Nora Bernard Development
Halifax, Nova Scotia
Transportation Impact Study

Release:

April 17, 2024 - Final Report

Prepared for:

Black Bay Group Inc.
Halifax, Nova Scotia

Prepared By:

Fathom Studio
40 King Street
Dartmouth, Nova Scotia
902 461 2525
fathomstudio.ca

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01 Introduction and Existing Conditions

1.1 Introduction and Study Area

Fathom Studio was retained by the Black Bay Group to prepare a Transportation Impact Study (TIS) for a proposed residential development identified as the Nora Bernard Development, located at 5663 Bernard Street, Halifax, Nova Scotia. For the purposes of this study, it has been assumed that North Park Street / Maynard Street are oriented in and east-west direction with Nora Bernard oriented in a north-south direction as shown in the figure below.

The proposed development is expected to contain about 157 units within a 16 storey residential building with a 2 level parking podium and accommodation of an existing Heritage property into the building envelope. The area immediately surrounding the development is primarily residential in nature with 1-2 story detached and attached units mixed with occasional multi-unit mid-rise and high-rise residential buildings. This includes a similar 16 storey residential building directly across Maynard Street to the north.

There are small scale neighbourhood commercial developments near the proposed site, various institutional uses including the Halifax Armory immediately to the west, and the Halifax Common green space and recreational lands immediately to the south. The development is located in close proximity to the Halifax downtown core and as such, is expected to benefit from high levels of transit and active transportation mobility.

1.2 Existing Roads and Intersections

Nora Bernard Street - Facing North

Nora Bernard Street runs along the east side of the development and has a two-lane cross section approximately 11 meters in width from curb to curb. This includes 1 through lane in each direction with wide curb lanes to support parking and other curbside activity. The cross section includes curb and gutter, and wide concrete sidewalk on both sides of the road, with bus stops on both sides of the road adjacent to the development. The asphalt pavement is in good condition with some repair patches and a posted speed of 40km/h.

Maynard Street - Facing Northwest

Maynard Street is a one-way local street in the westbound direction and is located along the north side of the development. It has 1 through lane and a right side parking lane within it's 8 meter overall width. The cross-section includes curb and gutter, and concrete sidewalk on both sides of the road with a grassed boulevard on right side. The asphalt pavement is in fair condition with some repair patches.

Photos: from Google Earth streetview

North Park Street - Facing West

North Park Street is an urban divided roadway with a single through lane in each direction, a 1.5 meter painted bike lane, and a parking lane for a total paved width of about 8 meters in each direction where parking is present. The cross-section includes median curb, and outside curb and gutter, landscaped boulevard about 3.5 meters in width and the asphalt pavement is in relatively new condition. The north side of the street features a wide concrete sidewalk with 2.5 meter grassed boulevard while the south side abuts the Halifax Common and has a asphalt multi-use trail about 4 meters in width.

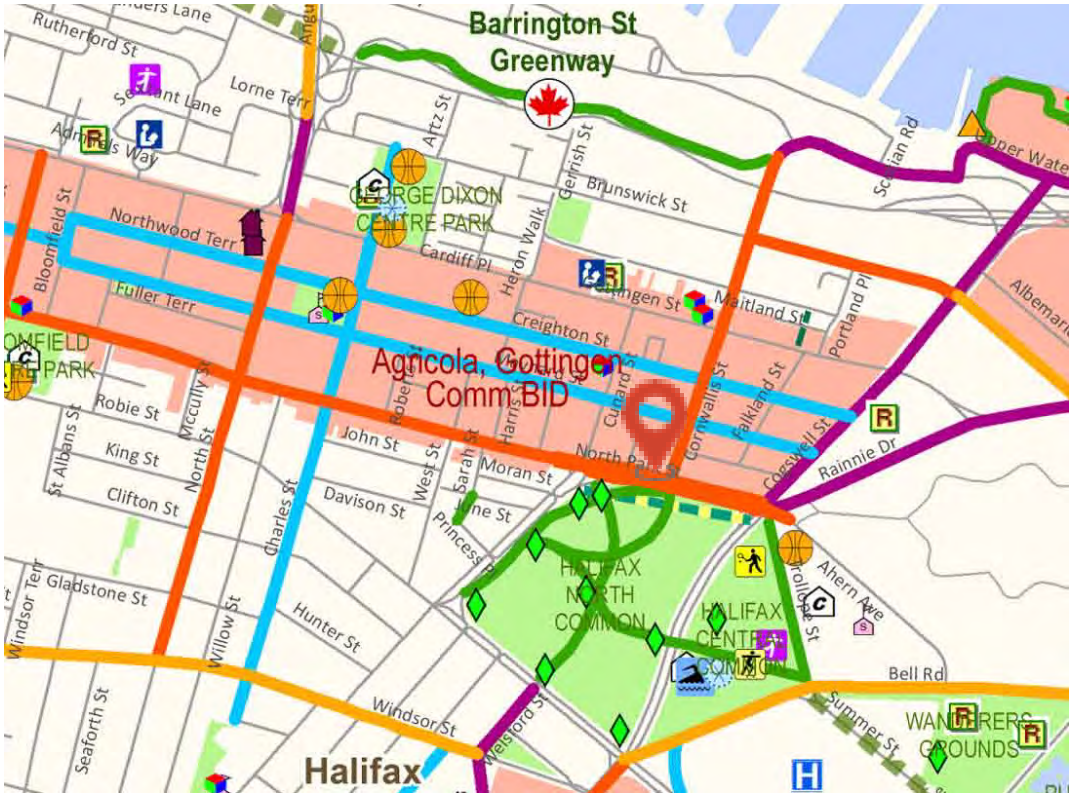
Nora Bernard Street is located between two roundabouts: the north roundabout connects to Cunard and Agricola Street, while the south roundabout connects to 4 main routes namely Cogswell Street, Rainnie Drive, Ahern Avenue, and Trollope Street. Between the two roundabouts, a dedicated left turn lane is provided from North Park to Nora Bernard in the eastbound direction. The presence of the roundabouts connected to Cunard Street and Cogswell provides residents a wide variety of route options to and from the site.

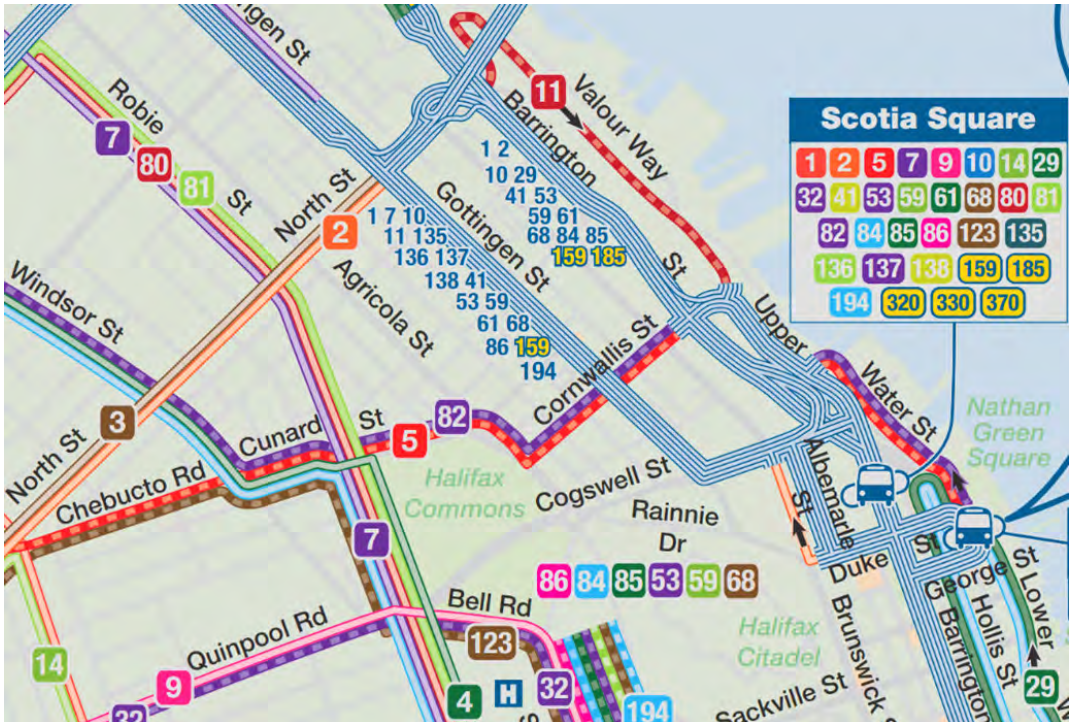
1.3 Other Transportation Infrastructure

Active Transportation

The proposed development ( ) is located in close proximity to the Halifax North and Central Commons, George Dixon Centre Park, Wanderers Grounds and Public Gardens. Sidewalks and pathways surround all roads near the development and an RA-5 signalized pedestrian crossing is located across North Park Street directly across from Nora Bernard Drive, which affords residents convenient access to an extensive list of amenities including commercial areas, many park, hospitals, baseball and soccer fields, basketball courts, and other recreation facilities, the skating Oval, Citadel Hill, and much more.

As shown in the figure to the right taken from the HRM Active Transportation website, proposed bike-ways (orange) are shown along Nora Bernard Street and North Park Street (completed). Proposed local street bike-ways (cyan) are shown on Creighton and Maynard Street. Extensive greenway facilities are located through the Commons and a variety of other AT facilities are identified the place the development directly in the middle of a very robust active transportation environment.





Transit

Similar to AT, the proposed development is located in the middle of a very robust transit network that includes about 20 routes on Gottingen Street, (200 meters north of the development), two routes (Route 5 and 82) the run along Nora Bernard directly past the development, and another 6 routes along Robie Street about 450 meters south of the development. Most routes connect to the Scotia Square Terminal providing 31 different routes.

Existing bus stops are located directly across from the development where residents can access routes 82 and 5 going to Scotia Square Terminal.

02 Existing and Future Traffic Conditions

2.1 Existing Traffic

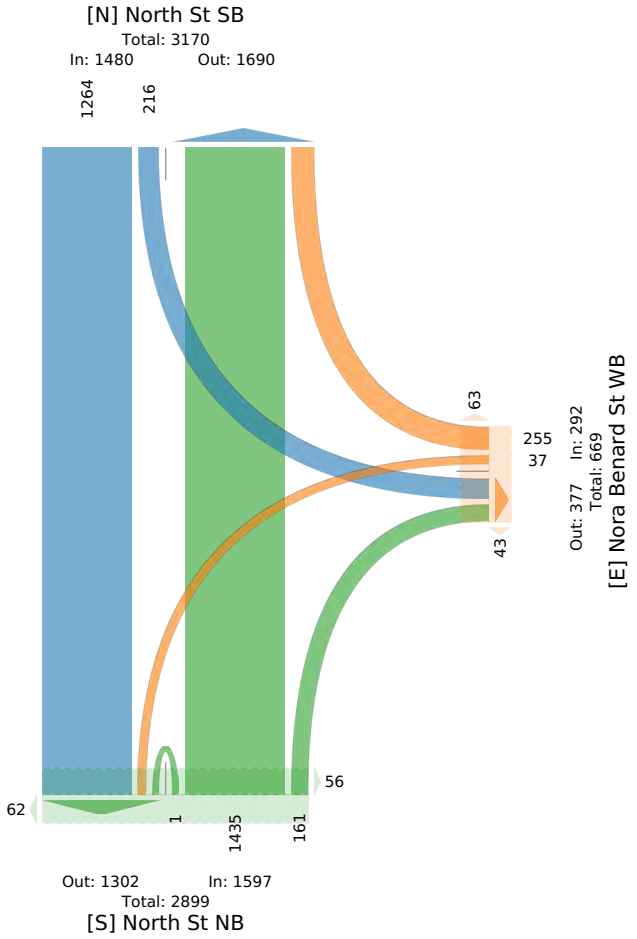
Recent and historic traffic counts were requested from HRM though limited data was available near the proposed development site, with the most recent relevant counts going back to 2016. Therefore, a new traffic count was carried out at the intersection of North Park and Nora Bernard Street using the MioVision automated traffic counting technology. This intersection is the highest volume intersection directly impacted by the development and was considered the most appropriate location to evaluate potential development impacts.

Counts were completed a the end of February 2024 and included vehicle, truck, bus, and pedestrian data through the intersection. The combination of data was used to establish a 2024 baseline traffic volume model.

To evaluate the potential impacts of the new development, a Synchro/ SimTraffic traffic model was prepared to gain a better understanding of existing and future traffic operations.

2.2 Project Time Horizons

It was anticipated that this development will be constructed within the next 5-year period, therefore an analysis time horizon of 10-years (5-years with full build-out +5 years) was established. Given that the volumes of traffic generated by the development are expected to be very low, the analysis was limited to the existing conditions scenario which provides adequate information to understand how the proposed development will interact with the road and active transportation network now and in the future.



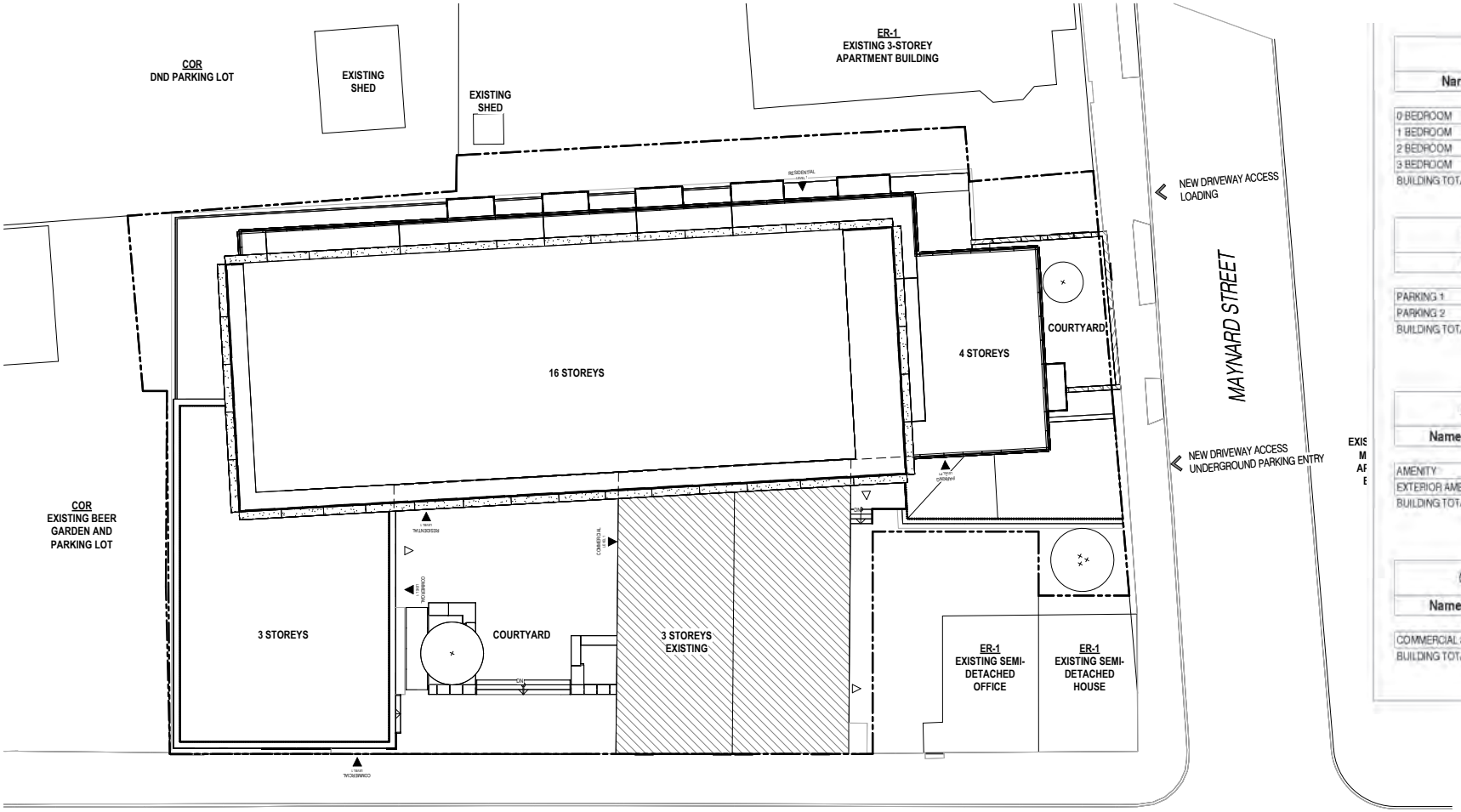
2.3 Analysis Periods

This area has a mix of medium and high density residential land uses and is located near the downtown core of Halifax. North Park Street, Gottingen, Cogswell and Cunard Streets that all surround the development site are significant commuter routes, therefore the area supports both trip generation due to the residential nature of the area as well as commuter support due to the connected road networks. Such environments typically generate their highest volumes during commuter peak periods as residents travel to and from work therefore, the weekday AM and PM peak hours were selected as the critical analysis periods for this report.

2.4 Traffic Growth

Estimating traffic growth is becoming increasingly challenging as work arrangements shift, more people are moving to Nova Scotia, there are significant initiatives to further promote alternative modes of transportation to the passenger car, major residential growth areas are being rapidly deployed due to housing shortages, and high level transportation changes such as the opening of the Burnside Connector are all expected to impact travel patterns and transportation growth. For the purposes of this study, a 2% annual growth rate over a 10-year period was assumed, in addition to adding traffic generated by this development. This is regarded as an aggressive estimate, but serves the purposes of the analysis to evaluate the potential impacts of future traffic conditions.

03 Proposed Development



LEGEND

PROPERTY BOUNDARY
NEW CONSTRUCTION
BUILDING ENTRY
EMERGENCY EGRESS

Unit Breakdown

Name	Count	%
0 BEDROOM	46	29%
1 BEDROOM	69	44%
2 BEDROOM	41	26%
3 BEDROOM	1	1%
BUILDING TOTAL:	157	100%

Parking Schedule

Level	Count
PARKING 1	23
PARKING 2	30
BUILDING TOTAL:	53

Amenity Schedule

Name	Area	Count
AMENITY	4,633.26 ft²	6
EXTERIOR AMENITY	5,531.89 ft²	34
BUILDING TOTAL:	10,165.17 ft²	40

Commercial Space

Name	Area	Count
COMMERCIAL SUITE	3,976.32 ft²	2
BUILDING TOTAL:	3,976.32 ft²	2

Fathom
fathomstudio.ca
40 King Street, Dartmouth, NS, B2Y 2R4

Project
NORA BERNARD STREET HERITAGE DA

5663 NORA BERNARD ST
HALIFAX, NS

Drawing Name
SITE PLAN

Scale: As indicated
Project Number: 23-110

Nora Bernard Street - Heritage DA

The proposed development plan includes approximately 160 residential units contained in a multi-level high rise building up to 16 storeys in height. Access is provided off of Maynard Street along the east side of the building approximately 23 meters north of the Nora Bernard curb-line. This location was established as the preferred location in discussions with HRM as Maynard is the lower volumes street as compared to Nora Bernard and the one-way nature of Maynard is well suited for residential access. The driveway is configured with a single entry and exit lane to Maynard Street, which requires that the driveway be a right-in, right-out only driveway due to the one-way northbound orientation of Maynard. A second driveway location is provided at the north end of the site along Maynard Street to serve as a loading and waste management access location. The building is serviced by two levels of underground parking with approximately 53 parking spaces and a dedicated bicycle parking room on the first parking level.

3.1 Trip Generation

Trips Generated by the Development

The new trips generated by the development were based on guidance provided from the Institute of Transportation Engineers (ITE) Trip Generation Guide (11th Edition). The table at the below summarizes the estimated trips generated based on an assumed 160 residential units.

Land Use	Trip Code	# Units	Variable	AM Peak			PM Peak		
				Enter	Exit	TOTAL	Enter	Exit	TOTAL
Multi-Family High Rise	222	160	Units	11	32	43	32	19	51
			TOTAL	**11**	**32**	**43**	**32**	**19**	**51**

Transit, Active Transportation and Transportation Demand Management

Active Transportation and Transit modal shares from this site are expected to be very high, which is consistent with many other residential areas near the downtown core area. From AT perspective, there are extensive recreational facilities nearby that will generate significant recreational traffic, while the nearby downtown is expected to create a high number of commuter based trips by walking, biking or other modes of active mobility. Similarly, transit service around the area is high is expected to attract regular trips from this development.

Using HRMs Modal Share Application, modal share data was extracted for census tracks immediately adjacent to the development.

	Census Tract		
	North (0010.00)	S.East (0007.00)	West (0011.00)
Walking	49%	60%	40%
Transit	22%	7%	20%
Driver	22%	25%	29%
Passenger	2%	5%	5%
Bicycle	3%	2%	5%

The data suggests that between 65 and 75% of all journey to work trips in this general area take place by active transportation or transit, with walking accounting for the highest portion of all trips made. It is assumed that this development would yield similar results based on its location, therefore trips shown in the trip generation table to the left are likely to be closer to half of the values shown in the table.

3.2 Trip Distribution and Assignment

Trips entering the development have 4 distinct approach directions (North Park east and west, Maynard, and Nora Bernard north), while exiting vehicles can go in 3 distinct directions due to the one-way nature of Maynard Street. When considering the high levels of AT and transit use, and the minimal number of trips generated by the site, new volumes on the roadway generally equate to less than 5 trips per hour on any given roadway adjacent to the development. Such volumes would be indistinguishable in terms of operational impact to any roadways or intersections in the area of the development.

The greatest concentration of vehicles would be expected on Maynard Street itself, and again, volumes are low enough from the development and on Maynard Street that the new traffic will have no noticeable impact on roadway operations.

04 Transportation Analysis

4.1 Transportation Modeling

A traffic model was prepared using the Synchro/SimTraffic (v.11) platform for the weekday AM and PM peak hours of analysis at the Nora Bernard / North Park Street intersection. The model was used to gain a general insight into traffic operations and capacity utilization at the main intersection nearest the development, though as noted in the previous section, development volumes are low enough that extensive intersection modeling is not practical or meaningful in this situation.

The figures to the right and on the following page show the modeling results in graphical form for the existing AM and PM peak hour analyses based on the collected traffic data. To simplify the presentation of results, intersection results at the Nora Bernard / North Park Street, and Nora Bernard / Maynard Street intersections are shown and include the existing traffic volumes, volume to capacity ratios for each movement, and delay values for each movement.

The key findings from each peak and their relevance to the development are also discussed along with the figures. Additional details are provided in the Synchro reports provided in Appendix C of this report.

4.2 AM Peak Hour

The AM peak hour results show that all movements operate with relatively low volume to capacity ratios with the highest capacity utilization being in the eastbound through direction on North Park Street. This represents the inbound commuter movement toward the core destinations in Halifax including the business core, hospitals and universities. With respect to the development, we would anticipate a minimal number of vehicles approaching the development on any given movement as most AM peak trips would be in the outbound direction onto Maynard Street.

The only notable delay in this scenario is the southbound left turn movement from Nora Bernard to North Park at close to 50 seconds.

This movement is strictly related to non-development traffic due to the Maynard Street exit. From a practical perspective, background traffic on this movement have other route options, or could make a right turn to the Cunard roundabout and then return back towards the downtown areas.

Traffic exiting the development on Maynard Street is not expected to have any operational issues due to the numerous route choices they have downstream of the development.

Existing AM Peak Hour

Volumes

Volume / Capacity

Delays

4.3 PM Peak Hour

PM peak hour operations are quite similar to the AM peak hours where the majority of volume to capacity ratios and delay values are quite low. During the PM peak, traffic is more evenly distributed in both direction on North Park Street with the higher volumes occurring in the outbound direction away from the core areas of Peninsular Halifax.

Combined with the lower volumes of southbound left turn movements from Nora Bernard to North Park Street, the Nora Bernard / North Park intersection operates at better levels of service than the AM peak.

Existing PM Peak Hour

Volumes

Volume / Capacity

Delays

With respect to the development, there are more trips associated with the development turning from North Park to Nora Bernard Street and less vehicles exiting the development to Maynard Street. Again, the exiting movements to Maynard distribute themselves over numerous routes downstream of the development and therefore have minimal impacts on any intersection operation.

Volumes approaching can do so with limited impact as the westbound right turn and eastbound left turn can be made at high levels of service given the distribution of volumes at the intersection. Other approach directions on westbound Maynard or southbound Nora Bernard can similarly be made with little delay.

4.4 Warrants and Other Operational Considerations

The development's main access is to a relatively low volume local roadway. Combined with the low volumes from the development, warrants for left turn lanes, advanced traffic control, or other key driveway / intersection features are not required.

Sight distances can easily be met at the driveway provided that no site obstructions are constructed as part of the buildings entrance. During detailed design, care should be taken to maximize visibility to both pedestrian and vehicular traffic on Maynard Street.

05 Discussion and Conclusions

5.1 Conclusions

This Transportation Impact Study (TIS) was prepared to evaluate the anticipated impacts of the proposed multi-unit high rise development in Halifax, Nova Scotia. The development is located between North Park and Maynard Street on Nora Bernard Street with access to 53 parking spaces in2 levels of underground parking provided off of Maynard Street, a one-way westbound street immediately north of the development site. The development is expected to include up to 160 residential units with a variety of amenities, and some small scale ground floor commercial development anticipated to primarily serve the local residential community.

The development's main access point to Maynard Street can operate as a basic two-way driveway with a single entry and exit lane to the parkade. A second access point is provided toward the west end of the site as a loading and waste management location.

As the development is located near the downtown core of Halifax, modal splits to transit and active transportation are expected to be very high - consistent with modal share statistics reported on the HRM website for surrounding areas. The development is located in the middle of robust active transportation and transit networks with cross-walks and transit stops being located directly beside the development.

New traffic counts were performed as part of this study and confirmed existing traffic volumes at the Nora Bernard / North Park Street, the highest volume intersection directly impacted by the proposed development. Vehicles exiting the development do not impact this intersection due to the one-way arrangement of Maynard Street. These vehicles distribute themselves to a variety of route alternatives downstream of the development and therefore have very little impact on any road network operations.

Some vehicles approaching the site will travel through the North Park / Nora Bernard intersection, though have negligible impact on the intersection. This is due to the low volumes of traffic generated by the development that will be using a basic right turn movement in the westbound direction, or turning left using a dedicated left turn lane in the eastbound direction on North Park.

All intersections reviewed operate at a high level of service with basic two-way stop control (TWSC) on the minor roadways / driveways. The only notable delay was the southbound left turn movement from Nora Bernard Street to North Park, though the report shows that these volumes are not associated with the development, and there are a number of route options available to alleviate any delays that may be experienced on that movement.

Overall, this development is consistent with adjacent building densities and can be accommodated on the road and active transportation networks without any network improvements being required.

We trust that the contents of this report are informative, clear, and provide adequate detail to evaluate the impacts of this proposed multi-unit residential development. Should there be any questions or comments regarding the content of the study, please do not hesitate to contact the undersigned.

Roger Boychuk • P Eng •
Senior Transportation Engineer
www.fathomstudio.ca
40 King Street, Dartmouth, NS B2Y 2R4
902.233.1152 [mobile]

APPENDIX A

TRAFFIC COUNTS

North Park and Nora Benard - AM - TMC

Fri Mar 1, 2024
Full Length (7 AM-9 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians)
All Movements
ID: 1160887, Location: 44.6507, -63.586571

Provided by: Trans4m Development Group
59 Craigburn Drive,
Dartmouth, NS, B2X 3E6, CA

Leg	Nora Benard WB					North St NB					North St SB					
Direction	Westbound					Northbound					Southbound					
Time	L	R	U	**App**	Ped*	T	R	U	**App**	Ped*	L	T	U	**App**	Ped*	**Int**
2024-03-01 7:00AM	0	4	0	**4**	1	70	17	0	**87**	5	51	160	0	**211**	0	**302**
7:15AM	3	9	0	**12**	7	80	18	0	**98**	10	53	205	0	**258**	0	**368**
7:30AM	0	15	0	**15**	10	64	13	0	**77**	11	41	229	0	**270**	0	**362**
7:45AM	8	16	0	**24**	6	65	10	0	**75**	15	37	267	0	**304**	0	**403**
Hourly Total	11	44	0	**55**	24	279	58	0	**337**	41	182	861	0	**1043**	0	**1435**
8:00AM	4	17	0	**21**	11	78	18	0	**96**	17	40	243	0	**283**	0	**400**
8:15AM	2	21	0	**23**	16	112	8	0	**120**	17	47	249	0	**296**	0	**439**
8:30AM	4	23	0	**27**	13	115	16	0	**131**	9	42	244	0	**286**	1	**444**
8:45AM	5	26	0	**31**	22	91	22	0	**113**	19	36	259	0	**295**	0	**439**
Hourly Total	15	87	0	**102**	62	396	64	0	**460**	62	165	995	0	**1160**	1	**1722**
Total	26	131	0	**157**	86	675	122	0	**797**	103	347	1856	0	**2203**	1	**3157**
% Approach	16.6%	83.4%	0%	**-**	-	84.7%	15.3%	0%	**-**	-	15.8%	84.2%	0%	**-**	-	-
% Total	0.8%	4.1%	0%	**5.0%**	-	21.4%	3.9%	0%	**25.2%**	-	11.0%	58.8%	0%	**69.8%**	-	-
Lights	24	124	0	**148**	-	651	121	0	**772**	-	338	1832	0	**2170**	-	3090
% Lights	92.3%	94.7%	0%	**94.3%**	-	96.4%	99.2%	0%	**96.9%**	-	97.4%	98.7%	0%	**98.5%**	-	97.9%
Articulated Trucks	0	1	0	**1**	-	1	0	0	**1**	-	0	0	0	**0**	-	2
% Articulated Trucks	0%	0.8%	0%	**0.6%**	-	0.1%	0%	0%	**0.1%**	-	0%	0%	0%	**0%**	-	0.1%
Buses and Single-Unit Trucks	2	6	0	**8**	-	23	1	0	**24**	-	9	24	0	**33**	-	65
% Buses and Single-Unit Trucks	7.7%	4.6%	0%	**5.1%**	-	3.4%	0.8%	0%	**3.0%**	-	2.6%	1.3%	0%	**1.5%**	-	2.1%
Pedestrians	-	-	-	-	86	-	-	-	-	103	-	-	-	-	1	
% Pedestrians	-	-	-	-	100%	-	-	-	-	100%	-	-	-	-	100%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

North Park and Nora Benard - AM - TMC
Fri Mar 1, 2024
Full Length (7 AM-9 AM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians)
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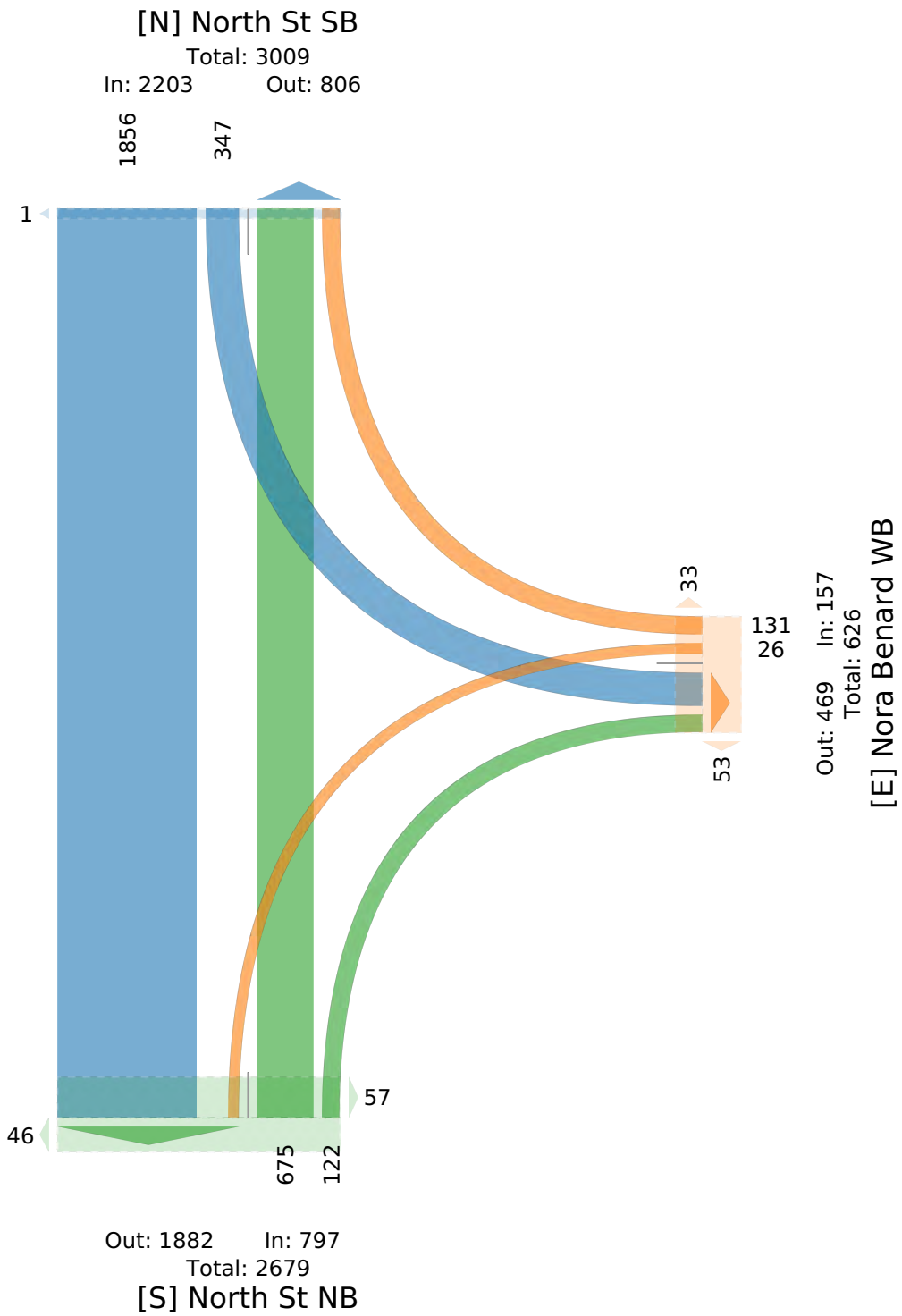

North Park and Nora Benard - AM - TMC

Fri Mar 1, 2024
AM Peak (8 AM - 9 AM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians)
All Movements
ID: 1160887, Location: 44.6507, -63.586571

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Leg Direction	Nora Benard WB Westbound					North St NB Northbound					North St SB Southbound					
Time	L	R	U	**App**	Ped*	T	R	U	**App**	Ped*	L	T	U	**App**	Ped*	**Int**
2024-03-01 8:00AM	4	17	0	**21**	11	78	18	0	**96**	17	40	243	0	**283**	0	**400**
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Total	15	87	0	**102**	62	396	64	0	**460**	62	165	995	0	**1160**	1	**1722**
% Approach	14.7%	85.3%	0%	**-**	-	86.1%	13.9%	0%	**-**	-	14.2%	85.8%	0%	**-**	-	**-**
% Total	0.9%	5.1%	0%	**5.9%**	-	23.0%	3.7%	0%	**26.7%**	-	9.6%	57.8%	0%	**67.4%**	-	**-**
PHF	0.750	0.837	-	**0.823**	-	0.861	0.727	-	**0.878**	-	0.878	0.960	-	**0.980**	-	0.970
Lights	15	85	0	**100**	-	378	63	0	**441**	-	159	980	0	**1139**	-	1680
% Lights	100%	97.7%	0%	**98.0%**	-	95.5%	98.4%	0%	**95.9%**	-	96.4%	98.5%	0%	**98.2%**	-	97.6%
Articulated Trucks	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0
% Articulated Trucks	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%
Buses and Single-Unit Trucks	0	2	0	**2**	-	18	1	0	**19**	-	6	15	0	**21**	-	42
% Buses and Single-Unit Trucks	0%	2.3%	0%	**2.0%**	-	4.5%	1.6%	0%	**4.1%**	-	3.6%	1.5%	0%	**1.8%**	-	2.4%
Pedestrians	-	-	-	-	62	-	-	-	-	62	-	-	-	-	1	
% Pedestrians	-	-	-	-	100%	-	-	-	-	100%	-	-	-	-	100%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

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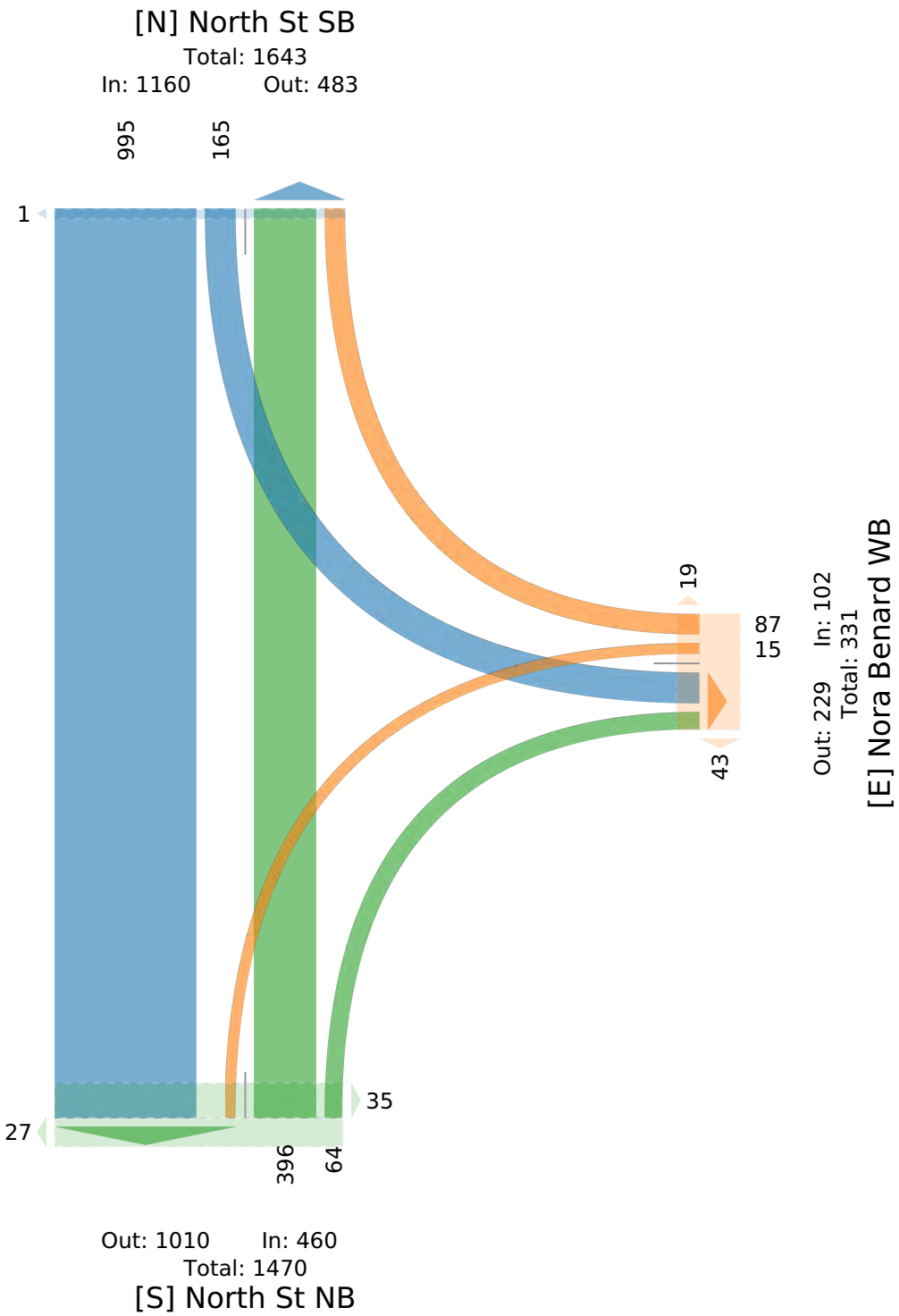

North Park and Nora Benard - PM - TMC

Thu Feb 29, 2024
Full Length (4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians)
All Movements
ID: 1160888, Location: 44.6507, -63.586571

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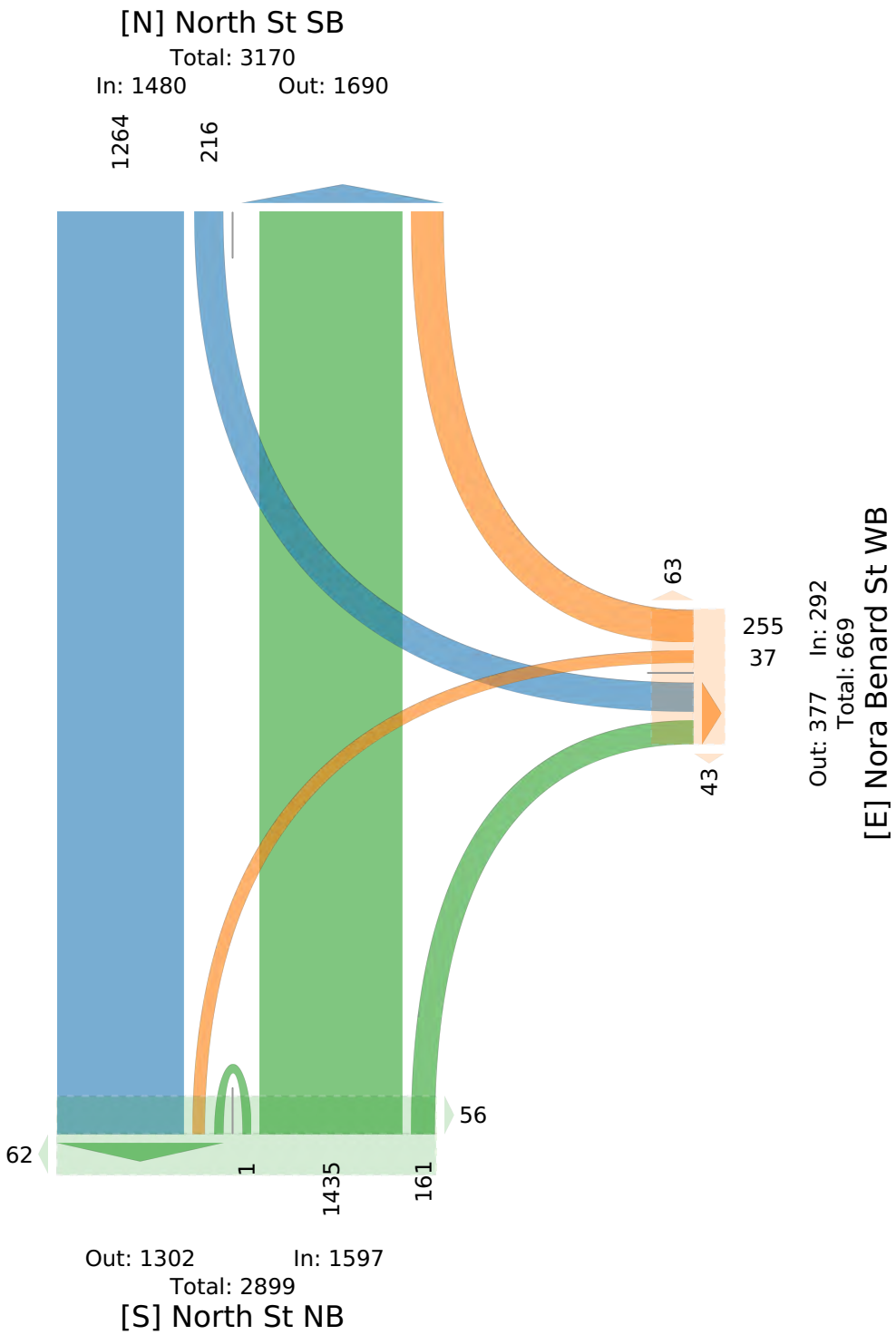
Leg	Nora Benard St WB					North St NB					North St SB					
Direction	Westbound					Northbound					Southbound					
Time	L	R	U	App	Ped*	T	R	U	App	Ped*	L	T	U	App	Ped*	Int
2024-02-29 4:00PM	4	28	0	**32**	12	217	26	0	**243**	16	29	141	0	**170**	0	**445**
4:15PM	5	29	0	**34**	11	224	17	0	**241**	14	20	156	0	**176**	0	**451**
4:30PM	3	35	0	**38**	12	199	23	0	**222**	10	37	151	0	**188**	0	**448**
4:45PM	3	37	0	**40**	15	172	24	1	**197**	10	22	164	0	**186**	0	**423**
Hourly Total	15	129	0	**144**	50	812	90	1	**903**	50	108	612	0	**720**	0	**1767**
5:00PM	3	43	0	**46**	14	176	14	0	**190**	19	32	178	0	**210**	0	**446**
5:15PM	9	32	0	**41**	13	158	12	0	**170**	24	25	163	0	**188**	0	**399**
5:30PM	4	27	0	**31**	20	134	26	0	**160**	14	33	164	0	**197**	0	**388**
5:45PM	6	24	0	**30**	9	155	19	0	**174**	11	18	147	0	**165**	0	**369**
Hourly Total	22	126	0	**148**	56	623	71	0	**694**	68	108	652	0	**760**	0	**1602**
Total	37	255	0	**292**	106	1435	161	1	**1597**	118	216	1264	0	**1480**	0	**3369**
% Approach	12.7%	87.3%	0%	**-**	-	89.9%	10.1%	0.1%	**-**	-	14.6%	85.4%	0%	**-**	-	-
% Total	1.1%	7.6%	0%	**8.7%**	-	42.6%	4.8%	0%	**47.4%**	-	6.4%	37.5%	0%	**43.9%**	-	-
Lights	37	252	0	**289**	-	1422	160	1	**1583**	-	205	1237	0	**1442**	-	3314
% Lights	100%	98.8%	0%	**99.0%**	-	99.1%	99.4%	100%	**99.1%**	-	94.9%	97.9%	0%	**97.4%**	-	98.4%
Articulated Trucks	0	1	0	**1**	-	0	0	0	**0**	-	0	0	0	**0**	-	1
% Articulated Trucks	0%	0.4%	0%	**0.3%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%
Buses and Single-Unit Trucks	0	2	0	**2**	-	13	1	0	**14**	-	11	27	0	**38**	-	54
% Buses and Single-Unit Trucks	0%	0.8%	0%	**0.7%**	-	0.9%	0.6%	0%	**0.9%**	-	5.1%	2.1%	0%	**2.6%**	-	1.6%
Pedestrians	-	-	-	-	106	-	-	-	-	118	-	-	-	-	0	
% Pedestrians	-	-	-	-	100%	-	-	-	-	100%	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

North Park and Nora Benard - PM - TMC
Thu Feb 29, 2024
Full Length (4 PM-6 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians)
All Movements
ID: 1160888, Location: 44.6507, -63.586571

Provided by: Trans4m Development Group
59 Craigburn Drive, Dartmouth, NS, B2X 3E6, CA



North Park and Nora Benard - PM - TMC

Thu Feb 29, 2024
PM Peak (4:15 PM - 5:15 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians)
All Movements
ID: 1160888, Location: 44.6507, -63.586571

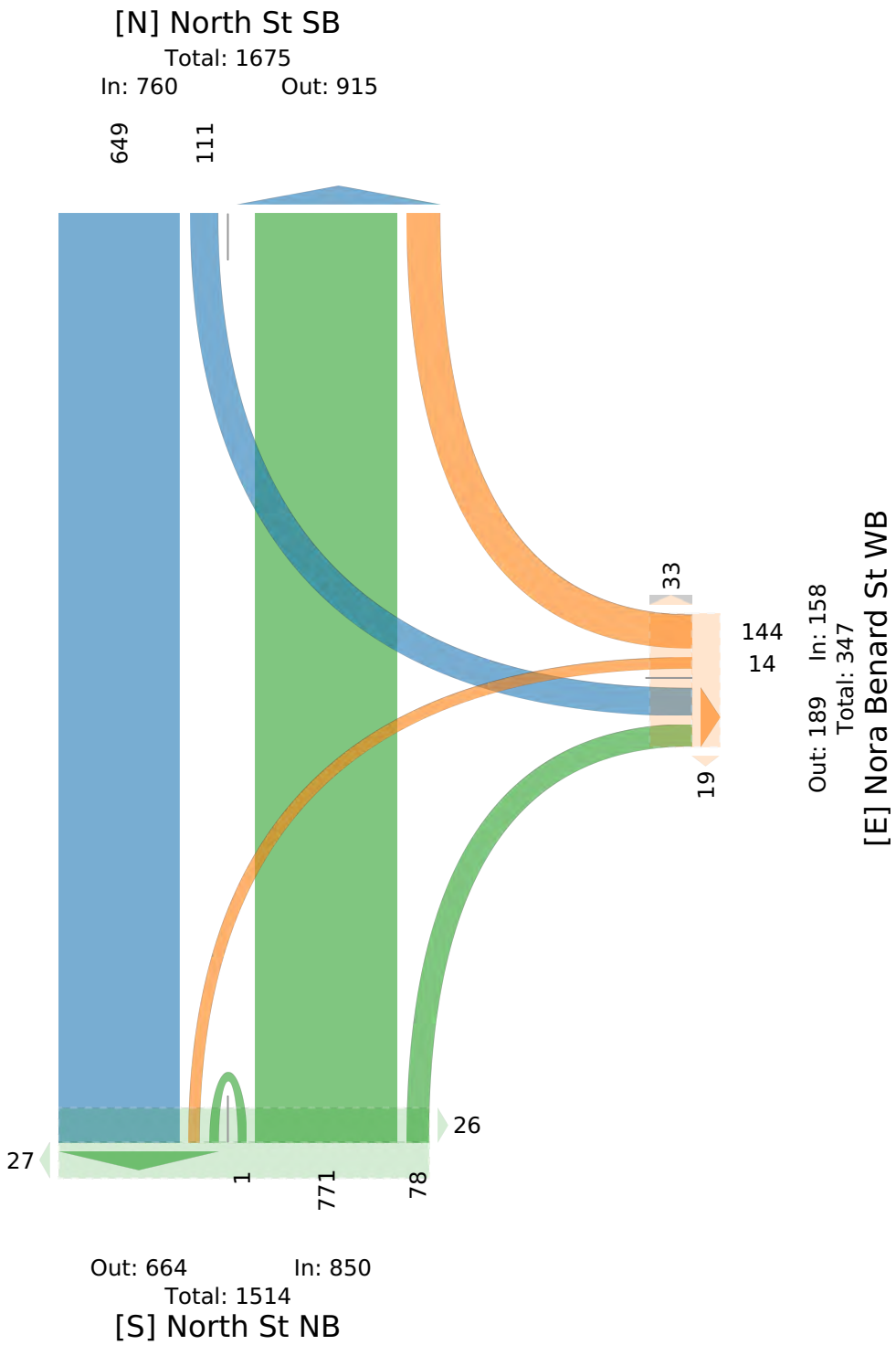
Provided by: Trans4m Development Group
59 Craigburn Drive,
Dartmouth, NS, B2X 3E6, CA

Leg Direction	Nora Benard St WB Westbound					North St NB Northbound					North St SB Southbound					
Time	L	R	U	**App**	Ped*	T	R	U	**App**	Ped*	L	T	U	**App**	Ped*	**Int**
2024-02-29 4:15PM	5	29	0	**34**	11	224	17	0	**241**	14	20	156	0	**176**	0	**451**
4:30PM	3	35	0	**38**	12	199	23	0	**222**	10	37	151	0	**188**	0	**448**
4:45PM	3	37	0	**40**	15	172	24	1	**197**	10	22	164	0	**186**	0	**423**
5:00PM	3	43	0	**46**	14	176	14	0	**190**	19	32	178	0	**210**	0	**446**
Total	14	144	0	**158**	52	771	78	1	**850**	53	111	649	0	**760**	0	**1768**
% Approach	8.9%	91.1%	0%	**-**	-	90.7%	9.2%	0.1%	**-**	-	14.6%	85.4%	0%	**-**	-	-
% Total	0.8%	8.1%	0%	**8.9%**	-	43.6%	4.4%	0.1%	**48.1%**	-	6.3%	36.7%	0%	**43.0%**	-	-
PHF	0.700	0.837	-	**0.859**	-	0.860	0.813	0.250	**0.882**	-	0.750	0.912	-	**0.905**	-	0.980
Lights	14	142	0	**156**	-	764	77	1	**842**	-	106	634	0	**740**	-	1738
% Lights	100%	98.6%	0%	**98.7%**	-	99.1%	98.7%	100%	**99.1%**	-	95.5%	97.7%	0%	**97.4%**	-	98.3%
Articulated Trucks	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0
% Articulated Trucks	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%
Buses and Single-Unit Trucks	0	2	0	**2**	-	7	1	0	**8**	-	5	15	0	**20**	-	30
% Buses and Single-Unit Trucks	0%	1.4%	0%	**1.3%**	-	0.9%	1.3%	0%	**0.9%**	-	4.5%	2.3%	0%	**2.6%**	-	1.7%
Pedestrians	-	-	-	-	52	-	-	-	-	53	-	-	-	-	0	
% Pedestrians	-	-	-	-	100%	-	-	-	-	100%	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

North Park and Nora Benard - PM - TMC
Thu Feb 29, 2024
PM Peak (4:15 PM - 5:15 PM) - Overall Peak Hour
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians)
All Movements
ID: 1160888, Location: 44.6507, -63.586571

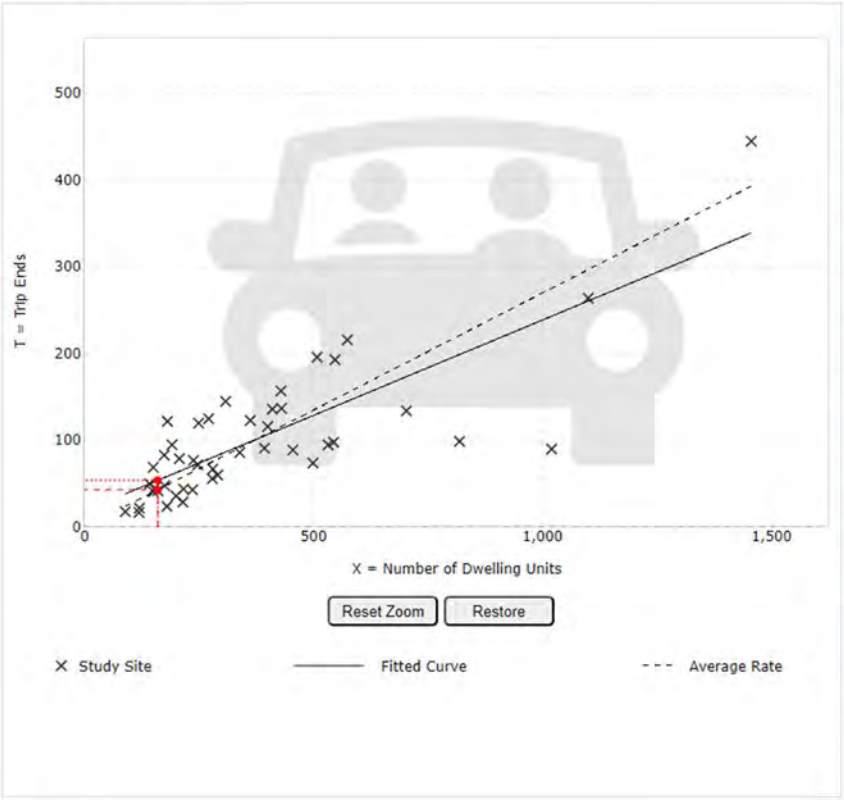
Provided by: Trans4m Development Group
59 Craigburn Drive, Dartmouth, NS, B2X 3E6, CA



APPENDIX B

TRIP GENERATION

Data Plot and Equation



DATA STATISTICS

Land Use:
Multifamily Housing (High-Rise) - Not Close to Rail Transit (222) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
45

Avg. Num. of Dwelling Units:
372

Average Rate:
0.27

Range of Rates:
0.09 - 0.67

Standard Deviation:
0.11

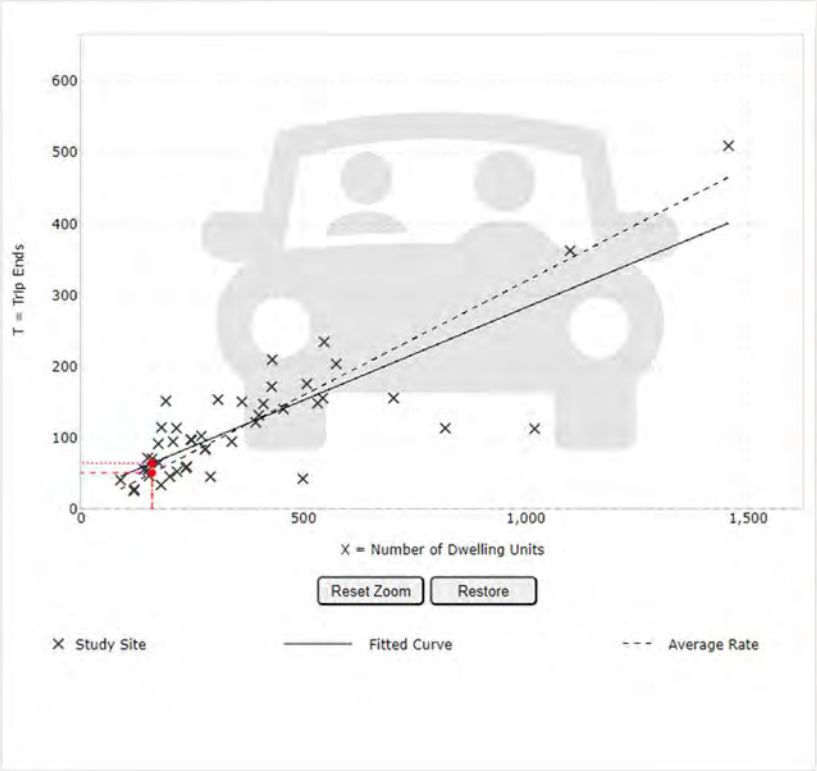
Fitted Curve Equation:
T = 0.22(X) + 18.85

R^2:
0.64

Directional Distribution:
26% entering, 74% exiting

Calculated Trip Ends:
Average Rate: 43 (Total), 11 (Entry), 32 (Exit)
Fitted Curve: 54 (Total), 14 (Entry), 40 (Exit)

Data Plot and Equation



DATA STATISTICS

Land Use:
Multifamily Housing (High-Rise) - Not Close to Rail Transit (222) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
45

Avg. Num. of Dwelling Units:
372

Average Rate:
0.32

Range of Rates:
0.09 - 0.80

Standard Deviation:
0.13

Fitted Curve Equation:
T = 0.26(X) + 23.12

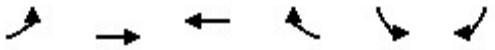
R^2:
0.67

Directional Distribution:
62% entering, 38% exiting

Calculated Trip Ends:
Average Rate: 51 (Total), 32 (Entry), 19 (Exit)
Fitted Curve: 65 (Total), 40 (Entry), 25 (Exit)

APPENDIX C

SYNCHRO REPORTS



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	165	995	400	65	45	20
Future Volume (Veh/h)	165	995	400	65	45	20
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	179	1082	435	71	49	22
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	506				1910	470
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	506				1910	470
tC, single (s)	4.1				*5.0	*5.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	83				63	97
cM capacity (veh/h)	1059				132	696

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	179	1082	506	49	22
Volume Left	179	0	0	49	0
Volume Right	0	0	71	0	22
cSH	1059	1700	1700	132	696
Volume to Capacity	0.17	0.64	0.30	0.37	0.03
Queue Length 95th (m)	4.6	0.0	0.0	11.7	0.7
Control Delay (s)	9.1	0.0	0.0	47.4	10.3
Lane LOS	A			E	B
Approach Delay (s)	1.3		0.0	36.0	
Approach LOS				E	

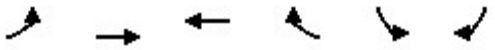
Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	10	40	20	10	220	0	0	55	20
Future Volume (Veh/h)	0	0	0	10	40	20	10	220	0	0	55	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	0	11	43	22	11	239	0	0	60	22
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	376	332	71	332	343	239	82			239		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	376	332	71	332	343	239	82			239		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	98	93	97	99			100		
cM capacity (veh/h)	530	583	991	618	575	800	1515			1328		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	76	250	82
Volume Left	11	11	0
Volume Right	22	0	22
cSH	633	1515	1700
Volume to Capacity	0.12	0.01	0.05
Queue Length 95th (m)	3.1	0.2	0.0
Control Delay (s)	11.5	0.4	0.0
Lane LOS	B	A	
Approach Delay (s)	11.5	0.4	0.0
Approach LOS	B		

Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	29.3%	ICU Level of Service	A	
Analysis Period (min)	15			

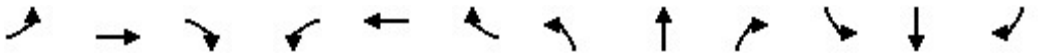


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	115	650	775	80	20	35
Future Volume (Veh/h)	115	650	775	80	20	35
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	707	842	87	22	38
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	929				1842	886
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	929				1842	886
tC, single (s)	4.1				*5.0	*5.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	83				84	92
cM capacity (veh/h)	736				142	464

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	125	707	929	22	38
Volume Left	125	0	0	22	0
Volume Right	0	0	87	0	38
cSH	736	1700	1700	142	464
Volume to Capacity	0.17	0.42	0.55	0.16	0.08
Queue Length 95th (m)	4.6	0.0	0.0	4.0	2.0
Control Delay (s)	10.9	0.0	0.0	35.0	13.4
Lane LOS	B			D	B
Approach Delay (s)	1.6		0.0	21.3	
Approach LOS				C	

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		

* User Entered Value



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	30	60	30	15	180	0	0	25	30
Future Volume (Veh/h)	0	0	0	30	60	30	15	180	0	0	25	30
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	0	0	33	65	33	16	196	0	0	27	33
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	337	272	44	272	288	196	60			196		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	337	272	44	272	288	196	60			196		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	95	89	96	99			100		
cM capacity (veh/h)	540	629	1027	676	615	845	1544			1377		

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	131	212	60
Volume Left	33	16	0
Volume Right	33	0	33
cSH	677	1544	1700
Volume to Capacity	0.19	0.01	0.04
Queue Length 95th (m)	5.4	0.2	0.0
Control Delay (s)	11.6	0.6	0.0
Lane LOS	B	A	
Approach Delay (s)	11.6	0.6	0.0
Approach LOS	B		

Intersection Summary				
Average Delay	4.1			
Intersection Capacity Utilization	30.3%	ICU Level of Service	A	
Analysis Period (min)	15			