

MEMORANDUM

To: Jesse Hannahs, PE, City of Marysville
From: Brad Lincoln, PE *BL*
Subject: 10 Degrees – PA 21-039
Traffic Comment Response
Date: March 17, 2022
Project: GTC #21-190

This memorandum addresses comments for the 10 Degrees development (PA 21-039) dated October 14, 2021. This comment response specifically addresses Comment #2 and three subparts (b through d). It is important to note that Comment 2a is more about process and not one that needs to a response. The comments are based on the initial traffic impact analysis completed in August 2021.

Comment 2b – Analysis of 172nd Street NE at 27th Avenue NE with Diversion

The intersection of 172nd Street NE at 27th Avenue NE was identified to operate at LOS F under the 2030 baseline and 2030 horizon year conditions during the Saturday peak-hour (Table 5 in the initial TIA). It is important to note that all of the study intersections are anticipated to operate at acceptable levels of service during the weekday PM peak-hour.

This intersection has been re-evaluated with a 25% diversion, which what is identified in the comment. 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 this response.

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 E under the 2030 baseline and 2030 horizon year conditions. This level of service meets the City of Marysville standards for signalized intersections along the 172nd Street NE corridor. The level of service calculations are included with this response.

Response

The intersection of 172nd Street NE at 27th Avenue NE is anticipated to operate at an acceptable level of service with the 25% diversion identified in the comment memorandum. Additional improvements by the 10 Degrees development should not be required for the intersection of 172nd Street NE at 27th Avenue NE.

Comment 2C – Trip Distribution

The trip distribution documented in the initial traffic impact analysis using the “Lakewood S/O 172nd St NE” trip distribution provided by the City of Marysville. Additionally, the trip generation for the initial traffic was completed for 166 single-family detached units and 170 multifamily units. The current proposal includes 167 single-family detached units and 166 multifamily units. The trip generation of the overall site is not anticipated to significantly change from what was documented and evaluated in the initial traffic impact analysis.

Response

The trip distribution and trip generation in the initial traffic impact analysis should be considered acceptable and additional analysis should not be required.

Comment 2D – Commercial Development

The initial traffic impact analysis only evaluated the residential units that are being proposed. The current proposal does not include any commercial uses, are not included in the site plan, and have not been disclosed to GTC. Any future commercial uses should be evaluated separately since those additional impacts and any resulting mitigation would be associated with the commercial use. It is reasonable to require the trips generated by the residential units of the 10 Degrees development to be evaluated.

Response

Commercial uses are not part of the 10 Degrees development and have therefore not been evaluated. The impacts of any potential future commercial development should be evaluated separately.

Attachments

Horizon Year

2 27th Ave NE at 172nd St NE

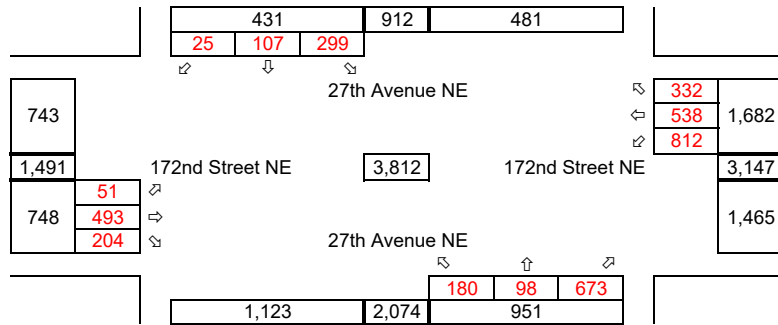
Saturday Peak-Hour

Synchro ID: 2

Existing
Saturday
Peak-Hour

Year: **7/31/2021**

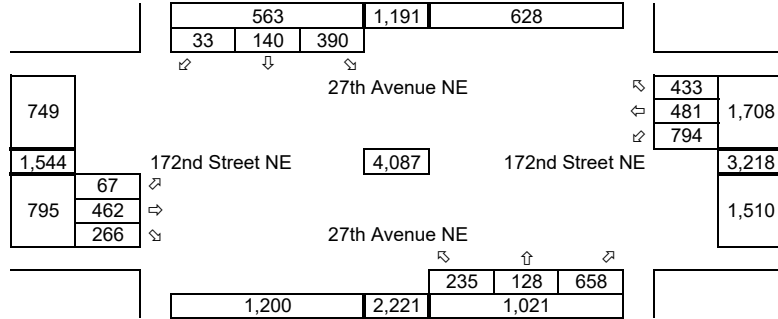
Data Source: **TDG**



↑
North
↓

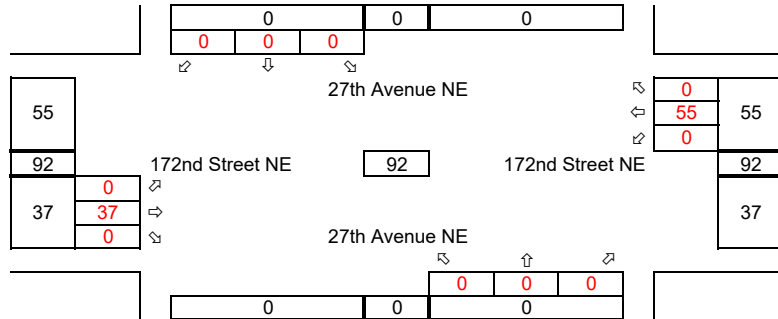
Future without Development
Saturday
PM Peak Hour

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



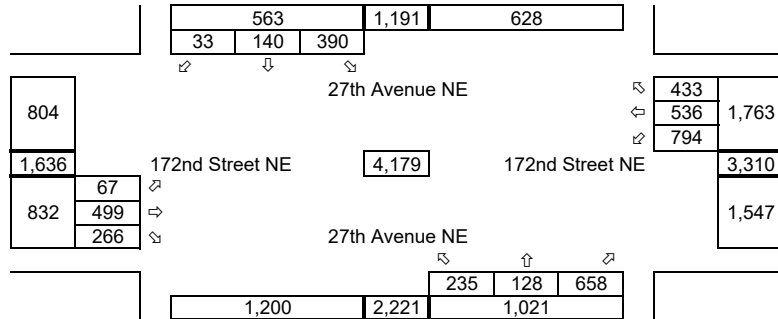
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North
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Total Development Trips
Saturday
PM Peak Hour



↑
North
↓

Future with Development
Saturday
PM Peak Hour



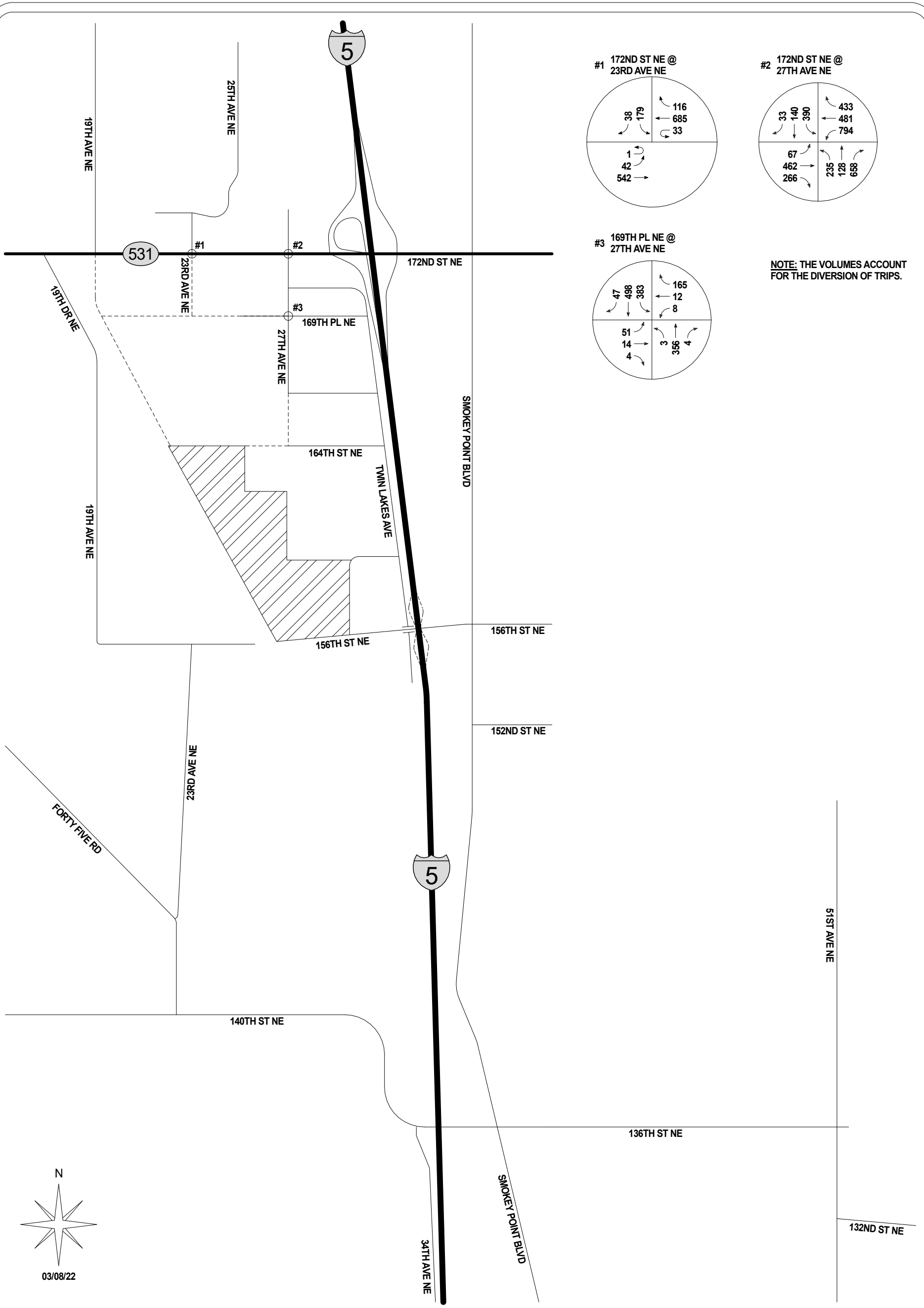
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North
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Diversion Trips
Saturday
PM Peak Hour

Reduction: **25%**



↑
North
↓



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #21-190

10 DEGREES

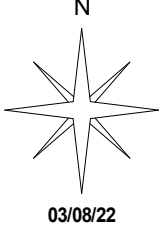
LEGEND

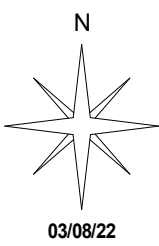
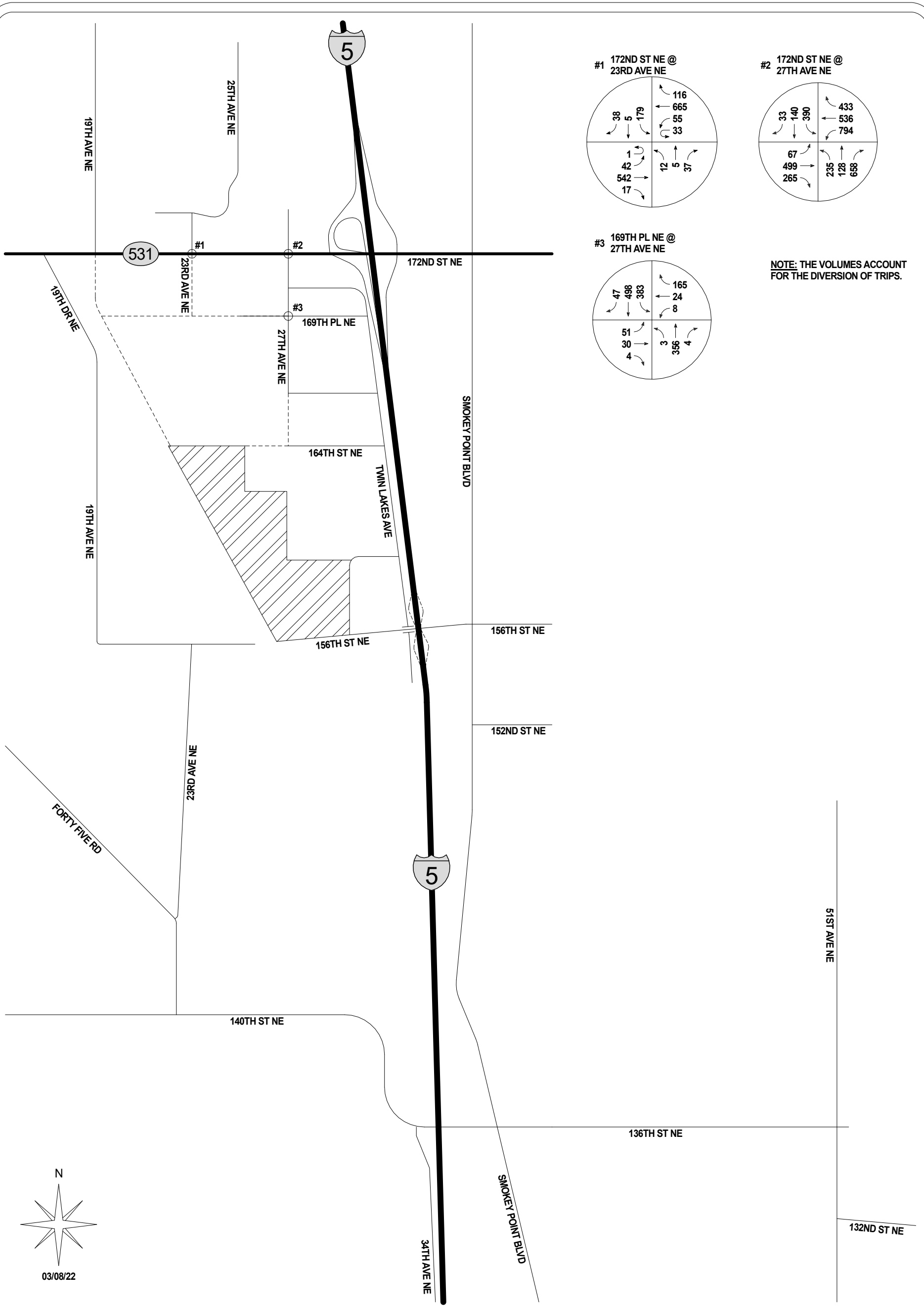
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SATURDAY PEAK-HOUR
TURNING MOVEMENT VOLUMES

CITY OF MARYSVILLE

FIGURE 15
2030 BASELINE
TURNING MOVEMENTS
SATURDAY PEAK-HOUR





GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #21-190

10 DEGREES

LEGEND
























xxx → SATURDAY PEAK-HOUR
TURNING MOVEMENT VOLUMES

CITY OF MARYSVILLE

FIGURE 17
2030 HORIZON YEAR
TURNING MOVEMENTS
SATURDAY PEAK-HOUR

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	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	

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	84.7	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	

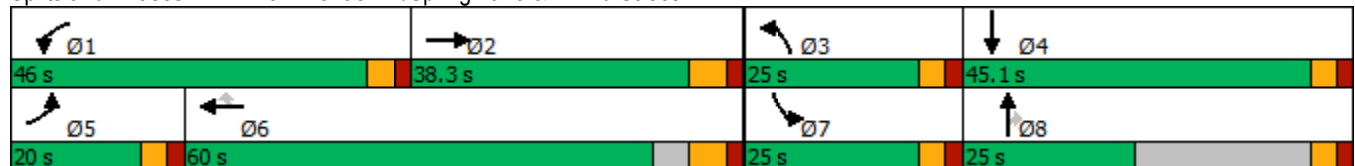
Intersection Summary

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 Capacity Utilization 109.3%
 Analysis Period (min) 15

Intersection LOS: E
 ICU Level of Service H

- ~ 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



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

10 Degrees

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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	
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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	

Lanes, Volumes, Timings
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10 Degrees

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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 Capacity Utilization 110.1%
 Analysis Period (min) 15

Intersection LOS: E
 ICU Level of Service H

- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
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Splits and Phases: 2: 27th Avenue NE/Spring Lane & 172nd Street NE

