

TRAFFIC IMPACT ANALYSIS

OAK TREE STATION

Camas, Washington

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ENGINEERING NORTHWEST

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INTRODUCTION

This project will consist of a 5,500 sq.ft indoor and outdoor eating area which is surrounded by food carts. Also the project will consist of a drive thru 600 sq.ft coffee shop. The restaurant use is proposed on the most south westerly portion of the site approximately 1.5 acres in size and approximately. Currently all proposed parcel for the development are zoned Commercial Community (CC). Access will be provided by utilizing the existing driveway onto NW Friberg-Strunk St and constructing a new driveway approach onto NW Lake Road which will be right-in / right-out. Please refer to the plans included in this application for more information on the proposed lot layout.

As indicated on vicinity map the 3.95-acre subject site is located north side of NW Lake Road in City of Camas Washington. The approximate latitude and longitude are 45.81151278°N 122.69973816°W and the legal description is a portion of the SE 1/4, S29, T2N, R3E of the Willamette Meridian. The regulatory jurisdictional agency is the City of Camas, Washington.



Vicinity Map

The proposed development is estimated to generate more than 200 vpd. As per City of Camas a traffic impact study is required. Traffic profile for this project is shown below in table 2.

TRAFFIC ANALYSIS CONSIDERATION

In the project scope established City of Camas, a number of important elements were identified and considered in this study.

- Inventory and record pertinent information such as traffic control devices, lane conditions, pedestrian & bicycle facilities, transit zones, parking conditions, and street characteristics
- Record data on typical weekdays during the am and pm peak traffic hours
- Forecast year 2027 traffic conditions during the weekday am and pm peak hours
- Level of service (LOS) analysis of the study intersections to measure the approach delays for comparison to City of Camas standards
- Verification of intersection sight distance at the existing/proposed accesses.
- On-Site access
- Implementation of the trip generation rates for AM & PM the proposed development

SCOPE OF TRAFFIC IMPACT STUDY AREA

The scope of the traffic impact study area included the following intersections:

- NW Friberg-Strunk Street/ NW Lake Road
- NW 192 Avenue / SE 1st Street (Within the City Limits)
- NW Payne Street / NW Lake Road

The remainder of this report presents the following analysis:

- Existing traffic conditions in the project study area
- 2027 “Without Project” condition to establish the baseline condition by which the project impacts could be determined.
- Trip generation estimates for the proposed development
- 2027 “With Project” condition to determine project traffic impacts

SITE CONDITIONS AND ADJACENT LAND USES

The study site is located northeast of intersection of NW Friberg-Strunk Street and NW Lake Road. Table 1 summarizes key characteristics of the adjacent roadways.

Table 1

Roadway	Classification	Cross Section	Speed Limit	Side-walks	Bicycle Lanes	Median	On-Street Parking
NW Lake Rd	Arterial Roadway	4-lanes	40	yes	yes	yes	no
		5-lane	35				
NW Friberg-Strunk rd	Collector Arterial	2-lanes	20	yes	yes	no	no
NW Larkspur St	Arterial Roadway	2-lanes	25	Intermit	No	No	no
NE 192 nd Ave	Principal Arterial	2/4-lanes	40	yes	yes	yes	No

PEDESTRIAN AND BICYCLE FACILITIES

Sidewalks are currently provided along the site frontage on NW Friberg-Strunk Rd and NW Lake Rd. Currently no bike lanes exist on both sides of NW Friberg-Strunk Rd.

TRANSIT FACILITIES

C-Tran provides public transit service in Clark County. Currently there is no transit service in the project vicinity.

PROPOSED DEVELOPMENT TRIP GENERATION ESTIMATE

Estimates of daily and weekday am and pm peak hour vehicle trip ends for the proposed development were calculated from empirical observations at other similar developments. These observations were obtained from the standard reference manual, Trip Generation, 10th Edition, and the Trip Generation Handbook, published by the

Institute of Transportation Engineers (ITE) (References 2 and 3). Table 2 summarizes the estimated site trip generation. The trip generation table below includes AM and PM. The Food Cart facility will not operate before 11am.

Table 2. Trip Generation Summary

	Amount	Average Daily	A.M. Peak			P.M. Peak		
			In	Out	Total	In	Out	Total
High Turnover Sit-Down Restaurant - ITE Code 932								
Rate per 1,000 square feet (ksf)		112.18				6.06	3.71	9.77
Trips	5.5 ksf	617				34	20	54
Coffee Shop with Drive Through - ITE Code 937								
Rate per 1,000 square feet (ksf)		818.58	51.30	49.28	100.58	21.40	21.40	42.80
Trips	0.6 ksf	491	31	29	60	13	13	26
Net Total Site Trips		1,108	31	29	60	47	33	80

TRIP DISTRIBUTION AND ASSIGNMENT

A generalized trip distribution pattern for the A.M. and P.M. peak hour project-generated trips was developed for the existing traffic counts, previous traffic studies, locations of major employment centers and residential areas, and logical travel paths to and from major travel corridors. Appendix A shows the resulting trip distribution pattern and assignment of A.M. and P.M. peak hour project generated trips without pass-

TRAFFIC OPERATIONAL ANALYSIS

In order to evaluate traffic flow and delay in the area the signalized intersection a Level of Services (LOS) analyses were completed in the pm peak hour period and am peak hour period for the following scenarios: The analyzed intersections identified below using the methodologies outlined in the 2010 Highway Capacity manual (HCM).

According to the HCM there are six levels of service (LOS) by which the operational performance of an intersection may be described. These levels of service range between

LOS “A” which indicates a relatively free-flowing condition and LOS “F” which indicates operational breakdown. LOS “D” is the Cit of Camas adopted level of service standard for arterial/collector intersection. The overall level of serves was report in the table below.

- 2022 Existing Traffic

Table 1: Existing Levels of Service

	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Average Delay (sec)	LOS	Average Delay (sec)
Signalized Intersections				
NW Friberg-Strunk St/NW Lake Rd	A	8.8	A	10.0
NW Lake Road / NW Larkspur Rd	A	8.2	B	14.7
SE 1 st St / NE & SE 192 Avenue	C	32	C	32.7

In order to perform the Level of Service (LOS) analysis at the intersections, manual traffic counts were conducted during the pm peak (4:00-6:00 pm) traffic hours and am peak (7:00-9:00 am). The existing volume data for the weekday peak hours (see Appendix A).

CAPACITY ANALYSIS

Capacity analysis was performed to determine the level of service for the weekday pm peak hour and weekday am peak hour. Synchro 10 software was used to determine the level of service for each scenario considered. The program is based on the latest Highway Capacity Manual (HCS) methodology.

Generally, LOS ‘A’, ‘B’, ‘C’, and ‘D’ are desirable service levels ranging from no vehicle delays to average or longer than average delays in the peak hours. Level ‘E’ represents long delays indicating signalization warrants need to be reviewed and signals considered only if warrants are met. Level ‘F’ indicates that intersection improvements, such as widening and signalization, may be required. According to the Highway

Capacity Manual (HCM), the following delay times are associated with the LOS at stop controlled unsignalized and signalized intersections.

Level of Service criteria defined in the 2000 Highway Capacity Manual

Level of Service (LOS)	Unsignalized Control Stopped Delay (sec/veh)	Signalized Control Stopped Delay (sec/veh)
A	<10	<10
B	> 10 and <15	>10 and <20
C	>15 and <25	>20 and <35
D	>25 and <35	>35 and < 55
E	>35 and <50	>55 and <80
F	>50	>80

QUEUING ANALYSIS

Queuing analysis at the project access intersection were not conducted due to low traffic volumes, acceptable levels of service, and acceptable accident rate in the 2027 “With Project” conditions.

SIGHT DISTANCE

Sight distance at the driveway approach onto NW Friberg-Strunk was reviewed in the field in accordance with City of Camas standards. Based on at a posted speed of 20 miles per hour, City of Camas requires a minimum of 200 of sight distance be available in both directions. The sight distance is to be measured from an eye height of 3.5 feet, at least fifteen feet from the edge of the uncontrolled public travel way. Based on the measurements obtained from existing driveway approach along NW Friberg-Strunk Rd the project has 200 feet of sight distance is available to the north and south. This distance exceeds City of Camas minimum sight distance requirements of 200 feet.

Sight distance at the driveway approach onto NW Lake Rd was reviewed in the field in accordance with City of Camas standards. Based on at a posted speed of 40 miles per hour, City of Camas requires a minimum of 400 of sight distance be available in both directions. The sight distance is to be measured from an eye height of 3.5 feet, at least fifteen feet from the edge of the uncontrolled public travel way. Based on the measurements obtained from proposed driveway approach along NW lake Rd the

project has 400 feet of sight distance is available to the east. This distance exceeds City of Camas minimum sight distance requirements of 400 feet.

LEFT TURN LANE WARRANTS

None

2027 WITHOUT PROJECT TRAFFIC L.O.S.

The 2027 “Without Project” traffic volumes were calculated using a nominal 0.5 percent annual compounded growth factor as established by pervious traffic studies

	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Average Delay (sec)	LOS	Average Delay (sec)
Signalized Intersections				
NW Friberg-Strunk St/NW Lake Rd			A	9.3
NW Lake Road / NW Larkspur Rd			A	8.4
SE 1 st St / NE & SE 192 Avenue			D	38.4

2027 WITH PROJECT TRAFFIC L.O.S.

The 2027 “Without Project” traffic volumes were calculated using a nominal 0.5 percent annual compounded growth factor as established by pervious traffic studies.

The traffic study area intersection are projected to operate within adopted level of service standards in the 2027 “With Project”

	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Average Delay (sec)	LOS	Average Delay (sec)
Signalized Intersections				
NW Friberg-Strunk St/NW Lake Rd	B	11.7	B	15.0
NW Lake Road / NW Larkspur Rd	A	6.8	A	7.7
SE 1 st St / NE & SE 192 Avenue				

PROJECT CROSS CIRCULATION

This project will not provide a private connection to the parcel to the east because a significant portion of the parcel is wetland and currently owned by the City of Camas.

FINDINGS AND RECOMMENDATIONS

Based on the results of the transportation impact analysis, the proposed Oak Tree Station development can be constructed while maintaining acceptable levels of service and safety at the study intersections. The primary findings and recommendations of this study are summarized below.

Existing Conditions

- All of the study intersections operated within operating standards deemed acceptable by the City of Camas during the weekday am and pm peak hours.

YEAR 2022 and 2027 Total Traffic Conditions

- Year 2018 and 2023 total traffic conditions were estimated assuming continued local and regional growth plus the proposed site traffic. Operational analysis indicates that the study intersections are forecast to continue to operate at acceptable levels.
- Engineering Northwest LLC performed filed sight distance measurements. The project access intersection will be able to meet the sight distance requirements assuming any vegetation within the sight distance triangles are properly maintained after construction.

REFERENCES

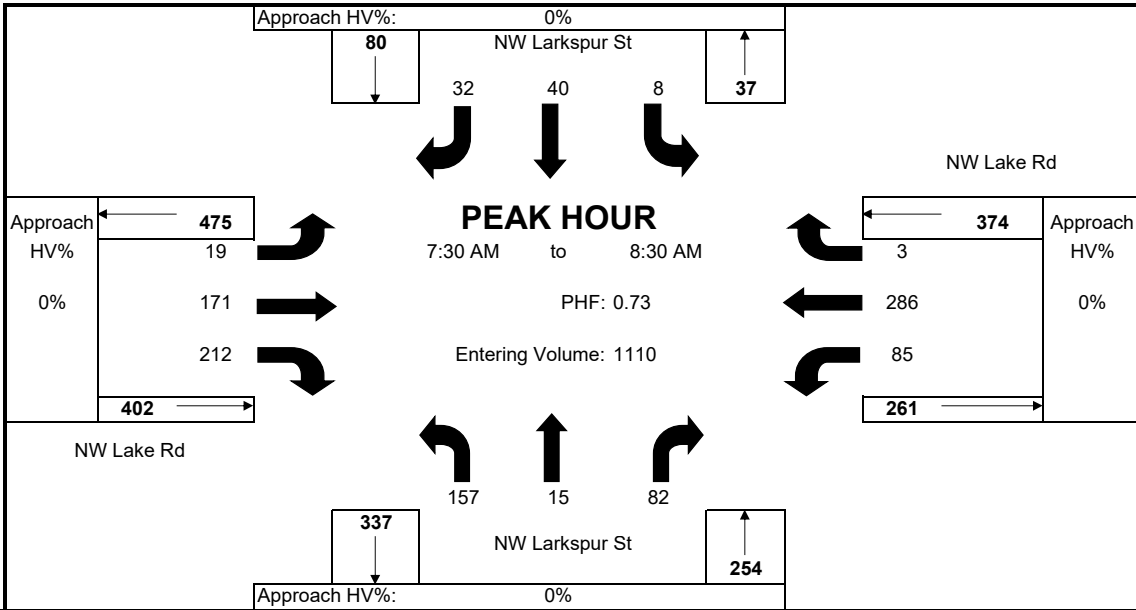
- 1) C-Tran, <http://www.c-tran.com>, March 201
- 2) Institute of Transportation Engineers, Trip Generation, 10th Editions
- 3) Transportation Research Board, Highway Capacity Manual, 2010

Appendix B

Existing Traffic Counts

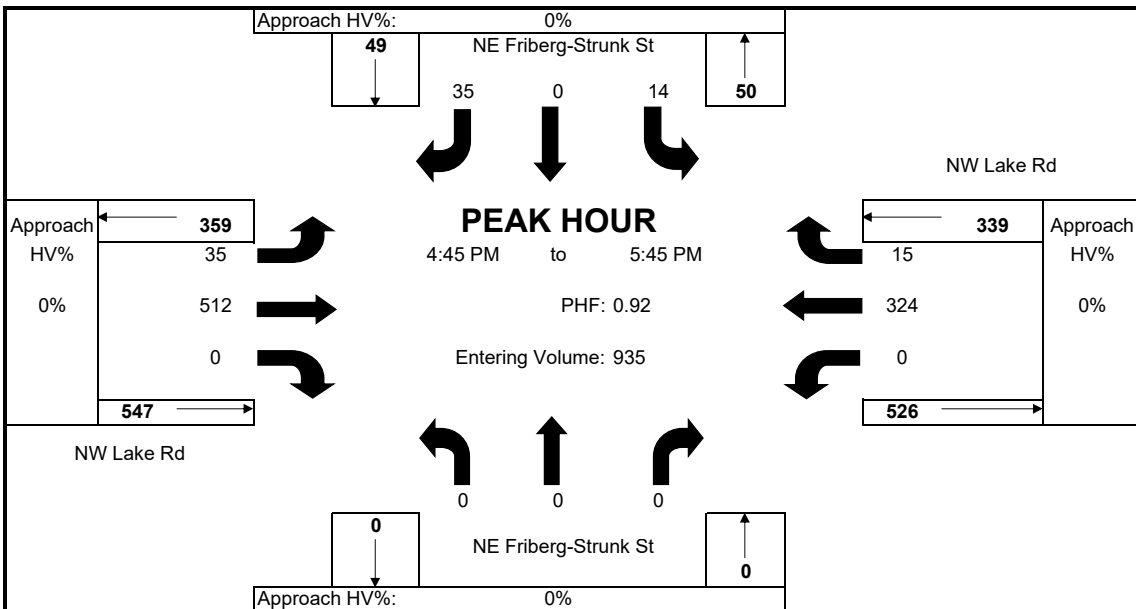
LOCATION:

NW Larkspur St & NW Lake Rd
Ridgefield, WA

DATE: 1/5/2022**DAY:** Wednesday**TIME:** 7:30 to 8:30

Time Period	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	←	↑	→	←	↓	→	↑	→	↓	↓	←	↑	
7:30 7:45	50	4	18	5	13	2	3	39	45	30	70	1	280
7:45 8:00	56	7	48	11	13	2	4	46	79	35	80	0	381
8:00 8:15	22	4	13	6	8	1	7	44	54	13	78	1	251
8:15 8:30	29	0	3	10	6	3	5	42	34	7	58	1	198
8:30 8:45	26	3	11	7	9	1	5	46	14	9	56	1	188
8:45 9:00	38	4	10	9	4	3	5	45	20	8	97	1	244
9:00 9:15	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 9:30	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 9:45	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 10:00	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 10:15	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 10:30	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL:	221	22	103	48	53	12	29	262	246	102	439	5	1542
Peak HR %HV:	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Peak HR Factor:	0.70	0.54	0.43	0.73	0.77	0.67	0.68	0.93	0.67	0.61	0.89	0.75	

DATE: 1/5/2022
DAY: Wenesday
TIME: 7:30 to 8:30

LOCATION:NE Friberg-Strunk St & NW Lake Rd
Camas, WA**DATE:** 1/5/2022**DAY:** Wednesday**TIME:** 16:00 to 9:00

Time Period	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	←	↑	→	←	↓	→	↑	→	↓	↓	←	↑	
16:00 16:15	0	0	0	5	0	6	10	95	0	0	77	6	199
16:15 16:30	1	0	0	8	0	4	5	120	0	0	98	3	239
16:30 16:45	0	0	0	6	0	3	10	119	0	0	92	2	232
16:45 17:00	0	0	0	9	0	5	5	106	0	0	91	4	220
17:00 17:15	0	0	0	10	0	3	12	118	0	0	75	5	223
17:15 17:30	0	0	0	9	0	2	7	165	0	0	66	4	253
17:30 17:45	0	0	0	7	0	4	11	123	0	0	92	2	239
17:45 18:00	0	0	0	5	0	3	5	119	0	0	68	4	204
18:00 18:15	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15 18:30	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30 18:45	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45 19:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL:	1	0	0	59	0	30	65	965	0	0	659	30	1809
Peak HR %HV:	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Peak HR Factor:	0.00	0.00	0.00	0.88	0.00	0.70	0.73	0.78	0.00	0.00	0.88	0.75	

DATE: 1/5/2022
DAY: Wednesday
TIME: 16:00 to 9:00

DATE: 1/5/2022
DAY: Wednesday
TIME: 16:00 to 9:00

Appendix C

Existing Level of Services

Lanes, Volumes, Timings

NE 192nd Ave & SE 1st St

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	133	50	193	211	51	32	232	195	57	244	73
Future Volume (vph)	55	133	50	193	211	51	32	232	195	57	244	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.97	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Fr't		0.959				0.850			0.850		0.966	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3394	0	3433	1863	1583	1770	3539	1583	1770	3419	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3394	0	3433	1863	1583	1770	3539	1583	1770	3419	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		46				112			238		33	
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		687			2643			1144			1304	
Travel Time (s)		11.7			45.1			19.5			22.2	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	67	162	61	235	257	62	39	283	238	70	298	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	67	223	0	235	257	62	39	283	238	70	387	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6	3	7	4	1	3	8	
Permitted Phases						6			4			
Detector Phase	5	2		1	6	3	7	4	1	3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	15.0	5.0	5.0	15.0	

Baseline

Synchro 10 Light Report
Page 1

Lanes, Volumes, Timings

NE 192nd Ave & SE 1st St

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	22.5		9.5	22.5	22.5	9.5	22.5	9.5	22.5	22.5	
Total Split (s)	9.5	22.5		12.0	25.0	22.5	45.5	23.0	12.0	22.5	22.5	
Total Split (%)	9.3%	22.0%		11.7%	24.4%	22.0%	44.4%	22.4%	11.7%	22.0%	22.0%	
Maximum Green (s)	5.0	18.0		7.5	20.5	18.0	41.0	18.5	7.5	18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
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)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		None	Max	Max	None	C-Max	None	Max	Max	
Walk Time (s)		7.0			7.0	7.0		7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0		0		0	0	
Act Effect Green (s)	5.0	18.0		7.5	22.4	44.9	7.8	41.0	53.0	18.0	55.4	
Actuated g/C Ratio	0.05	0.18		0.07	0.22	0.44	0.08	0.40	0.52	0.18	0.54	
v/c Ratio	0.40	0.35		0.94	0.63	0.08	0.29	0.20	0.26	0.23	0.21	
Control Delay	54.7	31.0		90.9	45.3	0.8	49.6	20.5	2.4	38.5	12.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	54.7	31.0		90.9	45.3	0.8	49.6	20.5	2.4	38.5	12.5	
LOS	D	C		F	D	A	D	C	A	D	B	
Approach Delay		36.5			59.7			14.9			16.5	
Approach LOS		D			E			B			B	
Queue Length 50th (ft)	22	53		80	158	0	25	62	0	40	65	
Queue Length 95th (ft)	41	80		#133	219	1	51	83	26	73	88	
Internal Link Dist (ft)		607			2563			1064			1224	
Turn Bay Length (ft)												
Base Capacity (vph)	167	633		251	407	756	708	1415	933	310	1864	
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	0.40	0.35		0.94	0.63	0.08	0.06	0.20	0.26	0.23	0.21	

Intersection Summary

Area Type: Other

Cycle Length: 102.5

Actuated Cycle Length: 102.5

Offset: 0 (0%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 32.0

Intersection LOS: C

Intersection Capacity Utilization 46.9%

ICU Level of Service A

Analysis Period (min) 15

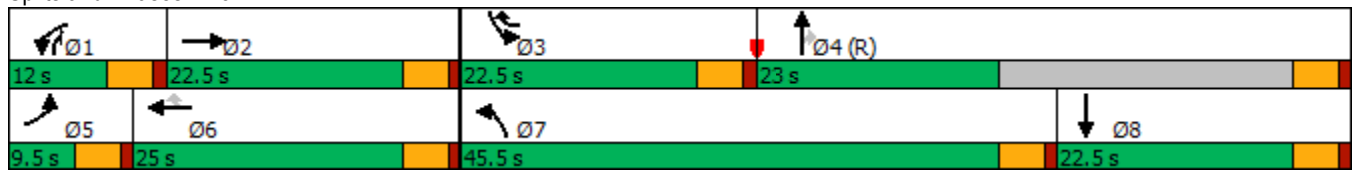
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
NE 192nd Ave & SE 1st St

AM PEAK

Splits and Phases: 3:



Lanes, Volumes, Timings

NE Friberg & NW Lake Rd

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	179	1	0	303	9	0	0	0	14	0	32
Future Volume (vph)	19	179	1	0	303	9	0	0	0	14	0	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999				0.850						0.850
Flt Protected	0.950										0.950	
Satd. Flow (prot)	1770	3536	0	0	3539	1583	0	1863	0	0	1770	1583
Flt Permitted	0.553										0.757	
Satd. Flow (perm)	1030	3536	0	0	3539	1583	0	1863	0	0	1410	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				36						36
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2643			4666			279			633	
Travel Time (s)		60.1			106.0			6.3			14.4	
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
Adj. Flow (vph)	21	195	1	0	329	10	0	0	0	15	0	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	196	0	0	329	10	0	0	0	0	15	35
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA			NA	Perm				Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0			0.0	0.0
Total Lost Time (s)	4.5	4.5			4.5	4.5		4.5			4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	0
Act Effect Green (s)	18.0	18.0			18.0	18.0					18.0	18.0
Actuated g/C Ratio	0.40	0.40			0.40	0.40					0.40	0.40
v/c Ratio	0.05	0.14			0.23	0.02					0.03	0.05
Control Delay	8.8	8.9			9.5	1.0					8.4	3.9
Queue Delay	0.0	0.0			0.0	0.0					0.0	0.0
Total Delay	8.8	8.9			9.5	1.0					8.4	3.9

Baseline

Synchro 10 Light Report
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Lanes, Volumes, Timings

NE Friberg & NW Lake Rd

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	A	A			A	A					A	A
Approach Delay		8.9			9.2						5.3	
Approach LOS		A			A						A	
Queue Length 50th (ft)	3	15			27	0					2	0
Queue Length 95th (ft)	13	31			48	2					10	11
Internal Link Dist (ft)		2563			4586			199			553	
Turn Bay Length (ft)												
Base Capacity (vph)	412	1415			1415	654					564	654
Starvation Cap Reductn	0	0			0	0					0	0
Spillback Cap Reductn	0	0			0	0					0	0
Storage Cap Reductn	0	0			0	0					0	0
Reduced v/c Ratio	0.05	0.14			0.23	0.02					0.03	0.05

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 45

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.23

Intersection Signal Delay: 8.8

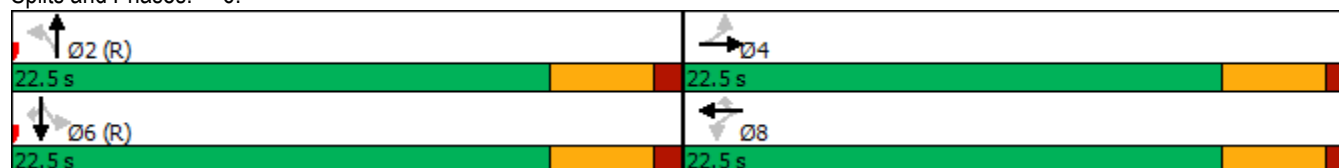
Intersection LOS: A

Intersection Capacity Utilization 27.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6:



Lanes, Volumes, Timings

NW Parker St & NW Lake Rd

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	171	212	85	286	3	157	15	82	8	40	32
Future Volume (vph)	19	171	212	85	286	3	157	15	82	8	40	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr't			0.850		0.999			0.873			0.933	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	3536	0	1770	1626	0	1770	1738	0
Flt Permitted	0.561			0.640			0.706			0.689		
Satd. Flow (perm)	1045	1863	1583	1192	3536	0	1315	1626	0	1283	1738	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			230		2			89			35	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		4666			452			981			831	
Travel Time (s)		106.0			10.3			22.3			18.9	
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
Adj. Flow (vph)	21	186	230	92	311	3	171	16	89	9	43	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	186	230	92	314	0	171	105	0	9	78	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5	22.5	22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	18.0	18.0	18.0	18.0	18.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40		0.40	0.40		0.40	0.40	
v/c Ratio	0.05	0.25	0.30	0.19	0.22		0.33	0.15		0.02	0.11	
Control Delay	9.5	10.2	4.3	10.2	9.4		11.5	3.9		8.4	6.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	9.5	10.2	4.3	10.2	9.4		11.5	3.9		8.4	6.0	

Baseline

 Synchro 10 Light Report
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Lanes, Volumes, Timings

NW Parker St & NW Lake Rd

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	A	B	A	B	A		B	A		A	A	
Approach Delay		7.1			9.5			8.6			6.3	
Approach LOS		A			A			A			A	
Queue Length 50th (ft)	3	26	0	15	26		29	2		1	6	
Queue Length 95th (ft)	13	62	32	37	46		64	23		7	24	
Internal Link Dist (ft)		4586			372			901			751	
Turn Bay Length (ft)												
Base Capacity (vph)	418	745	771	476	1415		526	703		513	716	
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	0.25	0.30	0.19	0.22		0.33	0.15		0.02	0.11	

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 45

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.33

Intersection Signal Delay: 8.2

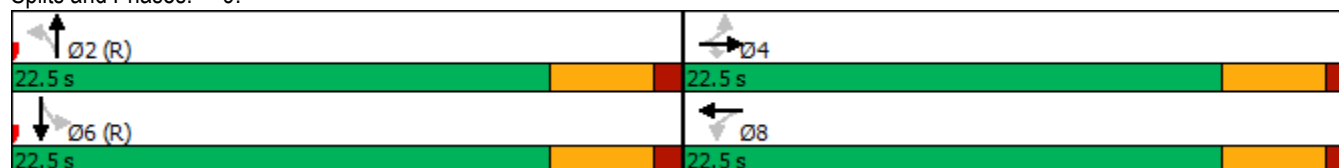
Intersection LOS: A

Intersection Capacity Utilization 40.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 9:



Lanes, Volumes, Timings

NE 192nd Ave & SE 1st St

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	209	71	363	291	95	83	543	243	73	244	69
Future Volume (vph)	180	209	71	363	291	95	83	543	243	73	244	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	280		0	330		1000	200		220	270		0
Storage Lanes	2		0	2		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.962				0.850			0.850		0.967	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3405	0	3433	1863	1583	1770	3539	1583	1770	3422	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3405	0	3433	1863	1583	1770	3539	1583	1770	3422	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		41				65			261		39	
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		687			2643			1144			1304	
Travel Time (s)		11.7			45.1			19.5			22.2	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	194	225	76	390	313	102	89	584	261	78	262	74
Shared Lane Traffic (%)												
Lane Group Flow (vph)	194	301	0	390	313	102	89	584	261	78	336	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6	3	7	4	1	3	8	
Permitted Phases						6			4			

Baseline

Synchro 10 Light Report
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Lanes, Volumes, Timings

NE 192nd Ave & SE 1st St

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2		1	6	3	7	4	1	3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	15.0	5.0	5.0	15.0	
Minimum Split (s)	9.5	22.5		9.5	22.5	22.5	9.5	22.5	9.5	22.5	22.5	
Total Split (s)	15.0	24.0		23.0	32.0	22.5	15.1	30.5	23.0	22.5	37.9	
Total Split (%)	15.0%	24.0%		23.0%	32.0%	22.5%	15.1%	30.5%	23.0%	22.5%	37.9%	
Maximum Green (s)	10.5	19.5		18.5	27.5	18.0	10.6	26.0	18.5	18.0	33.4	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
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)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		None	Max	Max	None	C-Max	None	Max	Max	
Walk Time (s)		7.0			7.0	7.0		7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0		0		0	0	
Act Effect Green (s)	9.8	21.9		16.1	28.2	50.7	9.3	26.0	46.6	18.0	36.9	
Actuated g/C Ratio	0.10	0.22		0.16	0.28	0.51	0.09	0.26	0.47	0.18	0.37	
v/c Ratio	0.58	0.39		0.71	0.60	0.12	0.54	0.63	0.30	0.25	0.26	
Control Delay	50.1	31.0		46.9	36.9	6.2	55.5	36.5	2.8	37.6	21.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	50.1	31.0		46.9	36.9	6.2	55.5	36.5	2.8	37.6	21.1	
LOS	D	C		D	D	A	E	D	A	D	C	
Approach Delay		38.5			37.8			28.9			24.2	
Approach LOS		D			D			C			C	
Queue Length 50th (ft)	61	74		122	174	12	55	173	0	43	71	
Queue Length 95th (ft)	97	118		168	265	39	105	232	40	86	108	
Internal Link Dist (ft)		607			2563			1064			1224	
Turn Bay Length (ft)	280			330		1000	200		220	270		
Base Capacity (vph)	360	777		635	525	834	187	920	908	318	1285	
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	0.54	0.39		0.61	0.60	0.12	0.48	0.63	0.29	0.25	0.26	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 32.7

Intersection LOS: C

Intersection Capacity Utilization 54.6%

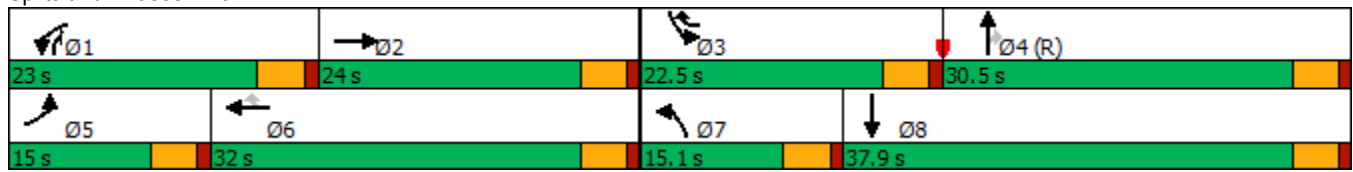
ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings
NE 192nd Ave & SE 1st St

PM PEAK

Splits and Phases: 3:



Lanes, Volumes, Timings

NE Friberg St & NW Lake Rd

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	512	0	0	324	15	0	0	0	14	0	35
Future Volume (vph)	35	512	0	0	324	15	0	0	0	14	0	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t						0.850						0.850
Fl _t Protected	0.950										0.950	
Satd. Flow (prot)	1770	3539	0	0	3539	1583	0	1863	0	0	1770	1583
Fl _t Permitted	0.541										0.757	
Satd. Flow (perm)	1008	3539	0	0	3539	1583	0	1863	0	0	1410	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						36						38
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2643			4666			279			633	
Travel Time (s)		60.1			106.0			6.3			14.4	
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
Adj. Flow (vph)	38	557	0	0	352	16	0	0	0	15	0	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	557	0	0	352	16	0	0	0	0	15	38
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			36			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA			NA	Perm				Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0			0.0	0.0
Total Lost Time (s)	4.5	4.5			4.5	4.5		4.5			4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	0
Act Effect Green (s)	18.0	18.0			18.0	18.0					18.0	18.0
Actuated g/C Ratio	0.40	0.40			0.40	0.40					0.40	0.40
v/c Ratio	0.09	0.39			0.25	0.02					0.03	0.06
Control Delay	9.3	10.7			10.0	3.7					8.4	3.9
Queue Delay	0.0	0.0			0.0	0.0					0.0	0.0
Total Delay	9.3	10.7			10.0	3.7					8.4	3.9

Baseline

Synchro 10 Light Report
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Lanes, Volumes, Timings

NE Friberg St & NW Lake Rd

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	A	B			B	A					A	A
Approach Delay		10.6			9.8						5.2	
Approach LOS		B			A						A	
Queue Length 50th (ft)	6	51			28	0					2	0
Queue Length 95th (ft)	19	81			56	m4					10	12
Internal Link Dist (ft)		2563			4586			199			553	
Turn Bay Length (ft)												
Base Capacity (vph)	403	1415			1415	654					564	656
Starvation Cap Reductn	0	0			0	0					0	0
Spillback Cap Reductn	0	0			0	0					0	0
Storage Cap Reductn	0	0			0	0					0	0
Reduced v/c Ratio	0.09	0.39			0.25	0.02					0.03	0.06

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 45

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 10.0

Intersection LOS: A

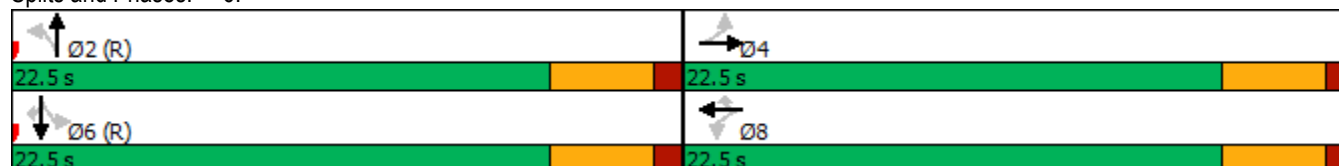
Intersection Capacity Utilization 38.5%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6:



Lanes, Volumes, Timings NW Parker St & NW Lake Rd

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	485	235	43	291	11	239	22	66	5	18	43
Future Volume (vph)	45	485	235	43	291	11	239	22	66	5	18	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.995			0.887			0.895	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	3522	0	1770	1652	0	1770	1667	0
Flt Permitted	0.554			0.295			0.713			0.695		
Satd. Flow (perm)	1032	1863	1583	550	3522	0	1328	1652	0	1295	1667	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			255		10			72			47	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		4666			452			981			831	
Travel Time (s)		106.0			10.3			22.3			18.9	
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
Adj. Flow (vph)	49	527	255	47	316	12	260	24	72	5	20	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	527	255	47	328	0	260	96	0	5	67	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5	22.5	22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	18.0	18.0	18.0	18.0	18.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40		0.40	0.40		0.40	0.40	
v/c Ratio	0.12	0.71	0.32	0.21	0.23		0.49	0.14		0.01	0.10	
Control Delay	15.8	24.9	8.1	12.0	9.2		14.0	4.4		8.2	4.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.8	24.9	8.1	12.0	9.2		14.0	4.4		8.2	4.8	

Baseline

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Lanes, Volumes, Timings

Parker St & NW Lake Rd

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B	C	A	B	A		B	A		A	A	
Approach Delay		19.2			9.5			11.4			5.1	
Approach LOS		B			A			B			A	
Queue Length 50th (ft)	10	124	0	8	26		47	4		1	3	
Queue Length 95th (ft)	m29	#210	61	26	47		98	23		5	19	
Internal Link Dist (ft)		4586			372			901			751	
Turn Bay Length (ft)												
Base Capacity (vph)	412	745	786	220	1414		531	704		518	695	
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	0.12	0.71	0.32	0.21	0.23		0.49	0.14		0.01	0.10	

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 45

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 14.7

Intersection LOS: B

Intersection Capacity Utilization 60.9%

ICU Level of Service B

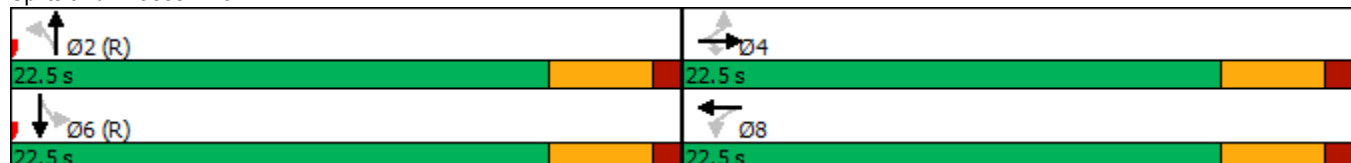
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9:



Appendix D
2023 Without Project Level of Services

Lanes, Volumes, Timings

NE 192nd Ave & SE 1st St

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	133	50	193	211	51	32	232	195	57	244	73
Future Volume (vph)	55	133	50	193	211	51	32	232	195	57	244	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.97	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.959				0.850			0.850		0.965	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3394	0	3433	1863	1583	1770	3539	1583	1770	3415	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3394	0	3433	1863	1583	1770	3539	1583	1770	3415	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		46				112			262		33	
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		687			2643			1144			1304	
Travel Time (s)		11.7			45.1			19.5			22.2	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Adj. Flow (vph)	74	178	67	259	283	68	43	311	262	76	327	98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	245	0	259	283	68	43	311	262	76	425	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6	3	7	4	1	3	8	
Permitted Phases						6			4			
Detector Phase	5	2		1	6	3	7	4	1	3	8	
Switch Phase												

Baseline

Synchro 10 Light Report
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Lanes, Volumes, Timings

NE 192nd Ave & SE 1st St

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	15.0	5.0	5.0	15.0	
Minimum Split (s)	9.5	22.5		9.5	22.5	22.5	9.5	22.5	9.5	22.5	22.5	
Total Split (s)	9.5	22.5		12.0	25.0	22.5	45.5	23.0	12.0	22.5	22.5	
Total Split (%)	9.3%	22.0%		11.7%	24.4%	22.0%	44.4%	22.4%	11.7%	22.0%	22.0%	
Maximum Green (s)	5.0	18.0		7.5	20.5	18.0	41.0	18.5	7.5	18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
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)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		None	Max	Max	None	C-Max	None	Max	Max	
Walk Time (s)		7.0			7.0	7.0		7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0		0		0	0	
Act Effect Green (s)	5.0	18.0		7.5	22.4	44.9	8.0	41.0	53.0	18.0	55.3	
Actuated g/C Ratio	0.05	0.18		0.07	0.22	0.44	0.08	0.40	0.52	0.18	0.54	
v/c Ratio	0.44	0.39		1.03	0.70	0.09	0.31	0.22	0.28	0.25	0.23	
Control Delay	56.1	32.2		112.9	48.3	1.2	49.9	20.8	2.4	38.8	12.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	56.1	32.2		112.9	48.3	1.2	49.9	20.8	2.4	38.8	12.9	
LOS	E	C		F	D	A	D	C	A	D	B	
Approach Delay		37.7			70.5			15.0			16.8	
Approach LOS		D			E			B			B	
Queue Length 50th (ft)	24	60		~94	176	0	27	68	0	43	73	
Queue Length 95th (ft)	44	87		#152	242	3	55	90	26	78	98	
Internal Link Dist (ft)		607			2563			1064			1224	
Turn Bay Length (ft)												
Base Capacity (vph)	167	633		251	407	756	708	1415	945	310	1856	
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	0.44	0.39		1.03	0.70	0.09	0.06	0.22	0.28	0.25	0.23	

Intersection Summary

Area Type: Other

Cycle Length: 102.5

Actuated Cycle Length: 102.5

Offset: 0 (0%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.03

Intersection Signal Delay: 35.5

Intersection LOS: D

Intersection Capacity Utilization 48.0%

ICU Level of Service A

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

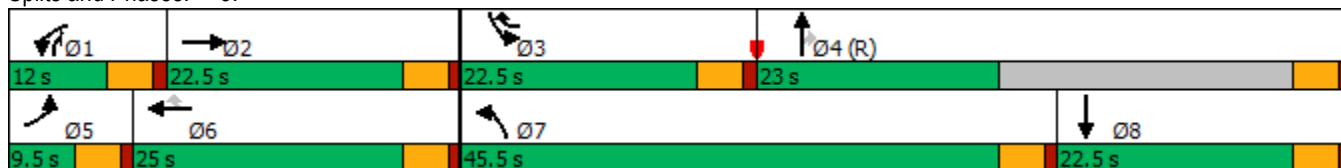
95th percentile volume exceeds capacity, queue may be longer.

Lanes, Volumes, Timings
NE 192nd Ave & SE 1st St

AM PEAK

Queue shown is maximum after two cycles.

Splits and Phases: 3:



Lanes, Volumes, Timings

NE Friberg St & NW Lake Rd

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	179	1	0	303	9	0	0	0	14	0	32
Future Volume (vph)	19	179	1	0	303	9	0	0	0	14	0	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr't		0.999				0.850						0.850
Flt Protected	0.950										0.950	
Satd. Flow (prot)	1770	3536	0	0	3539	1583	0	1863	0	0	1770	1583
Flt Permitted	0.536										0.757	
Satd. Flow (perm)	998	3536	0	0	3539	1583	0	1863	0	0	1410	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				36						38
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2643			4666			279			633	
Travel Time (s)		60.1			106.0			6.3			14.4	
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
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Adj. Flow (vph)	23	214	1	0	362	11	0	0	0	17	0	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	215	0	0	362	11	0	0	0	0	17	38
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA			NA	Perm				Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0			0.0	0.0
Total Lost Time (s)	4.5	4.5			4.5	4.5		4.5			4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	0
Act Effect Green (s)	18.0	18.0			18.0	18.0					18.0	18.0
Actuated g/C Ratio	0.40	0.40			0.40	0.40					0.40	0.40
v/c Ratio	0.06	0.15			0.26	0.02					0.03	0.06
Control Delay	8.9	9.0			10.5	3.0					8.4	3.9
Queue Delay	0.0	0.0			0.0	0.0					0.0	0.0

Baseline

Synchro 10 Light Report
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Lanes, Volumes, Timings

NE 192nd Ave & SE 1st St

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	8.9	9.0			10.5	3.0					8.4	3.9
LOS	A	A			B	A					A	A
Approach Delay		9.0			10.3						5.3	
Approach LOS		A			B						A	
Queue Length 50th (ft)	4	17			30	0					3	0
Queue Length 95th (ft)	14	33			58	m0					11	12
Internal Link Dist (ft)		2563			4586			199			553	
Turn Bay Length (ft)												
Base Capacity (vph)	399	1415			1415	654					564	656
Starvation Cap Reductn	0	0			0	0					0	0
Spillback Cap Reductn	0	0			0	0					0	0
Storage Cap Reductn	0	0			0	0					0	0
Reduced v/c Ratio	0.06	0.15			0.26	0.02					0.03	0.06

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 45

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.26

Intersection Signal Delay: 9.4

Intersection LOS: A

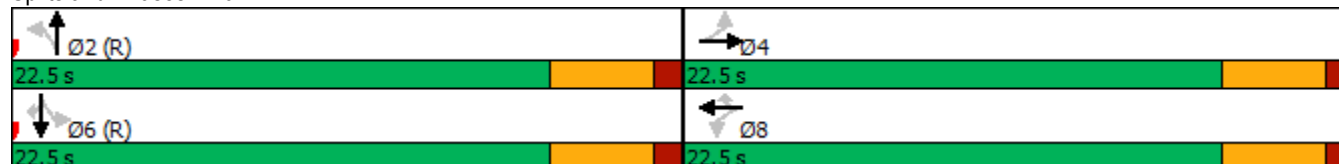
Intersection Capacity Utilization 29.0%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6:



Lanes, Volumes, Timings

NW Parker St & NW Lake Rd

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	171	212	85	286	3	157	15	82	8	40	32
Future Volume (vph)	19	171	212	85	286	3	157	15	82	8	40	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.998			0.873			0.934	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	3532	0	1770	1626	0	1770	1740	0
Flt Permitted	0.544			0.630			0.701			0.682		
Satd. Flow (perm)	1013	1863	1583	1174	3532	0	1306	1626	0	1270	1740	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			253		3			98			38	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		4666			452			981			831	
Travel Time (s)		106.0			10.3			22.3			18.9	
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
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Adj. Flow (vph)	23	204	253	102	342	4	188	18	98	10	48	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	204	253	102	346	0	188	116	0	10	86	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5	22.5	22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	18.0	18.0	18.0	18.0	18.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40		0.40	0.40		0.40	0.40	
v/c Ratio	0.06	0.27	0.32	0.22	0.24		0.36	0.16		0.02	0.12	
Control Delay	9.9	10.7	4.7	10.4	9.5		12.0	3.9		8.4	6.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	

Baseline

 Synchro 10 Light Report
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Lanes, Volumes, Timings

NW Parker St & NW Lake Rd

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	9.9	10.7	4.7	10.4	9.5		12.0	3.9		8.4	6.1	
LOS	A	B	A	B	A		B	A		A	A	
Approach Delay		7.5			9.7			8.9			6.3	
Approach LOS		A			A			A			A	
Queue Length 50th (ft)	3	29	0	16	29		32	3		2	7	
Queue Length 95th (ft)	15	69	36	41	50		70	24		8	26	
Internal Link Dist (ft)		4586			372			901			751	
Turn Bay Length (ft)												
Base Capacity (vph)	405	745	785	469	1414		522	709		508	718	
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	0.27	0.32	0.22	0.24		0.36	0.16		0.02	0.12	

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 45

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.36

Intersection Signal Delay: 8.5

Intersection LOS: A

Intersection Capacity Utilization 42.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 9:

 Ø2 (R)	 Ø4
22.5 s	22.5 s
 Ø6 (R)	 Ø8
22.5 s	22.5 s

Lanes, Volumes, Timings

NE 192nd Ave & SE 1st St

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	209	71	363	291	95	83	543	243	73	244	69
Future Volume (vph)	180	209	71	363	291	95	83	543	243	73	244	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	280		0	330		1000	200		220	270		0
Storage Lanes	2		0	2		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.962				0.850			0.850		0.967	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3405	0	3433	1863	1583	1770	3539	1583	1770	3422	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3405	0	3433	1863	1583	1770	3539	1583	1770	3422	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		42				65			287		39	
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		687			2643			1144			1304	
Travel Time (s)		11.7			45.1			19.5			22.2	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Adj. Flow (vph)	213	247	84	429	344	112	98	642	287	86	289	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	213	331	0	429	344	112	98	642	287	86	371	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6	3	7	4	1	3	8	

Baseline

 Synchro 10 Light Report
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Lanes, Volumes, Timings

NE 192nd Ave & SE 1st St

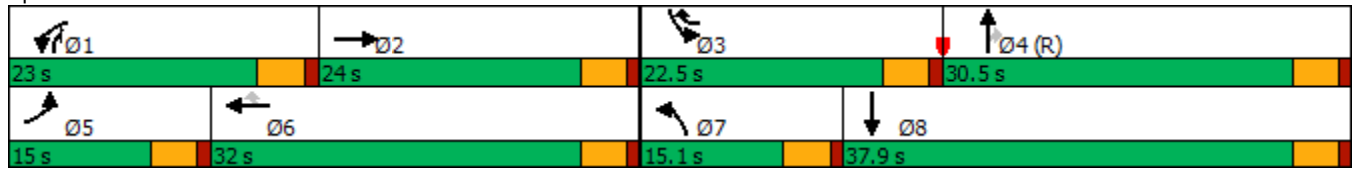
PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				6			4					
Detector Phase	5	2		1	6	3	7	4	1	3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	15.0	5.0	5.0	15.0	
Minimum Split (s)	9.5	22.5		9.5	22.5	22.5	9.5	22.5	9.5	22.5	22.5	
Total Split (s)	15.0	24.0		23.0	32.0	22.5	15.1	30.5	23.0	22.5	37.9	
Total Split (%)	15.0%	24.0%		23.0%	32.0%	22.5%	15.1%	30.5%	23.0%	22.5%	37.9%	
Maximum Green (s)	10.5	19.5		18.5	27.5	18.0	10.6	26.0	18.5	18.0	33.4	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
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)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		None	Max	Max	None	C-Max	None	Max	Max	
Walk Time (s)		7.0			7.0	7.0		7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0		0		0	0	
Act Effct Green (s)	10.0	21.3		16.7	28.0	50.5	9.5	26.0	47.2	18.0	36.7	
Actuated g/C Ratio	0.10	0.21		0.17	0.28	0.50	0.10	0.26	0.47	0.18	0.37	
v/c Ratio	0.62	0.44		0.75	0.66	0.13	0.58	0.70	0.32	0.27	0.29	
Control Delay	51.5	32.2		48.2	39.1	6.7	57.3	38.2	2.7	38.0	21.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	51.5	32.2		48.2	39.1	6.7	57.3	38.2	2.7	38.0	21.7	
LOS	D	C		D	D	A	E	D	A	D	C	
Approach Delay		39.8			39.4			30.1			24.8	
Approach LOS		D			D			C			C	
Queue Length 50th (ft)	68	85		134	195	15	60	194	0	48	81	
Queue Length 95th (ft)	105	130		184	294	43	113	257	41	93	120	
Internal Link Dist (ft)		607			2563			1064			1224	
Turn Bay Length (ft)	280			330		1000	200		220	270		
Base Capacity (vph)	360	758		635	521	831	187	920	922	318	1280	
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	0.59	0.44		0.68	0.66	0.13	0.52	0.70	0.31	0.27	0.29	
Intersection Summary												
Area Type:	Other											
Cycle Length: 100												
Actuated Cycle Length: 100												
Offset: 0 (0%), Referenced to phase 4:NBT, Start of Green												
Natural Cycle: 80												
Control Type: Actuated-Coordinated												
Maximum v/c Ratio: 0.75												
Intersection Signal Delay: 33.9				Intersection LOS: C								
Intersection Capacity Utilization 58.5%				ICU Level of Service B								
Analysis Period (min) 15												

Lanes, Volumes, Timings
NE 192nd Ave & SE 1st St

PM PEAK

Splits and Phases: 3:



Lanes, Volumes, Timings

NE Friberg St & NW Lake Rd

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	512	0	0	324	15	0	0	0	14	0	35
Future Volume (vph)	35	512	0	0	324	15	0	0	0	14	0	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr't						0.850						0.850
Flt Protected	0.950										0.950	
Satd. Flow (prot)	1770	3539	0	0	3539	1583	0	1863	0	0	1770	1583
Flt Permitted	0.523										0.757	
Satd. Flow (perm)	974	3539	0	0	3539	1583	0	1863	0	0	1410	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						36						42
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2643			4666			279			633	
Travel Time (s)		60.1			106.0			6.3			14.4	
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
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Adj. Flow (vph)	42	612	0	0	387	18	0	0	0	17	0	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	612	0	0	387	18	0	0	0	0	17	42
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			36			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA			NA	Perm				Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0			0.0	0.0
Total Lost Time (s)	4.5	4.5			4.5	4.5		4.5			4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	0
Act Effect Green (s)	18.0	18.0			18.0	18.0					18.0	18.0
Actuated g/C Ratio	0.40	0.40			0.40	0.40					0.40	0.40
v/c Ratio	0.11	0.43			0.27	0.03					0.03	0.06
Control Delay	9.4	11.0			9.4	3.2					8.4	3.8
Queue Delay	0.0	0.0			0.0	0.0					0.0	0.0

Baseline

Synchro 10 Light Report
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Lanes, Volumes, Timings

NE Friberg St & NW Lake Rd

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	9.4	11.0			9.4	3.2					8.4	3.8
LOS	A	B			A	A					A	A
Approach Delay		10.9			9.1						5.1	
Approach LOS		B			A						A	
Queue Length 50th (ft)	6	56			27	0					3	0
Queue Length 95th (ft)	21	90			53	m1					11	12
Internal Link Dist (ft)		2563			4586			199			553	
Turn Bay Length (ft)												
Base Capacity (vph)	389	1415			1415	654					564	658
Starvation Cap Reductn	0	0			0	0					0	0
Spillback Cap Reductn	0	0			0	0					0	0
Storage Cap Reductn	0	0			0	0					0	0
Reduced v/c Ratio	0.11	0.43			0.27	0.03					0.03	0.06

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 45

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.43

Intersection Signal Delay: 9.9

Intersection LOS: A

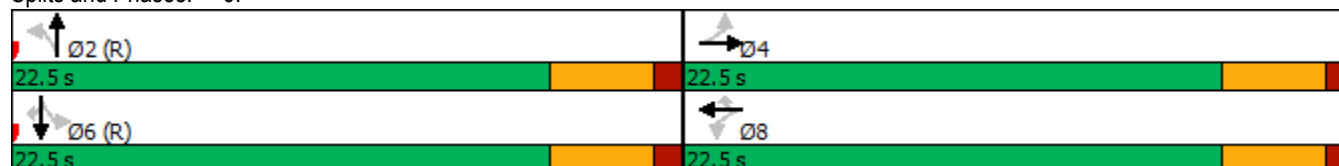
Intersection Capacity Utilization 40.8%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6:



Lanes, Volumes, Timings

NW Parker St & NW Lake Rd

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	485	235	43	291	11	239	22	66	5	18	43
Future Volume (vph)	45	485	235	43	291	11	239	22	66	5	18	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.995			0.887			0.895	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	3522	0	1770	1652	0	1770	1667	0
Flt Permitted	0.536			0.239			0.709			0.689		
Satd. Flow (perm)	998	1863	1583	445	3522	0	1321	1652	0	1283	1667	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			281		10			79			51	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		4666			452			981			831	
Travel Time (s)		106.0			10.3			22.3			18.9	
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
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Adj. Flow (vph)	54	580	281	51	348	13	286	26	79	6	22	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	580	281	51	361	0	286	105	0	6	73	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5	22.5	22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	18.0	18.0	18.0	18.0	18.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40		0.40	0.40		0.40	0.40	
v/c Ratio	0.14	0.78	0.35	0.29	0.26		0.54	0.15		0.01	0.10	
Control Delay	16.1	28.4	8.4	14.5	9.4		15.1	4.4		8.3	4.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	

Baseline

Synchro 10 Light Report
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Lanes, Volumes, Timings

NW Parker St & NW Lake Rd

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	16.1	28.4	8.4	14.5	9.4		15.1	4.4		8.3	4.8	
LOS	B	C	A	B	A		B	A		A	A	
Approach Delay		21.5			10.0			12.2			5.1	
Approach LOS		C			A			B			A	
Queue Length 50th (ft)	11	141	0	8	30		53	4		1	3	
Queue Length 95th (ft)	m31	#255	67	30	52		111	24		6	20	
Internal Link Dist (ft)		4586			372			901			751	
Turn Bay Length (ft)												
Base Capacity (vph)	399	745	801	178	1414		528	708		513	697	
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	0.14	0.78	0.35	0.29	0.26		0.54	0.15		0.01	0.10	

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 45

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 16.1

Intersection LOS: B

Intersection Capacity Utilization 64.7%

ICU Level of Service C

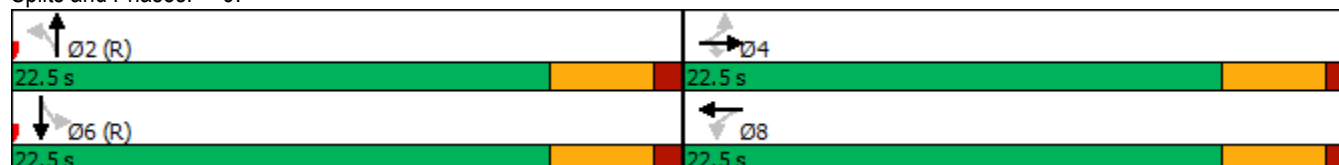
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9:



Appendix E

2023 With Project Level of Services

Lanes, Volumes, Timings

NE 192nd Ave & SE 1 St

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 		 				 			 	
Traffic Volume (vph)	55	134	50	206	212	51	32	232	208	57	244	73
Future Volume (vph)	55	134	50	206	212	51	32	232	208	57	244	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.97	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.959				0.850			0.850		0.965	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3394	0	3433	1863	1583	1770	3539	1583	1770	3415	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3394	0	3433	1863	1583	1770	3539	1583	1770	3415	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		45				112			279		33	
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		687			2643			1144			1304	
Travel Time (s)		11.7			45.1			19.5			22.2	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Adj. Flow (vph)	74	180	67	276	284	68	43	311	279	76	327	98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	247	0	276	284	68	43	311	279	76	425	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6	3	7	4	1	3	8	
Permitted Phases						6			4			
Detector Phase	5	2		1	6	3	7	4	1	3	8	
Switch Phase												

Baseline

Synchro 10 Light Report
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Lanes, Volumes, Timings

NE 192nd Ave & SE 1 St

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	15.0	5.0	5.0	15.0	
Minimum Split (s)	9.5	22.5		9.5	22.5	22.5	9.5	22.5	9.5	22.5	22.5	
Total Split (s)	9.5	22.5		12.0	25.0	22.5	45.5	23.0	12.0	22.5	22.5	
Total Split (%)	9.3%	22.0%		11.7%	24.4%	22.0%	44.4%	22.4%	11.7%	22.0%	22.0%	
Maximum Green (s)	5.0	18.0		7.5	20.5	18.0	41.0	18.5	7.5	18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
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)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		None	Max	Max	None	C-Max	None	Max	Max	
Walk Time (s)		7.0			7.0	7.0		7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0		0		0	0	
Act Effect Green (s)	5.0	18.0		7.5	22.4	44.9	8.0	41.0	53.0	18.0	55.3	
Actuated g/C Ratio	0.05	0.18		0.07	0.22	0.44	0.08	0.40	0.52	0.18	0.54	
v/c Ratio	0.44	0.39		1.10	0.70	0.09	0.31	0.22	0.29	0.25	0.23	
Control Delay	56.1	32.4		131.1	48.4	1.2	49.9	20.8	2.4	38.8	12.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	56.1	32.4		131.1	48.4	1.2	49.9	20.8	2.4	38.8	12.9	
LOS	E	C		F	D	A	D	C	A	D	B	
Approach Delay		37.9			79.6			14.7			16.8	
Approach LOS		D			E			B			B	
Queue Length 50th (ft)	24	61		~106	177	0	27	68	0	43	73	
Queue Length 95th (ft)	44	88		#164	242	3	55	90	27	78	98	
Internal Link Dist (ft)		607			2563			1064			1224	
Turn Bay Length (ft)												
Base Capacity (vph)	167	633		251	407	756	708	1415	953	310	1856	
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	0.44	0.39		1.10	0.70	0.09	0.06	0.22	0.29	0.25	0.23	

Intersection Summary

Area Type: Other

Cycle Length: 102.5

Actuated Cycle Length: 102.5

Offset: 0 (0%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.10

Intersection Signal Delay: 38.4

Intersection LOS: D

Intersection Capacity Utilization 48.1%

ICU Level of Service A

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.

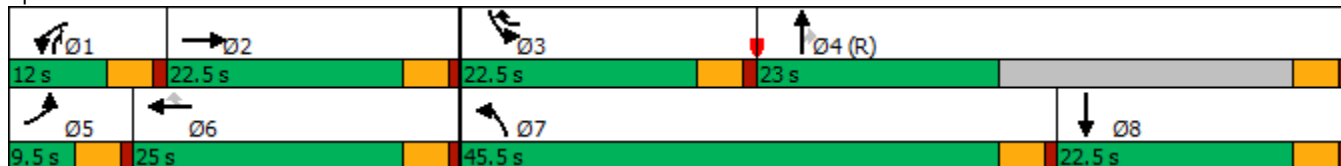
Lanes, Volumes, Timings

NE 192nd Ave & SE 1 St

PM PEAK

Queue shown is maximum after two cycles.

Splits and Phases: 3:



Lanes, Volumes, Timings

NE Friberg St & NW Lake Rd

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	179	1	0	319	9	0	0	0	21	0	48
Future Volume (vph)	35	179	1	0	319	9	0	0	0	21	0	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr't		0.999				0.850						0.850
Flt Protected	0.950										0.950	
Satd. Flow (prot)	1770	3536	0	0	3539	1583	0	1863	0	0	1770	1583
Flt Permitted	0.526										0.757	
Satd. Flow (perm)	980	3536	0	0	3539	1583	0	1863	0	0	1410	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				36						57
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2643			4666			279			633	
Travel Time (s)		60.1			106.0			6.3			14.4	
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
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Adj. Flow (vph)	42	214	1	0	381	11	0	0	0	25	0	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	215	0	0	381	11	0	0	0	0	25	57
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA			NA	Perm				Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0			0.0	0.0
Total Lost Time (s)	4.5	4.5			4.5	4.5		4.5			4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	0
Act Effect Green (s)	18.0	18.0			18.0	18.0					18.0	18.0
Actuated g/C Ratio	0.40	0.40			0.40	0.40					0.40	0.40
v/c Ratio	0.11	0.15			0.27	0.02					0.04	0.09
Control Delay	9.4	9.0			10.6	3.0					8.6	3.5
Queue Delay	0.0	0.0			0.0	0.0					0.0	0.0

Baseline

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Lanes, Volumes, Timings

NE 192nd Ave & SE 1 St

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	9.4	9.0			10.6	3.0					8.6	3.5
LOS	A	A			B	A					A	A
Approach Delay		9.0			10.4						5.1	
Approach LOS		A			B						A	
Queue Length 50th (ft)	6	17			32	0					4	0
Queue Length 95th (ft)	21	33			61	m0					14	15
Internal Link Dist (ft)		2563			4586			199			553	
Turn Bay Length (ft)												
Base Capacity (vph)	392	1415			1415	654					564	667
Starvation Cap Reductn	0	0			0	0					0	0
Spillback Cap Reductn	0	0			0	0					0	0
Storage Cap Reductn	0	0			0	0					0	0
Reduced v/c Ratio	0.11	0.15			0.27	0.02					0.04	0.09

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 45

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.27

Intersection Signal Delay: 9.3

Intersection LOS: A

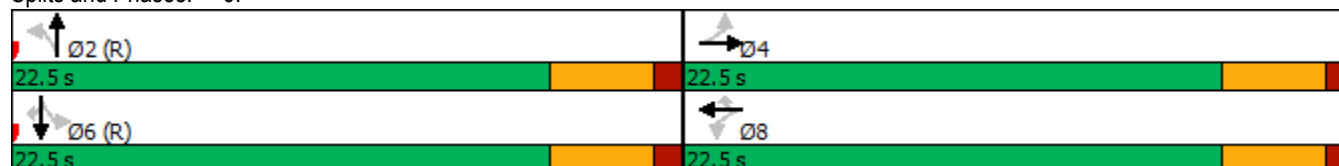
Intersection Capacity Utilization 30.6%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6:



Lanes, Volumes, Timings

NW Parker St & NW Lake Rd

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	171	212	85	286	3	157	15	82	8	40	32
Future Volume (vph)	19	171	212	85	286	3	157	15	82	8	40	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.998			0.873			0.934	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	3532	0	1770	1626	0	1770	1740	0
Flt Permitted	0.544			0.630			0.701			0.682		
Satd. Flow (perm)	1013	1863	1583	1174	3532	0	1306	1626	0	1270	1740	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			253		3			98			38	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		4666			452			981			831	
Travel Time (s)		106.0			10.3			22.3			18.9	
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
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Adj. Flow (vph)	23	204	253	102	342	4	188	18	98	10	48	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	204	253	102	346	0	188	116	0	10	86	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5	22.5	22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	18.0	18.0	18.0	18.0	18.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40		0.40	0.40		0.40	0.40	
v/c Ratio	0.06	0.27	0.32	0.22	0.24		0.36	0.16		0.02	0.12	
Control Delay	9.8	10.6	4.6	10.4	9.5		12.0	3.9		8.4	6.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	

Baseline

Synchro 10 Light Report
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Lanes, Volumes, Timings

NW Parker St & NW Lake Rd

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	9.8	10.6	4.6	10.4	9.5		12.0	3.9		8.4	6.1	
LOS	A	B	A	B	A		B	A		A	A	
Approach Delay		7.4			9.7			8.9			6.3	
Approach LOS		A			A			A			A	
Queue Length 50th (ft)	3	29	0	16	29		32	3		2	7	
Queue Length 95th (ft)	15	69	35	41	50		70	24		8	26	
Internal Link Dist (ft)		4586			372			901			751	
Turn Bay Length (ft)												
Base Capacity (vph)	405	745	785	469	1414		522	709		508	718	
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	0.27	0.32	0.22	0.24		0.36	0.16		0.02	0.12	

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 45

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.36

Intersection Signal Delay: 8.4

Intersection LOS: A

Intersection Capacity Utilization 42.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 9:

 Ø2 (R)	 Ø4
22.5 s	22.5 s
 Ø6 (R)	 Ø8
22.5 s	22.5 s