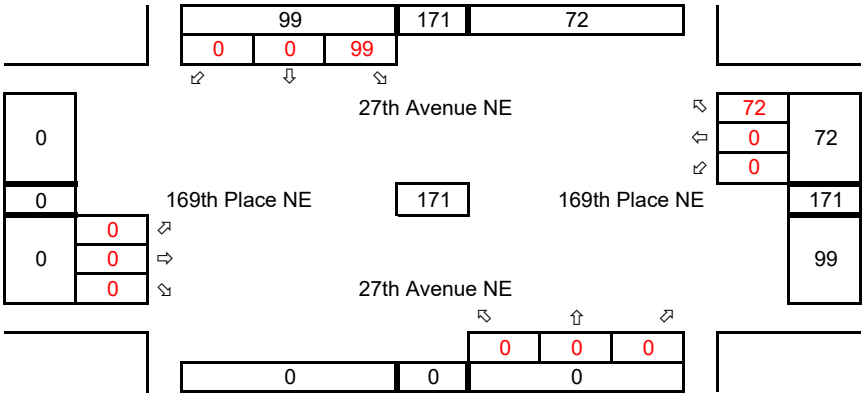


Future without Development
Saturday
PM Peak Hour

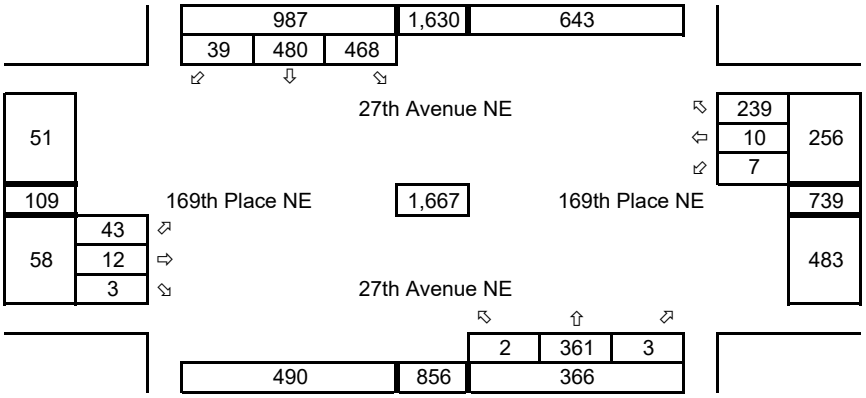
Year: 2024
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Saturday
PM Peak Hour



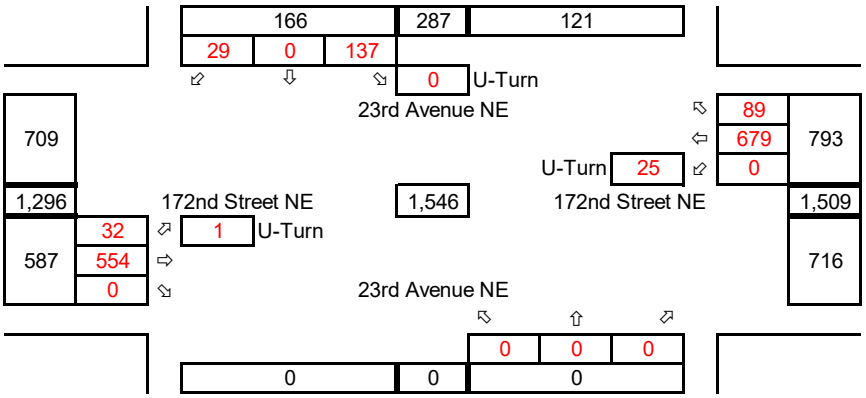
Future with Development
Saturday
PM Peak Hour



Synchro ID: 1
Existing
Saturday
Peak-Hour

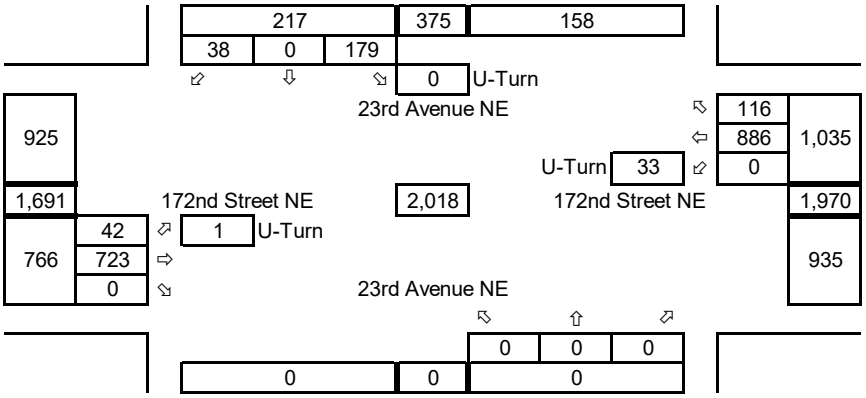
Year: **7/31/2021**

Data Source: **TDG**

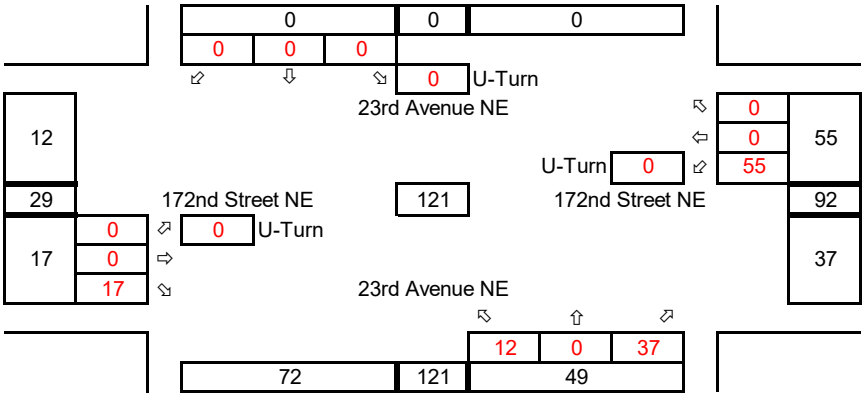


Future without Development
Saturday
PM Peak Hour

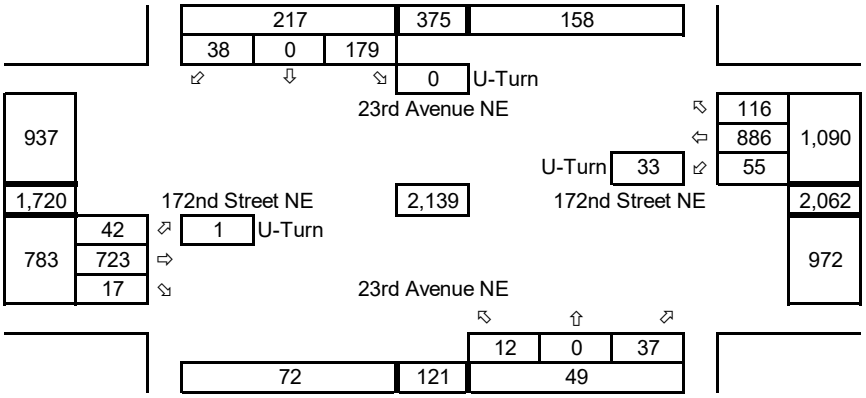
Year: 2030
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Saturday
PM Peak Hour



Future with Development
Saturday
PM Peak Hour

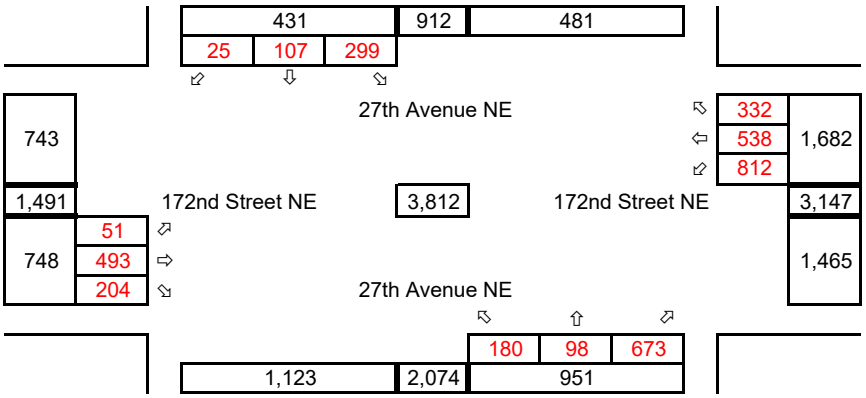


Horizon Year 2 27th Ave NE at 172nd St NE **Saturday Peak-Hour**

Synchro ID: 2
Existing
Saturday
Peak-Hour

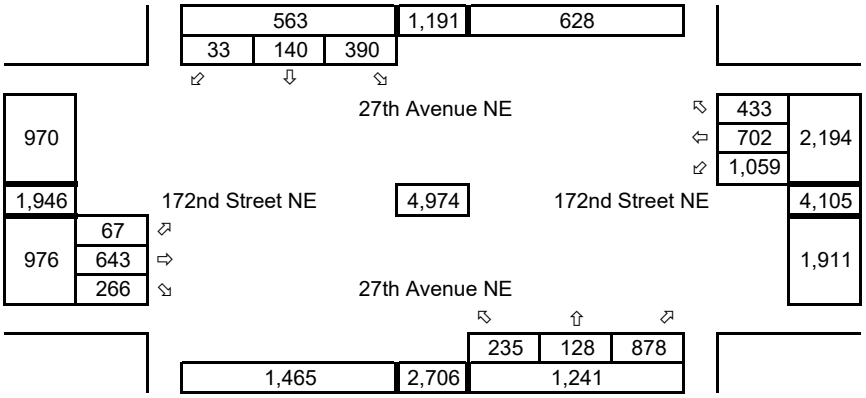
Year: **7/31/2021**

Data Source: **TDG**

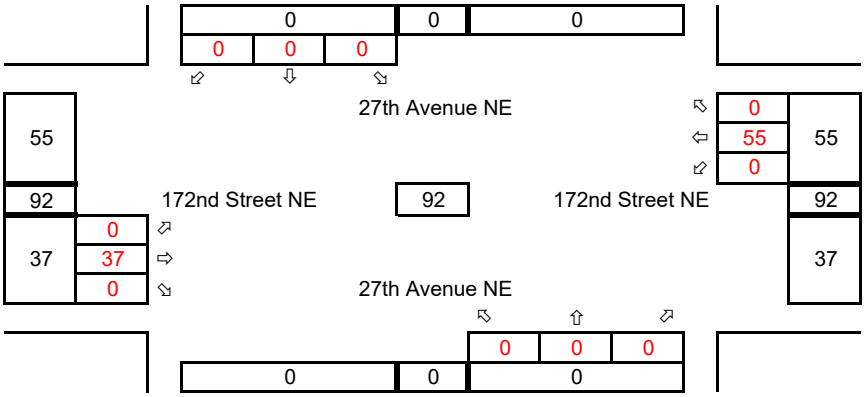


Future without Development
Saturday
PM Peak Hour

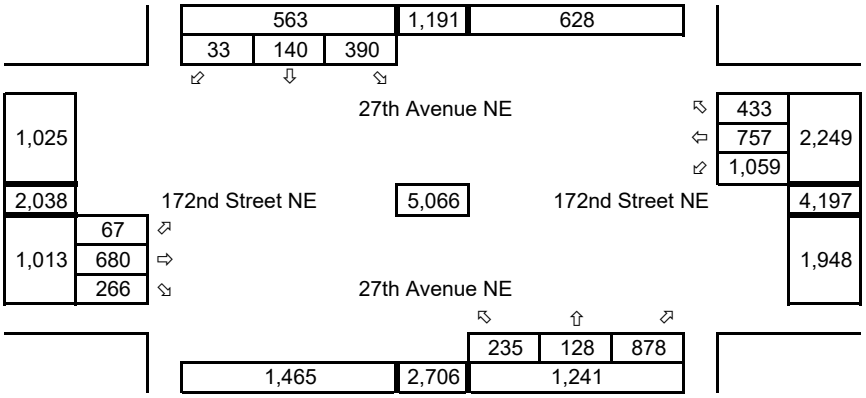
Year: 2030
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Saturday
PM Peak Hour



Future with Development
Saturday
PM Peak Hour

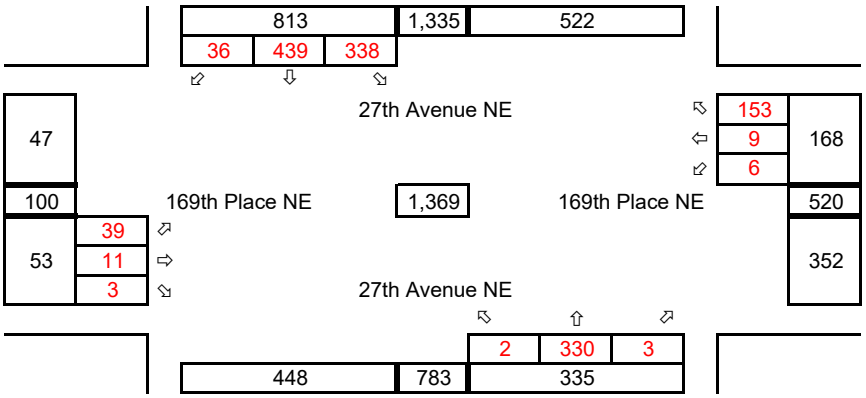


Horizon Year 3 27th Ave NE at 169th Pl NE **Saturday Peak-Hour**

Synchro ID: 3
Existing
Saturday
Peak-Hour

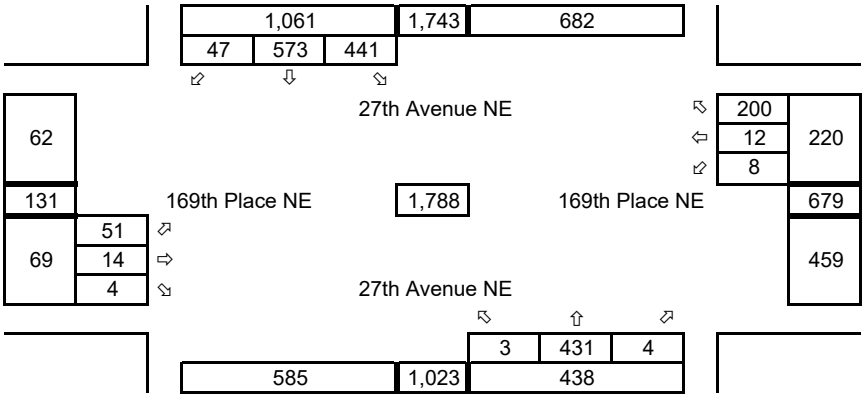
Year: **7/31/2021**

Data Source: **TDG**

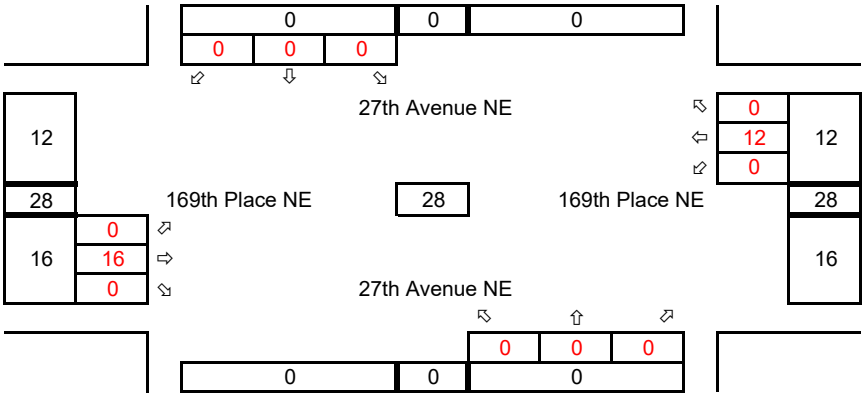


Future without Development
Saturday
PM Peak Hour

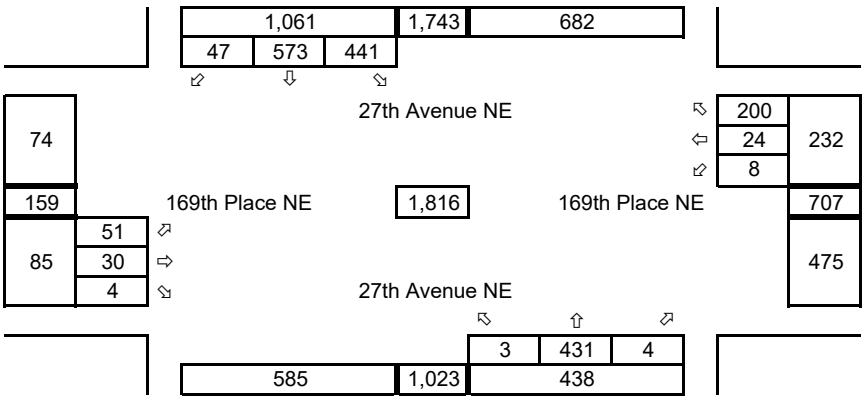
Year: 2030
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Saturday
PM Peak Hour



Future with Development
Saturday
PM Peak Hour

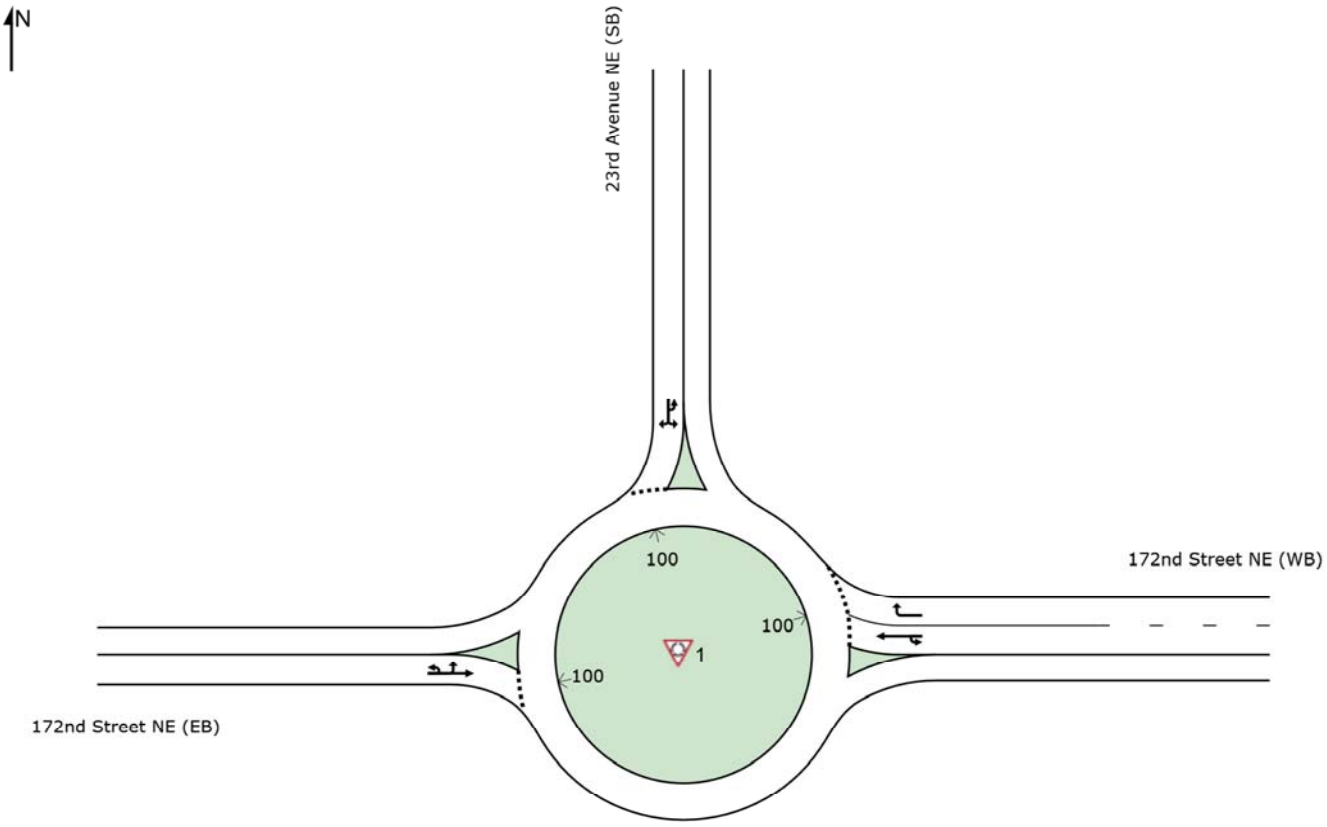


Weekday PM Peak-Hour Level of Service Calculations

SITE LAYOUT

Site: 1 [2021 Existing Conditions - Weekday PM]

172nd Street NE at 23rd Avenue NE
Site Category: PM Peak-Hour
Roundabout



Organisation: GIBSON TRAFFIC CONSULTANTS | Created: Wednesday, August 18, 2021 7:25:41 AM
Project: H:\2021\21-190\Sidra\#1 - 172nd St NE at 23rd Ave NE.sip8

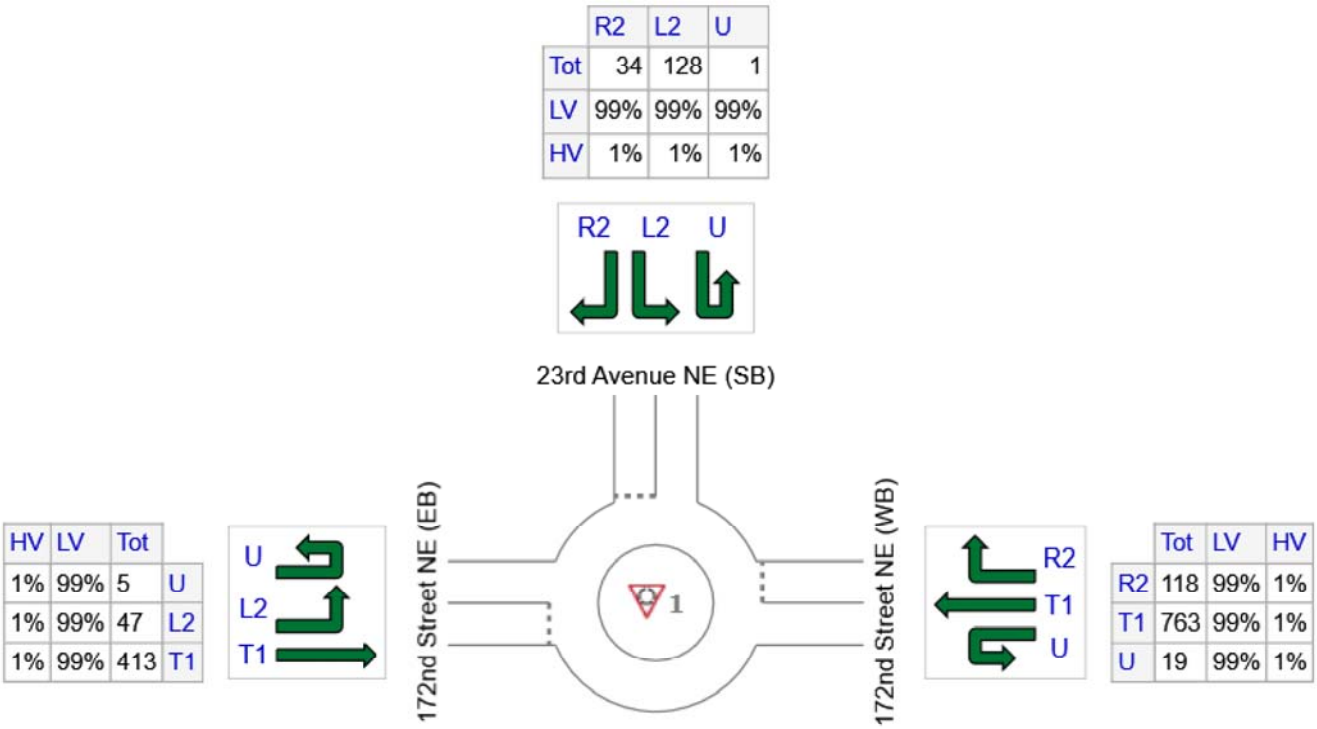
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [2021 Existing Conditions - Weekday PM]

172nd Street NE at 23rd Avenue NE
Site Category: PM Peak-Hour
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: 172nd Street NE (WB)	900	891	9
N: 23rd Avenue NE (SB)	163	161	2
W: 172nd Street NE (EB)	465	460	5
Total	1528	1513	15

Organisation: GIBSON TRAFFIC CONSULTANTS | Created: Wednesday, August 18, 2021 7:25:48 AM
Project: H:\2021\21-190\Sidra\#1 - 172nd St NE at 23rd Ave NE.sip8

MOVEMENT SUMMARY

Site: 1 [2021 Existing Conditions - Weekday PM]

172nd Street NE at 23rd Avenue NE
Site Category: PM Peak-Hour
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: 172nd Street NE (WB)												
1u	U	20	1.0	0.512	12.5	LOS B	4.4	109.7	0.27	0.39	0.27	38.2
6	T1	820	1.0	0.512	4.1	LOS A	4.4	109.7	0.27	0.39	0.27	37.1
16	R2	127	1.0	0.110	4.4	LOS A	0.6	14.1	0.20	0.46	0.20	36.2
Approach		968	1.0	0.512	4.3	LOS A	4.4	109.7	0.26	0.40	0.26	37.0
North: 23rd Avenue NE (SB)												
7u	U	1	1.0	0.224	17.1	LOS B	1.4	35.8	0.76	0.83	0.76	33.8
7	L2	138	1.0	0.224	14.7	LOS B	1.4	35.8	0.76	0.83	0.76	33.1
14	R2	37	1.0	0.224	8.8	LOS A	1.4	35.8	0.76	0.83	0.76	32.1
Approach		175	1.0	0.224	13.5	LOS B	1.4	35.8	0.76	0.83	0.76	32.9
West: 172nd Street NE (EB)												
5u	U	5	1.0	0.392	13.0	LOS B	2.7	67.7	0.42	0.49	0.42	37.4
5	L2	51	1.0	0.392	10.6	LOS B	2.7	67.7	0.42	0.49	0.42	36.4
2	T1	444	1.0	0.392	4.6	LOS A	2.7	67.7	0.42	0.49	0.42	36.3
Approach		500	1.0	0.392	5.3	LOS A	2.7	67.7	0.42	0.49	0.42	36.4
All Vehicles		1643	1.0	0.512	5.6	LOS A	4.4	109.7	0.37	0.47	0.37	36.3

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lanes, Volumes, Timings
2: 27th Avenue NE/Spring Lane & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	367	125	679	692	303	201	92	542	298	77	49
Future Volume (vph)	32	367	125	679	692	303	201	92	542	298	77	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		375	400		200	150		0	175		175
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor							1.00				0.99	
Frt		0.962				0.850			0.850		0.941	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3438	0	3467	3574	1599	1787	1881	1599	3467	1760	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1787	3438	0	3467	3574	1599	1782	1881	1599	3467	1760	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28				280			489		20	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1312			609			730			589	
Travel Time (s)		29.8			13.8			16.6			13.4	
Confl. Peds. (#/hr)							3					3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	34	386	132	715	728	319	212	97	571	314	81	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	518	0	715	728	319	212	97	571	314	133	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Detector Phase	5	2		1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0		3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	9.5	38.3		9.5	38.3	38.3	9.5	23.1	23.1	9.5	45.1	
Total Split (s)	20.0	38.3		46.0	60.0	60.0	25.0	25.0	25.0	25.0	45.1	
Total Split (%)	13.0%	24.8%		29.8%	38.9%	38.9%	16.2%	16.2%	16.2%	16.2%	29.2%	
Maximum Green (s)	15.0	32.0		41.0	53.7	53.7	20.0	19.9	19.9	20.0	40.0	
Yellow Time (s)	3.0	4.3		3.0	4.3	4.3	3.0	3.1	3.1	3.0	3.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.3		5.0	6.3	6.3	5.0	5.1	5.1	5.0	5.1	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0	2.5	3.0	3.0	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0					7.0	
Flash Dont Walk (s)		25.0			25.0	25.0					33.0	
Pedestrian Calls (#/hr)		0			0	0					0	
Act Effct Green (s)	7.7	25.4		33.1	55.6	55.6	19.3	42.7	42.7	16.9	40.3	
Actuated g/C Ratio	0.06	0.18		0.24	0.40	0.40	0.14	0.31	0.31	0.12	0.29	
v/c Ratio	0.35	0.80		0.87	0.51	0.40	0.86	0.17	0.69	0.75	0.25	

Lanes, Volumes, Timings
2: 27th Avenue NE/Spring Lane & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	76.7	62.2		63.9	34.0	6.7	90.4	40.5	12.6	72.4	36.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	76.7	62.2		63.9	34.0	6.7	90.4	40.5	12.6	72.4	36.4	
LOS	E	E		E	C	A	F	D	B	E	D	
Approach Delay		63.1			41.2			34.4			61.7	
Approach LOS		E			D			C			E	
Queue Length 50th (ft)	31	230		328	277	23	193	66	56	145	80	
Queue Length 95th (ft)	72	312		422	351	94	#375	130	223	213	155	
Internal Link Dist (ft)		1232			529			650			509	
Turn Bay Length (ft)	195			400		200	150			175		
Base Capacity (vph)	193	815		1025	1520	841	257	575	828	500	522	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.18	0.64		0.70	0.48	0.38	0.82	0.17	0.69	0.63	0.25	

Intersection Summary

Area Type: Other
Cycle Length: 154.4
Actuated Cycle Length: 139.7
Natural Cycle: 135
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 45.4 Intersection LOS: D
Intersection Capacity Utilization 95.8% 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: 2: 27th Avenue NE/Spring Lane & 172nd Street NE

2021 Existing Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
PM Peak-Hour

Lanes, Volumes, Timings
3: 27th Avenue NE & 169th Place NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	10	5	2	9	160	4	272	8	222	303	41
Future Volume (vph)	31	10	5	2	9	160	4	272	8	222	303	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	75		0	200		0	0		135
Storage Lanes	0		0	1		1	1		0	1		1
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
Ped Bike Factor		1.00			1.00		0.99	1.00		0.99		0.96
Frt		0.986				0.850		0.996				0.850
Flt Protected		0.967			0.991		0.950			0.950		
Satd. Flow (prot)	0	1788	0	0	1864	1599	1787	1872	0	1787	1881	1599
Flt Permitted		0.809			0.961		0.569			0.519		
Satd. Flow (perm)	0	1496	0	0	1805	1599	1057	1872	0	970	1881	1537
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				167		2				52
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		967			413			725			730	
Travel Time (s)		22.0			9.4			16.5			16.6	
Confl. Peds. (#/hr)			3	3			8		5	5		8
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	32	10	5	2	9	167	4	283	8	231	316	43
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	47	0	0	11	167	4	291	0	231	316	43
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Detector Phase	4	4		8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	22.5	22.5		26.0	26.0	26.0	9.5	22.5		9.5	26.0	26.0
Total Split (s)	25.0	25.0		25.0	25.0	25.0	20.0	50.0		30.0	50.0	50.0
Total Split (%)	23.8%	23.8%		23.8%	23.8%	23.8%	19.0%	47.6%		28.6%	47.6%	47.6%
Maximum Green (s)	21.0	21.0		21.0	21.0	21.0	16.0	46.0		26.0	46.0	46.0
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	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
Total Lost Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max		None	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)	8.0	8.0		15.0	15.0	15.0		10.0			15.0	15.0
Pedestrian Calls (#/hr)	3	3		3	3	3		13			13	13
Act Effct Green (s)		9.8			9.8	9.8	51.5	46.4		58.9	57.4	57.4
Actuated g/C Ratio		0.13			0.13	0.13	0.67	0.60		0.77	0.75	0.75
v/c Ratio		0.24			0.05	0.48	0.01	0.26		0.28	0.22	0.04

Lanes, Volumes, Timings
3: 27th Avenue NE & 169th Place NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		30.4			29.1	10.1	4.0	9.2		4.0	4.9	1.8
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		30.4			29.1	10.1	4.0	9.2		4.0	4.9	1.8
LOS		C			C	B	A	A		A	A	A
Approach Delay		30.4			11.2			9.1			4.3	
Approach LOS		C			B			A			A	
Queue Length 50th (ft)		18			5	0	0	49		17	24	0
Queue Length 95th (ft)		48			19	49	4	151		72	135	11
Internal Link Dist (ft)		887			333			645			650	
Turn Bay Length (ft)							200					135
Base Capacity (vph)		420			502	565	963	1134		1024	1416	1170
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		0.11			0.02	0.30	0.00	0.26		0.23	0.22	0.04

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 76.7
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.48
Intersection Signal Delay: 7.8 — Intersection LOS: A
Intersection Capacity Utilization 46.7% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: 27th Avenue NE & 169th Place NE

2021 Existing Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
PM Peak-Hour

Lanes, Volumes, Timings
4: I-5 Southbound Ramps & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	852	469	0	1350	553	0	0	0	259	1	317
Future Volume (vph)	0	852	469	0	1350	553	0	0	0	259	1	317
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	0		0	350		435
Storage Lanes	0		1	0		1	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor			0.98			0.96						0.99
Frt			0.850			0.850						0.850
Flt Protected										0.950	0.953	
Satd. Flow (prot)	0	3539	1583	0	3539	1583	0	0	0	1681	1686	1583
Flt Permitted										0.950	0.953	
Satd. Flow (perm)	0	3539	1552	0	3539	1523	0	0	0	1681	1686	1562
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			489			576						79
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		609			940			979			1126	
Travel Time (s)		13.8			21.4			22.3			25.6	
Confl. Peds. (#/hr)	8		4	4		8	1					1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	888	489	0	1406	576	0	0	0	270	1	330
Shared Lane Traffic (%)										50%		
Lane Group Flow (vph)	0	888	489	0	1406	576	0	0	0	135	136	330
Turn Type		NA	Perm		NA	Perm				Perm	NA	Perm
Protected Phases		2			6						4	
Permitted Phases			2			6				4		4
Detector Phase		2	2		6	6				4	4	4
Switch Phase												
Minimum Initial (s)		7.0	7.0		7.0	7.0				5.0	5.0	5.0
Minimum Split (s)		24.8	24.8		34.1	34.1				33.8	33.8	33.8
Total Split (s)		100.0	100.0		100.0	100.0				30.0	30.0	30.0
Total Split (%)		76.9%	76.9%		76.9%	76.9%				23.1%	23.1%	23.1%
Maximum Green (s)		94.2	94.2		93.9	93.9				24.2	24.2	24.2
Yellow Time (s)		3.8	3.8		4.1	4.1				3.8	3.8	3.8
All-Red Time (s)		2.0	2.0		2.0	2.0				2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0				0.0	0.0	0.0
Total Lost Time (s)		5.8	5.8		6.1	6.1				5.8	5.8	5.8
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		4.0	4.0		4.0	4.0				4.5	4.5	4.5
Recall Mode		None	None		None	None				Max	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0				7.0	7.0	7.0
Flash Dont Walk (s)		12.0	12.0		21.0	21.0				21.0	21.0	21.0
Pedestrian Calls (#/hr)		0	0		0	0				0	0	0
Act Effct Green (s)		77.2	77.2		76.9	76.9				28.7	28.7	28.7
Actuated g/C Ratio		0.66	0.66		0.65	0.65				0.24	0.24	0.24
v/c Ratio		0.38	0.41		0.61	0.48				0.33	0.33	0.75
Control Delay		9.3	1.6		12.5	1.9				43.9	44.0	45.8

Lanes, Volumes, Timings
4: I-5 Southbound Ramps & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.2		0.0	0.0				0.0	0.0	0.0
Total Delay		9.3	1.9		12.5	1.9				43.9	44.0	45.8
LOS		A	A		B	A				D	D	D
Approach Delay		6.7			9.4						45.0	
Approach LOS		A			A						D	
Queue Length 50th (ft)		145	0		289	0				96	97	195
Queue Length 95th (ft)		178	31		343	33				175	176	#380
Internal Link Dist (ft)		529			860			899			1046	
Turn Bay Length (ft)			200							350		435
Base Capacity (vph)		2864	1349		2857	1340				409	410	440
Starvation Cap Reductn		0	309		0	0				0	0	0
Spillback Cap Reductn		0	0		0	0				0	0	0
Storage Cap Reductn		0	0		0	0				0	0	0
Reduced v/c Ratio		0.31	0.47		0.49	0.43				0.33	0.33	0.75

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 117.7
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 13.9 Intersection LOS: B
Intersection Capacity Utilization 70.6% ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: I-5 Southbound Ramps & 172nd Street NE

2021 Existing Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
PM Peak-Hour

Lanes, Volumes, Timings
5: I-5 Northbound Ramps & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	181	943	0	0	1286	322	581	2	738	0	0	0
Future Volume (vph)	181	943	0	0	1286	322	581	2	738	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	600		0	0		300	400		0	0		0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00					0.98			0.99			
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1770	3539	0	0	5085	1583	1681	1686	1583	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1768	3539	0	0	5085	1553	1681	1686	1562	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						332			387			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		940			1086			1094			999	
Travel Time (s)		21.4			24.7			24.9			22.7	
Confl. Peds. (#/hr)	3		9	9		3			5	5		
Confl. Bikes (#/hr)			1									
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
Adj. Flow (vph)	187	972	0	0	1326	332	599	2	761	0	0	0
Shared Lane Traffic (%)							50%					
Lane Group Flow (vph)	187	972	0	0	1326	332	299	302	761	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Free			
Protected Phases	5	2			6			8				
Permitted Phases						6	8		Free			
Detector Phase	5	2			6	6	8	8				
Switch Phase												
Minimum Initial (s)	5.0	7.0			7.0	7.0	7.0	7.0				
Minimum Split (s)	10.6	24.1			23.8	23.8	40.8	40.8				
Total Split (s)	30.0	90.0			60.0	60.0	30.0	30.0				
Total Split (%)	25.0%	75.0%			50.0%	50.0%	25.0%	25.0%				
Maximum Green (s)	24.4	83.9			54.2	54.2	24.2	24.2				
Yellow Time (s)	3.6	4.1			3.8	3.8	3.8	3.8				
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0				
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0				
Total Lost Time (s)	5.6	6.1			5.8	5.8	5.8	5.8				
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	4.0			4.0	4.0	4.5	4.5				
Recall Mode	None	None			None	None	Max	Max				
Walk Time (s)		7.0			7.0	7.0	7.0	7.0				
Flash Dont Walk (s)		10.0			8.0	8.0	28.0	28.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effct Green (s)	17.6	72.3			49.3	49.3	35.3	35.3	119.6			
Actuated g/C Ratio	0.15	0.60			0.41	0.41	0.30	0.30	1.00			
v/c Ratio	0.72	0.45			0.63	0.40	0.60	0.61	0.49			

Lanes, Volumes, Timings
5: I-5 Northbound Ramps & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	65.5	13.4			29.7	4.0	44.5	44.6	1.1			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	65.5	13.4			29.7	4.0	44.5	44.6	1.1			
LOS	E	B			C	A	D	D	A			
Approach Delay		21.8			24.5			20.3				
Approach LOS		C			C			C				
Queue Length 50th (ft)	146	200			294	0	223	225	0			
Queue Length 95th (ft)	227	244			373	57	348	352	0			
Internal Link Dist (ft)		860			1006			1014			919	
Turn Bay Length (ft)	600					300	400					
Base Capacity (vph)	364	2506			2326	890	496	498	1562			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.51	0.39			0.57	0.37	0.60	0.61	0.49			

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 119.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 22.4 Intersection LOS: C
Intersection Capacity Utilization 78.4% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 5: I-5 Northbound Ramps & 172nd Street NE

2021 Existing Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
PM Peak-Hour

Lanes, Volumes, Timings
6: Smokey Point Boulevard & 156th Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	7	228	11	7	29	198	690	9	13	691	44
Future Volume (vph)	22	7	228	11	7	29	198	690	9	13	691	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	200		0	250		0	200		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
Ped Bike Factor							1.00	1.00		1.00	1.00	
Frt			0.850		0.878			0.998			0.991	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1635	0	1770	3531	0	1770	3502	0
Flt Permitted	0.651			0.753			0.224			0.381		
Satd. Flow (perm)	1213	1863	1583	1403	1635	0	417	3531	0	709	3502	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			233		30			1			7	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1704			1283			1356			4794	
Travel Time (s)		38.7			29.2			30.8			109.0	
Confl. Peds. (#/hr)							2		1	1		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
Adj. Flow (vph)	22	7	233	11	7	30	202	704	9	13	705	45
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	7	233	11	37	0	202	713	0	13	750	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)	25.0	20.0	20.0	25.0	10.0		20.0	50.0		20.0	50.0	
Total Split (%)	21.7%	17.4%	17.4%	21.7%	8.7%		17.4%	43.5%		17.4%	43.5%	
Maximum Green (s)	20.0	15.0	15.0	20.0	5.0		15.0	45.0		15.0	45.0	
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	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	3.5		2.0	3.5	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	
Flash Dont Walk (s)		13.0	13.0		13.0			13.0			13.0	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	10.8	9.8	9.8	10.0	7.8		37.0	35.3		28.0	20.5	
Actuated g/C Ratio	0.18	0.17	0.17	0.17	0.13		0.62	0.60		0.47	0.35	
v/c Ratio	0.08	0.02	0.51	0.04	0.15		0.39	0.34		0.03	0.62	
Control Delay	22.3	27.0	9.2	22.0	16.8		7.9	8.3		6.8	19.2	

Lanes, Volumes, Timings
6: Smokey Point Boulevard & 156th Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.3	27.0	9.2	22.0	16.8		7.9	8.3		6.8	19.2	
LOS	C	C	A	C	B		A	A		A	B	
Approach Delay		10.8			18.0			8.2			19.0	
Approach LOS		B			B			A			B	
Queue Length 50th (ft)	6	2	0	3	2		17	35		1	92	
Queue Length 95th (ft)	26	15	63	16	31		74	174		9	221	
Internal Link Dist (ft)		1624			1203			1276			4714	
Turn Bay Length (ft)	150		150	200			250			200		
Base Capacity (vph)	652	517	608	654	466		628	2831		713	2809	
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	0.03	0.01	0.38	0.02	0.08		0.32	0.25		0.02	0.27	

Intersection Summary

Area Type: Other
Cycle Length: 115
Actuated Cycle Length: 59.2
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.62
Intersection Signal Delay: 12.9 Intersection LOS: B
Intersection Capacity Utilization 53.0% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 6: Smokey Point Boulevard & 156th Street NE

2021 Existing Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
PM Peak-Hour

Lanes, Volumes, Timings
7: Smokey Point Boulevard & 152nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	6	18	87	5	260	14	631	121	303	625	8
Future Volume (vph)	14	6	18	87	5	260	14	631	121	303	625	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0	125		0	150		0	200		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	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00				0.99		1.00	1.00		1.00	1.00	
Frt		0.886			0.853			0.976			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1650	0	1770	1568	0	1770	3440	0	1770	3531	0
Flt Permitted	0.930			0.435			0.401			0.205		
Satd. Flow (perm)	1731	1650	0	810	1568	0	746	3440	0	381	3531	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			271			21			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		209			5141			1452			1356	
Travel Time (s)		4.8			116.8			33.0			30.8	
Confl. Peds. (#/hr)	1					1	2		2	2		2
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	15	6	19	91	5	271	15	657	126	316	651	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	15	25	0	91	276	0	15	783	0	316	659	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)	4.0	4.0		4.0	4.0		4.0	7.0		4.0	7.0	
Minimum Split (s)	9.5	27.0		11.5	26.0		9.5	24.0		9.5	26.0	
Total Split (s)	16.0	16.0		16.0	40.0		16.0	50.0		16.0	50.0	
Total Split (%)	13.1%	13.1%		13.1%	32.8%		13.1%	41.0%		13.1%	41.0%	
Maximum Green (s)	11.0	11.0		11.0	35.0		11.0	45.0		11.0	45.0	
Yellow Time (s)	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	
Lost Time Adjust (s)	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	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.5	2.5		2.5	2.5	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		15.0			14.0			12.0			14.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	7.5	5.6		10.8	9.2		25.4	19.9		36.7	35.0	
Actuated g/C Ratio	0.13	0.10		0.19	0.16		0.44	0.34		0.63	0.60	
v/c Ratio	0.07	0.14		0.34	0.58		0.04	0.66		0.61	0.31	
Control Delay	20.5	19.1		23.8	9.7		7.1	19.4		14.0	8.3	

Lanes, Volumes, Timings
7: Smokey Point Boulevard & 152nd Street NE

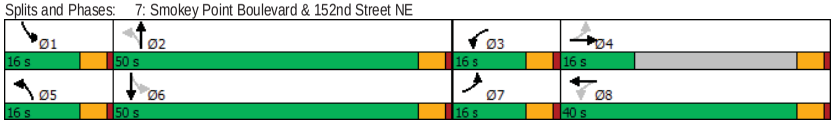
10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.5	19.1		23.8	9.7		7.1	19.4		14.0	8.3	
LOS	C	B		C	A		A	B		B	A	
Approach Delay		19.6			13.2			19.1			10.2	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)	4	2		27	1		1	96		29	32	
Queue Length 95th (ft)	18	25		66	66		10	215		#177	157	
Internal Link Dist (ft)		129			5061			1372			1276	
Turn Bay Length (ft)	50			125			150			200		
Base Capacity (vph)	419	1052		396	1093		608	2777		517	2846	
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	0.04	0.02		0.23	0.25		0.02	0.28		0.61	0.23	

Intersection Summary

Area Type: Other
Cycle Length: 122
Actuated Cycle Length: 58
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 14.1 Intersection LOS: B
Intersection Capacity Utilization 67.1% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Smokey Point Boulevard & 152nd Street NE



2021 Existing Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
PM Peak-Hour

Lanes, Volumes, Timings
8: State Avenue/Smokey Point Boulevard & 136th Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	198	70	139	171	130	92	457	187	135	427	192
Future Volume (vph)	140	198	70	139	171	130	92	457	187	135	427	192
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	200		0	300		0	300		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
Ped Bike Factor			0.99	1.00							0.99	
Frt			0.850		0.935			0.956			0.953	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1845	1568	1752	1725	0	1752	3351	0	1752	3315	0
Flt Permitted	0.281			0.483			0.337			0.258		
Satd. Flow (perm)	518	1845	1547	890	1725	0	622	3351	0	476	3315	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			143		32			44			49	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		981			4740			2821			4424	
Travel Time (s)		22.3			107.7			64.1			100.5	
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)												2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	147	208	74	146	180	137	97	481	197	142	449	202
Shared Lane Traffic (%)												
Lane Group Flow (vph)	147	208	74	146	317	0	97	678	0	142	651	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)	5.0	5.0	5.0	5.0	7.0		5.0	7.0		5.0	7.0	
Minimum Split (s)	10.0	34.0	34.0	10.0	23.0		10.0	35.0		10.0	23.0	
Total Split (s)	15.0	35.0	35.0	30.0	40.0		35.0	35.0		30.0	30.0	
Total Split (%)	11.5%	26.9%	26.9%	23.1%	30.8%		26.9%	26.9%		23.1%	23.1%	
Maximum Green (s)	10.0	30.0	30.0	25.0	35.0		30.0	30.0		25.0	25.0	
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	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Walk Time (s)		8.0	8.0					9.0				
Flash Dont Walk (s)		21.0	21.0					21.0				
Pedestrian Calls (#/hr)		0	0					0				
Act Effct Green (s)	28.0	18.9	18.9	28.6	19.2		37.9	30.4		41.7	34.1	
Actuated g/C Ratio	0.32	0.22	0.22	0.33	0.22		0.43	0.35		0.47	0.39	

Lanes, Volumes, Timings
8: State Avenue/Smokey Point Boulevard & 136th Street NE

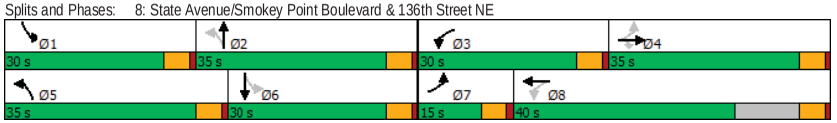
10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.50	0.53	0.17	0.38	0.79		0.27	0.57		0.40	0.49	
Control Delay	24.9	36.2	0.8	21.4	43.8		15.4	25.7		16.9	22.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.9	36.2	0.8	21.4	43.8		15.4	25.7		16.9	22.7	
LOS	C	D	A	C	D		B	C		B	C	
Approach Delay		26.2			36.8			24.4			21.7	
Approach LOS		C			D			C			C	
Queue Length 50th (ft)	53	101	0	53	151		27	149		41	136	
Queue Length 95th (ft)	100	185	0	100	255		64	255		89	233	
Internal Link Dist (ft)		901			4660			2741			4344	
Turn Bay Length (ft)	150		150	200			300			300		
Base Capacity (vph)	313	637	628	590	910		704	1187		608	1318	
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	0.47	0.33	0.12	0.25	0.35		0.14	0.57		0.23	0.49	

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 87.8
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 26.2 — Intersection LOS: C
Intersection Capacity Utilization 67.5% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 8: State Avenue/Smokey Point Boulevard & 136th Street NE

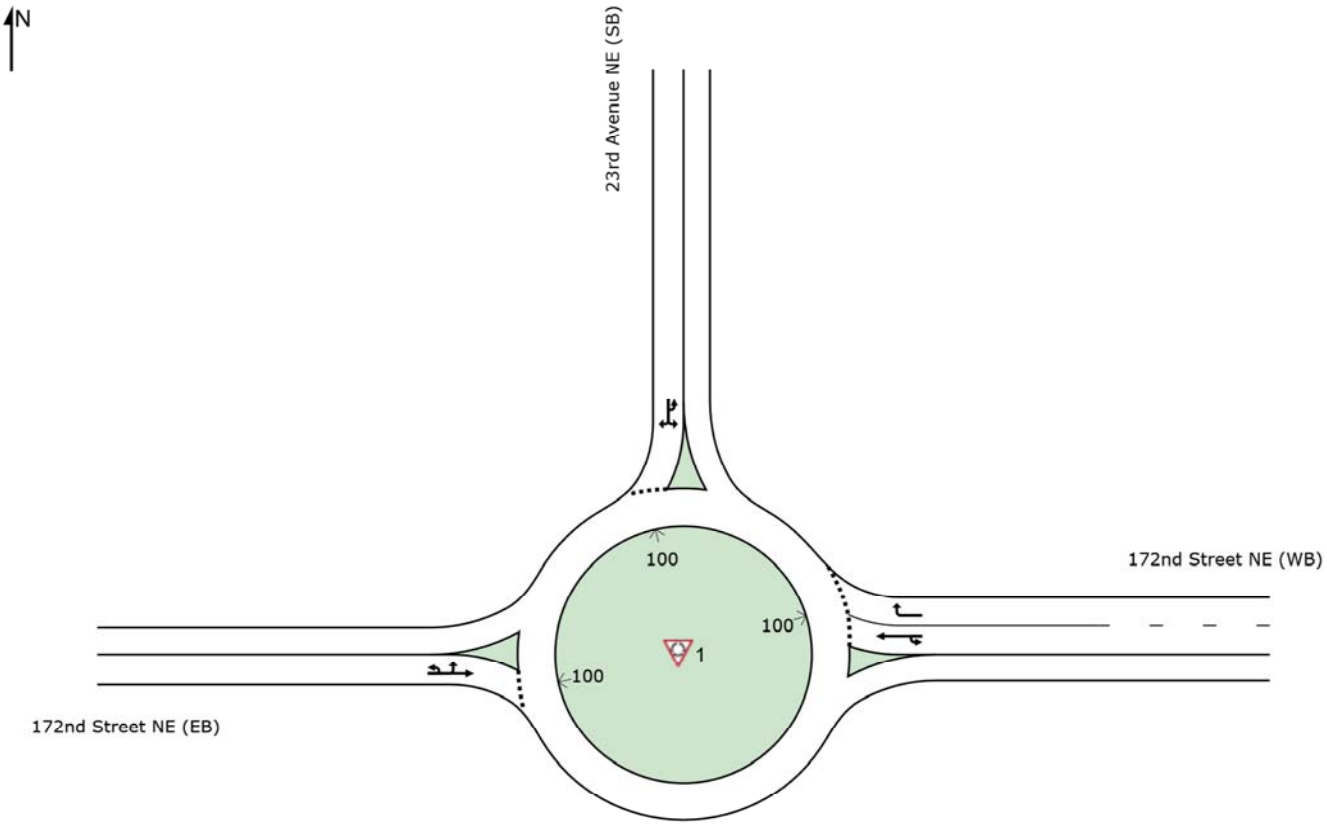


2021 Existing Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
PM Peak-Hour

SITE LAYOUT

Site: 1 [2024 Baseline Conditions - Weekday PM]

172nd Street NE at 23rd Avenue NE
Site Category: PM Peak-Hour
Roundabout



Organisation: GIBSON TRAFFIC CONSULTANTS | Created: Wednesday, August 18, 2021 7:25:59 AM
Project: H:\2021\21-190\Sidra\#1 - 172nd St NE at 23rd Ave NE.sip8

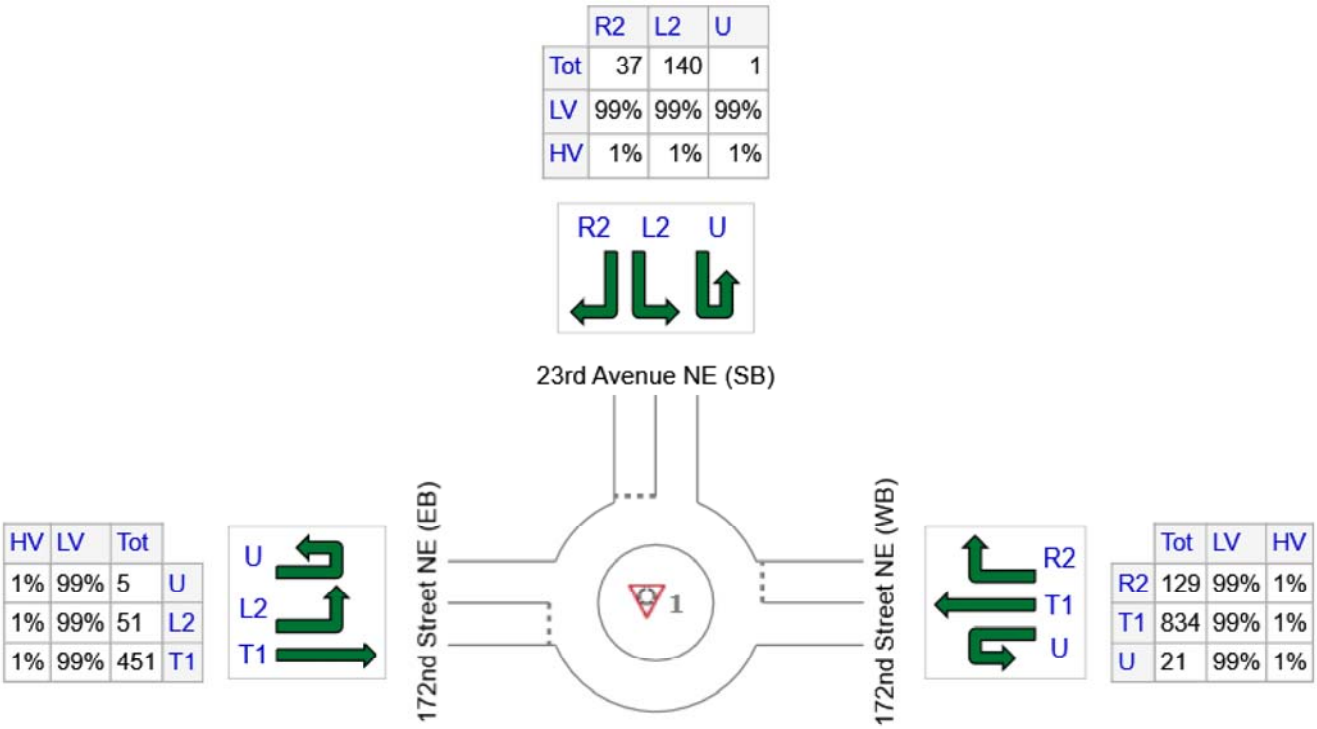
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [2024 Baseline Conditions - Weekday PM]

172nd Street NE at 23rd Avenue NE
Site Category: PM Peak-Hour
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: 172nd Street NE (WB)	984	974	10
N: 23rd Avenue NE (SB)	178	176	2
W: 172nd Street NE (EB)	507	502	5
Total	1669	1652	17

Organisation: GIBSON TRAFFIC CONSULTANTS | Created: Wednesday, August 18, 2021 7:26:05 AM
Project: H:\2021\21-190\Sidra\#1 - 172nd St NE at 23rd Ave NE.sip8

MOVEMENT SUMMARY

Site: 1 [2024 Baseline Conditions - Weekday PM]

172nd Street NE at 23rd Avenue NE
Site Category: PM Peak-Hour
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: 172nd Street NE (WB)												
1u	U	23	1.0	0.562	12.5	LOS B	5.2	131.6	0.31	0.40	0.31	38.0
6	T1	897	1.0	0.562	4.2	LOS A	5.2	131.6	0.31	0.40	0.31	37.0
16	R2	139	1.0	0.121	4.4	LOS A	0.6	15.8	0.22	0.46	0.22	36.2
Approach		1058	1.0	0.562	4.4	LOS A	5.2	131.6	0.30	0.41	0.30	36.9
North: 23rd Avenue NE (SB)												
7u	U	1	1.0	0.268	18.2	LOS B	1.8	45.3	0.82	0.87	0.82	33.3
7	L2	151	1.0	0.268	15.8	LOS B	1.8	45.3	0.82	0.87	0.82	32.6
14	R2	40	1.0	0.268	9.9	LOS A	1.8	45.3	0.82	0.87	0.82	31.6
Approach		191	1.0	0.268	14.6	LOS B	1.8	45.3	0.82	0.87	0.82	32.4
West: 172nd Street NE (EB)												
5u	U	5	1.0	0.434	13.1	LOS B	3.1	79.0	0.47	0.50	0.47	37.2
5	L2	55	1.0	0.434	10.7	LOS B	3.1	79.0	0.47	0.50	0.47	36.3
2	T1	485	1.0	0.434	4.7	LOS A	3.1	79.0	0.47	0.50	0.47	36.2
Approach		545	1.0	0.434	5.4	LOS A	3.1	79.0	0.47	0.50	0.47	36.2
All Vehicles		1795	1.0	0.562	5.8	LOS A	5.2	131.6	0.40	0.48	0.40	36.1

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lanes, Volumes, Timings
2: 27th Avenue NE/Spring Lane & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	401	137	742	756	331	220	101	592	326	84	54
Future Volume (vph)	35	401	137	742	756	331	220	101	592	326	84	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		375	400		200	150		0	175		175
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor							1.00				0.99	
Frt		0.962				0.850			0.850		0.941	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3438	0	3467	3574	1599	1787	1881	1599	3467	1759	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1787	3438	0	3467	3574	1599	1782	1881	1599	3467	1759	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28				279			479		20	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1312			609			730			589	
Travel Time (s)		29.8			13.8			16.6			13.4	
Confl. Peds. (#/hr)							3					3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	37	422	144	781	796	348	232	106	623	343	88	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	566	0	781	796	348	232	106	623	343	145	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Detector Phase	5	2		1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0		3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	9.5	38.3		9.5	38.3	38.3	9.5	23.1	23.1	9.5	45.1	
Total Split (s)	20.0	38.3		46.0	60.0	60.0	25.0	25.0	25.0	25.0	45.1	
Total Split (%)	13.0%	24.8%		29.8%	38.9%	38.9%	16.2%	16.2%	16.2%	16.2%	29.2%	
Maximum Green (s)	15.0	32.0		41.0	53.7	53.7	20.0	19.9	19.9	20.0	40.0	
Yellow Time (s)	3.0	4.3		3.0	4.3	4.3	3.0	3.1	3.1	3.0	3.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.3		5.0	6.3	6.3	5.0	5.1	5.1	5.0	5.1	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0	2.5	3.0	3.0	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0					7.0	
Flash Dont Walk (s)		25.0			25.0	25.0					33.0	
Pedestrian Calls (#/hr)		0			0	0					0	
Act Effct Green (s)	8.0	27.7		36.3	58.3	58.3	20.1	42.3	42.3	18.0	40.2	
Actuated g/C Ratio	0.05	0.19		0.25	0.40	0.40	0.14	0.29	0.29	0.12	0.28	
v/c Ratio	0.38	0.84		0.91	0.56	0.43	0.94	0.19	0.77	0.80	0.29	

Lanes, Volumes, Timings
2: 27th Avenue NE/Spring Lane & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	79.7	66.1		68.3	36.0	8.5	106.7	43.2	19.2	77.9	39.3	
Queue Delay	0.0	0.0		0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	79.7	66.1		68.3	36.6	8.5	106.7	43.2	19.2	77.9	39.3	
LOS	E	E		E	D	A	F	D	B	E	D	
Approach Delay		67.0			44.4			43.0			66.4	
Approach LOS		E			D			D			E	
Queue Length 50th (ft)	36	267		378	312	42	229	80	136	168	97	
Queue Length 95th (ft)	77	345		469	391	124	#423	140	327	231	168	
Internal Link Dist (ft)		1232			529			650			509	
Turn Bay Length (ft)	195			400		200	150			175		
Base Capacity (vph)	184	779		979	1481	826	246	546	804	478	499	
Starvation Cap Reductn	0	0		0	328	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.20	0.73		0.80	0.69	0.42	0.94	0.19	0.77	0.72	0.29	

Intersection Summary

Area Type: Other
Cycle Length: 154.4
Actuated Cycle Length: 145.8
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 50.2 Intersection LOS: D
Intersection Capacity Utilization 100.0% 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: 2: 27th Avenue NE/Spring Lane & 172nd Street NE

2024 Baseline Conditions PM Peak-Hour
Gibson Traffic Consultants, Inc. [BJL #21-190]

Lanes, Volumes, Timings
3: 27th Avenue NE & 169th Place NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	11	5	2	10	175	4	297	9	243	331	45
Future Volume (vph)	34	11	5	2	10	175	4	297	9	243	331	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	75		0	200		0	0		135
Storage Lanes	0		0	1		1	1		0	1		1
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
Ped Bike Factor		1.00			1.00		0.99	1.00		0.99		0.96
Frt		0.987				0.850		0.996				0.850
Flt Protected		0.967			0.992		0.950			0.950		
Satd. Flow (prot)	0	1790	0	0	1866	1599	1787	1872	0	1787	1881	1599
Flt Permitted		0.803			0.963		0.554			0.499		
Satd. Flow (perm)	0	1487	0	0	1809	1599	1030	1872	0	933	1881	1537
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				182		2				52
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		967			413			725			730	
Travel Time (s)		22.0			9.4			16.5			16.6	
Confl. Peds. (#/hr)			3	3			8		5	5		8
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	35	11	5	2	10	182	4	309	9	253	345	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	51	0	0	12	182	4	318	0	253	345	47
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Detector Phase	4	4		8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	22.5	22.5		26.0	26.0	26.0	9.5	22.5		9.5	26.0	26.0
Total Split (s)	25.0	25.0		25.0	25.0	25.0	20.0	50.0		30.0	50.0	50.0
Total Split (%)	23.8%	23.8%		23.8%	23.8%	23.8%	19.0%	47.6%		28.6%	47.6%	47.6%
Maximum Green (s)	21.0	21.0		21.0	21.0	21.0	16.0	46.0		26.0	46.0	46.0
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	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
Total Lost Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max		None	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)	8.0	8.0		15.0	15.0	15.0		10.0			15.0	15.0
Pedestrian Calls (#/hr)	3	3		3	3	3		13			13	13
Act Effct Green (s)		9.8			9.8	9.8	51.5	46.4		59.2	57.7	57.7
Actuated g/C Ratio		0.13			0.13	0.13	0.67	0.60		0.77	0.75	0.75
v/c Ratio		0.26			0.05	0.50	0.01	0.28		0.31	0.25	0.04

Lanes, Volumes, Timings
3: 27th Avenue NE & 169th Place NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		31.2			29.3	10.1	4.2	9.6		4.2	5.0	2.0
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		31.2			29.3	10.1	4.2	9.6		4.2	5.0	2.0
LOS		C			C	B	A	A		A	A	A
Approach Delay		31.2			11.3			9.5			4.5	
Approach LOS		C			B			A			A	
Queue Length 50th (ft)		20			5	0	0	56		19	27	0
Queue Length 95th (ft)		52			20	52	4	169		79	149	13
Internal Link Dist (ft)		887			333			645			650	
Turn Bay Length (ft)							200					135
Base Capacity (vph)		415			501	574	946	1127		1007	1414	1169
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		0.12			0.02	0.32	0.00	0.28		0.25	0.24	0.04

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 77.1
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.50
Intersection Signal Delay: 8.0 Intersection LOS: A
Intersection Capacity Utilization 49.4% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: 27th Avenue NE & 169th Place NE

2024 Baseline Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
PM Peak-Hour

Lanes, Volumes, Timings
4: I-5 Southbound Ramps & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	931	512	0	1475	604	0	0	0	283	1	346
Future Volume (vph)	0	931	512	0	1475	604	0	0	0	283	1	346
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	0		0	350		435
Storage Lanes	0		1	0		1	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor			0.98			0.96						0.99
Frt			0.850			0.850						0.850
Flt Protected										0.950	0.953	
Satd. Flow (prot)	0	3539	1583	0	3539	1583	0	0	0	1681	1686	1583
Flt Permitted										0.950	0.953	
Satd. Flow (perm)	0	3539	1552	0	3539	1523	0	0	0	1681	1686	1562
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			533			629						62
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		609			940			979			1126	
Travel Time (s)		13.8			21.4			22.3			25.6	
Confl. Peds. (#/hr)	8		4	4		8	1					1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	970	533	0	1536	629	0	0	0	295	1	360
Shared Lane Traffic (%)										50%		
Lane Group Flow (vph)	0	970	533	0	1536	629	0	0	0	147	149	360
Turn Type		NA	Perm		NA	Perm				Perm	NA	Perm
Protected Phases		2			6						4	
Permitted Phases			2			6				4		4
Detector Phase		2	2		6	6				4	4	4
Switch Phase												
Minimum Initial (s)		7.0	7.0		7.0	7.0				5.0	5.0	5.0
Minimum Split (s)		24.8	24.8		34.1	34.1				33.8	33.8	33.8
Total Split (s)		100.0	100.0		100.0	100.0				30.0	30.0	30.0
Total Split (%)		76.9%	76.9%		76.9%	76.9%				23.1%	23.1%	23.1%
Maximum Green (s)		94.2	94.2		93.9	93.9				24.2	24.2	24.2
Yellow Time (s)		3.8	3.8		4.1	4.1				3.8	3.8	3.8
All-Red Time (s)		2.0	2.0		2.0	2.0				2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0				0.0	0.0	0.0
Total Lost Time (s)		5.8	5.8		6.1	6.1				5.8	5.8	5.8
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		4.0	4.0		4.0	4.0				4.5	4.5	4.5
Recall Mode		None	None		None	None				Max	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0				7.0	7.0	7.0
Flash Dont Walk (s)		12.0	12.0		21.0	21.0				21.0	21.0	21.0
Pedestrian Calls (#/hr)		0	0		0	0				0	0	0
Act Effct Green (s)		85.4	85.4		85.1	85.1				28.3	28.3	28.3
Actuated g/C Ratio		0.68	0.68		0.68	0.68				0.23	0.23	0.23
v/c Ratio		0.40	0.43		0.64	0.51				0.39	0.39	0.90
Control Delay		9.1	1.7		12.6	2.0				47.6	47.7	66.8

Lanes, Volumes, Timings
4: I-5 Southbound Ramps & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.3	0.4		0.0	0.0				0.0	0.0	0.0
Total Delay		9.4	2.1		12.6	2.0				47.6	47.7	66.8
LOS		A	A		B	A				D	D	E
Approach Delay		6.8			9.5						58.1	
Approach LOS		A			A						E	
Queue Length 50th (ft)		164	0		335	0				117	118	265
Queue Length 95th (ft)		199	32		397	33				189	192	#466
Internal Link Dist (ft)		529			860			899			1046	
Turn Bay Length (ft)			200							350		435
Base Capacity (vph)		2687	1306		2679	1305				379	380	400
Starvation Cap Reductn		962	328		0	0				0	0	0
Spillback Cap Reductn		0	0		0	0				0	0	0
Storage Cap Reductn		0	0		0	0				0	0	0
Reduced v/c Ratio		0.56	0.54		0.57	0.48				0.39	0.39	0.90

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 125.5
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 16.0 Intersection LOS: B
Intersection Capacity Utilization 74.0% 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: 4: I-5 Southbound Ramps & 172nd Street NE

2024 Baseline Conditions PM Peak-Hour
Gibson Traffic Consultants, Inc. [BJL #21-190]

Lanes, Volumes, Timings
5: I-5 Northbound Ramps & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	198	1030	0	0	1405	352	635	2	806	0	0	0
Future Volume (vph)	198	1030	0	0	1405	352	635	2	806	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	600		0	0		300	400		0	0		0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00					0.98			0.99			
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1770	3539	0	0	5085	1583	1681	1686	1583	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1768	3539	0	0	5085	1553	1681	1686	1562	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						363			366			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		940			1086			1094			999	
Travel Time (s)		21.4			24.7			24.9			22.7	
Confl. Peds. (#/hr)	3		9	9		3			5	5		
Confl. Bikes (#/hr)			1									
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
Adj. Flow (vph)	204	1062	0	0	1448	363	655	2	831	0	0	0
Shared Lane Traffic (%)							50%					
Lane Group Flow (vph)	204	1062	0	0	1448	363	327	330	831	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Free			
Protected Phases	5	2			6			8				
Permitted Phases						6	8		Free			
Detector Phase	5	2			6	6	8	8				
Switch Phase												
Minimum Initial (s)	5.0	7.0			7.0	7.0	7.0	7.0				
Minimum Split (s)	10.6	24.1			23.8	23.8	40.8	40.8				
Total Split (s)	30.0	90.0			60.0	60.0	30.0	30.0				
Total Split (%)	25.0%	75.0%			50.0%	50.0%	25.0%	25.0%				
Maximum Green (s)	24.4	83.9			54.2	54.2	24.2	24.2				
Yellow Time (s)	3.6	4.1			3.8	3.8	3.8	3.8				
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0				
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0				
Total Lost Time (s)	5.6	6.1			5.8	5.8	5.8	5.8				
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	4.0			4.0	4.0	4.5	4.5				
Recall Mode	None	None			None	None	Max	Max				
Walk Time (s)		7.0			7.0	7.0	7.0	7.0				
Flash Dont Walk (s)		10.0			8.0	8.0	28.0	28.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effct Green (s)	18.8	76.1			52.0	52.0	35.2	35.2	123.3			
Actuated g/C Ratio	0.15	0.62			0.42	0.42	0.29	0.29	1.00			
v/c Ratio	0.76	0.49			0.67	0.42	0.68	0.69	0.53			

Lanes, Volumes, Timings
5: I-5 Northbound Ramps & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	68.6	13.6			31.0	4.0	49.1	49.2	1.3			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	68.6	13.6			31.0	4.0	49.1	49.2	1.3			
LOS	E	B			C	A	D	D	A			
Approach Delay		22.4			25.6			22.4				
Approach LOS		C			C			C				
Queue Length 50th (ft)	161	227			338	0	252	254	0			
Queue Length 95th (ft)	246	274			419	59	385	388	0			
Internal Link Dist (ft)		860			1006			1014			919	
Turn Bay Length (ft)	600					300	400					
Base Capacity (vph)	352	2421			2247	888	479	481	1562			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.58	0.44			0.64	0.41	0.68	0.69	0.53			

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 123.3
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 23.7 Intersection LOS: C
Intersection Capacity Utilization 81.6% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 5: I-5 Northbound Ramps & 172nd Street NE

2024 Baseline Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
PM Peak-Hour

Lanes, Volumes, Timings
6: Smokey Point Boulevard & 156th Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	8	249	12	8	32	216	754	10	14	755	48
Future Volume (vph)	24	8	249	12	8	32	216	754	10	14	755	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	200		0	250		0	200		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
Ped Bike Factor							1.00	1.00		1.00	1.00	
Frt			0.850		0.879			0.998			0.991	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1637	0	1770	3531	0	1770	3502	0
Flt Permitted	0.643			0.752			0.201			0.357		
Satd. Flow (perm)	1198	1863	1583	1401	1637	0	374	3531	0	665	3502	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			254		33			1			7	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1704			1283			1356			4794	
Travel Time (s)		38.7			29.2			30.8			109.0	
Confl. Peds. (#/hr)							2		1	1		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
Adj. Flow (vph)	24	8	254	12	8	33	220	769	10	14	770	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	8	254	12	41	0	220	779	0	14	819	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)	25.0	20.0	20.0	25.0	10.0		20.0	50.0		20.0	50.0	
Total Split (%)	21.7%	17.4%	17.4%	21.7%	8.7%		17.4%	43.5%		17.4%	43.5%	
Maximum Green (s)	20.0	15.0	15.0	20.0	5.0		15.0	45.0		15.0	45.0	
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	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	3.5		2.0	3.5	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	
Flash Dont Walk (s)		13.0	13.0		13.0			13.0			13.0	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	10.9	10.0	10.0	10.1	7.9		40.0	38.3		30.4	22.9	
Actuated g/C Ratio	0.17	0.16	0.16	0.16	0.13		0.64	0.61		0.49	0.37	
v/c Ratio	0.09	0.03	0.55	0.04	0.17		0.44	0.36		0.03	0.63	
Control Delay	23.8	28.5	9.6	23.5	17.2		8.3	8.2		6.6	19.4	

Lanes, Volumes, Timings
6: Smokey Point Boulevard & 156th Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	23.8	28.5	9.6	23.5	17.2		8.3	8.2		6.6	19.4	
LOS	C	C	A	C	B		A	A		A	B	
Approach Delay		11.3			18.6			8.2			19.2	
Approach LOS		B			B			A			B	
Queue Length 50th (ft)	7	2	0	3	2		19	40		1	106	
Queue Length 95th (ft)	30	17	67	18	33		83	195		10	247	
Internal Link Dist (ft)		1624			1203			1276			4714	
Turn Bay Length (ft)	150		150	200			250			200		
Base Capacity (vph)	620	490	604	622	446		599	2724		691	2695	
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	0.04	0.02	0.42	0.02	0.09		0.37	0.29		0.02	0.30	

Intersection Summary

Area Type: Other
Cycle Length: 115
Actuated Cycle Length: 62.3
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.63
Intersection Signal Delay: 13.1 Intersection LOS: B
Intersection Capacity Utilization 56.2% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 6: Smokey Point Boulevard & 156th Street NE

2024 Baseline Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
PM Peak-Hour

Lanes, Volumes, Timings
7: Smokey Point Boulevard & 152nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	7	20	95	5	284	15	690	132	331	683	9
Future Volume (vph)	15	7	20	95	5	284	15	690	132	331	683	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0	125		0	150		0	200		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	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00				0.99		1.00	1.00			1.00	
Frt		0.887			0.852			0.976			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1652	0	1770	1566	0	1770	3440	0	1770	3531	0
Flt Permitted	0.909			0.426			0.378			0.183		
Satd. Flow (perm)	1692	1652	0	794	1566	0	703	3440	0	341	3531	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			296			21			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		209			5141			1452			1356	
Travel Time (s)		4.8			116.8			33.0			30.8	
Confl. Peds. (#/hr)	1					1	2		2	2		2
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	16	7	21	99	5	296	16	719	138	345	711	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	28	0	99	301	0	16	857	0	345	720	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)	4.0	4.0		4.0	4.0		4.0	7.0		4.0	7.0	
Minimum Split (s)	9.5	27.0		11.5	26.0		9.5	24.0		9.5	26.0	
Total Split (s)	16.0	16.0		16.0	40.0		16.0	50.0		16.0	50.0	
Total Split (%)	13.1%	13.1%		13.1%	32.8%		13.1%	41.0%		13.1%	41.0%	
Maximum Green (s)	11.0	11.0		11.0	35.0		11.0	45.0		11.0	45.0	
Yellow Time (s)	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	
Lost Time Adjust (s)	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	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.5	2.5		2.5	2.5	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		15.0			14.0			12.0			14.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	7.6	5.7		11.3	9.6		27.5	21.9		38.8	37.2	
Actuated g/C Ratio	0.13	0.09		0.19	0.16		0.45	0.36		0.64	0.61	
v/c Ratio	0.07	0.16		0.37	0.61		0.04	0.68		0.70	0.33	
Control Delay	21.9	20.0		25.5	10.0		7.2	19.8		19.7	8.5	

Lanes, Volumes, Timings
7: Smokey Point Boulevard & 152nd Street NE

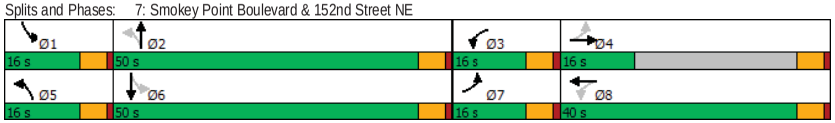
10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	21.9	20.0		25.5	10.0		7.2	19.8		19.7	8.5	
LOS	C	C		C	A		A	B		B	A	
Approach Delay		20.7			13.8			19.5			12.1	
Approach LOS		C			B			B			B	
Queue Length 50th (ft)	5	2		31	2		1	110		35	37	
Queue Length 95th (ft)	20	28		75	71		11	244		#243	178	
Internal Link Dist (ft)		129			5061			1372			1276	
Turn Bay Length (ft)	50			125			150			200		
Base Capacity (vph)	403	1017		383	1071		593	2691		492	2758	
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	0.04	0.03		0.26	0.28		0.03	0.32		0.70	0.26	

Intersection Summary

Area Type: Other
Cycle Length: 122
Actuated Cycle Length: 60.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 15.3 Intersection LOS: B
Intersection Capacity Utilization 72.1% ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Smokey Point Boulevard & 152nd Street NE



2024 Baseline Conditions PM Peak-Hour
Gibson Traffic Consultants, Inc. [BJL #21-190]

Lanes, Volumes, Timings
8: State Avenue/Smokey Point Boulevard & 136th Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	153	216	76	152	187	142	101	499	204	148	467	210
Future Volume (vph)	153	216	76	152	187	142	101	499	204	148	467	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	200		0	300		0	300		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
Ped Bike Factor			0.99	1.00							0.99	
Frt			0.850		0.935			0.956			0.954	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1845	1568	1752	1725	0	1752	3351	0	1752	3319	0
Flt Permitted	0.265			0.450			0.270			0.217		
Satd. Flow (perm)	489	1845	1547	829	1725	0	498	3351	0	400	3319	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			143		32			44			49	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		981			4740			2821			4424	
Travel Time (s)		22.3			107.7			64.1			100.5	
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)												2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	161	227	80	160	197	149	106	525	215	156	492	221
Shared Lane Traffic (%)												
Lane Group Flow (vph)	161	227	80	160	346	0	106	740	0	156	713	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)	5.0	5.0	5.0	5.0	7.0		5.0	7.0		5.0	7.0	
Minimum Split (s)	10.0	34.0	34.0	10.0	23.0		10.0	35.0		10.0	23.0	
Total Split (s)	15.0	35.0	35.0	30.0	40.0		35.0	35.0		30.0	30.0	
Total Split (%)	11.5%	26.9%	26.9%	23.1%	30.8%		26.9%	26.9%		23.1%	23.1%	
Maximum Green (s)	10.0	30.0	30.0	25.0	35.0		30.0	30.0		25.0	25.0	
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	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Walk Time (s)		8.0	8.0					9.0				
Flash Dont Walk (s)		21.0	21.0					21.0				
Pedestrian Calls (#/hr)		0	0					0				
Act Effct Green (s)	30.0	20.7	20.7	31.3	21.3		38.4	30.4		41.6	32.0	
Actuated g/C Ratio	0.33	0.23	0.23	0.34	0.23		0.42	0.33		0.46	0.35	

Lanes, Volumes, Timings
8: State Avenue/Smokey Point Boulevard & 136th Street NE

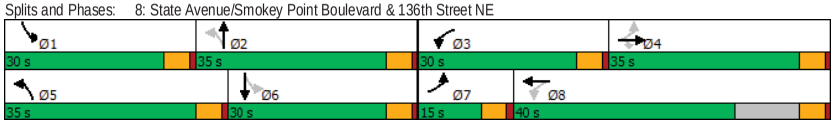
10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.55	0.54	0.17	0.41	0.81		0.33	0.64		0.48	0.59	
Control Delay	26.3	36.7	1.1	21.8	45.0		17.4	28.9		19.5	26.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	26.3	36.7	1.1	21.8	45.0		17.4	28.9		19.5	26.4	
LOS	C	D	A	C	D		B	C		B	C	
Approach Delay		27.0			37.6			27.5			25.1	
Approach LOS		C			D			C			C	
Queue Length 50th (ft)	60	114	0	59	172		32	177		48	163	
Queue Length 95th (ft)	110	204	3	109	284		73	298		103	274	
Internal Link Dist (ft)		901			4660			2741			4344	
Turn Bay Length (ft)	150		150	200			300			300		
Base Capacity (vph)	306	616	612	583	881		666	1150		575	1200	
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	0.53	0.37	0.13	0.27	0.39		0.16	0.64		0.27	0.59	

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 90.9
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 28.6 — Intersection LOS: C
Intersection Capacity Utilization 72.2% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 8: State Avenue/Smokey Point Boulevard & 136th Street NE

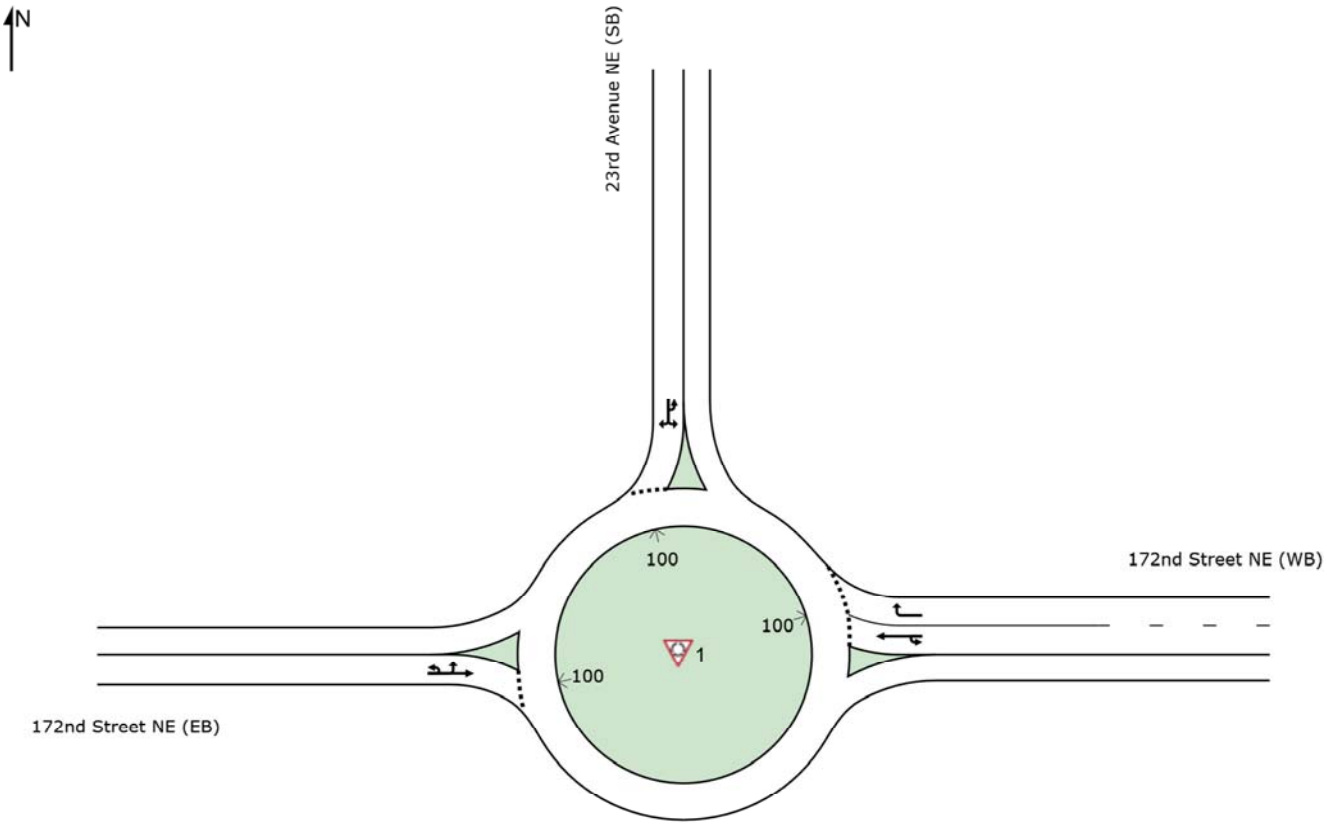


2024 Baseline Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
PM Peak-Hour

SITE LAYOUT

Site: 1 [2024 Opening Conditions - Weekday PM]

172nd Street NE at 23rd Avenue NE
Site Category: PM Peak-Hour
Roundabout



Organisation: GIBSON TRAFFIC CONSULTANTS | Created: Wednesday, August 18, 2021 7:26:15 AM
Project: H:\2021\21-190\Sidra\#1 - 172nd St NE at 23rd Ave NE.sip8

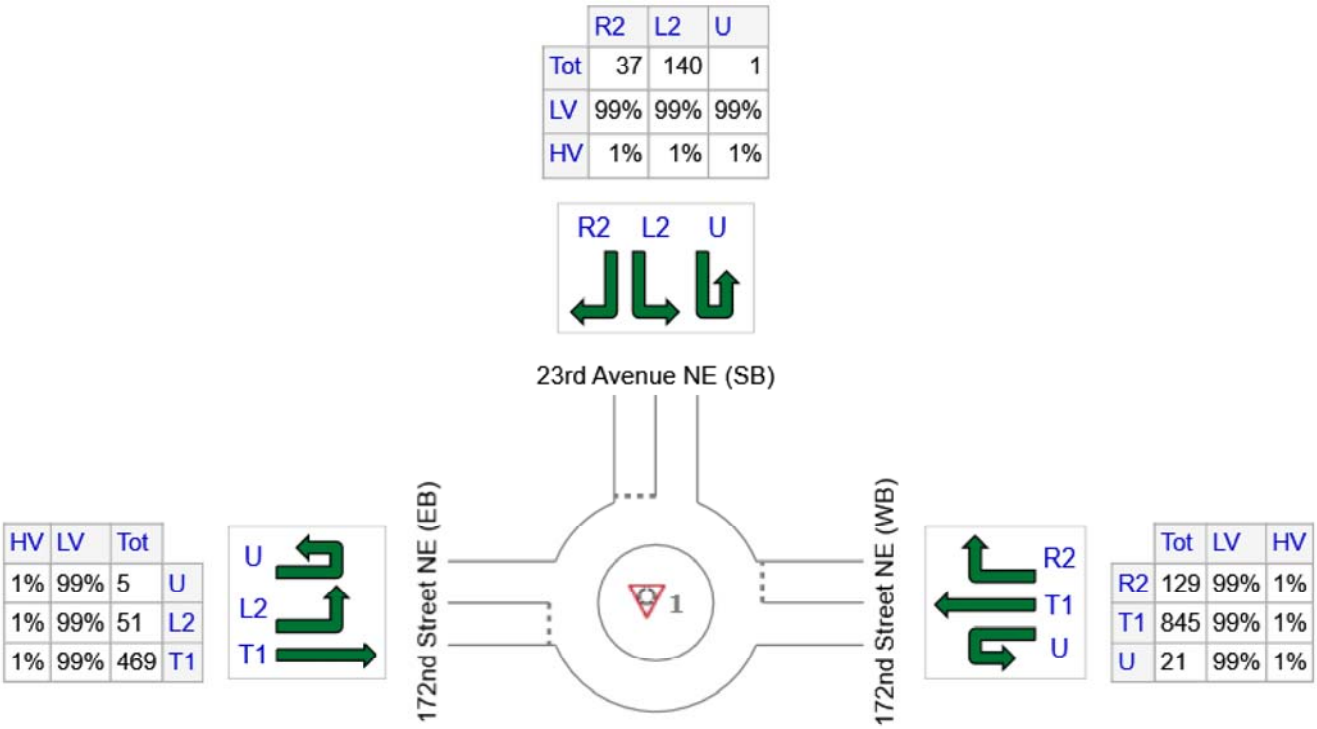
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [2024 Opening Conditions - Weekday PM]

172nd Street NE at 23rd Avenue NE
Site Category: PM Peak-Hour
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: 172nd Street NE (WB)	995	985	10
N: 23rd Avenue NE (SB)	178	176	2
W: 172nd Street NE (EB)	525	520	5
Total	1698	1681	17

MOVEMENT SUMMARY

Site: 1 [2024 Opening Conditions - Weekday PM]

172nd Street NE at 23rd Avenue NE
Site Category: PM Peak-Hour
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: 172nd Street NE (WB)												
1u	U	23	1.0	0.569	12.5	LOS B	5.4	135.3	0.31	0.40	0.31	38.0
6	T1	909	1.0	0.569	4.2	LOS A	5.4	135.3	0.31	0.40	0.31	36.9
16	R2	139	1.0	0.121	4.4	LOS A	0.6	15.9	0.22	0.46	0.22	36.2
Approach		1070	1.0	0.569	4.4	LOS A	5.4	135.3	0.30	0.41	0.30	36.9
North: 23rd Avenue NE (SB)												
7u	U	1	1.0	0.272	18.4	LOS B	1.8	46.3	0.83	0.88	0.83	33.2
7	L2	151	1.0	0.272	15.9	LOS B	1.8	46.3	0.83	0.88	0.83	32.5
14	R2	40	1.0	0.272	10.1	LOS B	1.8	46.3	0.83	0.88	0.83	31.6
Approach		191	1.0	0.272	14.7	LOS B	1.8	46.3	0.83	0.88	0.83	32.3
West: 172nd Street NE (EB)												
5u	U	5	1.0	0.449	13.1	LOS B	3.3	83.4	0.48	0.50	0.48	37.2
5	L2	55	1.0	0.449	10.7	LOS B	3.3	83.4	0.48	0.50	0.48	36.3
2	T1	504	1.0	0.449	4.8	LOS A	3.3	83.4	0.48	0.50	0.48	36.2
Approach		565	1.0	0.449	5.4	LOS A	3.3	83.4	0.48	0.50	0.48	36.2
All Vehicles		1826	1.0	0.569	5.8	LOS A	5.4	135.3	0.41	0.48	0.41	36.1

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lanes, Volumes, Timings
2: 27th Avenue NE/Spring Lane & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	401	155	828	756	331	231	101	641	326	84	54
Future Volume (vph)	35	401	155	828	756	331	231	101	641	326	84	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		375	400		200	150		0	175		175
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor							1.00				0.99	
Frt		0.958				0.850			0.850		0.941	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3424	0	3467	3574	1599	1787	1881	1599	3467	1759	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1787	3424	0	3467	3574	1599	1782	1881	1599	3467	1759	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33				279			479		20	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1312			609			730			589	
Travel Time (s)		29.8			13.8			16.6			13.4	
Confl. Peds. (#/hr)							3					3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	37	422	163	872	796	348	243	106	675	343	88	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	585	0	872	796	348	243	106	675	343	145	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Detector Phase	5	2		1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0		3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	9.5	38.3		9.5	38.3	38.3	9.5	23.1	23.1	9.5	45.1	
Total Split (s)	20.0	38.3		46.0	60.0	60.0	25.0	25.0	25.0	25.0	45.1	
Total Split (%)	13.0%	24.8%		29.8%	38.9%	38.9%	16.2%	16.2%	16.2%	16.2%	29.2%	
Maximum Green (s)	15.0	32.0		41.0	53.7	53.7	20.0	19.9	19.9	20.0	40.0	
Yellow Time (s)	3.0	4.3		3.0	4.3	4.3	3.0	3.1	3.1	3.0	3.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.3		5.0	6.3	6.3	5.0	5.1	5.1	5.0	5.1	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0	2.5	3.0	3.0	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0					7.0	
Flash Dont Walk (s)		25.0			25.0	25.0					33.0	
Pedestrian Calls (#/hr)		0			0	0					0	
Act Effct Green (s)	8.1	28.7		39.6	62.5	62.5	20.0	41.9	41.9	18.3	40.1	
Actuated g/C Ratio	0.05	0.19		0.26	0.42	0.42	0.13	0.28	0.28	0.12	0.27	
v/c Ratio	0.39	0.86		0.95	0.53	0.42	1.02	0.20	0.85	0.81	0.30	

Lanes, Volumes, Timings
2: 27th Avenue NE/Spring Lane & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	81.1	68.8		74.2	35.0	8.4	126.1	44.6	26.6	80.3	40.5	
Queue Delay	0.0	0.0		0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	81.1	68.8		74.2	35.8	8.4	126.1	44.6	26.6	80.3	40.5	
LOS	F	E		E	D	A	F	D	C	F	D	
Approach Delay		69.5			47.7			52.0			68.5	
Approach LOS		E			D			D			E	
Queue Length 50th (ft)	36	282		442	312	42	~262	83	218	173	100	
Queue Length 95th (ft)	77	355		#576	391	124	#448	140	#474	231	168	
Internal Link Dist (ft)		1232			529			650			509	
Turn Bay Length (ft)	195			400		200	150			175		
Base Capacity (vph)	179	758		950	1489	828	238	525	791	463	484	
Starvation Cap Reductn	0	0		0	367	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.21	0.77		0.92	0.71	0.42	1.02	0.20	0.85	0.74	0.30	

Intersection Summary

Area Type: Other
Cycle Length: 154.4
Actuated Cycle Length: 149.9
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 54.5 Intersection LOS: D
Intersection Capacity Utilization 103.6% ICU Level of Service G
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: 27th Avenue NE/Spring Lane & 172nd Street NE

2024 Opening Conditions PM Peak-Hour
Gibson Traffic Consultants, Inc. [BJL #21-190]

Lanes, Volumes, Timings
3: 27th Avenue NE & 169th Place NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	11	5	2	10	235	4	297	9	347	331	45
Future Volume (vph)	34	11	5	2	10	235	4	297	9	347	331	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	75		0	200		0	0		135
Storage Lanes	0		0	1		1	1		0	1		1
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
Ped Bike Factor		1.00			1.00		0.99	1.00		0.99		0.96
Frt		0.987				0.850		0.996				0.850
Flt Protected		0.967			0.992		0.950			0.950		
Satd. Flow (prot)	0	1790	0	0	1866	1599	1787	1872	0	1787	1881	1599
Flt Permitted		0.802			0.963		0.554			0.495		
Satd. Flow (perm)	0	1485	0	0	1809	1599	1030	1872	0	925	1881	1537
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				245		2				52
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		967			413			725			730	
Travel Time (s)		22.0			9.4			16.5			16.6	
Confl. Peds. (#/hr)			3	3			8		5	5		8
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	35	11	5	2	10	245	4	309	9	361	345	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	51	0	0	12	245	4	318	0	361	345	47
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Detector Phase	4	4		8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	22.5	22.5		26.0	26.0	26.0	9.5	22.5		9.5	26.0	26.0
Total Split (s)	25.0	25.0		25.0	25.0	25.0	20.0	50.0		30.0	50.0	50.0
Total Split (%)	23.8%	23.8%		23.8%	23.8%	23.8%	19.0%	47.6%		28.6%	47.6%	47.6%
Maximum Green (s)	21.0	21.0		21.0	21.0	21.0	16.0	46.0		26.0	46.0	46.0
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	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
Total Lost Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max		None	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)	8.0	8.0		15.0	15.0	15.0		10.0			15.0	15.0
Pedestrian Calls (#/hr)	3	3		3	3	3		13			13	13
Act Effct Green (s)		9.9			9.9	9.9	51.6	46.6		61.0	59.6	59.6
Actuated g/C Ratio		0.13			0.13	0.13	0.65	0.59		0.77	0.75	0.75
v/c Ratio		0.27			0.05	0.59	0.01	0.29		0.44	0.24	0.04

Lanes, Volumes, Timings
3: 27th Avenue NE & 169th Place NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		32.5			30.8	10.9	4.5	10.5		4.9	4.8	1.8
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		32.5			30.8	10.9	4.5	10.5		4.9	4.8	1.8
LOS		C			C	B	A	B		A	A	A
Approach Delay		32.5			11.8			10.5			4.7	
Approach LOS		C			B			B			A	
Queue Length 50th (ft)		20			5	0	0	60		29	27	0
Queue Length 95th (ft)		54			21	61	4	183		115	147	12
Internal Link Dist (ft)		887			333			645			650	
Turn Bay Length (ft)							200					135
Base Capacity (vph)		406			490	612	939	1104		1002	1418	1171
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			0.02	0.40	0.00	0.29		0.36	0.24	0.04

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 79
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.59
Intersection Signal Delay: 8.4 Intersection LOS: A
Intersection Capacity Utilization 55.2% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 3: 27th Avenue NE & 169th Place NE

2024 Opening Conditions PM Peak-Hour
Gibson Traffic Consultants, Inc. [BJL #21-190]

Lanes, Volumes, Timings
4: I-5 Southbound Ramps & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	963	529	0	1536	604	0	0	0	283	1	371
Future Volume (vph)	0	963	529	0	1536	604	0	0	0	283	1	371
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	0		0	350		435
Storage Lanes	0		1	0		1	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor			0.98			0.96						0.99
Frt			0.850			0.850						0.850
Flt Protected										0.950	0.953	
Satd. Flow (prot)	0	3539	1583	0	3539	1583	0	0	0	1681	1686	1583
Flt Permitted										0.950	0.953	
Satd. Flow (perm)	0	3539	1552	0	3539	1523	0	0	0	1681	1686	1562
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			551			629						54
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		609			940			979			1126	
Travel Time (s)		13.8			21.4			22.3			25.6	
Confl. Peds. (#/hr)	8		4	4		8	1					1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	1003	551	0	1600	629	0	0	0	295	1	386
Shared Lane Traffic (%)										50%		
Lane Group Flow (vph)	0	1003	551	0	1600	629	0	0	0	147	149	386
Turn Type		NA	Perm		NA	Perm				Perm	NA	Perm
Protected Phases		2			6						4	
Permitted Phases			2			6				4		4
Detector Phase		2	2		6	6				4	4	4
Switch Phase												
Minimum Initial (s)		7.0	7.0		7.0	7.0				5.0	5.0	5.0
Minimum Split (s)		24.8	24.8		34.1	34.1				33.8	33.8	33.8
Total Split (s)		100.0	100.0		100.0	100.0				30.0	30.0	30.0
Total Split (%)		76.9%	76.9%		76.9%	76.9%				23.1%	23.1%	23.1%
Maximum Green (s)		94.2	94.2		93.9	93.9				24.2	24.2	24.2
Yellow Time (s)		3.8	3.8		4.1	4.1				3.8	3.8	3.8
All-Red Time (s)		2.0	2.0		2.0	2.0				2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0				0.0	0.0	0.0
Total Lost Time (s)		5.8	5.8		6.1	6.1				5.8	5.8	5.8
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		4.0	4.0		4.0	4.0				4.5	4.5	4.5
Recall Mode		None	None		None	None				Max	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0				7.0	7.0	7.0
Flash Dont Walk (s)		12.0	12.0		21.0	21.0				21.0	21.0	21.0
Pedestrian Calls (#/hr)		0	0		0	0				0	0	0
Act Effct Green (s)		88.4	88.4		88.1	88.1				28.2	28.2	28.2
Actuated g/C Ratio		0.69	0.69		0.69	0.69				0.22	0.22	0.22
v/c Ratio		0.41	0.44		0.66	0.51				0.40	0.40	1.00
Control Delay		9.1	1.7		12.9	2.0				48.6	48.7	90.4

Lanes, Volumes, Timings
4: I-5 Southbound Ramps & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.4	0.4		0.2	0.0				0.0	0.0	0.0
Total Delay		9.4	2.1		13.1	2.0				48.6	48.7	90.4
LOS		A	A		B	A				D	D	F
Approach Delay		6.8			10.0						72.3	
Approach LOS		A			A						E	
Queue Length 50th (ft)		172	0		362	0				117	118	~324
Queue Length 95th (ft)		208	32		427	33				189	192	#531
Internal Link Dist (ft)		529			860			899			1046	
Turn Bay Length (ft)			200							350		435
Base Capacity (vph)		2619	1291		2611	1288				369	370	385
Starvation Cap Reductn		949	322		341	0				0	0	0
Spillback Cap Reductn		0	0		0	0				0	0	0
Storage Cap Reductn		0	0		0	0				0	0	0
Reduced v/c Ratio		0.60	0.57		0.70	0.49				0.40	0.40	1.00

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 128.3
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 18.4 Intersection LOS: B
Intersection Capacity Utilization 75.7% ICU Level of Service D
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: 4: I-5 Southbound Ramps & 172nd Street NE

2024 Opening Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
PM Peak-Hour

Lanes, Volumes, Timings
5: I-5 Northbound Ramps & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	212	1048	0	0	1436	352	665	2	806	0	0	0
Future Volume (vph)	212	1048	0	0	1436	352	665	2	806	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	600		0	0		300	400		0	0		0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00					0.98			0.99			
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1770	3539	0	0	5085	1583	1681	1686	1583	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1768	3539	0	0	5085	1553	1681	1686	1562	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						363			363			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		940			1086			1094			999	
Travel Time (s)		21.4			24.7			24.9			22.7	
Confl. Peds. (#/hr)	3		9	9		3			5	5		
Confl. Bikes (#/hr)			1									
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
Adj. Flow (vph)	219	1080	0	0	1480	363	686	2	831	0	0	0
Shared Lane Traffic (%)							50%					
Lane Group Flow (vph)	219	1080	0	0	1480	363	343	345	831	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Free			
Protected Phases	5	2			6			8				
Permitted Phases						6	8		Free			
Detector Phase	5	2			6	6	8	8				
Switch Phase												
Minimum Initial (s)	5.0	7.0			7.0	7.0	7.0	7.0				
Minimum Split (s)	10.6	24.1			23.8	23.8	40.8	40.8				
Total Split (s)	30.0	90.0			60.0	60.0	30.0	30.0				
Total Split (%)	25.0%	75.0%			50.0%	50.0%	25.0%	25.0%				
Maximum Green (s)	24.4	83.9			54.2	54.2	24.2	24.2				
Yellow Time (s)	3.6	4.1			3.8	3.8	3.8	3.8				
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0				
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0				
Total Lost Time (s)	5.6	6.1			5.8	5.8	5.8	5.8				
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	4.0			4.0	4.0	4.5	4.5				
Recall Mode	None	None			None	None	Max	Max				
Walk Time (s)		7.0			7.0	7.0	7.0	7.0				
Flash Dont Walk (s)		10.0			8.0	8.0	28.0	28.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effct Green (s)	19.7	77.4			52.4	52.4	35.1	35.1	124.5			
Actuated g/C Ratio	0.16	0.62			0.42	0.42	0.28	0.28	1.00			
v/c Ratio	0.78	0.49			0.69	0.42	0.72	0.73	0.53			

Lanes, Volumes, Timings
5: I-5 Northbound Ramps & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	70.3	13.5			31.9	4.0	51.8	51.8	1.3			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	70.3	13.5			31.9	4.0	51.8	51.8	1.3			
LOS	E	B			C	A	D	D	A			
Approach Delay		23.1			26.4			24.2				
Approach LOS		C			C			C				
Queue Length 50th (ft)	174	232			356	0	271	273	0			
Queue Length 95th (ft)	264	281			431	59	#411	#413	0			
Internal Link Dist (ft)		860			1006			1014			919	
Turn Bay Length (ft)	600					300	400					
Base Capacity (vph)	348	2394			2222	883	474	475	1562			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.63	0.45			0.67	0.41	0.72	0.73	0.53			

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 124.5
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 24.7 Intersection LOS: C
Intersection Capacity Utilization 83.0% 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: 5: I-5 Northbound Ramps & 172nd Street NE

2024 Opening Conditions PM Peak-Hour
Gibson Traffic Consultants, Inc. [BJL #21-190]

Lanes, Volumes, Timings
6: Smokey Point Boulevard & 156th Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	8	272	12	8	32	256	754	10	14	755	53
Future Volume (vph)	27	8	272	12	8	32	256	754	10	14	755	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	200		0	250		0	200		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
Ped Bike Factor							1.00	1.00		1.00	1.00	
Frt			0.850		0.879			0.998			0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1637	0	1770	3531	0	1770	3498	0
Flt Permitted	0.644			0.752			0.200			0.357		
Satd. Flow (perm)	1200	1863	1583	1401	1637	0	372	3531	0	665	3498	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			278		33			1			7	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1704			1283			1356			4794	
Travel Time (s)		38.7			29.2			30.8			109.0	
Confl. Peds. (#/hr)							2		1	1		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
Adj. Flow (vph)	28	8	278	12	8	33	261	769	10	14	770	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	8	278	12	41	0	261	779	0	14	824	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)	25.0	20.0	20.0	25.0	10.0		20.0	50.0		20.0	50.0	
Total Split (%)	21.7%	17.4%	17.4%	21.7%	8.7%		17.4%	43.5%		17.4%	43.5%	
Maximum Green (s)	20.0	15.0	15.0	20.0	5.0		15.0	45.0		15.0	45.0	
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	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	3.5		2.0	3.5	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	
Flash Dont Walk (s)		13.0	13.0		13.0			13.0			13.0	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	11.1	10.1	10.1	10.2	8.0		42.6	40.9		31.7	24.2	
Actuated g/C Ratio	0.17	0.16	0.16	0.16	0.12		0.66	0.63		0.49	0.37	
v/c Ratio	0.10	0.03	0.58	0.05	0.18		0.50	0.35		0.03	0.63	
Control Delay	25.0	29.4	9.9	24.5	17.4		9.4	8.1		6.7	19.8	

Lanes, Volumes, Timings
6: Smokey Point Boulevard & 156th Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	25.0	29.4	9.9	24.5	17.4		9.4	8.1		6.7	19.8	
LOS	C	C	A	C	B		A	A		A	B	
Approach Delay		11.8			19.0			8.4			19.6	
Approach LOS		B			B			A			B	
Queue Length 50th (ft)	10	3	0	4	3		23	40		1	120	
Queue Length 95th (ft)	33	17	71	19	33		105	198		10	252	
Internal Link Dist (ft)		1624			1203			1276			4714	
Turn Bay Length (ft)	150		150	200			250			200		
Base Capacity (vph)	594	468	606	596	427		587	2635		677	2582	
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	0.05	0.02	0.46	0.02	0.10		0.44	0.30		0.02	0.32	

Intersection Summary

Area Type: Other
Cycle Length: 115
Actuated Cycle Length: 65
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.63
Intersection Signal Delay: 13.3 Intersection LOS: B
Intersection Capacity Utilization 57.7% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 6: Smokey Point Boulevard & 156th Street NE

2024 Opening Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
PM Peak-Hour

Lanes, Volumes, Timings
7: Smokey Point Boulevard & 152nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	7	20	95	5	297	15	717	132	339	698	9
Future Volume (vph)	15	7	20	95	5	297	15	717	132	339	698	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0	125		0	150		0	200		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	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00				0.99		1.00	1.00			1.00	
Frt		0.887			0.852			0.977			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1652	0	1770	1566	0	1770	3444	0	1770	3531	0
Flt Permitted	0.909			0.426			0.372			0.175		
Satd. Flow (perm)	1692	1652	0	794	1566	0	692	3444	0	326	3531	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			309			20			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		209			5141			1452			1356	
Travel Time (s)		4.8			116.8			33.0			30.8	
Confl. Peds. (#/hr)	1					1	2		2	2		2
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	16	7	21	99	5	309	16	747	138	353	727	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	28	0	99	314	0	16	885	0	353	736	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)	4.0	4.0		4.0	4.0		4.0	7.0		4.0	7.0	
Minimum Split (s)	9.5	27.0		11.5	26.0		9.5	24.0		9.5	26.0	
Total Split (s)	16.0	16.0		16.0	40.0		16.0	50.0		16.0	50.0	
Total Split (%)	13.1%	13.1%		13.1%	32.8%		13.1%	41.0%		13.1%	41.0%	
Maximum Green (s)	11.0	11.0		11.0	35.0		11.0	45.0		11.0	45.0	
Yellow Time (s)	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	
Lost Time Adjust (s)	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	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.5	2.5		2.5	2.5	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		15.0			14.0			12.0			14.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	7.7	5.8		11.4	9.7		28.4	22.8		39.6	38.1	
Actuated g/C Ratio	0.12	0.09		0.19	0.16		0.46	0.37		0.64	0.62	
v/c Ratio	0.07	0.16		0.37	0.62		0.04	0.69		0.73	0.34	
Control Delay	22.4	20.2		26.0	10.1		7.1	19.8		22.4	8.5	

Lanes, Volumes, Timings
7: Smokey Point Boulevard & 152nd Street NE

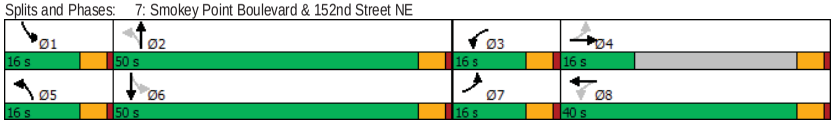
10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.4	20.2		26.0	10.1		7.1	19.8		22.4	8.5	
LOS	C	C		C	B		A	B		C	A	
Approach Delay		21.0			13.9			19.6			13.0	
Approach LOS		C			B			B			B	
Queue Length 50th (ft)	5	2		32	2		1	116		42	38	
Queue Length 95th (ft)	20	28		77	74		11	256		#267	185	
Internal Link Dist (ft)		129			5061			1372			1276	
Turn Bay Length (ft)	50			125			150			200		
Base Capacity (vph)	398	1000		378	1063		589	2655		482	2718	
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	0.04	0.03		0.26	0.30		0.03	0.33		0.73	0.27	

Intersection Summary

Area Type: Other
Cycle Length: 122
Actuated Cycle Length: 61.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 15.7 Intersection LOS: B
Intersection Capacity Utilization 74.1% 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: 7: Smokey Point Boulevard & 152nd Street NE



2024 Opening Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
PM Peak-Hour

Lanes, Volumes, Timings
8: State Avenue/Smokey Point Boulevard & 136th Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	216	76	152	187	149	101	512	204	152	474	214
Future Volume (vph)	160	216	76	152	187	149	101	512	204	152	474	214
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	200		0	300		0	300		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
Ped Bike Factor			0.99	1.00							0.99	
Frt			0.850		0.933			0.957			0.953	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1845	1568	1752	1721	0	1752	3354	0	1752	3315	0
Flt Permitted	0.252			0.458			0.263			0.205		
Satd. Flow (perm)	465	1845	1547	844	1721	0	485	3354	0	378	3315	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			143		34			43			49	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		981			4740			2821			4424	
Travel Time (s)		22.3			107.7			64.1			100.5	
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)												2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	168	227	80	160	197	157	106	539	215	160	499	225
Shared Lane Traffic (%)												
Lane Group Flow (vph)	168	227	80	160	354	0	106	754	0	160	724	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)	5.0	5.0	5.0	5.0	7.0		5.0	7.0		5.0	7.0	
Minimum Split (s)	10.0	34.0	34.0	10.0	23.0		10.0	35.0		10.0	23.0	
Total Split (s)	15.0	35.0	35.0	30.0	40.0		35.0	35.0		30.0	30.0	
Total Split (%)	11.5%	26.9%	26.9%	23.1%	30.8%		26.9%	26.9%		23.1%	23.1%	
Maximum Green (s)	10.0	30.0	30.0	25.0	35.0		30.0	30.0		25.0	25.0	
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	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Walk Time (s)		8.0	8.0					9.0				
Flash Dont Walk (s)		21.0	21.0					21.0				
Pedestrian Calls (#/hr)		0	0					0				
Act Effct Green (s)	30.8	21.3	21.3	31.8	21.9		38.4	30.4		41.9	32.1	
Actuated g/C Ratio	0.34	0.23	0.23	0.35	0.24		0.42	0.33		0.46	0.35	

Lanes, Volumes, Timings
8: State Avenue/Smokey Point Boulevard & 136th Street NE

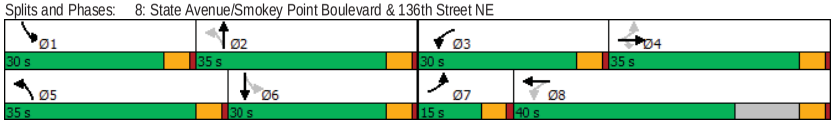
10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.58	0.53	0.17	0.41	0.81		0.34	0.66		0.50	0.61	
Control Delay	27.5	36.2	1.0	21.6	45.1		17.8	29.9		20.4	27.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	27.5	36.2	1.0	21.6	45.1		17.8	29.9		20.4	27.0	
LOS	C	D	A	C	D		B	C		C	C	
Approach Delay		27.2			37.8			28.4			25.8	
Approach LOS		C			D			C			C	
Queue Length 50th (ft)	63	114	0	60	177		32	185		50	167	
Queue Length 95th (ft)	114	205	3	109	291		74	310		107	282	
Internal Link Dist (ft)		901			4660			2741			4344	
Turn Bay Length (ft)	150		150	200			300			300		
Base Capacity (vph)	301	610	608	585	872		658	1139		565	1193	
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	0.56	0.37	0.13	0.27	0.41		0.16	0.66		0.28	0.61	

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 91.7
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 29.1 Intersection LOS: C
Intersection Capacity Utilization 73.6% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 8: State Avenue/Smokey Point Boulevard & 136th Street NE

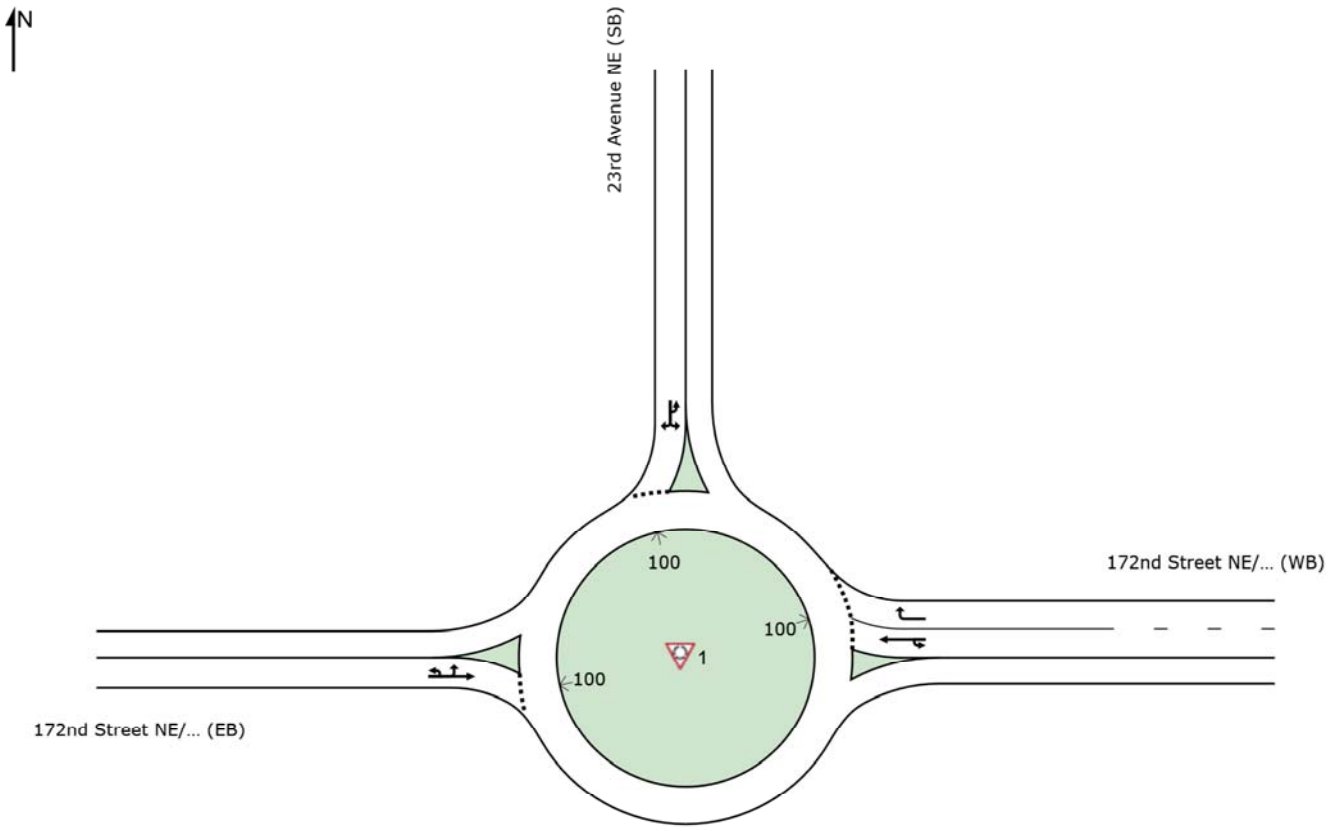


2024 Opening Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
PM Peak-Hour

SITE LAYOUT

Site: 1 [2030 Baseline Conditions - Weekday PM]

172nd Street NE/SR-531 at 23rd Avenue NE
Site Category: PM Peak-Hour
Roundabout



Organisation: GIBSON TRAFFIC CONSULTANTS | Created: Wednesday, August 18, 2021 7:26:31 AM
Project: H:\2021\21-190\Sidra\#1 - 172nd St NE at 23rd Ave NE.sip8

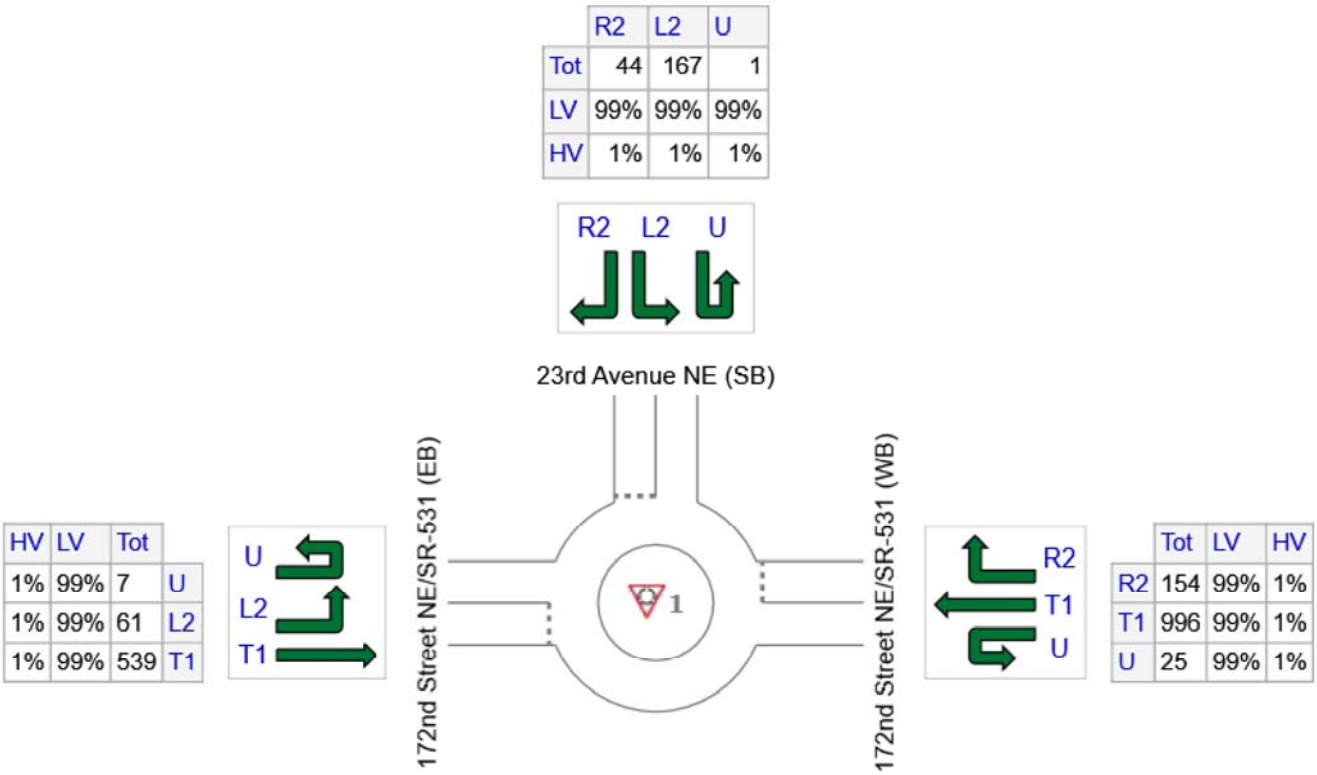
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [2030 Baseline Conditions - Weekday PM]

172nd Street NE/SR-531 at 23rd Avenue NE
Site Category: PM Peak-Hour
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: 172nd Street NE/SR-531 (WB)	1175	1163	12
N: 23rd Avenue NE (SB)	212	210	2
W: 172nd Street NE/SR-531 (EB)	607	601	6
Total	1994	1974	20

Organisation: GIBSON TRAFFIC CONSULTANTS | Created: Wednesday, August 18, 2021 7:26:37 AM
Project: H:\2021\21-190\Sidra\#1 - 172nd St NE at 23rd Ave NE.sip8

MOVEMENT SUMMARY

Site: 1 [2030 Baseline Conditions - Weekday PM]

172nd Street NE/SR-531 at 23rd Avenue NE
Site Category: PM Peak-Hour
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: 172nd Street NE/SR-531 (WB)												
1u	U	27	1.0	0.679	12.7	LOS B	8.0	200.6	0.43	0.42	0.43	37.6
6	T1	1071	1.0	0.679	4.4	LOS A	8.0	200.6	0.43	0.42	0.43	36.5
16	R2	166	1.0	0.146	4.5	LOS A	0.8	20.1	0.25	0.47	0.25	36.1
Approach		1263	1.0	0.679	4.6	LOS A	8.0	200.6	0.40	0.43	0.40	36.5
North: 23rd Avenue NE (SB)												
7u	U	1	1.0	0.419	23.1	LOS C	3.4	85.8	0.97	1.01	1.08	31.1
7	L2	180	1.0	0.419	20.6	LOS C	3.4	85.8	0.97	1.01	1.08	30.5
14	R2	47	1.0	0.419	14.8	LOS B	3.4	85.8	0.97	1.01	1.08	29.7
Approach		228	1.0	0.419	19.4	LOS B	3.4	85.8	0.97	1.01	1.08	30.3
West: 172nd Street NE/SR-531 (EB)												
5u	U	8	1.0	0.537	13.5	LOS B	4.4	111.8	0.58	0.53	0.58	36.8
5	L2	66	1.0	0.537	11.0	LOS B	4.4	111.8	0.58	0.53	0.58	35.9
2	T1	580	1.0	0.537	5.1	LOS A	4.4	111.8	0.58	0.53	0.58	35.8
Approach		653	1.0	0.537	5.8	LOS A	4.4	111.8	0.58	0.53	0.58	35.8
All Vehicles		2144	1.0	0.679	6.5	LOS A	8.0	200.6	0.52	0.52	0.53	35.5

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lanes, Volumes, Timings
2: 27th Avenue NE/Spring Lane & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	479	163	886	903	395	262	120	707	389	100	64
Future Volume (vph)	42	479	163	886	903	395	262	120	707	389	100	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		375	400		200	150		0	175		175
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor							1.00				0.99	
Frt		0.962				0.850			0.850		0.942	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3438	0	3467	3574	1599	1787	1881	1599	3467	1761	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1787	3438	0	3467	3574	1599	1782	1881	1599	3467	1761	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27				279			465		20	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1312			609			730			589	
Travel Time (s)		29.8			13.8			16.6			13.4	
Confl. Peds. (#/hr)							3					3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	44	504	172	933	951	416	276	126	744	409	105	67
Shared Lane Traffic (%)												
Lane Group Flow (vph)	44	676	0	933	951	416	276	126	744	409	172	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Detector Phase	5	2		1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0		3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	9.5	38.3		9.5	38.3	38.3	9.5	23.1	23.1	9.5	45.1	
Total Split (s)	20.0	38.3		46.0	60.0	60.0	25.0	25.0	25.0	25.0	45.1	
Total Split (%)	13.0%	24.8%		29.8%	38.9%	38.9%	16.2%	16.2%	16.2%	16.2%	29.2%	
Maximum Green (s)	15.0	32.0		41.0	53.7	53.7	20.0	19.9	19.9	20.0	40.0	
Yellow Time (s)	3.0	4.3		3.0	4.3	4.3	3.0	3.1	3.1	3.0	3.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.3		5.0	6.3	6.3	5.0	5.1	5.1	5.0	5.1	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0	2.5	3.0	3.0	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0					7.0	
Flash Dont Walk (s)		25.0			25.0	25.0					33.0	
Pedestrian Calls (#/hr)		0			0	0					0	
Act Effct Green (s)	8.7	31.5		41.0	65.9	65.9	20.0	40.3	40.3	19.7	40.0	
Actuated g/C Ratio	0.06	0.20		0.27	0.43	0.43	0.13	0.26	0.26	0.13	0.26	
v/c Ratio	0.44	0.93		1.01	0.62	0.49	1.19	0.26	0.98	0.92	0.36	

Lanes, Volumes, Timings
2: 27th Avenue NE/Spring Lane & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	83.1	78.3		87.4	37.4	12.5	175.1	47.0	48.4	92.7	43.6	
Queue Delay	0.0	0.0		0.0	1.3	0.4	0.0	0.0	0.0	0.0	0.0	
Total Delay	83.1	78.3		87.4	38.6	12.9	175.1	47.0	48.4	92.7	43.6	
LOS	F	E		F	D	B	F	D	D	F	D	
Approach Delay		78.6			53.8			78.8			78.1	
Approach LOS		E			D			E			E	
Queue Length 50th (ft)	44	342		~509	398	93	~335	102	357	212	126	
Queue Length 95th (ft)	87	#459		#643	493	200	#525	163	#648	#310	199	
Internal Link Dist (ft)		1232			529			650			509	
Turn Bay Length (ft)	195			400		200	150			175		
Base Capacity (vph)	174	736		923	1529	843	232	492	761	451	473	
Starvation Cap Reductn	0	0		0	346	117	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.25	0.92		1.01	0.80	0.57	1.19	0.26	0.98	0.91	0.36	

Intersection Summary

Area Type: Other
Cycle Length: 154.4
Actuated Cycle Length: 153.9
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.19
Intersection Signal Delay: 66.6 Intersection LOS: E
Intersection Capacity Utilization 109.4% ICU Level of Service H
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: 27th Avenue NE/Spring Lane & 172nd Street NE

2030 Baseline Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
PM Peak-Hour

Lanes, Volumes, Timings
3: 27th Avenue NE & 169th Place NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	13	7	3	12	209	5	355	10	290	395	53
Future Volume (vph)	40	13	7	3	12	209	5	355	10	290	395	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	75		0	200		0	0		135
Storage Lanes	0		0	1		1	1		0	1		1
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
Ped Bike Factor		1.00			1.00		0.99	1.00		1.00		0.96
Frt		0.985				0.850		0.996				0.850
Flt Protected		0.968			0.991		0.950			0.950		
Satd. Flow (prot)	0	1788	0	0	1864	1599	1787	1872	0	1787	1881	1599
Flt Permitted		0.798			0.956		0.521			0.452		
Satd. Flow (perm)	0	1474	0	0	1795	1599	970	1872	0	846	1881	1537
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				218		2				55
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		967			413			725			730	
Travel Time (s)		22.0			9.4			16.5			16.6	
Confl. Peds. (#/hr)			3	3			8		5	5		8
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	42	14	7	3	13	218	5	370	10	302	411	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	63	0	0	16	218	5	380	0	302	411	55
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Detector Phase	4	4		8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	22.5	22.5		26.0	26.0	26.0	9.5	22.5		9.5	26.0	26.0
Total Split (s)	25.0	25.0		25.0	25.0	25.0	20.0	50.0		30.0	50.0	50.0
Total Split (%)	23.8%	23.8%		23.8%	23.8%	23.8%	19.0%	47.6%		28.6%	47.6%	47.6%
Maximum Green (s)	21.0	21.0		21.0	21.0	21.0	16.0	46.0		26.0	46.0	46.0
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	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
Total Lost Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max		None	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)	8.0	8.0		15.0	15.0	15.0		10.0			15.0	15.0
Pedestrian Calls (#/hr)	3	3		3	3	3		13			13	13
Act Effct Green (s)		10.1			10.1	10.1	51.5	46.5		60.1	58.6	58.6
Actuated g/C Ratio		0.13			0.13	0.13	0.66	0.59		0.77	0.75	0.75
v/c Ratio		0.32			0.07	0.55	0.01	0.34		0.40	0.29	0.05

Lanes, Volumes, Timings
3: 27th Avenue NE & 169th Place NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		33.4			30.1	10.3	4.4	10.7		4.8	5.3	2.0
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		33.4			30.1	10.3	4.4	10.7		4.8	5.3	2.0
LOS		C			C	B	A	B		A	A	A
Approach Delay		33.4			11.6			10.6			4.9	
Approach LOS		C			B			B			A	
Queue Length 50th (ft)		26			7	0	1	74		25	36	0
Queue Length 95th (ft)		63			24	57	4	214		95	180	15
Internal Link Dist (ft)		887			333			645			650	
Turn Bay Length (ft)							200					135
Base Capacity (vph)		406			490	594	906	1112		964	1407	1164
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		0.16			0.03	0.37	0.01	0.34		0.31	0.29	0.05

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 78.3
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.55
Intersection Signal Delay: 8.7 Intersection LOS: A
Intersection Capacity Utilization 55.6% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 3: 27th Avenue NE & 169th Place NE

2030 Baseline Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
PM Peak-Hour

Lanes, Volumes, Timings
4: I-5 Southbound Ramps & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1112	612	0	1761	722	0	0	0	338	1	414
Future Volume (vph)	0	1112	612	0	1761	722	0	0	0	338	1	414
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	0		0	350		435
Storage Lanes	0		1	0		1	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor			0.98			0.96						0.99
Frt			0.850			0.850						0.850
Flt Protected										0.950	0.953	
Satd. Flow (prot)	0	3539	1583	0	3539	1583	0	0	0	1681	1686	1583
Flt Permitted										0.950	0.953	
Satd. Flow (perm)	0	3539	1552	0	3539	1523	0	0	0	1681	1686	1562
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			638			752						34
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		609			940			979			1126	
Travel Time (s)		13.8			21.4			22.3			25.6	
Confl. Peds. (#/hr)	8		4	4		8	1					1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	1158	638	0	1834	752	0	0	0	352	1	431
Shared Lane Traffic (%)										50%		
Lane Group Flow (vph)	0	1158	638	0	1834	752	0	0	0	176	177	431
Turn Type		NA	Perm		NA	Perm				Perm	NA	Perm
Protected Phases		2			6						4	
Permitted Phases			2			6				4		4
Detector Phase		2	2		6	6				4	4	4
Switch Phase												
Minimum Initial (s)		7.0	7.0		7.0	7.0				5.0	5.0	5.0
Minimum Split (s)		24.8	24.8		34.1	34.1				33.8	33.8	33.8
Total Split (s)		100.0	100.0		100.0	100.0				30.0	30.0	30.0
Total Split (%)		76.9%	76.9%		76.9%	76.9%				23.1%	23.1%	23.1%
Maximum Green (s)		94.2	94.2		93.9	93.9				24.2	24.2	24.2
Yellow Time (s)		3.8	3.8		4.1	4.1				3.8	3.8	3.8
All-Red Time (s)		2.0	2.0		2.0	2.0				2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0				0.0	0.0	0.0
Total Lost Time (s)		5.8	5.8		6.1	6.1				5.8	5.8	5.8
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		4.0	4.0		4.0	4.0				4.5	4.5	4.5
Recall Mode		None	None		None	None				Max	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0				7.0	7.0	7.0
Flash Dont Walk (s)		12.0	12.0		21.0	21.0				21.0	21.0	21.0
Pedestrian Calls (#/hr)		0	0		0	0				0	0	0
Act Effct Green (s)		94.2	94.2		93.9	93.9				28.0	28.0	28.0
Actuated g/C Ratio		0.70	0.70		0.70	0.70				0.21	0.21	0.21
v/c Ratio		0.46	0.50		0.74	0.58				0.50	0.50	1.22
Control Delay		9.4	1.9		14.7	2.4				52.5	52.5	163.2

Lanes, Volumes, Timings
4: I-5 Southbound Ramps & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.7	0.6		0.7	0.1				0.0	0.0	0.0
Total Delay		10.1	2.5		15.3	2.5				52.5	52.5	163.2
LOS		B	A		B	A				D	D	F
Approach Delay		7.4			11.6						113.3	
Approach LOS		A			B						F	
Queue Length 50th (ft)		211	0		472	0				143	144	~435
Queue Length 95th (ft)		253	33		556	35				224	226	#648
Internal Link Dist (ft)		529			860			899			1046	
Turn Bay Length (ft)			200							350		435
Base Capacity (vph)		2491	1281		2483	1293				351	352	353
Starvation Cap Reductn		888	292		297	71				0	0	0
Spillback Cap Reductn		0	0		0	0				0	0	0
Storage Cap Reductn		0	0		0	0				0	0	0
Reduced v/c Ratio		0.72	0.65		0.84	0.62				0.50	0.50	1.22

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 133.8
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.22
Intersection Signal Delay: 25.6 Intersection LOS: C
Intersection Capacity Utilization 84.3% ICU Level of Service E
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: 4: I-5 Southbound Ramps & 172nd Street NE

2030 Baseline Conditions PM Peak-Hour
Gibson Traffic Consultants, Inc. [BJL #21-190]

Lanes, Volumes, Timings
5: I-5 Northbound Ramps & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	236	1230	0	0	1678	420	758	3	963	0	0	0
Future Volume (vph)	236	1230	0	0	1678	420	758	3	963	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	600		0	0		300	400		0	0		0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00					0.98			0.99			
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1770	3539	0	0	5085	1583	1681	1686	1583	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1768	3539	0	0	5085	1553	1681	1686	1562	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						433			330			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		940			1086			1094			999	
Travel Time (s)		21.4			24.7			24.9			22.7	
Confl. Peds. (#/hr)	3		9	9		3			5	5		
Confl. Bikes (#/hr)			1									
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
Adj. Flow (vph)	243	1268	0	0	1730	433	781	3	993	0	0	0
Shared Lane Traffic (%)							50%					
Lane Group Flow (vph)	243	1268	0	0	1730	433	390	394	993	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Free			
Protected Phases	5	2			6			8				
Permitted Phases						6	8		Free			
Detector Phase	5	2			6	6	8	8				
Switch Phase												
Minimum Initial (s)	5.0	7.0			7.0	7.0	7.0	7.0				
Minimum Split (s)	10.6	24.1			23.8	23.8	40.8	40.8				
Total Split (s)	30.0	90.0			60.0	60.0	30.0	30.0				
Total Split (%)	25.0%	75.0%			50.0%	50.0%	25.0%	25.0%				
Maximum Green (s)	24.4	83.9			54.2	54.2	24.2	24.2				
Yellow Time (s)	3.6	4.1			3.8	3.8	3.8	3.8				
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0				
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0				
Total Lost Time (s)	5.6	6.1			5.8	5.8	5.8	5.8				
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	4.0			4.0	4.0	4.5	4.5				
Recall Mode	None	None			None	None	Max	Max				
Walk Time (s)		7.0			7.0	7.0	7.0	7.0				
Flash Dont Walk (s)		10.0			8.0	8.0	28.0	28.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effct Green (s)	20.9	80.5			54.2	54.2	35.0	35.0	127.4			
Actuated g/C Ratio	0.16	0.63			0.43	0.43	0.27	0.27	1.00			
v/c Ratio	0.84	0.57			0.80	0.48	0.84	0.85	0.64			

Lanes, Volumes, Timings
5: I-5 Northbound Ramps & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	75.7	14.6			35.8	4.1	61.9	62.5	2.0			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	75.7	14.6			35.8	4.1	61.9	62.5	2.0			
LOS	E	B			D	A	E	E	A			
Approach Delay		24.4			29.4			28.6				
Approach LOS		C			C			C				
Queue Length 50th (ft)	197	295			460	0	327	331	0			
Queue Length 95th (ft)	#308	353			535	63	#517	#525	0			
Internal Link Dist (ft)		860			1006			1014			919	
Turn Bay Length (ft)	600					300	400					
Base Capacity (vph)	339	2332			2164	909	462	463	1562			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.72	0.54			0.80	0.48	0.84	0.85	0.64			

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 127.4
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 27.8 Intersection LOS: C
Intersection Capacity Utilization 89.0% 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: 5: I-5 Northbound Ramps & 172nd Street NE

2030 Baseline Conditions PM Peak-Hour
Gibson Traffic Consultants, Inc. [BJL #21-190]

Lanes, Volumes, Timings
6: Smokey Point Boulevard & 156th Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	9	297	14	9	38	258	900	12	17	902	57
Future Volume (vph)	29	9	297	14	9	38	258	900	12	17	902	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	200		0	250		0	200		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
Ped Bike Factor								1.00			1.00	
Frt			0.850		0.878			0.998			0.991	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1635	0	1770	3531	0	1770	3502	0
Flt Permitted	0.633			0.752			0.158			0.307		
Satd. Flow (perm)	1179	1863	1583	1401	1635	0	294	3531	0	572	3502	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			303		39			1			7	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1704			1283			1356			4794	
Travel Time (s)		38.7			29.2			30.8			109.0	
Confl. Peds. (#/hr)							2		1	1		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
Adj. Flow (vph)	30	9	303	14	9	39	263	918	12	17	920	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	30	9	303	14	48	0	263	930	0	17	978	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)	25.0	20.0	20.0	25.0	10.0		20.0	50.0		20.0	50.0	
Total Split (%)	21.7%	17.4%	17.4%	21.7%	8.7%		17.4%	43.5%		17.4%	43.5%	
Maximum Green (s)	20.0	15.0	15.0	20.0	5.0		15.0	45.0		15.0	45.0	
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	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	3.5		2.0	3.5	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	
Flash Dont Walk (s)		13.0	13.0		13.0			13.0			13.0	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	11.3	10.2	10.2	10.3	8.0		48.7	47.0		37.1	29.6	
Actuated g/C Ratio	0.16	0.14	0.14	0.14	0.11		0.68	0.66		0.52	0.42	
v/c Ratio	0.12	0.03	0.62	0.06	0.22		0.54	0.40		0.04	0.67	
Control Delay	28.6	32.8	10.9	28.0	18.5		12.6	8.0		6.4	19.9	

Lanes, Volumes, Timings
6: Smokey Point Boulevard & 156th Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	28.6	32.8	10.9	28.0	18.5		12.6	8.0		6.4	19.9	
LOS	C	C	B	C	B		B	A		A	B	
Approach Delay		13.0			20.7			9.0			19.6	
Approach LOS		B			C			A			B	
Queue Length 50th (ft)	11	3	0	5	3		24	50		1	152	
Queue Length 95th (ft)	38	20	78	23	38		139	247		11	314	
Internal Link Dist (ft)		1624			1203			1276			4714	
Turn Bay Length (ft)	150		150	200			250			200		
Base Capacity (vph)	543	427	596	546	396		532	2567		633	2358	
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	0.06	0.02	0.51	0.03	0.12		0.49	0.36		0.03	0.41	

Intersection Summary

Area Type: Other
Cycle Length: 115
Actuated Cycle Length: 71.3
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 13.9 Intersection LOS: B
Intersection Capacity Utilization 63.5% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 6: Smokey Point Boulevard & 156th Street NE

2030 Baseline Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
PM Peak-Hour

Lanes, Volumes, Timings
7: Smokey Point Boulevard & 152nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	8	23	114	7	339	18	823	158	395	815	10
Future Volume (vph)	18	8	23	114	7	339	18	823	158	395	815	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0	125		0	150		0	200		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	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00				0.99		1.00	1.00			1.00	
Frt		0.887			0.853			0.976			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1652	0	1770	1568	0	1770	3440	0	1770	3531	0
Flt Permitted	0.678			0.406			0.330			0.137		
Satd. Flow (perm)	1262	1652	0	756	1568	0	614	3440	0	255	3531	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			353			21			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		209			5141			1452			1356	
Travel Time (s)		4.8			116.8			33.0			30.8	
Confl. Peds. (#/hr)	1					1	2		2	2		2
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	19	8	24	119	7	353	19	857	165	411	849	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	19	32	0	119	360	0	19	1022	0	411	859	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)	4.0	4.0		4.0	4.0		4.0	7.0		4.0	7.0	
Minimum Split (s)	9.5	27.0		11.5	26.0		9.5	24.0		9.5	26.0	
Total Split (s)	16.0	16.0		16.0	40.0		16.0	50.0		16.0	50.0	
Total Split (%)	13.1%	13.1%		13.1%	32.8%		13.1%	41.0%		13.1%	41.0%	
Maximum Green (s)	11.0	11.0		11.0	35.0		11.0	45.0		11.0	45.0	
Yellow Time (s)	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	
Lost Time Adjust (s)	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	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.5	2.5		2.5	2.5	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		15.0			14.0			12.0			14.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	9.1	6.1		14.3	10.7		33.8	28.1		45.2	41.7	
Actuated g/C Ratio	0.13	0.09		0.20	0.15		0.48	0.40		0.64	0.59	
v/c Ratio	0.09	0.20		0.43	0.67		0.05	0.73		0.98	0.41	
Control Delay	24.9	22.0		29.5	11.5		7.5	21.5		62.1	11.0	

Lanes, Volumes, Timings
7: Smokey Point Boulevard & 152nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.9	22.0		29.5	11.5		7.5	21.5		62.1	11.0	
LOS	C	C		C	B		A	C		E	B	
Approach Delay		23.1			16.0			21.3			27.5	
Approach LOS		C			B			C			C	
Queue Length 50th (ft)	7	3		43	2		3	198		~151	92	
Queue Length 95th (ft)	25	32		101	87		13	314		#415	226	
Internal Link Dist (ft)		129			5061			1372			1276	
Turn Bay Length (ft)	50			125			150			200		
Base Capacity (vph)	360	891		354	1000		542	2364		418	2436	
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	0.05	0.04		0.34	0.36		0.04	0.43		0.98	0.35	

Intersection Summary

Area Type: Other
Cycle Length: 122
Actuated Cycle Length: 70.1
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.98
Intersection Signal Delay: 23.2 Intersection LOS: C
Intersection Capacity Utilization 83.7% ICU Level of Service E
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: 7: Smokey Point Boulevard & 152nd Street NE

2030 Baseline Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
PM Peak-Hour

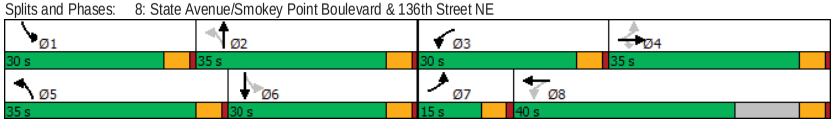
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	183	258	91	181	223	170	120	596	244	176	557	251
Future Volume (vph)	183	258	91	181	223	170	120	596	244	176	557	251
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	200		0	300		0	300		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
Ped Bike Factor			0.99	1.00							0.99	
Frt			0.850		0.935			0.956			0.953	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1845	1568	1752	1725	0	1752	3351	0	1752	3315	0
Flt Permitted	0.204			0.369			0.176			0.123		
Satd. Flow (perm)	376	1845	1547	680	1725	0	325	3351	0	227	3315	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			143		32			44			49	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		981			4740			2821			4424	
Travel Time (s)		22.3			107.7			64.1			100.5	
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)												2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	193	272	96	191	235	179	126	627	257	185	586	264
Shared Lane Traffic (%)												
Lane Group Flow (vph)	193	272	96	191	414	0	126	884	0	185	850	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)	5.0	5.0	5.0	5.0	7.0		5.0	7.0		5.0	7.0	
Minimum Split (s)	10.0	34.0	34.0	10.0	23.0		10.0	35.0		10.0	23.0	
Total Split (s)	15.0	35.0	35.0	30.0	40.0		35.0	35.0		30.0	30.0	
Total Split (%)	11.5%	26.9%	26.9%	23.1%	30.8%		26.9%	26.9%		23.1%	23.1%	
Maximum Green (s)	10.0	30.0	30.0	25.0	35.0		30.0	30.0		25.0	25.0	
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	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Walk Time (s)		8.0	8.0					9.0				
Flash Dont Walk (s)		21.0	21.0					21.0				
Pedestrian Calls (#/hr)		0	0					0				
Act Effct Green (s)	33.7	24.0	24.0	36.9	25.7		39.5	30.4		43.6	32.4	
Actuated g/C Ratio	0.35	0.25	0.25	0.38	0.26		0.41	0.31		0.45	0.33	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.72	0.60	0.20	0.50	0.86		0.48	0.82		0.67	0.75	
Control Delay	36.9	39.2	2.6	23.4	49.9		22.4	38.6		31.5	33.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	36.9	39.2	2.6	23.4	49.9		22.4	38.6		31.5	33.5	
LOS	D	D	A	C	D		C	D		C	C	
Approach Delay		32.1			41.5			36.6			33.2	
Approach LOS		C			D			D			C	
Queue Length 50th (ft)	76	148	0	75	226		43	256		65	232	
Queue Length 95th (ft)	#168	257	14	132	363		88	#441		146	#365	
Internal Link Dist (ft)		901			4660			2741			4344	
Turn Bay Length (ft)	150		150	200			300			300		
Base Capacity (vph)	275	576	581	562	825		601	1077		505	1137	
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	0.70	0.47	0.17	0.34	0.50		0.21	0.82		0.37	0.75	

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 97.2
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 35.6 Intersection LOS: D
Intersection Capacity Utilization 83.0% 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.

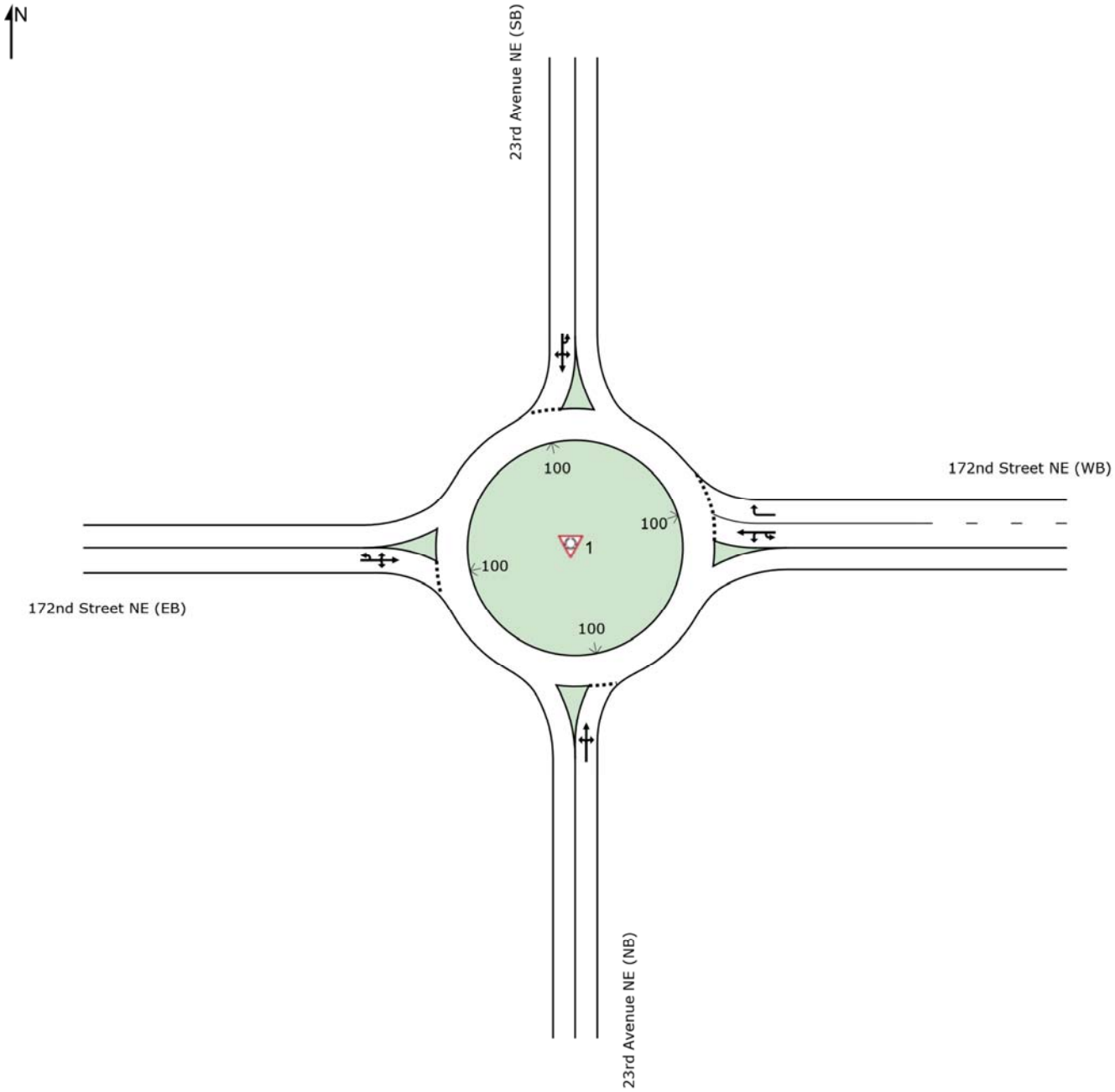
Splits and Phases: 8: State Avenue/Smokey Point Boulevard & 136th Street NE



SITE LAYOUT

Site: 1 [2030 Horizon Conditions - Weekday PM]

172nd Street NE at 23rd Avenue NE
Site Category: PM Peak-Hour
Roundabout



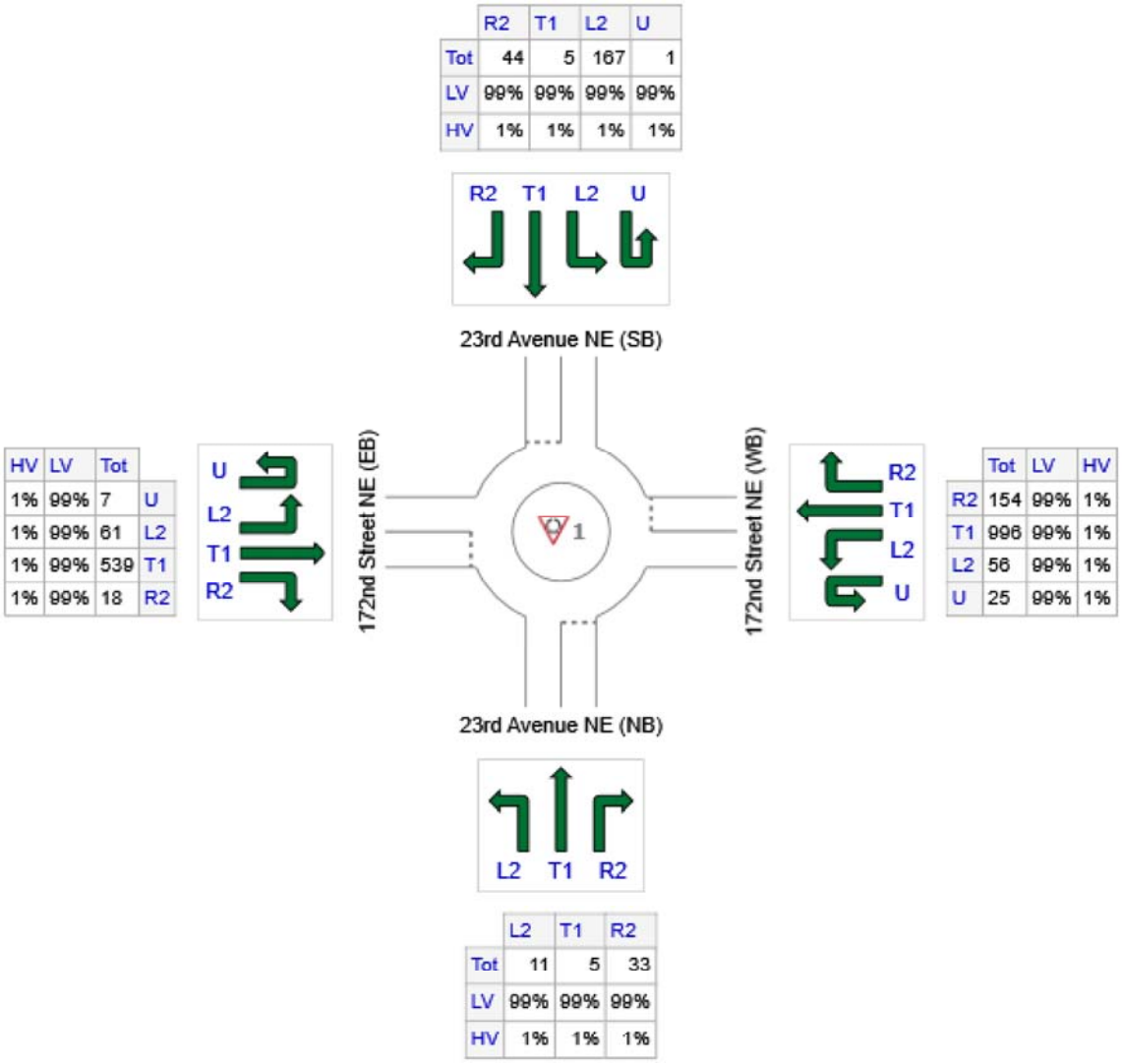
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [2030 Horizon Conditions - Weekday PM]

172nd Street NE at 23rd Avenue NE
Site Category: PM Peak-Hour
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: 23rd Avenue NE (NB)	49	49	0
E: 172nd Street NE (WB)	1231	1219	12
N: 23rd Avenue NE (SB)	217	215	2
W: 172nd Street NE (EB)	625	619	6
Total	2122	2101	21

MOVEMENT SUMMARY

Site: 1 [2030 Horizon Conditions - Weekday PM]

172nd Street NE at 23rd Avenue NE
Site Category: PM Peak-Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 23rd Avenue NE (NB)												
3	L2	12	1.0	0.079	15.1	LOS B	0.5	13.3	0.81	0.75	0.81	34.4
8	T1	5	1.0	0.079	9.1	LOS A	0.5	13.3	0.81	0.75	0.81	34.3
18	R2	35	1.0	0.079	9.2	LOS A	0.5	13.3	0.81	0.75	0.81	33.4
Approach		53	1.0	0.079	10.5	LOS B	0.5	13.3	0.81	0.75	0.81	33.7
East: 172nd Street NE (WB)												
1u	U	27	1.0	0.724	12.9	LOS B	9.1	229.1	0.50	0.45	0.50	37.2
1	L2	60	1.0	0.724	10.5	LOS B	9.1	229.1	0.50	0.45	0.50	36.2
6	T1	1071	1.0	0.724	4.6	LOS A	9.1	229.1	0.50	0.45	0.50	36.1
16	R2	166	1.0	0.149	4.6	LOS A	0.8	20.1	0.28	0.48	0.28	36.0
Approach		1324	1.0	0.724	5.0	LOS A	9.1	229.1	0.48	0.46	0.48	36.1
North: 23rd Avenue NE (SB)												
7u	U	1	1.0	0.497	28.2	LOS C	4.6	115.5	1.00	1.10	1.27	29.2
7	L2	180	1.0	0.497	25.8	LOS C	4.6	115.5	1.00	1.10	1.27	28.6
4	T1	5	1.0	0.497	19.8	LOS B	4.6	115.5	1.00	1.10	1.27	28.5
14	R2	47	1.0	0.497	19.9	LOS B	4.6	115.5	1.00	1.10	1.27	27.9
Approach		233	1.0	0.497	24.4	LOS C	4.6	115.5	1.00	1.10	1.27	28.4
West: 172nd Street NE (EB)												
5u	U	8	1.0	0.576	13.9	LOS B	4.7	118.5	0.65	0.58	0.65	36.6
5	L2	66	1.0	0.576	11.5	LOS B	4.7	118.5	0.65	0.58	0.65	35.7
2	T1	580	1.0	0.576	5.5	LOS A	4.7	118.5	0.65	0.58	0.65	35.6
12	R2	19	1.0	0.576	5.6	LOS A	4.7	118.5	0.65	0.58	0.65	34.5
Approach		672	1.0	0.576	6.2	LOS A	4.7	118.5	0.65	0.58	0.65	35.6
All Vehicles		2282	1.0	0.724	7.5	LOS A	9.1	229.1	0.59	0.57	0.62	34.9

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lanes, Volumes, Timings
2: 27th Avenue NE/Spring Lane & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	512	163	886	959	395	262	120	707	389	100	64
Future Volume (vph)	42	512	163	886	959	395	262	120	707	389	100	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		375	400		200	150		0	175		175
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor							1.00				0.99	
Frt		0.964				0.850			0.850		0.942	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3446	0	3467	3574	1599	1787	1881	1599	3467	1761	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1787	3446	0	3467	3574	1599	1782	1881	1599	3467	1761	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25				263			461		20	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1312			609			730			589	
Travel Time (s)		29.8			13.8			16.6			13.4	
Confl. Peds. (#/hr)							3					3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	44	539	172	933	1009	416	276	126	744	409	105	67
Shared Lane Traffic (%)												
Lane Group Flow (vph)	44	711	0	933	1009	416	276	126	744	409	172	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Detector Phase	5	2		1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0		3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	9.5	38.3		9.5	38.3	38.3	9.5	23.1	23.1	9.5	45.1	
Total Split (s)	20.0	38.3		46.0	60.0	60.0	25.0	25.0	25.0	25.0	45.1	
Total Split (%)	13.0%	24.8%		29.8%	38.9%	38.9%	16.2%	16.2%	16.2%	16.2%	29.2%	
Maximum Green (s)	15.0	32.0		41.0	53.7	53.7	20.0	19.9	19.9	20.0	40.0	
Yellow Time (s)	3.0	4.3		3.0	4.3	4.3	3.0	3.1	3.1	3.0	3.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.3		5.0	6.3	6.3	5.0	5.1	5.1	5.0	5.1	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0	2.5	3.0	3.0	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0					7.0	
Flash Dont Walk (s)		25.0			25.0	25.0					33.0	
Pedestrian Calls (#/hr)		0			0	0					0	
Act Effct Green (s)	8.7	32.0		41.0	66.4	66.4	20.0	40.2	40.2	19.8	40.0	
Actuated g/C Ratio	0.06	0.21		0.27	0.43	0.43	0.13	0.26	0.26	0.13	0.26	
v/c Ratio	0.44	0.97		1.01	0.66	0.50	1.19	0.26	0.98	0.92	0.37	

Lanes, Volumes, Timings
2: 27th Avenue NE/Spring Lane & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	83.1	84.3		88.5	38.4	13.8	176.7	47.1	50.1	93.1	43.8	
Queue Delay	0.0	0.0		0.0	1.7	0.4	0.0	0.0	0.0	0.0	0.0	
Total Delay	83.1	84.3		88.5	40.1	14.2	176.7	47.1	50.1	93.1	43.8	
LOS	F	F		F	D	B	F	D	D	F	D	
Approach Delay		84.3			54.7			80.2			78.5	
Approach LOS		F			D			F			E	
Queue Length 50th (ft)	44	367		~509	432	106	~335	102	363	212	126	
Queue Length 95th (ft)	87	#500		#643	532	215	#525	163	#655	#310	199	
Internal Link Dist (ft)		1232			529			650			509	
Turn Bay Length (ft)	195			400		200	150			175		
Base Capacity (vph)	173	734		920	1536	837	231	490	757	449	471	
Starvation Cap Reductn	0	0		0	338	117	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.25	0.97		1.01	0.84	0.58	1.19	0.26	0.98	0.91	0.37	

Intersection Summary

Area Type: Other
Cycle Length: 154.4
Actuated Cycle Length: 154.4
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.19
Intersection Signal Delay: 68.2 Intersection LOS: E
Intersection Capacity Utilization 110.3% ICU Level of Service H
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: 27th Avenue NE/Spring Lane & 172nd Street NE

2030 Horizon Conditions PM Peak-Hour
Gibson Traffic Consultants, Inc. [BJL #21-190]

Lanes, Volumes, Timings
3: 27th Avenue NE & 169th Place NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	23	7	3	29	209	5	355	10	290	395	53
Future Volume (vph)	40	23	7	3	29	209	5	355	10	290	395	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	75		0	200		0	0		135
Storage Lanes	0		0	1		1	1		0	1		1
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
Ped Bike Factor		1.00			1.00		0.99	1.00		1.00		0.96
Frt		0.987				0.850		0.996				0.850
Flt Protected		0.972			0.995		0.950			0.950		
Satd. Flow (prot)	0	1800	0	0	1872	1599	1787	1872	0	1787	1881	1599
Flt Permitted		0.813			0.977		0.521			0.451		
Satd. Flow (perm)	0	1505	0	0	1836	1599	970	1872	0	844	1881	1537
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				218		2				55
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		967			413			725			730	
Travel Time (s)		22.0			9.4			16.5			16.6	
Confl. Peds. (#/hr)			3	3			8		5	5		8
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	42	24	7	3	30	218	5	370	10	302	411	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	73	0	0	33	218	5	380	0	302	411	55
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Detector Phase	4	4		8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	22.5	22.5		26.0	26.0	26.0	9.5	22.5		9.5	26.0	26.0
Total Split (s)	25.0	25.0		25.0	25.0	25.0	20.0	50.0		30.0	50.0	50.0
Total Split (%)	23.8%	23.8%		23.8%	23.8%	23.8%	19.0%	47.6%		28.6%	47.6%	47.6%
Maximum Green (s)	21.0	21.0		21.0	21.0	21.0	16.0	46.0		26.0	46.0	46.0
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	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
Total Lost Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max		None	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)	8.0	8.0		15.0	15.0	15.0		10.0			15.0	15.0
Pedestrian Calls (#/hr)	3	3		3	3	3		13			13	13
Act Effct Green (s)		10.3			10.3	10.3	51.5	46.5		60.1	58.6	58.6
Actuated g/C Ratio		0.13			0.13	0.13	0.66	0.59		0.77	0.75	0.75
v/c Ratio		0.36			0.14	0.55	0.01	0.34		0.40	0.29	0.05

Lanes, Volumes, Timings
3: 27th Avenue NE & 169th Place NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		34.4			31.1	10.2	4.4	10.8		4.9	5.4	2.0
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		34.4			31.1	10.2	4.4	10.8		4.9	5.4	2.0
LOS		C			C	B	A	B		A	A	A
Approach Delay		34.4			12.9			10.7			4.9	
Approach LOS		C			B			B			A	
Queue Length 50th (ft)		30			14	0	1	76		26	38	0
Queue Length 95th (ft)		71			40	57	4	214		95	180	15
Internal Link Dist (ft)		887			333			645			650	
Turn Bay Length (ft)							200					135
Base Capacity (vph)		413			499	593	904	1108		961	1403	1161
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		0.18			0.07	0.37	0.01	0.34		0.31	0.29	0.05

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 78.5
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.55
Intersection Signal Delay: 9.3 Intersection LOS: A
Intersection Capacity Utilization 56.1% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 3: 27th Avenue NE & 169th Place NE

2030 Horizon Conditions PM Peak-Hour
Gibson Traffic Consultants, Inc. [BJL #21-190]

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1145	612	0	1792	722	0	0	0	338	1	439
Future Volume (vph)	0	1145	612	0	1792	722	0	0	0	338	1	439
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	0		0	0		0	350		435
Storage Lanes	0		1	0		1	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor			0.98			0.96						0.99
Frt			0.850			0.850						0.850
Flt Protected										0.950	0.953	
Satd. Flow (prot)	0	3539	1583	0	3539	1583	0	0	0	1681	1686	1583
Flt Permitted										0.950	0.953	
Satd. Flow (perm)	0	3539	1552	0	3539	1523	0	0	0	1681	1686	1562
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			638			752						32
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		609			940			979			1126	
Travel Time (s)		13.8			21.4			22.3			25.6	
Confl. Peds. (#/hr)	8		4	4		8	1					1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	1193	638	0	1867	752	0	0	0	352	1	457
Shared Lane Traffic (%)										50%		
Lane Group Flow (vph)	0	1193	638	0	1867	752	0	0	0	176	177	457
Turn Type		NA	Perm		NA	Perm				Perm	NA	Perm
Protected Phases		2			6						4	
Permitted Phases			2			6				4		4
Detector Phase		2	2		6	6				4	4	4
Switch Phase												
Minimum Initial (s)		7.0	7.0		7.0	7.0				5.0	5.0	5.0
Minimum Split (s)		24.8	24.8		34.1	34.1				33.8	33.8	33.8
Total Split (s)		100.0	100.0		100.0	100.0				30.0	30.0	30.0
Total Split (%)		76.9%	76.9%		76.9%	76.9%				23.1%	23.1%	23.1%
Maximum Green (s)		94.2	94.2		93.9	93.9				24.2	24.2	24.2
Yellow Time (s)		3.8	3.8		4.1	4.1				3.8	3.8	3.8
All-Red Time (s)		2.0	2.0		2.0	2.0				2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0				0.0	0.0	0.0
Total Lost Time (s)		5.8	5.8		6.1	6.1				5.8	5.8	5.8
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		4.0	4.0		4.0	4.0				4.5	4.5	4.5
Recall Mode		None	None		None	None				Max	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0				7.0	7.0	7.0
Flash Dont Walk (s)		12.0	12.0		21.0	21.0				21.0	21.0	21.0
Pedestrian Calls (#/hr)		0	0		0	0				0	0	0
Act Effct Green (s)		94.2	94.2		93.9	93.9				28.0	28.0	28.0
Actuated g/C Ratio		0.70	0.70		0.70	0.70				0.21	0.21	0.21
v/c Ratio		0.48	0.50		0.75	0.58				0.50	0.50	1.30
Control Delay		9.6	1.9		15.1	2.4				52.5	52.5	192.7

Lanes, Volumes, Timings
4: I-5 Southbound Ramps & 172nd Street NE 10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.7	0.6		0.7	0.1				0.0	0.0	0.0
Total Delay		10.3	2.5		15.8	2.5				52.5	52.5	192.7
LOS		B	A		B	A				D	D	F
Approach Delay		7.6			12.0						131.6	
Approach LOS		A			B						F	
Queue Length 50th (ft)		221	0		489	0				143	144	~486
Queue Length 95th (ft)		265	33		577	35				224	226	#702
Internal Link Dist (ft)		529			860			899			1046	
Turn Bay Length (ft)			200							350		435
Base Capacity (vph)		2491	1281		2483	1293				351	352	352
Starvation Cap Reductn		873	292		291	71				0	0	0
Spillback Cap Reductn		0	0		0	0				0	0	0
Storage Cap Reductn		0	0		0	0				0	0	0
Reduced v/c Ratio		0.74	0.65		0.85	0.62				0.50	0.50	1.30

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 133.8
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.30
Intersection Signal Delay: 28.9 Intersection LOS: C
Intersection Capacity Utilization 86.7% ICU Level of Service E
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: 4: I-5 Southbound Ramps & 172nd Street NE

2030 Horizon Conditions PM Peak-Hour
Gibson Traffic Consultants, Inc. [BJL #21-190]

Lanes, Volumes, Timings
5: I-5 Northbound Ramps & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	251	1248	0	0	1709	420	758	3	963	0	0	0
Future Volume (vph)	251	1248	0	0	1709	420	758	3	963	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	600		0	0		300	400		0	0		0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00					0.98			0.99			
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.953				
Satd. Flow (prot)	1770	3539	0	0	5085	1583	1681	1686	1583	0	0	0
Flt Permitted	0.950						0.950	0.953				
Satd. Flow (perm)	1769	3539	0	0	5085	1553	1681	1686	1562	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						433			327			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		940			1086			1094			999	
Travel Time (s)		21.4			24.7			24.9			22.7	
Confl. Peds. (#/hr)	3		9	9		3			5	5		
Confl. Bikes (#/hr)			1									
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
Adj. Flow (vph)	259	1287	0	0	1762	433	781	3	993	0	0	0
Shared Lane Traffic (%)							50%					
Lane Group Flow (vph)	259	1287	0	0	1762	433	390	394	993	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Free			
Protected Phases	5	2			6			8				
Permitted Phases						6	8		Free			
Detector Phase	5	2			6	6	8	8				
Switch Phase												
Minimum Initial (s)	5.0	7.0			7.0	7.0	7.0	7.0				
Minimum Split (s)	10.6	24.1			23.8	23.8	40.8	40.8				
Total Split (s)	30.0	90.0			60.0	60.0	30.0	30.0				
Total Split (%)	25.0%	75.0%			50.0%	50.0%	25.0%	25.0%				
Maximum Green (s)	24.4	83.9			54.2	54.2	24.2	24.2				
Yellow Time (s)	3.6	4.1			3.8	3.8	3.8	3.8				
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0				
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0				
Total Lost Time (s)	5.6	6.1			5.8	5.8	5.8	5.8				
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Vehicle Extension (s)	3.0	4.0			4.0	4.0	4.5	4.5				
Recall Mode	None	None			None	None	Max	Max				
Walk Time (s)		7.0			7.0	7.0	7.0	7.0				
Flash Dont Walk (s)		10.0			8.0	8.0	28.0	28.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effct Green (s)	21.8	81.3			54.3	54.3	35.0	35.0	128.3			
Actuated g/C Ratio	0.17	0.63			0.42	0.42	0.27	0.27	1.00			
v/c Ratio	0.86	0.57			0.82	0.48	0.85	0.86	0.64			

Lanes, Volumes, Timings
5: I-5 Northbound Ramps & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	78.2	14.7			37.0	4.1	63.0	63.5	2.0			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	78.2	14.7			37.0	4.1	63.0	63.5	2.0			
LOS	E	B			D	A	E	E	A			
Approach Delay		25.3			30.5			29.0				
Approach LOS		C			C			C				
Queue Length 50th (ft)	212	302			484	0	333	337	0			
Queue Length 95th (ft)	#340	361			550	63	#517	#525	0			
Internal Link Dist (ft)		860			1006			1014			919	
Turn Bay Length (ft)	600					300	400					
Base Capacity (vph)	337	2316			2150	906	458	460	1562			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.77	0.56			0.82	0.48	0.85	0.86	0.64			

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 128.3
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 28.6 Intersection LOS: C
Intersection Capacity Utilization 90.4% 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: 5: I-5 Northbound Ramps & 172nd Street NE

2030 Horizon Conditions PM Peak-Hour
Gibson Traffic Consultants, Inc. [BJL #21-190]

Lanes, Volumes, Timings
6: Smokey Point Boulevard & 156th Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	17	312	14	22	38	284	900	12	17	902	62
Future Volume (vph)	32	17	312	14	22	38	284	900	12	17	902	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	200		0	250		0	200		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
Ped Bike Factor								1.00			1.00	
Frt			0.850		0.904			0.998			0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1684	0	1770	3531	0	1770	3498	0
Flt Permitted	0.553			0.746			0.148			0.307		
Satd. Flow (perm)	1030	1863	1583	1390	1684	0	276	3531	0	572	3498	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			318		39			1			7	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1704			1283			1356			4794	
Travel Time (s)		38.7			29.2			30.8			109.0	
Confl. Peds. (#/hr)							2		1	1		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
Adj. Flow (vph)	33	17	318	14	22	39	290	918	12	17	920	63
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	17	318	14	61	0	290	930	0	17	983	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)	25.0	20.0	20.0	25.0	10.0		20.0	50.0		20.0	50.0	
Total Split (%)	21.7%	17.4%	17.4%	21.7%	8.7%		17.4%	43.5%		17.4%	43.5%	
Maximum Green (s)	20.0	15.0	15.0	20.0	5.0		15.0	45.0		15.0	45.0	
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	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	3.5		2.0	3.5	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	
Flash Dont Walk (s)		13.0	13.0		13.0			13.0			13.0	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	13.4	12.3	12.3	11.3	7.6		50.1	48.4		37.4	30.0	
Actuated g/C Ratio	0.18	0.16	0.16	0.15	0.10		0.67	0.65		0.50	0.40	
v/c Ratio	0.13	0.06	0.61	0.06	0.29		0.60	0.41		0.04	0.70	
Control Delay	28.0	32.1	9.9	27.4	23.1		16.9	8.7		6.9	21.9	

Lanes, Volumes, Timings
6: Smokey Point Boulevard & 156th Street NE

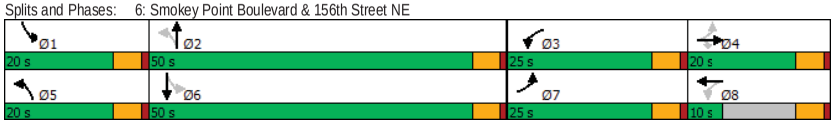
10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	28.0	32.1	9.9	27.4	23.1		16.9	8.7		6.9	21.9	
LOS	C	C	A	C	C		B	A		A	C	
Approach Delay		12.6			23.9			10.7			21.6	
Approach LOS		B			C			B			C	
Queue Length 50th (ft)	13	6	0	5	10		55	96		3	203	
Queue Length 95th (ft)	40	30	80	23	51		#192	250		11	318	
Internal Link Dist (ft)		1624			1203			1276			4714	
Turn Bay Length (ft)	150		150	200			250			200		
Base Capacity (vph)	513	413	598	518	387		501	2433		604	2227	
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	0.06	0.04	0.53	0.03	0.16		0.58	0.38		0.03	0.44	

Intersection Summary

Area Type: Other
Cycle Length: 115
Actuated Cycle Length: 74.7
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 15.4 Intersection LOS: B
Intersection Capacity Utilization 64.6% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Smokey Point Boulevard & 156th Street NE



2030 Horizon Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
PM Peak-Hour

Lanes, Volumes, Timings
7: Smokey Point Boulevard & 152nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	8	23	114	7	339	18	849	158	395	830	10
Future Volume (vph)	18	8	23	114	7	339	18	849	158	395	830	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0	125		0	150		0	200		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	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00				0.99			1.00			1.00	
Frt		0.887			0.853			0.976			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1652	0	1770	1568	0	1770	3440	0	1770	3531	0
Flt Permitted	0.870			0.417			0.324			0.129		
Satd. Flow (perm)	1620	1652	0	777	1568	0	604	3440	0	240	3531	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			353			20			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		209			5141			1452			1356	
Travel Time (s)		4.8			116.8			33.0			30.8	
Confl. Peds. (#/hr)	1					1	2		2	2		2
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	19	8	24	119	7	353	19	884	165	411	865	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	19	32	0	119	360	0	19	1049	0	411	875	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)	4.0	4.0		4.0	4.0		4.0	7.0		4.0	7.0	
Minimum Split (s)	9.5	27.0		11.5	26.0		9.5	24.0		9.5	26.0	
Total Split (s)	16.0	16.0		16.0	40.0		16.0	50.0		16.0	50.0	
Total Split (%)	13.1%	13.1%		13.1%	32.8%		13.1%	41.0%		13.1%	41.0%	
Maximum Green (s)	11.0	11.0		11.0	35.0		11.0	45.0		11.0	45.0	
Yellow Time (s)	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	
Lost Time Adjust (s)	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	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.5	2.5		2.5	2.5	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		15.0			14.0			12.0			14.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	9.1	6.1		14.4	11.0		34.6	28.8		45.9	42.4	
Actuated g/C Ratio	0.13	0.09		0.20	0.15		0.49	0.41		0.65	0.60	
v/c Ratio	0.09	0.20		0.43	0.67		0.05	0.75		1.01	0.42	
Control Delay	25.3	22.3		30.0	11.4		7.4	21.8		70.1	10.9	

Lanes, Volumes, Timings
7: Smokey Point Boulevard & 152nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	25.3	22.3		30.0	11.4		7.4	21.8		70.1	10.9	
LOS	C	C		C	B		A	C		E	B	
Approach Delay		23.4			16.0			21.6			29.9	
Approach LOS		C			B			C			C	
Queue Length 50th (ft)	7	4		44	2		3	207		~161	95	
Queue Length 95th (ft)	26	32		103	88		13	326		#430	231	
Internal Link Dist (ft)		129			5061			1372			1276	
Turn Bay Length (ft)	50			125			150			200		
Base Capacity (vph)	373	877		351	990		536	2325		407	2410	
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	0.05	0.04		0.34	0.36		0.04	0.45		1.01	0.36	

Intersection Summary

Area Type: Other
Cycle Length: 122
Actuated Cycle Length: 71.1
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 24.4 Intersection LOS: C
Intersection Capacity Utilization 84.4% ICU Level of Service E
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: 7: Smokey Point Boulevard & 152nd Street NE

2030 Horizon Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
PM Peak-Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	189	258	91	181	223	177	120	609	244	180	564	255
Future Volume (vph)	189	258	91	181	223	177	120	609	244	180	564	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	200		0	300		0	300		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
Ped Bike Factor			0.99	1.00							0.99	
Frt			0.850		0.934			0.957			0.953	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1845	1568	1752	1723	0	1752	3354	0	1752	3315	0
Flt Permitted	0.195			0.374			0.170			0.123		
Satd. Flow (perm)	360	1845	1547	689	1723	0	314	3354	0	227	3315	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			143		34			43			49	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		981			4740			2821			4424	
Travel Time (s)		22.3			107.7			64.1			100.5	
Confl. Peds. (#/hr)			1	1								
Confl. Bikes (#/hr)												2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	199	272	96	191	235	186	126	641	257	189	594	268
Shared Lane Traffic (%)												
Lane Group Flow (vph)	199	272	96	191	421	0	126	898	0	189	862	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)	5.0	5.0	5.0	5.0	7.0		5.0	7.0		5.0	7.0	
Minimum Split (s)	10.0	34.0	34.0	10.0	23.0		10.0	35.0		10.0	23.0	
Total Split (s)	15.0	35.0	35.0	30.0	40.0		35.0	35.0		30.0	30.0	
Total Split (%)	11.5%	26.9%	26.9%	23.1%	30.8%		26.9%	26.9%		23.1%	23.1%	
Maximum Green (s)	10.0	30.0	30.0	25.0	35.0		30.0	30.0		25.0	25.0	
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	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Walk Time (s)		8.0	8.0					9.0				
Flash Dont Walk (s)		21.0	21.0					21.0				
Pedestrian Calls (#/hr)		0	0					0				
Act Effct Green (s)	34.2	24.4	24.4	37.3	26.1		39.5	30.4		43.9	32.5	
Actuated g/C Ratio	0.35	0.25	0.25	0.38	0.27		0.40	0.31		0.45	0.33	

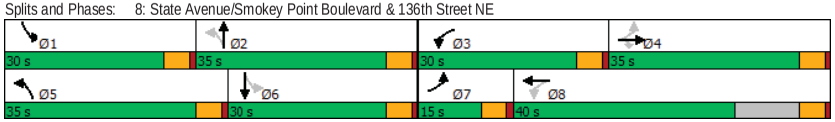
Lanes, Volumes, Timings
8: State Avenue/Smokey Point Boulevard & 136th Street NE 10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.75	0.59	0.19	0.49	0.87		0.48	0.84		0.68	0.76	
Control Delay	39.6	39.0	2.5	23.3	50.4		22.9	40.0		32.3	34.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	39.6	39.0	2.5	23.3	50.4		22.9	40.0		32.3	34.2	
LOS	D	D	A	C	D		C	D		C	C	
Approach Delay		33.0			42.0			37.9			33.9	
Approach LOS		C			D			D			C	
Queue Length 50th (ft)	79	148	0	75	231		43	265		68	239	
Queue Length 95th (ft)	#185	257	14	132	370		88	#453		150	#378	
Internal Link Dist (ft)		901			4660			2741			4344	
Turn Bay Length (ft)	150		150	200			300			300		
Base Capacity (vph)	271	572	578	563	820		596	1070		502	1135	
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	0.73	0.48	0.17	0.34	0.51		0.21	0.84		0.38	0.76	

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 97.8
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 36.5 Intersection LOS: D
Intersection Capacity Utilization 84.3% 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: 8: State Avenue/Smokey Point Boulevard & 136th Street NE



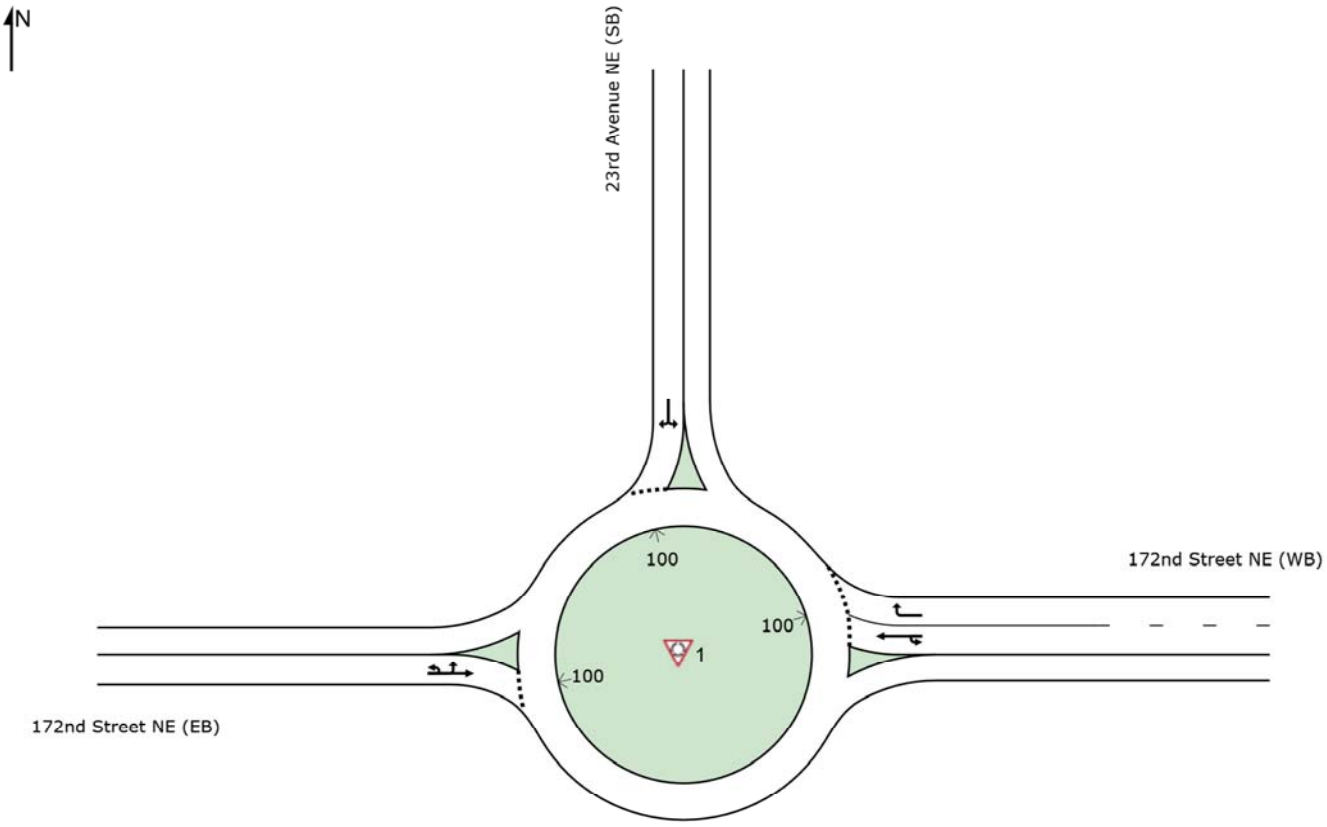
2030 Horizon Conditions PM Peak-Hour
Gibson Traffic Consultants, Inc. [BJL #21-190]

Saturday Peak-Hour Level of Service Calculations

SITE LAYOUT

Site: 1 [2021 Existing Conditions - Saturday]

172nd Street NE at 23rd Avenue NE
Site Category: Saturday Peak-Hour
Roundabout



Organisation: GIBSON TRAFFIC CONSULTANTS | Created: Wednesday, August 18, 2021 7:27:42 AM
Project: H:\2021\21-190\Sidra\#1 - 172nd St NE at 23rd Ave NE.sip8

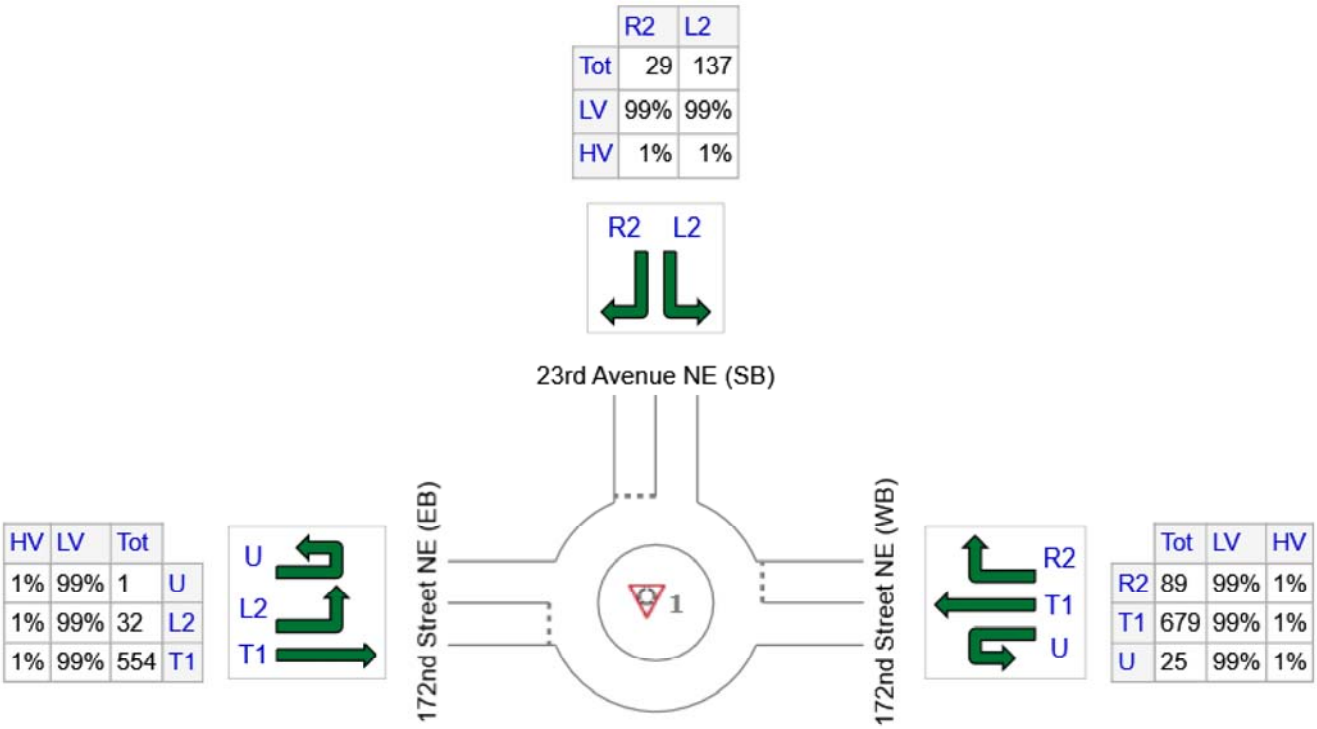
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [2021 Existing Conditions - Saturday]

172nd Street NE at 23rd Avenue NE
Site Category: Saturday Peak-Hour
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: 172nd Street NE (WB)	793	785	8
N: 23rd Avenue NE (SB)	166	164	2
W: 172nd Street NE (EB)	587	581	6
Total	1546	1531	15

Organisation: GIBSON TRAFFIC CONSULTANTS | Created: Wednesday, August 18, 2021 7:27:51 AM
Project: H:\2021\21-190\Sidra\#1 - 172nd St NE at 23rd Ave NE.sip8

MOVEMENT SUMMARY

Site: 1 [2021 Existing Conditions - Saturday]

172nd Street NE at 23rd Avenue NE
Site Category: Saturday Peak-Hour
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: 172nd Street NE (WB)												
1u	U	27	1.0	0.459	12.4	LOS B	3.8	95.1	0.20	0.38	0.20	38.4
6	T1	738	1.0	0.459	4.0	LOS A	3.8	95.1	0.20	0.38	0.20	37.3
16	R2	97	1.0	0.082	4.3	LOS A	0.4	10.6	0.16	0.45	0.16	36.3
Approach		862	1.0	0.459	4.3	LOS A	3.8	95.1	0.20	0.39	0.20	37.2
North: 23rd Avenue NE (SB)												
7	L2	149	1.0	0.210	13.9	LOS B	1.3	31.9	0.70	0.80	0.70	33.4
14	R2	32	1.0	0.210	8.0	LOS A	1.3	31.9	0.70	0.80	0.70	32.4
Approach		180	1.0	0.210	12.9	LOS B	1.3	31.9	0.70	0.80	0.70	33.2
West: 172nd Street NE (EB)												
5u	U	1	1.0	0.505	13.2	LOS B	3.9	97.4	0.49	0.50	0.49	37.3
5	L2	35	1.0	0.505	10.8	LOS B	3.9	97.4	0.49	0.50	0.49	36.3
2	T1	602	1.0	0.505	4.9	LOS A	3.9	97.4	0.49	0.50	0.49	36.2
Approach		638	1.0	0.505	5.2	LOS A	3.9	97.4	0.49	0.50	0.49	36.2
All Vehicles		1680	1.0	0.505	5.5	LOS A	3.9	97.4	0.36	0.48	0.36	36.4

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lanes, Volumes, Timings
2: 27th Avenue NE/Spring Lane & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	493	204	812	538	332	180	98	673	299	107	25
Future Volume (vph)	51	493	204	812	538	332	180	98	673	299	107	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		375	400		200	150		0	175		175
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor	1.00	0.99		0.99		0.98	1.00				1.00	
Frt		0.956				0.850			0.850		0.971	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3396	0	3467	3574	1599	1787	1881	1599	3467	1820	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1783	3396	0	3449	3574	1559	1779	1881	1599	3467	1820	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37				342			470		7	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1312			609			730			589	
Travel Time (s)		29.8			13.8			16.6			13.4	
Confl. Peds. (#/hr)	2		6	6		2	5					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 (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	53	508	210	837	555	342	186	101	694	308	110	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	53	718	0	837	555	342	186	101	694	308	136	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Detector Phase	5	2		1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0		3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	9.5	38.3		9.5	38.3	38.3	9.5	23.1	23.1	9.5	45.1	
Total Split (s)	20.0	38.3		46.0	60.0	60.0	25.0	25.0	25.0	25.0	45.1	
Total Split (%)	13.0%	24.8%		29.8%	38.9%	38.9%	16.2%	16.2%	16.2%	16.2%	29.2%	
Maximum Green (s)	15.0	32.0		41.0	53.7	53.7	20.0	19.9	19.9	20.0	40.0	
Yellow Time (s)	3.0	4.3		3.0	4.3	4.3	3.0	3.1	3.1	3.0	3.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.3		5.0	6.3	6.3	5.0	5.1	5.1	5.0	5.1	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0	2.5	3.0	3.0	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0					7.0	
Flash Dont Walk (s)		25.0			25.0	25.0					33.0	
Pedestrian Calls (#/hr)		0			0	0					0	
Act Effct Green (s)	9.4	32.0		38.8	63.7	63.7	18.3	40.9	40.9	17.5	40.1	
Actuated g/C Ratio	0.06	0.21		0.26	0.42	0.42	0.12	0.27	0.27	0.12	0.27	
v/c Ratio	0.48	0.96		0.94	0.37	0.40	0.86	0.20	0.89	0.77	0.28	

Lanes, Volumes, Timings
2: 27th Avenue NE/Spring Lane & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	83.0	79.0		73.2	31.8	4.3	97.9	44.8	32.1	78.1	44.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	83.0	79.0		73.2	31.8	4.3	97.9	44.8	32.1	78.1	44.3	
LOS	F	E		E	C	A	F	D	C	E	D	
Approach Delay		79.3			46.4			45.9			67.7	
Approach LOS		E			D			D			E	
Queue Length 50th (ft)	53	366		424	204	0	185	79	259	157	105	
Queue Length 95th (ft)	99	#503		#538	266	64	#312	134	#530	209	169	
Internal Link Dist (ft)		1232			529			650			509	
Turn Bay Length (ft)	195			400		200	150			175		
Base Capacity (vph)	178	751		944	1511	856	237	511	776	461	489	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.30	0.96		0.89	0.37	0.40	0.78	0.20	0.89	0.67	0.28	

Intersection Summary

Area Type: Other
Cycle Length: 154.4
Actuated Cycle Length: 150.6
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 55.1 Intersection LOS: E
Intersection Capacity Utilization 105.8% ICU Level of Service G
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: 27th Avenue NE/Spring Lane & 172nd Street NE

2021 Existing Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
Saturday Peak-Hour

Lanes, Volumes, Timings
3: 27th Avenue NE & 169th Place NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	11	3	6	9	153	2	330	3	338	439	36
Future Volume (vph)	39	11	3	6	9	153	2	330	3	338	439	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	75		0	200		0	0		135
Storage Lanes	0		0	1		1	1		0	1		1
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
Ped Bike Factor							1.00					0.97
Frt		0.993				0.850		0.999				0.850
Flt Protected		0.964			0.980		0.950			0.950		
Satd. Flow (prot)	0	1801	0	0	1844	1599	1787	1879	0	1787	1881	1599
Flt Permitted		0.780			0.899		0.490			0.462		
Satd. Flow (perm)	0	1457	0	0	1691	1599	918	1879	0	869	1881	1552
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				166		1				52
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		967			413			725			730	
Travel Time (s)		22.0			9.4			16.5			16.6	
Confl. Peds. (#/hr)							4					4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	42	12	3	7	10	166	2	359	3	367	477	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	57	0	0	17	166	2	362	0	367	477	39
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Detector Phase	4	4		8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	22.5	22.5		26.0	26.0	26.0	9.5	22.5		9.5	26.0	26.0
Total Split (s)	25.0	25.0		25.0	25.0	25.0	20.0	50.0		30.0	50.0	50.0
Total Split (%)	23.8%	23.8%		23.8%	23.8%	23.8%	19.0%	47.6%		28.6%	47.6%	47.6%
Maximum Green (s)	21.0	21.0		21.0	21.0	21.0	16.0	46.0		26.0	46.0	46.0
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	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
Total Lost Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max		None	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)	8.0	8.0		15.0	15.0	15.0		10.0			15.0	15.0
Pedestrian Calls (#/hr)	3	3		3	3	3		13			13	13
Act Effct Green (s)		10.1			10.1	10.1	51.6	46.5		61.2	59.8	59.8
Actuated g/C Ratio		0.13			0.13	0.13	0.65	0.59		0.77	0.75	0.75
v/c Ratio		0.31			0.08	0.48	0.00	0.33		0.46	0.34	0.03

Lanes, Volumes, Timings
3: 27th Avenue NE & 169th Place NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		35.1			31.2	10.3	4.5	11.2		5.3	5.5	1.6
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		35.1			31.2	10.3	4.5	11.2		5.3	5.5	1.6
LOS		D			C	B	A	B		A	A	A
Approach Delay		35.1			12.2			11.1			5.2	
Approach LOS		D			B			B			A	
Queue Length 50th (ft)		24			7	0	0	72		31	43	0
Queue Length 95th (ft)		62			26	52	2	213		117	215	9
Internal Link Dist (ft)		887			333			645			650	
Turn Bay Length (ft)							200					135
Base Capacity (vph)		394			456	552	874	1101		974	1415	1181
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		0.14			0.04	0.30	0.00	0.33		0.38	0.34	0.03

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 79.4
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.48
Intersection Signal Delay: 8.7 — Intersection LOS: A
Intersection Capacity Utilization 55.9% — ICU Level of Service B
Analysis Period (min) 15

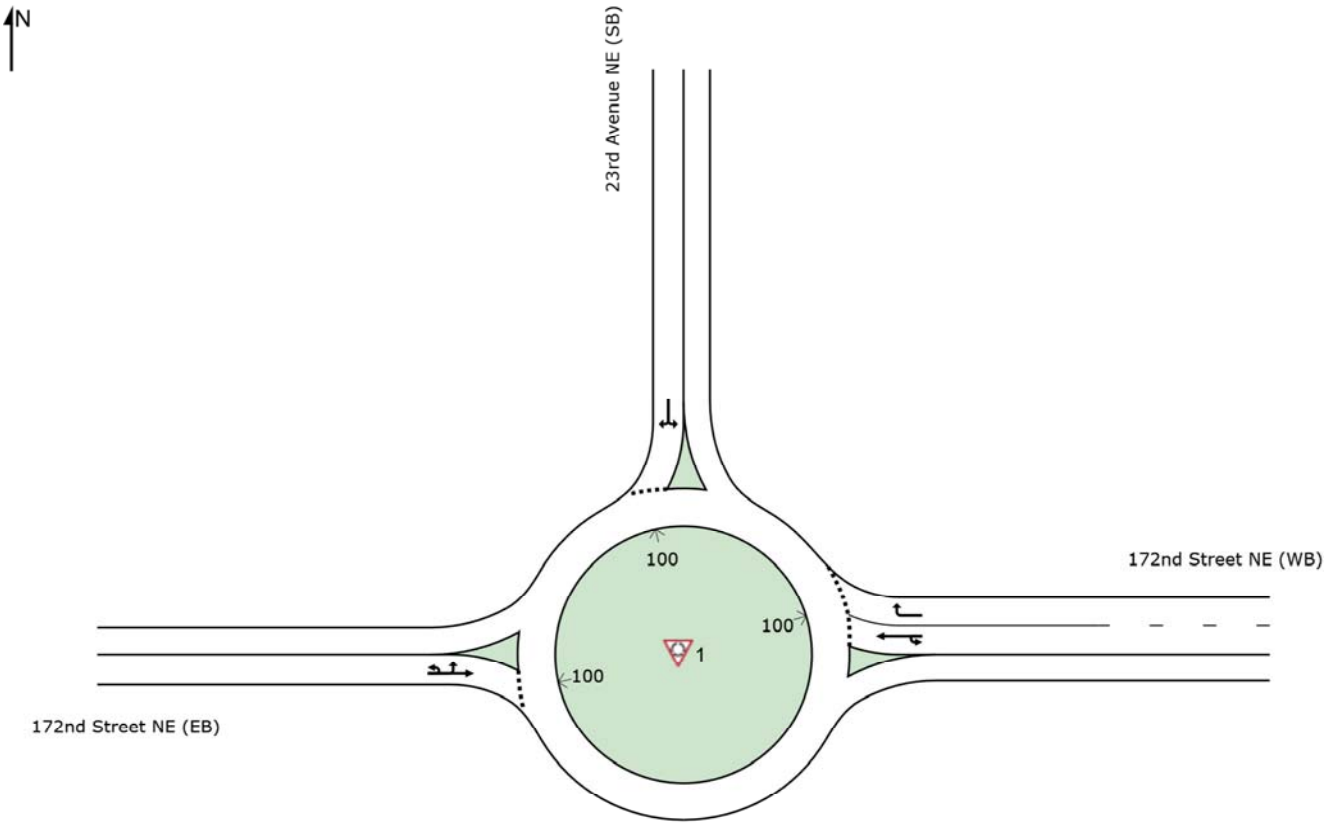
Splits and Phases: 3: 27th Avenue NE & 169th Place NE

2021 Existing Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
Saturday Peak-Hour

SITE LAYOUT

Site: 1 [2024 Baseline Conditions - Saturday]

172nd Street NE at 23rd Avenue NE
Site Category: Saturday Peak-Hour
Roundabout



Organisation: GIBSON TRAFFIC CONSULTANTS | Created: Wednesday, August 18, 2021 7:28:04 AM
Project: H:\2021\21-190\Sidra\#1 - 172nd St NE at 23rd Ave NE.sip8

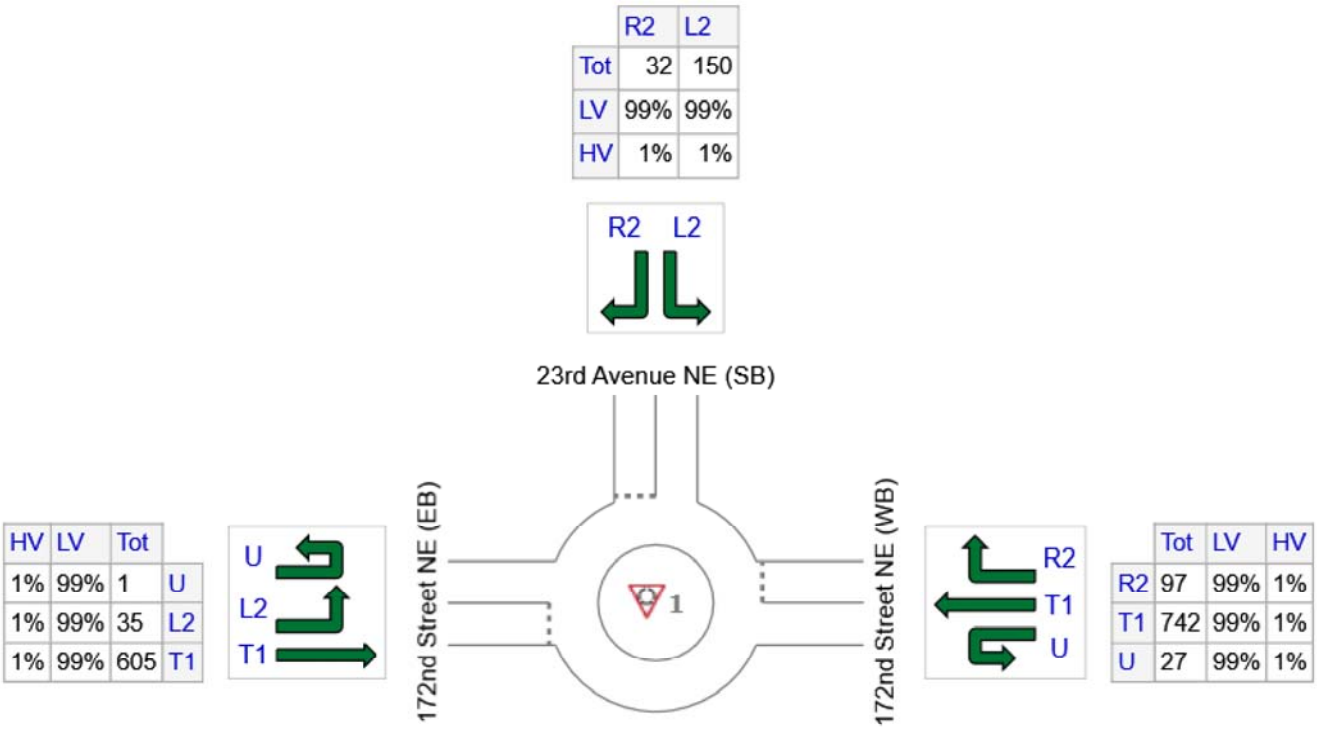
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [2024 Baseline Conditions - Saturday]

172nd Street NE at 23rd Avenue NE
Site Category: Saturday Peak-Hour
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: 172nd Street NE (WB)	866	857	9
N: 23rd Avenue NE (SB)	182	180	2
W: 172nd Street NE (EB)	641	635	6
Total	1689	1672	17

Organisation: GIBSON TRAFFIC CONSULTANTS | Created: Wednesday, August 18, 2021 7:28:11 AM
Project: H:\2021\21-190\Sidra\#1 - 172nd St NE at 23rd Ave NE.sip8

MOVEMENT SUMMARY

Site: 1 [2024 Baseline Conditions - Saturday]

172nd Street NE at 23rd Avenue NE
Site Category: Saturday Peak-Hour
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: 172nd Street NE (WB)												
1u	U	29	1.0	0.503	12.4	LOS B	4.5	113.2	0.23	0.39	0.23	38.3
6	T1	807	1.0	0.503	4.0	LOS A	4.5	113.2	0.23	0.39	0.23	37.2
16	R2	105	1.0	0.090	4.3	LOS A	0.5	11.8	0.17	0.45	0.17	36.3
Approach		941	1.0	0.503	4.3	LOS A	4.5	113.2	0.22	0.39	0.22	37.1
North: 23rd Avenue NE (SB)												
7	L2	163	1.0	0.248	14.7	LOS B	1.6	39.5	0.76	0.84	0.76	33.0
14	R2	35	1.0	0.248	8.8	LOS A	1.6	39.5	0.76	0.84	0.76	32.0
Approach		198	1.0	0.248	13.7	LOS B	1.6	39.5	0.76	0.84	0.76	32.8
West: 172nd Street NE (EB)												
5u	U	1	1.0	0.560	13.4	LOS B	4.6	116.3	0.56	0.51	0.56	37.0
5	L2	38	1.0	0.560	11.0	LOS B	4.6	116.3	0.56	0.51	0.56	36.1
2	T1	658	1.0	0.560	5.0	LOS A	4.6	116.3	0.56	0.51	0.56	36.0
Approach		697	1.0	0.560	5.4	LOS A	4.6	116.3	0.56	0.51	0.56	36.0
All Vehicles		1836	1.0	0.560	5.7	LOS A	4.6	116.3	0.41	0.49	0.41	36.2

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lanes, Volumes, Timings
2: 27th Avenue NE/Spring Lane & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	539	223	887	588	363	197	107	735	327	117	27
Future Volume (vph)	56	539	223	887	588	363	197	107	735	327	117	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		375	400		200	150		0	175		175
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor	1.00	0.99		1.00		0.98	1.00				1.00	
Frt		0.956				0.850			0.850		0.972	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3396	0	3467	3574	1599	1787	1881	1599	3467	1822	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1783	3396	0	3450	3574	1559	1779	1881	1599	3467	1822	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37				374			463		7	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1312			609			730			589	
Travel Time (s)		29.8			13.8			16.6			13.4	
Confl. Peds. (#/hr)	2		6	6		2	5					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 (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	58	556	230	914	606	374	203	110	758	337	121	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	58	786	0	914	606	374	203	110	758	337	149	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Detector Phase	5	2		1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0		3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	9.5	38.3		9.5	38.3	38.3	9.5	23.1	23.1	9.5	45.1	
Total Split (s)	20.0	38.3		46.0	60.0	60.0	25.0	25.0	25.0	25.0	45.1	
Total Split (%)	13.0%	24.8%		29.8%	38.9%	38.9%	16.2%	16.2%	16.2%	16.2%	29.2%	
Maximum Green (s)	15.0	32.0		41.0	53.7	53.7	20.0	19.9	19.9	20.0	40.0	
Yellow Time (s)	3.0	4.3		3.0	4.3	4.3	3.0	3.1	3.1	3.0	3.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.3		5.0	6.3	6.3	5.0	5.1	5.1	5.0	5.1	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0	2.5	3.0	3.0	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0					7.0	
Flash Dont Walk (s)		25.0			25.0	25.0					33.0	
Pedestrian Calls (#/hr)		0			0	0					0	
Act Effct Green (s)	9.9	32.0		41.0	65.3	65.3	19.3	40.9	40.9	18.4	40.0	
Actuated g/C Ratio	0.06	0.21		0.27	0.42	0.42	0.13	0.27	0.27	0.12	0.26	
v/c Ratio	0.51	1.07		0.99	0.40	0.43	0.91	0.22	0.99	0.81	0.31	

Lanes, Volumes, Timings
2: 27th Avenue NE/Spring Lane & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	84.2	106.5		82.6	32.7	4.4	105.7	45.9	51.9	82.0	45.9	
Queue Delay	0.0	0.0		0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	
Total Delay	84.2	106.5		82.6	32.7	4.6	105.7	45.9	51.9	82.0	45.9	
LOS	F	F		F	C	A	F	D	D	F	D	
Approach Delay		105.0			51.2			61.5			70.9	
Approach LOS		F			D			E			E	
Queue Length 50th (ft)	58	~445		477	227	0	204	88	385	172	116	
Queue Length 95th (ft)	105	#581		#623	295	68	#352	144	#681	228	183	
Internal Link Dist (ft)		1232			529			650			509	
Turn Bay Length (ft)	195			400		200	150			175		
Base Capacity (vph)	174	736		924	1519	877	232	500	765	451	479	
Starvation Cap Reductn	0	0		0	0	99	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.33	1.07		0.99	0.40	0.48	0.88	0.22	0.99	0.75	0.31	

Intersection Summary

Area Type: Other
Cycle Length: 154.4
Actuated Cycle Length: 153.7
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.07
Intersection Signal Delay: 66.6 Intersection LOS: E
Intersection Capacity Utilization 110.4% ICU Level of Service H
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: 27th Avenue NE/Spring Lane & 172nd Street NE

2024 Baseline Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
Saturday Peak-hour

Lanes, Volumes, Timings
3: 27th Avenue NE & 169th Place NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	12	3	7	10	167	2	361	3	369	480	39
Future Volume (vph)	43	12	3	7	10	167	2	361	3	369	480	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	75		0	200		0	0		135
Storage Lanes	0		0	1		1	1		0	1		1
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
Ped Bike Factor							1.00					0.97
Frt		0.994				0.850		0.999				0.850
Flt Protected		0.964			0.979		0.950			0.950		
Satd. Flow (prot)	0	1803	0	0	1842	1599	1787	1879	0	1787	1881	1599
Flt Permitted		0.772			0.893		0.471			0.436		
Satd. Flow (perm)	0	1444	0	0	1680	1599	883	1879	0	820	1881	1552
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				182						52
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		967			413			725			730	
Travel Time (s)		22.0			9.4			16.5			16.6	
Confl. Peds. (#/hr)							4					4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	47	13	3	8	11	182	2	392	3	401	522	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	63	0	0	19	182	2	395	0	401	522	42
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Detector Phase	4	4		8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	22.5	22.5		26.0	26.0	26.0	9.5	22.5		9.5	26.0	26.0
Total Split (s)	25.0	25.0		25.0	25.0	25.0	20.0	50.0		30.0	50.0	50.0
Total Split (%)	23.8%	23.8%		23.8%	23.8%	23.8%	19.0%	47.6%		28.6%	47.6%	47.6%
Maximum Green (s)	21.0	21.0		21.0	21.0	21.0	16.0	46.0		26.0	46.0	46.0
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	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
Total Lost Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max		None	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)	8.0	8.0		15.0	15.0	15.0		10.0			15.0	15.0
Pedestrian Calls (#/hr)	3	3		3	3	3		13			13	13
Act Effct Green (s)		10.3			10.3	10.3	51.6	46.6		61.9	60.5	60.5
Actuated g/C Ratio		0.13			0.13	0.13	0.64	0.58		0.77	0.75	0.75
v/c Ratio		0.34			0.09	0.50	0.00	0.36		0.52	0.37	0.04

Lanes, Volumes, Timings
3: 27th Avenue NE & 169th Place NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		36.4			31.8	10.4	5.0	12.0		6.0	5.8	1.6
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		36.4			31.8	10.4	5.0	12.0		6.0	5.8	1.6
LOS		D			C	B	A	B		A	A	A
Approach Delay		36.4			12.4			12.0			5.7	
Approach LOS		D			B			B			A	
Queue Length 50th (ft)		28			8	0	0	85		36	51	0
Queue Length 95th (ft)		68			29	54	2	242		129	241	10
Internal Link Dist (ft)		887			333			645			650	
Turn Bay Length (ft)							200					135
Base Capacity (vph)		386			448	560	851	1089		949	1416	1181
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		0.16			0.04	0.33	0.00	0.36		0.42	0.37	0.04

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 80.3
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.52
Intersection Signal Delay: 9.2 Intersection LOS: A
Intersection Capacity Utilization 59.5% ICU Level of Service B
Analysis Period (min) 15

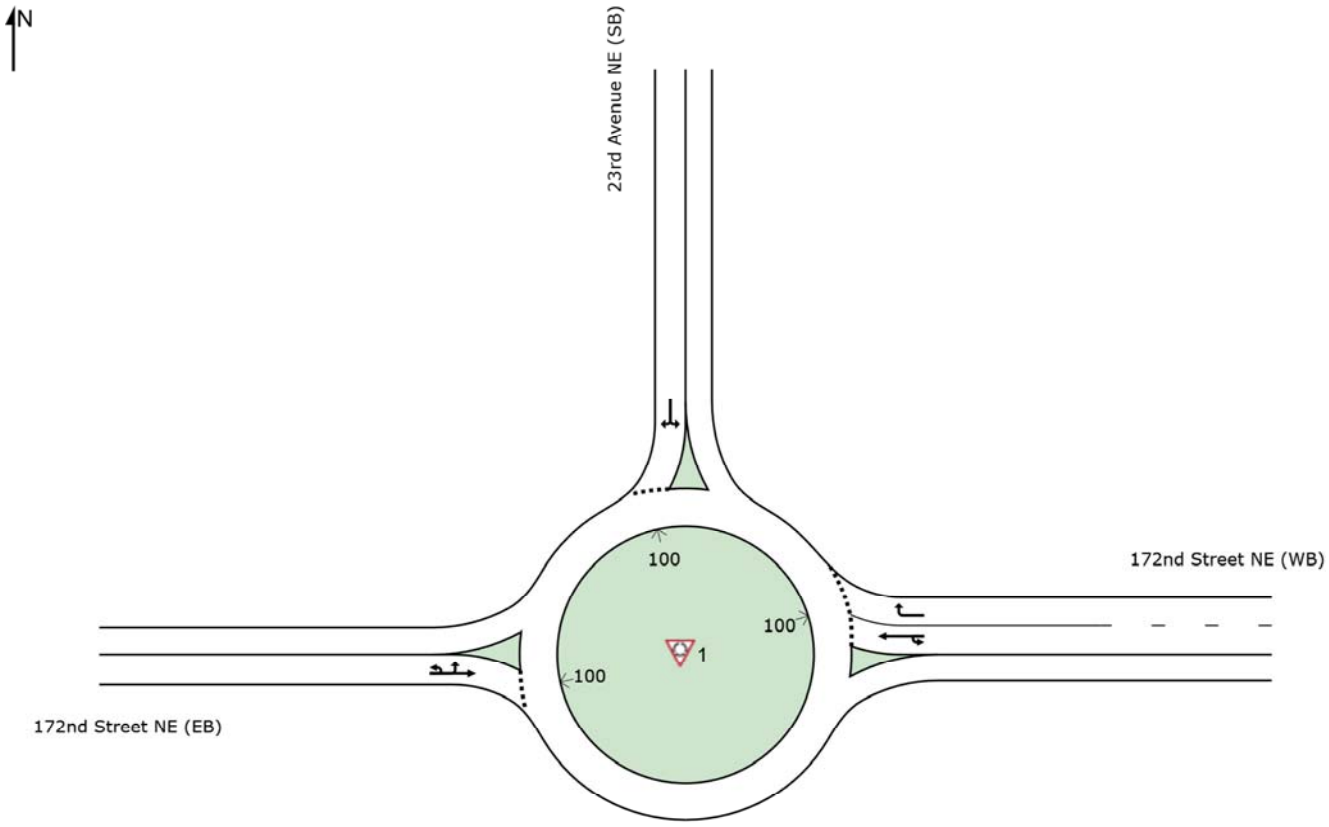
Splits and Phases: 3: 27th Avenue NE & 169th Place NE

2024 Baseline Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
Saturday Peak-hour

SITE LAYOUT

Site: 1 [2024 Opening Conditions - Saturday]

172nd Street NE at 23rd Avenue NE
Site Category: Saturday Peak-Hour
Roundabout



Organisation: GIBSON TRAFFIC CONSULTANTS | Created: Wednesday, August 18, 2021 7:28:22 AM
Project: H:\2021\21-190\Sidra\#1 - 172nd St NE at 23rd Ave NE.sip8

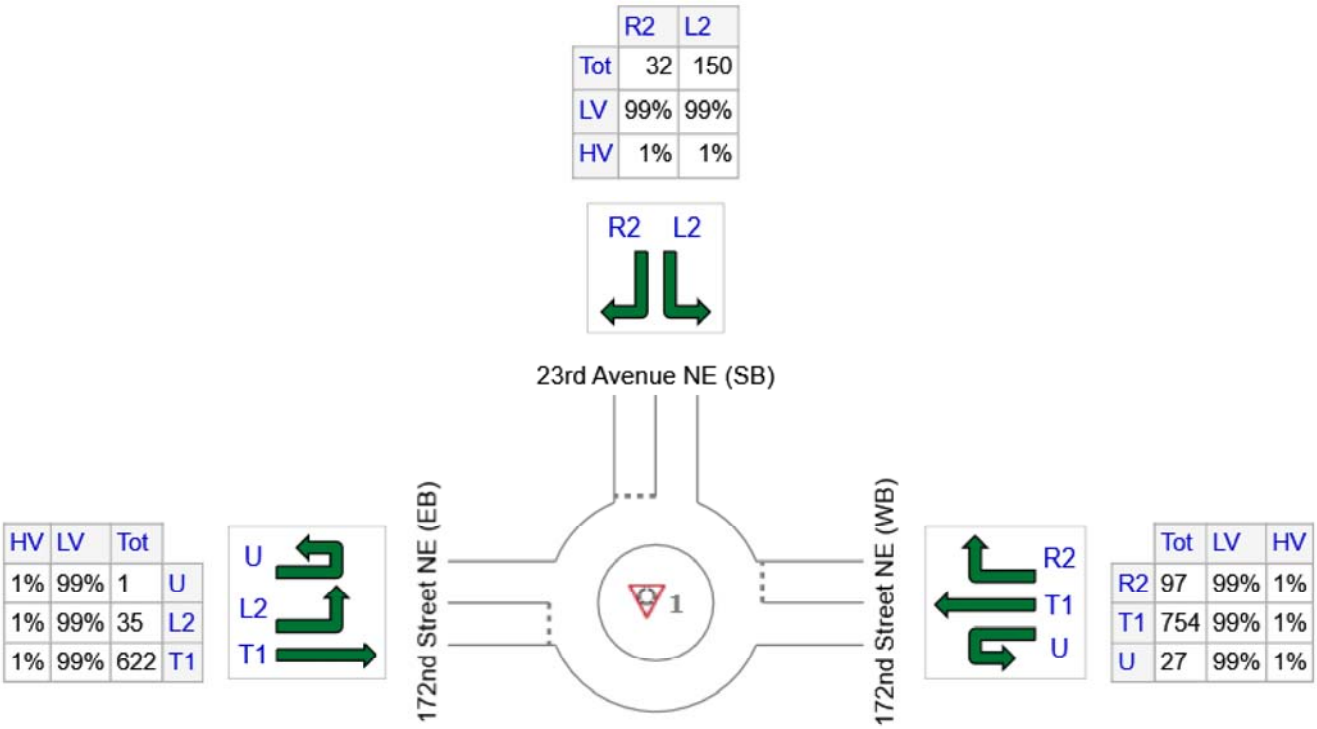
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [2024 Opening Conditions - Saturday]

172nd Street NE at 23rd Avenue NE
Site Category: Saturday Peak-Hour
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: 172nd Street NE (WB)	878	869	9
N: 23rd Avenue NE (SB)	182	180	2
W: 172nd Street NE (EB)	658	651	7
Total	1718	1701	17

Organisation: GIBSON TRAFFIC CONSULTANTS | Created: Wednesday, August 18, 2021 7:28:30 AM
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MOVEMENT SUMMARY

Site: 1 [2024 Opening Conditions - Saturday]

172nd Street NE at 23rd Avenue NE
Site Category: Saturday Peak-Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: 172nd Street NE (WB)												
1u	U	29	1.0	0.511	12.4	LOS B	4.6	116.8	0.23	0.38	0.23	38.3
6	T1	820	1.0	0.511	4.0	LOS A	4.6	116.8	0.23	0.38	0.23	37.2
16	R2	105	1.0	0.090	4.3	LOS A	0.5	11.9	0.17	0.45	0.17	36.3
Approach		954	1.0	0.511	4.3	LOS A	4.6	116.8	0.23	0.39	0.23	37.1
North: 23rd Avenue NE (SB)												
7	L2	163	1.0	0.251	14.8	LOS B	1.6	40.3	0.77	0.84	0.77	32.9
14	R2	35	1.0	0.251	9.0	LOS A	1.6	40.3	0.77	0.84	0.77	32.0
Approach		198	1.0	0.251	13.8	LOS B	1.6	40.3	0.77	0.84	0.77	32.8
West: 172nd Street NE (EB)												
5u	U	1	1.0	0.575	13.5	LOS B	4.8	122.0	0.57	0.52	0.57	37.0
5	L2	38	1.0	0.575	11.0	LOS B	4.8	122.0	0.57	0.52	0.57	36.1
2	T1	676	1.0	0.575	5.1	LOS A	4.8	122.0	0.57	0.52	0.57	36.0
Approach		715	1.0	0.575	5.4	LOS A	4.8	122.0	0.57	0.52	0.57	36.0
All Vehicles		1867	1.0	0.575	5.7	LOS A	4.8	122.0	0.41	0.49	0.41	36.2

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

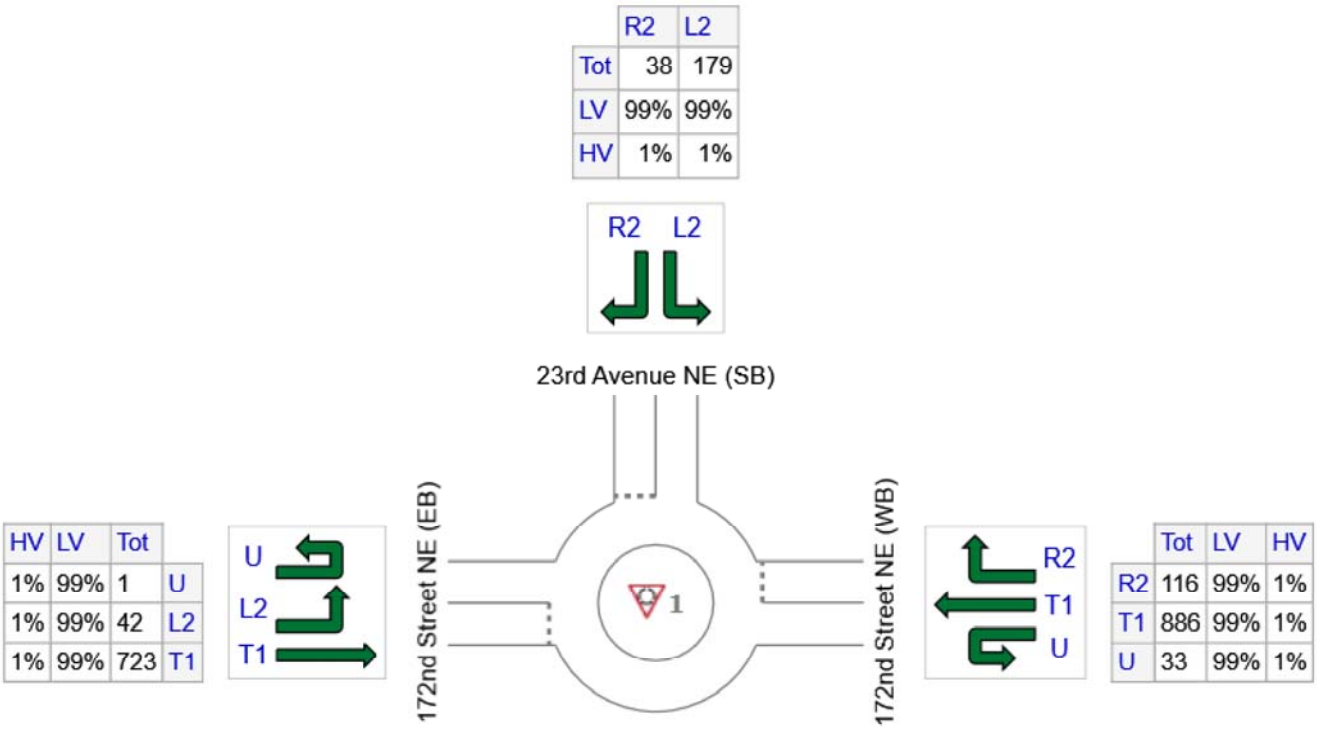
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [2030 Baseline Conditions - Saturday]

172nd Street NE at 23rd Avenue NE
Site Category: Saturday Peak-Hour
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: 172nd Street NE (WB)	1035	1025	10
N: 23rd Avenue NE (SB)	217	215	2
W: 172nd Street NE (EB)	766	758	8
Total	2018	1998	20

Organisation: GIBSON TRAFFIC CONSULTANTS | Created: Wednesday, August 18, 2021 7:28:48 AM
Project: H:\2021\21-190\Sidra\#1 - 172nd St NE at 23rd Ave NE.sip8

Lanes, Volumes, Timings
2: 27th Avenue NE/Spring Lane & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	539	240	969	588	363	209	107	795	327	117	27
Future Volume (vph)	56	539	240	969	588	363	209	107	795	327	117	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		375	400		200	150		0	175		175
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor	1.00	0.99		1.00		0.98	1.00				1.00	
Frt		0.954				0.850			0.850		0.972	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3388	0	3467	3574	1599	1787	1881	1599	3467	1822	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1783	3388	0	3451	3574	1559	1779	1881	1599	3467	1822	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		41				374			463		7	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1312			609			730			589	
Travel Time (s)		29.8			13.8			16.6			13.4	
Confl. Peds. (#/hr)	2		6	6		2	5					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 (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	58	556	247	999	606	374	215	110	820	337	121	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	58	803	0	999	606	374	215	110	820	337	149	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Detector Phase	5	2		1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0		3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	9.5	38.3		9.5	38.3	38.3	9.5	23.1	23.1	9.5	45.1	
Total Split (s)	20.0	38.3		46.0	60.0	60.0	25.0	25.0	25.0	25.0	45.1	
Total Split (%)	13.0%	24.8%		29.8%	38.9%	38.9%	16.2%	16.2%	16.2%	16.2%	29.2%	
Maximum Green (s)	15.0	32.0		41.0	53.7	53.7	20.0	19.9	19.9	20.0	40.0	
Yellow Time (s)	3.0	4.3		3.0	4.3	4.3	3.0	3.1	3.1	3.0	3.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.3		5.0	6.3	6.3	5.0	5.1	5.1	5.0	5.1	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0	2.5	3.0	3.0	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0					7.0	
Flash Dont Walk (s)		25.0			25.0	25.0					33.0	
Pedestrian Calls (#/hr)		0			0	0					0	
Act Effct Green (s)	9.9	32.0		41.0	65.3	65.3	19.8	41.4	41.4	18.4	40.0	
Actuated g/C Ratio	0.06	0.21		0.27	0.42	0.42	0.13	0.27	0.27	0.12	0.26	
v/c Ratio	0.51	1.09		1.08	0.40	0.43	0.94	0.22	1.07	0.81	0.31	

Lanes, Volumes, Timings
2: 27th Avenue NE/Spring Lane & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	84.3	113.9		107.3	32.9	4.4	111.2	45.9	75.3	82.2	46.0	
Queue Delay	0.0	0.0		0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	
Total Delay	84.3	113.9		107.3	32.9	4.6	111.2	45.9	75.3	82.2	46.0	
LOS	F	F		F	C	A	F	D	E	F	D	
Approach Delay		111.9			65.1			79.2			71.1	
Approach LOS		F			E			E			E	
Queue Length 50th (ft)	58	~461		~580	227	0	218	88	~555	172	116	
Queue Length 95th (ft)	105	#597		#715	295	68	#381	144	#814	228	183	
Internal Link Dist (ft)		1232			529			650			509	
Turn Bay Length (ft)	195			400		200	150			175		
Base Capacity (vph)	173	735		921	1513	875	231	504	767	450	478	
Starvation Cap Reductn	0	0		0	0	99	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.34	1.09		1.08	0.40	0.48	0.93	0.22	1.07	0.75	0.31	

Intersection Summary

Area Type: Other
Cycle Length: 154.4
Actuated Cycle Length: 154.2
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.09
Intersection Signal Delay: 78.4 Intersection LOS: E
Intersection Capacity Utilization 113.9% ICU Level of Service H
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: 27th Avenue NE/Spring Lane & 172nd Street NE

2024 Opening Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
Saturday Peak-hour

Lanes, Volumes, Timings
3: 27th Avenue NE & 169th Place NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	12	3	7	10	239	2	361	3	468	480	39
Future Volume (vph)	43	12	3	7	10	239	2	361	3	468	480	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	75		0	200		0	0		135
Storage Lanes	0		0	1		1	1		0	1		1
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
Ped Bike Factor							1.00					0.97
Frt		0.994				0.850		0.999				0.850
Flt Protected		0.964			0.979		0.950			0.950		
Satd. Flow (prot)	0	1803	0	0	1842	1599	1787	1879	0	1787	1881	1599
Flt Permitted		0.770			0.892		0.471			0.430		
Satd. Flow (perm)	0	1440	0	0	1678	1599	883	1879	0	809	1881	1552
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				260						52
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		967			413			725			730	
Travel Time (s)		22.0			9.4			16.5			16.6	
Confl. Peds. (#/hr)							4					4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	47	13	3	8	11	260	2	392	3	509	522	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	63	0	0	19	260	2	395	0	509	522	42
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Detector Phase	4	4		8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	22.5	22.5		26.0	26.0	26.0	9.5	22.5		9.5	26.0	26.0
Total Split (s)	25.0	25.0		25.0	25.0	25.0	20.0	50.0		30.0	50.0	50.0
Total Split (%)	23.8%	23.8%		23.8%	23.8%	23.8%	19.0%	47.6%		28.6%	47.6%	47.6%
Maximum Green (s)	21.0	21.0		21.0	21.0	21.0	16.0	46.0		26.0	46.0	46.0
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	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
Total Lost Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max		None	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)	8.0	8.0		15.0	15.0	15.0		10.0			15.0	15.0
Pedestrian Calls (#/hr)	3	3		3	3	3		13			13	13
Act Effct Green (s)		10.3			10.3	10.3	51.8	46.7		64.4	63.0	63.0
Actuated g/C Ratio		0.12			0.12	0.12	0.63	0.56		0.78	0.76	0.76
v/c Ratio		0.35			0.09	0.61	0.00	0.37		0.65	0.37	0.04

Lanes, Volumes, Timings
3: 27th Avenue NE & 169th Place NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		38.5			33.7	11.2	5.5	13.5		7.6	5.5	1.5
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		38.5			33.7	11.2	5.5	13.5		7.6	5.5	1.5
LOS		D			C	B	A	B		A	A	A
Approach Delay		38.5			12.8			13.4			6.4	
Approach LOS		D			B			B			A	
Queue Length 50th (ft)		28			9	0	0	91		51	51	0
Queue Length 95th (ft)		72			30	65	2	268		172	238	10
Internal Link Dist (ft)		887			333			645			650	
Turn Bay Length (ft)							200					135
Base Capacity (vph)		375			435	607	838	1060		941	1430	1192
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		0.17			0.04	0.43	0.00	0.37		0.54	0.37	0.04

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 82.8
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.65
Intersection Signal Delay: 10.0 Intersection LOS: B
Intersection Capacity Utilization 65.0% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 3: 27th Avenue NE & 169th Place NE

2024 Opening Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
Saturday Peak-hour

MOVEMENT SUMMARY

Site: 1 [2030 Baseline Conditions - Saturday]

172nd Street NE at 23rd Avenue NE
Site Category: Saturday Peak-Hour
Roundabout

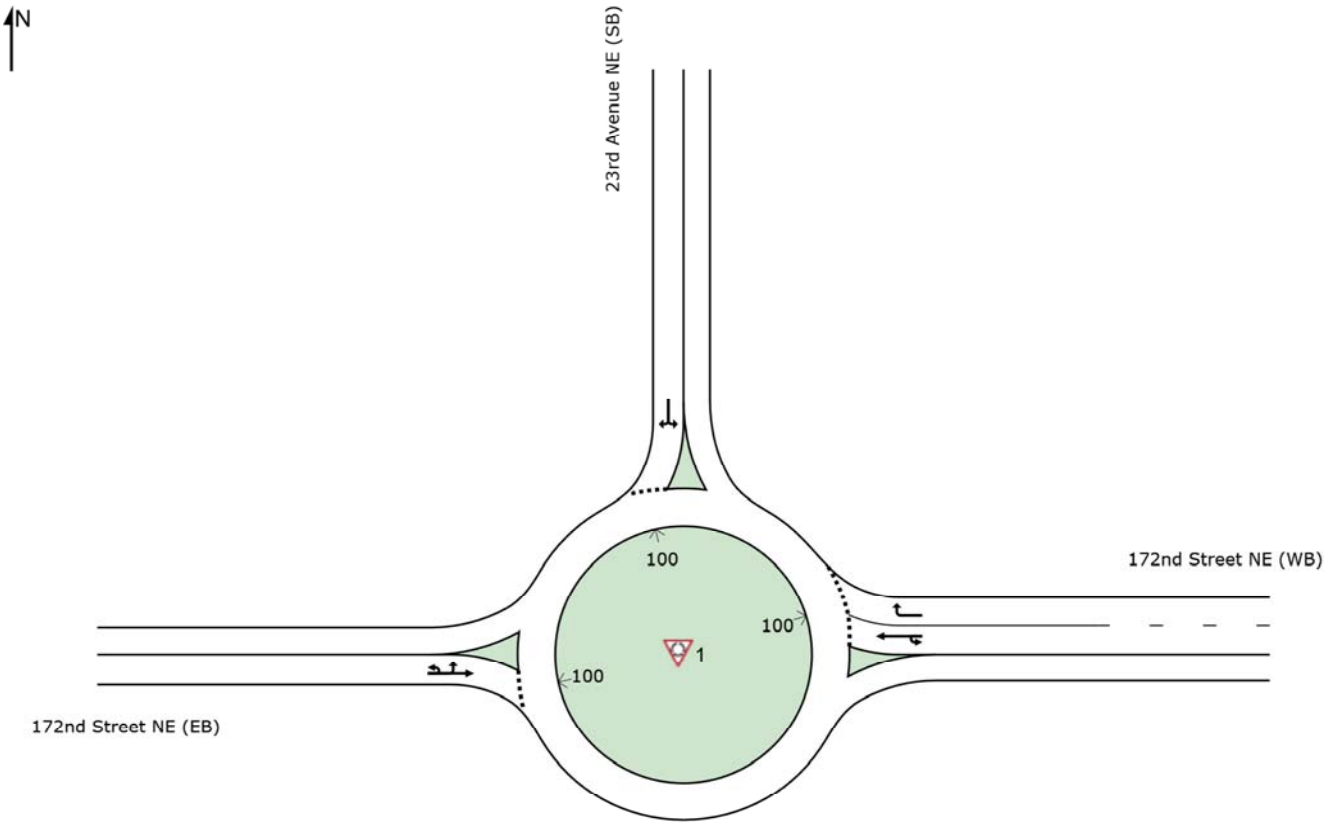
Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: 172nd Street NE (WB)												
1u	U	36	1.0	0.607	12.5	LOS B	6.7	169.5	0.31	0.39	0.31	38.0
6	T1	963	1.0	0.607	4.1	LOS A	6.7	169.5	0.31	0.39	0.31	36.9
16	R2	126	1.0	0.109	4.3	LOS A	0.6	15.1	0.20	0.46	0.20	36.2
Approach		1125	1.0	0.607	4.4	LOS A	6.7	169.5	0.30	0.40	0.30	36.8
North: 23rd Avenue NE (SB)												
7	L2	195	1.0	0.361	17.2	LOS B	2.6	64.6	0.89	0.92	0.89	31.9
14	R2	41	1.0	0.361	11.3	LOS B	2.6	64.6	0.89	0.92	0.89	31.0
Approach		236	1.0	0.361	16.2	LOS B	2.6	64.6	0.89	0.92	0.89	31.7
West: 172nd Street NE (EB)												
5u	U	1	1.0	0.694	14.5	LOS B	7.5	188.2	0.72	0.63	0.76	36.4
5	L2	46	1.0	0.694	12.0	LOS B	7.5	188.2	0.72	0.63	0.76	35.5
2	T1	786	1.0	0.694	6.1	LOS A	7.5	188.2	0.72	0.63	0.76	35.4
Approach		833	1.0	0.694	6.4	LOS A	7.5	188.2	0.72	0.63	0.76	35.4
All Vehicles		2193	1.0	0.694	6.4	LOS A	7.5	188.2	0.52	0.54	0.54	35.7

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 1 [2030 Baseline Conditions - Saturday]

172nd Street NE at 23rd Avenue NE
Site Category: Saturday Peak-Hour
Roundabout



Organisation: GIBSON TRAFFIC CONSULTANTS | Created: Wednesday, August 18, 2021 7:28:42 AM
Project: H:\2021\21-190\Sidra\#1 - 172nd St NE at 23rd Ave NE.sip8

Lanes, Volumes, Timings
2: 27th Avenue NE/Spring Lane & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	643	266	1059	702	433	235	128	878	390	140	33
Future Volume (vph)	67	643	266	1059	702	433	235	128	878	390	140	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		375	400		200	150		0	175		175
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor	1.00	0.99		1.00		0.98	1.00				1.00	
Frt		0.956				0.850			0.850		0.971	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3396	0	3467	3574	1599	1787	1881	1599	3467	1820	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1784	3396	0	3453	3574	1559	1779	1881	1599	3467	1820	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37				393			454		7	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1312			609			730			589	
Travel Time (s)		29.8			13.8			16.6			13.4	
Confl. Peds. (#/hr)	2		6	6		2	5					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 (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	69	663	274	1092	724	446	242	132	905	402	144	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	69	937	0	1092	724	446	242	132	905	402	178	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Detector Phase	5	2		1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0		3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	9.5	38.3		9.5	38.3	38.3	9.5	23.1	23.1	9.5	45.1	
Total Split (s)	20.0	38.3		46.0	60.0	60.0	25.0	25.0	25.0	25.0	45.1	
Total Split (%)	13.0%	24.8%		29.8%	38.9%	38.9%	16.2%	16.2%	16.2%	16.2%	29.2%	
Maximum Green (s)	15.0	32.0		41.0	53.7	53.7	20.0	19.9	19.9	20.0	40.0	
Yellow Time (s)	3.0	4.3		3.0	4.3	4.3	3.0	3.1	3.1	3.0	3.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.3		5.0	6.3	6.3	5.0	5.1	5.1	5.0	5.1	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0	2.5	3.0	3.0	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0					7.0	
Flash Dont Walk (s)		25.0			25.0	25.0					33.0	
Pedestrian Calls (#/hr)		0			0	0					0	
Act Effct Green (s)	10.8	32.0		41.0	62.2	62.2	20.0	40.3	40.3	19.7	40.0	
Actuated g/C Ratio	0.07	0.21		0.27	0.40	0.40	0.13	0.26	0.26	0.13	0.26	
v/c Ratio	0.56	1.28		1.19	0.50	0.52	1.05	0.27	1.20	0.91	0.37	

Lanes, Volumes, Timings
2: 27th Avenue NE/Spring Lane & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	85.5	181.4		143.2	36.5	7.4	134.8	47.3	127.5	91.6	47.8	
Queue Delay	0.0	0.0		0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	
Total Delay	85.5	181.4		143.2	36.5	7.6	134.8	47.3	127.5	91.6	47.8	
LOS	F	F		F	D	A	F	D	F	F	D	
Approach Delay		174.8			82.3			120.6			78.1	
Approach LOS		F			F			F			E	
Queue Length 50th (ft)	69	~613		~680	286	33	~264	107	~750	209	142	
Queue Length 95th (ft)	121	#753		#817	365	130	#446	169	#1015	#302	218	
Internal Link Dist (ft)		1232			529			650			509	
Turn Bay Length (ft)	195			400		200	150			175		
Base Capacity (vph)	173	733		920	1440	863	231	491	753	449	476	
Starvation Cap Reductn	0	0		0	0	86	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.40	1.28		1.19	0.50	0.57	1.05	0.27	1.20	0.90	0.37	

Intersection Summary

Area Type: Other
Cycle Length: 154.4
Actuated Cycle Length: 154.4
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.28
Intersection Signal Delay: 109.6 Intersection LOS: F
Intersection Capacity Utilization 120.9% ICU Level of Service H
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: 27th Avenue NE/Spring Lane & 172nd Street NE

2030 Baseline Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
Saturday Peak-hour

Lanes, Volumes, Timings
3: 27th Avenue NE & 169th Place NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	14	4	8	12	200	3	431	4	441	573	47
Future Volume (vph)	51	14	4	8	12	200	3	431	4	441	573	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	75		0	200		0	0		135
Storage Lanes	0		0	1		1	1		0	1		1
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
Ped Bike Factor							1.00					0.97
Frt		0.993				0.850		0.999				0.850
Flt Protected		0.964			0.980		0.950			0.950		
Satd. Flow (prot)	0	1801	0	0	1844	1599	1787	1879	0	1787	1881	1599
Flt Permitted		0.767			0.891		0.429			0.375		
Satd. Flow (perm)	0	1433	0	0	1676	1599	805	1879	0	705	1881	1552
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				217		1				52
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		967			413			725			730	
Travel Time (s)		22.0			9.4			16.5			16.6	
Confl. Peds. (#/hr)							4					4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	55	15	4	9	13	217	3	468	4	479	623	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	74	0	0	22	217	3	472	0	479	623	51
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Detector Phase	4	4		8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	22.5	22.5		26.0	26.0	26.0	9.5	22.5		9.5	26.0	26.0
Total Split (s)	25.0	25.0		25.0	25.0	25.0	20.0	50.0		30.0	50.0	50.0
Total Split (%)	23.8%	23.8%		23.8%	23.8%	23.8%	19.0%	47.6%		28.6%	47.6%	47.6%
Maximum Green (s)	21.0	21.0		21.0	21.0	21.0	16.0	46.0		26.0	46.0	46.0
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	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
Total Lost Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max		None	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)	8.0	8.0		15.0	15.0	15.0		10.0			15.0	15.0
Pedestrian Calls (#/hr)	3	3		3	3	3		13			13	13
Act Effct Green (s)		10.7			10.7	10.7	51.9	46.8		64.5	63.1	63.1
Actuated g/C Ratio		0.13			0.13	0.13	0.62	0.56		0.77	0.76	0.76
v/c Ratio		0.40			0.10	0.55	0.01	0.45		0.66	0.44	0.04

Lanes, Volumes, Timings
3: 27th Avenue NE & 169th Place NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		40.1			34.0	10.8	5.3	14.8		8.3	6.2	1.8
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		40.1			34.0	10.8	5.3	14.8		8.3	6.2	1.8
LOS		D			C	B	A	B		A	A	A
Approach Delay		40.1			12.9			14.8			6.9	
Approach LOS		D			B			B			A	
Queue Length 50th (ft)		34			10	0	0	117		49	71	0
Queue Length 95th (ft)		83			34	61	3	340		158	303	13
Internal Link Dist (ft)		887			333			645			650	
Turn Bay Length (ft)							200					135
Base Capacity (vph)		371			432	573	789	1055		889	1424	1188
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		0.20			0.05	0.38	0.00	0.45		0.54	0.44	0.04

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 83.3
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 10.8 Intersection LOS: B
Intersection Capacity Utilization 67.8% ICU Level of Service C
Analysis Period (min) 15

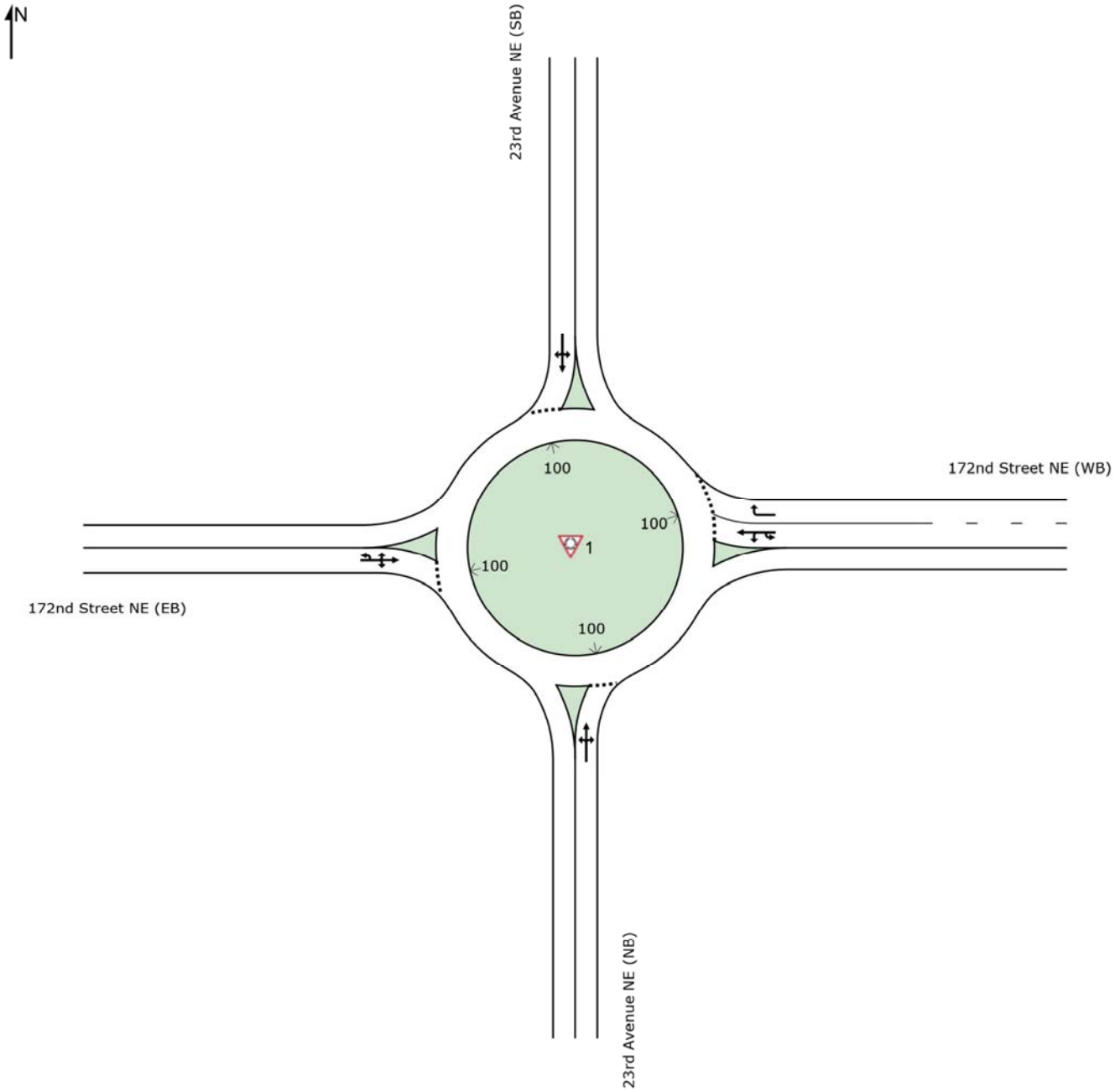
Splits and Phases: 3: 27th Avenue NE & 169th Place NE

2030 Baseline Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
Saturday Peak-hour

SITE LAYOUT

Site: 1 [2030 Horizon Year Conditions - Saturday]

172nd Street NE at 23rd Avenue NE
Site Category: Saturday Peak-Hour
Roundabout



Organisation: GIBSON TRAFFIC CONSULTANTS | Created: Wednesday, August 18, 2021 7:29:00 AM
Project: H:\2021\21-190\Sidra\#1 - 172nd St NE at 23rd Ave NE.sip8

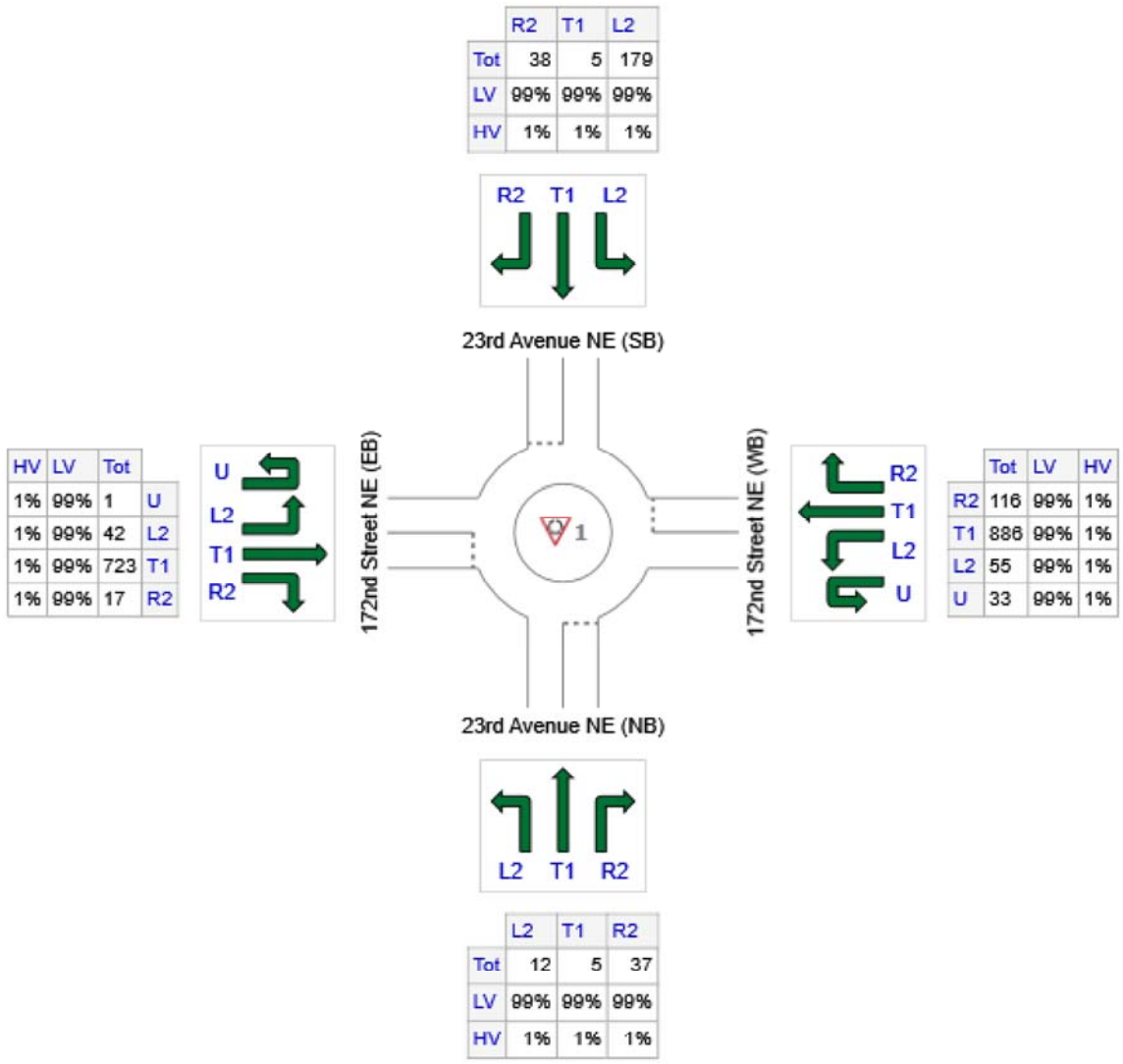
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [2030 Horizon Year Conditions - Saturday]

172nd Street NE at 23rd Avenue NE
Site Category: Saturday Peak-Hour
Roundabout

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: 23rd Avenue NE (NB)	54	53	1
E: 172nd Street NE (WB)	1090	1079	11
N: 23rd Avenue NE (SB)	222	220	2
W: 172nd Street NE (EB)	783	775	8
Total	2149	2128	21

MOVEMENT SUMMARY

Site: 1 [2030 Horizon Year Conditions - Saturday]

172nd Street NE at 23rd Avenue NE
Site Category: Saturday Peak-Hour
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 23rd Avenue NE (NB)												
3	L2	13	1.0	0.123	18.3	LOS B	0.9	22.9	0.94	0.85	0.94	32.8
8	T1	5	1.0	0.123	12.3	LOS B	0.9	22.9	0.94	0.85	0.94	32.7
18	R2	40	1.0	0.123	12.4	LOS B	0.9	22.9	0.94	0.85	0.94	31.9
Approach		59	1.0	0.123	13.7	LOS B	0.9	22.9	0.94	0.85	0.94	32.1
East: 172nd Street NE (WB)												
1u	U	36	1.0	0.651	12.6	LOS B	7.3	184.5	0.38	0.43	0.38	37.6
1	L2	60	1.0	0.651	10.2	LOS B	7.3	184.5	0.38	0.43	0.38	36.6
6	T1	963	1.0	0.651	4.3	LOS A	7.3	184.5	0.38	0.43	0.38	36.5
16	R2	126	1.0	0.111	4.4	LOS A	0.6	14.8	0.23	0.46	0.23	36.1
Approach		1185	1.0	0.651	4.8	LOS A	7.3	184.5	0.37	0.43	0.37	36.5
North: 23rd Avenue NE (SB)												
7	L2	195	1.0	0.416	19.8	LOS B	3.3	83.3	0.95	1.00	1.05	30.8
4	T1	5	1.0	0.416	13.8	LOS B	3.3	83.3	0.95	1.00	1.05	30.7
14	R2	41	1.0	0.416	13.9	LOS B	3.3	83.3	0.95	1.00	1.05	30.0
Approach		241	1.0	0.416	18.6	LOS B	3.3	83.3	0.95	1.00	1.05	30.7
West: 172nd Street NE (EB)												
5u	U	1	1.0	0.740	16.1	LOS B	9.1	230.3	0.81	0.77	0.93	36.1
5	L2	46	1.0	0.740	13.7	LOS B	9.1	230.3	0.81	0.77	0.93	35.2
2	T1	786	1.0	0.740	7.7	LOS A	9.1	230.3	0.81	0.77	0.93	35.1
12	R2	18	1.0	0.740	7.8	LOS A	9.1	230.3	0.81	0.77	0.93	34.1
Approach		851	1.0	0.740	8.1	LOS A	9.1	230.3	0.81	0.77	0.93	35.1
All Vehicles		2336	1.0	0.740	7.7	LOS A	9.1	230.3	0.60	0.62	0.66	35.2

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lanes, Volumes, Timings
2: 27th Avenue NE/Spring Lane & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	680	266	1059	757	433	235	128	878	390	140	33
Future Volume (vph)	67	680	266	1059	757	433	235	128	878	390	140	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		375	400		200	150		0	175		175
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor	1.00	0.99		1.00		0.98	1.00				1.00	
Frt		0.958				0.850			0.850		0.971	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3404	0	3467	3574	1599	1787	1881	1599	3467	1820	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1784	3404	0	3454	3574	1559	1779	1881	1599	3467	1820	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34				365			453		7	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1312			609			730			589	
Travel Time (s)		29.8			13.8			16.6			13.4	
Confl. Peds. (#/hr)	2		6	6		2	5					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 (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	69	701	274	1092	780	446	242	132	905	402	144	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	69	975	0	1092	780	446	242	132	905	402	178	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Detector Phase	5	2		1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0		3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	9.5	38.3		9.5	38.3	38.3	9.5	23.1	23.1	9.5	45.1	
Total Split (s)	20.0	38.3		46.0	60.0	60.0	25.0	25.0	25.0	25.0	45.1	
Total Split (%)	13.0%	24.8%		29.8%	38.9%	38.9%	16.2%	16.2%	16.2%	16.2%	29.2%	
Maximum Green (s)	15.0	32.0		41.0	53.7	53.7	20.0	19.9	19.9	20.0	40.0	
Yellow Time (s)	3.0	4.3		3.0	4.3	4.3	3.0	3.1	3.1	3.0	3.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.3		5.0	6.3	6.3	5.0	5.1	5.1	5.0	5.1	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0	2.5	3.0	3.0	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0					7.0	
Flash Dont Walk (s)		25.0			25.0	25.0					33.0	
Pedestrian Calls (#/hr)		0			0	0					0	
Act Effct Green (s)	10.8	32.0		41.0	62.2	62.2	20.0	40.3	40.3	19.7	40.0	
Actuated g/C Ratio	0.07	0.21		0.27	0.40	0.40	0.13	0.26	0.26	0.13	0.26	
v/c Ratio	0.56	1.33		1.19	0.54	0.53	1.05	0.27	1.20	0.91	0.37	

Lanes, Volumes, Timings
2: 27th Avenue NE/Spring Lane & 172nd Street NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	85.5	202.8		143.2	37.4	9.2	134.8	47.3	128.2	91.6	47.8	
Queue Delay	0.0	0.0		0.0	0.7	0.3	0.0	0.0	0.0	0.0	0.0	
Total Delay	85.5	202.8		143.2	38.1	9.5	134.8	47.3	128.2	91.6	47.8	
LOS	F	F		F	D	A	F	D	F	F	D	
Approach Delay		195.0			82.1			121.1			78.1	
Approach LOS		F			F			F			E	
Queue Length 50th (ft)	69	~657		~680	314	51	~264	107	~752	209	142	
Queue Length 95th (ft)	121	#798		#817	398	159	#446	169	#1017	#302	218	
Internal Link Dist (ft)		1232			529			650			509	
Turn Bay Length (ft)	195			400		200	150			175		
Base Capacity (vph)	173	732		920	1440	846	231	491	752	449	476	
Starvation Cap Reductn	0	0		0	329	86	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.40	1.33		1.19	0.70	0.59	1.05	0.27	1.20	0.90	0.37	

Intersection Summary

Area Type: Other
Cycle Length: 154.4
Actuated Cycle Length: 154.4
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.33
Intersection Signal Delay: 113.8 Intersection LOS: F
Intersection Capacity Utilization 121.9% ICU Level of Service H
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: 27th Avenue NE/Spring Lane & 172nd Street NE

2030 Horizon Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
Saturday Peak-hour

Lanes, Volumes, Timings
3: 27th Avenue NE & 169th Place NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	30	4	8	24	200	3	431	4	441	573	47
Future Volume (vph)	51	30	4	8	24	200	3	431	4	441	573	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	75		0	200		0	0		135
Storage Lanes	0		0	1		1	1		0	1		1
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
Ped Bike Factor							1.00					0.97
Frt		0.994				0.850		0.999				0.850
Flt Protected		0.971			0.987		0.950			0.950		
Satd. Flow (prot)	0	1816	0	0	1857	1599	1787	1879	0	1787	1881	1599
Flt Permitted		0.796			0.925		0.429			0.373		
Satd. Flow (perm)	0	1488	0	0	1740	1599	805	1879	0	702	1881	1552
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				217		1				52
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		967			413			725			730	
Travel Time (s)		22.0			9.4			16.5			16.6	
Confl. Peds. (#/hr)							4					4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	55	33	4	9	26	217	3	468	4	479	623	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	92	0	0	35	217	3	472	0	479	623	51
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Detector Phase	4	4		8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	22.5	22.5		26.0	26.0	26.0	9.5	22.5		9.5	26.0	26.0
Total Split (s)	25.0	25.0		25.0	25.0	25.0	20.0	50.0		30.0	50.0	50.0
Total Split (%)	23.8%	23.8%		23.8%	23.8%	23.8%	19.0%	47.6%		28.6%	47.6%	47.6%
Maximum Green (s)	21.0	21.0		21.0	21.0	21.0	16.0	46.0		26.0	46.0	46.0
Yellow Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	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
Total Lost Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.5	2.5		2.5	2.5	2.5	2.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max		None	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)	8.0	8.0		15.0	15.0	15.0		10.0			15.0	15.0
Pedestrian Calls (#/hr)	3	3		3	3	3		13			13	13
Act Effct Green (s)		11.2			11.2	11.2	51.9	46.8		64.8	63.3	63.3
Actuated g/C Ratio		0.13			0.13	0.13	0.62	0.56		0.77	0.75	0.75
v/c Ratio		0.46			0.15	0.54	0.01	0.45		0.67	0.44	0.04

Lanes, Volumes, Timings
3: 27th Avenue NE & 169th Place NE

10 Degrees

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay		41.4			34.5	10.5	5.7	15.2		8.5	6.4	1.8
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		41.4			34.5	10.5	5.7	15.2		8.5	6.4	1.8
LOS		D			C	B	A	B		A	A	A
Approach Delay		41.4			13.8			15.2			7.1	
Approach LOS		D			B			B			A	
Queue Length 50th (ft)		43			16	0	0	122		53	76	0
Queue Length 95th (ft)		100			47	61	3	340		158	303	13
Internal Link Dist (ft)		887			333			645			650	
Turn Bay Length (ft)							200					135
Base Capacity (vph)		382			445	570	783	1045		881	1416	1181
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		0.24			0.08	0.38	0.00	0.45		0.54	0.44	0.04

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 84.1
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 11.5 Intersection LOS: B
Intersection Capacity Utilization 68.7% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 3: 27th Avenue NE & 169th Place NE

2030 Horizon Conditions
Gibson Traffic Consultants, Inc. [BJL #21-190]
Saturday Peak-hour

Analysis with Diversion

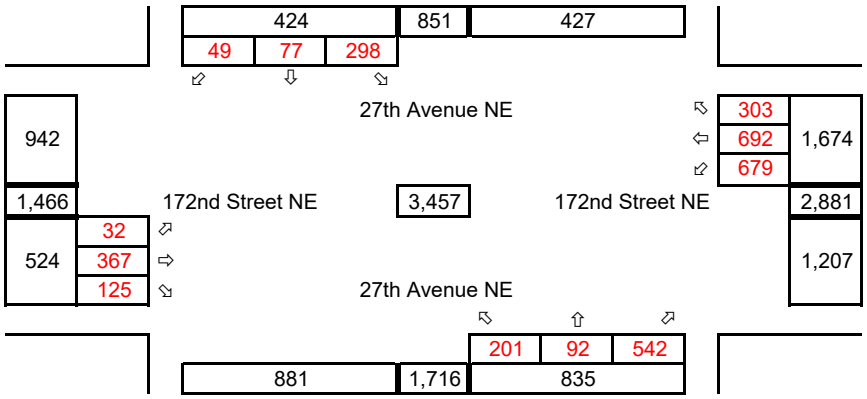
Horizon Year | 2 27th Ave NE at 172nd St NE | **Weekday PM Peak-Hour**

Synchro ID: 2

Existing
Average Weekday
PM Peak-Hour

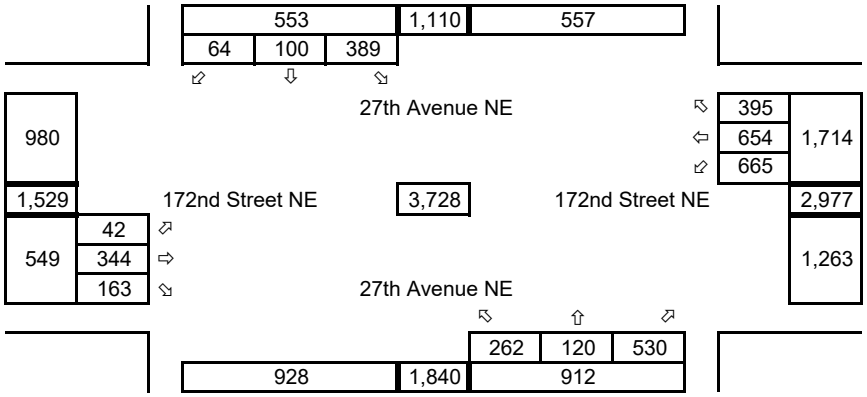
Year: **7/29/2021**

Data Source: **TDG**

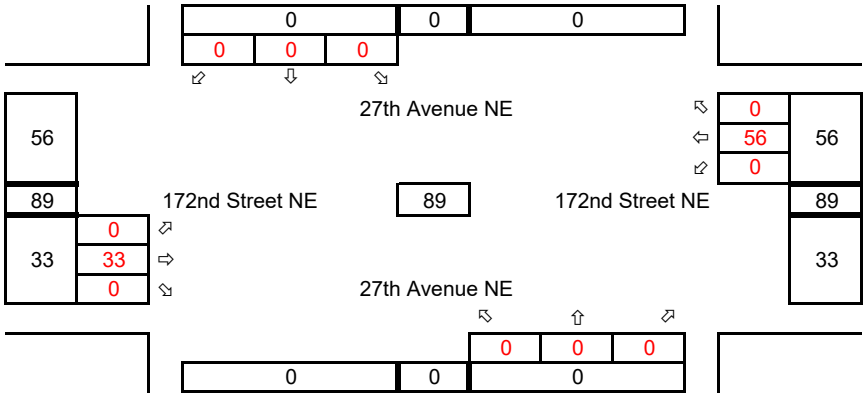


Future without Development
Average Weekday
PM Peak Hour

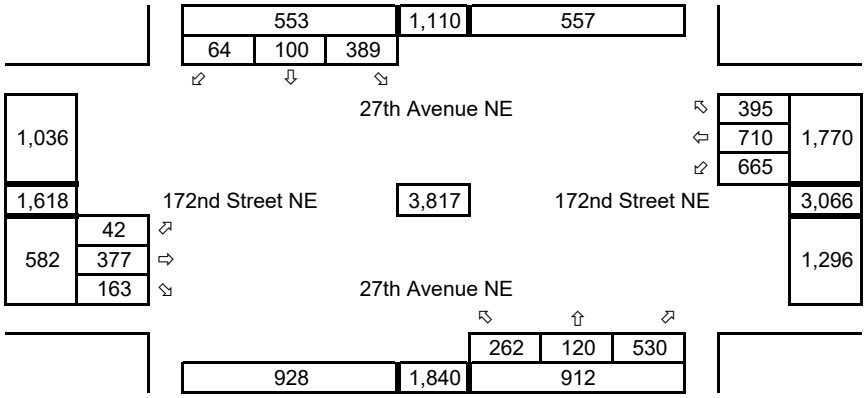
Year: 2030
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Average Weekday
PM Peak Hour

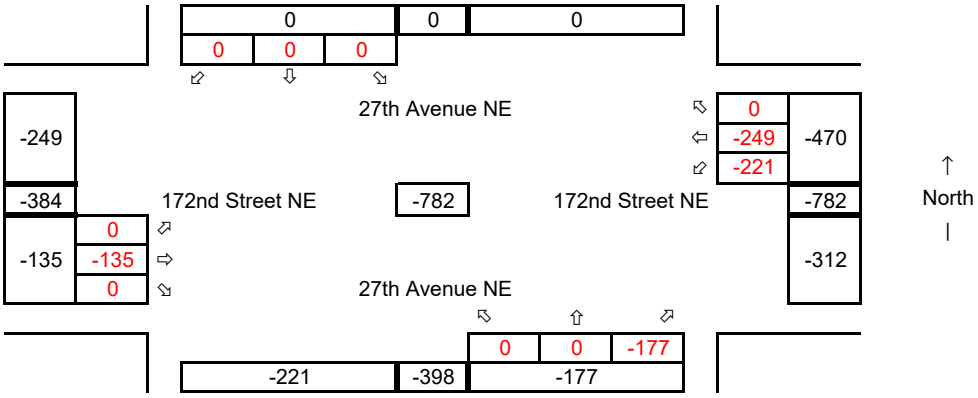


Future with Development
Average Weekday
PM Peak Hour



Diversion Trips
Average Weekday
PM Peak Hour

Reduction: 25%

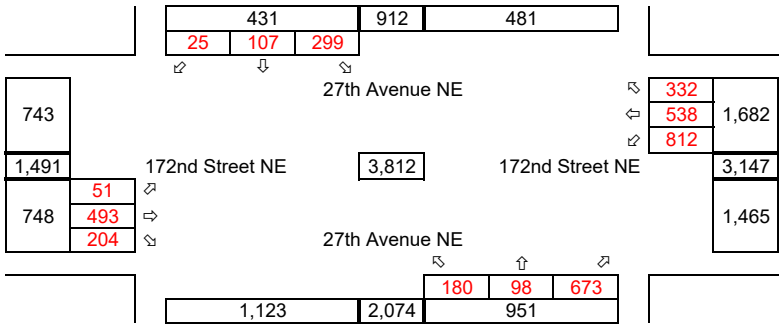


Synchro ID: 2

Existing
Saturday
Peak-Hour

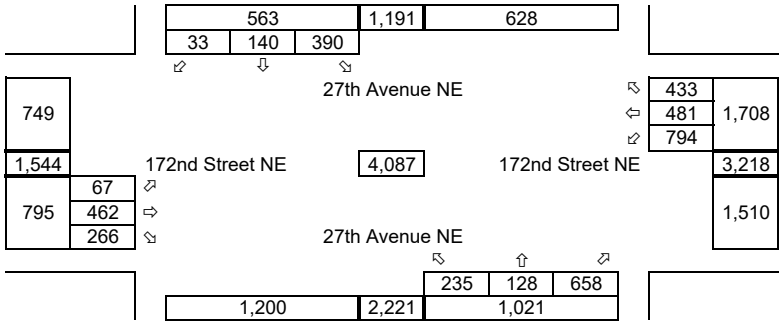
Year: **7/31/2021**

Data Source: **TDG**

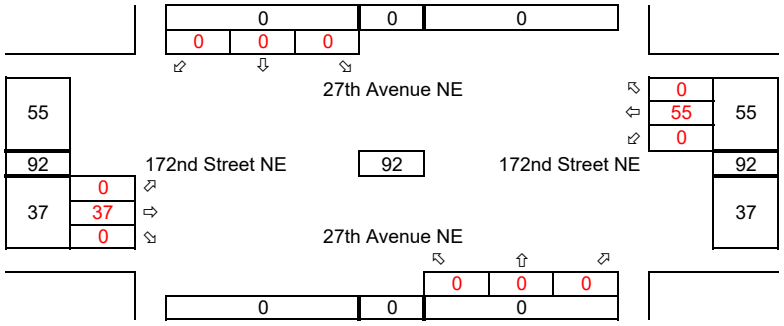


Future without Development
Saturday
PM Peak Hour

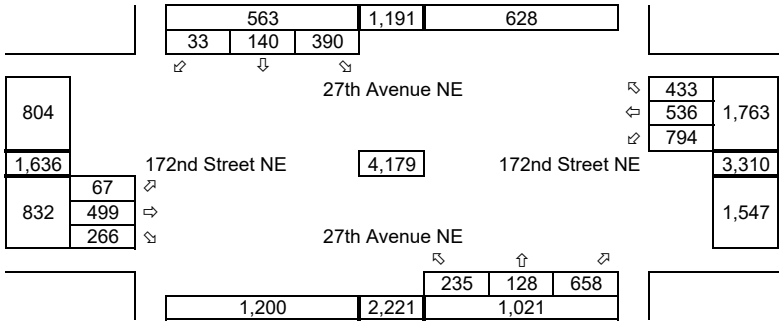
Year: 2030
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Saturday
PM Peak Hour

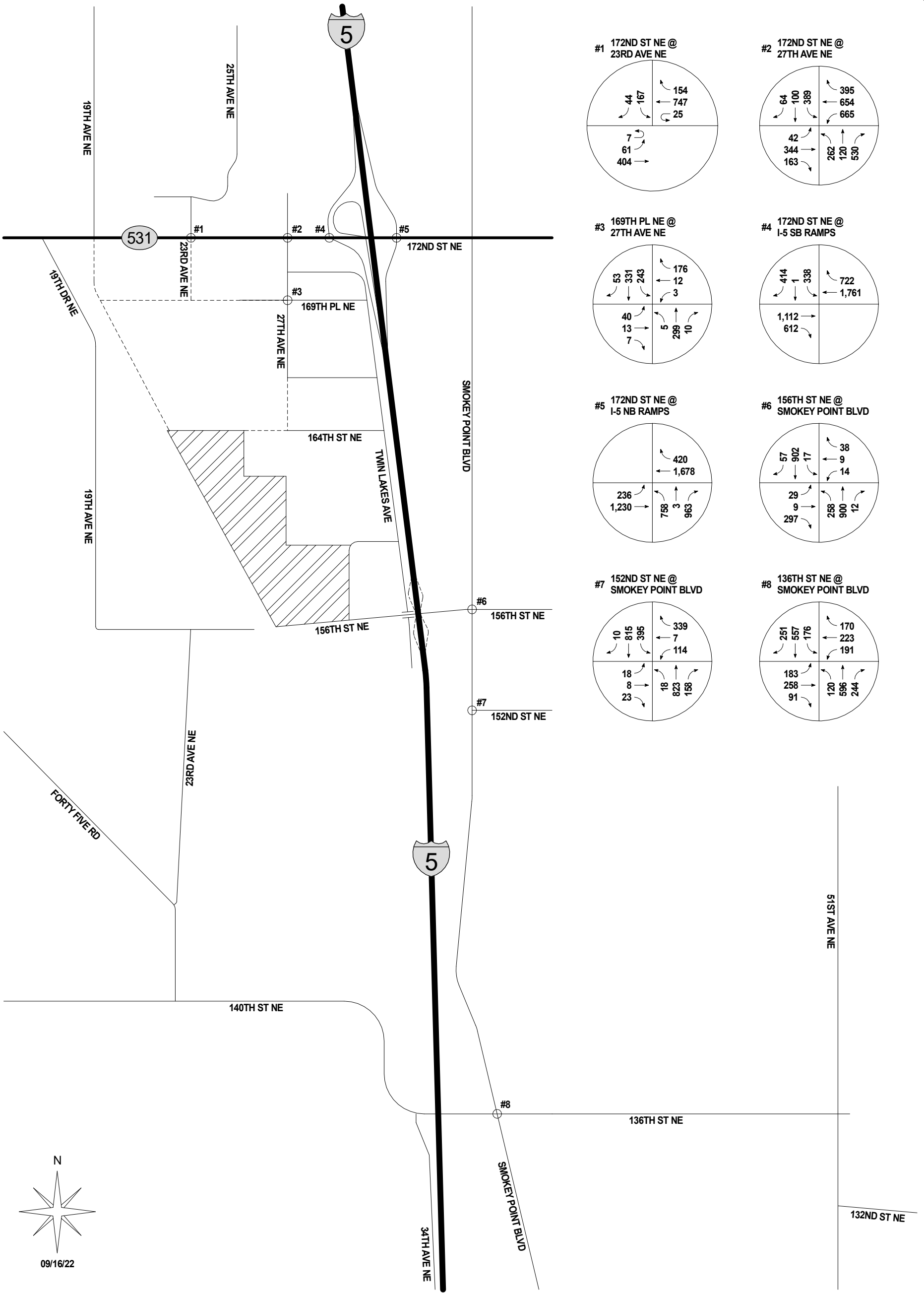


Future with Development
Saturday
PM Peak Hour



Diversion Trips
Saturday
PM Peak Hour

Reduction: 25%



Kimley»Horn

TRAFFIC IMPACT STUDY
KH #090222183

10 DEGREES

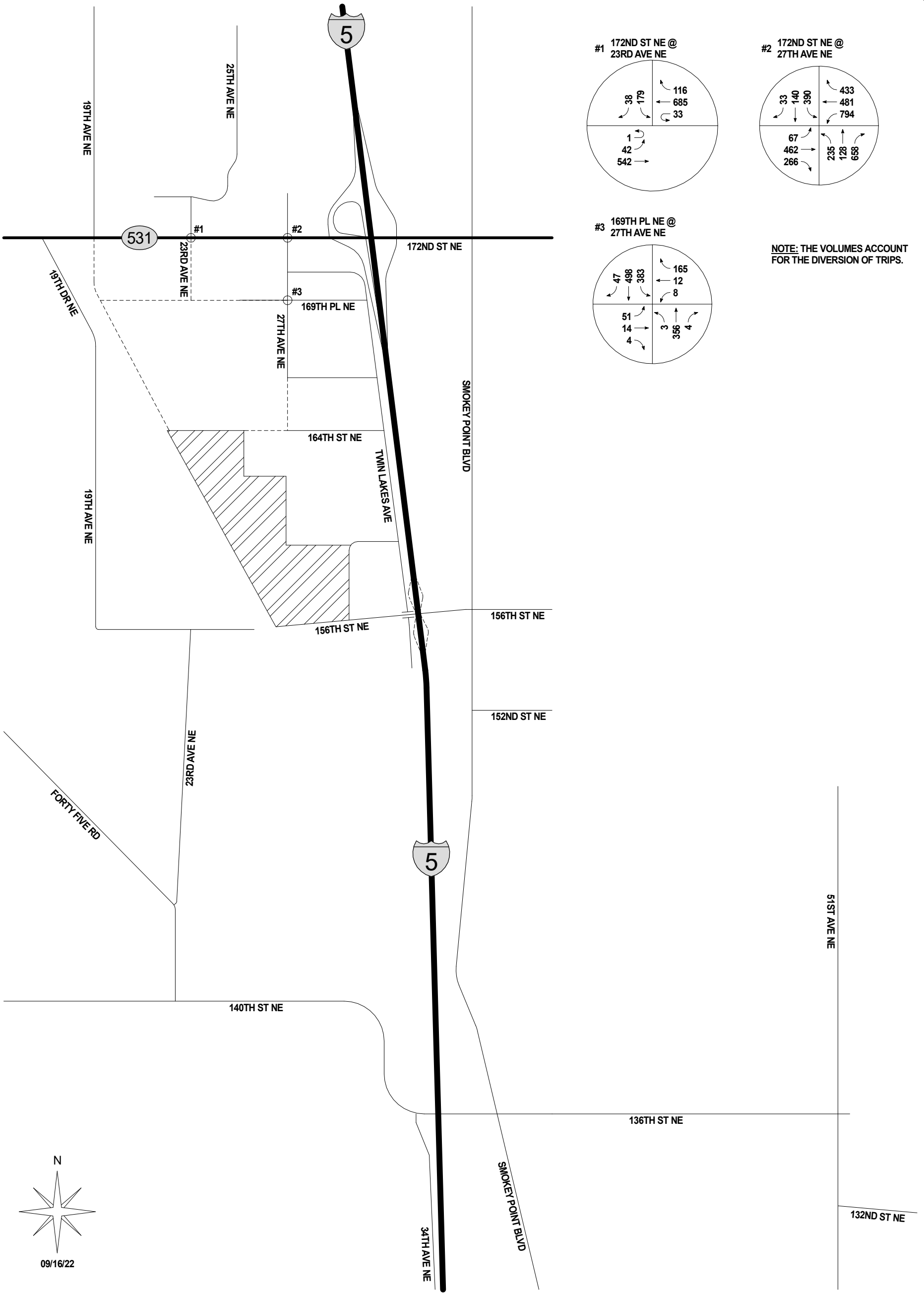
CITY OF MARYSVILLE

LEGEND

XXX → WEEKDAY PM PEAK-HOUR TURNING MOVEMENT VOLUMES

FIGURE 14

2030 BASELINE TURNING MOVEMENTS WEEKDAY PM PEAK-HOUR



#1 172ND ST NE @ 23RD AVE NE

#2 172ND ST NE @ 27TH AVE NE

#3 169TH PL NE @ 27TH AVE NE

NOTE: THE VOLUMES ACCOUNT FOR THE DIVERSION OF TRIPS.

Kimley»Horn

TRAFFIC IMPACT STUDY
KH #090222183

10 DEGREES

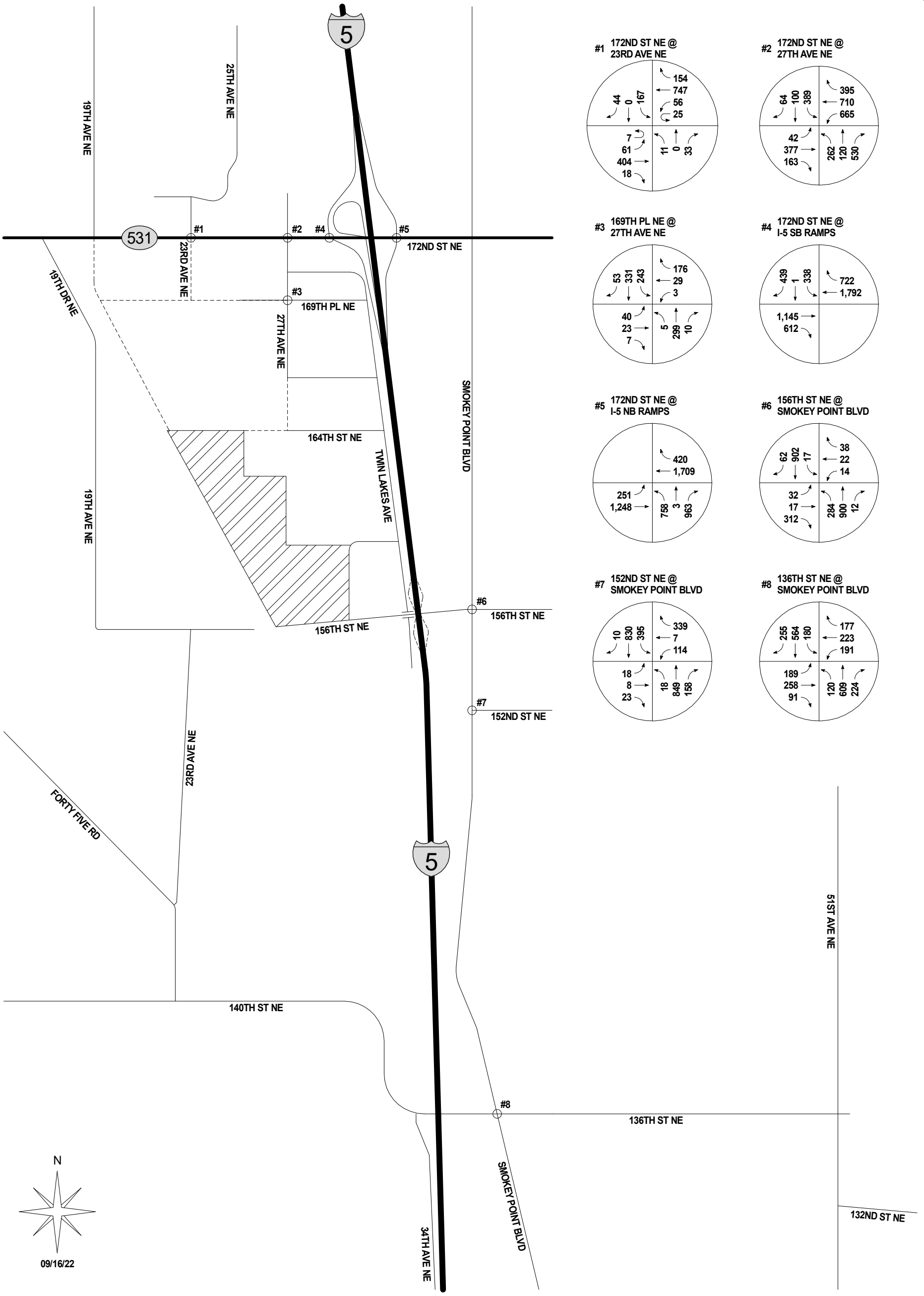
CITY OF MARYSVILLE

LEGEND

XXX → SATURDAY PEAK-HOUR TURNING MOVEMENT VOLUMES

FIGURE 15

2030 BASELINE TURNING MOVEMENTS SATURDAY PEAK-HOUR



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KH #090222183

10 DEGREES

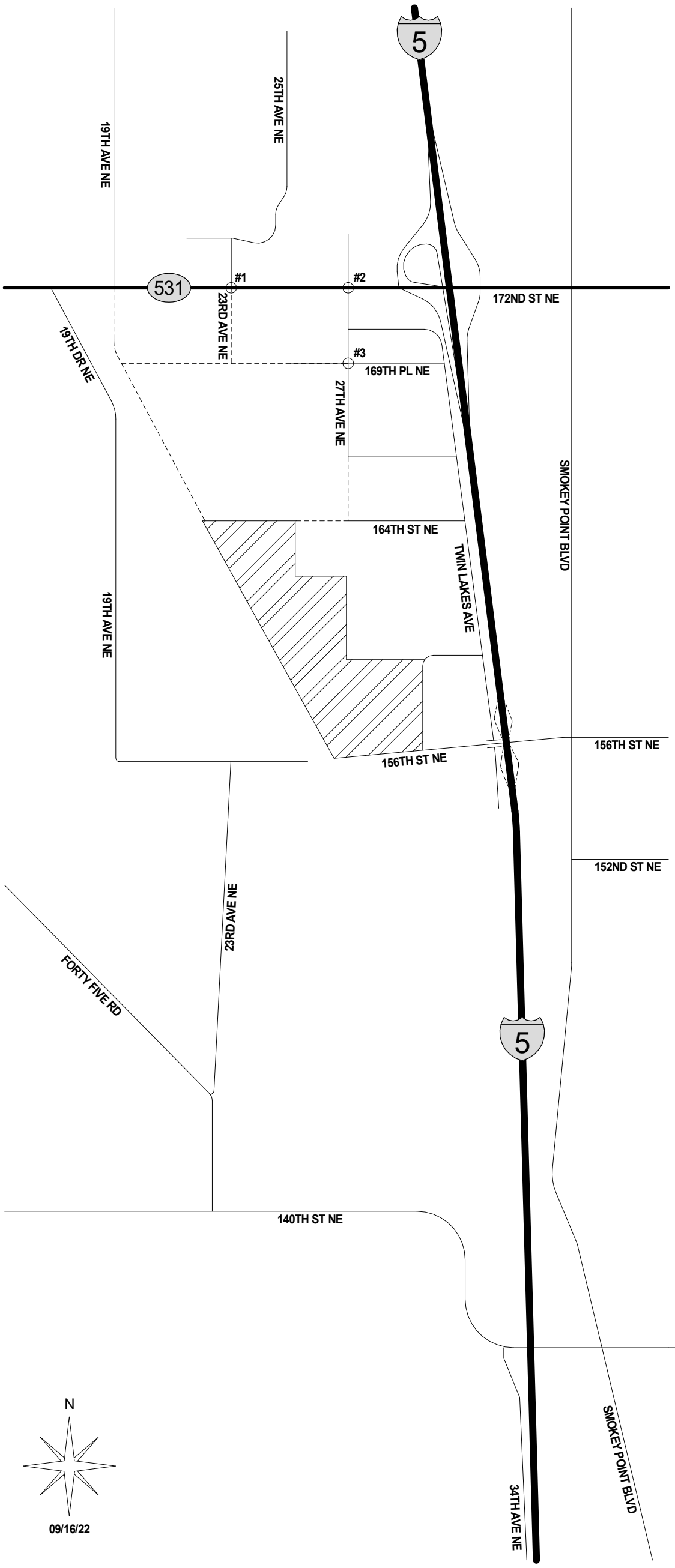
CITY OF MARYSVILLE

LEGEND

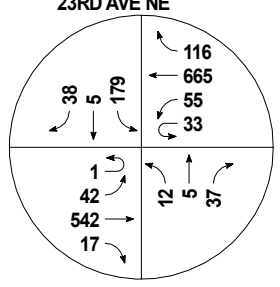
XXX → WEEKDAY PM PEAK-HOUR TURNING MOVEMENT VOLUMES

FIGURE 16

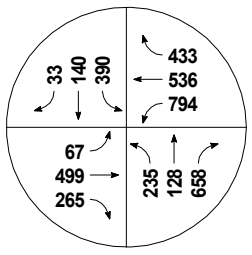
2030 HORIZON YEAR TURNING MOVEMENTS WEEKDAY PM PEAK-HOUR



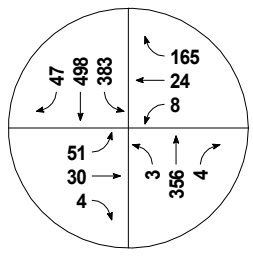
#1 172ND ST NE @ 23RD AVE NE



#2 172ND ST NE @ 27TH AVE NE



#3 169TH PL NE @ 27TH AVE NE



NOTE: THE VOLUMES ACCOUNT FOR THE DIVERSION OF TRIPS.

Kimley»Horn

TRAFFIC IMPACT STUDY
KH #090222183

10 DEGREES

CITY OF MARYSVILLE

LEGEND

XXX → SATURDAY PEAK-HOUR TURNING MOVEMENT VOLUMES

FIGURE 17

2030 HORIZON YEAR TURNING MOVEMENTS SATURDAY PEAK-HOUR

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	344	163	665	654	395	262	120	530	389	100	64
Future Volume (vph)	42	344	163	665	654	395	262	120	530	389	100	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		375	400		200	150		0	175		175
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor							1.00				0.99	
Frt		0.952				0.850			0.850		0.942	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3403	0	3467	3574	1599	1787	1881	1599	3467	1761	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1787	3403	0	3467	3574	1599	1782	1881	1599	3467	1761	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		46				386			489		20	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1312			609			730			589	
Travel Time (s)		29.8			13.8			16.6			13.4	
Confl. Peds. (#/hr)							3					3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	44	362	172	700	688	416	276	126	558	409	105	67
Shared Lane Traffic (%)												
Lane Group Flow (vph)	44	534	0	700	688	416	276	126	558	409	172	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Detector Phase	5	2		1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0		3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	9.5	38.3		9.5	38.3	38.3	9.5	23.1	23.1	9.5	45.1	
Total Split (s)	20.0	38.3		46.0	60.0	60.0	25.0	25.0	25.0	25.0	45.1	
Total Split (%)	13.0%	24.8%		29.8%	38.9%	38.9%	16.2%	16.2%	16.2%	16.2%	29.2%	
Maximum Green (s)	15.0	32.0		41.0	53.7	53.7	20.0	19.9	19.9	20.0	40.0	
Yellow Time (s)	3.0	4.3		3.0	4.3	4.3	3.0	3.1	3.1	3.0	3.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.3		5.0	6.3	6.3	5.0	5.1	5.1	5.0	5.1	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0	2.5	3.0	3.0	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0					7.0	
Flash Dont Walk (s)		25.0			25.0	25.0					33.0	
Pedestrian Calls (#/hr)		0			0	0					0	
Act Effct Green (s)	8.4	25.8		32.7	52.4	52.4	20.1	41.1	41.1	19.3	40.3	
Actuated g/C Ratio	0.06	0.18		0.23	0.37	0.37	0.14	0.29	0.29	0.14	0.29	
v/c Ratio	0.41	0.81		0.87	0.52	0.50	1.08	0.23	0.69	0.86	0.33	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	77.7	60.7		64.2	36.1	6.2	134.6	42.0	11.9	77.9	39.0	
Queue Delay	0.0	0.0		0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	
Total Delay	77.7	60.7		64.2	36.1	6.3	134.6	42.0	11.9	77.9	39.0	
LOS	E	E		E	D	A	F	D	B	E	D	
Approach Delay		62.0			40.1			51.1			66.4	
Approach LOS		E			D			D			E	
Queue Length 50th (ft)	40	228		320	261	18	~285	89	48	191	111	
Queue Length 95th (ft)	87	313		412	333	97	#525	163	201	#310	199	
Internal Link Dist (ft)		1232			529			650			509	
Turn Bay Length (ft)	195			400		200	150			175		
Base Capacity (vph)	192	816		1018	1499	894	256	550	813	497	519	
Starvation Cap Reductn	0	0		0	0	53	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.23	0.65		0.69	0.46	0.49	1.08	0.23	0.69	0.82	0.33	

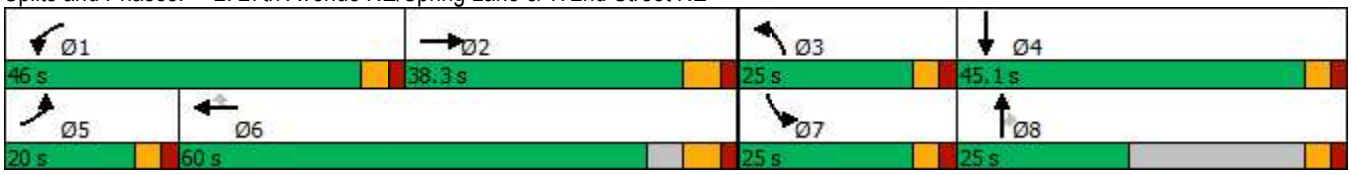
Intersection Summary

Area Type: Other
Cycle Length: 154.4
Actuated Cycle Length: 140.4
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.08
Intersection Signal Delay: 49.9 Intersection LOS: D
Intersection Capacity Utilization 99.4% 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: 27th Avenue NE/Spring Lane & 172nd Street NE



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	462	266	794	481	433	235	128	658	390	140	33
Future Volume (vph)	67	462	266	794	481	433	235	128	658	390	140	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		375	400		200	150		0	175		175
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor	1.00	0.99		0.99		0.98	1.00				1.00	
Frt		0.945				0.850			0.850		0.971	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3352	0	3467	3574	1599	1787	1881	1599	3467	1820	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1783	3352	0	3449	3574	1559	1779	1881	1599	3467	1820	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		67				446			467		7	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1312			609			730			589	
Travel Time (s)		29.8			13.8			16.6			13.4	
Confl. Peds. (#/hr)	2		6	6		2	5					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 (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	69	476	274	819	496	446	242	132	678	402	144	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	69	750	0	819	496	446	242	132	678	402	178	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Detector Phase	5	2		1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0		3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	9.5	38.3		9.5	38.3	38.3	9.5	23.1	23.1	9.5	45.1	
Total Split (s)	20.0	38.3		46.0	60.0	60.0	25.0	25.0	25.0	25.0	45.1	
Total Split (%)	13.0%	24.8%		29.8%	38.9%	38.9%	16.2%	16.2%	16.2%	16.2%	29.2%	
Maximum Green (s)	15.0	32.0		41.0	53.7	53.7	20.0	19.9	19.9	20.0	40.0	
Yellow Time (s)	3.0	4.3		3.0	4.3	4.3	3.0	3.1	3.1	3.0	3.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.3		5.0	6.3	6.3	5.0	5.1	5.1	5.0	5.1	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0	2.5	3.0	3.0	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0					7.0	
Flash Dont Walk (s)		25.0			25.0	25.0					33.0	
Pedestrian Calls (#/hr)		0			0	0					0	
Act Effct Green (s)	10.7	32.0		38.6	59.9	59.9	20.0	40.5	40.5	19.5	40.0	
Actuated g/C Ratio	0.07	0.21		0.25	0.39	0.39	0.13	0.27	0.27	0.13	0.26	
v/c Ratio	0.55	0.99		0.93	0.35	0.50	1.03	0.26	0.88	0.90	0.37	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	84.7	84.0		73.0	33.7	4.8	129.7	46.6	30.6	89.6	47.0	
Queue Delay	0.0	0.0		0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	
Total Delay	84.7	84.0		73.0	33.7	5.0	129.7	46.6	30.6	89.6	47.0	
LOS	F	F		E	C	A	F	D	C	F	D	
Approach Delay		84.1			44.7			55.4			76.5	
Approach LOS		F			D			E			E	
Queue Length 50th (ft)	69	~374		412	181	0	~264	107	242	209	142	
Queue Length 95th (ft)	121	#518		#517	241	75	#446	169	#501	#302	218	
Internal Link Dist (ft)		1232			529			650			509	
Turn Bay Length (ft)	195			400		200	150			175		
Base Capacity (vph)	176	758		935	1408	884	235	501	768	456	484	
Starvation Cap Reductn	0	0		0	0	86	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.39	0.99		0.88	0.35	0.56	1.03	0.26	0.88	0.88	0.37	

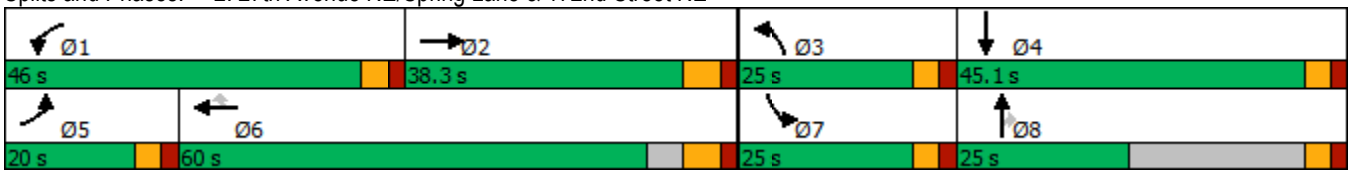
Intersection Summary

Area Type: Other
Cycle Length: 154.4
Actuated Cycle Length: 152
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.03
Intersection Signal Delay: 59.4 Intersection LOS: E
Intersection Capacity Utilization 109.3% ICU Level of Service H
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: 27th Avenue NE/Spring Lane & 172nd Street NE



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	377	163	665	710	395	262	120	530	389	100	64
Future Volume (vph)	42	377	163	665	710	395	262	120	530	389	100	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		375	400		200	150		0	175		175
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor							1.00				0.99	
Frt		0.955				0.850			0.850		0.942	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3413	0	3467	3574	1599	1787	1881	1599	3467	1761	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1787	3413	0	3467	3574	1599	1782	1881	1599	3467	1761	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		40				356			481		20	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1312			609			730			589	
Travel Time (s)		29.8			13.8			16.6			13.4	
Confl. Peds. (#/hr)							3					3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	44	397	172	700	747	416	276	126	558	409	105	67
Shared Lane Traffic (%)												
Lane Group Flow (vph)	44	569	0	700	747	416	276	126	558	409	172	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Detector Phase	5	2		1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0		3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	9.5	38.3		9.5	38.3	38.3	9.5	23.1	23.1	9.5	45.1	
Total Split (s)	20.0	38.3		46.0	60.0	60.0	25.0	25.0	25.0	25.0	45.1	
Total Split (%)	13.0%	24.8%		29.8%	38.9%	38.9%	16.2%	16.2%	16.2%	16.2%	29.2%	
Maximum Green (s)	15.0	32.0		41.0	53.7	53.7	20.0	19.9	19.9	20.0	40.0	
Yellow Time (s)	3.0	4.3		3.0	4.3	4.3	3.0	3.1	3.1	3.0	3.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.3		5.0	6.3	6.3	5.0	5.1	5.1	5.0	5.1	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0	2.5	3.0	3.0	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0					7.0	
Flash Dont Walk (s)		25.0			25.0	25.0					33.0	
Pedestrian Calls (#/hr)		0			0	0					0	
Act Effct Green (s)	8.5	27.2		33.0	54.1	54.1	20.1	41.0	41.0	19.3	40.2	
Actuated g/C Ratio	0.06	0.19		0.23	0.38	0.38	0.14	0.29	0.29	0.14	0.28	
v/c Ratio	0.42	0.83		0.87	0.55	0.50	1.09	0.23	0.69	0.87	0.34	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	78.7	63.0		65.0	36.6	7.8	139.0	42.8	12.8	79.7	39.7	
Queue Delay	0.0	0.0		0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	
Total Delay	78.7	63.0		65.0	36.6	7.9	139.0	42.8	12.8	79.7	39.7	
LOS	E	E		E	D	A	F	D	B	E	D	
Approach Delay		64.2			40.9			53.0			67.9	
Approach LOS		E			D			D			E	
Queue Length 50th (ft)	40	252		325	289	36	~294	91	55	194	113	
Queue Length 95th (ft)	87	340		412	367	126	#525	163	212	#310	199	
Internal Link Dist (ft)		1232			529			650			509	
Turn Bay Length (ft)	195			400		200	150			175		
Base Capacity (vph)	189	804		1006	1489	874	253	543	803	491	513	
Starvation Cap Reductn	0	0		0	0	65	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.23	0.71		0.70	0.50	0.51	1.09	0.23	0.69	0.83	0.34	

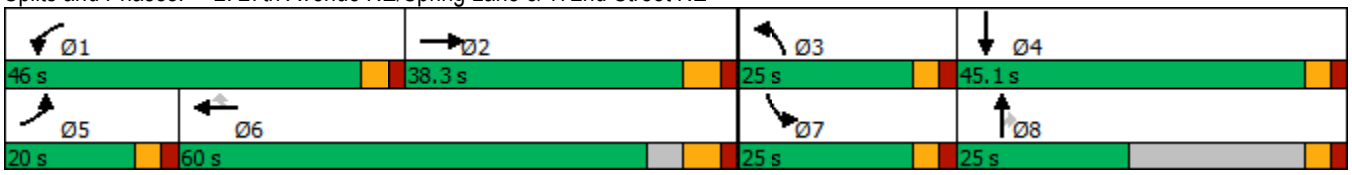
Intersection Summary

Area Type: Other
Cycle Length: 154.4
Actuated Cycle Length: 142.1
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.09
Intersection Signal Delay: 51.2 Intersection LOS: D
Intersection Capacity Utilization 100.3% ICU Level of Service G
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: 27th Avenue NE/Spring Lane & 172nd Street NE



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	499	266	794	536	433	235	128	658	390	140	33
Future Volume (vph)	67	499	266	794	536	433	235	128	658	390	140	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		375	400		200	150		0	175		175
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor	1.00	0.99		1.00		0.98	1.00				1.00	
Frt		0.948				0.850			0.850		0.971	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3364	0	3467	3574	1599	1787	1881	1599	3467	1820	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1783	3364	0	3450	3574	1559	1779	1881	1599	3467	1820	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		57				446			463		7	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1312			609			730			589	
Travel Time (s)		29.8			13.8			16.6			13.4	
Confl. Peds. (#/hr)	2		6	6		2	5					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 (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	69	514	274	819	553	446	242	132	678	402	144	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	69	788	0	819	553	446	242	132	678	402	178	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Detector Phase	5	2		1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0		3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	9.5	38.3		9.5	38.3	38.3	9.5	23.1	23.1	9.5	45.1	
Total Split (s)	20.0	38.3		46.0	60.0	60.0	25.0	25.0	25.0	25.0	45.1	
Total Split (%)	13.0%	24.8%		29.8%	38.9%	38.9%	16.2%	16.2%	16.2%	16.2%	29.2%	
Maximum Green (s)	15.0	32.0		41.0	53.7	53.7	20.0	19.9	19.9	20.0	40.0	
Yellow Time (s)	3.0	4.3		3.0	4.3	4.3	3.0	3.1	3.1	3.0	3.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.3		5.0	6.3	6.3	5.0	5.1	5.1	5.0	5.1	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0	2.5	3.0	3.0	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0					7.0	
Flash Dont Walk (s)		25.0			25.0	25.0					33.0	
Pedestrian Calls (#/hr)		0			0	0					0	
Act Effct Green (s)	10.7	32.0		38.6	59.9	59.9	20.0	40.5	40.5	19.5	40.0	
Actuated g/C Ratio	0.07	0.21		0.25	0.39	0.39	0.13	0.27	0.27	0.13	0.26	
v/c Ratio	0.55	1.05		0.93	0.39	0.50	1.03	0.26	0.89	0.90	0.37	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	84.7	98.2		73.0	34.4	4.8	129.7	46.6	31.3	89.6	47.0	
Queue Delay	0.0	0.0		0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	
Total Delay	84.7	98.2		73.0	34.4	5.0	129.7	46.6	31.3	89.6	47.0	
LOS	F	F		E	C	A	F	D	C	F	D	
Approach Delay		97.1			44.6			55.8			76.5	
Approach LOS		F			D			E			E	
Queue Length 50th (ft)	69	~433		412	206	0	~264	107	248	209	142	
Queue Length 95th (ft)	121	#569		#517	270	75	#446	169	#507	#302	218	
Internal Link Dist (ft)		1232			529			650			509	
Turn Bay Length (ft)	195			400		200	150			175		
Base Capacity (vph)	176	753		935	1408	884	235	501	765	456	484	
Starvation Cap Reductn	0	0		0	0	86	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.39	1.05		0.88	0.39	0.56	1.03	0.26	0.89	0.88	0.37	

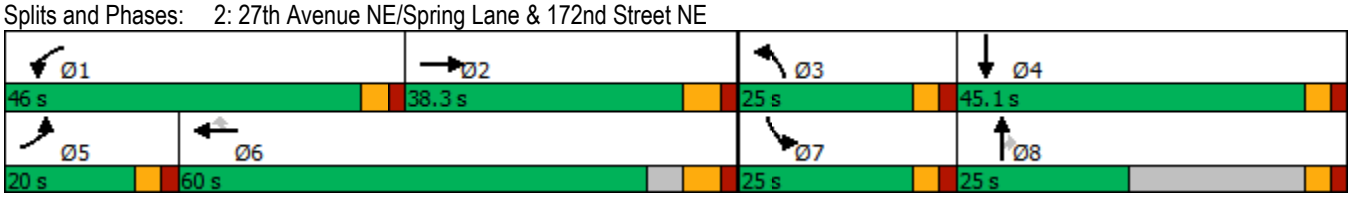
Intersection Summary

Area Type: Other
Cycle Length: 154.4
Actuated Cycle Length: 152
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.05
Intersection Signal Delay: 62.1 Intersection LOS: E
Intersection Capacity Utilization 110.1% ICU Level of Service H
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: 27th Avenue NE/Spring Lane & 172nd Street NE



WSDOT Exhibit C List

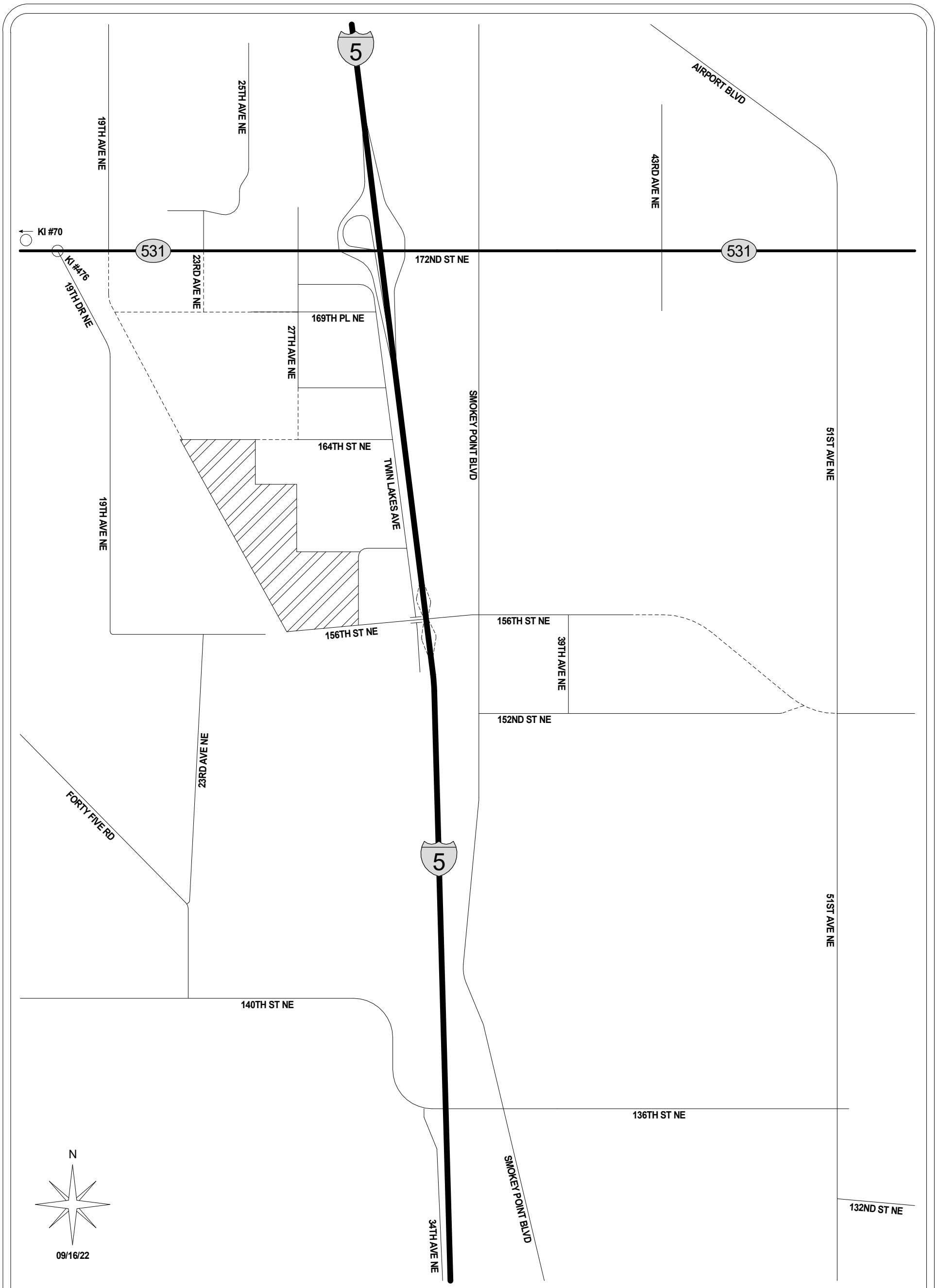
LIST OF PROGRAMED
WSDOT PROJECTS IN
SNOHOMISH COUNTY
AS OF Nov. 2008

County ID#	TSA	SR	MP1	MP2	Title/Description	Design/ Construction year	Total Cost (M)	TOTAL CAPA-CITY (ADT)	PRESENT VOLUME	RESERVE CAPACITY (ADT)	TRUE CONTRI-BUTION PER ADT	50% TRIP END DEDUCTION	TAX DEDUCTION	Proportionate Share Per Development Generated ADT
DOT-11	D	5	186.42	186.42	128th ST SW Interchange - Construct Loop Ramps / HOV Bypass	2014	$13.30	99,000	65,000	34,000	$391.18	$195.15	$40.98	$154.17
DOT-01	A	5	205.85	205.85	172nd Street NE (SR 531) Interchange improvements, SB loop ramp, bridge widening	2009	$41.00	90,000	34,900	55,100	$744.10	$372.05	$63.25	$308.80
DOT-30	E	9	1.66	4.04	212th Street SE to 176th Street SE, widen to 5 lanes	2011	$80.80	54,000	21,000	33,000	2,448.48	$1,224.24	$183.64	$1,040.60
DOT-56	B	9	16.48	17.49	Lundeen Parkway to SR-92, Widen to 4 lanes & RT-LT lanes	2009	$38.90	54,000	24,000	30,000	$1,296.67	$648.34	$123.18	$525.16
DOT-37	B	9	17.96	17.96	SR-9 at 60th Street NE, add LT & RT lanes at Tee intersection	2011	$2.95	54,000	36,000	18,000	$163.89	$81.95	$13.91	$67.94
DOT-22	A	9	18.88	19.46	SR 9/SR 528 Intersection improvements, Signal & Channelization	2010	$17.13	54,000	36,000	18,000	$951.67	$475.83	$80.89	$394.94
DOT-57	A	9	20.51	20.59	SR-9/84th Street NE intersection improvements, LT & RT lanes	2011	$17.13	54,000	12,000	42,000	$407.88	$203.93	$55.06	$148.87
DOT-58	A	9	26.00	26.09	SR-9/SR-531/172nd St. NE intersection improvement, Roundabout	2011	$15.60	54,000	11,000	43,000	$362.80	$181.40	$45.87	$135.53
DOT-33	B	92	1.46	1.46	SR-92 at 113th Avenue NE, Roundabout	2009	$2.36	54,000	19,600	34,000	$68.60	$34.30	$6.52	$27.78
DOT-31	B	92	1.73	1.73	SR-92 at Callow/Grade Road, turn lanes to SR-92	2009	$1.90	54,000	19,600	34,400	$55.24	$27.62	$5.25	$22.37
DOT-46	C	203	22.36	22.38	SR-203 at North High Rock/Tualco Roads, Re-align cross street for I/S and add LT & RT lanes on SR-203	2009	$3.34	18,000	13,000	5,000	$688.00	$344.00	$73.48	$270.52
DOT-36	C	203	23.01	23.01	Ben Howard Rd channelization, LT lanes on SR-203	2009	$1.07	54,000	13,000	41,000	$26.10	$13.05	$2.87	$10.18
DOT-16	E	522	13.82	16.61	Paradise Lake Road I/C, Stage 3, new interchange	2010	$27.95	81,000	48,000	33,000	$847.03	$423.52	$63.53	$359.99
DOT-17	E	522	16.80	20.41	Paradise Lake Road to Snohomish River, Bridge, Stage 2, widen to 4 lanes	2009	$33.48	80,000	21,900	58,100	$576.25	$288.13	$43.22	$244.91
DOT-28	C	522	20.50	24.68	Snohomish River Bridge to SR 2, widen to 4 lanes	2010	$171.98	80,000	20,000	60,000	$2,866.33	$1,433.17	$315.30	$1,117.87

LIST OF PROGRAMED
WSDOT PROJECTS IN
SNOHOMISH COUNTY
AS OF Nov. 2008

County ID#	TSA	SR	MP1	MP2	Title/Description	Design/ Construction year	Total Cost (M)	TOTAL CAPA-CITY (ADT)	PRESENT VOLUME	RESERVE CAPACITY (ADT)	TRUE CONTRI-BUTION PER ADT	50% TRIP END DEDUCTION	TAX DEDUCTION	Proportionate Share Per Development Generated ADT
DOT-19	F	524	5.87	9.50	24th Avenue SE to I-405, widen to 5 Lanes	2012	$33.34	54,000	15,300	38,700	$861.50	$430.75	$77.54	$353.21
DOT-20	F	524	5.87	9.50	I-405 to Royal Ann Road, widen to 5 Lanes	2011	$71.06	54,000	15,300	38,700	$1,836.18	$918.09	$165.26	$752.83
DOT-60	E	524	6.79	6.79	Larch Way intersection, LT lanes, signal	2009	$2.59	54,000	15,300	38,700	$66.93	$33.47	$5.02	$28.45
DOT-59	D	525	6.25	6.25	SR-525/88th St. SW intersection improvements, NBRT, NBLT & SBLT	2011	$3.70	25,700	17,000	8,700	$425.29	$212.64	$89.31	$123.33
DOT-49	A	530	17.30	17.30	SR-530 at Old 99, Roundabout	2011	$8.00	18,000	10,000	8,000	$1,000.00	$500.00	$85.00	$415.00
DOT-62	A	530	19.71	19.71	211th Place NE, Intersection Roundabout	2011	$6.10	24,000	15,000	9,000	$677.78	$338.89	$57.61	$281.28
DOT-52	A	531	1.95	2.25	SR-531/Jct. Freestad Road Intersection, LT lanes	2011	$1.55	18,000	7,900	10,100	$140.14	$70.07	$11.92	$58.15
DOT-05	A	531	7.00	8.59	43rd Ave. NE to 67th Ave. NE, NE, Widen to 5 lanes (Arlington)	2014	$20.78	54,000	11,000	43,000	$483.14	$241.57	$41.07	$200.50
DOT-53	A	532	5.25	5.90	270th St. NW Vic. To 72nd Ave. NW, EB Climbing Lane, intersection improvements & signal.	2009	$19.00	54,000	16,000	38,000	500	$250.00	$28.75	$221.25
DOT-54	A	532	6.45	9.79	64th Ave. NW to 12th Ave. NW, Climbing lane & LT Lanes	2010	$22.40	54,000	17,000	37,000	$605.41	$302.70	$33.75	$268.95
					TAX DEDUCTIONS									
					TSA A = 17%									
					TSA B = 19%									
					TSA C = 22%									
					TSA D = 21%									
					TSA E = 15%									
					TSA F = 18%									

Snohomish County Key Intersections



Kimley»Horn

TRAFFIC IMPACT STUDY
KH #090222183

10 DEGREES

CITY OF MARYSVILLE

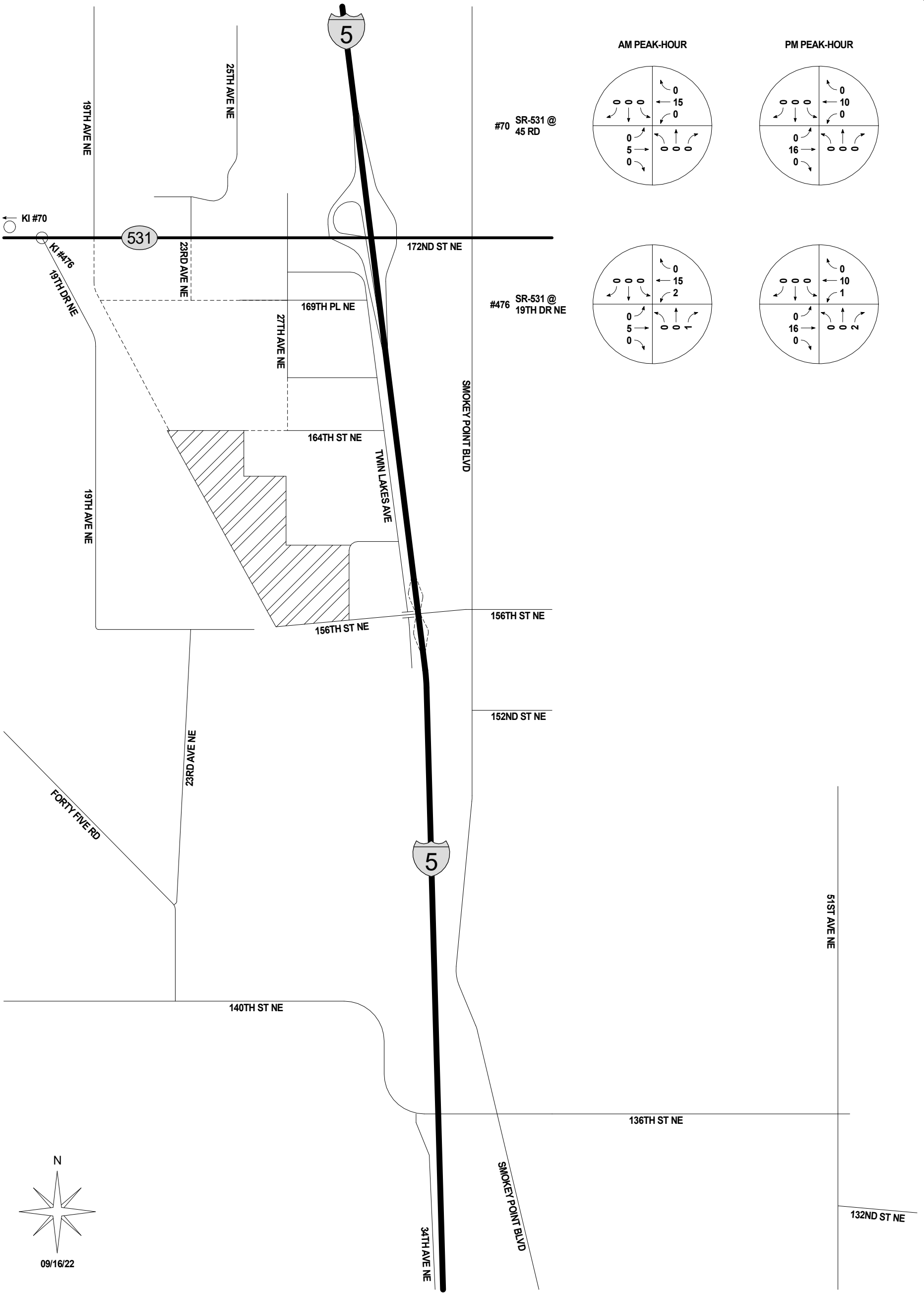
LEGEND

DEVELOPMENT SITE

KI # SNOHOMISH COUNTY KEY INTERSECTION

FIGURE A

SNOHOMISH COUNTY KEY INTERSECTIONS



Kimley»Horn

TRAFFIC IMPACT STUDY
KH #090222183

10 DEGREES

CITY OF MARYSVILLE

LEGEND

XXX → DEVELOPMENT TURNING MOVEMENT VOLUMES

FIGURE B

SNOHOMISH COUNTY KEY INTERSECTION TURNING MOVEMENTS

Table A: AM Peak-Hour Key Intersection Volumes

Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#70: Forty-Five Rd at SR-531	0	5	0	0	14	0	0	0	0	0	0	0
#476: 19th Dr NE at SR-531	0	5	0	2	14	0	0	0	0	0	0	0

Table B: PM Peak-Hour Key Intersection Volumes

Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#70: Forty-Five Rd at SR-531	0	15	0	0	9	0	0	0	0	0	0	0
#476: 19th Dr NE at SR-531	0	15	0	1	9	0	0	0	2	0	0	0