APPENDIX 3 – Overlake South Traffic Analysis

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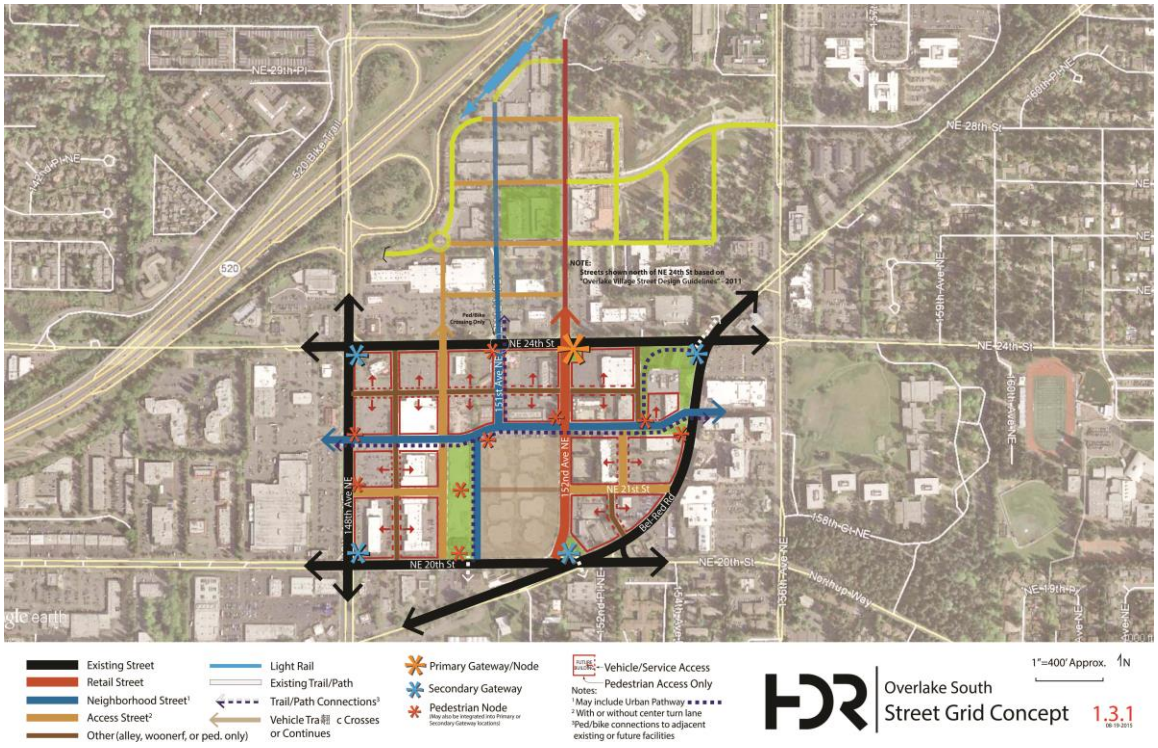
Memo

Date:	March 11, 2016
Project:	Overlake Village South & Marymoor Subarea Infrastructure Planning Studies
To:	Jeff Churchill (City of Redmond)
From:	Hua (Tony) Wang (HDR), Rob Gorman (HDR)
Cc:	Don Sims (HZ), file
Subject:	Overlake Village South Subarea Traffic Analysis

1. Introduction

This technical memorandum summarizes traffic analysis methodology and results associated with the proposed street network concept prepared by HDR (Consultant) and City of Redmond (City) staff for the Overlake Village South subarea as shown in **Exhibit 1**. The study area is bordered by NE 24th Street to the north, NE 20th Street to the south, 148th Avenue NE to the west, and Bel-Red Road to the east.

Exhibit 1 - Proposed Street Network Concept



Source: HDR

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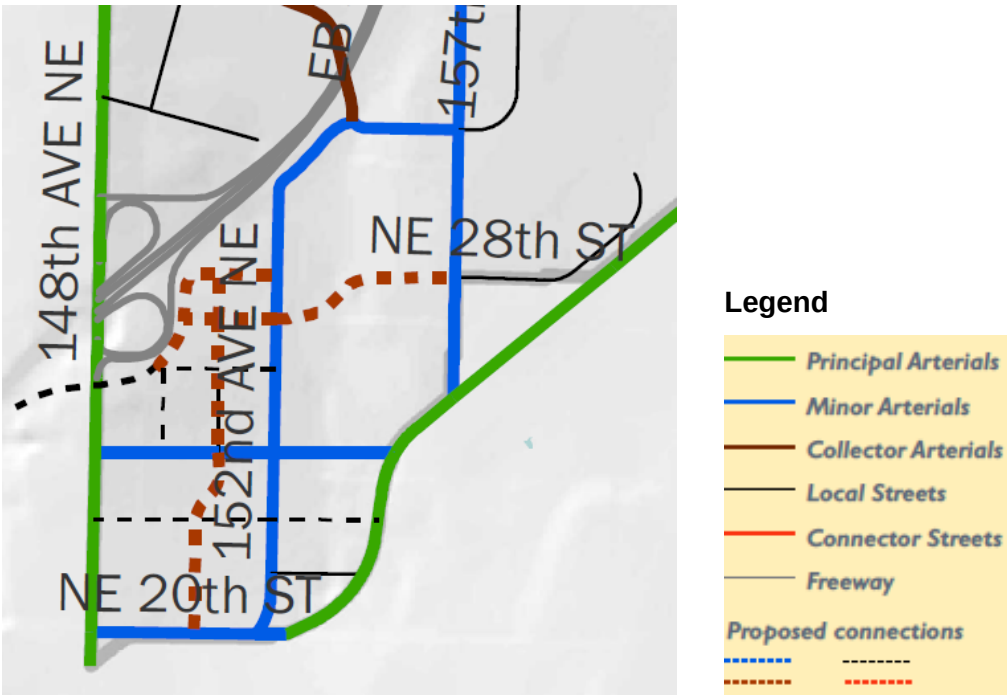
2. Street Network and Classifications

The existing and planned street network in the vicinity of the Overlake Village South subarea, as shown in **Exhibit 2,** was excerpted from the City's August 2013 Transportation Master Plan (TMP).

148th Avenue NE is a north-south principal arterial that traverses along the boundary between the cities of Bellevue and Redmond. Similarly, Bel-Red Road is a principal arterial that traverses northeasterly along the boundary between the two cities. Within the study area, 152nd Avenue NE, NE 20th Street and NE 24th Street are minor arterials.

151st Avenue NE was previously identified as a collector arterial. During the current Overlake Village South Infrastructure Planning Study, the project team determined that 150th Avenue NE would replace 151st Ave NE as the main north-south collector arterial for motor vehicles between 148th Avenue NE and 152nd Avenue NE. 151st Avenue NE will become a local street with a bike and pedestrian only crossing at NE 24th Street.

Exhibit 2 - Roadway Functional Classifications



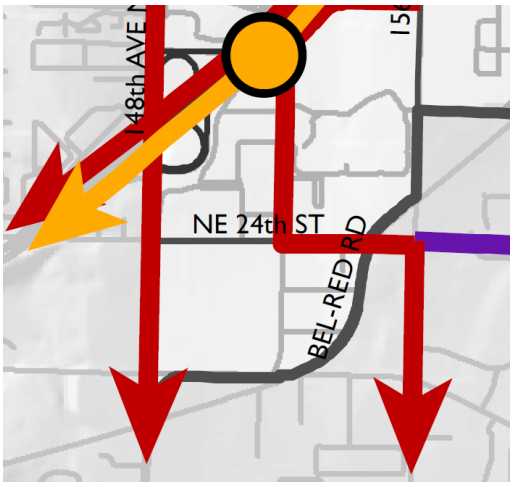
Source: City of Redmond, Transportation Master Plan

In addition to functional classifications, the City's TMP provides modal corridors for automobile, transit, bicycle, and freight, as well as pedestrian priority zones in the Multi-Modal Transportation System Plans. As shown in **Exhibit 3**, 148th Avenue NE, Bel-Red Road and NE 20th Street are automobile modal corridors and primary freight corridors due to their importance for ensuring good connections for motor vehicles. As part of the designated transit corridors, the Overlake Village Light Rail Transit (LRT) station located north of the Overlake Village South subarea is a key node for Sound Transit's East Link LRT system.

Exhibit 3 - Modal Corridors

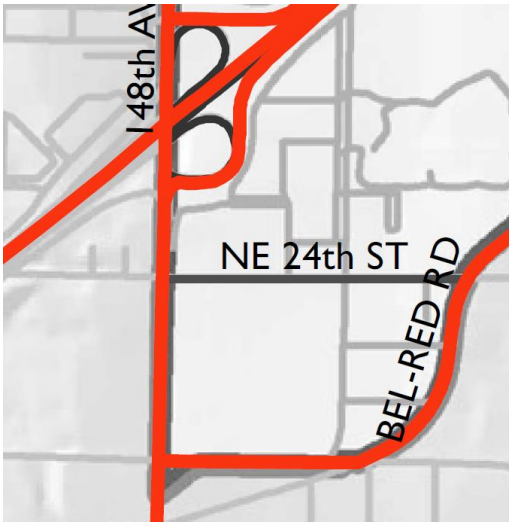
Automobile Modal Corridors

Designated Transit Corridors



Bicycle Modal Corridors

Freight Corridors

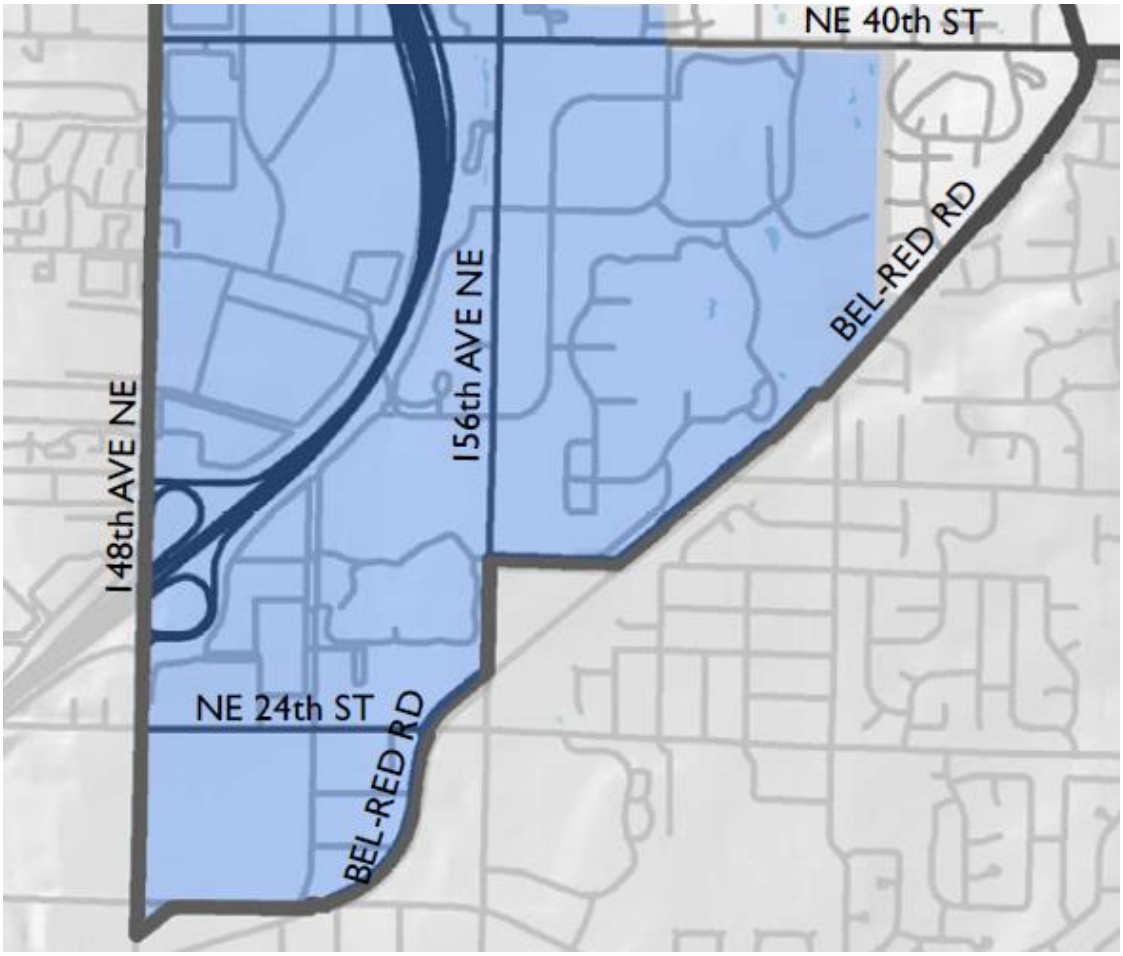


Source: City of Redmond, Transportation Master Plan

The SR 520 Bike Trail and the bike facility along 152nd Avenue NE, as part of the bicycle modal corridor, are vital assets in Overlake Village for non-motorized travel. Additional bike facilities are planned as part of the current Overlake Village South Infrastructure Planning Study.

As shown in **Exhibit 4,** all of the Overlake Village south subarea is designated as a pedestrian priority zone in the City's TMP.

Exhibit 4 - Pedestrian Priority Zones



Source: City of Redmond, Transportation Master Plan

3. Intersection Analysis Assumptions

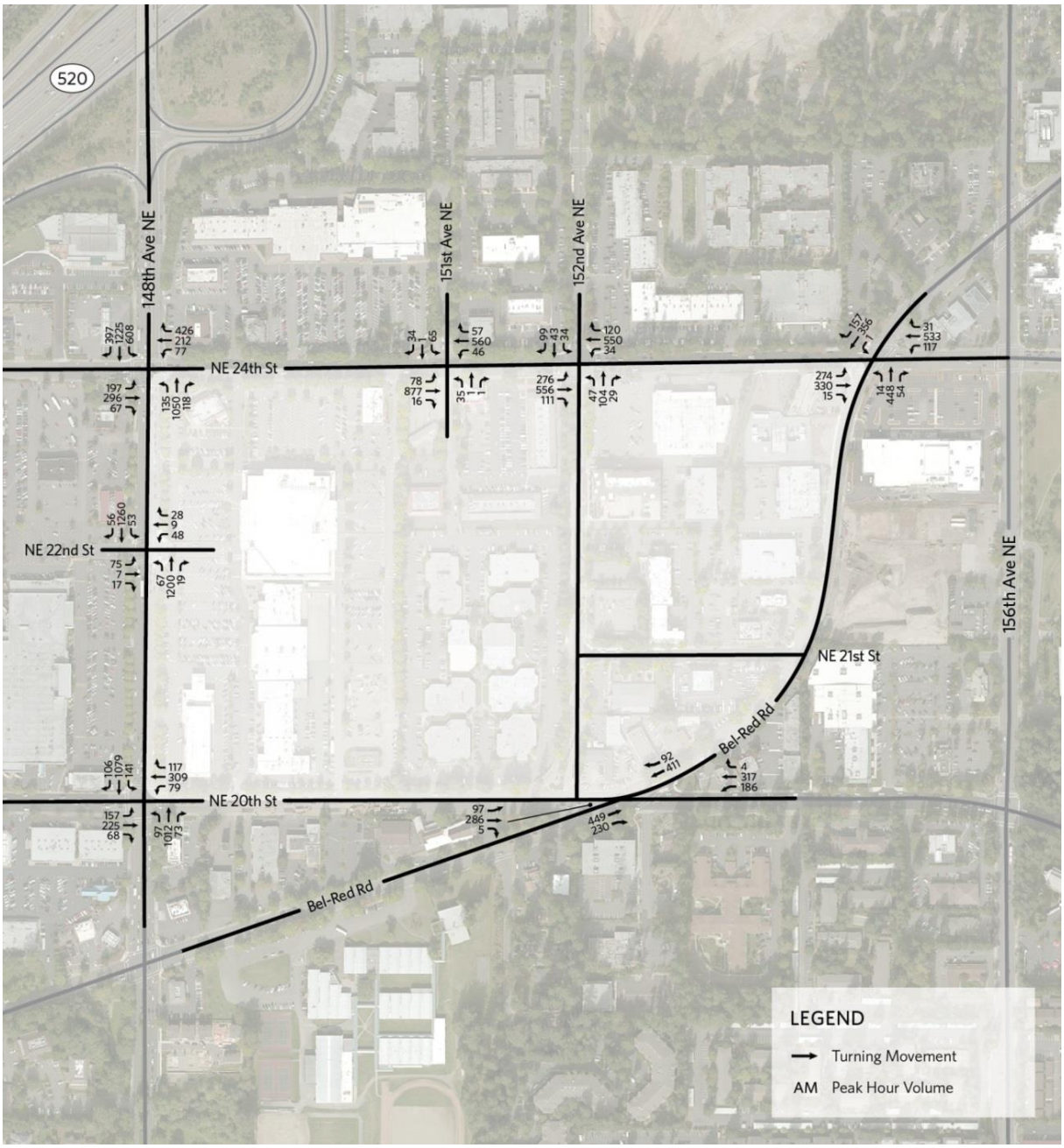
The following general assumptions were used in the intersection analysis:

1. An ideal saturated flow rate of 1900 vehicles per hour per lane (vphpl) is used and is consistent with the Highway Capacity Manual (HCM 2010).
2. The existing condition for this study refers to the year 2013.
3. For the existing condition analysis, peak hour factors are 0.92 or the same as values provided in existing Synchro models by the City; for the 2030 analysis, peak hour factors are 0.95 or greater based on existing values provided in existing Synchro models.
4. The heavy vehicle percentage is 1% for all movements within the subarea and in and out of the subarea in the AM and PM peak hour analyses based on existing traffic counts and the expectation that the subarea will have less industrial use in the future.
5. Default lane utilization factors in Synchro (version 9) were used except at 148th Avenue NE and NE 24th Street where lane utilizations factors were revised as part of model calibration.
6. For existing condition models, pedestrian volumes and bike volumes use the values provided in the City's Synchro models.
7. For 2030 models, there will be 20 pedestrian conflicts per hour for each conflicting movement and 5 bicycle conflicts per hour in the AM and PM peak hour analyses.
8. Six bus blockages occur per hour at approaches where bus stops are located near intersections to be analyzed.
9. Lane width is 12 feet per lane.
10. Type of area is Non-CBD.
11. The target intersection level of service for signalized intersections is "E".
12. Signal timing plans will be optimized and coordinated for the 2030 future year models.

4. Existing Traffic Conditions

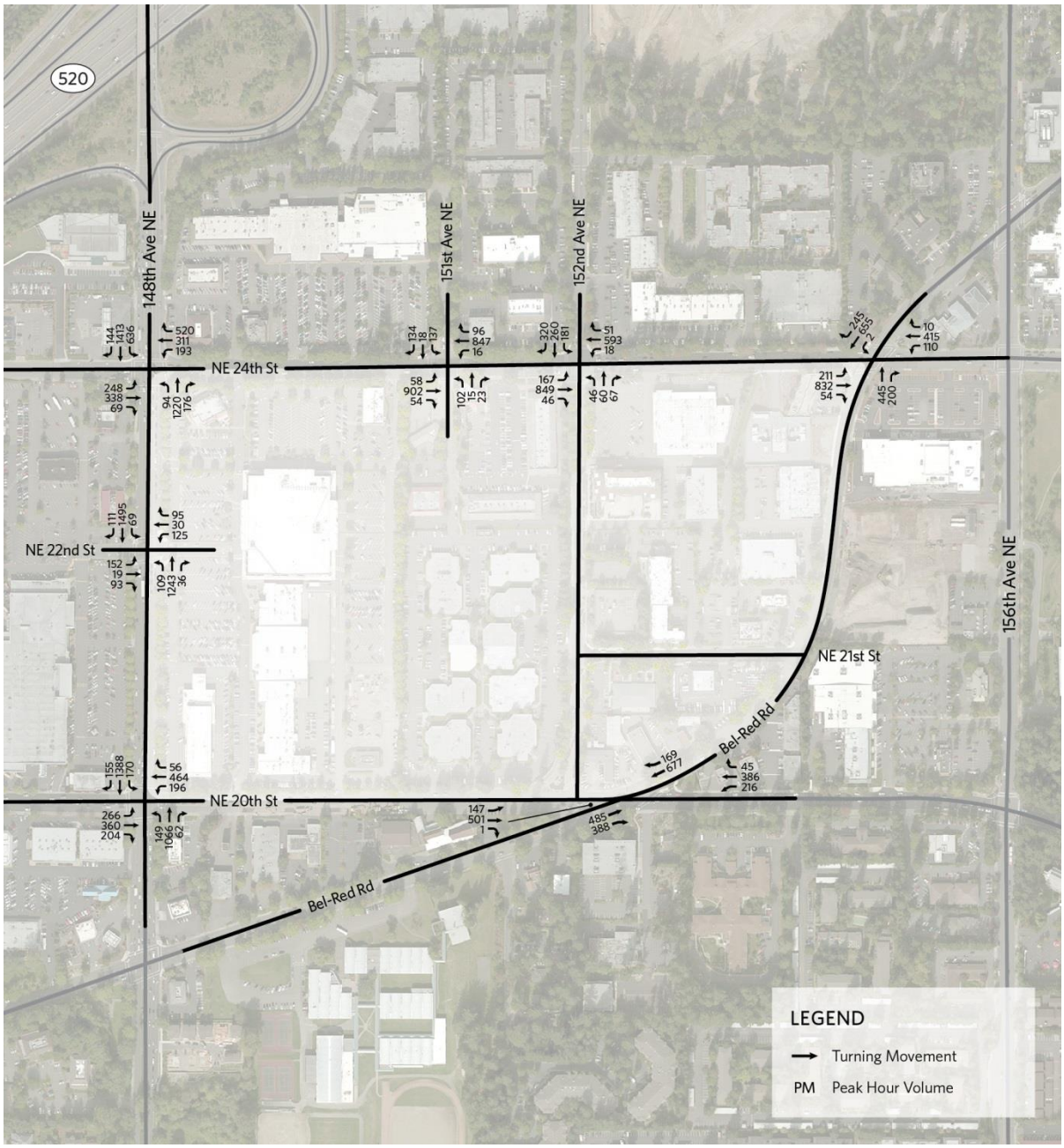
The existing conditions analyses are based on the 2013 volumes provided by the City. **Exhibits 5** and **6** present existing (2013) AM and PM peak hour traffic volumes, respectively.

Exhibit 5 - Existing (2013) AM Peak Hour Traffic Volumes



Source: City of Redmond and HDR.

Exhibit 6 - 2013 PM Peak Hour Traffic Volumes



Source: City of Redmond and HDR.

The 2013 AM and PM peak hour intersection operations at signalized intersections are summarized in **Exhibit 7**. Existing turn pocket storage lengths and 95th percentile queue lengths from Synchro models are summarized in **Exhibit 8**. The detailed Synchro modeling results are provided in **Appendix A.**

Exhibit 7 – Existing Year (2013) Traffic Operations

Intersection	Control Type[1]	MOE[2]	Approach Direction									
			2013 AM Peak Hour					2013 PM Peak Hour				
			EB	WB	NB	SB	Int.	EB	WB	NB	SB	Int.
148th Ave NE and NE 24th St	Signal	LOS[3]	E	C	D	D	D	E	C	F	E	E
		Delay[4]	59.7	26.3	38.7	41.6	40.6	64.7	30.9	84.8	62.0	62.7
148th Ave NE and NE 20th St	Signal	LOS	D	E	D	C	C	D	E	D	D	D
		Delay	48.6	59.5	35.2	20.4	34.8	54.2	61.4	49.4	35.6	47.0
Bel-Red Rd and NE 20th St	Signal	LOS	E	D	A	B	C	D	D	B	C	C
		Delay	57.7	51.7	8.1	11.6	28.9	55.0	46.7	12.7	20.8	31.4
Bel-Red Rd and NE 24th St	Signal	LOS	C	C	D	D	D	C	D	C	D	C
		Delay	28.8	30.9	53.4	43.4	38.1	26.7	35.6	30.3	44.3	33.9
152nd Ave NE and NE 24th St	Signal	LOS	A	D	D	C	C	C	D	B	C	C
		Delay	7.6	42.4	53.2	31.2	25.9	25.2	43.5	16.7	31.8	31.1
148th Ave NE and NE 22nd St	Signal	LOS	E	D	A	A	A	F	D	A	B	B
		Delay	68.5	50.6	1.6	8.6	8.8	81.8	54.4	5.0	15.2	18.9
151st Ave NE and NE 24th St	Signal	LOS	B	A	E	D	B	B	A	F	D	B
		Delay	11.7	7.7	56.0	44.9	13.0	13.5	6.7	87.8	37.2	17.9

Source: HDR.

Notes:

1. Signal = signalized intersection, OWSC = one-way stop controlled intersection, TWSC = two-way stop controlled intersection.
2. MOE: Measure of Effectiveness from Synchro (Version 9).
3. LOS, refers to Level of Service, is based on the methodologies outlined in the 2010 Highway Capacity Manual. LOS is rated from "A" (low delay) to "F" (delay in excess of 80 seconds per vehicle at signalized intersections).
4. Delay, or control delay, measured in seconds per vehicle, is a measure of all delays to traffic control measures, such as signals or stop signs. At signalized intersections and AWSC intersections, the reported delay is the average of all the control delay experienced for all movements. At TWSC and OWSC intersections, the reported delay is for only one movement, the movement experiencing the worst control delay.

Exhibit 8 - Existing Turn Pocket Lengths and Queue Lengths (Unit: feet)

Intersection	Approach	Turn Type	Existing Turn Pocket Length[1]	Existing AM 95th Percentile Queue[2]	Existing PM 95th Percentile Queue[2]
148th Ave NE and NE 24th St	EB	Left	330	242	285
	WB	Left	300	104	220
	WB	Right	175	0	0
	NB	Left	220	**#283**	m149
	NB	Right	380	20	m20
	SB	Left	470	395	433
148th Ave NE and NE 20th St	EB	Left	510	173	306
	WB	Left	200	95	197
	NB	Left	350	160	#269
	SB	Left	420	#254	m#296
Bel-Red Rd and NE 20th St	EB	Left	300	136	188
	WB	Left	350	222	249
	NB	Right	110	17	**154**
Bel-Red Rd and NE 24th St	EB	Left	280	**305**	m196
	WB	Left	400	158	150
152nd Ave NE and NE 24th St	EB	Left	200	**248**	**211**
	WB	Left	90	m52	m33
	NB	Right	60	0	11
	SB	Right	540	15	53
148th Ave NE and NE 22nd St	EB	Left	120	**133**	**#323**
	WB	Left	100	91	**#240**
	NB	Left	200	m11	m38
	NB	Right	150	m0	m0
	SB	Left	230	m19	m24
	SB	Right	150	m7	m18
151st Ave NE and NE 24th St	EB	Left	425	113	91
	WB	Left	65	m53	m24
	SB	Right	160	13	50

Source: HDR.

Notes:

1. Turn Pocket Length, measured in feet, is based on latest Google Earth imagery.
2. 95th Percentile Queue Length, measured in feet, is the maximum back of queue with 95th percentile traffic volumes. The "#" footnote indicates that the volume for the 95th percentile cycle exceeds capacity. This traffic was simulated for two complete cycles of 95th percentile traffic to account for the effects of spillover between cycles. The "m" footnote indicates that volume for the 95th percentile queue is metered by an upstream signal. The values of 95th percentile queue lengths are bold and underlined if they are greater than corresponding turn pocket lengths.

5. Land Use and Trip Generation

Existing and future (2030) land use data was provided by the City. **Exhibit 9** presents the existing and 2030 land use data within the study area. It shows that office land use will be increased by 107,930 ft^2 gross floor area and retail land use will be increased by 68,466 ft^2 gross leasable area. The industrial land use will be removed in the study area. There will be an increase of 887 units of multi-family dwell units in 2030. There are no changes for hotel land use in the study area.

Exhibit 9 – Existing (2010) and 2030 Land Use

Land Use	2010	2030	Changes
Office (GFA)	115,047	222,977	107,930
Retail (GLA)	633,395	701,861	68,466
Industrial (GFA)	47,229	0	-47,229
Hotel (Room)	144	144	0
Multi-family (Units)	38	925	887

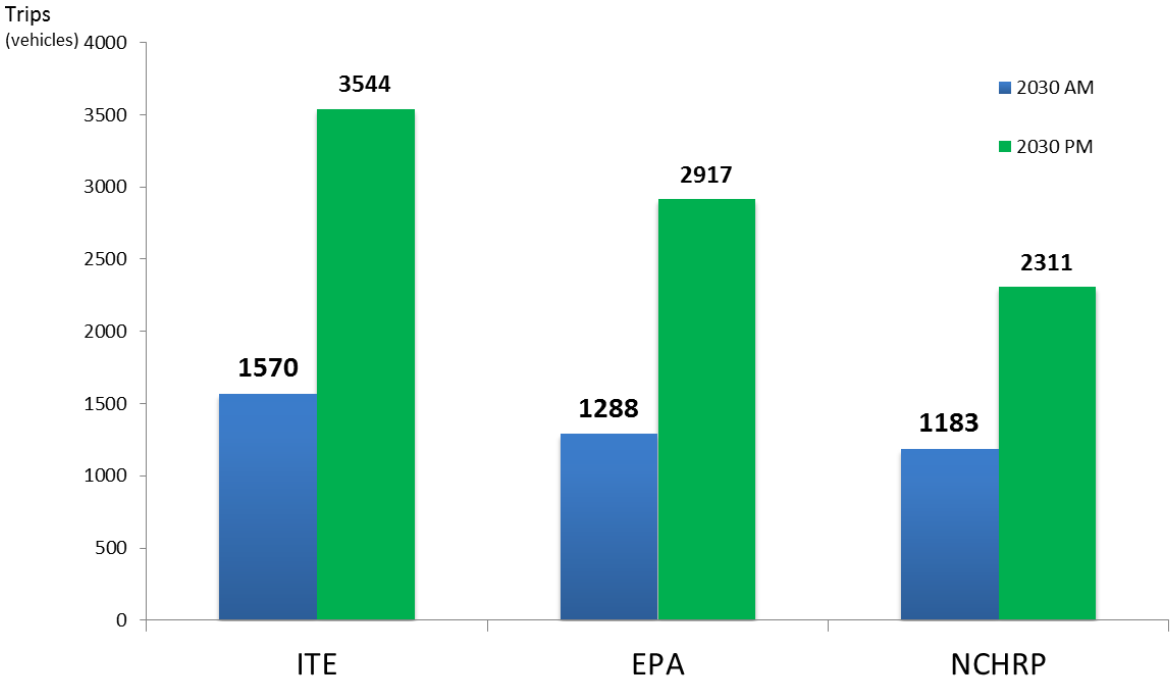
Source: City of Redmond and HDR.

The technical methods to estimate how much traffic a new development will create, known as trip generation analysis, have been standardized by the Institute of Transportation Engineers (ITE) and are used by traffic engineers across the country. However, these methods are generally based on data collected from single-use, automobile-dependent, suburban sites. They do allow for some internal capture (trips that might be entirely within larger, mixed-use developments), but in general the methods do not adequately account for the effects of compact development, mix of uses, site design, walkability, transit, and regional accessibility.

To help give communities better tools to analyze new development, the Environmental Protection Agency (EPA), in cooperation with ITE, worked with leading researchers and practitioners to develop new data and methods to estimate the trip-generation impacts of mixed-use developments (MXD). EPA analyzed six metropolitan regions, merging data from household travel surveys, GIS databases, and other sources to create consistent land use and travel measures. In addition, the Transportation Research Board also published NCHRP 684-Enhancing Internal Trip Capture Estimation for Mixed-Use Developments.

The above three trip generation methods were used to compare the number of trips based on the 2030 planned land use. As shown in **Exhibit 10**, the ITE trip generation manual method estimated the highest trips and the NCHRP estimated the lowest trips. After discussion with City staff, the results from the EPA method were approved for this project. The detailed results are provided in **Appendix B**.

Exhibit 10 - 2030 AM Peak Hour Site Trip Distributions



Source: HDR.

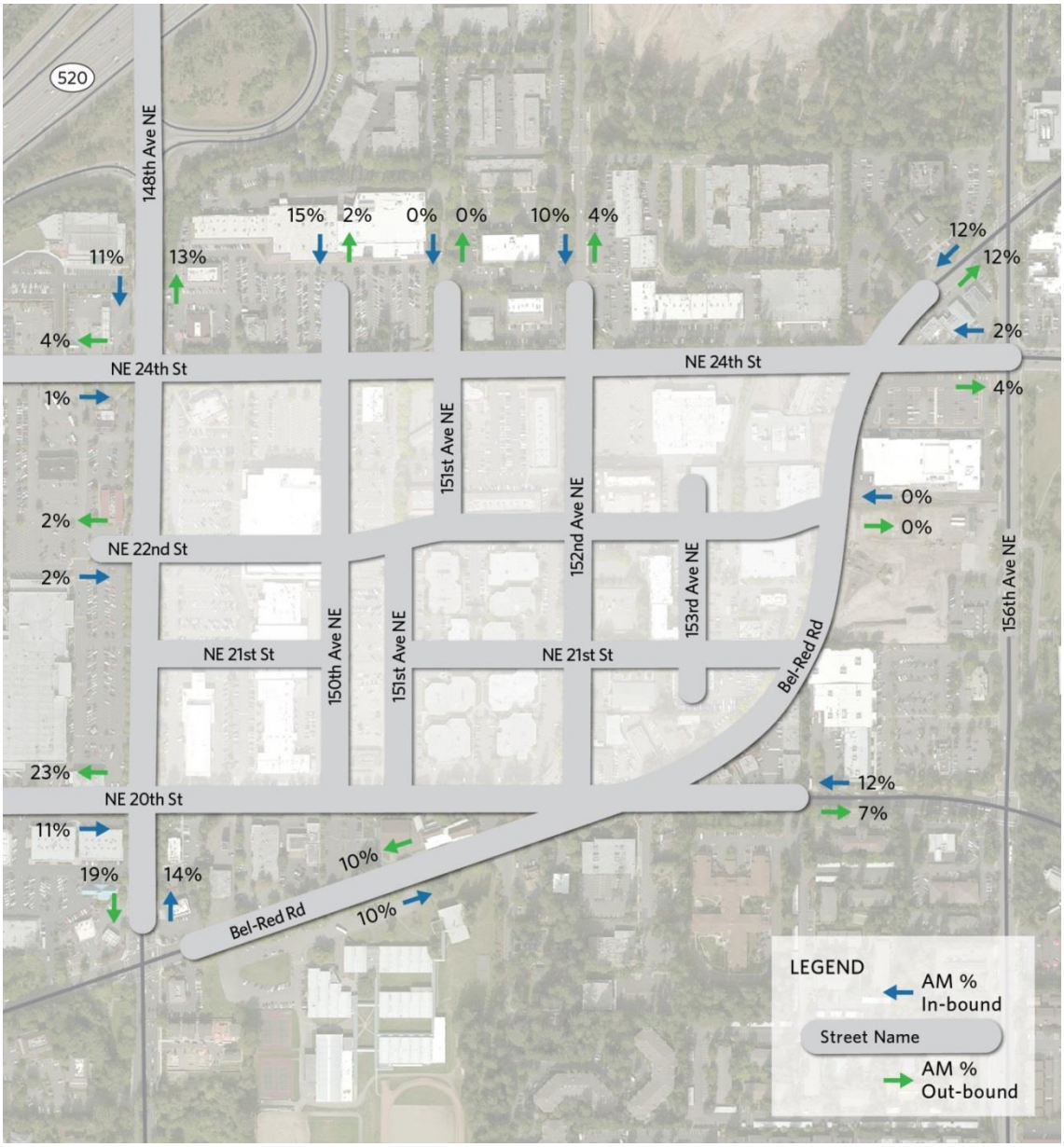
6. Trip Distributions and Forecasted Volumes

Trip distributions as shown in **Exhibits 11** and **12** were utilized to estimate trips on the proposed street network within the study area. These trip distributions were based on the traffic study for the KCC Limited Edition development and adjusted to reflect the proposed network concept and to utilize 150th Avenue NE as the main north/south motor vehicle access to and from the Overlake Village South subarea. Both AM and PM peak hour trip distributions were approved by City staff.

2030 forecast volumes were calculated based on 2013 intersection volumes with an annual background growth rate of 1% from 2013 to 2030. Existing trips to and from the study area were removed from the street network based on existing traffic counts. Project trips were added to the street network after trip distribution. The

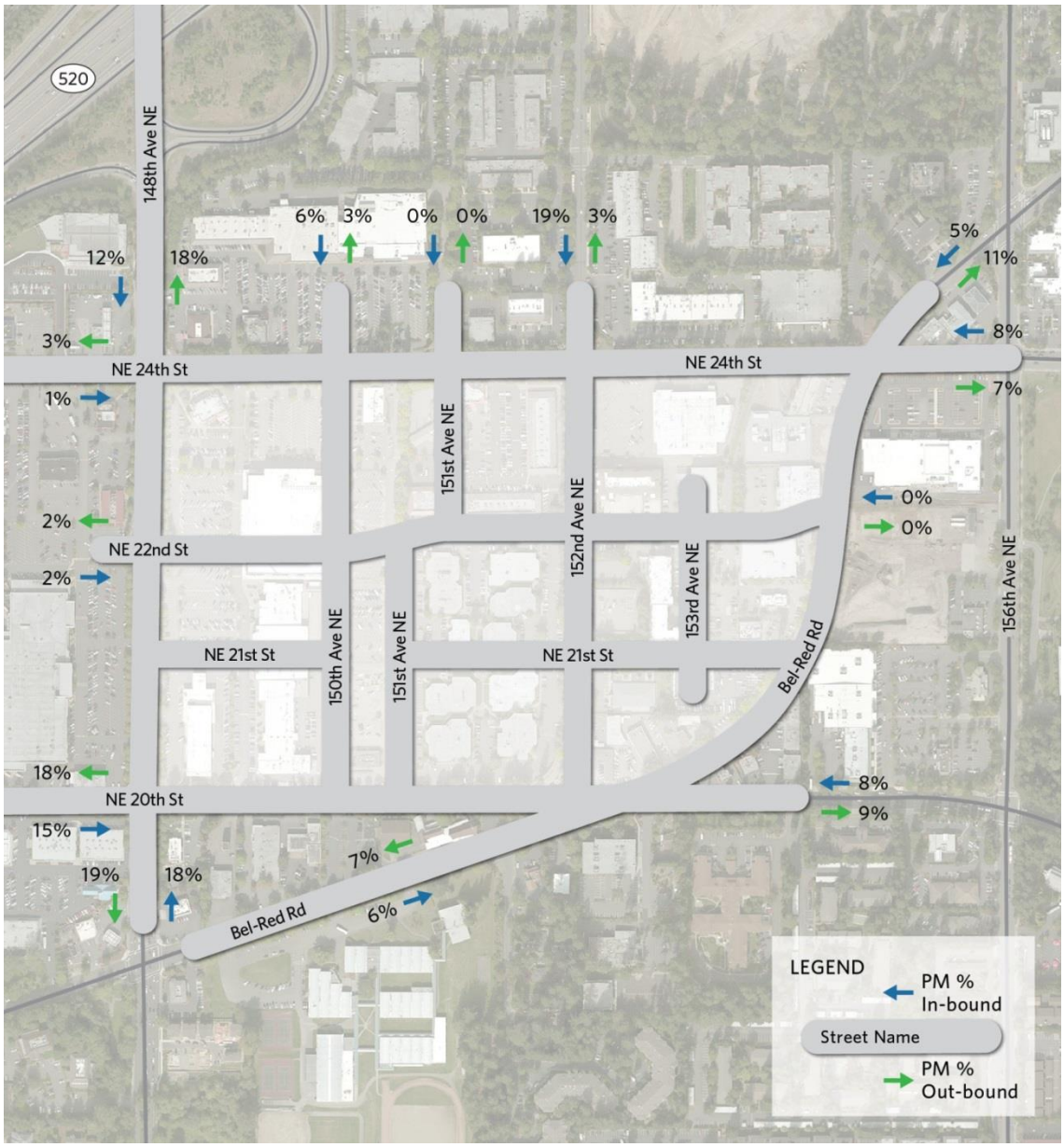
forecasted traffic volumes also considered development north of NE 24th Street by adjusting turn volumes to and from 151st Avenue NE, 152nd Avenue NE, and 150th Avenue NE along NE 24th Street. The background growth rate and the method of estimating 2030 traffic volumes were approved by City staff. **Exhibits 13** and **14** present 2030 AM and PM peak hour intersection volumes in the study area, respectively. **Exhibits 15** and **16** present 2030 AM and PM peak hour link volumes in the study area, respectively.

Exhibit 11 - 2030 AM Peak Hour Site Trip Distributions



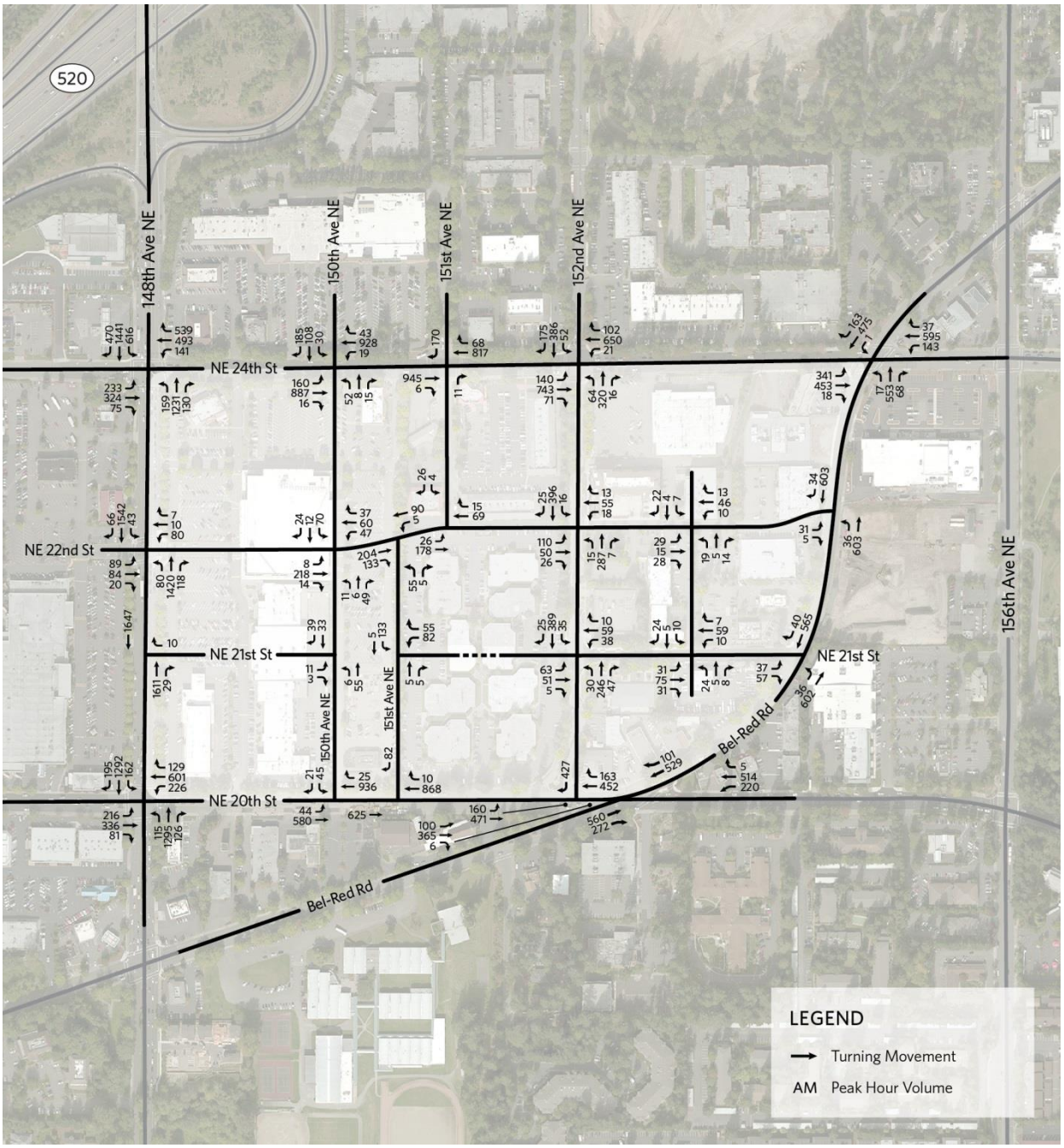
Source: HDR.

Exhibit 12 - 2030 PM Peak Hour Site Trip Distributions



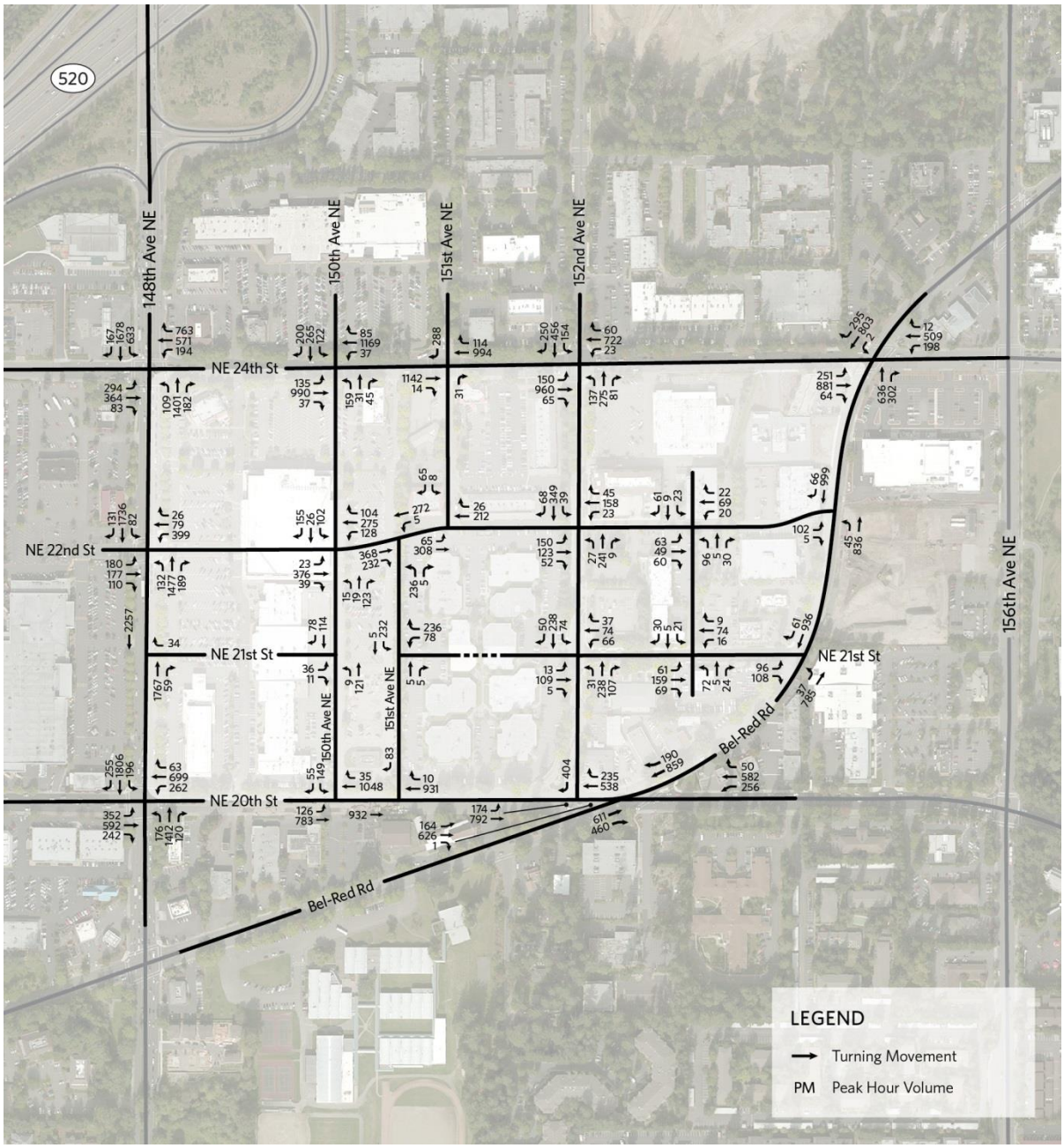
Source: HDR.

Exhibit 13 - 2030 AM Peak Hour Traffic Volumes



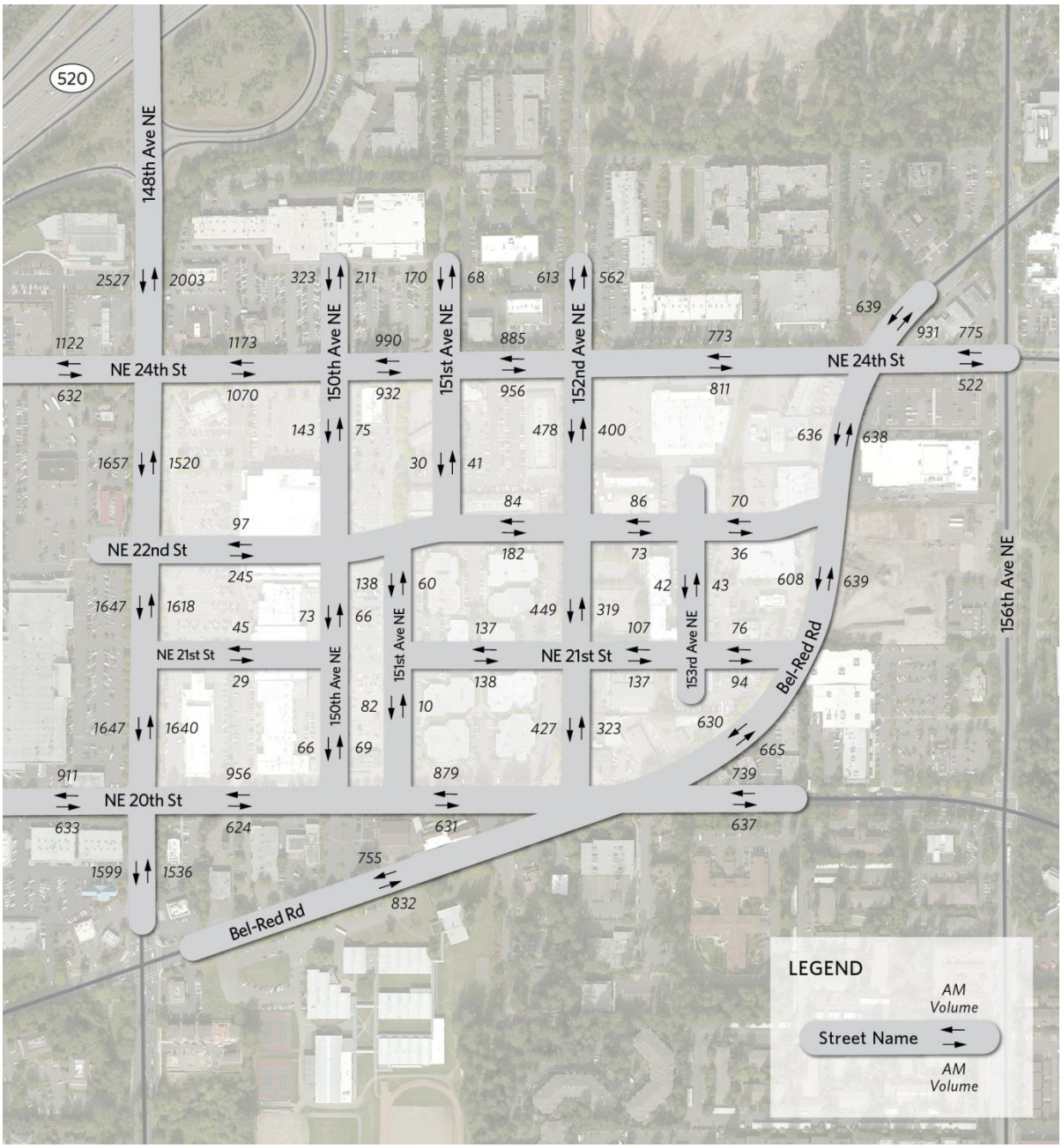
Source: HDR.

Exhibit 14 - 2030 PM Peak Hour Traffic Volumes



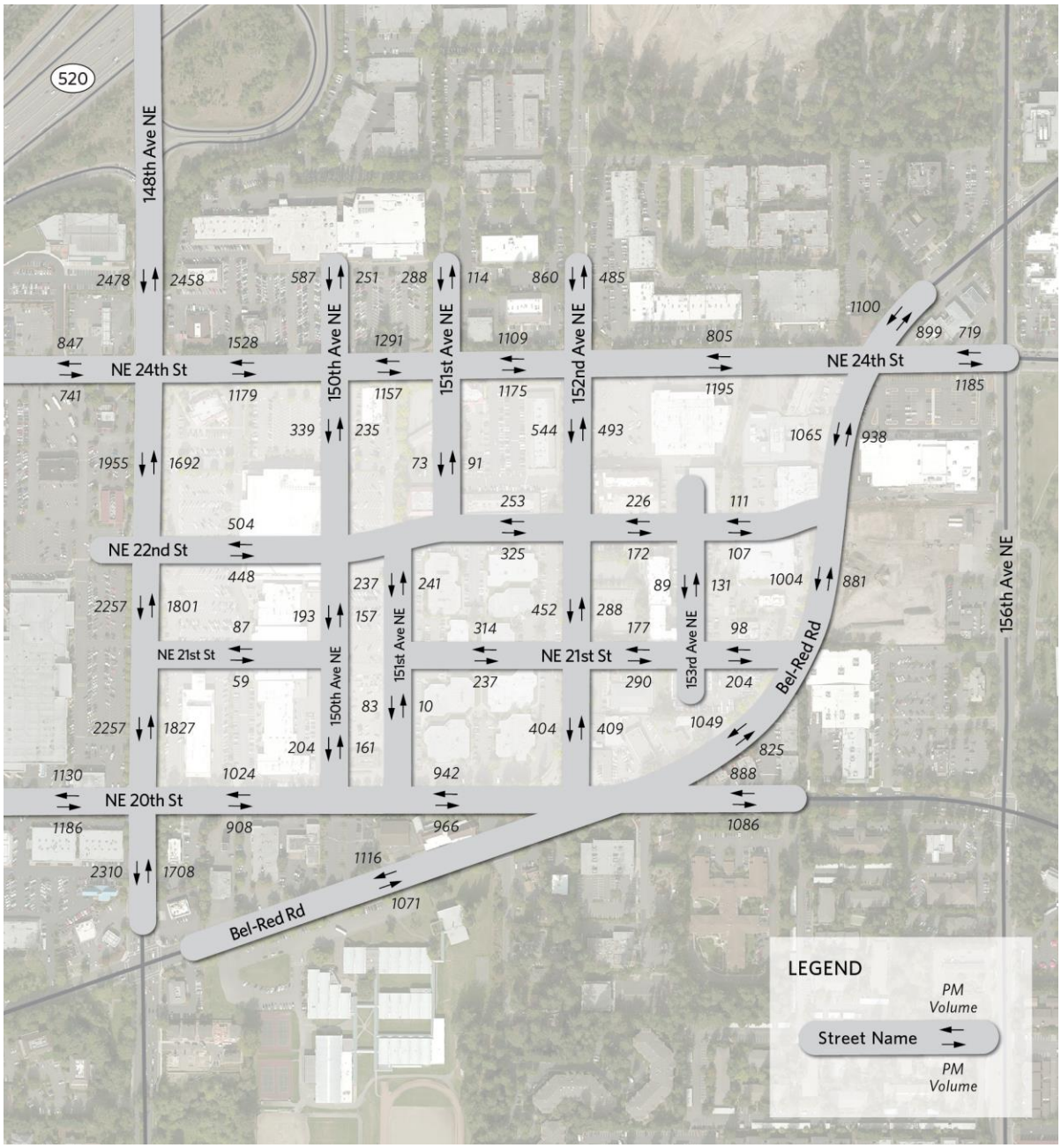
Source: HDR.

Exhibit 15 - 2030 AM Peak Hour Link Volumes



Source: HDR.

Exhibit 16 - 2030 PM Peak Hour Link Volumes



Source: HDR.

7. Proposed Traffic Control

Roadway and intersection improvements are required to mitigate the impact of additional trips into the Overlake Village South subarea based on the proposed street network in the 2030 AM and PM peak hour analyses. **Exhibit 17** presents proposed traffic control measures including new signals and stop controlled intersections. Proposed signal locations are based on the 2030 forecasted operational analysis at locations where multimodal traffic is expected to be heaviest. However, signal warrants at these locations have not been evaluated as part of this study and signals won't be installed in the future build out condition unless supported by signal warrants at that time.

Exhibit 17 – Proposed Overlake Village South Subarea Traffic Control

Source: HDR.

Exhibit 18 presents proposed lane configuration assumptions used in Synchro at all intersections within the study area. The lane configuration is illustrated by letters and numbers. For example, “L” represents one left turn lane; “2L” represents two left turn lanes; “LTR” represents one shared lane for left, through and right turn movements.

Exhibit 18 - Intersection Configuration Assumptions

ID	Intersection Name	Street Name	Approach	Existing Geometry	Proposed Changes	Notes
1	148th Ave NE and NE 24th St	NE 24th St	EB	L, T, TR	2L, T, TR	• Conversion of NB right turn lane on 148th Ave NE to a through/right lane will require a fourth NB through lane between NE 24th St and the SR 520 EB ramps. • Adding additional exclusive left turn lanes on NE 24th St.
		NE 24th St	WB	L, 2T, R	2L, 2T, R	
		148th Ave NE	NB	L, 2T, R	L, 2T, TR	
		148th Ave NE	SB	2L, T, TR	-	
2	148th Ave NE and NE 20th St	NE 20th St	EB	L, T, TR	-	• Adding a NB through lane on 148th Ave NE.
		NE 20th St	WB	L, T, TR	-	
		148th Ave NE	NB	L, T, TR	L, 2T, TR	
		148th Ave NE	SB	L, 2T, TR	-	
3	Bel-Red Rd and NE 20th St	NE 20th St	EB	L, T, TR	-	• Keeping existing intersection
		NE 20th St	WB	L, T, TR	-	
		Bel-Red Rd	NB	2T, R	-	
		Bel-Red Rd	SB	T, TR	-	
4	Bel-Red Rd and NE 24th St	Bel-Red Rd	EB	L, T, TR	-	• Keeping existing intersection
		Bel-Red Rd	WB	L, T, TR	-	
		NE 24th St	NB	LT, TR	-	
		NE 24th St	SB	LT, TR	-	
5	152nd Ave NE and NE 24th St	NE 24th St	EB	L, T, TR	-	• Reconfiguration of 152nd Ave NE to allow concurrent left turns. • The protected SB bike lane and pedestrian phase could work with protected E-W left turns, and protected N-S left turns.
		NE 24th St	WB	L, T, TR	-	
		152nd Ave NE	NB	LT, R	L, TR	
		152nd Ave NE	SB	LT, R	L, T, R	

ID	Intersection Name	Street Name	Approach	Existing Geometry	Proposed Changes	Notes
7	148th Ave NE and NE 22nd St	NE 22nd St	EB	L, TR	-	• Conversion of the WB through/right turn lane to a left/through/right turn lane will require the EB and WB movements at this intersection to be split phased.
		NE 22nd St	WB	L, TR	L, LTR	
		148th Ave NE	NB	L, 2T, R	L, 2T, TR	
		148th Ave NE	SB	L, 2T, R	-	
8	151st Ave NE and NE 24th St	NE 24th St	EB	L, T, TR	T, TR	• Median to be constructed in center turn lane area to preclude NB and SB left/through movements for vehicles. NB and SB pedestrian and bike through movement will be allowed.
		NE 24th St	WB	L, T, TR	T, TR	
		151st Ave NE	NB	LTR	R	
		151st Ave NE	SB	LT, R	R	
9	150th Ave NE and NE 24th St	150th Ave NE	EB	N/A	L, 2T, R	• A new 4-leg intersection will be constructed on NE 24th St. • North of this intersection, 150th Ave NE will be connected with a proposed roundabout intersection for the Overlake Access Ramp.
		150th Ave NE	WB	N/A	L, T, TR	
		NE 24th St	NB	N/A	L, TR	
		NE 24th St	SB	N/A	L, T, R	
10	152nd Ave NE and NE 21st St	NE 21st St	EB	LTR	L, TR	• The assumption of 3-lane-section on NE 21st St was provided by the City as part of the KCC Limited Edition development agreement.
		NE 21st St	WB	LTR	-	
		152nd Ave NE	NB	LTR	-	
		152nd Ave NE	SB	LTR	-	
13	152nd Ave NE and NE 22nd St	NE 22nd St	EB	-	LTR	• A 4-leg intersection will be constructed at the existing location of 152nd Ave NE and NE 22nd St.
		NE 22nd St	WB	LTR	-	
		152nd Ave NE	NB	LTR	-	
		152nd Ave NE	SB	LTR	-	
16	150th Ave NE and NE 22nd St	NE 22nd St	EB	N/A	LTR	• A new 4-leg intersection will be constructed.
		NE 22nd St	WB	N/A	LTR	
		150th Ave NE	NB	N/A	LTR	
		150th Ave NE	SB	N/A	LTR	
33	150th Ave NE and NE 20th St	NE 20th St	EB	N/A	L, 2T	• A new 3-leg intersection will be constructed.
		NE 20th St	WB	N/A	T, TR	
		150th Ave NE	SB	N/A	LR	

ID	Intersection Name	Street Name	Approach	Existing Geometry	Proposed Changes	Notes
6	152nd Ave NE and NE 20th St	NE 20th St	EB	L, 2T	-	• Keeping existing intersection • Potential changes to be studied in another effort of collaboration with the City of Bellevue.
		NE 20th St	WB	T, TR	-	
		152nd Ave NE	SB	R	-	
11	Bel-Red Rd and NE 21st St	NE 21st St	EB	LR	-	• Keeping existing intersection
		Bel-Red Rd	NB	LT, T	-	
		Bel-Red Rd	SB	T, TR	-	
12	Bel-Red Rd and NE 22nd St	NE 22nd St	EB	LR	-	• Keeping existing intersection
		Bel-Red Rd	NB	LT, T	-	
		Bel-Red Rd	SB	T, TR	-	
14	151st Ave NE and NE 22nd St (E)	NE 22nd St (E)	EB	N/A	LT	• A new 3-leg intersection will be constructed.
		NE 22nd St (E)	WB	N/A	TR	
		151st Ave NE	SB	N/A	LR	
15	151st Ave NE and NE 22nd St (W)	NE 22nd St (W)	EB	N/A	TR	• A new 3-leg intersection will be constructed.
		NE 22nd St (W)	WB	N/A	LT	
		151st Ave NE	NB	N/A	LR	
17	150th Ave NE and NE 21st St	NE 21st St	EB	N/A	LR	• A new 3-leg intersection will be constructed.
		150th Ave NE	NB	N/A	LT	
		150th Ave NE	SB	N/A	TR	
18	148th Ave NE and NE 21st St	NE 21st St	WB	N/A	R	• A right-in-and-right out access will be reconstructed.
		148th Ave NE	NB	N/A	2T, TR	
19	153rd Ave NE and NE 22nd St	NE 22nd St	EB	N/A	LTR	• A new 4-leg intersection will be constructed.
		NE 22nd St	WB	N/A	LTR	
		153rd Ave NE	NB	N/A	LTR	
		153rd Ave NE	SB	N/A	LTR	

ID	Intersection Name	Street Name	Approach	Existing Geometry	Proposed Changes	Notes
20	153rd Ave NE and NE 21st St	NE 21st St	EB	N/A	LTR	• A new 4-leg intersection will be constructed.
		NE 21st St	WB	N/A	LTR	
		153rd Ave NE	NB	N/A	LTR	
		153rd Ave NE	SB	N/A	LTR	
34	151st Ave NE and NE 20th St	NE 20th St	EB	N/A	2T	• A new 3-leg intersection will be constructed.
		NE 20th St	WB	N/A	T, TR	
		151st Ave NE	SB	N/A	R	
39	151st Ave NE and NE 21st St	NE 21st St	WB	N/A	L, R	• The assumption of 3-lane-section on NE 21st St was provided by the City as part of the KCC Limited Edition development agreement.
		151st Ave NE	NB	N/A	TR	
		151st Ave NE	SB	N/A	LT	

Source: HDR

Notes: "N/A" = the approach is not available. "-" = lane configuration is the same as existing condition in the 2030 AM and PM peak hour analyses.

8. Future Traffic Conditions

Future traffic conditions were analyzed based on the projected traffic volumes and proposed geometry, as well as optimized traffic signal timing plans. 2030 AM and PM peak hour operations for both signalized and unsignalized intersections are summarized in **Exhibit 19**. Proposed pocket storage lengths and 95th percentile queue lengths in the 2030 AM and PM peak hour analyses are summarized in **Exhibit 20**. The detailed Synchro modeling results are provided in **Appendix A.**

Exhibit 19 – 2030 AM and PM Peak Hour Traffic Operations

Intersection	Control Type[1]	MOE[2]	Approach Direction									
			2030 AM Peak Hour					2030 PM Peak Hour				
			EB	WB	NB	SB	Int.	EB	WB	NB	SB	Int.
148th Ave NE and NE 24th St	Signal	LOS[3]	D	C	C	F	E	D	C	C	F	E
		Delay[4]	48.1	32.0	33.1	85.0	56.9	51.4	33.8	26.4	114.7	65.0
148th Ave NE and NE 20th St	Signal	LOS	E	E	D	D	D	F	F	D	F	E
		Delay	57.3	65.8	39.3	36.8	46.1	96.4	92.6	47.7	82.9	77.4
Bel-Red Rd and NE 20th St	Signal	LOS	D	D	B	B	C	D	D	B	C	C
		Delay	45.6	43.3	10.7	11.0	25.9	44.1	44.6	16.1	21.1	30.0
Bel-Red Rd and NE 24th St	Signal	LOS	B	C	D	D	C	C	D	C	D	D
		Delay	14.4	34.8	47.2	43.5	33.7	23.1	49.6	33.9	44.1	36.3
152nd Ave NE and NE 24th St	Signal	LOS	C	C	C	C	C	D	D	D	D	D
		Delay	32.0	32.4	31.4	25.1	30.5	48.7	48.7	39.4	47.0	46.9
148th Ave NE and NE 22nd St	Signal	LOS	E	E	A	A	A	E	E	C	E	D
		Delay	67.8	65.6	5.9	3.1	9.6	76.2	78.0	24.4	70.3	54.2
151st Ave NE and NE 24th St	Signal	LOS	A	A	A	C	A	A	A	A	D	A
		Delay	1.3	1.9	0.5	22.4	3.4	2.4	2.8	3.7	49.5	7.8
150th Ave NE and NE 24th St	Signal	LOS	B	A	C	C	B	B	B	D	D	C
		Delay	10.3	5.3	27.9	29.2	11.3	19.9	16.5	36.4	40.6	23.4
152nd Ave NE and NE 21st St	Signal	LOS	C	C	A	A	A	B	C	A	A	B
		Delay	20.7	23.5	4.9	1.8	7.4	20.7	26.8	6.5	3.6	10.1

Intersection	Control Type[1]	MOE[2]	Approach Direction									
			2030 AM Peak Hour					2030 PM Peak Hour				
			EB	WB	NB	SB	Int.	EB	WB	NB	SB	Int.
152nd Ave NE and NE 22nd St	Signal	LOS	C	B	A	A	A	C	B	A	A	B
		Delay	23.6	15.1	5.7	3.5	8.8	33.4	16.7	8.3	4.5	14.8
150th Ave NE and NE 22nd St	Signal	LOS	B	A	A	A	A	B	B	A	A	B
		Delay	11.2	7.4	5.3	3.1	8.0	12.5	18.3	4.4	9.1	13.0
150th Ave NE and NE 20th St	Signal	LOS	A	A	-	D	A	A	A	-	E	B
		Delay	2.3	3.4	-	44.0	4.6	5.8	8.6	-	64.4	12.6
152nd Ave NE and NE 20th St	OWSC	LOS	A	A	-	D	D	A	A	-	D	D
		Delay	2.5	0	-	25.4	-	2.0	0	-	31.8	-
Bel-Red Rd and NE 21st St	OWSC	LOS	B	-	A	A	B	C	-	A	A	C
		Delay	12.4	-	0.6	0	-	19.3	-	0.6	0	-
Bel-Red Rd and NE 22nd St	OWSC	LOS	B	-	A	A	B	C	-	A	A	C
		Delay	14.4	-	0.6	0	-	24.8	-	0.7	0	-
151st Ave NE and NE 22nd St (E)	OWSC	LOS	A	A	-	A	A	A	A	-	B	B
		Delay	1.1	0	-	9.4	-	1.8	0	-	11.1	-
151st Ave NE and NE 22nd St (W)	OWSC	LOS	A	A	B	-	B	A	A	E	-	E
		Delay	0	0.4	11.8	-	-	0	0.2	47.5	-	-
150th Ave NE and NE 21st St	OWSC	LOS	A	-	A	A	A	B	-	A	A	B
		Delay	9.5	-	0.7	0	-	10.9	-	0.6	0	-
148th Ave NE and NE 21st St	OWSC	LOS	-	B	A	-	B	-	C	A	-	C
		Delay	-	13.7	0	-	-	-	15.4	0	-	-
153rd Ave NE and NE 22nd St	TWSC	LOS	A	A	B	A	B	A	A	C	B	C
		Delay	3.1	1.2	10.2	9.6	-	3.0	1.5	15.2	11.1	-
153rd Ave NE and NE 21st St	AWSC	LOS	A	A	A	A	A	A	A	A	A	A
		Delay	7.9	7.7	7.7	7.4	7.8	9.9	8.4	8.8	8.2	9.3

Intersection	Control Type[1]	MOE[2]	Approach Direction									
			2030 AM Peak Hour					2030 PM Peak Hour				
			EB	WB	NB	SB	Int.	EB	WB	NB	SB	Int.
151st Ave NE and NE 20th St	OWSC	LOS	A	A	-	B	B	A	A	-	B	B
		Delay	0	0	-	10.3	-	0	0	-	10.2	-
151st Ave NE and NE 21st St	OWSC	LOS	-	B	A	A	B	-	B	A	A	B
		Delay	-	10.9	0	7.3	-	-	11.4	0	7.6	-

Source: HDR.

Notes:

1. Signal = signalized intersection, OWSC = one-way stop controlled intersection, TWSC = two-way stop controlled intersection.
2. MOE: Measure of Effectiveness from Synchro (Version 9).
3. LOS, refers to Level of Service, is based on the methodologies outlined in the 2010 Highway Capacity Manual. LOS is rated from "A" (low delay) to "F" (delay in excess of 80 seconds per vehicle at signalized intersections).
4. Delay, or control delay, measured in seconds per vehicle, is a measure of all delays to traffic control measures, such as signals or stop signs. At signalized intersections and AWSC intersections, the reported delay is the average of all the control delay experienced for all movements. At TWSC and OWSC intersections, the reported delay is for only one movement, the movement experiencing the worst control delay.

Exhibit 20 – 2030 Turn Pocket Lengths and Queue Lengths (Unit: feet)

Intersection	Approach	Turn Type	Existing Turn Pocket Length[1]	2030 AM 95th Percentile Queue[2]	2030 PM 95th Percentile Queue[2]	Turn Pocket Length Recommendation[1]
148th Ave NE and NE 24th St	EB	Left	330	118	150	-
	WB	Left	300	75	102	-
	WB	Right	175	0	0	-
	NB	Left	220	**#299**	m133	300
	NB	Right	380	N/A	N/A	Convert to through lane
	SB	Left	470	378	#450	-
148th Ave NE and NE 20th St	EB	Left	510	#309	#508	-
	WB	Left	200	231	**#316**	320
	NB	Left	350	171	#303	-
	SB	Left	420	244	m194	-
Bel-Red Rd and NE 20th St	EB	Left	300	103	140	-
	WB	Left	350	219	281	-
	NB	Right	110	40	**202**	210
Bel-Red Rd and NE 24th St	EB	Left	280	134	m67	-
	WB	Left	400	167	#287	-

Intersection	Approach	Turn Type	Existing Turn Pocket Length[1]	2030 AM 95th Percentile Queue[2]	2030 PM 95th Percentile Queue[2]	Turn Pocket Length Recommendation[1]
152nd Ave NE and NE 24th St	EB	Left	200	**#202**	**#238**	250
	WB	Left	90	m28	m30	-
	NB	Left	N/A	86	m172	250*
	NB	Right	60	N/A	N/A	removed
	SB	Left	N/A	77	#227	230
	SB	Right	540	76	153	350*
148th Ave NE and NE 22nd St	EB	Left	120	**138**	**243**	250
	WB	Left	100	92	**#384**	390
	NB	Left	200	m0	m121	-
	NB	Right	150	-	-	Convert to through lane
	SB	Left	230	m3	m22	150 (turn pocket length is reduced to accommodate longer 148th Ave NE NB left turn pocket at NE 24th St.)
	SB	Right	150	m0	m8	-
151st Ave NE and NE 24th St	EB	Left	425	N/A	N/A	removed
	WB	Left	65	N/A	N/A	removed
	SB	Right	160	N/A	N/A	removed
150th Ave NE and NE 24th St	EB	Left	N/A	74	109	120
	EB	Right	N/A	0	0	370*
	WB	Left	N/A	4	m14	240*
	NB	Left	N/A	53	m128	130
	SB	Left	N/A	40	120	130
	SB	Right	N/A	63	65	330*
150th Ave NE and NE 20th St	EB	Left	N/A	12	42	150*

Source: HDR.

Note:

1. "N/A" = the turn pocket is not available. "-" = No turn pocket length changes are recommended. "*"= Turn pocket lane lengths are increased to reduce the possibility of through traffic blocking turning traffic.
2. 95th Percentile Queue Length, measured in feet, is the maximum back of queue with 95th percentile traffic volumes. The "#" footnote indicates that the volume for the 95th percentile cycle exceeds capacity. This traffic was simulated for two complete cycles of 95th percentile traffic to account for the effects of spillover between cycles. The "m" footnote indicates that volume for the 95th percentile queue is metered by an upstream signal. The values of 95th percentile queue lengths are bold and underlined if they are greater than corresponding turn pocket lengths.

9. Findings

The bullets listed below highlight the key findings of this traffic analysis study:

- The proposed street network, with proposed geometry improvements and traffic control, would allow intersections to operate at LOS E or better in both the 2030 AM and PM peak hours.
- 150th Avenue NE was shown to operate effectively as the north-south collector arterial in the study area.
- Traffic congestion on 148th Avenue NE has a major influence on ingress and egress traffic to and from the Overlake Village South subarea. A corridor study is recommended to verify if proposed improvements meet the City's overall goals and objectives along 148th Avenue NE.

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APPENDIX A

Synchro Model Outputs

Signalized and Unsignalized Intersections

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Lanes, Volumes, Timings
1: 148th & NE 24th

1/12/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	197	296	67	77	212	426	135	1050	118	608	1225	397
Future Volume (vph)	197	296	67	77	212	426	135	1050	118	608	1225	397
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	330		220	300		175	220		380	470		0
Storage Lanes	1		1	1		1	1		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	*0.85	1.00	*0.90	0.95	0.95
Ped Bike Factor												
Frt		0.972				0.850			0.850		0.963	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3440	0	1770	3539	1583	1770	3167	1583	3185	3408	0
Flt Permitted	0.299			0.386			0.950			0.950		
Satd. Flow (perm)	557	3440	0	719	3539	1583	1770	3167	1583	3185	3408	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16				463			107		41	
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		768			924			562			685	
Travel Time (s)		17.5			21.0			10.9			13.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	214	322	73	84	230	463	147	1141	128	661	1332	432
Shared Lane Traffic (%)												
Lane Group Flow (vph)	214	395	0	84	230	463	147	1141	128	661	1764	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			24			24	
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	2	1	2	2	2	2	
Detector Template												
Leading Detector (ft)	38	100		38	100	100	38	100	100	100	100	
Trailing Detector (ft)	2	2		2	2	2	2	2	2	2	2	
Turn Type	pm+pt	NA		pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4		Free			2			
Detector Phase	3	8		7	4		5	2	2	1	6	
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	11.0	29.0		11.0	29.0		11.0	28.0	28.0	11.0	27.0	
Total Split (s)	27.0	30.0		27.0	30.0		17.0	49.0	49.0	44.0	76.0	
Total Split (%)	18.0%	20.0%		18.0%	20.0%		11.3%	32.7%	32.7%	29.3%	50.7%	
Maximum Green (s)	22.0	25.0		22.0	25.0		12.0	44.0	44.0	39.0	71.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag	Lag	Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Time To Reduce (s)	0.0	0.0		5.0	5.0		5.0	5.0	5.0	5.0	0.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	None	Max	
Walk Time (s)		9.0			9.0			8.0	8.0		8.0	
Flash Dont Walk (s)		15.0			15.0			15.0	15.0		14.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effct Green (s)	39.9	25.2		27.8	16.0	150.0	14.0	63.4	63.4	37.7	87.1	
Actuated g/C Ratio	0.27	0.17		0.19	0.11	1.00	0.09	0.42	0.42	0.25	0.58	
v/c Ratio	0.68	0.67		0.39	0.61	0.29	0.89	0.85	0.18	0.83	0.88	
Control Delay	56.1	61.7		46.7	70.7	0.5	96.8	34.6	3.4	62.0	33.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	
Total Delay	56.1	61.7		46.7	70.7	0.5	96.8	35.2	3.4	62.0	33.9	
LOS	E	E		D	E	A	F	D	A	E	C	
Approach Delay		59.7			26.3			38.7			41.6	
Approach LOS		E			C			D			D	
Queue Length 50th (ft)	175	184		63	115	0	147	634	5	340	753	
Queue Length 95th (ft)	242	238		104	157	0	#283	#897	20	395	#1030	
Internal Link Dist (ft)		688			844			482			605	
Turn Bay Length (ft)	330			300		175	220		380	470		
Base Capacity (vph)	342	647		352	637	1583	165	1337	730	887	1996	
Starvation Cap Reductn	0	0		0	0	0	0	41	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	0.63	0.61		0.24	0.36	0.29	0.89	0.88	0.18	0.75	0.88	

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 39 (26%), Referenced to phase 2:NBT and 5:NBL, Start of Red
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 40.6 Intersection LOS: D
Intersection Capacity Utilization 84.1% ICU Level of Service E
Analysis Period (min) 15

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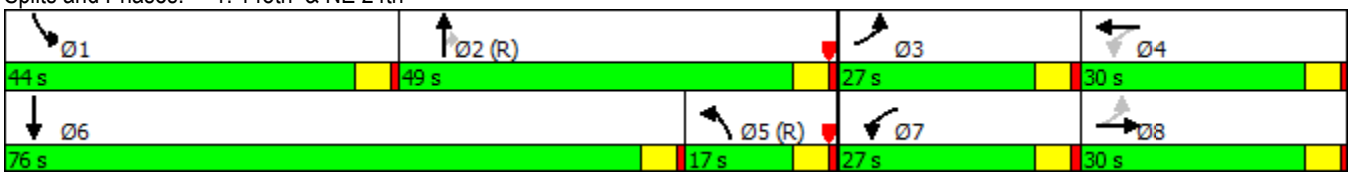
* User Entered Value
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: 148th & NE 24th



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	157	225	68	79	309	117	97	1012	73	141	1079	106
Future Volume (vph)	157	225	68	79	309	117	97	1012	73	141	1079	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	11	12	12	12	12	11	12	12	11	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	510		0	200		0	350		0	420		610
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.91	0.91
Ped Bike Factor		0.99			0.99			1.00			1.00	
Frt		0.965			0.959			0.990			0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3391	0	1770	3357	0	1770	3377	0	1770	4829	0
Flt Permitted	0.158			0.490			0.950			0.950		
Satd. Flow (perm)	294	3391	0	913	3357	0	1770	3377	0	1770	4829	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			33			6			12	
Link Speed (mph)		35			30			35			35	
Link Distance (ft)		789			1386			608			749	
Travel Time (s)		15.4			31.5			11.8			14.6	
Confl. Peds. (#/hr)			10			15			15			20
Confl. Bikes (#/hr)												
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	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	171	245	74	86	336	127	105	1100	79	153	1173	115
Shared Lane Traffic (%)												
Lane Group Flow (vph)	171	319	0	86	463	0	105	1179	0	153	1288	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					Yes							
Headway Factor	1.00	1.00	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.00	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	2	2		2	2		2	2		2	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	100	100		100	100		100	100		100	100	
Trailing Detector (ft)	2	2		2	2		2	2		2	2	
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4								
Detector Phase	3	8		7	4		1	6		5	2	
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	7.0	7.0		7.0	7.0		6.0	7.0		6.0	7.0	
Minimum Split (s)	12.0	29.0		12.0	29.0		11.0	28.0		11.0	28.0	
Total Split (s)	36.0	38.0		33.0	35.0		21.0	58.0		21.0	58.0	
Total Split (%)	24.0%	25.3%		22.0%	23.3%		14.0%	38.7%		14.0%	38.7%	
Maximum Green (s)	31.0	33.0		28.0	30.0		16.0	53.0		16.0	53.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Recall Mode	None	None		None	None		None	Max		C-Max	C-Max	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		17.0			17.0			15.0			15.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	46.5	31.8		37.5	25.8		15.2	76.5		18.0	79.3	
Actuated g/C Ratio	0.31	0.21		0.25	0.17		0.10	0.51		0.12	0.53	
v/c Ratio	0.65	0.43		0.29	0.77		0.59	0.68		0.72	0.50	
Control Delay	49.7	48.0		38.3	63.4		76.8	31.4		70.7	14.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	49.7	48.0		38.3	63.4		76.8	31.4		70.7	14.4	
LOS	D	D		D	E		E	C		E	B	
Approach Delay		48.6			59.5			35.2			20.4	
Approach LOS		D			E			D			C	
Queue Length 50th (ft)	128	132		61	214		100	445		159	160	
Queue Length 95th (ft)	173	168		95	264		160	612		#254	394	
Internal Link Dist (ft)		709			1306			528			669	
Turn Bay Length (ft)	510			200			350			420		
Base Capacity (vph)	415	833		454	744		218	1725		212	2557	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.41	0.38		0.19	0.62		0.48	0.68		0.72	0.50	

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 39 (26%), Referenced to phase 2:SBT and 5:SBL, Start of Red
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 34.8 Intersection LOS: C
Intersection Capacity Utilization 75.8% ICU Level of Service D
Analysis Period (min) 15

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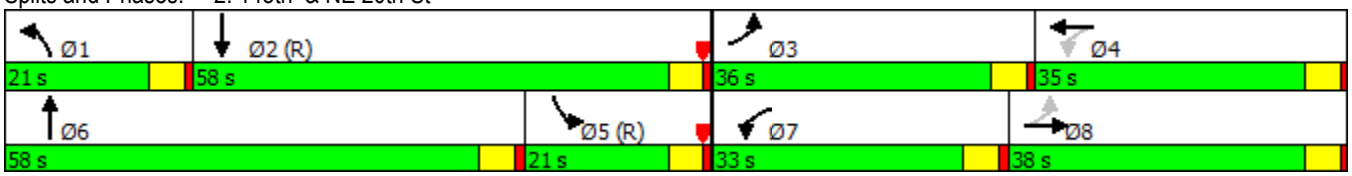
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: 148th & NE 20th St



DRAFT

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	286	5	186	317	4	0	449	230	0	411	92
Future Volume (vph)	97	286	5	186	317	4	0	449	230	0	411	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	300		0	350		0	0		110	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.998			0.998				0.850		0.973	
Flt Protected	0.950			0.950								
Satd. Flow (prot)	1770	3532	0	1770	3532	0	0	3539	1583	0	3444	0
Flt Permitted	0.950			0.950								
Satd. Flow (perm)	1770	3532	0	1770	3532	0	0	3539	1583	0	3444	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					1				246		26	
Link Speed (mph)		35			30			35			35	
Link Distance (ft)		1386			825			775			1701	
Travel Time (s)		27.0			18.8			15.1			33.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	105	311	5	202	345	4	0	488	250	0	447	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	105	316	0	202	349	0	0	488	250	0	547	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			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
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	9		9	15		9
Number of Detectors	2	2		2	2			2	2		2	
Detector Template												
Leading Detector (ft)	100	100		100	100			100	100		100	
Trailing Detector (ft)	0	0		0	0			0	0		0	
Turn Type	Prot	NA		Prot	NA			NA	pm+ov		NA	
Protected Phases	3	8		7	4			6	7		2	
Permitted Phases								6	6			
Detector Phase	3	8		7	4			6	7		2	
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	6.0	6.0		6.0	6.0			6.0	6.0		6.0	
Minimum Split (s)	30.0	36.0		30.0	30.0			33.0	30.0		28.0	
Total Split (s)	30.0	37.0		33.0	40.0			55.0	33.0		55.0	
Total Split (%)	24.0%	29.6%		26.4%	32.0%			44.0%	26.4%		44.0%	
Maximum Green (s)	25.0	32.0		28.0	35.0			50.0	28.0		50.0	
Yellow Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0			1.0	1.0		1.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0	-2.0		-2.0	
Total Lost Time (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lead/Lag	Lead	Lead		Lag	Lag				Lag			
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Time To Reduce (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Recall Mode	None	None		None	None			C-Max	None		C-Max	
Walk Time (s)	8.0	7.0		8.0	8.0			10.0	8.0			
Flash Dont Walk (s)	14.0	22.0		14.0	14.0			17.0	14.0			
Pedestrian Calls (#/hr)	0	0		0	0			0	0			
Act Effct Green (s)	13.8	17.6		20.7	24.6			77.6	101.4		77.6	
Actuated g/C Ratio	0.11	0.14		0.17	0.20			0.62	0.81		0.62	
v/c Ratio	0.54	0.64		0.69	0.50			0.22	0.19		0.25	
Control Delay	62.1	56.3		60.7	46.5			11.9	0.7		11.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	62.1	56.3		60.7	46.5			11.9	0.7		11.6	
LOS	E	E		E	D			B	A		B	
Approach Delay		57.7			51.7			8.1			11.6	
Approach LOS		E			D			A			B	
Queue Length 50th (ft)	82	128		156	133			85	1		92	
Queue Length 95th (ft)	136	171		222	170			144	17		157	
Internal Link Dist (ft)		1306			745			695			1621	
Turn Bay Length (ft)	300			350					110			
Base Capacity (vph)	382	960		424	1046			2197	1327		2149	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.27	0.33		0.48	0.33			0.22	0.19		0.25	

Intersection Summary

Area Type: Other
Cycle Length: 125
Actuated Cycle Length: 125
Offset: 3 (2%), Referenced to phase 2:SBT and 6:NBT, Start of Red
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 28.9 Intersection LOS: C
Intersection Capacity Utilization 42.7% ICU Level of Service A
Analysis Period (min) 15

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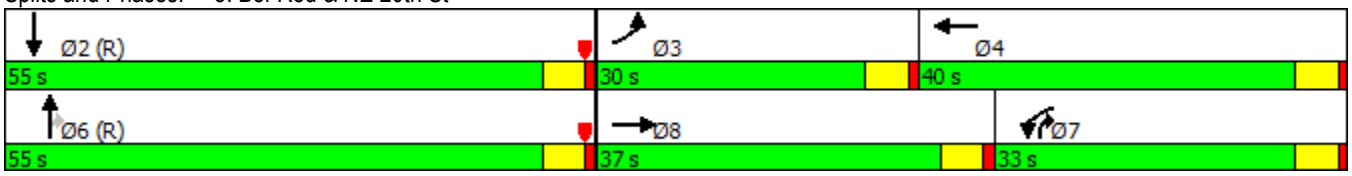
Splits and Phases: 3: Bel-Red & NE 20th St



DRAFT

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	274	330	15	117	533	31	14	448	54	1	356	157
Future Volume (vph)	274	330	15	117	533	31	14	448	54	1	356	157
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	280		0	400		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor												
Frt		0.994			0.992			0.984			0.954	
Flt Protected	0.950			0.950				0.999				
Satd. Flow (prot)	1676	3333	0	1676	3326	0	0	3296	0	0	3199	0
Flt Permitted	0.950			0.950				0.887			0.954	
Satd. Flow (perm)	1676	3333	0	1676	3326	0	0	2926	0	0	3052	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			5			12			69	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		897			739			1701			600	
Travel Time (s)		20.4			16.8			29.0			10.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	298	359	16	127	579	34	15	487	59	1	387	171
Shared Lane Traffic (%)												
Lane Group Flow (vph)	298	375	0	127	613	0	0	561	0	0	559	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			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8	8		4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	13.0	29.0		13.0	29.0		29.0	29.0		29.0	29.0	
Total Split (s)	30.0	48.0		21.0	39.0		51.0	51.0		51.0	51.0	
Total Split (%)	25.0%	40.0%		17.5%	32.5%		42.5%	42.5%		42.5%	42.5%	
Maximum Green (s)	25.0	43.0		16.0	34.0		46.0	46.0		46.0	46.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lead/Lag	Lead	Lead		Lag	Lag							
Lead-Lag Optimize?		Yes			Yes							
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	5.0	5.0		5.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		8.0			8.0		8.0	8.0		8.0	8.0	
Flash Dont Walk (s)		16.0			16.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)		0			10		5	5		15	15	
Act Effct Green (s)	27.0	63.5		17.0	53.5			27.5			27.5	
Actuated g/C Ratio	0.22	0.53		0.14	0.45			0.23			0.23	
v/c Ratio	0.79	0.21		0.54	0.41			0.82			0.74	
Control Delay	51.0	11.2		57.0	25.5			53.4			43.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	51.0	11.2		57.0	25.5			53.4			43.4	
LOS	D	B		E	C			D			D	
Approach Delay		28.8			30.9			53.4			43.4	
Approach LOS		C			C			D			D	
Queue Length 50th (ft)	222	88		93	166			214			187	
Queue Length 95th (ft)	305	106		158	262			261			234	
Internal Link Dist (ft)		817			659			1621			520	
Turn Bay Length (ft)	280			400								
Base Capacity (vph)	402	1764		237	1484			1153			1237	
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	0.74	0.21		0.54	0.41			0.49			0.45	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 38.1 Intersection LOS: D
Intersection Capacity Utilization 68.3% ICU Level of Service C
Analysis Period (min) 15

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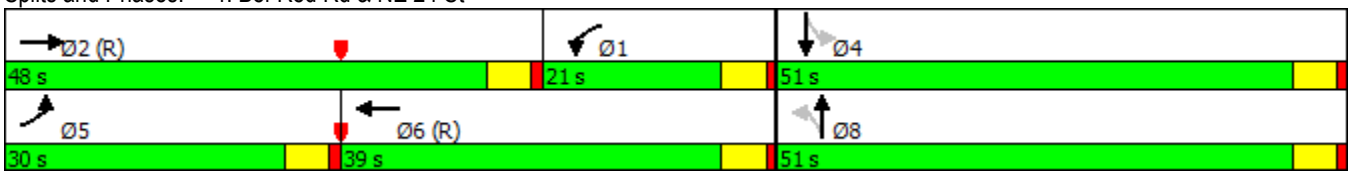
Splits and Phases: 4: Bel-Red Rd & NE 24 St



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	276	556	111	34	550	120	47	104	29	34	43	66
Future Volume (vph)	276	556	111	34	550	120	47	104	29	34	43	66
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			-5%			0%			0%	
Storage Length (ft)	200		0	90		0	0		60	0		0
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.99				0.97			0.97
Frt		0.975			0.973				0.850			0.850
Flt Protected	0.950			0.950				0.985			0.978	
Satd. Flow (prot)	1676	3232	0	1718	3322	0	0	1738	1500	0	1726	1500
Flt Permitted	0.950			0.950				0.873			0.653	
Satd. Flow (perm)	1676	3232	0	1718	3322	0	0	1541	1460	0	1152	1460
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			21				109			109
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		393			897			462			625	
Travel Time (s)		8.9			20.4			10.5			14.2	
Confl. Peds. (#/hr)			14			5			7			7
Confl. Bikes (#/hr)												
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	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	300	604	121	37	598	130	51	113	32	37	47	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	300	725	0	37	728	0	0	164	32	0	84	72
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	1.07	1.07	1.07	1.04	1.04	1.04	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100		110	100	20	110	100	20
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8		8	4		4
Detector Phase	1	6		5	2		8	8	8	4	4	4
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	3.0		4.0	8.0		4.0	4.0	4.0	5.0	5.0	5.0
Minimum Split (s)	24.0	26.0		11.0	26.0		22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	26.0	51.0		11.0	36.0		58.0	58.0	58.0	58.0	58.0	58.0
Total Split (%)	21.7%	42.5%		9.2%	30.0%		48.3%	48.3%	48.3%	48.3%	48.3%	48.3%
Maximum Green (s)	21.0	46.0		6.0	31.0		53.0	53.0	53.0	53.0	53.0	53.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	3.0		2.5	5.0		2.0	2.0	2.0	2.0	2.0	2.0
Minimum Gap (s)	2.5	3.0		2.5	5.0		2.0	2.0	2.0	2.0	2.0	2.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Max	C-Max		None	Ped		None	None	None	None	None	None
Walk Time (s)		7.0			7.0		6.0	6.0	6.0	6.0	6.0	6.0
Flash Dont Walk (s)		10.0			10.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effct Green (s)	58.4	87.1		6.8	31.3			18.3	18.3		18.3	18.3
Actuated g/C Ratio	0.49	0.73		0.06	0.26			0.15	0.15		0.15	0.15
v/c Ratio	0.37	0.31		0.38	0.83			0.70	0.10		0.48	0.23
Control Delay	18.4	3.0		49.4	42.0			63.4	0.7		54.4	4.1
Queue Delay	0.0	0.1		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	18.4	3.2		49.4	42.0			63.4	0.7		54.4	4.1
LOS	B	A		D	D			E	A		D	A
Approach Delay		7.6			42.4			53.2			31.2	
Approach LOS		A			D			D			C	
Queue Length 50th (ft)	152	25		29	288			122	0		60	0
Queue Length 95th (ft)	248	30		m52	356			184	0		106	15
Internal Link Dist (ft)		313			817			382			545	
Turn Bay Length (ft)	200			90					60			
Base Capacity (vph)	816	2353		100	901			693	716		518	716
Starvation Cap Reductn	0	574		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.37	0.41		0.37	0.81			0.24	0.04		0.16	0.10

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 98 (82%), Referenced to phase 1:EBL and 6:EBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 25.9 Intersection LOS: C
Intersection Capacity Utilization 61.5% ICU Level of Service B
Analysis Period (min) 15

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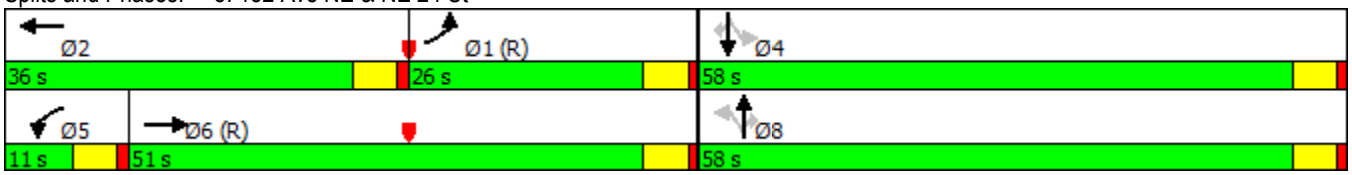
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: 152 Ave NE & NE 24 St



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	7	17	48	9	28	67	1200	19	53	1260	56
Future Volume (vph)	75	7	17	48	9	28	67	1200	19	53	1260	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	120		0	100		0	200		150	230		150
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		0.99			0.98				0.96			0.94
Frt		0.896			0.887				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1645	0	1770	1615	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.728			0.740			0.160			0.167		
Satd. Flow (perm)	1356	1645	0	1378	1615	0	298	3539	1521	311	3539	1490
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			30				51			51
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		272			418			749			562	
Travel Time (s)		6.2			9.5			14.6			10.9	
Confl. Peds. (#/hr)			5			10			5			10
Confl. Bikes (#/hr)												
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	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	82	8	18	52	10	30	73	1304	21	58	1370	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	82	26	0	52	40	0	73	1304	21	58	1370	61
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
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4			6		6	2		2
Detector Phase	8	8		4	4		1	6	6	5	2	2
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0		29.0	29.0		12.0	24.0	24.0	12.0	24.0	24.0
Total Split (s)	30.0	30.0		30.0	30.0		25.0	95.0	95.0	25.0	95.0	95.0
Total Split (%)	20.0%	20.0%		20.0%	20.0%		16.7%	63.3%	63.3%	16.7%	63.3%	63.3%
Maximum Green (s)	25.0	25.0		25.0	25.0		20.0	90.0	90.0	20.0	90.0	90.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lead/Lag							Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	17.0	17.0		17.0	17.0			12.0	12.0		12.0	12.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	15.4	15.4		15.4	15.4		118.8	118.8	118.8	103.6	103.6	103.6
Actuated g/C Ratio	0.10	0.10		0.10	0.10		0.79	0.79	0.79	0.69	0.69	0.69
v/c Ratio	0.59	0.14		0.37	0.21		0.16	0.47	0.02	0.19	0.56	0.06
Control Delay	80.4	30.8		68.5	27.4		1.8	1.5	0.0	8.5	8.5	3.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.1	0.0	0.0	0.4	0.0
Total Delay	80.4	30.8		68.5	27.4		1.8	1.6	0.0	8.5	8.8	3.1
LOS	F	C		E	C		A	A	A	A	A	A
Approach Delay		68.5			50.6			1.6			8.6	
Approach LOS		E			D			A			A	
Queue Length 50th (ft)	78	7		48	9		6	70	0	8	128	1
Queue Length 95th (ft)	133	37		91	46		m11	75	m0	m19	235	m7
Internal Link Dist (ft)		192			338			669			482	
Turn Bay Length (ft)	120			100			200		150	230		150
Base Capacity (vph)	244	310		248	315		451	2803	1215	428	2444	1044
Starvation Cap Reductn	0	0		0	0		0	350	0	0	484	0
Spillback Cap Reductn	0	0		0	3		0	441	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.08		0.21	0.13		0.16	0.55	0.02	0.14	0.70	0.06

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 93 (62%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 8.8	Intersection LOS: A
Intersection Capacity Utilization 63.0%	ICU Level of Service B
Analysis Period (min) 15	

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

Splits and Phases: 7: 148th & NE 22nd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	877	16	46	560	57	35	1	1	65	1	34
Future Volume (vph)	78	877	16	46	560	57	35	1	1	65	1	34
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	425		0	65		0	0		0	0		160
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.997			0.986			0.997				0.850
Flt Protected	0.950			0.950				0.955			0.953	
Satd. Flow (prot)	1676	3343	0	1676	3306	0	0	1680	0	0	1682	1500
Flt Permitted	0.950			0.950				0.651			0.749	
Satd. Flow (perm)	1676	3343	0	1676	3306	0	0	1145	0	0	1322	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			12			1				64
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		924			393			326			622	
Travel Time (s)		21.0			8.9			7.4			14.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	85	953	17	50	609	62	38	1	1	71	1	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	85	970	0	50	671	0	0	40	0	0	72	37
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	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		110	100		110	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		4
Detector Phase	1	6		5	2		8	8		4	4	4
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	8.0		3.0	8.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	13.0	28.0		12.0	28.0		26.0	26.0		26.0	26.0	26.0
Total Split (s)	16.0	60.0		15.0	59.0		45.0	45.0		45.0	45.0	45.0
Total Split (%)	13.3%	50.0%		12.5%	49.2%		37.5%	37.5%		37.5%	37.5%	37.5%
Maximum Green (s)	11.0	55.0		10.0	54.0		40.0	40.0		40.0	40.0	40.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	-1.0
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	3.0		2.5	3.0		2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	2.5	3.0		2.5	3.0		2.0	2.0		2.0	2.0	2.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	None
Walk Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	6.0
Flash Dont Walk (s)		8.0			8.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0		0	0		0	0	0
Act Effct Green (s)	11.9	91.3		9.5	89.2			11.9			12.1	12.1
Actuated g/C Ratio	0.10	0.76		0.08	0.74			0.10			0.10	0.10
v/c Ratio	0.51	0.38		0.38	0.27			0.35			0.54	0.18
Control Delay	61.4	7.4		82.7	1.7			56.0			65.2	5.6
Queue Delay	0.0	0.0		0.0	0.5			0.0			0.0	0.0
Total Delay	61.4	7.4		82.7	2.2			56.0			65.2	5.6
LOS	E	A		F	A			E			E	A
Approach Delay		11.7			7.7			56.0			44.9	
Approach LOS		B			A			E			D	
Queue Length 50th (ft)	63	137		39	28			29			54	0
Queue Length 95th (ft)	113	227		m53	42			62			99	13
Internal Link Dist (ft)		844			313			246			542	
Turn Bay Length (ft)	425			65								160
Base Capacity (vph)	184	2544		159	2460			391			451	554
Starvation Cap Reductn	0	0		0	1243			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.46	0.38		0.31	0.55			0.10			0.16	0.07

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 58 (48%), Referenced to phase 2:WBT and 6:EBT, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.54	
Intersection Signal Delay: 13.0	Intersection LOS: B
Intersection Capacity Utilization 48.3%	ICU Level of Service A
Analysis Period (min) 15	

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

Splits and Phases: 8: 151 Ave NE & NE 24 St

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Lanes, Volumes, Timings
1: 148th & NE 24th

1/12/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	248	338	69	193	311	520	94	1220	176	636	1413	144
Future Volume (vph)	248	338	69	193	311	520	94	1220	176	636	1413	144
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	330		220	300		175	220		380	470		0
Storage Lanes	1		1	1		1	1		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	*0.85	1.00	*0.90	*0.85	0.95
Ped Bike Factor												
Frt		0.975				0.850			0.850		0.986	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3451	0	1770	3539	1583	1770	3167	1583	3185	3122	0
Flt Permitted	0.236			0.201			0.950			0.950		
Satd. Flow (perm)	440	3451	0	374	3539	1583	1770	3167	1583	3185	3122	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14				519			137		9	
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		768			924			562			685	
Travel Time (s)		17.5			21.0			10.9			13.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	270	367	75	210	338	565	102	1326	191	691	1536	157
Shared Lane Traffic (%)												
Lane Group Flow (vph)	270	442	0	210	338	565	102	1326	191	691	1693	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			24			24	
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	2	1	2	2	2	2	
Detector Template												
Leading Detector (ft)	38	100		38	100	100	38	100	100	100	100	
Trailing Detector (ft)	2	2		2	2	2	2	2	2	2	2	
Turn Type	pm+pt	NA		pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4		Free			2			
Detector Phase	3	8		7	4		5	2	2	1	6	
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	11.0	29.0		11.0	29.0		11.0	28.0	28.0	11.0	27.0	
Total Split (s)	27.0	30.0		27.0	30.0		17.0	49.0	49.0	44.0	76.0	
Total Split (%)	18.0%	20.0%		18.0%	20.0%		11.3%	32.7%	32.7%	29.3%	50.7%	
Maximum Green (s)	22.0	25.0		22.0	25.0		12.0	44.0	44.0	39.0	71.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag	Lag	Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Time To Reduce (s)	0.0	0.0		5.0	5.0		5.0	5.0	5.0	5.0	0.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	None	Max	
Walk Time (s)		9.0			9.0			8.0	8.0		8.0	
Flash Dont Walk (s)		15.0			15.0			15.0	15.0		14.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effct Green (s)	46.2	24.3		41.4	21.6	150.0	14.0	55.9	55.9	38.0	79.8	
Actuated g/C Ratio	0.31	0.16		0.28	0.14	1.00	0.09	0.37	0.37	0.25	0.53	
v/c Ratio	0.81	0.77		0.73	0.66	0.36	0.62	1.12	0.28	0.86	1.02	
Control Delay	59.5	67.9		54.4	66.9	0.6	64.5	97.8	5.1	64.7	60.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	59.5	67.9		54.4	66.9	0.6	64.5	97.8	5.1	64.7	60.9	
LOS	E	E		D	E	A	E	F	A	E	E	
Approach Delay		64.7			30.9			84.8			62.0	
Approach LOS		E			C			F			E	
Queue Length 50th (ft)	213	213		159	168	0	100	~918	11	356	~1033	
Queue Length 95th (ft)	285	272		220	213	0	m149	m#1135	m20	433	#1268	
Internal Link Dist (ft)		688			844			482			605	
Turn Bay Length (ft)	330			300		175	220		380	470		
Base Capacity (vph)	348	632		335	637	1583	165	1179	675	875	1665	
Starvation Cap Reductn	0	0		0	0	0	0	12	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	0.78	0.70		0.63	0.53	0.36	0.62	1.14	0.28	0.79	1.02	

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 39 (26%), Referenced to phase 2:NBT and 5:NBL, Start of Red
Natural Cycle: 120
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.12
Intersection Signal Delay: 62.7 Intersection LOS: E
Intersection Capacity Utilization 87.5% ICU Level of Service E
Analysis Period (min) 15

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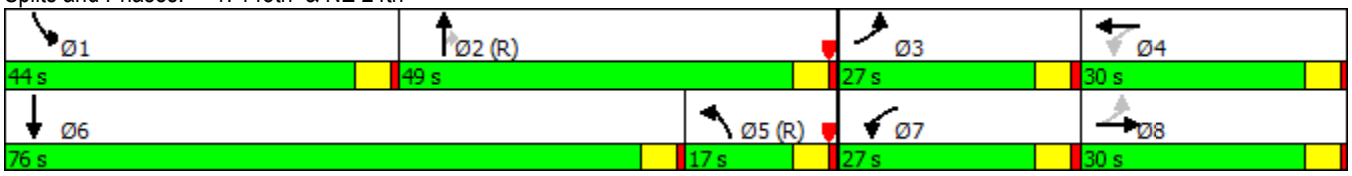
* User Entered Value
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: 148th & NE 24th



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	266	360	204	196	464	56	149	1066	62	170	1388	155
Future Volume (vph)	266	360	204	196	464	56	149	1066	62	170	1388	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	11	12	12	12	12	11	12	12	11	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	510		0	200		0	350		0	420		610
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.91	0.91
Ped Bike Factor		0.99			1.00			1.00			0.99	
Frt		0.946			0.984			0.992			0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3311	0	1770	3468	0	1770	3386	0	1770	4817	0
Flt Permitted	0.123			0.192			0.950			0.950		
Satd. Flow (perm)	229	3311	0	358	3468	0	1770	3386	0	1770	4817	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		69			8			4			14	
Link Speed (mph)		35			30			35			35	
Link Distance (ft)		789			1386			608			749	
Travel Time (s)		15.4			31.5			11.8			14.6	
Confl. Peds. (#/hr)			10			15			15			20
Confl. Bikes (#/hr)												
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	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	289	391	222	213	504	61	162	1159	67	185	1509	168
Shared Lane Traffic (%)												
Lane Group Flow (vph)	289	613	0	213	565	0	162	1226	0	185	1677	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					Yes							
Headway Factor	1.00	1.00	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.00	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	2	2		2	2		2	2		2	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	100	100		100	100		100	100		100	100	
Trailing Detector (ft)	2	2		2	2		2	2		2	2	
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4								
Detector Phase	3	8		7	4		1	6		5	2	
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	7.0	7.0		7.0	7.0		6.0	7.0		6.0	7.0	
Minimum Split (s)	12.0	29.0		12.0	29.0		11.0	28.0		11.0	28.0	
Total Split (s)	36.0	38.0		33.0	35.0		21.0	58.0		21.0	58.0	
Total Split (%)	24.0%	25.3%		22.0%	23.3%		14.0%	38.7%		14.0%	38.7%	
Maximum Green (s)	31.0	33.0		28.0	30.0		16.0	53.0		16.0	53.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Recall Mode	None	None		None	None		None	Max		C-Max	C-Max	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		17.0			17.0			15.0			15.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	58.1	35.5		49.1	29.5		18.4	64.9		18.0	64.5	
Actuated g/C Ratio	0.39	0.24		0.33	0.20		0.12	0.43		0.12	0.43	
v/c Ratio	0.82	0.73		0.71	0.82		0.75	0.84		0.87	0.81	
Control Delay	59.0	52.0		45.8	67.3		83.9	44.8		81.8	30.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	59.0	52.0		45.8	67.3		83.9	44.8		81.8	30.6	
LOS	E	D		D	E		F	D		F	C	
Approach Delay		54.2			61.4			49.4			35.6	
Approach LOS		D			E			D			D	
Queue Length 50th (ft)	221	260		143	276		153	557		192	580	
Queue Length 95th (ft)	306	325		197	342		#269	#784		m#296	#697	
Internal Link Dist (ft)		709			1306			528			669	
Turn Bay Length (ft)	510			200			350			420		
Base Capacity (vph)	427	870		417	753		226	1467		212	2079	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.68	0.70		0.51	0.75		0.72	0.84		0.87	0.81	

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 39 (26%), Referenced to phase 2:SBT and 5:SBL, Start of Red
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 47.0 Intersection LOS: D
Intersection Capacity Utilization 85.8% ICU Level of Service E
Analysis Period (min) 15

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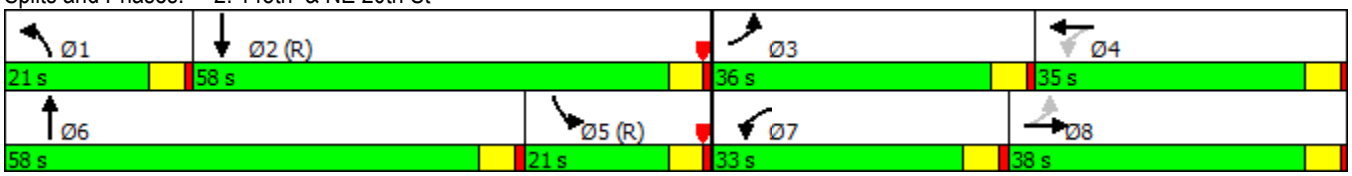
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: 148th & NE 20th St



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	147	501	1	216	386	45	0	485	388	0	677	169
Future Volume (vph)	147	501	1	216	386	45	0	485	388	0	677	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	300		0	350		0	0		110	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt					0.984				0.850		0.970	
Flt Protected	0.950			0.950								
Satd. Flow (prot)	1770	3539	0	1770	3483	0	0	3539	1583	0	3433	0
Flt Permitted	0.950			0.950								
Satd. Flow (perm)	1770	3539	0	1770	3483	0	0	3539	1583	0	3433	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					10				75		30	
Link Speed (mph)		35			30			35			35	
Link Distance (ft)		1386			825			775			1701	
Travel Time (s)		27.0			18.8			15.1			33.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	160	545	1	235	420	49	0	527	422	0	736	184
Shared Lane Traffic (%)												
Lane Group Flow (vph)	160	546	0	235	469	0	0	527	422	0	920	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			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
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	9		9	15		9
Number of Detectors	2	2		2	2			2	2		2	
Detector Template												
Leading Detector (ft)	100	100		100	100			100	100		100	
Trailing Detector (ft)	0	0		0	0			0	0		0	
Turn Type	Prot	NA		Prot	NA			NA	pm+ov		NA	
Protected Phases	3	8		7	4			6	7		2	
Permitted Phases								6	6			
Detector Phase	3	8		7	4			6	7		2	
Switch Phase												

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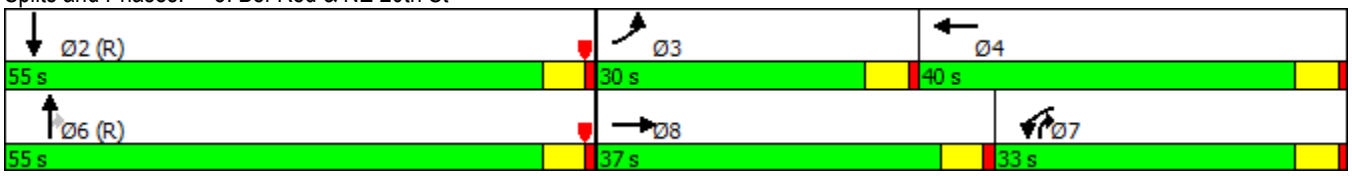
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	6.0	6.0		6.0	6.0			6.0	6.0		6.0	
Minimum Split (s)	30.0	36.0		30.0	30.0			33.0	30.0		28.0	
Total Split (s)	30.0	37.0		33.0	40.0			55.0	33.0		55.0	
Total Split (%)	24.0%	29.6%		26.4%	32.0%			44.0%	26.4%		44.0%	
Maximum Green (s)	25.0	32.0		28.0	35.0			50.0	28.0		50.0	
Yellow Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0			1.0	1.0		1.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0	-2.0		-2.0	
Total Lost Time (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lead/Lag	Lead	Lead		Lag	Lag				Lag			
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Time To Reduce (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Recall Mode	None	None		None	None			C-Max	None		C-Max	
Walk Time (s)	8.0	7.0		8.0	8.0			10.0	8.0			
Flash Dont Walk (s)	14.0	22.0		14.0	14.0			17.0	14.0			
Pedestrian Calls (#/hr)	0	0		0	0			0	0			
Act Effct Green (s)	17.7	25.8		23.5	31.7			66.7	93.2		66.7	
Actuated g/C Ratio	0.14	0.21		0.19	0.25			0.53	0.75		0.53	
v/c Ratio	0.64	0.75		0.71	0.53			0.28	0.35		0.50	
Control Delay	61.9	53.0		58.5	40.8			18.2	5.7		20.8	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	61.9	53.0		58.5	40.8			18.2	5.7		20.8	
LOS	E	D		E	D			B	A		C	
Approach Delay		55.0			46.7			12.7			20.8	
Approach LOS		D			D			B			C	
Queue Length 50th (ft)	124	220		179	168			118	80		232	
Queue Length 95th (ft)	188	266		249	203			196	154		366	
Internal Link Dist (ft)		1306			745			695			1621	
Turn Bay Length (ft)	300			350					110			
Base Capacity (vph)	382	962		429	1054			1887	1199		1844	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.42	0.57		0.55	0.44			0.28	0.35		0.50	

Intersection Summary	
Area Type:	Other
Cycle Length: 125	
Actuated Cycle Length: 125	
Offset: 3 (2%), Referenced to phase 2:SBT and 6:NBT, Start of Red	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 31.4	Intersection LOS: C
Intersection Capacity Utilization 60.0%	ICU Level of Service B
Analysis Period (min) 15	

DRAFT

Splits and Phases: 3: Bel-Red & NE 20th St



DRAFT

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	211	832	54	110	415	10	0	445	200	2	655	245
Future Volume (vph)	211	832	54	110	415	10	0	445	200	2	655	245
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	280		0	400		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor												
Frt		0.991			0.996			0.954			0.959	
Flt Protected	0.950			0.950								
Satd. Flow (prot)	1676	3323	0	1676	3340	0	0	3199	0	0	3215	0
Flt Permitted	0.950			0.950							0.954	
Satd. Flow (perm)	1676	3323	0	1676	3340	0	0	3199	0	0	3068	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			2			70			52	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		897			739			1701			600	
Travel Time (s)		20.4			16.8			29.0			10.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	229	904	59	120	451	11	0	484	217	2	712	266
Shared Lane Traffic (%)												
Lane Group Flow (vph)	229	963	0	120	462	0	0	701	0	0	980	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			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1			1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50			50		50	50	
Trailing Detector (ft)	0	0		0	0			0		0	0	
Turn Type	Prot	NA		Prot	NA			NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases								8		4		
Detector Phase	5	2		1	6			8		4	4	
Switch Phase												

DRAFT

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	8.0	8.0		8.0	8.0			8.0		8.0	8.0	
Minimum Split (s)	13.0	29.0		13.0	29.0			29.0		29.0	29.0	
Total Split (s)	30.0	48.0		21.0	39.0			51.0		51.0	51.0	
Total Split (%)	25.0%	40.0%		17.5%	32.5%			42.5%		42.5%	42.5%	
Maximum Green (s)	25.0	43.0		16.0	34.0			46.0		46.0	46.0	
Yellow Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0			1.0		1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lead/Lag	Lead	Lead		Lag	Lag							
Lead-Lag Optimize?		Yes			Yes							
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Time To Reduce (s)	5.0	5.0		5.0	0.0			0.0		0.0	0.0	
Recall Mode	None	C-Max		None	C-Max			None		None	None	
Walk Time (s)		8.0			8.0			8.0		8.0	8.0	
Flash Dont Walk (s)		16.0			16.0			16.0		16.0	16.0	
Pedestrian Calls (#/hr)		0			10			5		15	15	
Act Effct Green (s)	21.0	48.8		17.0	44.7			42.2			42.2	
Actuated g/C Ratio	0.18	0.41		0.14	0.37			0.35			0.35	
v/c Ratio	0.78	0.71		0.51	0.37			0.60			0.88	
Control Delay	54.2	20.1		55.9	30.3			30.3			44.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	54.2	20.1		55.9	30.3			30.3			44.3	
LOS	D	C		E	C			C			D	
Approach Delay		26.7			35.6			30.3			44.3	
Approach LOS		C			D			C			D	
Queue Length 50th (ft)	141	360		87	138			206			350	
Queue Length 95th (ft)	m196	154		150	206			256			420	
Internal Link Dist (ft)		817			659			1621			520	
Turn Bay Length (ft)	280			400								
Base Capacity (vph)	363	1353		237	1245			1295			1233	
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	0.63	0.71		0.51	0.37			0.54			0.79	

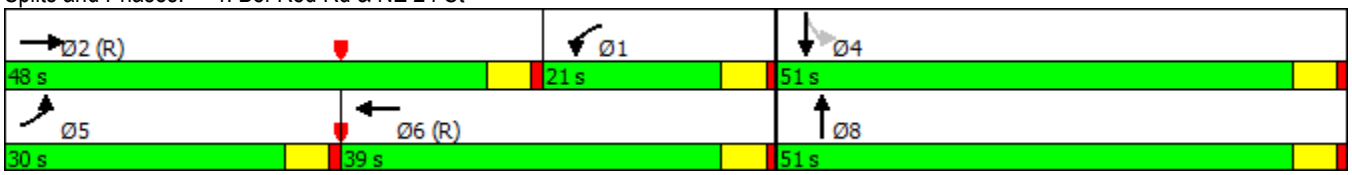
Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 33.9 Intersection LOS: C
Intersection Capacity Utilization 71.7% ICU Level of Service C
Analysis Period (min) 15

DRAFT

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

Splits and Phases: 4: Bel-Red Rd & NE 24 St



DRAFT

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	167	849	46	18	593	51	46	60	67	181	260	320
Future Volume (vph)	167	849	46	18	593	51	46	60	67	181	260	320
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			-5%			0%			0%	
Storage Length (ft)	200		0	90		0	0		60	0		0
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			1.00				0.97			0.97
Frt		0.992			0.988				0.850			0.850
Flt Protected	0.950			0.950				0.979			0.980	
Satd. Flow (prot)	1676	3314	0	1718	3386	0	0	1728	1500	0	1729	1500
Flt Permitted	0.950			0.950				0.544			0.797	
Satd. Flow (perm)	1676	3314	0	1718	3386	0	0	960	1460	0	1406	1460
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			7				109			348
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		393			897			462			625	
Travel Time (s)		8.9			20.4			10.5			14.2	
Confl. Peds. (#/hr)			14			5			7			7
Confl. Bikes (#/hr)												
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	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	182	923	50	20	645	55	50	65	73	197	283	348
Shared Lane Traffic (%)												
Lane Group Flow (vph)	182	973	0	20	700	0	0	115	73	0	480	348
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	1.07	1.07	1.07	1.04	1.04	1.04	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100		110	100	20	110	100	20
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8		8	4		4
Detector Phase	1	6		5	2		8	8	8	4	4	4
Switch Phase												

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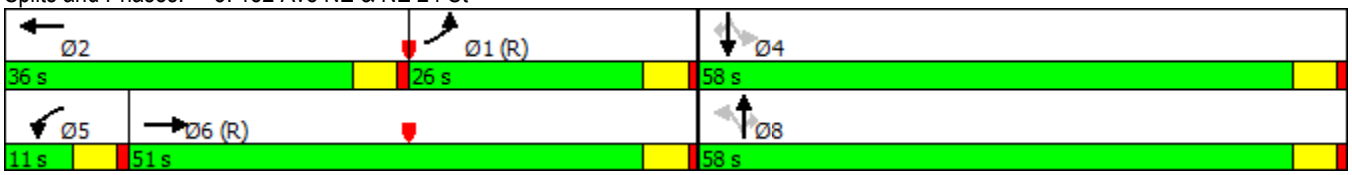
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	3.0		4.0	8.0		4.0	4.0	4.0	5.0	5.0	5.0
Minimum Split (s)	24.0	26.0		11.0	26.0		22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	26.0	51.0		11.0	36.0		58.0	58.0	58.0	58.0	58.0	58.0
Total Split (%)	21.7%	42.5%		9.2%	30.0%		48.3%	48.3%	48.3%	48.3%	48.3%	48.3%
Maximum Green (s)	21.0	46.0		6.0	31.0		53.0	53.0	53.0	53.0	53.0	53.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0	-1.0		-1.0	-1.0
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	3.0		2.5	5.0		2.0	2.0	2.0	2.0	2.0	2.0
Minimum Gap (s)	2.5	3.0		2.5	5.0		2.0	2.0	2.0	2.0	2.0	2.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Max	C-Max		None	Ped		None	None	None	None	None	None
Walk Time (s)		7.0			7.0		6.0	6.0	6.0	6.0	6.0	6.0
Flash Dont Walk (s)		10.0			10.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effct Green (s)	30.4	61.1		6.7	31.1			46.5	46.5		46.5	46.5
Actuated g/C Ratio	0.25	0.51		0.06	0.26			0.39	0.39		0.39	0.39
v/c Ratio	0.43	0.58		0.21	0.79			0.31	0.12		0.88	0.45
Control Delay	41.1	21.8		54.7	43.1			26.3	1.6		52.0	4.0
Queue Delay	0.0	0.4		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	41.1	22.2		54.7	43.1			26.3	1.6		52.0	4.0
LOS	D	C		D	D			C	A		D	A
Approach Delay		25.2			43.5			16.7			31.8	
Approach LOS		C			D			B			C	
Queue Length 50th (ft)	127	287		15	252			59	0		332	0
Queue Length 95th (ft)	211	434		m33	337			99	11		448	53
Internal Link Dist (ft)		313			817			382			545	
Turn Bay Length (ft)	200			90					60			
Base Capacity (vph)	424	1689		100	908			432	716		632	848
Starvation Cap Reductn	0	264		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.43	0.68		0.20	0.77			0.27	0.10		0.76	0.41

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 98 (82%), Referenced to phase 1:EBL and 6:EBT, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 31.1	Intersection LOS: C
Intersection Capacity Utilization 75.8%	ICU Level of Service D
Analysis Period (min) 15	

DRAFT

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

Splits and Phases: 5: 152 Ave NE & NE 24 St



DRAFT

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	152	19	93	125	30	95	109	1243	36	69	1495	111
Future Volume (vph)	152	19	93	125	30	95	109	1243	36	69	1495	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	120		0	100		0	200		150	230		150
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		0.98			0.98				0.96			0.94
Frt		0.876			0.886				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1603	0	1770	1612	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.495			0.529			0.084			0.129		
Satd. Flow (perm)	922	1603	0	985	1612	0	156	3539	1521	240	3539	1490
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		101			91				51			61
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		272			418			749			562	
Travel Time (s)		6.2			9.5			14.6			10.9	
Confl. Peds. (#/hr)			5			10			5			10
Confl. Bikes (#/hr)												
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	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	165	21	101	136	33	103	118	1351	39	75	1625	121
Shared Lane Traffic (%)												
Lane Group Flow (vph)	165	122	0	136	136	0	118	1351	39	75	1625	121
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
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4			6		6	2		2
Detector Phase	8	8		4	4		1	6	6	5	2	2
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0		29.0	29.0		12.0	24.0	24.0	12.0	24.0	24.0
Total Split (s)	30.0	30.0		30.0	30.0		25.0	95.0	95.0	25.0	95.0	95.0
Total Split (%)	20.0%	20.0%		20.0%	20.0%		16.7%	63.3%	63.3%	16.7%	63.3%	63.3%
Maximum Green (s)	25.0	25.0		25.0	25.0		20.0	90.0	90.0	20.0	90.0	90.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lead/Lag							Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	17.0	17.0		17.0	17.0			12.0	12.0		12.0	12.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	0
Act Effct Green (s)	27.0	27.0		27.0	27.0		104.4	104.4	104.4	92.0	92.0	92.0
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.70	0.70	0.70	0.61	0.61	0.61
v/c Ratio	1.00	0.33		0.77	0.37		0.34	0.55	0.04	0.31	0.75	0.13
Control Delay	130.3	16.2		86.0	22.8		12.2	4.0	0.3	12.3	14.3	6.0
Queue Delay	0.0	0.0		0.0	0.1		0.0	0.5	0.0	0.0	1.7	0.0
Total Delay	130.3	16.2		86.0	22.9		12.2	4.5	0.3	12.3	16.1	6.0
LOS	F	B		F	C		B	A	A	B	B	A
Approach Delay		81.8			54.4			5.0			15.2	
Approach LOS		F			D			A			B	
Queue Length 50th (ft)	163	17		128	38		29	122	0	24	310	14
Queue Length 95th (ft)	#323	77		#240	104		m38	135	m0	m24	m308	m18
Internal Link Dist (ft)		192			338			669			482	
Turn Bay Length (ft)	120			100			200		150	230		150
Base Capacity (vph)	165	371		177	364		345	2464	1074	371	2170	937
Starvation Cap Reductn	0	0		0	0		0	336	0	0	359	0
Spillback Cap Reductn	0	0		0	15		0	606	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.00	0.33		0.77	0.39		0.34	0.73	0.04	0.20	0.90	0.13

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 150	
Offset: 93 (62%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 18.9	Intersection LOS: B
Intersection Capacity Utilization 80.7%	ICU Level of Service D
Analysis Period (min) 15	

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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: 7: 148th & NE 22nd

DRAFT

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	902	54	16	847	96	102	15	23	137	18	134
Future Volume (vph)	58	902	54	16	847	96	102	15	23	137	18	134
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	425		0	65		0	0		0	0		160
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.991			0.985			0.978				0.850
Flt Protected	0.950			0.950				0.965			0.958	
Satd. Flow (prot)	1676	3323	0	1676	3303	0	0	1665	0	0	1691	1500
Flt Permitted	0.950			0.950				0.500			0.693	
Satd. Flow (perm)	1676	3323	0	1676	3303	0	0	863	0	0	1223	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			13			9				146
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		924			393			326			622	
Travel Time (s)		21.0			8.9			7.4			14.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	63	980	59	17	921	104	111	16	25	149	20	146
Shared Lane Traffic (%)												
Lane Group Flow (vph)	63	1039	0	17	1025	0	0	152	0	0	169	146
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	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		110	100		110	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		4
Detector Phase	1	6		5	2		8	8		4	4	4
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	8.0		3.0	8.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	13.0	28.0		12.0	28.0		26.0	26.0		26.0	26.0	26.0
Total Split (s)	16.0	60.0		15.0	59.0		45.0	45.0		45.0	45.0	45.0
Total Split (%)	13.3%	50.0%		12.5%	49.2%		37.5%	37.5%		37.5%	37.5%	37.5%
Maximum Green (s)	11.0	55.0		10.0	54.0		40.0	40.0		40.0	40.0	40.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	-1.0
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	3.0		2.5	3.0		2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	2.5	3.0		2.5	3.0		2.0	2.0		2.0	2.0	2.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	None
Walk Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	6.0
Flash Dont Walk (s)		8.0			8.0		11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0		0	0		0	0	0
Act Effct Green (s)	10.4	84.1		7.3	76.8			22.9			22.9	22.9
Actuated g/C Ratio	0.09	0.70		0.06	0.64			0.19			0.19	0.19
v/c Ratio	0.44	0.45		0.17	0.48			0.89			0.73	0.36
Control Delay	60.5	10.6		63.4	5.5			87.8			62.2	8.3
Queue Delay	0.0	0.0		0.0	0.2			0.0			0.0	0.0
Total Delay	60.5	10.6		63.4	5.7			87.8			62.2	8.3
LOS	E	B		E	A			F			E	A
Approach Delay		13.5			6.7			87.8			37.2	
Approach LOS		B			A			F			D	
Queue Length 50th (ft)	47	136		14	73			109			124	0
Queue Length 95th (ft)	91	322		m24	131			178			185	50
Internal Link Dist (ft)		844			313			246			542	
Turn Bay Length (ft)	425			65								160
Base Capacity (vph)	173	2330		153	2119			300			417	608
Starvation Cap Reductn	0	0		0	367			0			0	0
Spillback Cap Reductn	0	183		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.36	0.48		0.11	0.59			0.51			0.41	0.24

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 58 (48%), Referenced to phase 2:WBT and 6:EBT, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 17.9	Intersection LOS: B
Intersection Capacity Utilization 57.1%	ICU Level of Service B
Analysis Period (min) 15	

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

Splits and Phases: 8: 151 Ave NE & NE 24 St

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Lanes, Volumes, Timings
1: 148th & NE 24th

1/12/2016

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	233	324	75	141	493	539	159	1231	130	616	1441	470
Future Volume (vph)	233	324	75	141	493	539	159	1231	130	616	1441	470
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	330		220	300		175	300		380	470		0
Storage Lanes	2		1	2		1	1		0	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.97	0.95	1.00	1.00	*0.85	0.91	*0.90	0.95	0.95
Ped Bike Factor	0.99	0.99		0.98		0.98	1.00	1.00		0.99	0.99	
Frt		0.972				0.850		0.986			0.963	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3407	0	3433	3539	1583	1770	4661	0	3185	3365	0
Flt Permitted	0.141			0.312			0.950			0.950		
Satd. Flow (perm)	504	3407	0	1100	3539	1553	1765	4661	0	3159	3365	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18				427		12			45	
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		768			582			562			685	
Travel Time (s)		17.5			13.2			10.9			13.3	
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	245	341	79	148	519	567	167	1296	137	648	1517	495
Shared Lane Traffic (%)												
Lane Group Flow (vph)	245	420	0	148	519	567	167	1433	0	648	2012	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			24			24	
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	2	1	2		2	2	
Detector Template												
Leading Detector (ft)	38	100		38	100	100	38	100		100	100	
Trailing Detector (ft)	2	2		2	2	2	2	2		2	2	
Turn Type	pm+pt	NA		pm+pt	NA	Free	Prot	NA		Prot	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4		Free						
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	18.0	29.0		18.0	29.0		18.0	28.0		18.0	27.0	
Total Split (s)	18.0	31.0		18.0	31.0		18.0	50.0		41.0	73.0	
Total Split (%)	12.9%	22.1%		12.9%	22.1%		12.9%	35.7%		29.3%	52.1%	
Maximum Green (s)	13.0	26.0		13.0	26.0		13.0	45.0		36.0	68.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		5.0	5.0		5.0	5.0		5.0	0.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)		9.0			9.0			8.0			8.0	
Flash Dont Walk (s)		15.0			15.0			15.0			14.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	41.7	28.3		36.3	25.6	140.0	15.0	54.7		34.2	73.9	
Actuated g/C Ratio	0.30	0.20		0.26	0.18	1.00	0.11	0.39		0.24	0.53	
v/c Ratio	0.57	0.60		0.32	0.80	0.37	0.88	0.78		0.83	1.12	
Control Delay	41.6	51.9		36.9	64.9	0.7	85.2	26.9		60.1	93.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.1		0.0	0.0	
Total Delay	41.6	51.9		36.9	64.9	0.7	85.2	27.0		60.1	93.0	
LOS	D	D		D	E	A	F	C		E	F	
Approach Delay		48.1			32.0			33.1			85.0	
Approach LOS		D			C			C			F	
Queue Length 50th (ft)	85	174		50	238	0	158	496		308	~1114	
Queue Length 95th (ft)	118	231		75	301	0	#299	#586		378	#1282	
Internal Link Dist (ft)		688			502			482			605	
Turn Bay Length (ft)	330			300		175	300			470		
Base Capacity (vph)	464	730		567	708	1553	189	1829		864	1798	
Starvation Cap Reductn	0	0		0	0	0	0	29		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.53	0.58		0.26	0.73	0.37	0.88	0.80		0.75	1.12	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 23 (16%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 155	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.12	
Intersection Signal Delay: 56.9	Intersection LOS: E
Intersection Capacity Utilization 100.8%	ICU Level of Service G
Analysis Period (min) 15	

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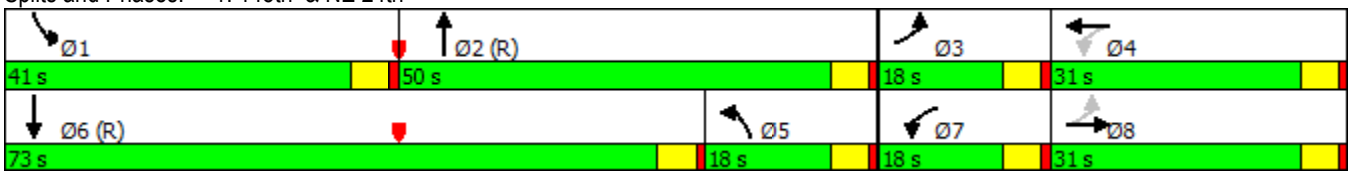
* User Entered Value
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: 148th & NE 24th



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	216	336	81	226	601	129	115	1295	126	162	1292	195
Future Volume (vph)	216	336	81	226	601	129	115	1295	126	162	1292	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	11	12	12	12	12	11	12	12	11	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	300		0	330		0	350		0	420		610
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor		0.99		0.99	0.99		1.00	1.00		1.00	0.99	
Frt		0.971			0.973			0.987			0.980	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3403	0	1770	3413	0	1770	4829	0	1770	4785	0
Flt Permitted	0.122			0.289			0.950			0.950		
Satd. Flow (perm)	227	3403	0	531	3413	0	1762	4829	0	1761	4785	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			17			13			25	
Link Speed (mph)		35			30			35			35	
Link Distance (ft)		789			576			608			749	
Travel Time (s)		15.4			13.1			11.8			14.6	
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	227	354	85	238	633	136	121	1363	133	171	1360	205
Shared Lane Traffic (%)												
Lane Group Flow (vph)	227	439	0	238	769	0	121	1496	0	171	1565	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	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.00	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	2	2		2	2		2	2		2	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	100	100		100	100		100	100		100	100	
Trailing Detector (ft)	2	2		2	2		2	2		2	2	
Turn Type	D.P+P	NA		D.P+P	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	8			4								
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	7.0	7.0		7.0	7.0		6.0	7.0		6.0	7.0	
Minimum Split (s)	15.0	29.0		15.0	29.0		15.0	28.0		15.0	28.0	
Total Split (s)	19.0	33.0		22.0	36.0		23.0	53.0		32.0	62.0	
Total Split (%)	13.6%	23.6%		15.7%	25.7%		16.4%	37.9%		22.9%	44.3%	
Maximum Green (s)	14.0	28.0		17.0	31.0		18.0	48.0		27.0	57.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		17.0			17.0			15.0			15.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	48.7	31.1		48.7	32.8		15.6	59.4		19.9	63.7	
Actuated g/C Ratio	0.35	0.22		0.35	0.23		0.11	0.42		0.14	0.46	
v/c Ratio	0.89	0.57		0.70	0.95		0.61	0.73		0.68	0.71	
Control Delay	71.6	50.0		44.1	72.6		72.2	36.6		79.0	32.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	71.6	50.0		44.1	72.6		72.2	36.6		79.0	32.2	
LOS	E	D		D	E		E	D		E	C	
Approach Delay		57.3			65.8			39.3			36.8	
Approach LOS		E			E			D			D	
Queue Length 50th (ft)	154	182		157	357		107	409		166	257	
Queue Length 95th (ft)	#309	242		231	#483		171	509		244	288	
Internal Link Dist (ft)		709			496			528			669	
Turn Bay Length (ft)	300			330			350			420		
Base Capacity (vph)	255	770		356	817		252	2056		366	2189	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.89	0.57		0.67	0.94		0.48	0.73		0.47	0.71	

Intersection Summary

Area Type: Other
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 131 (94%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 46.1 Intersection LOS: D
Intersection Capacity Utilization 83.3% ICU Level of Service E
Analysis Period (min) 15

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

Splits and Phases: 2: 148th & NE 20th St

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	365	6	220	514	5	0	560	272	0	529	101
Future Volume (vph)	100	365	6	220	514	5	0	560	272	0	529	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	300		0	350		0	0		110	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	0.99	1.00		0.99	1.00				0.96		0.99	
Frt		0.998			0.999				0.850		0.976	
Flt Protected	0.950			0.950								
Satd. Flow (prot)	1770	3530	0	1770	3534	0	0	3539	1583	0	3436	0
Flt Permitted	0.950			0.950								
Satd. Flow (perm)	1745	3530	0	1746	3534	0	0	3539	1515	0	3436	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					1				188		21	
Link Speed (mph)		35			30			35			35	
Link Distance (ft)		598			825			775			764	
Travel Time (s)		11.6			18.8			15.1			14.9	
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	105	384	6	232	541	5	0	589	286	0	557	106
Shared Lane Traffic (%)												
Lane Group Flow (vph)	105	390	0	232	546	0	0	589	286	0	663	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			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
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	9		9	15		9
Number of Detectors	2	2		2	2			2	2		2	
Detector Template												
Leading Detector (ft)	100	100		100	100			100	100		100	
Trailing Detector (ft)	0	0		0	0			0	0		0	
Turn Type	Prot	NA		Prot	NA			NA	pm+ov		NA	
Protected Phases	3	8		7	4			6	7		2	
Permitted Phases								6	6			
Detector Phase	3	8		7	4			6	7		2	
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	6.0	6.0		6.0	6.0			6.0	6.0		6.0	
Minimum Split (s)	30.0	36.0		30.0	30.0			33.0	30.0		28.0	
Total Split (s)	30.0	38.0		34.0	42.0			38.0	34.0		38.0	
Total Split (%)	27.3%	34.5%		30.9%	38.2%			34.5%	30.9%		34.5%	
Maximum Green (s)	25.0	33.0		29.0	37.0			33.0	29.0		33.0	
Yellow Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0			1.0	1.0		1.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0	-2.0		-2.0	
Total Lost Time (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lead/Lag	Lead	Lead		Lag	Lag				Lag			
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Time To Reduce (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Recall Mode	None	None		None	None			C-Max	None		C-Max	
Walk Time (s)	8.0	7.0		8.0	8.0			10.0	8.0			
Flash Dont Walk (s)	14.0	22.0		14.0	14.0			17.0	14.0			
Pedestrian Calls (#/hr)	0	0		0	0			0	0			
Act Effct Green (s)	12.9	18.6		21.1	26.9			61.2	82.4		61.2	
Actuated g/C Ratio	0.12	0.17		0.19	0.24			0.56	0.75		0.56	
v/c Ratio	0.50	0.65		0.68	0.63			0.30	0.24		0.35	
Control Delay	50.1	44.4		51.1	40.0			14.9	1.9		11.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	50.1	44.4		51.1	40.0			14.9	1.9		11.0	
LOS	D	D		D	D			B	A		B	
Approach Delay		45.6			43.3			10.7			11.0	
Approach LOS		D			D			B			B	
Queue Length 50th (ft)	63	115		154	182			109	14		100	
Queue Length 95th (ft)	103	145		219	218			185	40		300	
Internal Link Dist (ft)		518			745			695			684	
Turn Bay Length (ft)	300			350					110			
Base Capacity (vph)	434	1123		498	1253			1969	1236		1921	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.24	0.35		0.47	0.44			0.30	0.23		0.35	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 46 (42%), Referenced to phase 2:SBT and 6:NBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 25.9 Intersection LOS: C
Intersection Capacity Utilization 61.7% ICU Level of Service B
Analysis Period (min) 15

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Splits and Phases: 3: Bel-Red & NE 20th St

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	341	453	18	143	595	37	17	553	68	1	475	163
Future Volume (vph)	341	453	18	143	595	37	17	553	68	1	475	163
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	280		0	400		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.99	1.00		0.99	1.00			1.00			0.99	
Frt		0.994			0.991			0.984			0.962	
Flt Protected	0.950			0.950				0.999				
Satd. Flow (prot)	1676	3328	0	1676	3314	0	0	3281	0	0	3191	0
Flt Permitted	0.950			0.950				0.859			0.954	
Satd. Flow (perm)	1658	3328	0	1653	3314	0	0	2821	0	0	3044	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			6			12			44	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		897			739			478			600	
Travel Time (s)		20.4			16.8			8.1			10.2	
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	359	477	19	151	626	39	18	582	72	1	500	172
Shared Lane Traffic (%)												
Lane Group Flow (vph)	359	496	0	151	665	0	0	672	0	0	673	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			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8	8		4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	17.0	29.0		17.0	29.0		29.0	29.0		29.0	29.0	
Total Split (s)	39.0	51.0		22.0	34.0		37.0	37.0		37.0	37.0	
Total Split (%)	35.5%	46.4%		20.0%	30.9%		33.6%	33.6%		33.6%	33.6%	
Maximum Green (s)	34.0	46.0		17.0	29.0		32.0	32.0		32.0	32.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lead/Lag	Lead	Lead		Lag	Lag							
Lead-Lag Optimize?		Yes			Yes							
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	5.0	5.0		5.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		8.0			8.0		8.0	8.0		8.0	8.0	
Flash Dont Walk (s)		16.0			16.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)		0			10		5	5		15	15	
Act Effct Green (s)	28.4	51.1		18.0	40.7			28.9			28.9	
Actuated g/C Ratio	0.26	0.46		0.16	0.37			0.26			0.26	
v/c Ratio	0.83	0.32		0.55	0.54			0.90			0.81	
Control Delay	28.2	4.5		50.8	31.2			47.2			43.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	28.2	4.5		50.8	31.2			47.2			43.5	
LOS	C	A		D	C			D			D	
Approach Delay		14.4			34.8			47.2			43.5	
Approach LOS		B			C			D			D	
Queue Length 50th (ft)	135	0		99	194			227			218	
Queue Length 95th (ft)	34	22		167	291			303			276	
Internal Link Dist (ft)		817			659			398			520	
Turn Bay Length (ft)	280			400								
Base Capacity (vph)	533	1548		274	1229			854			944	
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	0.67	0.32		0.55	0.54			0.79			0.71	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 60 (55%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 33.7 Intersection LOS: C
Intersection Capacity Utilization 81.7% ICU Level of Service D
Analysis Period (min) 15

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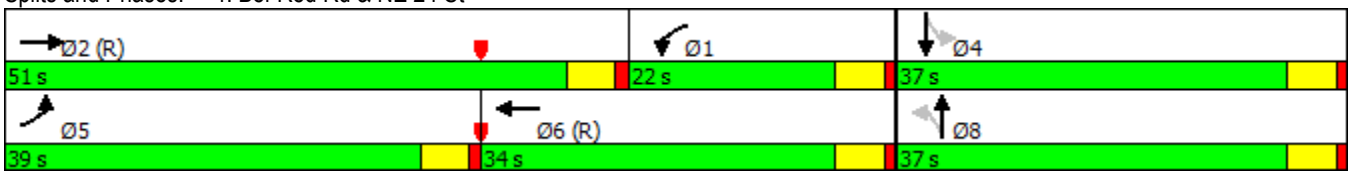
Splits and Phases: 4: Bel-Red Rd & NE 24 St



DRAFT

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	743	71	21	650	102	64	320	16	52	386	175
Future Volume (vph)	140	743	71	21	650	102	64	320	16	52	386	175
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			-5%			0%			0%	
Storage Length (ft)	250		0	90		0	250		60	200		350
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98	0.99		0.98	0.99		0.97	1.00		0.97		
Frt		0.987			0.980			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	3286	0	1718	3331	0	1676	1750	0	1676	1765	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1646	3286	0	1690	3331	0	1628	1750	0	1624	1765	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			15			3				184
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		393			897			500			625	
Travel Time (s)		8.9			20.4			11.4			14.2	
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	147	782	75	22	684	107	67	337	17	55	406	184
Shared Lane Traffic (%)												
Lane Group Flow (vph)	147	857	0	22	791	0	67	354	0	55	406	184
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	1.07	1.07	1.07	1.04	1.04	1.04	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	custom
Protected Phases	5	2		1	6		3	8 9		7	4 9	4 5
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	4 5
Switch Phase												

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Lane Group	Ø4	Ø8	Ø9
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Grade (%)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Lane Util. Factor			
Ped Bike Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Growth Factor			
Heavy Vehicles (%)			
Bus Blockages (#/hr)			
Parking (#/hr)			
Mid-Block Traffic (%)			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Enter Blocked Intersection			
Lane Alignment			
Median Width(ft)			
Link Offset(ft)			
Crosswalk Width(ft)			
Two way Left Turn Lane			
Headway Factor			
Turning Speed (mph)			
Number of Detectors			
Detector Template			
Leading Detector (ft)			
Trailing Detector (ft)			
Turn Type			
Protected Phases	4	8	9
Permitted Phases			
Detector Phase			
Switch Phase			

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	8.0		4.0	8.0		4.0			4.0		
Minimum Split (s)	17.0	25.0		17.0	26.5		17.0			17.0		
Total Split (s)	17.0	30.0		17.0	30.0		17.0			17.0		
Total Split (%)	15.5%	27.3%		15.5%	27.3%		15.5%			15.5%		
Maximum Green (s)	12.0	25.0		12.0	23.5		12.0			12.0		
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0			3.0		
All-Red Time (s)	1.0	1.0		1.0	2.5		2.0			2.0		
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0			-1.0		
Total Lost Time (s)	4.0	4.0		4.0	5.5		4.0			4.0		
Lead/Lag	Lag	Lead		Lag	Lead		Lead			Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	3.0		2.5	5.0		3.0			3.0		
Minimum Gap (s)	2.5	3.0		2.5	5.0		3.0			3.0		
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0			0.0		
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0			0.0		
Recall Mode	None	C-Max		None	C-Max		None			None		
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		13.0			13.0							
Pedestrian Calls (#/hr)		0			0							
Act Effct Green (s)	12.5	44.9		9.2	33.7		10.4	35.3		9.9	34.9	24.5
Actuated g/C Ratio	0.11	0.41		0.08	0.31		0.09	0.32		0.09	0.32	0.22
v/c Ratio	0.77	0.64		0.15	0.77		0.42	0.63		0.36	0.73	0.39
Control Delay	63.6	26.0		46.3	32.0		51.0	27.7		53.1	30.4	4.9
Queue Delay	0.0	0.6		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	63.6	26.6		46.3	32.0		51.0	27.7		53.1	30.4	4.9
LOS	E	C		D	C		D	C		D	C	A
Approach Delay		32.0			32.4			31.4			25.1	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	103	234		16	269		44	164		37	188	0
Queue Length 95th (ft)	#202	#462		m28	#444		86	202		77	241	30
Internal Link Dist (ft)		313			817			420			545	
Turn Bay Length (ft)	250			90			250			200		350
Base Capacity (vph)	198	1346		203	1032		198	619		198	622	530
Starvation Cap Reductn	0	184		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	0.74	0.74		0.11	0.77		0.34	0.57		0.28	0.65	0.35

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 1 (1%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 30.5 Intersection LOS: C
Intersection Capacity Utilization 70.6% ICU Level of Service C
Analysis Period (min) 15

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Lane Group	Ø4	Ø8	Ø9
Minimum Initial (s)	8.0	8.0	4.0
Minimum Split (s)	20.0	20.0	26.0
Total Split (s)	20.0	20.0	26.0
Total Split (%)	18%	18%	24%
Maximum Green (s)	15.0	15.0	24.0
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	0.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lag	Lag	
Lead-Lag Optimize?			
Vehicle Extension (s)	2.0	2.0	3.0
Minimum Gap (s)	2.0	2.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0
Recall Mode	None	None	Ped
Walk Time (s)			7.0
Flash Dont Walk (s)			17.0
Pedestrian Calls (#/hr)			0
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary

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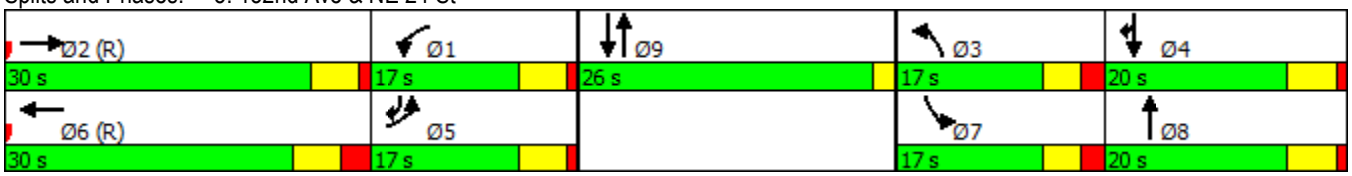
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: 152nd Ave & NE 24 St



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	89	84	20	80	10	7	80	1420	118	43	1542	66
Future Volume (vph)	89	84	20	80	10	7	80	1420	118	43	1542	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	250		0	390		0	200		150	150		150
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Ped Bike Factor	0.97	0.99		0.97	0.97			0.99				0.90
Frt		0.971			0.979			0.989				0.850
Flt Protected	0.950			0.950	0.969		0.950			0.950		
Satd. Flow (prot)	1770	1791	0	1681	1667	0	1770	4992	0	1770	3539	1583
Flt Permitted	0.950			0.950	0.969		0.090			0.118		
Satd. Flow (perm)	1712	1791	0	1631	1634	0	168	4992	0	220	3539	1431
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			5			12				94
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		387			584			749			562	
Travel Time (s)		8.8			13.3			14.6			10.9	
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	94	88	21	84	11	7	84	1495	124	45	1623	69
Shared Lane Traffic (%)				39%								
Lane Group Flow (vph)	94	109	0	51	51	0	84	1619	0	45	1623	69
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
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases							2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	29.0	29.0		29.0	29.0		18.0	24.0		18.0	24.0	24.0
Total Split (s)	29.0	29.0		29.0	29.0		18.0	64.0		18.0	64.0	64.0
Total Split (%)	20.7%	20.7%		20.7%	20.7%		12.9%	45.7%		12.9%	45.7%	45.7%
Maximum Green (s)	24.0	24.0		24.0	24.0		13.0	59.0		13.0	59.0	59.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	7.0
Flash Dont Walk (s)	17.0	17.0		17.0	17.0			12.0			12.0	12.0
Pedestrian Calls (#/hr)	0	0		0	0			0			0	0
Act Effct Green (s)	14.3	14.3		11.1	11.1		106.1	98.4		104.5	95.5	95.5
Actuated g/C Ratio	0.10	0.10		0.08	0.08		0.76	0.70		0.75	0.68	0.68
v/c Ratio	0.52	0.57		0.38	0.38		0.36	0.46		0.17	0.67	0.07
Control Delay	69.1	66.7		68.9	62.3		19.4	5.2		1.2	2.5	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.7	0.0
Total Delay	69.1	66.7		68.9	62.3		19.4	5.2		1.2	3.3	0.1
LOS	E	E		E	E		B	A		A	A	A
Approach Delay		67.8			65.6			5.9			3.1	
Approach LOS		E			E			A			A	
Queue Length 50th (ft)	83	89		47	42		10	101		3	97	0
Queue Length 95th (ft)	138	148		92	88		m0	m113		m3	m101	m0
Internal Link Dist (ft)		307			504			669			482	
Turn Bay Length (ft)	250			390			200			150		150
Base Capacity (vph)	328	339		312	313		301	3510		335	2413	1005
Starvation Cap Reductn	0	0		0	0		0	0		0	428	0
Spillback Cap Reductn	0	0		0	0		0	128		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.29	0.32		0.16	0.16		0.28	0.48		0.13	0.82	0.07

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 2 (1%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 140	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 9.6	Intersection LOS: A
Intersection Capacity Utilization 74.1%	ICU Level of Service D
Analysis Period (min) 15	

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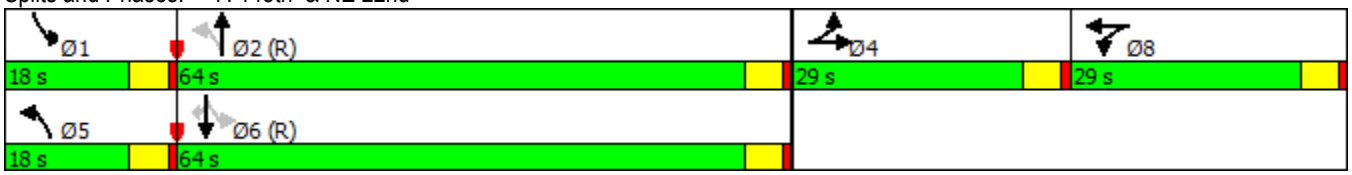
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: 148th & NE 22nd



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	945	6	0	817	68	0	0	11	0	0	170
Future Volume (vph)	0	945	6	0	817	68	0	0	11	0	0	170
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	100		0	65		0	0		0	0		0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.99				0.95			0.95
Frt		0.999			0.988				0.865			0.865
Flt Protected												
Satd. Flow (prot)	0	3348	0	0	3287	0	0	0	1526	0	0	1526
Flt Permitted												
Satd. Flow (perm)	0	3348	0	0	3287	0	0	0	1445	0	0	1445
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			15				123			165
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		342			393			505			622	
Travel Time (s)		7.8			8.9			11.5			14.1	
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	0	995	6	0	860	72	0	0	12	0	0	179
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1001	0	0	932	0	0	0	12	0	0	179
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	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2			2				1			1
Detector Template		Thru			Thru				Right			Right
Leading Detector (ft)		100			100				20			20
Trailing Detector (ft)		0			0				0			0
Turn Type		NA			NA				Perm			Perm
Protected Phases		2			6							
Permitted Phases									8			4
Detector Phase		2			6				8			4
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)		8.0			8.0				4.0			4.0
Minimum Split (s)		28.0			28.0				26.0			26.0
Total Split (s)		73.0			73.0				37.0			37.0
Total Split (%)		66.4%			66.4%				33.6%			33.6%
Maximum Green (s)		68.0			68.0				32.0			32.0
Yellow Time (s)		4.0			4.0				4.0			4.0
All-Red Time (s)		1.0			1.0				1.0			1.0
Lost Time Adjust (s)		-1.0			-1.0				-1.0			-1.0
Total Lost Time (s)		4.0			4.0				4.0			4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0				2.0			2.0
Minimum Gap (s)		3.0			3.0				2.0			2.0
Time Before Reduce (s)		0.0			0.0				0.0			0.0
Time To Reduce (s)		0.0			0.0				0.0			0.0
Recall Mode		C-Max			C-Max				None			None
Walk Time (s)		6.0			6.0				6.0			6.0
Flash Dont Walk (s)		8.0			8.0				11.0			11.0
Pedestrian Calls (#/hr)		0			0				0			0
Act Effct Green (s)		93.4			93.4				8.6			8.6
Actuated g/C Ratio		0.85			0.85				0.08			0.08
v/c Ratio		0.35			0.33				0.05			0.68
Control Delay		1.2			1.6				0.5			22.4
Queue Delay		0.1			0.3				0.0			0.0
Total Delay		1.3			1.9				0.5			22.4
LOS		A			A				A			C
Approach Delay		1.3			1.9							
Approach LOS		A			A							
Queue Length 50th (ft)		2			23				0			10
Queue Length 95th (ft)		4			42				m0			75
Internal Link Dist (ft)		262			313			425			542	
Turn Bay Length (ft)												
Base Capacity (vph)		2844			2794				519			549
Starvation Cap Reductn		783			1122				0			0
Spillback Cap Reductn		128			0				4			0
Storage Cap Reductn		0			0				0			0
Reduced v/c Ratio		0.49			0.56				0.02			0.33

Intersection Summary	
Area Type: Other	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 6 (5%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 3.4	Intersection LOS: A
Intersection Capacity Utilization 46.5%	ICU Level of Service A
Analysis Period (min) 15	

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

Splits and Phases: 8: 151 Ave NE & NE 24 St

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	887	16	19	928	43	52	8	15	30	108	185
Future Volume (vph)	160	887	16	19	928	43	52	8	15	30	108	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	120		370	240		0	130		0	130		330
Storage Lanes	1		1	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.92	0.99	1.00		0.97	0.97		0.97		0.95
Frt			0.850		0.993			0.900				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3502	0	1770	1621	0	1770	1863	1583
Flt Permitted	0.210			0.258			0.550			0.742		
Satd. Flow (perm)	391	3539	1460	477	3502	0	997	1621	0	1338	1863	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			99		5			16				195
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		582			342			574			612	
Travel Time (s)		13.2			7.8			13.0			13.9	
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	168	934	17	20	977	45	55	8	16	32	114	195
Shared Lane Traffic (%)												
Lane Group Flow (vph)	168	934	17	20	1022	0	55	24	0	32	114	195
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	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turn Type	D.P+P	NA	Perm	D.P+P	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	6		2	2			4			8		4
Detector Phase	5	2	2	1	6		3	8		7	4	4
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	17.0	25.0	25.0	17.0	25.0		17.0	25.0		17.0	25.0	25.0
Total Split (s)	17.0	51.0	51.0	17.0	51.0		17.0	25.0		17.0	25.0	25.0
Total Split (%)	15.5%	46.4%	46.4%	15.5%	46.4%		15.5%	22.7%		15.5%	22.7%	22.7%
Maximum Green (s)	13.0	47.0	47.0	13.0	47.0		12.0	21.0		12.0	21.0	21.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		2.0	1.0		2.0	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)	4.0	4.0	4.0	4.0	4.0		5.0	4.0		5.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Min		None	Min	Min
Walk Time (s)		5.0	5.0		5.0			5.0			5.0	5.0
Flash Dont Walk (s)		15.0	15.0		15.0			15.0			15.0	15.0
Pedestrian Calls (#/hr)		0	0		0			0			0	0
Act Effct Green (s)	74.7	74.6	74.6	77.1	65.2		18.3	15.5		19.3	12.2	12.2
Actuated g/C Ratio	0.68	0.68	0.68	0.70	0.59		0.17	0.14		0.18	0.11	0.11
v/c Ratio	0.44	0.39	0.02	0.05	0.49		0.25	0.10		0.12	0.55	0.57
Control Delay	10.1	10.5	0.0	2.4	5.0		31.6	19.4		32.4	55.7	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.3		0.0	0.0		0.0	0.0	0.0
Total Delay	10.1	10.5	0.0	2.4	5.4		31.6	19.4		32.4	55.7	13.2
LOS	B	B	A	A	A		C	B		C	E	B
Approach Delay		10.3			5.3			27.9			29.2	
Approach LOS		B			A			C			C	
Queue Length 50th (ft)	35	126	0	1	55		29	4		18	78	0
Queue Length 95th (ft)	74	266	0	4	147		53	22		40	130	63
Internal Link Dist (ft)		502			262			494			532	
Turn Bay Length (ft)	120		370	240			130			130		330
Base Capacity (vph)	441	2399	1021	494	2076		282	326		325	355	444
Starvation Cap Reductn	0	0	0	0	480		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	0.38	0.39	0.02	0.04	0.64		0.20	0.07		0.10	0.32	0.44

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green	
Natural Cycle: 85	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.57	
Intersection Signal Delay: 11.3	Intersection LOS: B
Intersection Capacity Utilization 59.0%	ICU Level of Service B
Analysis Period (min) 15	

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Splits and Phases: 9: 150th Ave & NE 24 St/NE 24th

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	51	5	38	59	10	30	246	47	35	389	25
Future Volume (vph)	63	51	5	38	59	10	30	246	47	35	389	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98	1.00			0.99			0.99			1.00	
Frt		0.987			0.987			0.981			0.993	
Flt Protected	0.950				0.983			0.995			0.996	
Satd. Flow (prot)	1770	1830	0	0	1798	0	0	1805	0	0	1837	0
Flt Permitted	0.804				0.859			0.942			0.959	
Satd. Flow (perm)	1462	1830	0	0	1557	0	0	1707	0	0	1767	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			11			20			7	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		200			351			337			393	
Travel Time (s)		4.5			8.0			7.7			8.9	
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	66	54	5	40	62	11	32	259	49	37	409	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	66	59	0	0	113	0	0	340	0	0	472	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			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
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Total Split (s)	26.0	26.0		26.0	26.0		29.0	29.0		29.0	29.0	
Total Split (%)	47.3%	47.3%		47.3%	47.3%		52.7%	52.7%		52.7%	52.7%	
Maximum Green (s)	21.0	21.0		21.0	21.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	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	
Total Lost Time (s)	5.0	5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	8.9	8.9			8.9			39.2			39.2	
Actuated g/C Ratio	0.16	0.16			0.16			0.71			0.71	
v/c Ratio	0.28	0.20			0.43			0.28			0.37	
Control Delay	22.2	19.0			23.5			4.9			1.8	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	22.2	19.0			23.5			4.9			1.8	
LOS	C	B			C			A			A	
Approach Delay		20.7			23.5			4.9			1.8	
Approach LOS		C			C			A			A	
Queue Length 50th (ft)	19	16			31			35			17	
Queue Length 95th (ft)	45	38			64			83			25	
Internal Link Dist (ft)		120			271			257			313	
Turn Bay Length (ft)												
Base Capacity (vph)	558	701			601			1223			1262	
Starvation Cap Reductn	0	0			0			0			0	
Spillback Cap Reductn	0	0			0			0			0	
Storage Cap Reductn	0	0			0			0			0	
Reduced v/c Ratio	0.12	0.08			0.19			0.28			0.37	

Intersection Summary

Area Type: Other
Cycle Length: 55
Actuated Cycle Length: 55
Offset: 12 (22%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.43
Intersection Signal Delay: 7.4 Intersection LOS: A
Intersection Capacity Utilization 53.2% ICU Level of Service A
Analysis Period (min) 15

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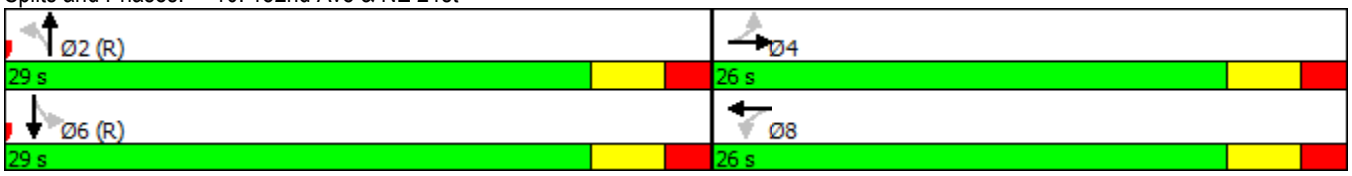
Splits and Phases: 10: 152nd Ave & NE 21st



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	50	26	18	55	13	15	287	7	16	396	25
Future Volume (vph)	110	50	26	18	55	13	15	287	7	16	396	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98			0.99			1.00			1.00	
Frt		0.981			0.979			0.997			0.992	
Flt Protected		0.971			0.990			0.998			0.998	
Satd. Flow (prot)	0	1762	0	0	1791	0	0	1851	0	0	1839	0
Flt Permitted		0.766			0.917			0.975			0.985	
Satd. Flow (perm)	0	1370	0	0	1652	0	0	1808	0	0	1814	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			14			3			7	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		393			358			393			500	
Travel Time (s)		8.9			8.1			8.9			11.4	
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	116	53	27	19	58	14	16	302	7	17	417	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	196	0	0	91	0	0	325	0	0	460	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)		0			0			0			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	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Total Split (s)	26.0	26.0		26.0	26.0		29.0	29.0		29.0	29.0	
Total Split (%)	47.3%	47.3%		47.3%	47.3%		52.7%	52.7%		52.7%	52.7%	
Maximum Green (s)	21.0	21.0		21.0	21.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	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	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		12.4			12.4			32.6			32.6	
Actuated g/C Ratio		0.23			0.23			0.59			0.59	
v/c Ratio		0.61			0.24			0.30			0.43	
Control Delay		23.6			15.1			5.7			3.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		23.6			15.1			5.7			3.5	
LOS		C			B			A			A	
Approach Delay		23.6			15.1			5.7			3.5	
Approach LOS		C			B			A			A	
Queue Length 50th (ft)		58			27			29			23	
Queue Length 95th (ft)		88			m41			87			120	
Internal Link Dist (ft)		313			278			313			420	
Turn Bay Length (ft)												
Base Capacity (vph)		533			639			1073			1078	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.37			0.14			0.30			0.43	

Intersection Summary

Area Type: Other
Cycle Length: 55
Actuated Cycle Length: 55
Offset: 4 (7%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 8.8 Intersection LOS: A
Intersection Capacity Utilization 53.5% ICU Level of Service A
Analysis Period (min) 15

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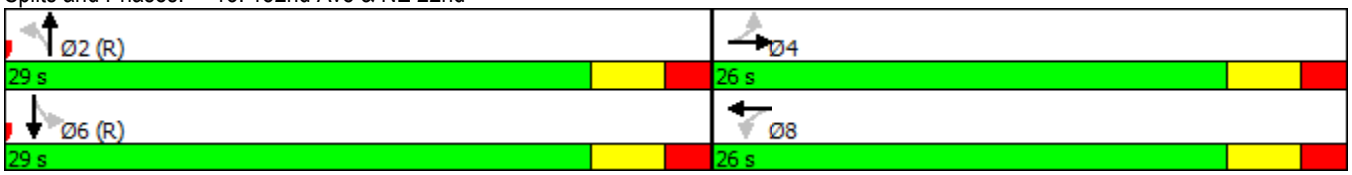
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 13: 152nd Ave & NE 22nd



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	218	14	47	60	37	11	6	49	70	12	24
Future Volume (vph)	8	218	14	47	60	37	11	6	49	70	12	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	150		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.98			0.96			0.97	
Frt		0.992			0.965			0.900			0.970	
Flt Protected		0.998			0.984			0.992			0.968	
Satd. Flow (prot)	0	1839	0	0	1745	0	0	1599	0	0	1729	0
Flt Permitted		0.992			0.853			0.957			0.796	
Satd. Flow (perm)	0	1826	0	0	1504	0	0	1537	0	0	1398	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			39			52			25	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		584			213			320			574	
Travel Time (s)		13.3			4.8			7.3			13.0	
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	8	229	15	49	63	39	12	6	52	74	13	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	252	0	0	151	0	0	70	0	0	112	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			0			0			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	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Total Split (s)	29.0	29.0		29.0	29.0		26.0	26.0		26.0	26.0	
Total Split (%)	52.7%	52.7%		52.7%	52.7%		47.3%	47.3%		47.3%	47.3%	
Maximum Green (s)	24.0	24.0		24.0	24.0		21.0	21.0		21.0	21.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	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	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		24.0			24.0			21.0			21.0	
Actuated g/C Ratio		0.44			0.44			0.38			0.38	
v/c Ratio		0.32			0.22			0.11			0.20	
Control Delay		11.2			7.4			5.3			3.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.2			7.4			5.3			3.1	
LOS		B			A			A			A	
Approach Delay		11.2			7.4			5.3			3.1	
Approach LOS		B			A			A			A	
Queue Length 50th (ft)		49			19			4			1	
Queue Length 95th (ft)		92			38			17			6	
Internal Link Dist (ft)		504			133			240			494	
Turn Bay Length (ft)												
Base Capacity (vph)		800			678			619			549	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.32			0.22			0.11			0.20	

Intersection Summary	
Area Type:	Other
Cycle Length: 55	
Actuated Cycle Length: 55	
Offset: 50 (91%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.32	
Intersection Signal Delay: 8.0	Intersection LOS: A
Intersection Capacity Utilization 55.5%	ICU Level of Service B
Analysis Period (min) 15	

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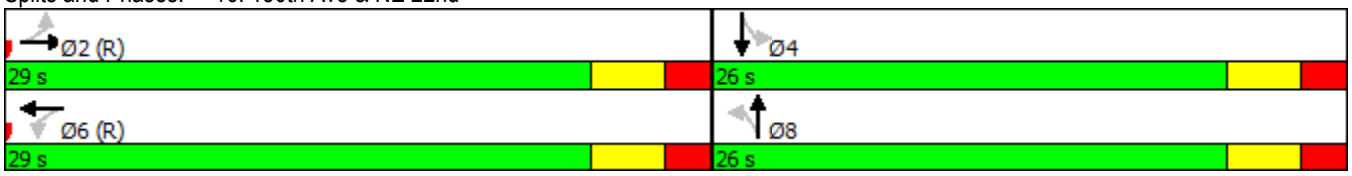
Splits and Phases: 16: 150th Ave & NE 22nd



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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	44	580	936	25	45	21
Future Volume (vph)	44	580	936	25	45	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	150			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	0.99		1.00		0.96	
Frt			0.996		0.957	
Flt Protected	0.950				0.967	
Satd. Flow (prot)	1770	3539	3518	0	1697	0
Flt Permitted	0.259				0.967	
Satd. Flow (perm)	479	3539	3518	0	1659	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			4		19	
Link Speed (mph)		35	30		30	
Link Distance (ft)		576	212		428	
Travel Time (s)		11.2	4.8		9.7	
Confl. Peds. (#/hr)	20			20	20	20
Confl. Bikes (#/hr)				5		5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Adj. Flow (vph)	46	611	985	26	47	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	46	611	1011	0	69	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane			Yes			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	2	2		1	
Detector Template	Left	Thru	Thru		Left	
Leading Detector (ft)	20	100	100		20	
Trailing Detector (ft)	0	0	0		0	
Turn Type	D.P+P	NA	NA		Prot	
Protected Phases	5	2	6		4	
Permitted Phases	6					
Detector Phase	5	2	6		4	
Switch Phase						

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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Minimum Initial (s)	4.0	4.0	4.0		4.0	
Minimum Split (s)	17.0	25.0	25.0		25.0	
Total Split (s)	19.0	82.0	63.0		28.0	
Total Split (%)	17.3%	74.5%	57.3%		25.5%	
Maximum Green (s)	14.0	77.0	58.0		23.0	
Yellow Time (s)	3.0	3.0	3.0		3.0	
All-Red Time (s)	2.0	2.0	2.0		2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0	5.0		5.0	
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Minimum Gap (s)	3.0	3.0	3.0		3.0	
Time Before Reduce (s)	0.0	0.0	0.0		0.0	
Time To Reduce (s)	0.0	0.0	0.0		0.0	
Recall Mode	None	C-Max	C-Max		Min	
Walk Time (s)			5.0		5.0	
Flash Dont Walk (s)			15.0		15.0	
Pedestrian Calls (#/hr)			0		0	
Act Effct Green (s)	87.2	91.2	82.3		8.8	
Actuated g/C Ratio	0.79	0.83	0.75		0.08	
v/c Ratio	0.10	0.21	0.38		0.45	
Control Delay	2.6	2.3	3.4		44.0	
Queue Delay	0.0	0.0	0.0		0.0	
Total Delay	2.6	2.3	3.4		44.0	
LOS	A	A	A		D	
Approach Delay		2.3	3.4		44.0	
Approach LOS		A	A		D	
Queue Length 50th (ft)	4	34	41		31	
Queue Length 95th (ft)	12	58	92		68	
Internal Link Dist (ft)		496	132		348	
Turn Bay Length (ft)	150					
Base Capacity (vph)	561	2933	2632		369	
Starvation Cap Reductn	0	0	0		0	
Spillback Cap Reductn	0	0	0		0	
Storage Cap Reductn	0	0	0		0	
Reduced v/c Ratio	0.08	0.21	0.38		0.19	

Intersection Summary	
Area Type: Other	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 108 (98%), Referenced to phase 2:EBT and 6:EBWB, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.45	
Intersection Signal Delay: 4.6	Intersection LOS: A
Intersection Capacity Utilization 52.9%	ICU Level of Service A
Analysis Period (min) 15	

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Splits and Phases: 33: NE 20th St & 150th Ave

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	160	471	452	163	0	427
Future Volume (Veh/h)	160	471	452	163	0	427
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	168	496	476	172	0	449
Pedestrians		20	20		20	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		2	2		2	
Right turn flare (veh)						
Median type		None	TWLTL			
Median storage veh)			2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	668				1186	364
vC1, stage 1 conf vol					582	
vC2, stage 2 conf vol					604	
vCu, unblocked vol	668				1186	364
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	81				100	27
cM capacity (veh/h)	902				338	612

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	168	248	248	317	331	449
Volume Left	168	0	0	0	0	0
Volume Right	0	0	0	0	172	449
cSH	902	1700	1700	1700	1700	612
Volume to Capacity	0.19	0.15	0.15	0.19	0.19	0.73
Queue Length 95th (ft)	17	0	0	0	0	158
Control Delay (s)	9.9	0.0	0.0	0.0	0.0	25.4
Lane LOS	A					D
Approach Delay (s)	2.5			0.0		25.4
Approach LOS						D

Intersection Summary			
Average Delay	7.4		
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	37	57	36	602	565	40
Future Volume (Veh/h)	37	57	36	602	565	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	39	60	38	634	595	42
Pedestrians	20			20	20	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			2	2	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				764	945	
pX, platoon unblocked	0.94	0.91	0.91			
vC, conflicting volume	1049	358	657			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	562	82	411			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	93	96			
cM capacity (veh/h)	402	842	1018			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	99	249	423	397	240
Volume Left	39	38	0	0	0
Volume Right	60	0	0	0	42
cSH	588	1018	1700	1700	1700
Volume to Capacity	0.17	0.04	0.25	0.23	0.14
Queue Length 95th (ft)	15	3	0	0	0
Control Delay (s)	12.4	1.6	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	12.4	0.6		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		

DRAFT

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	31	5	36	603	603	34
Future Volume (Veh/h)	31	5	36	603	603	34
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	33	5	38	635	635	36
Pedestrians	20			20	20	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			2	2	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1231	478	
pX, platoon unblocked	0.87	0.85	0.85			
vC, conflicting volume	1086	376	691			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	529	0	270			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	99	96			
cM capacity (veh/h)	391	887	1073			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	38	250	423	423	248
Volume Left	33	38	0	0	0
Volume Right	5	0	0	0	36
cSH	422	1073	1700	1700	1700
Volume to Capacity	0.09	0.04	0.25	0.25	0.15
Queue Length 95th (ft)	7	3	0	0	0
Control Delay (s)	14.4	1.6	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	14.4	0.6		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	53.8%	ICU Level of Service	A
Analysis Period (min)	15		

DRAFT

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	26	178	69	15	4	26
Future Volume (Veh/h)	26	178	69	15	4	26
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	27	187	73	16	4	27
Pedestrians		20	20		20	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		2	2		2	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		359	393			
pX, platoon unblocked						
vC, conflicting volume	109				362	121
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	109				362	121
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				99	97
cM capacity (veh/h)	1457				605	900

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	214	89	31
Volume Left	27	0	4
Volume Right	0	16	27
cSH	1457	1700	846
Volume to Capacity	0.02	0.05	0.04
Queue Length 95th (ft)	1	0	3
Control Delay (s)	1.1	0.0	9.4
Lane LOS	A		A
Approach Delay (s)	1.1	0.0	9.4
Approach LOS			A

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	32.4%	ICU Level of Service	A
Analysis Period (min)	15		

DRAFT

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	204	133	5	90	55	5
Future Volume (Veh/h)	204	133	5	90	55	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	215	140	5	95	58	5
Pedestrians	20			20	20	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			2	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	213			539		
pX, platoon unblocked			0.92		0.92	0.92
vC, conflicting volume			375		430	325
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			281		340	227
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		90	99
cM capacity (veh/h)			1163		582	725

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	355	100	63
Volume Left	0	5	58
Volume Right	140	0	5
cSH	1700	1163	592
Volume to Capacity	0.21	0.00	0.11
Queue Length 95th (ft)	0	0	9
Control Delay (s)	0.0	0.4	11.8
Lane LOS		A	B
Approach Delay (s)	0.0	0.4	11.8
Approach LOS			B

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	34.6%	ICU Level of Service	A
Analysis Period (min)	15		

DRAFT

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	3	6	55	33	39
Future Volume (Veh/h)	11	3	6	55	33	39
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	12	3	6	58	35	41
Pedestrians	20			20	20	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			2	2	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				428	320	
pX, platoon unblocked						
vC, conflicting volume	166	96	96			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	166	96	96			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	100			
cM capacity (veh/h)	795	929	1473			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	15	64	76
Volume Left	12	6	0
Volume Right	3	0	41
cSH	818	1473	1700
Volume to Capacity	0.02	0.00	0.04
Queue Length 95th (ft)	1	0	0
Control Delay (s)	9.5	0.7	0.0
Lane LOS	A	A	
Approach Delay (s)	9.5	0.7	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	24.0%	ICU Level of Service	A
Analysis Period (min)	15		

DRAFT

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	10	1611	29	0	0
Future Volume (Veh/h)	0	10	1611	29	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	11	1696	31	0	0
Pedestrians	20		20			20
Lane Width (ft)	12.0		12.0			0.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	2		2			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1752	621			1747	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1752	621			1747	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	97			100	
cM capacity (veh/h)	74	423			349	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3
Volume Total	11	678	678	370
Volume Left	0	0	0	0
Volume Right	11	0	0	31
cSH	423	1700	1700	1700
Volume to Capacity	0.03	0.40	0.40	0.22
Queue Length 95th (ft)	2	0	0	0
Control Delay (s)	13.7	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	13.7	0.0		
Approach LOS	B			

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	15	28	10	46	13	19	5	14	7	4	22
Future Volume (Veh/h)	29	15	28	10	46	13	19	5	14	7	4	22
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	31	16	29	11	48	14	20	5	15	7	4	23
Pedestrians		20			20			20			20	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		2			2			2			2	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		358										
pX, platoon unblocked												
vC, conflicting volume	82			65			234	216	70	227	224	95
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	82			65			234	216	70	227	224	95
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			97	99	98	99	99	98
cM capacity (veh/h)	1490			1511			645	640	959	657	634	930

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	76	73	40	34
Volume Left	31	11	20	7
Volume Right	29	14	15	23
cSH	1490	1511	734	816
Volume to Capacity	0.02	0.01	0.05	0.04
Queue Length 95th (ft)	2	1	4	3
Control Delay (s)	3.1	1.2	10.2	9.6
Lane LOS	A	A	B	A
Approach Delay (s)	3.1	1.2	10.2	9.6
Approach LOS			B	A

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	27.4%	ICU Level of Service	A
Analysis Period (min)	15		

DRAFT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	31	75	31	10	59	7	24	5	8	10	5	24
Future Volume (vph)	31	75	31	10	59	7	24	5	8	10	5	24
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	33	79	33	11	62	7	25	5	8	11	5	25

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	145	80	38	41
Volume Left (vph)	33	11	25	11
Volume Right (vph)	33	7	8	25
Hadj (s)	-0.06	0.01	0.04	-0.28
Departure Headway (s)	4.1	4.2	4.5	4.2
Degree Utilization, x	0.17	0.09	0.05	0.05
Capacity (veh/h)	855	827	757	807
Control Delay (s)	7.9	7.7	7.7	7.4
Approach Delay (s)	7.9	7.7	7.7	7.4
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.8		
Level of Service	A		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	625	868	10	0	82
Future Volume (Veh/h)	0	625	868	10	0	82
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	658	914	11	0	86
Pedestrians		20	20		20	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		2	2		2	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (ft)		212	598			
pX, platoon unblocked	0.87				0.88	0.87
vC, conflicting volume	945				1288	502
vC1, stage 1 conf vol					940	
vC2, stage 2 conf vol					349	
vCu, unblocked vol	632				896	123
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	89
cM capacity (veh/h)	808				396	760

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	329	329	609	316	86
Volume Left	0	0	0	0	0
Volume Right	0	0	0	11	86
cSH	1700	1700	1700	1700	760
Volume to Capacity	0.19	0.19	0.36	0.19	0.11
Queue Length 95th (ft)	0	0	0	0	10
Control Delay (s)	0.0	0.0	0.0	0.0	10.3
Lane LOS					B
Approach Delay (s)	0.0		0.0		10.3
Approach LOS					B

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		

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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	82	55	5	5	133	5
Future Volume (Veh/h)	82	55	5	5	133	5
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	86	58	5	5	140	5
Pedestrians	20		20			20
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	2		2			2
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	332	48			30	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	332	48			30	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	85	94			91	
cM capacity (veh/h)	583	988			1556	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	86	58	10	145
Volume Left	86	0	0	140
Volume Right	0	58	5	0
cSH	583	988	1700	1556
Volume to Capacity	0.15	0.06	0.01	0.09
Queue Length 95th (ft)	13	5	0	7
Control Delay (s)	12.2	8.9	0.0	7.3
Lane LOS	B	A		A
Approach Delay (s)	10.9		0.0	7.3
Approach LOS	B			

Intersection Summary			
Average Delay	8.8		
Intersection Capacity Utilization	29.8%	ICU Level of Service	A
Analysis Period (min)	15		

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	294	364	83	194	571	763	109	1401	182	633	1678	167
Future Volume (vph)	294	364	83	194	571	763	109	1401	182	633	1678	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	330		220	300		175	300		380	470		0
Storage Lanes	2		1	2		1	1		0	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.97	0.95	1.00	1.00	*0.85	0.91	*0.90	*0.85	0.95
Ped Bike Factor	0.99	0.99		0.98		0.98	1.00	0.99		0.99	1.00	
Frt		0.972				0.850		0.983			0.986	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3407	0	3433	3539	1583	1770	4642	0	3185	3108	0
Flt Permitted	0.143			0.242			0.950			0.950		
Satd. Flow (perm)	512	3407	0	856	3539	1553	1765	4642	0	3166	3108	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17				437		18			10	
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		768			582			562			685	
Travel Time (s)		17.5			13.2			10.9			13.3	
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	309	383	87	204	601	803	115	1475	192	666	1766	176
Shared Lane Traffic (%)												
Lane Group Flow (vph)	309	470	0	204	601	803	115	1667	0	666	1942	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			24			24	
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	2	1	2		2	2	
Detector Template												
Leading Detector (ft)	38	100		38	100	100	38	100		100	100	
Trailing Detector (ft)	2	2		2	2	2	2	2		2	2	
Turn Type	pm+pt	NA		pm+pt	NA	Free	Prot	NA		Prot	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4		Free						
Detector Phase	3	8		7	4		5	2		1	6	
Switch Phase												

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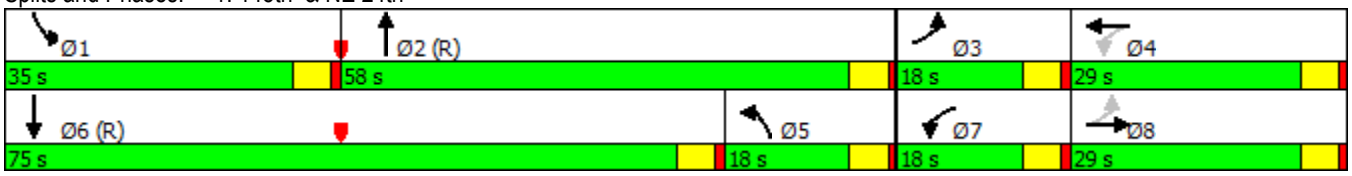
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	18.0	29.0		18.0	29.0		18.0	28.0		18.0	27.0	
Total Split (s)	18.0	29.0		18.0	29.0		18.0	58.0		35.0	75.0	
Total Split (%)	12.9%	20.7%		12.9%	20.7%		12.9%	41.4%		25.0%	53.6%	
Maximum Green (s)	13.0	24.0		13.0	24.0		13.0	53.0		30.0	70.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		5.0	5.0		5.0	5.0		5.0	0.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)		9.0			9.0			8.0			8.0	
Flash Dont Walk (s)		15.0			15.0			15.0			14.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	42.2	27.9		38.3	26.0	140.0	15.0	56.1		31.6	72.7	
Actuated g/C Ratio	0.30	0.20		0.27	0.19	1.00	0.11	0.40		0.23	0.52	
v/c Ratio	0.68	0.68		0.44	0.92	0.52	0.61	0.89		0.93	1.20	
Control Delay	44.8	55.8		38.6	75.6	1.2	48.9	24.3		73.0	127.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.6		0.0	1.3	
Total Delay	44.8	55.8		38.6	75.6	1.2	48.9	24.8		73.0	129.0	
LOS	D	E		D	E	A	D	C		E	F	
Approach Delay		51.4			33.8			26.4			114.7	
Approach LOS		D			C			C			F	
Queue Length 50th (ft)	109	202		70	285	0	90	321		331	~1270	
Queue Length 95th (ft)	150	271		102	#394	0	m133	405		#450	#1424	
Internal Link Dist (ft)		688			502			482			605	
Turn Bay Length (ft)	330			300		175	300			470		
Base Capacity (vph)	467	693		526	660	1553	189	1872		728	1618	
Starvation Cap Reductn	0	0		0	0	0	0	41		0	0	
Spillback Cap Reductn	0	1		0	0	0	0	0		0	473	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.66	0.68		0.39	0.91	0.52	0.61	0.91		0.91	1.70	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 9 (6%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 175	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.20	
Intersection Signal Delay: 65.0	Intersection LOS: E
Intersection Capacity Utilization 97.5%	ICU Level of Service F
Analysis Period (min) 15	

DRAFT

* User Entered Value
~ 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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: 148th & NE 24th



DRAFT

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	352	592	242	262	699	63	176	1412	120	196	1806	255
Future Volume (vph)	352	592	242	262	699	63	176	1412	120	196	1806	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	11	12	12	12	12	11	12	12	11	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	300		0	330		0	350		0	420		610
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor		0.99			1.00		1.00	1.00		1.00	0.99	
Frt		0.956			0.988			0.988			0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3333	0	1770	3482	0	1770	4837	0	1770	4791	0
Flt Permitted	0.133			0.120			0.950			0.950		
Satd. Flow (perm)	248	3333	0	224	3482	0	1766	4837	0	1762	4791	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		40			6			12			22	
Link Speed (mph)		35			30			35			35	
Link Distance (ft)		789			576			608			749	
Travel Time (s)		15.4			13.1			11.8			14.6	
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	371	623	255	276	736	66	185	1486	126	206	1901	268
Shared Lane Traffic (%)												
Lane Group Flow (vph)	371	878	0	276	802	0	185	1612	0	206	2169	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	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.00	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	2	2		2	2		2	2		2	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	100	100		100	100		100	100		100	100	
Trailing Detector (ft)	2	2		2	2		2	2		2	2	
Turn Type	D.P+P	NA		D.P+P	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	8			4								
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												

DRAFT

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	7.0	7.0		7.0	7.0		6.0	7.0		6.0	7.0	
Minimum Split (s)	15.0	29.0		15.0	29.0		15.0	28.0		15.0	28.0	
Total Split (s)	28.0	33.0		28.0	33.0		20.0	59.0		20.0	59.0	
Total Split (%)	20.0%	23.6%		20.0%	23.6%		14.3%	42.1%		14.3%	42.1%	
Maximum Green (s)	23.0	28.0		23.0	28.0		15.0	54.0		15.0	54.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		17.0			17.0			15.0			15.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	55.0	33.2		55.0	30.0		16.8	56.0		17.0	56.2	
Actuated g/C Ratio	0.39	0.24		0.39	0.21		0.12	0.40		0.12	0.40	
v/c Ratio	1.01	1.07		0.84	1.07		0.88	0.83		0.96	1.12	
Control Delay	89.3	99.4		59.3	104.1		97.0	42.0		84.7	82.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	89.3	99.4		59.3	104.1		97.0	42.0		84.7	82.7	
LOS	F	F		E	F		F	D		F	F	
Approach Delay		96.4			92.6			47.7			82.9	
Approach LOS		F			F			D			F	
Queue Length 50th (ft)	~292	~474		193	~422		168	475		200	~372	
Queue Length 95th (ft)	#508	#624		#316	#555		#303	541		m194	m#307	
Internal Link Dist (ft)		709			496			528			669	
Turn Bay Length (ft)	300			330			350			420		
Base Capacity (vph)	369	821		366	750		214	1942		214	1937	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	1.01	1.07		0.75	1.07		0.86	0.83		0.96	1.12	

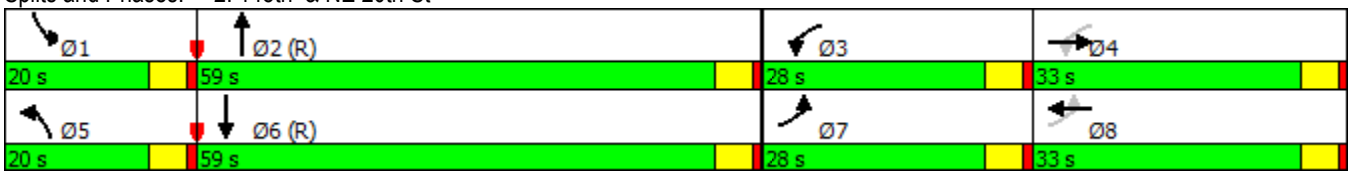
Intersection Summary

Area Type: Other
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 5 (4%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.12
Intersection Signal Delay: 77.4 Intersection LOS: E
Intersection Capacity Utilization 104.9% ICU Level of Service G
Analysis Period (min) 15

DRAFT

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

Splits and Phases: 2: 148th & NE 20th St



DRAFT

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	164	626	1	256	582	50	0	611	460	0	859	190
Future Volume (vph)	164	626	1	256	582	50	0	611	460	0	859	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	300		0	350		0	0		110	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor	0.99	1.00		0.99	1.00				0.95		0.99	
Frt					0.988				0.850		0.973	
Flt Protected	0.950			0.950								
Satd. Flow (prot)	1770	3539	0	1770	3483	0	0	3539	1583	0	3426	0
Flt Permitted	0.950			0.950								
Satd. Flow (perm)	1747	3539	0	1752	3483	0	0	3539	1511	0	3426	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					8				64		27	
Link Speed (mph)		35			30			35			35	
Link Distance (ft)		598			825			775			764	
Travel Time (s)		11.6			18.8			15.1			14.9	
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	173	659	1	269	613	53	0	643	484	0	904	200
Shared Lane Traffic (%)												
Lane Group Flow (vph)	173	660	0	269	666	0	0	643	484	0	1104	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			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
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	9		9	15		9
Number of Detectors	2	2		2	2			2	2		2	
Detector Template												
Leading Detector (ft)	100	100		100	100			100	100		100	
Trailing Detector (ft)	0	0		0	0			0	0		0	
Turn Type	Prot	NA		Prot	NA			NA	pm+ov		NA	
Protected Phases	3	8		7	4			6	7		2	
Permitted Phases								6	6			
Detector Phase	3	8		7	4			6	7		2	
Switch Phase												

DRAFT

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	6.0	6.0		6.0	6.0			6.0	6.0		6.0	
Minimum Split (s)	30.0	36.0		30.0	30.0			33.0	30.0		28.0	
Total Split (s)	30.0	36.0		32.0	38.0			52.0	32.0		52.0	
Total Split (%)	25.0%	30.0%		26.7%	31.7%			43.3%	26.7%		43.3%	
Maximum Green (s)	25.0	31.0		27.0	33.0			47.0	27.0		47.0	
Yellow Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0			1.0	1.0		1.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0	-2.0		-2.0	
Total Lost Time (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lead/Lag	Lead	Lead		Lag	Lag				Lag			
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Time To Reduce (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Recall Mode	None	None		None	None			C-Max	None		C-Max	
Walk Time (s)	8.0	7.0		8.0	8.0			10.0	8.0			
Flash Dont Walk (s)	14.0	22.0		14.0	14.0			17.0	14.0			
Pedestrian Calls (#/hr)	0	0		0	0			0	0			
Act Effct Green (s)	18.1	28.7		24.5	35.1			57.8	82.3		57.8	
Actuated g/C Ratio	0.15	0.24		0.20	0.29			0.48	0.69		0.48	
v/c Ratio	0.65	0.78		0.75	0.65			0.38	0.45		0.66	
Control Delay	50.3	42.5		57.3	39.5			22.0	8.1		21.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	50.3	42.5		57.3	39.5			22.0	8.1		21.1	
LOS	D	D		E	D			C	A		C	
Approach Delay		44.1			44.6			16.1			21.1	
Approach LOS		D			D			B			C	
Queue Length 50th (ft)	98	257		195	229			166	120		431	
Queue Length 95th (ft)	140	216		281	290			239	202		m527	
Internal Link Dist (ft)		518			745			695			684	
Turn Bay Length (ft)	300			350					110			
Base Capacity (vph)	398	973		428	1079			1704	1095		1664	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.43	0.68		0.63	0.62			0.38	0.44		0.66	

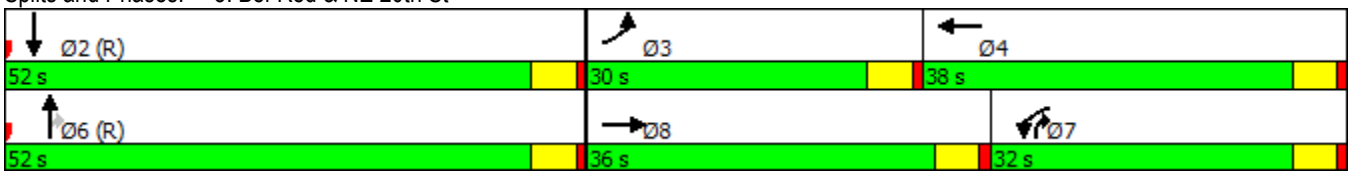
Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 31 (26%), Referenced to phase 2:SBT and 6:NBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 30.0 Intersection LOS: C
Intersection Capacity Utilization 75.0% ICU Level of Service D
Analysis Period (min) 15

DRAFT

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

Splits and Phases: 3: Bel-Red & NE 20th St



DRAFT

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	251	881	64	198	509	12	0	636	302	2	803	295
Future Volume (vph)	251	881	64	198	509	12	0	636	302	2	803	295
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	280		0	400		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.99	1.00		0.99	1.00			0.99			0.99	
Frt		0.990			0.996			0.952			0.960	
Flt Protected	0.950			0.950								
Satd. Flow (prot)	1676	3309	0	1676	3336	0	0	3147	0	0	3181	0
Flt Permitted	0.950			0.950							0.954	
Satd. Flow (perm)	1653	3309	0	1664	3336	0	0	3147	0	0	3035	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			2			83			54	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		897			739			478			600	
Travel Time (s)		20.4			16.8			8.1			10.2	
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	264	927	67	208	536	13	0	669	318	2	845	311
Shared Lane Traffic (%)												
Lane Group Flow (vph)	264	994	0	208	549	0	0	987	0	0	1158	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			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1			1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50			50		50	50	
Trailing Detector (ft)	0	0		0	0			0		0	0	
Turn Type	Prot	NA		Prot	NA			NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases								8		4		
Detector Phase	5	2		1	6			8		4	4	
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	8.0	8.0		8.0	8.0			8.0		8.0	8.0	
Minimum Split (s)	13.0	29.0		13.0	29.0			29.0		29.0	29.0	
Total Split (s)	33.0	43.0		22.0	32.0			55.0		55.0	55.0	
Total Split (%)	27.5%	35.8%		18.3%	26.7%			45.8%		45.8%	45.8%	
Maximum Green (s)	28.0	38.0		17.0	27.0			50.0		50.0	50.0	
Yellow Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0			1.0		1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0			-1.0			-1.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lead/Lag	Lead	Lead		Lag	Lag							
Lead-Lag Optimize?		Yes			Yes							
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Time To Reduce (s)	5.0	5.0		5.0	0.0			0.0		0.0	0.0	
Recall Mode	None	C-Max		None	C-Max			None		None	None	
Walk Time (s)		8.0			8.0			8.0		8.0	8.0	
Flash Dont Walk (s)		16.0			16.0			16.0		16.0	16.0	
Pedestrian Calls (#/hr)		0			10			5		15	15	
Act Effct Green (s)	23.5	41.3		18.0	35.8			48.7			48.7	
Actuated g/C Ratio	0.20	0.34		0.15	0.30			0.41			0.41	
v/c Ratio	0.80	0.87		0.83	0.55			0.74			0.92	
Control Delay	29.7	21.4		76.2	39.5			33.9			44.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	29.7	21.4		76.2	39.5			33.9			44.1	
LOS	C	C		E	D			C			D	
Approach Delay		23.1			49.6			33.9			44.1	
Approach LOS		C			D			C			D	
Queue Length 50th (ft)	106	433		158	193			375			411	
Queue Length 95th (ft)	m67	m#473		#287	269			444			513	
Internal Link Dist (ft)		817			659			398			520	
Turn Bay Length (ft)	280			400								
Base Capacity (vph)	405	1144		251	996			1385			1320	
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	0.65	0.87		0.83	0.55			0.71			0.88	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 64 (53%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.92
Intersection Signal Delay: 36.3 Intersection LOS: D
Intersection Capacity Utilization 85.0% ICU Level of Service E
Analysis Period (min) 15

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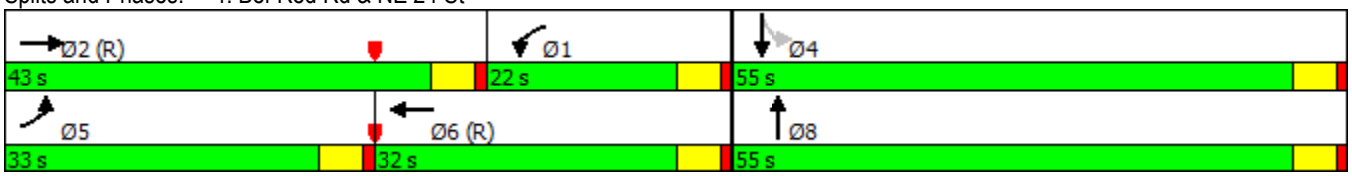
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

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

Splits and Phases: 4: Bel-Red Rd & NE 24 St



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	960	65	23	722	60	137	275	81	154	456	250
Future Volume (vph)	150	960	65	23	722	60	137	275	81	154	456	250
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			-5%			0%			0%	
Storage Length (ft)	250		0	90		0	250		60	200		350
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98	0.99		0.99	0.99		0.98	0.99		0.97		
Frt		0.991			0.989			0.966				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	3305	0	1718	3377	0	1676	1692	0	1676	1765	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1644	3305	0	1695	3377	0	1640	1692	0	1630	1765	1500
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)		6			7			13				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		393			897			500			625	
Travel Time (s)		8.9			20.4			11.4			14.2	
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	158	1011	68	24	760	63	144	289	85	162	480	263
Shared Lane Traffic (%)												
Lane Group Flow (vph)	158	1079	0	24	823	0	144	374	0	162	480	263
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	1.07	1.07	1.07	1.04	1.04	1.04	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	custom
Protected Phases	5	2		1	6		3	8 9		7	4 9	4 5
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	4 5
Switch Phase												

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Lane Group	Ø4	Ø8	Ø9
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Grade (%)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Lane Util. Factor			
Ped Bike Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Growth Factor			
Heavy Vehicles (%)			
Bus Blockages (#/hr)			
Parking (#/hr)			
Mid-Block Traffic (%)			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Enter Blocked Intersection			
Lane Alignment			
Median Width(ft)			
Link Offset(ft)			
Crosswalk Width(ft)			
Two way Left Turn Lane			
Headway Factor			
Turning Speed (mph)			
Number of Detectors			
Detector Template			
Leading Detector (ft)			
Trailing Detector (ft)			
Turn Type			
Protected Phases	4	8	9
Permitted Phases			
Detector Phase			
Switch Phase			

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	3.0		4.0	8.0		4.0			4.0		
Minimum Split (s)	17.0	25.0		17.0	26.5		17.0			17.0		
Total Split (s)	18.0	36.0		17.0	35.0		21.0			21.0		
Total Split (%)	15.0%	30.0%		14.2%	29.2%		17.5%			17.5%		
Maximum Green (s)	13.0	31.0		12.0	28.5		16.0			14.5		
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0			4.0		
All-Red Time (s)	1.0	1.0		1.0	2.5		2.0			2.5		
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0			-1.0		
Total Lost Time (s)	4.0	4.0		4.0	5.5		4.0			5.5		
Lead/Lag	Lag	Lead		Lag	Lead		Lead			Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	3.0		2.5	5.0		3.0			3.0		
Minimum Gap (s)	2.5	3.0		2.5	5.0		3.0			3.0		
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0			0.0		
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0			0.0		
Recall Mode	Max	C-Max		None	C-Max		None			None		
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		13.0			13.0							
Pedestrian Calls (#/hr)		0			0							
Act Effct Green (s)	14.0	41.8		10.3	32.5		15.0	35.7		14.8	37.0	29.0
Actuated g/C Ratio	0.12	0.35		0.09	0.27		0.12	0.30		0.12	0.31	0.24
v/c Ratio	0.81	0.94		0.16	0.90		0.69	0.73		0.78	0.88	0.73
Control Delay	65.9	44.7		57.2	48.5		65.6	29.3		76.4	44.2	33.9
Queue Delay	0.0	1.5		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	65.9	46.2		57.2	48.5		65.6	29.3		76.4	44.2	33.9
LOS	E	D		E	D		E	C		E	D	C
Approach Delay		48.7			48.7			39.4			47.0	
Approach LOS		D			D			D			D	
Queue Length 50th (ft)	122	~519		19	333		112	160		123	236	99
Queue Length 95th (ft)	#238	#655		m30	m#462		m172	235		#227	#335	153
Internal Link Dist (ft)		313			817			420			545	
Turn Bay Length (ft)	250			90			250			200		350
Base Capacity (vph)	195	1153		186	918		237	544		216	558	375
Starvation Cap Reductn	0	21		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	0.81	0.95		0.13	0.90		0.61	0.69		0.75	0.86	0.70

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 8 (7%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 46.9	Intersection LOS: D
Intersection Capacity Utilization 80.3%	ICU Level of Service D
Analysis Period (min) 15	

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Lane Group	Ø4	Ø8	Ø9
Minimum Initial (s)	5.0	4.0	4.0
Minimum Split (s)	20.0	20.0	26.0
Total Split (s)	20.0	20.0	26.0
Total Split (%)	17%	17%	22%
Maximum Green (s)	15.0	15.0	24.0
Yellow Time (s)	4.0	4.0	2.0
All-Red Time (s)	1.0	1.0	0.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lag	Lag	
Lead-Lag Optimize?			
Vehicle Extension (s)	2.0	2.0	3.0
Minimum Gap (s)	2.0	2.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0
Recall Mode	None	None	Ped
Walk Time (s)			7.0
Flash Dont Walk (s)			17.0
Pedestrian Calls (#/hr)			0
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary

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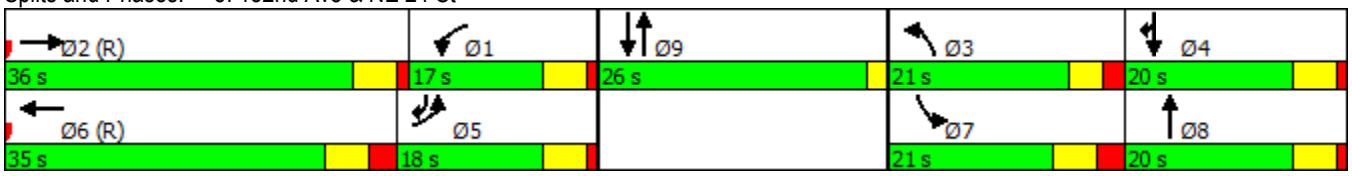
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: 152nd Ave & NE 24 St



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	177	110	399	79	26	132	1477	189	82	1736	131
Future Volume (vph)	180	177	110	399	79	26	132	1477	189	82	1736	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	250		0	390		0	200		150	150		150
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Ped Bike Factor	0.98	0.98		0.98	0.98			0.99				0.90
Frt		0.942			0.985			0.983				0.850
Flt Protected	0.950			0.950	0.972		0.950			0.950		
Satd. Flow (prot)	1770	1720	0	1681	1685	0	1770	4944	0	1770	3539	1583
Flt Permitted	0.950			0.950	0.972		0.060			0.062		
Satd. Flow (perm)	1727	1720	0	1642	1663	0	112	4944	0	115	3539	1431
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			4			20				94
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		387			584			749			562	
Travel Time (s)		8.8			13.3			14.6			10.9	
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	189	186	116	420	83	27	139	1555	199	86	1827	138
Shared Lane Traffic (%)				37%								
Lane Group Flow (vph)	189	302	0	265	265	0	139	1754	0	86	1827	138
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
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases							2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	29.0	29.0		29.0	29.0		18.0	24.0		18.0	24.0	24.0
Total Split (s)	29.0	29.0		31.0	31.0		18.0	62.0		18.0	62.0	62.0
Total Split (%)	20.7%	20.7%		22.1%	22.1%		12.9%	44.3%		12.9%	44.3%	44.3%
Maximum Green (s)	24.0	24.0		26.0	26.0		13.0	57.0		13.0	57.0	57.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	7.0
Flash Dont Walk (s)	17.0	17.0		17.0	17.0			12.0			12.0	12.0
Pedestrian Calls (#/hr)	0	0		0	0			0			0	0
Act Effct Green (s)	25.4	25.4		26.0	26.0		78.4	66.2		74.7	64.3	64.3
Actuated g/C Ratio	0.18	0.18		0.19	0.19		0.56	0.47		0.53	0.46	0.46
v/c Ratio	0.59	0.92		0.85	0.84		0.67	0.75		0.47	1.12	0.20
Control Delay	60.8	85.9		79.2	76.8		57.3	21.6		32.3	76.8	1.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.1		0.0	0.4	0.0
Total Delay	60.8	85.9		79.2	76.8		57.3	21.7		32.3	77.3	1.4
LOS	E	F		E	E		E	C		C	E	A
Approach Delay		76.2			78.0			24.4			70.3	
Approach LOS		E			E			C			E	
Queue Length 50th (ft)	159	256		244	240		101	212		27	~1057	7
Queue Length 95th (ft)	243	#428		#384	#376		m121	m285		m22	m#842	m8
Internal Link Dist (ft)		307			504			669			482	
Turn Bay Length (ft)	250			390			200			150		150
Base Capacity (vph)	328	335		336	340		241	2349		241	1624	707
Starvation Cap Reductn	0	0		0	0		0	39		0	197	0
Spillback Cap Reductn	0	0		0	0		0	81		0	134	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.58	0.90		0.79	0.78		0.58	0.77		0.36	1.28	0.20

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 160	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.13	
Intersection Signal Delay: 54.2	Intersection LOS: D
Intersection Capacity Utilization 103.9%	ICU Level of Service G
Analysis Period (min) 15	

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

Splits and Phases: 7: 148th & NE 22nd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1142	14	0	994	114	0	0	31	0	0	288
Future Volume (vph)	0	1142	14	0	994	114	0	0	31	0	0	288
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	100		0	65		0	0		0	0		0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.99				0.94			0.94
Frt		0.998			0.985				0.865			0.865
Flt Protected												
Satd. Flow (prot)	0	3342	0	0	3266	0	0	0	1526	0	0	1526
Flt Permitted												
Satd. Flow (perm)	0	3342	0	0	3266	0	0	0	1440	0	0	1440
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			17				61			89
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		342			393			505			622	
Travel Time (s)		7.8			8.9			11.5			14.1	
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	0	1202	15	0	1046	120	0	0	33	0	0	303
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1217	0	0	1166	0	0	0	33	0	0	303
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	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2			2				1			1
Detector Template		Thru			Thru				Right			Right
Leading Detector (ft)		100			100				20			20
Trailing Detector (ft)		0			0				0			0
Turn Type		NA			NA				Perm			Perm
Protected Phases		2			6							
Permitted Phases									8			4
Detector Phase		2			6				8			4
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)		8.0			8.0				4.0			4.0
Minimum Split (s)		28.0			28.0				26.0			26.0
Total Split (s)		73.0			73.0				47.0			47.0
Total Split (%)		60.8%			60.8%				39.2%			39.2%
Maximum Green (s)		68.0			68.0				42.0			42.0
Yellow Time (s)		4.0			4.0				4.0			4.0
All-Red Time (s)		1.0			1.0				1.0			1.0
Lost Time Adjust (s)		-1.0			-1.0				-1.0			-1.0
Total Lost Time (s)		4.0			4.0				4.0			4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0				2.0			2.0
Minimum Gap (s)		3.0			3.0				2.0			2.0
Time Before Reduce (s)		0.0			0.0				0.0			0.0
Time To Reduce (s)		0.0			0.0				0.0			0.0
Recall Mode		C-Max			C-Max				None			None
Walk Time (s)		6.0			6.0				6.0			6.0
Flash Dont Walk (s)		8.0			8.0				11.0			11.0
Pedestrian Calls (#/hr)		0			0				0			0
Act Effct Green (s)		87.3			87.3				24.7			24.7
Actuated g/C Ratio		0.73			0.73				0.21			0.21
v/c Ratio		0.50			0.49				0.10			0.83
Control Delay		2.2			2.2				3.7			49.4
Queue Delay		0.1			0.5				0.0			0.0
Total Delay		2.4			2.8				3.7			49.5
LOS		A			A				A			D
Approach Delay		2.4			2.8							
Approach LOS		A			A							
Queue Length 50th (ft)		24			61				0			163
Queue Length 95th (ft)		40			m70				m4			243
Internal Link Dist (ft)		262			313			425			542	
Turn Bay Length (ft)												
Base Capacity (vph)		2430			2379				555			573
Starvation Cap Reductn		289			699				0			0
Spillback Cap Reductn		337			208				5			7
Storage Cap Reductn		0			0				0			0
Reduced v/c Ratio		0.58			0.69				0.06			0.54

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 7 (6%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 7.8	Intersection LOS: A
Intersection Capacity Utilization 60.5%	ICU Level of Service B
Analysis Period (min) 15	

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

Splits and Phases: 8: 151 Ave NE & NE 24 St

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	990	37	37	1169	85	159	31	45	122	265	200
Future Volume (vph)	135	990	37	37	1169	85	159	31	45	122	265	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	120		370	240		0	130		0	130		330
Storage Lanes	1		1	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.92		0.99		0.98	0.97		0.97		0.95
Frt			0.850		0.990			0.912				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3484	0	1770	1646	0	1770	1863	1583
Flt Permitted	0.089			0.191			0.208			0.688		
Satd. Flow (perm)	166	3539	1452	356	3484	0	381	1646	0	1241	1863	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			91		8			47				211
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		582			342			574			612	
Travel Time (s)		13.2			7.8			13.0			13.9	
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	142	1042	39	39	1231	89	167	33	47	128	279	211
Shared Lane Traffic (%)												
Lane Group Flow (vph)	142	1042	39	39	1320	0	167	80	0	128	279	211
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	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Turn Type	D.P+P	NA	Perm	D.P+P	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	6		2	2			4			8		4
Detector Phase	5	2	2	1	6		3	8		7	4	4
Switch Phase												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	17.0	25.0	25.0	17.0	25.0		17.0	25.0		17.0	25.0	25.0
Total Split (s)	17.0	58.0	58.0	17.0	58.0		17.0	28.0		17.0	28.0	28.0
Total Split (%)	14.2%	48.3%	48.3%	14.2%	48.3%		14.2%	23.3%		14.2%	23.3%	23.3%
Maximum Green (s)	13.0	54.0	54.0	13.0	54.0		12.0	24.0		12.0	24.0	24.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		2.0	1.0		2.0	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)	4.0	4.0	4.0	4.0	4.0		5.0	4.0		5.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Min		None	Min	Min
Walk Time (s)		5.0	5.0		5.0			5.0			5.0	5.0
Flash Dont Walk (s)		15.0	15.0		15.0			15.0			15.0	15.0
Pedestrian Calls (#/hr)		0	0		0			0			0	0
Act Effct Green (s)	69.8	67.1	67.1	71.4	59.4		32.2	22.4		32.2	21.7	21.7
Actuated g/C Ratio	0.58	0.56	0.56	0.60	0.50		0.27	0.19		0.27	0.18	0.18
v/c Ratio	0.61	0.53	0.05	0.13	0.76		0.71	0.23		0.34	0.83	0.48
Control Delay	27.6	19.3	0.1	6.5	15.9		45.1	18.3		32.6	67.9	9.2
Queue Delay	0.0	0.3	0.0	0.0	0.9		0.0	0.0		0.0	0.0	0.0
Total Delay	27.6	19.6	0.1	6.5	16.8		45.1	18.3		32.6	67.9	9.2
LOS	C	B	A	A	B		D	B		C	E	A
Approach Delay		19.9			16.5			36.4			40.6	
Approach LOS		B			B			D			D	
Queue Length 50th (ft)	46	289	0	6	262		85	14		71	205	0
Queue Length 95th (ft)	109	364	0	m14	344		m128	m46		120	#322	65
Internal Link Dist (ft)		502			262			494			532	
Turn Bay Length (ft)	120		370	240			130			130		330
Base Capacity (vph)	273	1977	851	371	1729		242	367		398	372	468
Starvation Cap Reductn	0	388	0	0	171		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	0.52	0.66	0.05	0.11	0.85		0.69	0.22		0.32	0.75	0.45

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 1 (1%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green	
Natural Cycle: 95	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 23.4	Intersection LOS: C
Intersection Capacity Utilization 80.9%	ICU Level of Service D
Analysis Period (min) 15	

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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: 150th Ave & NE 24 St/NE 24th

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	109	5	66	74	37	31	238	107	74	328	50
Future Volume (vph)	13	109	5	66	74	37	31	238	107	74	328	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98	1.00			0.98			0.98			0.99	
Frt		0.994			0.972			0.962			0.985	
Flt Protected	0.950				0.982			0.996			0.992	
Satd. Flow (prot)	1770	1847	0	0	1758	0	0	1758	0	0	1809	0
Flt Permitted	0.622				0.827			0.946			0.885	
Satd. Flow (perm)	1134	1847	0	0	1466	0	0	1668	0	0	1610	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			24			48			15	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		204			351			337			393	
Travel Time (s)		4.6			8.0			7.7			8.9	
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	14	115	5	69	78	39	33	251	113	78	345	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	120	0	0	186	0	0	397	0	0	476	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			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
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												

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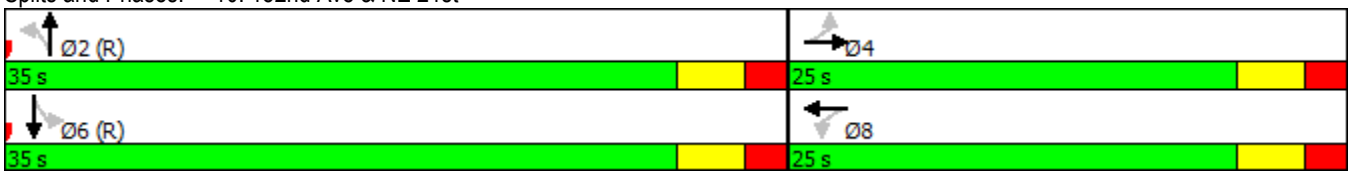
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Total Split (s)	25.0	25.0		25.0	25.0		35.0	35.0		35.0	35.0	
Total Split (%)	41.7%	41.7%		41.7%	41.7%		58.3%	58.3%		58.3%	58.3%	
Maximum Green (s)	20.0	20.0		20.0	20.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	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	
Total Lost Time (s)	5.0	5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	11.8	11.8			11.8			38.2			38.2	
Actuated g/C Ratio	0.20	0.20			0.20			0.64			0.64	
v/c Ratio	0.06	0.33			0.61			0.37			0.46	
Control Delay	17.8	21.0			26.8			6.5			3.5	
Queue Delay	0.0	0.0			0.0			0.0			0.1	
Total Delay	17.8	21.0			26.8			6.5			3.6	
LOS	B	C			C			A			A	
Approach Delay		20.7			26.8			6.5			3.6	
Approach LOS		C			C			A			A	
Queue Length 50th (ft)	4	36			53			48			32	
Queue Length 95th (ft)	15	68			98			118			42	
Internal Link Dist (ft)		124			271			257			313	
Turn Bay Length (ft)												
Base Capacity (vph)	378	618			504			1080			1031	
Starvation Cap Reductn	0	0			0			0			43	
Spillback Cap Reductn	0	0			0			0			0	
Storage Cap Reductn	0	0			0			0			0	
Reduced v/c Ratio	0.04	0.19			0.37			0.37			0.48	

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 13 (22%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 10.1 Intersection LOS: B
Intersection Capacity Utilization 66.3% ICU Level of Service C
Analysis Period (min) 15

DRAFT

Splits and Phases: 10: 152nd Ave & NE 21st



DRAFT

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	123	52	23	158	45	27	241	9	39	349	68
Future Volume (vph)	150	123	52	23	158	45	27	241	9	39	349	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98			0.99			1.00			0.99	
Frt		0.978			0.973			0.996			0.980	
Flt Protected		0.977			0.995			0.995			0.996	
Satd. Flow (prot)	0	1764	0	0	1784	0	0	1843	0	0	1804	0
Flt Permitted		0.723			0.948			0.938			0.955	
Satd. Flow (perm)	0	1294	0	0	1697	0	0	1735	0	0	1727	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			25			3			19	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		393			358			393			500	
Travel Time (s)		8.9			8.1			8.9			11.4	
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	158	129	55	24	166	47	28	254	9	41	367	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	342	0	0	237	0	0	291	0	0	480	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)		0			0			0			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	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												

DRAFT

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Total Split (s)	29.0	29.0		29.0	29.0		31.0	31.0		31.0	31.0	
Total Split (%)	48.3%	48.3%		48.3%	48.3%		51.7%	51.7%		51.7%	51.7%	
Maximum Green (s)	24.0	24.0		24.0	24.0		26.0	26.0		26.0	26.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	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	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		19.0			19.0			31.0			31.0	
Actuated g/C Ratio		0.32			0.32			0.52			0.52	
v/c Ratio		0.81			0.43			0.32			0.53	
Control Delay		33.4			16.7			8.3			4.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		33.4			16.7			8.3			4.5	
LOS		C			B			A			A	
Approach Delay		33.4			16.7			8.3			4.5	
Approach LOS		C			B			A			A	
Queue Length 50th (ft)		127			65			48			17	
Queue Length 95th (ft)		160			m86			80			m164	
Internal Link Dist (ft)		313			278			313			420	
Turn Bay Length (ft)												
Base Capacity (vph)		529			693			897			901	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.65			0.34			0.32			0.53	

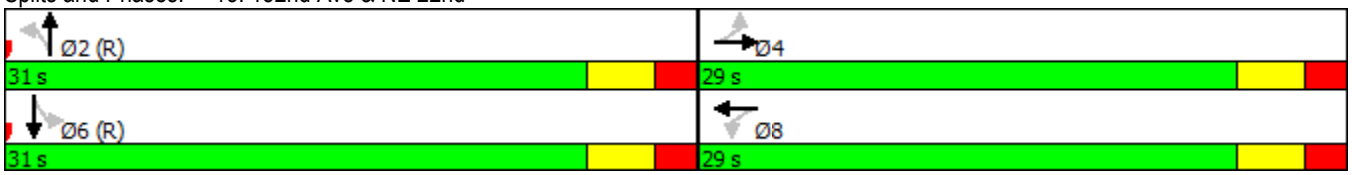
Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 8 (13%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 14.8 Intersection LOS: B
Intersection Capacity Utilization 77.1% ICU Level of Service D
Analysis Period (min) 15

DRAFT

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

Splits and Phases: 13: 152nd Ave & NE 22nd



DRAFT

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	376	39	128	275	104	15	19	123	102	26	155
Future Volume (vph)	23	376	39	128	275	104	15	19	123	102	26	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	150		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.99			0.96			0.96	
Frt		0.988			0.972			0.894			0.926	
Flt Protected		0.997			0.987			0.995			0.982	
Satd. Flow (prot)	0	1826	0	0	1768	0	0	1586	0	0	1643	0
Flt Permitted		0.963			0.787			0.956			0.841	
Satd. Flow (perm)	0	1763	0	0	1405	0	0	1521	0	0	1396	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			31			129			109	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		584			213			320			574	
Travel Time (s)		13.3			4.8			7.3			13.0	
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Confl. Bikes (#/hr)			5			5			5			5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	24	396	41	135	289	109	16	20	129	107	27	163
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	461	0	0	533	0	0	165	0	0	297	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			0			0			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	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												

DRAFT

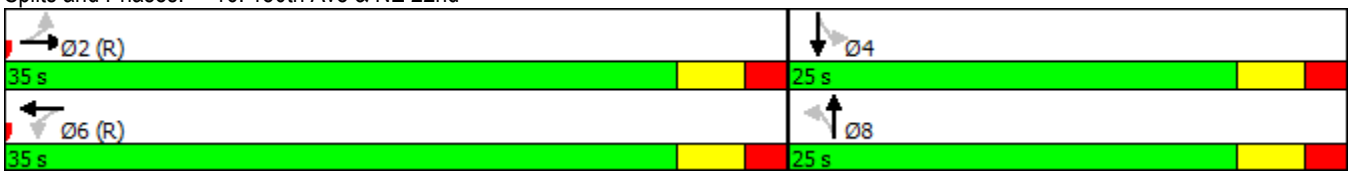
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Total Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		25.0	25.0	
Total Split (%)	58.3%	58.3%		58.3%	58.3%		41.7%	41.7%		41.7%	41.7%	
Maximum Green (s)	30.0	30.0		30.0	30.0		20.0	20.0		20.0	20.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	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	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		30.0			30.0			20.0			20.0	
Actuated g/C Ratio		0.50			0.50			0.33			0.33	
v/c Ratio		0.52			0.74			0.28			0.55	
Control Delay		12.5			18.3			4.4			9.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		12.5			18.3			4.4			9.1	
LOS		B			B			A			A	
Approach Delay		12.5			18.3			4.4			9.1	
Approach LOS		B			B			A			A	
Queue Length 50th (ft)		101			163			8			17	
Queue Length 95th (ft)		173			228			43			m76	
Internal Link Dist (ft)		504			133			240			494	
Turn Bay Length (ft)												
Base Capacity (vph)		887			718			593			538	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.52			0.74			0.28			0.55	

Intersection Summary	
Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 54 (90%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 13.0	Intersection LOS: B
Intersection Capacity Utilization 102.8%	ICU Level of Service G
Analysis Period (min) 15	

DRAFT

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

Splits and Phases: 16: 150th Ave & NE 22nd



DRAFT

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	126	783	1048	35	149	55
Future Volume (vph)	126	783	1048	35	149	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	150			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor			1.00		0.96	
Frt			0.995		0.964	
Flt Protected	0.950				0.965	
Satd. Flow (prot)	1770	3539	3512	0	1709	0
Flt Permitted	0.197				0.965	
Satd. Flow (perm)	367	3539	3512	0	1664	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			4		15	
Link Speed (mph)		35	30		30	
Link Distance (ft)		576	212		428	
Travel Time (s)		11.2	4.8		9.7	
Confl. Peds. (#/hr)	20			20	20	20
Confl. Bikes (#/hr)				5		5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Adj. Flow (vph)	133	824	1103	37	157	58
Shared Lane Traffic (%)						
Lane Group Flow (vph)	133	824	1140	0	215	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane			Yes			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	2	2		1	
Detector Template	Left	Thru	Thru		Left	
Leading Detector (ft)	20	100	100		20	
Trailing Detector (ft)	0	0	0		0	
Turn Type	D.P+P	NA	NA		Prot	
Protected Phases	5	2	6		4	
Permitted Phases	6					
Detector Phase	5	2	6		4	
Switch Phase						

DRAFT

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Minimum Initial (s)	4.0	4.0	4.0		4.0	
Minimum Split (s)	17.0	25.0	25.0		25.0	
Total Split (s)	18.0	86.0	68.0		34.0	
Total Split (%)	15.0%	71.7%	56.7%		28.3%	
Maximum Green (s)	13.0	81.0	63.0		29.0	
Yellow Time (s)	3.0	3.0	3.0		3.0	
All-Red Time (s)	2.0	2.0	2.0		2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0	5.0		5.0	
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Minimum Gap (s)	3.0	3.0	3.0		3.0	
Time Before Reduce (s)	0.0	0.0	0.0		0.0	
Time To Reduce (s)	0.0	0.0	0.0		0.0	
Recall Mode	None	C-Max	C-Max		Min	
Walk Time (s)			5.0		5.0	
Flash Dont Walk (s)			15.0		15.0	
Pedestrian Calls (#/hr)			0		0	
Act Effct Green (s)	85.6	90.6	77.6		19.4	
Actuated g/C Ratio	0.71	0.76	0.65		0.16	
v/c Ratio	0.37	0.31	0.50		0.75	
Control Delay	7.8	5.5	8.6		64.4	
Queue Delay	0.0	0.0	0.0		0.0	
Total Delay	7.8	5.5	8.6		64.4	
LOS	A	A	A		E	
Approach Delay		5.8	8.6		64.4	
Approach LOS		A	A		E	
Queue Length 50th (ft)	23	92	141		161	
Queue Length 95th (ft)	51	150	201		m228	
Internal Link Dist (ft)		496	132		348	
Turn Bay Length (ft)	150					
Base Capacity (vph)	427	2671	2271		424	
Starvation Cap Reductn	0	0	0		0	
Spillback Cap Reductn	0	0	0		0	
Storage Cap Reductn	0	0	0		0	
Reduced v/c Ratio	0.31	0.31	0.50		0.51	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 97 (81%), Referenced to phase 2:EBT and 6:EBWB, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 12.6	Intersection LOS: B
Intersection Capacity Utilization 64.0%	ICU Level of Service B
Analysis Period (min) 15	

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

Splits and Phases: 33: NE 20th St & 150th Ave

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	174	792	538	235	0	404
Future Volume (Veh/h)	174	792	538	235	0	404
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	183	834	566	247	0	425
Pedestrians		20	20		20	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		2	2		2	
Right turn flare (veh)						
Median type		None	TWLTL			
Median storage veh)			2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	833				1512	446
vC1, stage 1 conf vol					710	
vC2, stage 2 conf vol					803	
vCu, unblocked vol	833				1512	446
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	77				100	21
cM capacity (veh/h)	782				254	541

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	183	417	417	377	436	425
Volume Left	183	0	0	0	0	0
Volume Right	0	0	0	0	247	425
cSH	782	1700	1700	1700	1700	541
Volume to Capacity	0.23	0.25	0.25	0.22	0.26	0.79
Queue Length 95th (ft)	23	0	0	0	0	183
Control Delay (s)	11.0	0.0	0.0	0.0	0.0	31.8
Lane LOS	B					D
Approach Delay (s)	2.0			0.0		31.8
Approach LOS						D

Intersection Summary			
Average Delay	6.9		
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	96	108	37	785	936	61
Future Volume (Veh/h)	96	108	37	785	936	61
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	101	114	39	826	985	64
Pedestrians	20			20	20	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			2	2	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				764	945	
pX, platoon unblocked	0.82	0.77	0.77			
vC, conflicting volume	1548	564	1069			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	629	0	486			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	68	86	95			
cM capacity (veh/h)	314	805	811			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	215	314	551	657	392
Volume Left	101	39	0	0	0
Volume Right	114	0	0	0	64
cSH	464	811	1700	1700	1700
Volume to Capacity	0.46	0.05	0.32	0.39	0.23
Queue Length 95th (ft)	60	4	0	0	0
Control Delay (s)	19.3	1.7	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	19.3	0.6		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		

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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	102	5	45	836	999	66
Future Volume (Veh/h)	102	5	45	836	999	66
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	107	5	47	880	1052	69
Pedestrians	20			20	20	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			2	2	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1231	478	
pX, platoon unblocked	0.75	0.70	0.70			
vC, conflicting volume	1660	600	1141			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	628	0	350			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	62	99	94			
cM capacity (veh/h)	284	736	832			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	112	340	587	701	420
Volume Left	107	47	0	0	0
Volume Right	5	0	0	0	69
cSH	292	832	1700	1700	1700
Volume to Capacity	0.38	0.06	0.35	0.41	0.25
Queue Length 95th (ft)	43	4	0	0	0
Control Delay (s)	24.8	1.9	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	24.8	0.7		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	65	308	212	26	8	65
Future Volume (Veh/h)	65	308	212	26	8	65
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	68	324	223	27	8	68
Pedestrians		20	20		20	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		2	2		2	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		359	393			
pX, platoon unblocked	0.99				0.99	0.99
vC, conflicting volume	270				736	276
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	257				728	264
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				98	91
cM capacity (veh/h)	1273				353	742

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	392	250	76
Volume Left	68	0	8
Volume Right	0	27	68
cSH	1273	1700	665
Volume to Capacity	0.05	0.15	0.11
Queue Length 95th (ft)	4	0	10
Control Delay (s)	1.8	0.0	11.1
Lane LOS	A		B
Approach Delay (s)	1.8	0.0	11.1
Approach LOS			B

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

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Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	368	232	5	272	236	5
Future Volume (Veh/h)	368	232	5	272	236	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	387	244	5	286	248	5
Pedestrians	20			20	20	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			2	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	213			539		
pX, platoon unblocked			0.84		0.84	0.84
vC, conflicting volume			651		845	549
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			492		722	371
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		22	99
cM capacity (veh/h)			887		319	550

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	631	291	253
Volume Left	0	5	248
Volume Right	244	0	5
cSH	1700	887	321
Volume to Capacity	0.37	0.01	0.79
Queue Length 95th (ft)	0	0	159
Control Delay (s)	0.0	0.2	47.5
Lane LOS		A	E
Approach Delay (s)	0.0	0.2	47.5
Approach LOS			E

Intersection Summary			
Average Delay	10.3		
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	36	11	9	121	114	78
Future Volume (Veh/h)	36	11	9	121	114	78
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	38	12	9	127	120	82
Pedestrians	20			20	20	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	2			2	2	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				428	320	
pX, platoon unblocked						
vC, conflicting volume	346	201	222			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	346	201	222			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	99	99			
cM capacity (veh/h)	625	812	1325			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	50	136	202
Volume Left	38	9	0
Volume Right	12	0	82
cSH	662	1325	1700
Volume to Capacity	0.08	0.01	0.12
Queue Length 95th (ft)	6	1	0
Control Delay (s)	10.9	0.6	0.0
Lane LOS	B	A	
Approach Delay (s)	10.9	0.6	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	28.6%	ICU Level of Service	A
Analysis Period (min)	15		

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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	34	1767	59	0	0
Future Volume (Veh/h)	0	34	1767	59	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	36	1860	62	0	0
Pedestrians	20		20			20
Lane Width (ft)	12.0		12.0			0.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	2		2			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1931	691			1942	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1931	691			1942	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	91			100	
cM capacity (veh/h)	56	381			293	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3
Volume Total	36	744	744	434
Volume Left	0	0	0	0
Volume Right	36	0	0	62
cSH	381	1700	1700	1700
Volume to Capacity	0.09	0.44	0.44	0.26
Queue Length 95th (ft)	8	0	0	0
Control Delay (s)	15.4	0.0	0.0	0.0
Lane LOS	C			
Approach Delay (s)	15.4	0.0		
Approach LOS	C			

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	50.7%	ICU Level of Service	A
Analysis Period (min)	15		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	49	60	20	69	22	96	5	30	23	9	61
Future Volume (Veh/h)	63	49	60	20	69	22	96	5	30	23	9	61
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	66	52	63	21	73	23	101	5	32	24	9	64
Pedestrians		20			20			20			20	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		2			2			2			2	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		358										
pX, platoon unblocked												
vC, conflicting volume	116			135			450	394	124	416	414	124
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	116			135			450	394	124	416	414	124
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			99			76	99	96	95	98	93
cM capacity (veh/h)	1448			1425			428	494	897	471	481	896

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	181	117	138	97
Volume Left	66	21	101	24
Volume Right	63	23	32	64
cSH	1448	1425	489	687
Volume to Capacity	0.05	0.01	0.28	0.14
Queue Length 95th (ft)	4	1	29	12
Control Delay (s)	3.0	1.5	15.2	11.1
Lane LOS	A	A	C	B
Approach Delay (s)	3.0	1.5	15.2	11.1
Approach LOS			C	B

Intersection Summary			
Average Delay	7.3		
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	61	159	69	16	74	9	72	5	24	21	5	30
Future Volume (vph)	61	159	69	16	74	9	72	5	24	21	5	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	64	167	73	17	78	9	76	5	25	22	5	32

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	304	104	106	59
Volume Left (vph)	64	17	76	22
Volume Right (vph)	73	9	25	32
Hadj (s)	-0.07	0.01	0.04	-0.22
Departure Headway (s)	4.4	4.7	5.0	4.8
Degree Utilization, x	0.37	0.14	0.15	0.08
Capacity (veh/h)	795	722	669	678
Control Delay (s)	9.9	8.4	8.8	8.2
Approach Delay (s)	9.9	8.4	8.8	8.2
Approach LOS	A	A	A	A

Intersection Summary			
Delay	9.3		
Level of Service	A		
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	932	931	10	0	83
Future Volume (Veh/h)	0	932	931	10	0	83
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	981	980	11	0	87
Pedestrians		20	20		20	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		2	2		2	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (ft)		212	598			
pX, platoon unblocked	0.84				0.88	0.84
vC, conflicting volume	1011				1516	536
vC1, stage 1 conf vol					1006	
vC2, stage 2 conf vol					510	
vCu, unblocked vol	645				938	83
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	89
cM capacity (veh/h)	777				376	784

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	490	490	653	338	87
Volume Left	0	0	0	0	0
Volume Right	0	0	0	11	87
cSH	1700	1700	1700	1700	784
Volume to Capacity	0.29	0.29	0.38	0.20	0.11
Queue Length 95th (ft)	0	0	0	0	9
Control Delay (s)	0.0	0.0	0.0	0.0	10.2
Lane LOS					B
Approach Delay (s)	0.0		0.0		10.2
Approach LOS					B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		

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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	78	236	5	5	232	5
Future Volume (Veh/h)	78	236	5	5	232	5
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	82	248	5	5	244	5
Pedestrians	20		20			20
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	2		2			2
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	540	48			30	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	540	48			30	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	80	75			84	
cM capacity (veh/h)	410	988			1556	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	82	248	10	249
Volume Left	82	0	0	244
Volume Right	0	248	5	0
cSH	410	988	1700	1556
Volume to Capacity	0.20	0.25	0.01	0.16
Queue Length 95th (ft)	18	25	0	14
Control Delay (s)	16.0	9.9	0.0	7.6
Lane LOS	C	A		A
Approach Delay (s)	11.4		0.0	7.6
Approach LOS	B			

Intersection Summary			
Average Delay	9.6		
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		

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APPENDIX B

Trip Generation

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Trip Generation | **ITE Trip Generation Manual (9th Edition) Method** | **Trips**

Residental	Quantity	Units	LU Code	Daily	AM Peak Hour	PM Peak Hour	Daily	AM Peak Hour	PM Peak Hour
Number of Dwelling Units									
Single Family Detached	0	DU	210	Log Equation	Linear Equation	Log Equation	0	0	0
Apartment	38	DU	220	Linear Equation	Linear Equation	Linear Equation	354	22	39
Low-Rise Apartment	0	OC DU	221	Linear Equation	Log Equation	Log Equation	0	0	0
Mid-Rise Apartment	0	DU	223	Average Rate	Linear Equation	Linear Equation	0	0	0
High-Rise Apartment	0	DU	222	Log Equation	Log Equation	Linear Equation	0	0	0
Rental Townhouse	0	DU	224	Average Rate	Average Rate	Average Rate	0	0	0
Residental Condo/ Townhouse	0	DU	230	Linear Equation	Linear Equation	Linear Equation	0	0	0
Low-Rise Condo	0	DU	231	Average Rate	Linear Equation	Average Rate	0	0	0
High Rise Condo	0	DU	232	Linear Equation	Linear Equation	Linear Equation	0	0	0

Terminal	Quantity	Units		Daily	AM Peak Hour	PM Peak Hour	Daily	AM Peak Hour	PM Peak Hour
Park&Ride with Bus Service	0	PKG Space	90	Linear Equation	Linear Equation	Linear Equation	0	0	0
Park&Ride with Bus Service	0	Occupied Space	90	Average Rate	Average Rate	Linear Equation	0	0	0
LRT Station with Parking	0	PKG Space	93	Average Rate	Average Rate	Average Rate	0	0	0
LRT Station with Parking	0	Occupied Space	93	Average Rate	Average Rate	Average Rate	0	0	0

Retail	Quantity	Units		Daily	AM Peak Hour	PM Peak Hour	Daily	AM Peak Hour	PM Peak Hour
Home Improvement Superstore	0	1000 sqft GFA	862	Average Rate	Average Rate	Average Rate	0	0	0
Shopping Center	633	1000 sqft GLA	820	Average Rate	Average Rate	Average Rate	27046	608	2350

Office	Quantity	Units		Daily	AM Peak Hour	PM Peak Hour	Daily	AM Peak Hour	PM Peak Hour
General Office Building	115.047	1000 sqft GFA	710	Average Rate	Log Equation	Linear Equation	1269	214	207

Industrial	Quantity	Units		Daily	AM Peak Hour	PM Peak Hour	Daily	AM Peak Hour	PM Peak Hour
General Light Industrial	47.229	1000 sqft GFA	110	Average Rate	Average Rate	Average Rate	329	43	46

Lodging	Quantity	Units		Daily	AM Peak Hour	PM Peak Hour	Daily	AM Peak Hour	PM Peak Hour
Hotel	144	Rooms	310	Average Rate	Average Rate	Average Rate	1176	76	86
						Total	30174	964	2728

Landuse	TAZ 371		TAZ 372		Total	
	2010	2030	2010	2030	2010	2030
Office	0	63,575	115,047	159,402	115,047	222,977
Retail	389,035	360,261	244,360	341,600	633,395	701,861
Industrial	36,129	0	11,100	0	47,229	0
Hotel	0	0	144	144	144	144
Multi-family	0	296	38	629	38	925

Trip Generation — **ITE Trip Generation Manual (9th Edition) Method** — **Trips**

Residental	Quantity	Units	LU Code	Daily	AM Peak Hour	PM Peak Hour	Daily	AM Peak Hour	PM Peak Hour
Number of Dwelling Units									
Single Family Detached	0	DU	210	Log Equation	Linear Equation	Log Equation	0	0	0
Apartment	925	DU	220	Linear Equation	Linear Equation	Linear Equation	5729	457	526
Low-Rise Apartment	0	OC DU	221	Linear Equation	Log Equation	Log Equation	0	0	0
Mid-Rise Apartment	0	DU	223	Average Rate	Linear Equation	Linear Equation	0	0	0
High-Rise Apartment	0	DU	222	Log Equation	Log Equation	Linear Equation	0	0	0
Rental Townhouse	0	DU	224	Average Rate	Average Rate	Average Rate	0	0	0
Residental Condo/ Townhouse	0	DU	230	Linear Equation	Linear Equation	Linear Equation	0	0	0
Low-Rise Condo	0	DU	231	Average Rate	Linear Equation	Average Rate	0	0	0
High Rise Condo	0	DU	232	Linear Equation	Linear Equation	Linear Equation	0	0	0

Terminal	Quantity	Units		Daily	AM Peak Hour	PM Peak Hour	Daily	AM Peak Hour	PM Peak Hour
Park&Ride with Bus Service	0	PKG Space	90	Linear Equation	Linear Equation	Linear Equation	0	0	0
Park&Ride with Bus Service	0	Occupied Space	90	Average Rate	Average Rate	Linear Equation	0	0	0
LRT Station with Parking	0	PKG Space	93	Average Rate	Average Rate	Average Rate	0	0	0
LRT Station with Parking	0	Occupied Space	93	Average Rate	Average Rate	Average Rate	0	0	0

Retail	Quantity	Units		Daily	AM Peak Hour	PM Peak Hour	Daily	AM Peak Hour	PM Peak Hour
Home Improvement Superstore	0	1000 sqft GFA	862	Average Rate	Average Rate	Average Rate	0	0	0
Shopping Center	702	1000 sqft GLA	820	Average Rate	Average Rate	Average Rate	29969	674	2604

Office	Quantity	Units		Daily	AM Peak Hour	PM Peak Hour	Daily	AM Peak Hour	PM Peak Hour
General Office Building	222.977	1000 sqft GFA	710	Average Rate	Log Equation	Linear Equation	2459	363	328

Industrial	Quantity	Units		Daily	AM Peak Hour	PM Peak Hour	Daily	AM Peak Hour	PM Peak Hour
General Light Industrial	0	1000 sqft GFA	110	Average Rate	Average Rate	Average Rate	0	0	0

Lodging	Quantity	Units		Daily	AM Peak Hour	PM Peak Hour	Daily	AM Peak Hour	PM Peak Hour
Hotel	144	Rooms	310	Average Rate	Average Rate	Average Rate	1176	76	86
						Total	**39334**	**1570**	**3544**

Landuse	TAZ 371		TAZ 372		Total	
	2010	2030	2010	2030	2010	2030
Office	0	63,575	115,047	159,402	115,047	222,977
Retail	389,035	360,261	244,360	341,600	633,395	701,861
Industrial	36,129	0	11,100	0	47,229	0
Hotel	0	0	144	144	144	144
Multi-family	0	296	38	629	38	925

MIXED USE TRIP GENERATION MODEL V4 - RESULTS

MODEL APPLICATION - ALL TRIPS

	Daily				AM Peak Hour				PM Peak Hour			
	HBW	HBO	NHB	Total	HBW	HBO	NHB	Total	HBW	HBO	NHB	Total
Number of "Raw" ITE Trips Subject to Model	11709	17359	10449	39517	930	556	84	1571	1327	1267	951	3545
Predicted Probabilities:												
Internal Capture	5.11%	4.81%	7.30%	5.56%	5.11%	4.81%	7.30%	5.12%	5.11%	4.81%	7.30%	5.59%
Walking External	8.37%	16.84%	4.84%	11.20%	8.37%	16.84%	4.84%	11.20%	8.37%	16.84%	4.84%	10.49%
Transit External	2.40%	2.26%	2.38%	2.33%	2.40%	2.26%	2.38%	2.35%	2.40%	2.26%	2.38%	2.34%
Number of Trips:												
Internal Capture	599	835	762	2196	48	27	6	80	68	61	69	198
Walking External	930	2782	468	4181	74	89	4	167	105	203	43	351
Transit External	266	373	231	870	21	12	2	35	30	27	21	78
Net Number of IXXI Vehicle Trips	**9914**	**13369**	**8988**	**32270**	**787**	**428**	**73**	**1288**	**1123**	**976**	**818**	**2917**

	External Vehicle Trips			VMT		
Results	Raw	Net	Reduction %	Raw	Net	Reduction %
Daily	39,517	32,270	18%	168,016	138,907	17%
AM Peak Hour	1,571	1,288	18%	8,122	6,760	17%
PM Peak Hour	3,545	2,917	18%	15,949	13,277	17%

NOTE: External trips are attributed half to project site uses,
internal trips all to site uses for purposes of VMT allocation.
NHB Trips by households that start and end outside the site are not included.

MODEL APPLICATION - TRIP ENDS ASSOCIATED WITH HOUSES IN THE PROJECT ONLY

	Daily				AM Peak Hour				PM Peak Hour			
	HBW	HBO	NHB	Total	HBW	HBO	NHB	Total	HBW	HBO	NHB	Total
Number of "Raw" ITE Trips Subject to Model	1178	3724	827	5729	205	236	16	457	148	295	83	526
Predicted Probabilities:												
Internal Capture	5.11%	4.81%	7.30%	5.23%	5.11%	4.81%	7.30%	5.03%	5.11%	4.81%	7.30%	5.29%
Walking External	8.37%	16.84%	4.84%	13.40%	8.37%	16.84%	4.84%	12.63%	8.37%	16.84%	4.84%	12.60%
Transit External	2.40%	2.26%	2.38%	2.30%	2.40%	2.26%	2.38%	2.33%	2.40%	2.26%	2.38%	2.32%
Number of Trips:												
Internal Capture	60	179	60	300	10	11	1	23	8	14	6	28
Walking External	94	597	37	728	16	38	1	55	12	47	4	63
Transit External	27	80	18	125	5	5	0	10	3	6	2	12
Net Number of IXXI Vehicle Trips generated by Project Residences	**997**	**2868**	**711**	**4577**	**174**	**182**	**14**	**369**	**125**	**227**	**72**	**424**

	External Vehicle Trips			VMT			VMT Per Household	
Results	Raw	Net	Reduction %	Raw	Net	Reduction %	Raw	Net
Daily	5,729	4,577	20%	50,470	41,798	17%	54.6	45.2
AM Peak Hour	457	369	19%	4,392	3,620	18%	4.7	3.9
PM Peak Hour	526	424	19%	4,892	4,081	17%	5.3	4.4

NOTE: all trips generated by project households (either produced or attracted or both)
are counted 100%. This cannot be compared directly to the VMT in the section above.

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NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	Overlake Subarea	**Organization:**	HDR
Project Location:	Redmond	**Performed By:**	PC
Scenario Description:	Overlake South Build	**Date:**	10/27/2015
Analysis Year:	2030	**Checked By:**	TW
Analysis Period:	**AM Street Peak Hour**	**Date:**	28-Oct

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office	710	223	1000 sqft GFA	363	319	44
Retail	820	702	1000 sqft GFA	674	418	256
Restaurant				0		
Cinema/Entertainment				0		
Residential	220	925	DU	457	91	366
Hotel	310	144	Rooms	76	45	31
All Other Land Uses[2]					0	0
				1,570	874	696

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office	1.50	6%	14%	1.50	6%	14%
Retail	1.50	6%	14%	1.50	6%	14%
Restaurant						
Cinema/Entertainment						
Residential	1.50	6%	14%	1.50	6%	14%
Hotel	1.00			1.00		
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		18	0	0	0	0
Retail	19		0	0	3	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	11	5	0	0		0
Hotel	14	4	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	2,316	1,288	1,028
Internal Capture Percentage	6%	6%	7%
External Vehicle-Trips[5]	1,183	668	515
External Transit-Trips[6]	127	70	57
External Non-Motorized Trips[6]	296	164	132

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	9%	28%
Retail	4%	6%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	2%	3%
Hotel	0%	58%

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

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Project Name:	Overlake Subarea
Analysis Period:	**AM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.50	319.44	479	1.50	43.56	65
Retail	1.50	417.88	627	1.50	256.12	384
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.50	91.4	137	1.50	365.6	548
Hotel	1.00	44.84	45	1.00	31.16	31

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		18	41	0	1	0
Retail	111		50	0	54	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	11	5	110	0		0
Hotel	23	4	3	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		201	0	0	0	0
Retail	19		0	0	3	0
Restaurant	67	50		0	7	2
Cinema/Entertainment	0	0	0		0	0
Residential	14	107	0	0		0
Hotel	14	25	0	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	44	435	479	232	26	61
Retail	27	600	627	320	36	84
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	3	134	137	71	8	19
Hotel	0	45	45	45	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	18	47	65	25	3	7
Retail	22	362	384	193	22	51
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	16	532	548	284	32	74
Hotel	18	13	31	13	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	Overlake Subarea	**Organization:**	HDR
Project Location:	Redmond	**Performed By:**	PC
Scenario Description:	Overlake South Build	**Date:**	10/27/2015
Analysis Year:	2030	**Checked By:**	TW
Analysis Period:	**PM Street Peak Hour**	**Date:**	28-Oct

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office	710	223	1000 sqft GFA	328	56	272
Retail	820	702	1000 sqft GFA	2,604	1,250	1,354
Restaurant				0		
Cinema/Entertainment				0		
Residential	220	925	DU	526	342	184
Hotel	310	144	Rooms	86	44	42
All Other Land Uses[2]						
				3,544	1,691	1,853

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office	1.50	6%	14%	1.50	6%	14%
Retail	1.50	6%	14%	1.50	6%	14%
Restaurant						
Cinema/Entertainment						
Residential	1.50	6%	14%	1.50	6%	14%
Hotel	1.00			1.00		
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		82	0	0	8	0
Retail	26		0	0	236	7
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	11	116	0	0		5
Hotel	0	7	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	5,273	2,516	2,757
Internal Capture Percentage	19%	20%	18%
External Vehicle-Trips[5]	2,311	1,091	1,220
External Transit-Trips[6]	253	119	134
External Non-Motorized Trips[6]	591	279	312

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	44%	22%
Retail	11%	13%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	48%	48%
Hotel	27%	17%

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.
[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.
[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).
[4]Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be
[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.
[6]Person-Trips
*Indicates computation that has been rounded to the nearest whole number.

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Project Name:	Overlake Subarea
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.50	55.76	84	1.50	272.24	408
Retail	1.50	1249.92	1875	1.50	1354.08	2031
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.50	341.9	513	1.50	184.1	276
Hotel	1.00	43.86	44	1.00	42.14	42

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		82	16	0	8	0
Retail	41		589	81	528	102
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	11	116	58	0		8
Hotel	0	7	29	0	1	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		150	0	0	21	0
Retail	26		0	0	236	7
Restaurant	25	938		0	82	31
Cinema/Entertainment	5	75	0		21	0
Residential	48	188	0	0		5
Hotel	0	38	0	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	37	47	84	25	3	7
Retail	205	1670	1875	891	100	234
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	244	269	513	143	16	38
Hotel	12	32	44	32	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	90	318	408	169	19	45
Retail	269	1762	2031	939	106	247
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	132	144	276	77	9	20
Hotel	7	35	42	35	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

Table 7.1a Adjusted Internal Trip Capture Rates for Trip Origins within a Multi-Use Development			
Land Use Pairs		Weekday	
		AM Peak Hour	PM Peak Hour
From OFFICE	To Office	0.0%	0.0%
	To Retail	28.0%	20.0%
	To Restaurant	63.0%	4.0%
	To Cinema/Entertainment	0.0%	0.0%
	To Residential	1.0%	2.0%
	To Hotel	0.0%	0.0%
From RETAIL	To Office	29.0%	2.0%
	To Retail	0.0%	0.0%
	To Restaurant	13.0%	29.0%
	To Cinema/Entertainment	0.0%	4.0%
	To Residential	14.0%	26.0%
	To Hotel	0.0%	5.0%
From RESTAURANT	To Office	31.0%	3.0%
	To Retail	14.0%	41.0%
	To Restaurant	0.0%	0.0%
	To Cinema/Entertainment	0.0%	8.0%
	To Residential	4.0%	18.0%
	To Hotel	3.0%	7.0%
From CINEMA/ENTERTAINMENT	To Office	0.0%	2.0%
	To Retail	0.0%	21.0%
	To Restaurant	0.0%	31.0%
	To Cinema/Entertainment	0.0%	0.0%
	To Residential	0.0%	8.0%
	To Hotel	0.0%	2.0%
From RESIDENTIAL	To Office	2.0%	4.0%
	To Retail	1.0%	42.0%
	To Restaurant	20.0%	21.0%
	To Cinema/Entertainment	0.0%	0.0%
	To Residential	0.0%	0.0%
	To Hotel	0.0%	3.0%
From HOTEL	To Office	75.0%	0.0%
	To Retail	14.0%	16.0%
	To Restaurant	9.0%	68.0%
	To Cinema/Entertainment	0.0%	0.0%
	To Residential	0.0%	2.0%
	To Hotel	0.0%	0.0%

Table 7.2a Adjusted Internal Trip Capture Rates for Trip Destinations within a Multi-Use Development			
Land Use Pairs		Weekday	
		AM Peak Hour	PM Peak Hour
To OFFICE	From Office	0.0%	0.0%
	From Retail	4.0%	31.0%
	From Restaurant	14.0%	30.0%
	From Cinema/Entertainment	0.0%	6.0%
	From Residential	3.0%	57.0%
	From Hotel	3.0%	0.0%
To RETAIL	From Office	32.0%	8.0%
	From Retail	0.0%	0.0%
	From Restaurant	8.0%	50.0%
	From Cinema/Entertainment	0.0%	4.0%
	From Residential	17.0%	10.0%
	From Hotel	4.0%	2.0%
To RESTAURANT	From Office	23.0%	2.0%
	From Retail	50.0%	29.0%
	From Restaurant	0.0%	0.0%
	From Cinema/Entertainment	0.0%	3.0%
	From Residential	20.0%	14.0%
	From Hotel	6.0%	5.0%
To CINEMA/ENTERTAINMENT	From Office	0.0%	1.0%
	From Retail	0.0%	26.0%
	From Restaurant	0.0%	32.0%
	From Cinema/Entertainment	0.0%	0.0%
	From Residential	0.0%	0.0%
	From Hotel	0.0%	0.0%
To RESIDENTIAL	From Office	0.0%	4.0%
	From Retail	2.0%	46.0%
	From Restaurant	5.0%	16.0%
	From Cinema/Entertainment	0.0%	4.0%
	From Residential	0.0%	0.0%
	From Hotel	0.0%	0.0%
To HOTEL	From Office	0.0%	0.0%
	From Retail	0.0%	17.0%
	From Restaurant	4.0%	71.0%
	From Cinema/Entertainment	0.0%	1.0%
	From Residential	0.0%	12.0%
	From Hotel	0.0%	0.0%