

70 Richmond Road

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Forecasting Report

Step 4 Strategy Report (Revision #8 – SPA)

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1 Screening

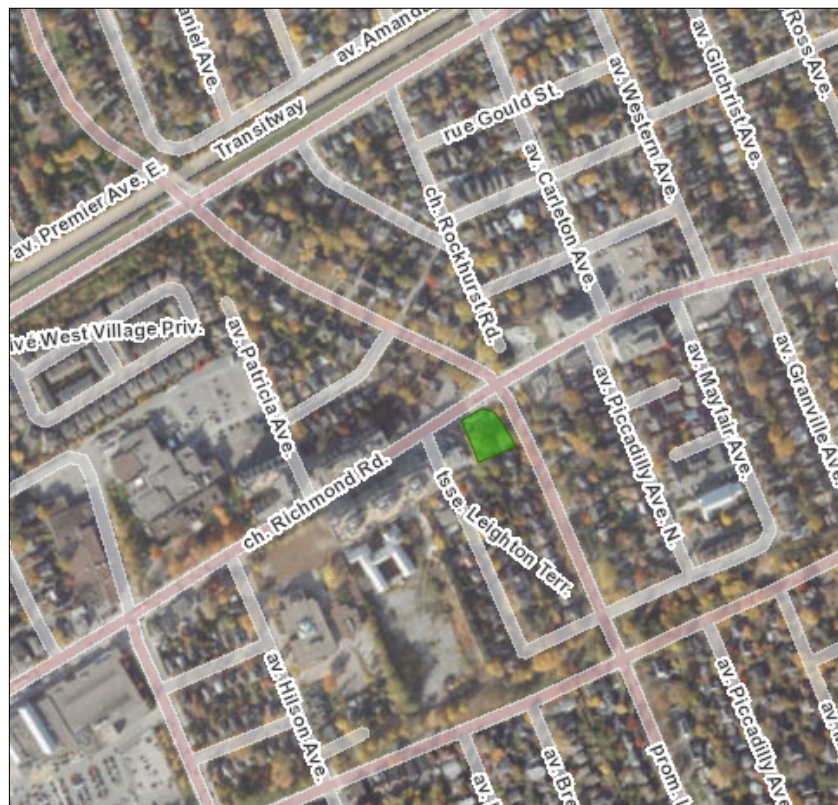
This study has been prepared according to the City of Ottawa’s 2017 Transportation Impact Assessment (TIA) Guidelines. Accordingly, a Step 1 Screening Form has been prepared and is included as Appendix A, along with the Certification Form for the TIA Study PM. As shown in the Screening Form, a TIA is required based on the Location and Safety triggers and will only include the Design Review component. This report is in support of a site plan application.

2 Existing and Planned Conditions

2.1 Proposed Development

The proposed development, designated and zoned as Traditional Mainstreet, is planned as a nine-storey, 96-unit mixed-use (residential and commercial) building with 1,455 sq. ft. of ground floor retail. The site is also located within the Richmond Road/Westboro Secondary Plan area (“Secondary Plan”) which is the statutory implementation of the Richmond Road/Westboro Community Design Plan (“CDP”). The site is to be built out in a single phase by 2023. The development includes 63 resident and eight visitor vehicular parking stalls across two underground parking levels and 96 bicycle parking stalls. Access is to be provided via an existing municipal laneway onto Richmond Road as a full-movement access. The study area will include the intersections of Island Park Drive at Scott Street, Island Park Drive at Richmond Road/Wellington Street West, Island Park Drive at Byron Avenue, Richmond Road at Kirkwood Avenue, Richmond Road at Patricia Avenue, Richmond Road at Future Site Access, and Wellington Street West at Western Avenue. Figure 1 illustrates the study area context. Figure 2 illustrates the proposed concept plan.

Figure 1: Area Context Plan



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: August 6, 2021

2.2 Existing Conditions

2.2.1 Area Road Network

Richmond Road: Richmond Road is a City of Ottawa arterial road with a two-lane urban cross-section with sidewalks on both sides of the road and on-street parking permitted on the north side of the road (no stopping 3:30 PM – 5:30 PM) and on the south side of the road (no restrictions) west of a point 20 metres west of Leighton Terrace. The posted speed limit is 50 km/h and the existing right of way within the study area varies from 20.0 metres to 21.0 metres. Richmond Road is a truck route.

Wellington Street West: Wellington Street West is a City of Ottawa arterial road with a four-lane urban cross-section west of Western Avenue where on-street parking is permitted on the north side of the road (no stopping 3:30 PM – 5:30 PM) and on the south side of the road east of the Esso property (no restrictions), and a four-lane urban cross-section east of Western Avenue where on-street parking is permitted in parking lanes on both sides of the road. The posted speed limit is 50 km/h and the City-protected right of way is 20.0 metres. Wellington Street West is a truck route.

Island Park Drive: Island Park Drive is a federally owned arterial road with a two-lane urban cross-section with curbside bike lanes and sidewalks on both sides of the road. The posted speed limit is 40 km/h and the existing right of way within the study area is 30.5 metres.

Scott Street: Scott Street is a City of Ottawa arterial road with a two-lane urban cross-section with curbside bike lanes on both sides of the road, a mixed-use path on the north side of the road, and a sidewalk on the south side of the road. The posted speed limit is 50 km/h and the City-protected right of way is 26.0 metres. Scott Street is a truck route.

Kirkwood Avenue: Kirkwood Avenue is a City of Ottawa arterial road with a four-lane urban cross-section with sidewalks on both sides of the road south of Richmond Road within the study area, and a local road with a two-lane urban cross-section and angle parking on the east side of the road and bay parking on the west side of the road north of Richmond Road. The posted speed limit is 50 km/h and the City-protected right of way is 26.0 metres south of Richmond Road, and the existing right of way is 19.5 metres north of Richmond Road. Kirkwood Avenue is a truck route.

Byron Avenue: Byron Avenue is a City of Ottawa collector road with a two-lane urban cross-section with a sidewalk on the south side of the road. West of Island Park Drive, curbside bike lanes are on both sides of the road. The unposted speed limit is 50 km/h and the existing right of way within the study area is 20.0 metres west of Island Park Drive and 15.0 metres east of Island Park Drive.

Patricia Avenue: Patricia Avenue is a City of Ottawa local road with a two-lane urban cross-section with a sidewalk on the east side of the road. North of Mailes Avenue, Patricia Avenue is no exit. The unposted speed limit is 50 km/h and the existing right of way is 15.5 metres.

Western Avenue: Western Avenue is a City of Ottawa local road with a two-lane urban cross-section with on-street parking permitted and sidewalks on both sides of the road. The unposted speed limit is 50 km/h and the existing right of way is 20.0 metres within the study area.

2.2.2 Existing Intersections

The existing signalized area intersections within 400 metres of the site have been summarized below:

<i>Richmond Road/Wellington Street West at Island Park Drive</i>	The intersection of Richmond Road/Wellington Street West at Island Park Drive is a signalized intersection. The northbound and southbound approaches each consists of an auxiliary left-turn lane, a shared through/right-turn lane, and a bike lane. The eastbound and westbound approaches each consist of a shared left-turn/through lane and a shared through/right-turn lane. Commercial vehicles are restricted from turning onto Island Park Drive.
<i>Richmond Road at Kirkwood Avenue</i>	The intersection of Richmond Road at Kirkwood Avenue is a signalized intersection. The northbound approach consists of a left-turn lane and a shared through/right-turn lane, and the southbound approach consists of shared all-movements lane. The eastbound and westbound approaches each consist of a shared left-turn/through lane and a shared through/right-turn lane, although on-street parking is permitted in the curbside lanes. No turn restrictions were noted.
<i>Richmond Road at Patricia Avenue</i>	The intersection of Richmond Road at Patricia Avenue is a signalized intersection. The private northbound approach and the southbound approach each consist of a shared all-movements lane. The eastbound and westbound approaches each consist of a shared left-turn/through lane and a shared through/right turn lane, although on-street parking is permitted in the curbside lanes. No turn restrictions were noted.
<i>Wellington Street West at Western Avenue</i>	The intersection of Wellington Street West at Western Avenue is a signalized intersection. The southbound approach consist of a shared all-movements lane and the northbound approach consists of two private driveways. The eastbound approach consists of a shared left-turn/through lane and a shared through/right-turn lane, which stops at the intersection and acts as a bypass for any left-turning vehicles. The westbound approach consists of a shared all-movements lane. A parking lane is provided on the north side of Wellington Street on the east side of the intersection and on-street parking is permitted on the west side of the intersection. A taxi parking lane is provided on the south side of Wellington Street to the east of the intersection. Northbound right turns on red are restricted from the private driveways.
<i>Scott Street at Island Park Drive</i>	The intersection of Scott Street at Island Park Drive is a signalized intersection. The northbound approach consists of a shared all-movements lane, and the southbound approach consists of an auxiliary left-turn lane and a shared through/right-turn lane. The eastbound approach consists of an auxiliary left-turn lane, a through lane, and an auxiliary right-turn lane and the westbound approach consists of an auxiliary left-turn lane and a shared through/right-turn lane. Bike lanes are provided on all approaches. No turn restrictions were noted.

Byron Avenue at Island Park Drive

The intersection of Byron Avenue at Island Park Drive is a signalized intersection. The northbound, southbound, eastbound, and westbound approaches each consist of a shared all-movements lane and the northbound and southbound approaches each have a bike lane. Left-turn bike boxes are provided on the northbound and southbound approaches. Northbound and southbound right turns on red are restricted.

2.2.3 Existing Driveways

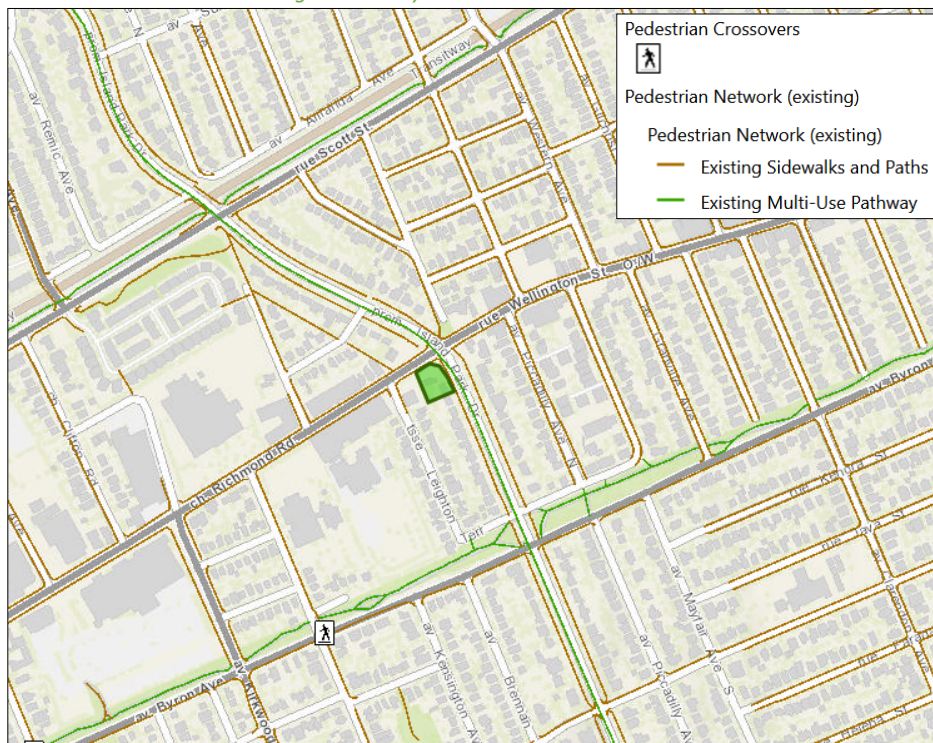
Driveways to low and medium-density residential and commercial land uses exist on both sides of Richmond Road and to low density residential land uses on both sides of Island Park Drive, and a gas station on the east side, within 200 metres of the proposed site access.

2.2.4 Cycling and Pedestrian Facilities

Figure 3 illustrates the pedestrian facilities in the study area and Figure 4 illustrates the cycling facilities.

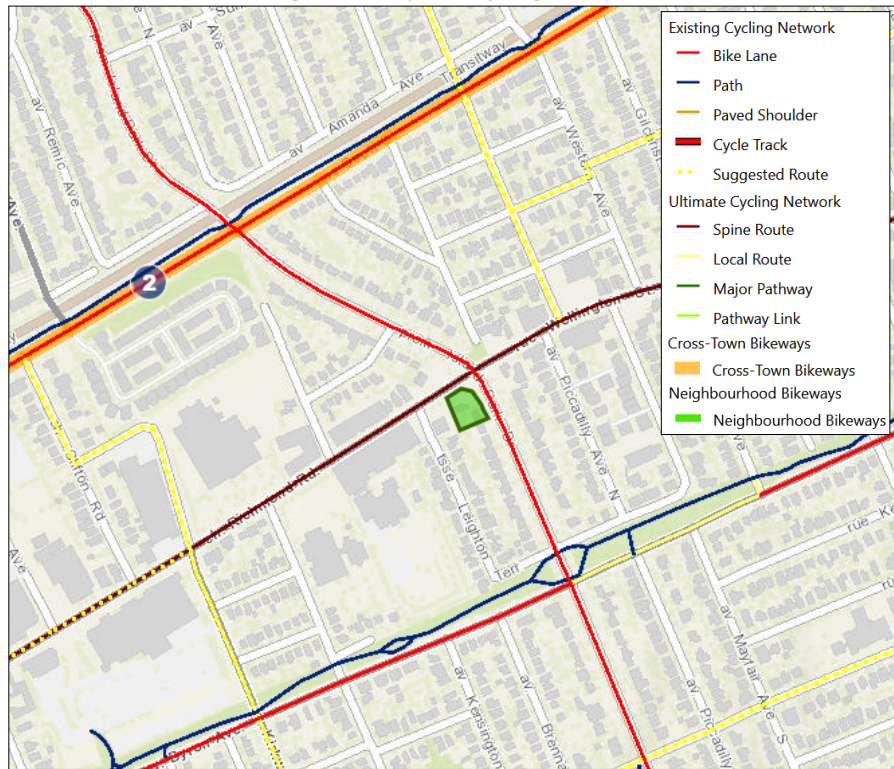
Sidewalks are provided along both sides of arterial roads within the study area, with the exception of Scott Street. Scott Street and Byron Avenue each have a mixed-use path on their north side and a sidewalk on their south side, and Patricia Avenue has a sidewalk on its east side. Cycling facilities include curbside bike lanes on Island Park Drive, Scott Street, and Byron Avenue excepting the segment between Island Park Drive and Granville Avenue. Mixed-use paths are on the north side of Scott Street and on the north side of Byron Avenue. Island Park Drive, Scott Street, and Richmond Road are cycling spine routes and Kirkwood Avenue, Carleton Avenue, and Byron Avenue are local routes.

Figure 3: Study Area Pedestrian Facilities



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: May 4, 2022

Figure 4: Study Area Cycling Facilities



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: May 4, 2022

Pedestrian and cyclist volumes included in study area intersection counts, presented in Section 2.2.7, have been compiled and are illustrated in Figure 5 and Figure 6 respectively.

Figure 5: Existing Pedestrian Volumes

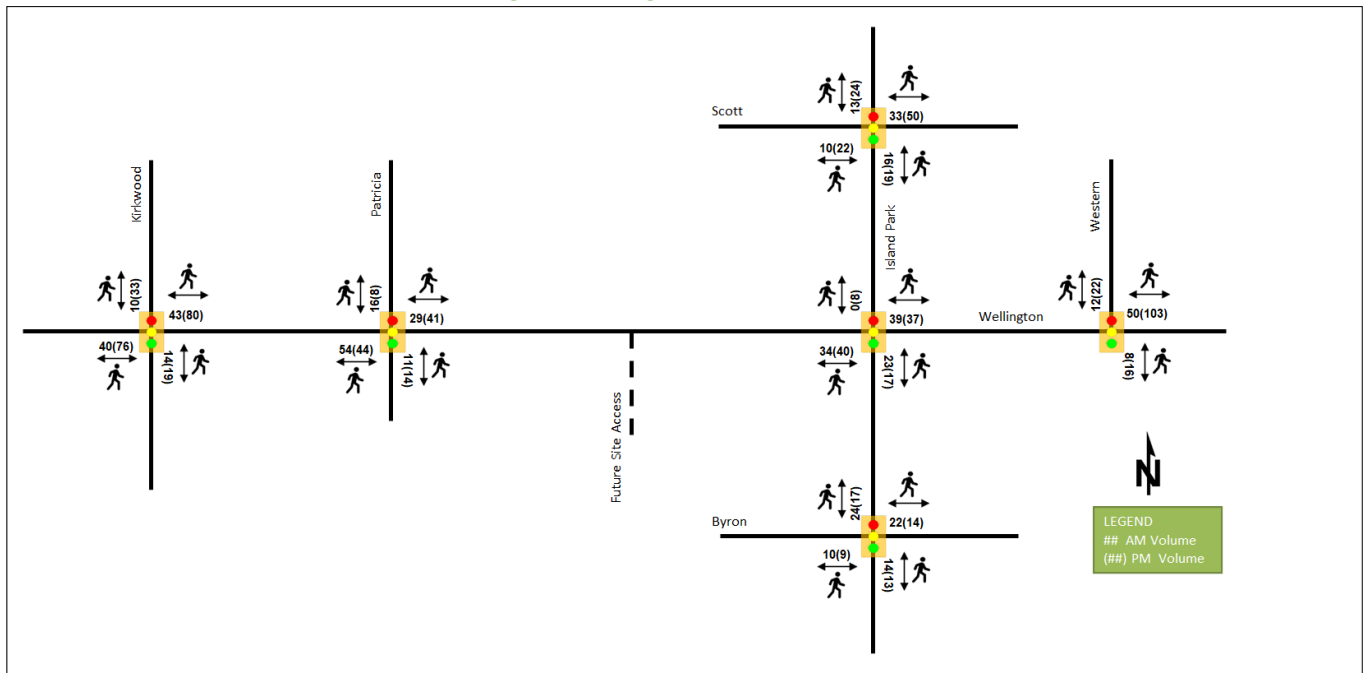


Figure 6: Existing Cyclist Volumes



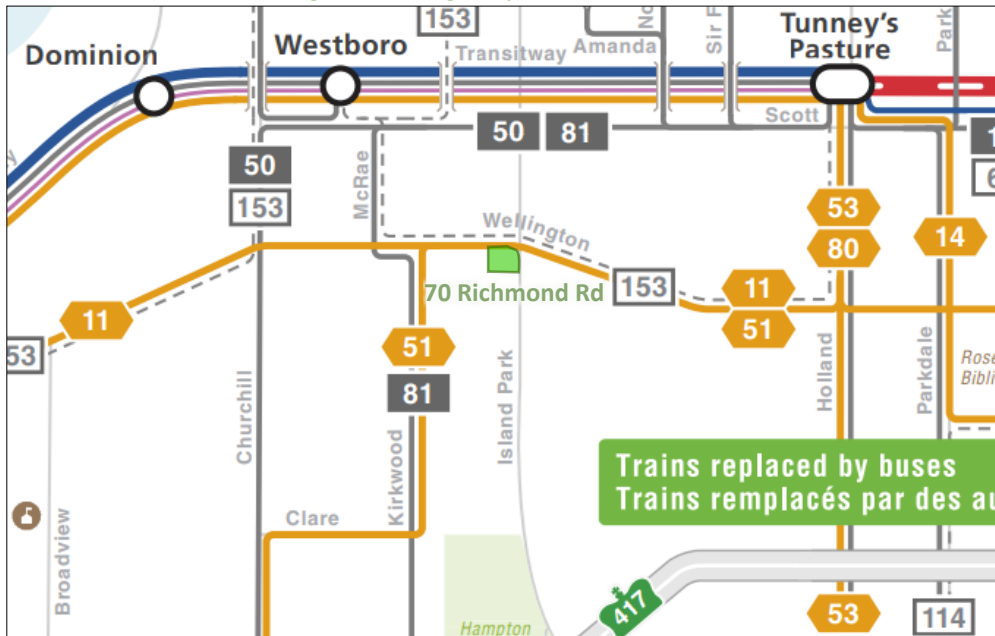
2.2.5 Existing Transit

The study area is served by the following transit routes: #11, #51, #153 travel along Richmond Road and Wellington Street West; Routes #50, #81 travel along Scott Street. Routes #51 and #81 continue along Kirkwood Avenue. As of July 2020, the frequency of these routes within proximity of the proposed site, are:

- Route # 11 – 15-minute service all day, 30-minute service after 9:00pm
- Route # 50 – 30-minute service all day
- Route # 51 – 15-minute service all day, 30-minute service after 7:00pm
- Route # 81 – 30-minute service all day
- Route # 153 – Five buses per day per direction

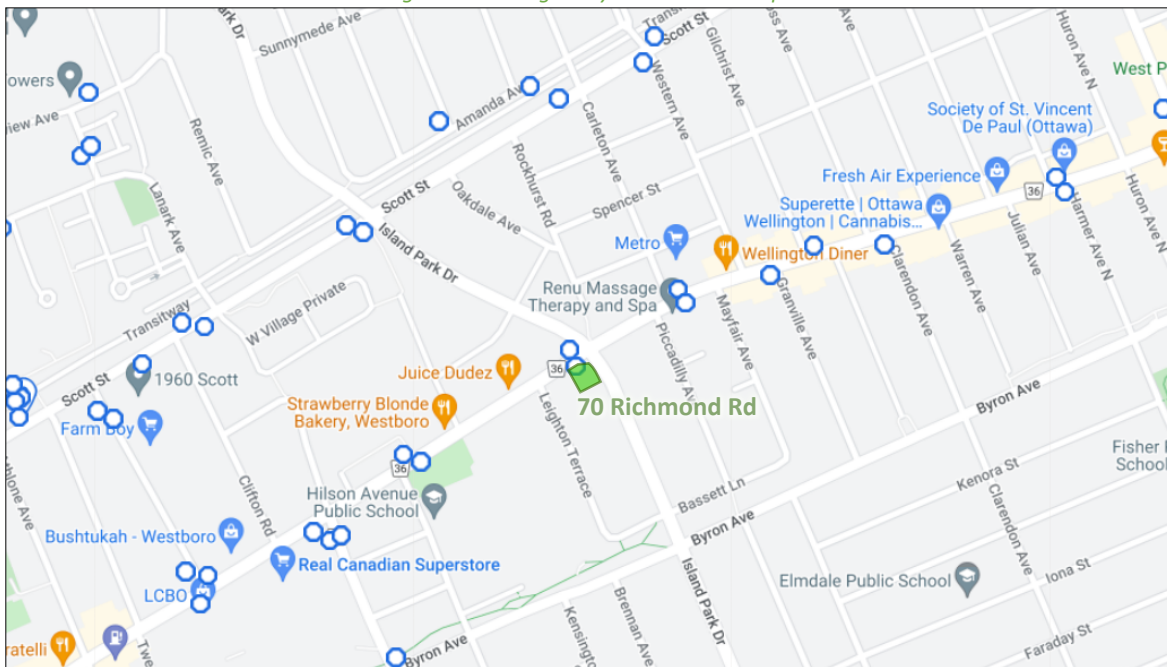
Figure 7 illustrates the transit system map in the study area and Figure 8 illustrates nearby transit stops.

Figure 7: Existing Study Area Transit Service



Source: <http://www.octranspo.com/> Accessed: May 4, 2022

Figure 8: Existing Study Area Transit Stops



Source: <http://www.octranspo.com/> Accessed: May 4, 2022

2.2.6 Existing Area Traffic Management Measures

Within the study area, traffic calming measures consist of on-street parking on Richmond Road and Wellington Street West and curb extensions on Wellington Street West framing parking lanes, and on Western Avenue.

2.2.7 Existing Peak Hour Travel Demand

Existing turning movement counts were acquired from the City of Ottawa for the existing Study Area intersections. Counts conducted within the past three years are considered to be representatively valid in the modelling of existing conditions. Table 1 summarizes the intersection count dates.

Table 1: Intersection Count Date

Intersection	Count Date
Scott Street & Island Park Drive	Tuesday, March 28, 2017
Richmond Road & Kirkwood Avenue	Thursday, April 20, 2017
Richmond Road & Patricia Avenue	Tuesday, April 25, 2017
Richmond Road/Wellington Street & Island Park Drive	Tuesday, April 25, 2017
Wellington Street & Western Avenue	Thursday, February 22, 2018
Byron Avenue & Island Park Drive	Thursday, January 23, 2020

Figure 9 illustrates the existing traffic counts and Table 2 summarizes the existing intersection operations. The level of service for signalized intersections is based on volume to capacity ratio (v/c) calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection. Detailed turning movement count data is included in Appendix B and the Synchro worksheets are provided in Appendix C.

Figure 9: Existing Traffic Counts

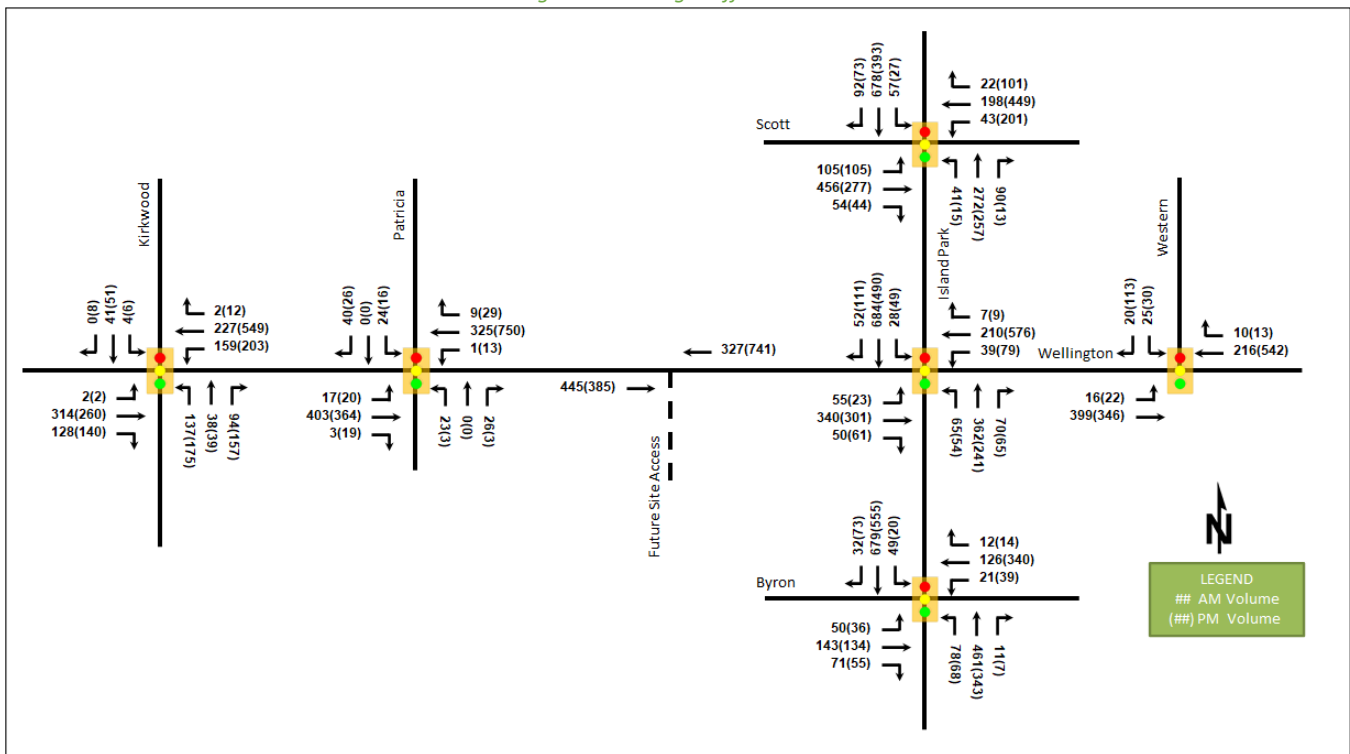


Table 2: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Richmond Road/Wellington Street W & Island Park Drive <i>Signalized</i>	EB	A	0.50	25.4	50.6	A	0.38	18.1	35.0
	WB	A	0.30	22.9	29.4	B	0.69	25.3	70.6
	NBL	B	0.65	45.5	m15.2	A	0.40	19.4	m8.4
	NBT/R	A	0.55	19.6	81.8	A	0.44	12.4	m37.0
	SBL	A	0.09	3.7	m0.9	A	0.14	14.5	11.8
	SBT/R	E	0.92	14.3	m19.2	D	0.85	32.2	#154.8
	Overall	C	0.74	20.0	-	C	0.77	23.6	-
Richmond Road & Kirkwood Avenue <i>Signalized</i>	EB	A	0.35	11.2	27.5	A	0.24	5.5	20.0
	WB	A	0.45	16.0	32.7	A	0.58	12.6	70.9
	NBL	A	0.31	18.0	28.0	B	0.62	36.9	43.4
	NBT/R	A	0.22	6.5	14.1	A	0.45	9.5	20.2
	SB	A	0.07	14.8	10.6	A	0.19	22.2	16.5
	Overall	A	0.39	13.2	-	A	0.59	13.5	-
Richmond Road & Patricia Avenue <i>Signalized</i>	EB	A	0.19	3.7	19.2	A	0.18	3.0	17.6
	WB	A	0.15	3.5	15.0	A	0.34	3.7	38.6
	NB	A	0.22	13.9	10.1	A	0.03	0.2	0.0
	SB	A	0.29	16.2	12.8	A	0.22	16.8	10.2
	Overall	A	0.21	5.1	-	A	0.34	3.9	-
Wellington Street & Western Avenue <i>Signalized</i>	EB	A	0.18	3.5	19.5	A	0.22	6.6	17.7
	WB	A	0.18	3.9	23.1	A	0.57	11.1	72.0
	NB	-	-	-	-	-	-	-	-
	SB	A	0.15	1.0	0.2	A	0.37	10.2	17.8
	Overall	A	0.19	3.5	-	A	0.51	9.4	-
Scott Street & Island Park Drive <i>Signalized</i>	EBL	A	0.33	24.4	29.3	A	0.52	27.5	34.3
	EBT	C	0.77	35.1	#119.7	A	0.35	16.6	53.6
	EBR	A	0.11	9.7	10.0	A	0.07	4.1	5.5
	WBL	A	0.29	26.7	15.7	A	0.50	21.6	49.5
	WBT/R	A	0.38	22.8	50.3	C	0.73	25.4	130.2
	NB	F	1.33	193.1	#170.3	A	0.56	29.0	74.3
	SBL	A	0.16	15.0	13.9	A	0.10	21.4	10.0
	SBT/R	F	1.02	61.5	#237.5	D	0.81	39.2	#140.4
Overall	F	1.09	71.8	-	C	0.76	27.2	-	
Byron Avenue & Island Park Drive <i>Signalized</i>	EB	D	0.86	56.6	#83.6	A	0.57	27.5	51.3
	WB	A	0.50	35.5	45.3	D	0.87	45.9	#107.8
	NB	B	0.68	16.1	113.1	A	0.59	17.4	82.4
	SB	D	0.81	13.0	m61.7	C	0.78	29.8	m133.2
	Overall	D	0.82	22.7	-	D	0.81	30.2	-

Notes: Saturation flow rate of 1800 veh/h/lane
Peak Hour Factor = 0.90
Queue is measured in metres

Delay is measured in seconds
m = metered queue
= volume for the 95th %ile cycle exceeds capacity

During the AM peak hour, the intersection of Scott Street and Island Park Drive is over capacity on the northbound and southbound shared through/right-turn movements with high delays and extended queues. The overall intersection is over capacity due to these movements. The eastbound through movement is also noted to have extended queues. During the PM peak, the southbound shared through/right-turn lane will have extended queues. A northbound left-turn lane would improve the intersection operations to a LOS E, with the northbound lane operations to LOS B or better. Due to the BRT/LRT underpass, the southbound approach cannot be improved through the introduction of a right-turn lane.

Extended queues are noted at the Byron Avenue and Island Park Drive intersection during the AM peak on the eastbound approach and on the westbound approach during the PM peak, and at the Richmond Road/Wellington Street W & Island Park Drive during the PM peak on the southbound shared through/right-turn lane.

The remaining study area intersections operate satisfactorily during the peak hours.

2.2.8 Collision Analysis

Collision data have been acquired from the City of Ottawa open data website (data.ottawa.ca) for five years prior to the commencement of this TIA for the surrounding study area road network. Table 3 summarizes the collisions types and conditions in the study area, Figure 10 illustrates the intersections and segments analyzed, and Table 4 summarizes the total collisions for each of these locations. Collision data are included in Appendix D.

Table 3: Study Area Collision Summary, 2016-2020

Total Collisions		Number	%
		51	100%
Classification	Fatality	0	0%
	Non-Fatal Injury	8	15%
	Property Damage Only	44	85%
Initial Impact Type	Angled	6	12%
	Rear end	11	21%
	Sideswipe	15	29%
	Turning Movement	11	21%
	SMV Unattended	7	13%
	SMV Other	2	4%
	Road Surface Condition	Dry	29
Wet		18	35%
Loose Snow		2	4%
Slush		2	4%
Ice		1	2%
Pedestrian Involved		1	2%
Cyclists Involved		2	4%

Figure 10: Study Area Collision Records – Representation of Study Area Collisions

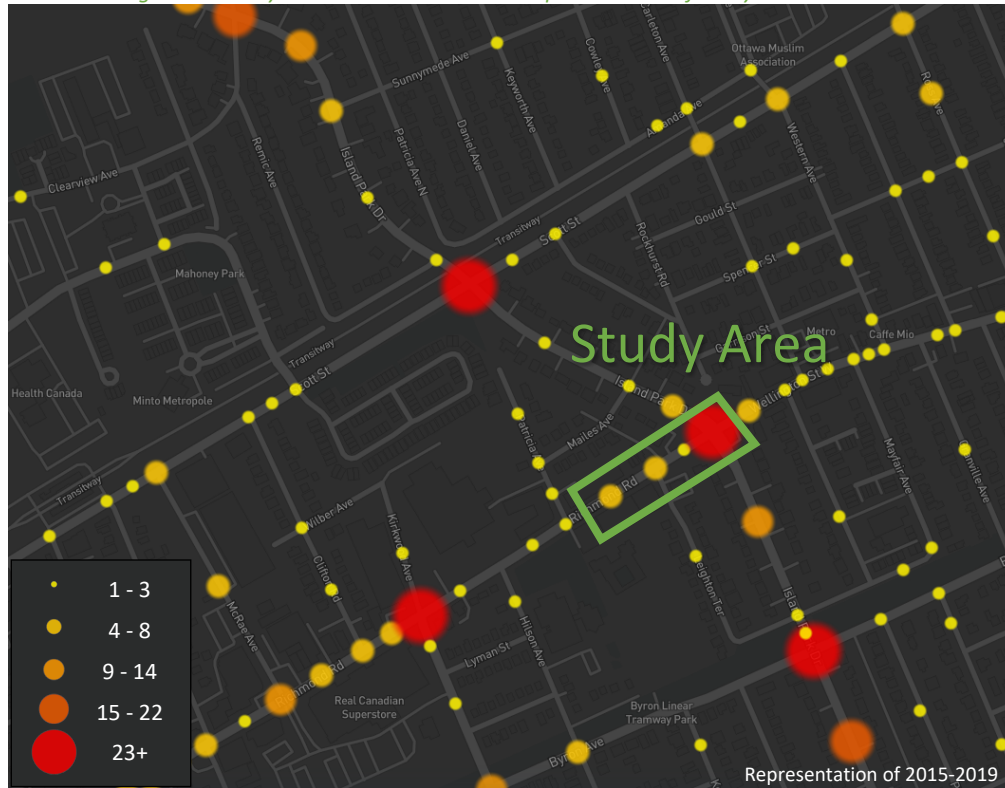


Table 4: Summary of Collision Locations, 2016-2020

Intersections / Segments	Number	%
	51	100%
Leighton Ter @ Richmond Rd	3	2%
Island Park Dr @ Richmond Rd/Wellington St W	41	23%
Richmond Rd btwn Patricia Ave & Leighton Ter	4	2%
Richmond Rd btwn Leighton Ter & Island Park Dr	4	2%

Collisions within the study area generally follow a pattern representative of typical Ottawa urban areas. High congestion during peak periods is correlated with the collision types of rear end, sideswipe, and turning movement. The collision types at the intersection of Richmond Road/Wellington Street West at Island Park Drive are summarized in Table 5.

Table 5: Richmond Road/Wellington St W at Island Park Drive Collision Summary

Total Collisions		Number	%
		41	100%
Classification	Fatality	0	0%
	Non-Fatal Injury	7	17%
	Property Damage Only	34	83%
Initial Impact Type	Angled	4	10%
	Rear end	11	27%
	Sideswipe	12	29%
	Turning Movement	11	27%
	SMV Unattended	1	2%
	SMV Other	2	5%

		Number	%
Total Collisions		41	100%
Road Surface Condition	Dry	22	54%
	Wet	15	37%
	Loose Snow	1	2%
	Slush	2	5%
	Ice	1	2%
Pedestrian Involved		1	2%
Cyclists Involved		2	5%

The of Richmond Road/Wellington Street West at Island Park Drive intersection had a total of 41 collisions during the 2016-2020 time period, with 34 involving property damage only and the remaining seven having non-fatal injuries. The three primary collision types were sideswipe with 12 collisions, and turning movement and rear end with 11 collisions each. The City has completed a review of this intersection through the Cycling Safety Review of High-Volume Intersections Report (2020) detailing a recommended plan to address the collision frequency and examine both pedestrian and cycling safety improvements. The recommendations include separated facilities along Richmond Road for cycling, reduced turning radii as no truck movements are permitted along Island Park Drive, signal timing improvements and no right-turn on red, and additional considerations such as reducing Richmond Road to 3 travel lanes to reduce side swipes. The City is currently planning the functional design and implementation.

2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

The subject development is within the Richmond Road/Westboro Secondary Plan and related CDP area. Both contemplate an additional 3970 dwelling units by 2021 within the Secondary Plan area. A Transportation Management Implementation Plan ("TMP") was produced in 2011, and is to be implemented over 15 years, with a view to lowering auto modal share to accommodate anticipated development. The portion of the TMP covering the study area is illustrated in Figure 11. Treatments within the vicinity of the site include a proposed bicycle lane on Richmond Road, new bus stop shelters (which have not yet been constructed), and pedestrian countdown signals, which have since been installed. It should be noted that the proposed bicycle lane along Richmond Road does not appear in the Ottawa Cycling Plan produced in 2013.

Within the TMP, the Rapid Transit and Transit Priority Network – Affordable Network diagram shows isolated transit priority measures along Richmond Road/Wellington Street West. No other changes are outlined in the TMP, nor are any outlined in the Ottawa Planned Construction Projects portal.

Figure 11: Richmond Road/Westboro Transportation Management Implementation Plan



Source: Richmond Road/Westboro Transportation Management Implementation Plan, Accessed: July 22, 2020

As noted in Section 2.2.8, the City is currently planning the improvement of the Richmond Road and Island Park Drive intersection. No plans are currently available at this time.

2.3.2 Other Study Area Developments

190 Richmond Road

The proposed development application proposes a 187-dwelling unit apartment building. The development is anticipated to generate 82 new two-way AM peak hour auto trips and 97 new two-way PM peak hour auto trips (LEA, 2017).

175 Richmond Road

The proposed development application proposes a nine-storey mixed-use building with 675 m² of ground floor retail and 241 residential dwelling units. The redevelopment of the site is anticipated to generate a net increase of 40 two-way AM peak hour auto trips and 23 two-way PM peak hour auto trips (Novatech, 2011).

114 Richmond Road

The proposed development application proposes the conversion of an existing structure to a mixed-use building and the addition of nine storeys of apartment dwellings. No TIA is included as part of this application.

89 Richmond Road

The proposed development application proposes a six-storey mixed-use building with a spa and health centre and 14 residential dwelling units. A TIA screening form determined no TIA was required for this site.

1445-1451 Wellington Street W

The proposed development application proposes to permit the construction of a 12-storey mixed-use building with 2740 sq. ft. ground floor retail and 114 residential dwelling units. It is anticipated that 50 new two-way AM peak hour auto trips and 53 new two-way PM peak hour auto trips (Delcan, 2013).

1391 Wellington Street W

The proposed development application proposes to permit a “broadcasting studio”. No TIA is included as part of this application.

3 Study Area and Time Periods

3.1 Study Area

The study area will include the intersections of:

- Island Park Drive at:
 - Scott Street
 - Richmond Road/Wellington Street West
 - Byron Avenue
- Richmond Road at:
 - Kirkwood Avenue
 - Patricia Avenue
 - Future Site Access
- Wellington Street West at Western Avenue

The boundary roads will be Richmond Road and Island Park Drive, and no screenlines are present within proximity to the site.

3.2 Time Periods

As the proposed development is composed of residential units and has only a small ground-floor retail component, the AM and PM peak hours will be examined.

3.3 Horizon Years

The anticipated build-out year is 2023. As a result, the full build-out plus five years horizon year is 2028.

4 Exemption Review

Table 6 summarizes the exemptions for this TIA.

Table 6: Exemption Review

Module	Element	Explanation	Exempt/Required
Design Review Component			
4.1 Development Design	4.1.2 Circulation and Access	Only required for site plans	Required
	4.1.3 New Street Networks	Only required for plans of subdivision	Exempt
4.2 Parking	4.2.1 Parking Supply	Only required for site plans	Required
	4.2.2 Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand	Exempt
Network Impact Component			

Module	Element	Explanation	Exempt/Required
4.5 Transportation Demand Management	All Elements	Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	Exempt (No network impact components required due to trip generation trigger) A TDM worksheet will be provided and summarized
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Exempt (No network impact components required due to trip generation trigger)
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of equivalent volume permitted by established zoning	Exempt (No network impact components required due to trip generation trigger)

As the Screening Form does not identify the need for a full TIA, Table 7 outlines the additional exemptions recommended for this TIA.

Table 7: Recommended Additional Exemptions

Module	Element	Explanation
Forecasting		
3.1 Development-Generated Travel Demand	All Elements	Trip generation trigger was not met
3.3 Demand Rationalization	All Elements	As trip generation trigger was not met, no demand rationalization is required
Design Review Component		
4.4 Access Intersection Design	4.4.2 Access Intersection Control	Private approach does not require review for a roundabout, signal warrant or transit priority impacts
	4.4.3 Access Intersection Design	Access is not provided through a signalized intersection
Network Impact Component		
4.7 Transit	All Elements	No network impact components required due to trip generation trigger
4.9 Network Intersection Design	All Elements	No network impact components required due to trip generation trigger

5 Background Network Travel Demands

5.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3. The transit signal priority on Richmond Road/Wellington Street is the only confirmed project within the study horizons and is not considered to have any notable impact on the study area traffic volumes and travel patterns.

5.2 Background Growth

A review of the background projections from the City's TRANS Regional Model for the 2011 and 2031 horizons was completed to determine the background growth for each of the study area roadways. Table 8 summarizes the results of the model, and the projections are provided in Appendix E.

Table 8: TRANS Regional Model Projections – Study Area Growth Rates

Street	Direction Growth Percentage	
	Eastbound	Westbound
Scott	-1.12%	1.55%
Richmond	0.31%	1.27%
Wellington	0.35%	1.42%
Byron	1.95%	0.15%
	Northbound	Southbound
Kirkwood	-0.39%	1.83%
Patricia	-6.87%	-0.73%
Island Park	1.53%	-0.24%
Western	0.66%	5.17%

In general, the TRANS projections identify a growth rate range of -1.12% and 1.95%, with low-volume outliers excluded. Appropriate growth rates rounded to the nearest 0.25% will be peak-directionally applied to the mainline volumes and major turning movements of identified links with negative growth rates being applied at zero.

5.3 Other Developments

The background developments were described in Section 2.3.2. Those development applications with traffic studies have been explicitly considered in the background volumes.

5.4 2023 Future Background Intersection Operations

Figure 12 illustrates the 2023 background volumes and Table 9 summarizes the background intersection operations. The level of service for signalized intersections is based on v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The Synchro worksheets are provided in Appendix F.

Figure 12: 2023 Future Background Volumes

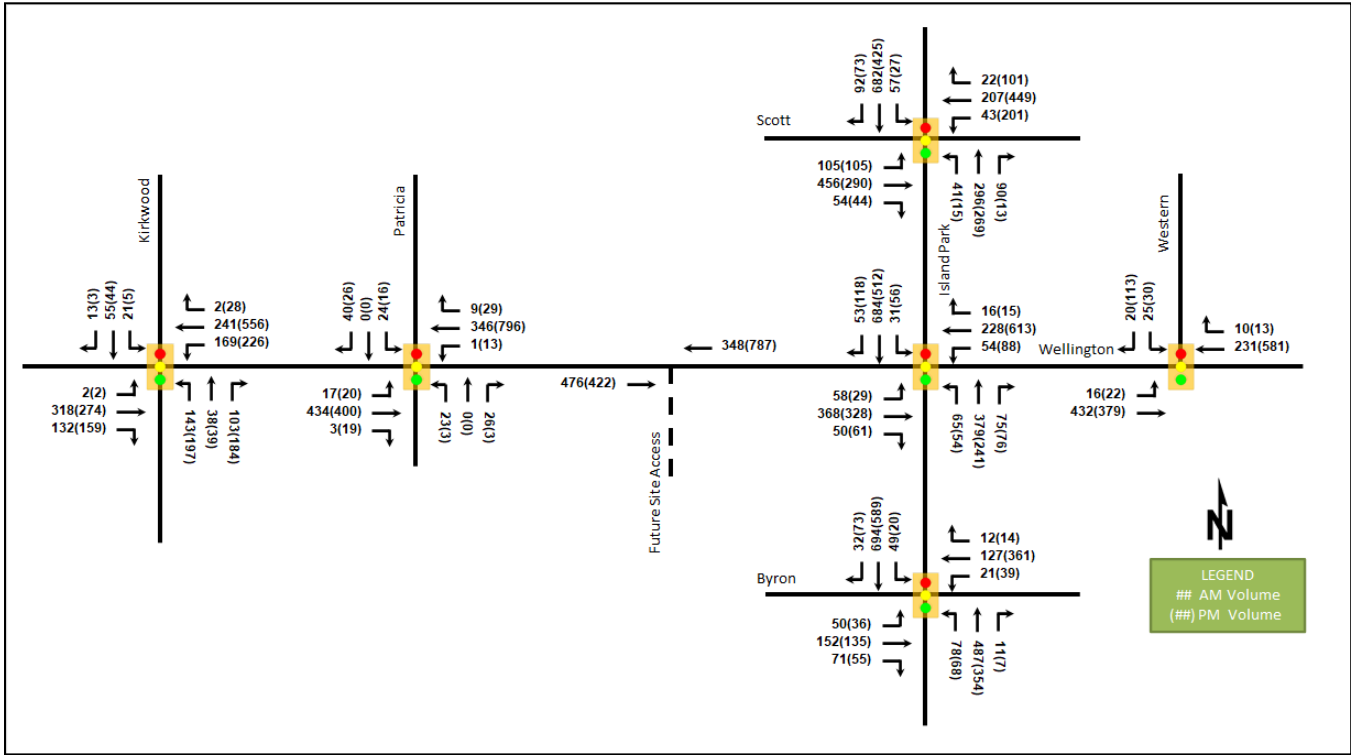


Table 9: 2023 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Richmond Road/Wellington Street W & Island Park Drive <i>Signalized</i>	EB	A	0.48	25.0	48.5	A	0.37	18.1	34.4
	WB	A	0.32	23.0	30.7	B	0.67	24.7	67.9
	NBL	A	0.40	24.6	m13.9	A	0.31	15.2	m7.4
	NBT/R	A	0.52	18.0	74.2	A	0.41	11.1	m29.5
	SBL	A	0.09	3.8	m0.9	A	0.14	14.5	12.0
	SBT/R	D	0.83	10.1	m18.5	C	0.80	28.7	#140.8
	Overall	B	0.68	17.5	-	C	0.74	22.1	-
Richmond Road & Kirkwood Avenue <i>Signalized</i>	EB	A	0.32	10.5	24.6	A	0.24	5.4	19.0
	WB	A	0.42	15.6	30.7	A	0.56	12.2	66.5
	NBL	A	0.30	18.0	26.5	B	0.70	41.9	45.3
	NBT/R	A	0.21	6.3	13.4	A	0.46	9.2	19.6
	SB	A	0.14	13.6	15.3	A	0.13	22.7	13.1
	Overall	A	0.37	12.8	-	A	0.60	13.8	-
Richmond Road & Patricia Avenue <i>Signalized</i>	EB	A	0.18	3.7	18.6	A	0.18	3.0	17.3
	WB	A	0.14	3.5	14.3	A	0.32	3.6	36.3
	NB	A	0.20	12.8	8.8	A	0.03	0.3	0.0
	SB	A	0.26	15.7	11.9	A	0.20	15.2	9.0
	Overall	A	0.20	4.9	-	A	0.32	3.7	-
Wellington Street & Western Avenue <i>Signalized</i>	EB	A	0.18	3.5	18.8	A	0.21	6.6	17.3
	WB	A	0.17	3.9	22.1	A	0.55	10.7	68.3
	NB	-	-	-	-	-	-	-	-
	SB	A	0.14	0.8	0.0	A	0.34	9.9	16.2
	Overall	A	0.19	3.5	-	A	0.49	9.1	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Scott Street & Island Park Drive <i>Signalized</i>	EBL	A	0.29	23.4	26.2	A	0.40	21.3	26.5
	EBT	B	0.69	31.4	103.7	A	0.33	16.3	50.1
	EBR	A	0.10	9.0	8.9	A	0.06	4.2	5.2
	WBL	A	0.21	23.6	13.5	A	0.44	19.8	42.9
	WBT/R	A	0.35	22.5	47.3	B	0.66	22.7	110.3
	NB	E	0.91	50.5	#89.5	A	0.49	27.0	67.0
	SBL	A	0.14	14.6	12.7	A	0.08	21.2	9.1
	SBT/R	E	0.92	40.9	#203.7	C	0.78	37.0	#124.6
	Overall	D	0.82	36.1	-	C	0.71	25.2	-
Byron Avenue & Island Park Drive <i>Signalized</i>	EB	D	0.83	53.3	69.5	A	0.52	26.3	45.5
	WB	A	0.47	35.6	41.3	D	0.84	44.1	#92.9
	NB	B	0.61	13.6	98.9	A	0.52	15.3	72.2
	SB	C	0.72	10.0	m64.9	C	0.72	27.3	m132.0
		Overall	C	0.75	20.1	-	C	0.76	28.2

Notes: Saturation flow rate of 1800 veh/h/lane
Peak Hour Factor = 1.00
Queue is measured in metres

Delay is measured in seconds
m = metered queue
= volume for the 95th %ile cycle exceeds capacity

The study area intersection operations for the 2023 future background horizon generally operate similarly to existing operations at peak hours. The peak hour factor increasing from 0.90 to 1.00 improves the operations for all study area intersections when compared to the existing conditions, and in the case of the northbound approach at the Scot Street and Island Park Drive intersection during the AM peak, this effect is significant. This illustrates that the northbound approach along Island Park Drive is extremely sensitive to any changes in the analysis parameters and network volumes.

5.5 2028 Future Background Intersection Operations

Figure 13 illustrates the 2028 background volumes and Table 10 summarizes the background intersection operations. The level of service for signalized intersections is based on v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The Synchro worksheets are provided in Appendix G.

Figure 13: 2028 Future Background Volumes

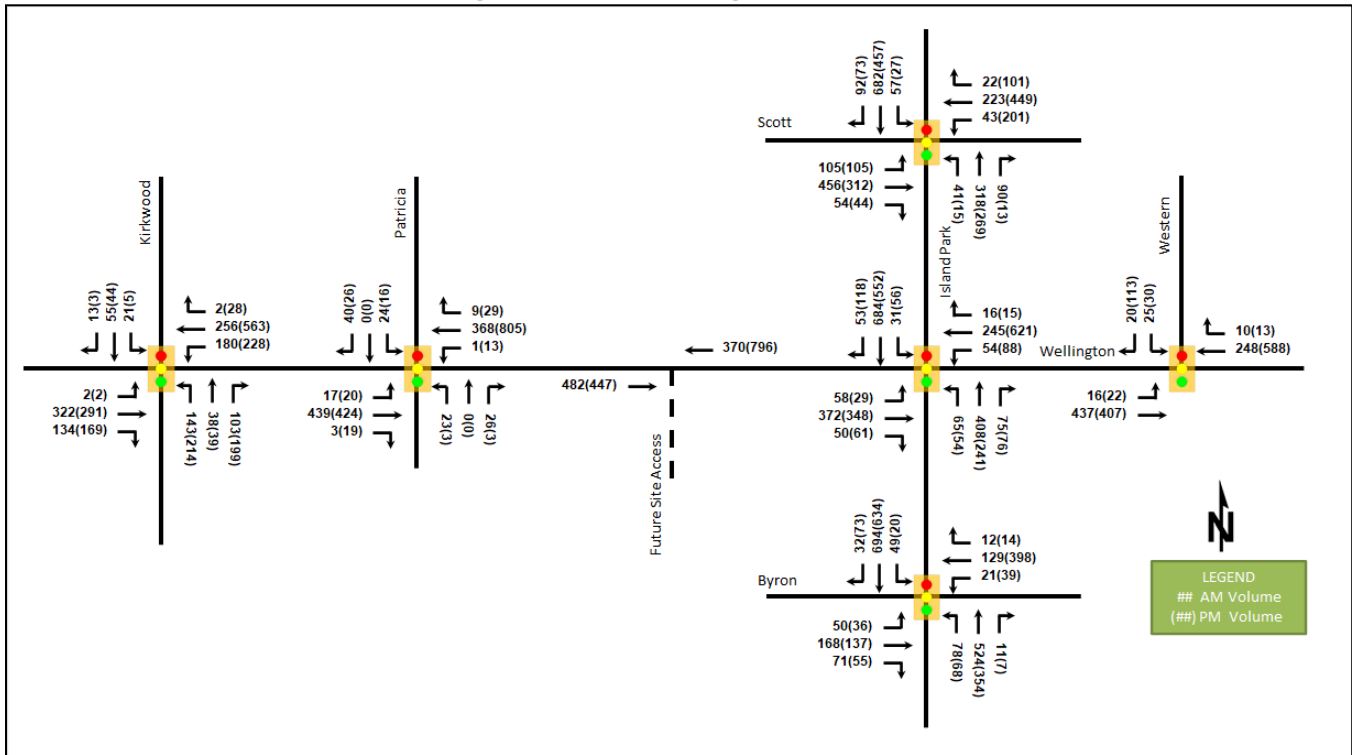


Table 10: 2028 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Richmond Road/Wellington Street W & Island Park Drive <i>Signalized</i>	EB	A	0.49	25.2	49.1	A	0.39	18.5	36.3
	WB	A	0.34	23.4	32.6	B	0.68	25.0	69.1
	NBL	A	0.40	25.4	m13.2	A	0.36	17.5	m7.2
	NBT/R	A	0.55	19.6	81.3	A	0.41	11.2	m30.2
	SBL	A	0.09	3.8	m0.9	A	0.14	14.5	12.0
	SBT/R	D	0.83	10.1	m18.5	D	0.85	32.5	#155.7
	Overall	B	0.68	18.1	-	C	0.77	23.6	-
Richmond Road & Kirkwood Avenue <i>Signalized</i>	EB	A	0.33	10.6	25.0	A	0.26	5.8	21.4
	WB	A	0.45	16.0	33.1	A	0.59	13.3	71.7
	NBL	A	0.30	18.0	26.5	C	0.72	42.4	48.0
	NBT/R	A	0.21	6.3	13.4	A	0.46	8.6	19.4
	SB	A	0.14	13.6	15.3	A	0.13	21.8	12.7
	Overall	A	0.38	13.0	-	B	0.62	14.5	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Richmond Road & Patricia Avenue <i>Signalized</i>	EB	A	0.18	3.7	18.7	A	0.19	3.0	18.3
	WB	A	0.15	3.5	15.2	A	0.32	3.6	36.7
	NB	A	0.20	12.8	8.8	A	0.03	0.3	0.0
	SB	A	0.26	15.7	11.9	A	0.20	15.2	9.0
	Overall	A	0.20	4.9	-	A	0.32	3.7	-
Wellington Street & Western Avenue <i>Signalized</i>	EB	A	0.18	3.5	19.1	A	0.23	6.7	18.6
	WB	A	0.18	3.9	23.6	A	0.56	10.8	69.4
	NB	-	-	-	-	-	-	-	-
	SB	A	0.14	0.8	0.0	A	0.34	9.9	16.2
	Overall	A	0.19	3.5	-	A	0.49	9.2	-
Scott Street & Island Park Drive <i>Signalized</i>	EBL	A	0.30	23.7	26.5	A	0.40	21.3	26.5
	EBT	B	0.69	31.4	103.7	A	0.36	16.7	54.2
	EBR	A	0.10	9.0	8.9	A	0.06	4.2	5.2
	WBL	A	0.21	23.6	13.5	A	0.45	20.4	43.7
	WBT/R	A	0.38	22.9	50.8	B	0.66	22.7	110.3
	NB	E	0.95	57.5	#127.3	A	0.52	27.9	68.6
	SBL	A	0.15	14.8	12.7	A	0.08	21.2	9.1
	SBT/R	E	0.92	40.9	#203.7	D	0.83	40.7	#145.4
	Overall	D	0.83	37.7	-	C	0.73	26.4	-
Byron Avenue & Island Park Drive <i>Signalized</i>	EB	D	0.84	54.0	#76.7	A	0.51	25.5	46.3
	WB	A	0.47	34.9	41.9	D	0.88	46.7	#112.2
	NB	B	0.65	15.0	109.8	A	0.54	16.3	72.7
	SB	C	0.73	10.4	m64.9	C	0.78	30.4	m134.0
	Overall	C	0.76	20.9	-	D	0.82	30.5	-

Notes: Saturation flow rate of 1800 veh/h/lane
Peak Hour Factor = 1.00
Queue is measured in metres

Delay is measured in seconds
m = metered queue
= volume for the 95th %ile cycle exceeds capacity

The study area intersection operations for the 2028 future background horizon operate similarly to the 2023 future background horizon.

6 Development Design

6.1 Design for Sustainable Modes

Bicycle and auto parking are located across two underground parking levels, and hard surface connections are provided from the building entrances to existing area pedestrian facilities.

Area transit route stops are within 400 metres walking distance to the building entrances.

6.2 Circulation and Access

Access to the site is provided via a public lane to Richmond Road. The right of way of the public laneway is 4.9 metres, and a 1.1-metre-wide building setback is provided the east side to permit the lane to function with a width of 6.0 metres. The loading area and parking garage have been recessed from the laneway. Emergency services are able to access the site via the two public road frontages.

The designation of a drop-off area is proposed to the east of the public laneway on Richmond Road via a signed five-minute parking zone. While currently permitted with the existing signage (No Parking) the designation of such a zone would aim to encourage its use as such.

7 Parking

7.1 Parking Supply

The site provides 63 resident vehicle parking spaces and eight visitor vehicle parking spaces across two underground parking levels and 96 total bicycle parking stalls.

Required parking from the zoning by-law is 38 vehicle spaces for tenants (at a rate of 0.5 spaces per unit after the first 12, reduced by 10% as all spaces are located underground), eight vehicle spaces for visitors (at a rate of 0.1 spaces per unit after the first 12 units), and 48 bicycle spaces (at a rate of 0.5 spaces per unit). No vehicle spaces are required for the retail component, given it is on the main floor and its gross floor area is less than 500 m².

The proposed parking meets the minimum requirements including the minimum visitor parking and bicycle parking requirements.

8 Boundary Street Design

Table 11 summarizes the MMLOS analysis for the boundary streets of Richmond Road and Island Park. The existing and future conditions for both intersections will be the same and are considered in one row. The boundary street analysis is based on the policy area of “Within 300m of a school” where both site frontages are within the specified distance of Hilson Avenue Public School. The MMLOS worksheet has been provided in Appendix H.

Table 11: Boundary Street MMLOS Analysis

Segment	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	TkLOS	Target
Richmond Road	A	A	E	C	D	D	C	D
Island Park Drive	C	A	F	D	N/A	D	N/A	E

Island Park Drive does not meet pedestrian LOS targets and both Richmond Road and Island Park Drive do not meet the cycling LOS targets. The traffic volumes on Island Park Drive are above MMLOS thresholds. Bicycle LOS was limited on Richmond Road by mixed traffic conditions, operating speeds, and cross-sectional width and was limited on Island Park Drive by the taper width for the development of the bike lane beyond the intersection limits. Richmond Road would require curbside bike lanes at a minimum to meet its BLOS targets and would require a corridor level study by the City to determine how and where a cycling facility could be implemented. The planned protected intersection implementation at the intersection of Richmond Road/Wellington Street West at Island Park Drive may improve the cycling conditions along the site frontage in future. Transit and truck LOS targets are met on boundary roads.

Crowding PLOS is not considered in the PLOS due to the high-volume threshold. At the lowest threshold given, of 250 pedestrians per hour, the minimum effective sidewalk width required to achieve LOS A would be 3.0 metres, whereby nearly any sidewalk considered for installation in the City would not be able to meet this target.

9 Access Intersections Design

9.1 Location and Design of Access

The residential access will be the public laneway onto Richmond Road, in the existing location of the laneway's right of way. This laneway is located approximately 30 metres west of the signalized intersection of Richmond Road at Island Park Drive. The access is proposed as permitting full movements, 6.0 metres in width, and with a throat length of approximately 16.5 metres. The access meets the minimum width from the zoning by-law's parking queueing and loading provisions.

The proposed access generally meets the Private Approach By-Law (PABL) requirement for a site access. The utilization of the public laneway right-of-way on the western edge of the property removes the access requirements regarding adjacent property limit offset. Within the laneway right-of-way itself, no laneway can sufficiently be located to meet an offset of 3.0 metres, or potential 0.3 metre offset from the adjacent property line. Further to this, the limited site frontage along both Island Park Drive and Richmond Road would not meet the PABL preferred distance requirements for an access to be located 30.0 metres from an adjacent access. The laneway is situated approximately in a midblock location, approximately 24.6 metres from Leighton Terrace and approximately 27.9 metres from Island Park Drive.

Overall, the unique nature of the public laneway is considered to meet the intent of the PABL for the geometry requirements and is located in the optimal location to limit additional accesses within close proximity to the Richmond and Island Park Drive intersection.

10 Transportation Demand Management

10.1 TDM Program

The “suite of post occupancy TDM measures” has been summarized in the TDM checklists for the residential land uses. The checklist is provided in Appendix I. The key TDM measures recommended include:

- Display local area maps with walking and cycling routes, and transit route information and schedules at major entrances
- Provide online links to OC Transpo and STO information
- Inclusion of a 1-month Presto card for first time new townhome purchase and apartment rental, with a set time frame for this offer (e.g. 6-months) from the initial opening of the site
- Unbundle parking cost from purchase or rental costs

11 Summary of Improvements Indicated and Modifications Options

The following summarizes the analysis and results presented in this TIA report:

Proposed Site and Screening

- The proposal for a nine-storey, 96-residential dwelling unit building with 1,455 sq. ft. of ground floor retail uses
- Accesses will be provided along via a public laneway onto Richmond Road, west of its intersection with Island Park Drive
- The development is proposed to be completed as a single phase by 2023
- Only the Location and Safety triggers were met for the TIA Screening

Existing Conditions

- Richmond Road, Wellington Street West, Island Park Drive, Scott Street, and Kirkwood Avenue are arterial roads, and Byron Avenue is a collector road in the study area
- Sidewalks/MUPs are generally provided on both sides of the study area roadways, and on-street bike lanes on both sides of the roadway on Island Park Drive and on the south side of Scott Street and the north side of Byron Avenue
- The high-volume roadways have produced a high number of collisions at the study area intersections, typical of urban areas in Ottawa

- The collisions are predominantly rear end, sideswipe, and turning movement collisions indicating that they are generally lower speed and a result of congestion, and the City completed a review of the intersection and detailed a recommended plan to address collisions including lane reductions, separated cycling facilities, and radii reduction
- Queuing, capacity issues and delays are noted on the northbound and southbound movements of the intersection of Scott Street and Island Park Drive during the AM peak hour. Extended queuing is noted on five additional peak direction movements scattered throughout the study area, but generally the intersections operate well

Background Conditions

- The background developments with traffic studies were explicitly included in the background conditions, along with a total background growth of rounded TRANS rates along appropriate links' mainline volumes and major turning movements
- All study area intersections at will operate similar to the existing conditions with improvements due to the increase in peak hour factor

Development Design

- The bike and auto parking areas are to be located internal to the building
- Pedestrian connections will be made from the building entrance to the sidewalk along Richmond Road and Island Park Drive
- A five-minute designated drop-off area is proposed on Richmond Road between the access and the bus stop through revised road signage
- A loading area and garage ramp have been recessed from the laneway, and emergency services are to access the site via the two public road frontages

Parking

- A total of 63 parking stalls are provided for resident, eight visitor parking stalls and 96 bike stalls are provided, all of which are within the underground garage
- The above parking numbers meet the minimum parking requirements for the site

Boundary Street Design

- The boundary streets will not meet pedestrian MMLOS targets along Island Park Drive and bicycle MMLOS targets along Richmond Road and Island Park Drive
- No improvements are recommended on the federally owned Island Park Drive to address pedestrian LOS which cannot be met given the auto volumes
- No bike lane improvements are recommended for the development recognizing its limited frontage along Richmond Road which would require study by the City for the coordination of facilities along the corridor
- The City's improvement of the Richmond Road and Island Park Drive intersection may improve the cycling and pedestrian levels of service one upgraded to a protected intersection
- Transit and truck LOS targets are met on boundary streets

Access Intersections Design

- A single 6.0 metre-wide full-movements access approximately 30 metres west of the intersection of Richmond Road at Island Park Drive, with a throat length of approximately 16.5 metres

- The access is within a public laneway right-of-way, generally meeting PABL requirements, but given location constraints, is not able to provide an offset from the laneway property line, and is mid-block between Island Park Drive and Leighton Terrace slightly below the required 30 metres distance from each

TDM

- Supportive TDM measures to be included within the proposed development should include:
 - Display local area maps with walking and cycling routes, and transit route information and schedules at major entrances
 - Provide online links to OC Transpo and STO information
 - Inclusion of a 1-month Presto card for first time new townhome purchase and apartment rental, with a set time frame for this offer (e.g. 6-months) from the initial opening of the site
 - Unbundle parking cost from purchase or rental costs

12 Conclusion

It is recommended that, from a transportation perspective, the proposed development application proceed.

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Reviewed By:



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Appendix A

TIA Screening Form and PM Certification Form

City of Ottawa 2017 TIA Guidelines
Step 1 - Screening Form

Date: 19-Oct-22
Project Number: 2022-072
Project Reference: 70 Richmond Road

1.1 Description of Proposed Development	
Municipal Address	70 Richmond Road
Description of Location	SW corner of Island Park Dr @ Richmond Rd/Wellington St W Intersection
Land Use Classification	TM[2792] S 461
Development Size	96 dwelling units, 1,318 sq. ft. retail
Accesses	Access via an existing rear laneway
Phase of Development	One
Buildout Year	2023
TIA Requirement	Design Review Component

1.2 Trip Generation Trigger	
Land Use Type	Townhomes or apartments
Development Size	96 Units
Trip Generation Trigger	See TRANS Trip Generation Manual (2020) site trip generation attached No

1.3 Location Triggers	
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?	Yes
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?	Yes
Location Trigger	Yes

1.4. Safety Triggers	
Are posted speed limits on a boundary street 80 km/hr or greater?	No
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?	No
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?	Yes
Is the proposed driveway within auxiliary lanes of an intersection?	No
Does the proposed driveway make use of an existing median break that serves an existing site?	No
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?	Yes
Does the development include a drive-thru facility?	No
Safety Trigger	Yes

Table 1: Trip Generation Person Trip Rates by Peak Period

Land Use	Land Use Code	Peak Period	Vehicle Trip Rate	Person Trip Rates
Multi-Unit High-Rise	221 & 222 (TRANS)	AM	-	0.80
		PM	-	0.90
Land Use	Land Use Code	Peak Hour	Vehicle Trip Rate	Person Trip Rates
Retail (<40k sq. ft.)	820 (ITE)	AM	2.36	3.02
		PM	6.59	8.44

Table 2: Total Residential Person Trip Generation by Peak Period

Land Use	Units	AM Peak Period			PM Peak Period		
		In	Out	Total	In	Out	Total
Multi-Unit High-Rise	96	24	53	77	50	36	86
Land Use	GFA (sq. ft.)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Retail (<40k sq. ft.)	1,455	2	2	4	6	6	12

Table 3: Trip Generation by Mode

Travel Mode		AM Peak Hour				PM Peak Hour			
		Mode Share	In	Out	Total	Mode Share	In	Out	Total
Multi-Unit (High-Rise)	Auto Driver	28%	3	7	11	33%	7	5	12
	Auto Passenger	11%	1	3	4	11%	3	2	4
	Transit	41%	6	12	18	26%	6	4	10
	Cycling	3%	1	1	1	7%	2	1	3
	Walking	16%	2	5	7	23%	6	4	10
	Total	100%	13	28	41	100%	24	16	39
Retail (<40k sq. ft.)	Auto Driver	55%	0	0	0	50%	1	1	1
	Auto Passenger	11%	0	0	0	16%	1	1	2
	Transit	11%	0	0	0	11%	1	1	1
	Cycling	0%	0	0	0	5%	0	0	1
	Walking	23%	0	0	1	18%	1	1	2
	Pass-by	40%	-1	-1	-2	40%	-2	-2	-4
	Internal Capture	varies	0	0	0	varies	0	-1	-1
Total	100%	0	0	1	100%	4	4	7	
Total	Auto Driver	-	3	7	11	-	8	6	13
	Auto Passenger	-	1	3	4	-	4	3	6
	Transit	-	6	12	18	-	7	5	11
	Cycling	-	1	1	1	-	2	1	4
	Walking	-	2	5	8	-	7	5	12
	Total	-	13	28	42	-	28	20	46

As shown above, a total of 43 AM and 46 PM new peak hour two-way person trips are projected as a result of the proposed development.



TIA Plan Reports

On 14 June 2017, the Council of the City of Ottawa adopted new Transportation Impact Assessment (TIA) Guidelines. In adopting the guidelines, Council established a requirement for those preparing and delivering transportation impact assessments and reports to sign a letter of certification.

Individuals submitting TIA reports will be responsible for all aspects of development-related transportation assessment and reporting, and undertaking such work, in accordance and compliance with the City of Ottawa's Official Plan, the Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines.

By submitting the attached TIA report (and any associated documents) and signing this document, the individual acknowledges that s/he meets the four criteria listed below.

CERTIFICATION

1. I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;
2. I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
3. I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
4. I am either a licensed¹ or registered² professional in good standing, whose field of expertise [check appropriate field(s)] is either transportation engineering or transportation planning .

1,2 License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.


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Planning and Growth Management
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collectivités
Urbanisme et Gestion de la croissance
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Télécopieur: 613-560-6006

Dated at Ottawa this 20 day of September, 2018.
(City)

Name: Andrew Harte
(Please Print)

Professional Title: Professional Engineer


Signature of Individual certifier that s/he meets the above four criteria

Office Contact Information (Please Print)
Address: 6 Plaza Court
City / Postal Code: Ottawa / K2H 7W1
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E-Mail Address: Andrew.Harte@CGHTransportation.com



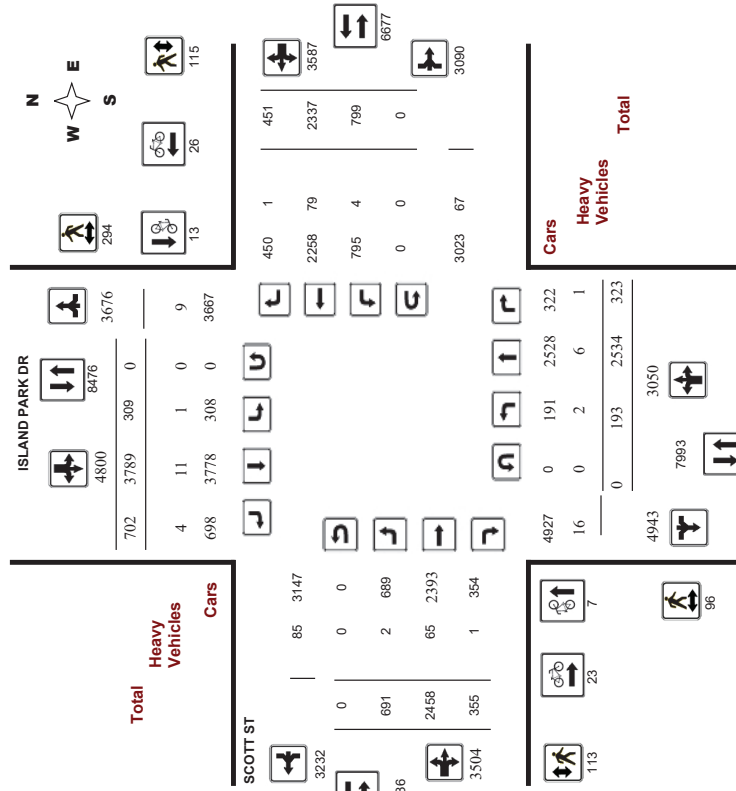
Appendix B

Turning Movement Counts

Survey Date: Tuesday, March 28, 2017
 Start Time: 07:00

WO No: 36808
 Device: Miovision

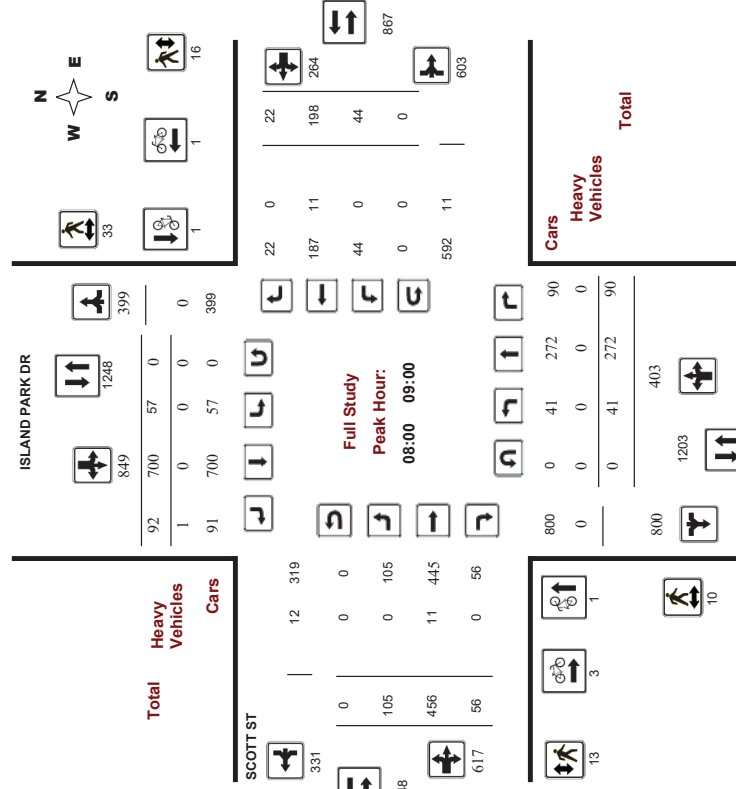
Full Study Diagram



Survey Date: Tuesday, March 28, 2017
 Start Time: 07:00

WO No: 36808
 Device: Miovision

Full Study Peak Hour Diagram





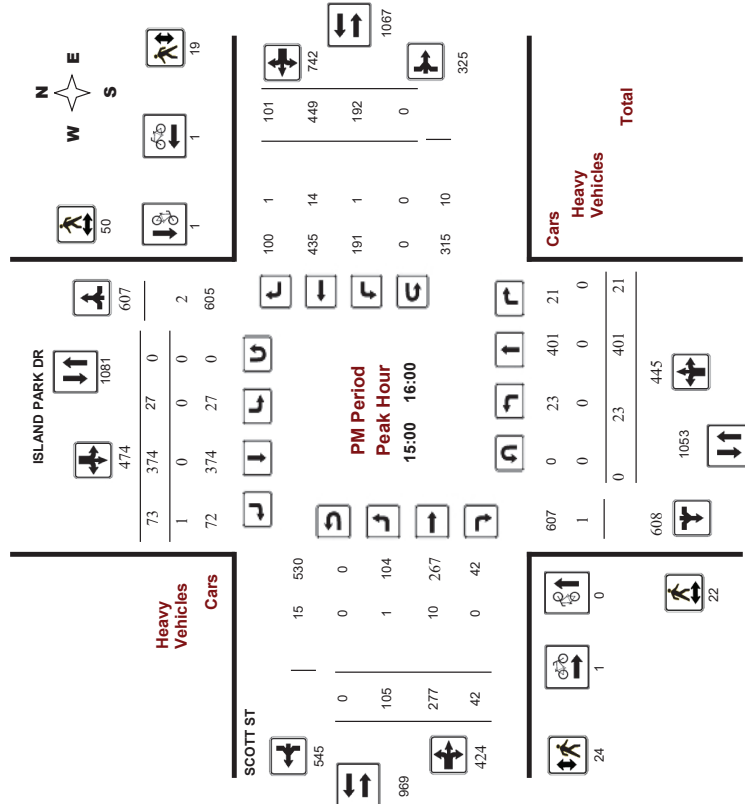
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ISLAND PARK DR @ SCOTT ST

Survey Date: Tuesday, March 28, 2017
Start Time: 07:00

WO No: 36808
Device: Miovision



Comments



Transportation Services - Traffic Services

Turning Movement Count - Study Results

ISLAND PARK DR @ SCOTT ST

Survey Date: Tuesday, March 28, 2017
Start Time: 07:00

WO No: 36808
Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Tuesday, March 28, 2017

Total Observed U-Turns
 Northbound: 0
 Southbound: 0
 Eastbound: 0
 Westbound: 0
AADT Factor
 1.00

Period	ISLAND PARK DR								SCOTT ST								WB TOT	STR TOT	Grand Total		
	Northbound				Southbound				Eastbound				Westbound								
	LT	ST	RT	TOT	NB	LT	ST	RT	TOT	SB	STR	LT	ST	RT	TOT	EB				LT	ST
07:00-08:00	20	242	79	341	32	686	66	794	1135	48	373	40	461	24	149	6	179	640	1775		
08:00-09:00	41	272	90	403	57	700	92	849	1252	105	456	56	617	44	198	22	264	881	2133		
09:00-10:00	37	313	34	384	42	542	107	691	1075	69	270	32	371	37	196	14	247	618	1693		
11:30-12:30	24	378	36	438	27	397	100	524	962	81	223	46	350	54	238	22	314	664	1626		
12:30-13:30	34	408	38	480	40	387	83	510	990	107	222	27	356	51	207	30	288	644	1634		
15:00-16:00	23	401	21	445	27	374	73	474	919	105	277	42	424	192	449	101	742	1166	2085		
16:00-17:00	5	204	9	218	38	330	84	452	670	80	309	56	445	244	449	150	843	1288	1958		
17:00-18:00	9	316	16	341	46	363	97	506	847	96	328	56	480	153	451	106	710	1190	2037		
Sub Total	183	2534	323	3050	309	3789	702	4800	7850	691	2458	355	3504	799	2337	451	3587	7091	14941		
U-Turns	0				0				0				0				0	0	0	0	0
Total	183	2534	323	3050	309	3789	702	4800	7850	691	2458	355	3504	799	2337	451	3587	7091	14941		
EQ 12hr	268	3522	449	4240	430	5267	976	6672	10912	960	3417	493	4871	1111	3248	627	4986	9856	20768		
Note: These values are calculated by multiplying the totals by the appropriate expansion factor: 1.39																					
AVG 12hr	253	3320	423	3996	405	4964	920	6288	10912	905	3220	465	4590	1047	3061	591	4699	9856	20768		
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor: 1																					
AVG 24hr	331	4349	554	5234	530	6502	1205	8237	13471	1186	4218	609	6013	1371	4011	774	6156	12169	25640		

Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor: **1.31**
 Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.



Transportation Services - Traffic Services
Turning Movement Count - Study Results
ISLAND PARK DR @ SCOTT ST

Survey Date: Tuesday, March 28, 2017
Start Time: 07:00

WO No: 36808
Device: Miovision

Full Study 15 Minute Increments
ISLAND PARK DR
SCOTT ST

Time Period	Northbound				Eastbound				Westbound				W	STR	Grand					
	LT	ST	RT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT				RT	TOT			
07:00	0	66	13	79	7	197	16	220	0	8	64	6	78	5	27	0	32	0	409	
07:15	0	45	17	69	9	166	13	188	1	9	80	12	101	3	40	0	43	1	401	
07:30	0	64	25	95	7	177	19	203	1	15	89	8	112	5	28	2	35	1	445	
07:45	0	67	24	98	9	156	18	183	1	16	140	14	170	11	54	4	69	1	520	
08:00	0	64	27	100	8	200	16	224	0	21	105	12	138	7	37	5	49	0	511	
08:15	0	71	24	108	18	164	18	200	1	25	117	11	153	13	46	7	66	1	527	
08:30	0	79	17	106	12	171	26	211	0	33	116	20	169	14	51	2	67	0	553	
08:45	0	58	22	89	19	165	30	214	0	26	118	13	157	10	64	8	82	0	542	
09:00	0	13	104	12	129	13	154	23	190	2	26	89	7	122	12	51	1	64	2	505
09:15	0	8	75	6	90	13	135	28	176	0	20	66	8	94	11	59	6	76	0	436
09:30	0	8	75	10	93	8	133	29	170	0	15	72	7	94	10	41	4	55	0	412
09:45	0	10	89	6	105	1	100	25	126	3	18	54	5	77	16	55	9	80	3	388
11:30	0	6	102	3	111	4	98	20	122	1	20	56	11	87	16	59	6	81	1	401
12:00	0	6	102	12	120	11	83	27	121	1	26	49	13	88	9	78	6	93	1	422
12:15	0	2	85	15	102	11	116	28	155	2	17	64	17	98	13	46	1	60	2	415
12:30	0	8	109	12	129	5	101	24	130	4	25	64	5	94	17	51	10	78	4	431
12:45	0	9	99	10	117	17	106	25	148	1	29	57	6	92	11	53	6	70	1	427
13:00	0	7	99	9	115	9	105	14	128	1	23	57	7	87	7	57	6	70	1	404
13:15	0	2	136	3	141	3	85	19	107	0	37	70	9	116	48	102	17	167	0	526
15:30	0	3	96	8	107	6	107	21	134	0	27	78	12	117	51	113	28	192	0	490
15:45	0	2	80	7	89	8	94	25	127	1	22	67	8	97	50	125	31	206	1	519
16:00	0	4	43	5	52	9	75	36	120	0	27	83	17	127	54	118	28	200	0	499
16:15	0	1	50	0	51	11	82	13	106	0	12	82	9	103	61	103	44	208	0	468
16:30	0	0	50	0	50	12	88	13	113	1	22	73	18	113	65	113	36	214	1	480
16:45	0	61	4	65	6	85	22	113	1	19	71	12	102	64	115	42	221	1	501	
17:00	0	3	59	2	64	7	91	22	120	0	19	94	24	137	53	127	42	222	0	543
17:15	0	0	79	3	82	14	95	30	139	1	28	81	10	119	39	136	20	195	1	535
17:30	0	4	66	4	74	11	96	25	132	0	27	83	10	120	30	101	25	156	0	482
17:45	0	2	112	7	121	14	81	20	115	0	22	70	12	104	31	87	19	137	0	477
Total:	193	2534	323	3050	309	3789	702	4900	25	691	2458	355	3504	799	2337	451	3587	25	14941	

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services
Turning Movement Count - Study Results
ISLAND PARK DR @ SCOTT ST

Survey Date: Tuesday, March 28, 2017
Start Time: 07:00

WO No: 36808
Device: Miovision

Full Study Cyclist Volume
ISLAND PARK DR
SCOTT ST

Time Period	Northbound		Southbound		Street Total		Eastbound		Westbound		Street Total		Grand Total
	07:15	07:30	07:45	08:00	08:15	08:30	08:45	09:00	09:15	09:30	09:45	10:00	
07:00	0	2	2	0	0	0	0	0	0	0	0	0	2
07:15	0	2	2	0	0	0	0	0	0	0	0	0	2
07:30	1	0	0	0	0	0	0	0	0	0	0	0	4
07:45	0	0	1	1	1	1	1	5	1	1	1	6	7
08:00	0	1	1	1	1	1	1	0	0	0	0	1	2
08:15	0	0	0	0	0	0	0	0	0	0	0	0	1
08:30	0	0	0	0	0	0	0	2	0	0	0	2	2
08:45	0	0	0	0	0	0	0	1	0	0	0	1	1
09:00	0	0	0	0	0	0	0	1	0	0	0	1	2
09:15	0	0	0	0	0	0	0	2	0	0	0	2	4
09:30	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45	1	3	3	3	4	4	1	1	0	0	0	1	5
10:00	0	0	0	0	0	0	0	1	0	0	0	1	1
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0	0	0	0	0
13:45	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	1	0	0	0	0	0	0	0	0	0	0	0	1
16:30	1	0	0	0	0	0	0	0	0	0	0	0	2
16:45	1	0	0	0	0	0	0	0	0	0	0	0	3
17:00	2	0	0	0	0	0	0	0	0	0	0	0	3
17:15	0	1	1	1	1	1	1	0	0	0	0	0	8
17:30	0	1	1	1	1	1	1	1	1	1	1	4	5
17:45	0	0	0	0	0	0	0	0	0	0	0	0	3
17:50	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	7	13	13	13	20	20	23	23	26	26	49	69	69



Transportation Services - Traffic Services
Turning Movement Count - Study Results
ISLAND PARK DR @ SCOTT ST

Survey Date: Tuesday, March 28, 2017
Start Time: 07:00

WO No: 36808
Device: Miovision

Full Study Pedestrian Volume
ISLAND PARK DR
SCOTT ST

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	3	3	6	1	2	3	9
07:15 07:30	3	11	14	5	4	9	23
07:30 07:45	2	13	15	6	5	11	26
07:45 08:00	0	5	5	0	1	1	6
08:00 08:15	2	7	9	7	1	8	17
08:15 08:30	4	7	11	3	2	5	16
08:30 08:45	2	13	15	2	12	14	29
08:45 09:00	2	6	8	1	1	2	10
09:00 09:15	1	3	4	0	1	1	5
09:15 09:30	1	1	2	0	2	2	4
09:30 09:45	0	1	1	2	0	2	3
09:45 10:00	2	1	3	0	1	1	4
11:30 11:45	0	9	9	0	1	1	10
11:45 12:00	0	8	8	0	5	5	13
12:00 12:15	6	13	19	2	2	4	23
12:15 12:30	2	15	17	6	4	10	27
12:30 12:45	1	13	14	2	11	13	27
12:45 13:00	1	5	6	4	2	6	12
13:00 13:15	0	8	8	4	2	6	14
13:15 13:30	3	2	5	1	1	2	7
15:00 15:15	5	10	15	2	1	3	18
15:15 15:30	4	8	12	3	7	10	22
15:30 15:45	3	21	24	12	2	14	38
15:45 16:00	10	11	21	7	9	16	37
16:00 16:15	6	3	9	5	2	7	16
16:15 16:30	1	13	14	7	2	9	23
16:30 16:45	6	10	16	4	4	8	24
16:45 17:00	7	10	17	4	4	8	25
17:00 17:15	7	20	27	7	7	14	41
17:15 17:30	5	17	22	3	6	9	31
17:30 17:45	6	19	25	6	13	19	38
17:45 18:00	1	8	9	6	5	11	20
Total	96	294	390	113	115	228	618



Transportation Services - Traffic Services
Turning Movement Count - Study Results
ISLAND PARK DR @ SCOTT ST

Survey Date: Tuesday, March 28, 2017
Start Time: 07:00

WO No: 36808
Device: Miovision

Full Study Heavy Vehicles
ISLAND PARK DR
SCOTT ST

Time Period	Northbound			Southbound			Eastbound			Westbound			W STR TOT	STR TOT	Grand Total							
	LT	ST	RT	N TOT	LT	ST	RT	S TOT	LT	ST	RT	E TOT				LT	ST	RT				
07:00 07:15	0	0	0	0	0	0	0	0	0	0	0	2	1	3	0	3	0	3	6	6		
07:15 07:30	0	0	1	1	0	0	0	0	0	0	0	3	0	1	0	1	0	1	0	1	4	5
07:30 07:45	0	1	0	1	0	0	0	0	1	0	1	0	1	0	1	1	2	0	3	4	5	
07:45 08:00	0	0	0	0	0	0	1	1	1	0	4	0	4	1	2	0	3	7	8	8	8	
08:00 08:15	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	4	0	4	5	5	5	
08:15 08:30	0	0	0	0	0	0	1	1	1	0	3	0	3	0	3	0	3	6	7	7	7	
08:30 08:45	0	0	0	0	0	0	0	0	0	0	4	0	4	0	4	0	4	8	8	8	8	
08:45 09:00	0	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	3	3	3	3	3	
09:00 09:15	0	2	0	2	0	0	0	0	2	0	2	0	2	1	4	0	5	7	9	9	9	
09:15 09:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	
09:30 09:45	0	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	3	3	3	3	
09:45 10:00	0	0	0	0	1	0	0	1	1	0	4	0	4	0	1	0	1	5	6	6	6	
11:30 11:45	0	2	0	2	0	1	0	1	3	0	3	0	3	0	5	0	5	8	11	11	11	
11:45 12:00	0	1	0	1	0	0	0	0	1	0	3	0	3	0	1	0	1	4	5	5	5	
12:00 12:15	0	0	0	0	0	0	1	1	1	1	1	1	1	0	2	0	2	4	5	5	5	
12:15 12:30	0	0	0	0	0	2	0	2	2	0	2	0	2	0	4	0	4	6	6	6	6	
12:30 12:45	2	0	0	2	0	2	0	2	4	0	2	0	2	0	3	0	3	5	5	5	5	
12:45 13:00	0	0	0	0	0	1	1	1	1	1	3	0	3	0	2	0	2	5	6	6	6	
13:00 13:15	0	0	0	0	0	1	0	1	1	1	0	2	0	2	0	4	0	4	6	6	6	
13:15 13:30	0	0	0	0	0	1	0	1	1	0	2	0	2	0	1	0	1	3	4	4	4	
15:00 15:15	0	0	0	0	0	0	0	0	0	0	5	0	5	0	5	0	5	10	10	10	10	
15:15 15:30	0	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	3	3	3	3	
15:30 15:45	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	5	1	6	8	8	8	
15:45 16:00	0	0	0	0	0	0	1	1	1	0	2	0	2	0	1	3	0	4	6	7	7	
16:00 16:15	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2	2	2	
16:15 16:30	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2	2	2	
16:30 16:45	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	3	0	3	3	3	3	
16:45 17:00	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00 17:15	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
17:15 17:30	0	0	0	0	0	0	0	0	0	0	4	0	4	0	2	0	2	6	6	6	6	
17:30 17:45	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	0	1	1	1	1	1	1
17:45 18:00	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2	2	2	2
17:45 18:00	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2	2	2	2
Total	2	6	1	9	1	11	4	16	25	2	65	1	68	4	79	1	84	152	177	177	177	

Transportation Services - Traffic Services
Turning Movement Count - Study Results
ISLAND PARK DR @ SCOTT ST

Survey Date: Tuesday, March 28, 2017 **WO No:** 36808
Start Time: 07:00 **Device:** Miovision

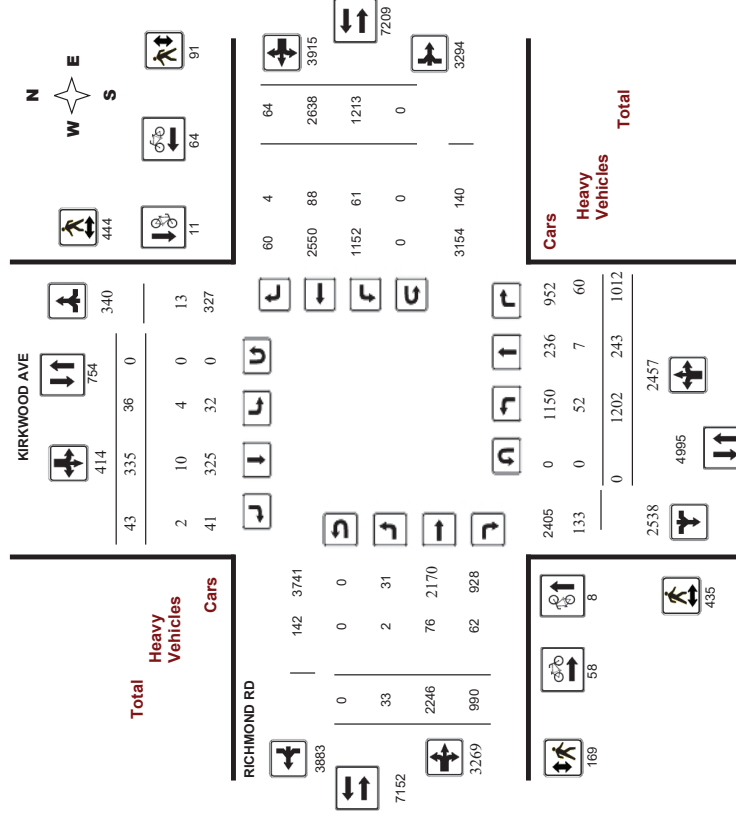
Full Study 15 Minute U-Turn Total
ISLAND PARK DR

Time Period	Northbound		Southbound		Eastbound		Westbound		Total
	U-Turn	Total	U-Turn	Total	U-Turn	Total	U-Turn	Total	
07:00	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0

Transportation Services - Traffic Services
Turning Movement Count - Study Results
KIRKWOOD AVE @ RICHMOND RD

Survey Date: Thursday, April 20, 2017 **WO No:** 36956
Start Time: 07:00 **Device:** Miovision

Full Study Diagram





Transportation Services - Traffic Services

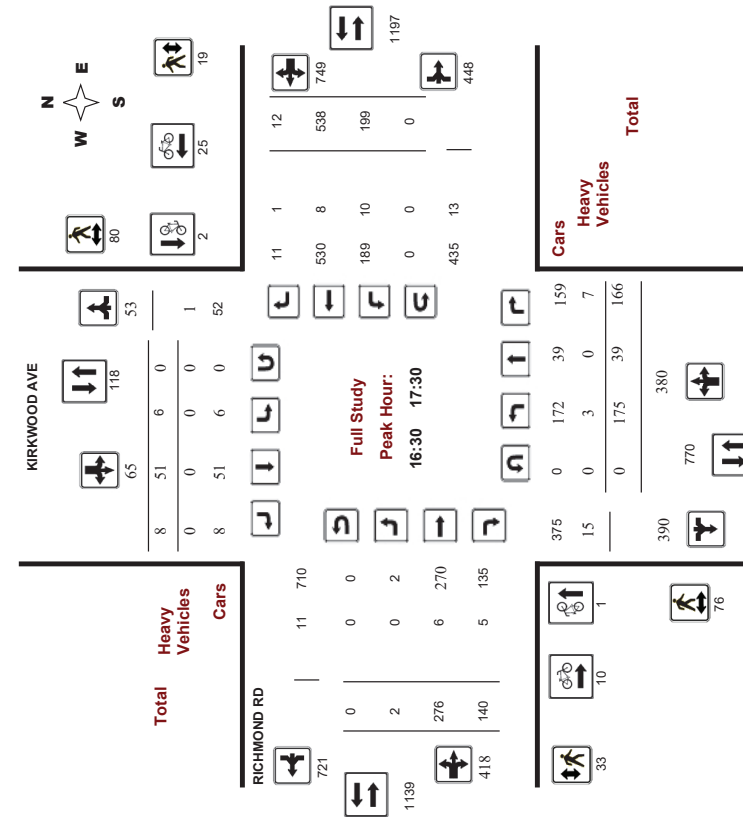
Turning Movement Count - Study Results

KIRKWOOD AVE @ RICHMOND RD

Survey Date: Thursday, April 20, 2017
Start Time: 07:00

WO No: 36956
Device: Miovision

Full Study Peak Hour Diagram



Comments



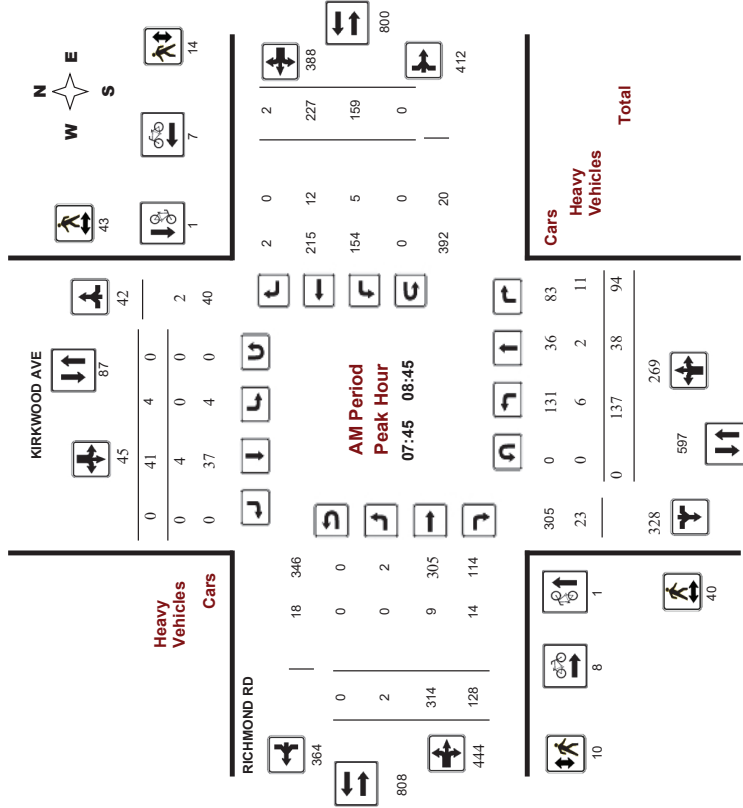
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

KIRKWOOD AVE @ RICHMOND RD

Survey Date: Thursday, April 20, 2017
Start Time: 07:00

WO No: 36956
Device: Miovision



Comments



Transportation Services - Traffic Services
Turning Movement Count - Study Results
KIRKWOOD AVE @ RICHMOND RD

Survey Date: Thursday, April 20, 2017 **WO No:** 36956
Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Thursday, April 20, 2017 **Total Observed U-Turns** **AAADT Factor**
 Northbound: 0 Southbound: 0 90
 Eastbound: 0 Westbound: 0

Period	Northbound				Southbound				Eastbound				Westbound				WB TOT	STR TOT	Grand Total
	LT	ST	RT	TOT	NB	LT	ST	RT	EB	LT	ST	RT	WB	LT	ST	RT			
07:00-08:00	126	33	70	229	3	38	1	42	271	8	274	106	388	135	139	2	276	664	935
08:00-09:00	135	34	98	267	3	39	0	42	309	2	294	127	423	160	217	3	380	803	1112
09:00-10:00	129	30	109	268	6	37	6	49	317	5	242	87	334	126	235	5	366	700	1017
11:30-12:30	137	20	121	278	5	31	10	46	324	6	287	138	431	115	339	13	467	898	1222
12:30-13:30	152	26	139	317	0	23	3	26	343	4	324	140	488	120	314	10	444	912	1255
15:00-16:00	146	30	143	319	10	74	5	89	408	2	281	128	411	165	394	5	564	975	1383
16:00-17:00	191	27	171	389	3	47	9	59	448	2	263	121	386	201	511	15	727	1113	1661
17:00-18:00	186	43	161	390	6	46	9	61	451	4	281	143	428	191	489	11	691	1119	1570
Sub Total	1202	243	1012	2457	36	335	43	414	2871	33	2246	990	3269	1213	2638	64	3915	7184	10055
U-Turns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1202	243	1012	2457	36	335	43	414	2871	33	2246	990	3269	1213	2638	64	3915	7184	10055
EQ 12hr	1671	338	1407	3415	50	466	60	575	3991	46	3122	1376	4544	1686	3667	89	5442	9866	13976

Note: These values are calculated by multiplying the totals by the appropriate expansion factor.
 Note: These values are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.
 Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.
AVG 12hr 1417 286 1193 2897 42 395 51 488 392 39 2648 1167 3854 1430 3110 75 4616 8987 12578
AVG 24hr 1856 375 1563 3795 56 517 66 639 4434 51 3469 1529 5049 1873 4074 99 6047 11096 15530
 Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.
 Note: U-Turns provided for approach totals. Refer to "U-Turn" Report for specific breakdown.



Transportation Services - Traffic Services
Turning Movement Count - Study Results
KIRKWOOD AVE @ RICHMOND RD

Survey Date: Thursday, April 20, 2017 **WO No:** 36956
Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

Time Period	Northbound				Southbound				Eastbound				Westbound				W TOT	STR TOT	Grand Total
	LT	ST	RT	TOT	N	LT	ST	RT	S	STR	ST	RT	E	LT	ST	RT			
07:00	22	9	12	43	0	6	1	7	2	3	47	21	71	37	33	1	71	2	192
07:15	32	6	18	56	0	5	0	5	9	1	59	26	86	18	21	0	39	9	186
07:30	34	8	23	65	2	11	0	13	6	2	79	33	114	46	38	1	85	6	277
07:45	38	10	17	65	1	16	0	17	8	2	89	26	117	34	47	0	81	8	280
08:00	27	9	26	62	0	7	0	7	5	0	76	35	111	43	56	1	100	5	280
08:15	38	10	21	69	0	2	0	2	6	0	74	32	106	34	64	1	99	6	276
08:30	34	9	30	73	3	16	0	19	4	0	75	35	110	48	60	0	108	4	310
08:45	36	6	21	63	0	14	0	14	7	2	69	25	96	35	37	1	73	7	246
09:00	30	7	26	63	2	7	1	10	2	0	62	25	87	32	52	2	86	2	246
09:15	27	11	31	69	2	11	2	15	4	0	65	19	84	30	67	0	97	4	265
09:30	32	7	29	68	1	9	1	11	5	2	53	25	80	27	61	2	90	5	249
09:45	40	5	23	68	1	10	2	13	4	3	62	18	83	37	55	1	93	4	257
11:30	34	4	29	67	1	12	2	15	8	0	74	36	110	26	80	4	110	8	302
11:45	30	5	22	57	3	8	0	11	2	4	74	30	108	30	92	4	128	2	302
12:00	45	6	34	85	0	5	4	9	5	1	72	41	114	34	77	4	115	5	323
12:15	28	5	36	69	1	6	4	11	5	1	67	31	99	25	90	1	116	5	295
12:30	43	6	34	83	0	4	2	6	5	1	77	32	110	28	74	3	108	5	305
12:45	34	8	37	79	0	10	0	10	6	1	80	37	118	27	83	1	111	6	318
13:00	32	7	30	69	0	3	1	4	0	0	82	32	114	31	81	4	116	0	303
13:15	43	5	38	86	0	6	0	6	4	2	85	39	126	33	76	2	111	4	329
15:00	33	8	32	73	3	22	1	28	2	0	77	32	109	33	74	2	108	2	317
15:15	32	5	38	75	3	9	1	13	4	0	69	30	99	51	101	0	152	4	339
15:30	45	10	39	94	1	24	1	26	5	2	66	26	94	36	103	0	139	5	353
15:45	36	7	34	77	3	19	2	24	1	0	69	40	109	45	116	3	164	1	374
16:00	52	8	52	112	3	12	2	17	4	2	74	30	106	38	118	5	161	4	396
16:15	58	5	38	101	0	10	3	13	7	0	56	25	81	57	134	2	193	7	368
16:30	32	7	42	81	0	14	4	18	1	0	67	26	93	61	132	6	199	1	391
16:45	49	7	39	95	0	11	0	11	4	0	66	40	106	45	127	2	174	4	386
17:00	41	13	44	98	4	13	4	21	1	0	62	44	106	56	162	2	220	1	445
17:15	53	12	44	106	2	13	0	15	4	2	81	30	113	37	117	2	156	4	390
17:30	37	5	35	77	0	9	2	11	0	0	67	37	104	60	122	5	187	0	379
17:45	13	13	41	109	0	11	3	14	5	2	71	32	105	38	88	2	128	5	356
Total:	1202	243	1012	2457	36	335	43	414	135	33	2246	990	3269	1213	2638	64	3915	135	10,055

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services
Turning Movement Count - Study Results
KIRKWOOD AVE @ RICHMOND RD

Survey Date: Thursday, April 20, 2017
Start Time: 07:00

WO No: 36956
Device: Miovision

Full Study Cyclist Volume
RICHMOND RD

Time Period	KIRKWOOD AVE		RICHMOND RD		Street Total	Grand Total
	Northbound	Southbound	Eastbound	Westbound		
07:00 07:15	0	0	4	1	5	5
07:15 07:30	0	0	2	2	4	4
07:30 07:45	1	0	5	1	6	7
07:45 08:00	0	0	2	1	3	3
08:00 08:15	0	0	1	3	4	4
08:15 08:30	1	0	2	1	3	4
08:30 08:45	0	1	3	2	5	6
08:45 09:00	0	0	2	2	4	4
09:00 09:15	0	0	0	1	1	1
09:15 09:30	0	1	3	2	5	6
09:30 09:45	0	0	1	0	2	2
09:45 10:00	0	0	0	0	0	0
10:00 10:15	0	0	0	0	0	0
10:15 10:30	1	0	1	3	3	4
10:30 10:45	1	1	2	1	2	4
10:45 11:00	1	0	1	0	0	1
11:00 11:15	0	0	0	0	0	0
11:15 11:30	0	0	1	1	2	1
11:30 11:45	0	0	1	0	1	1
11:45 12:00	0	0	1	0	1	1
12:00 12:15	0	0	1	0	1	1
12:15 12:30	1	0	1	1	2	3
12:30 12:45	0	0	1	1	2	2
12:45 13:00	0	0	1	1	2	2
13:00 13:15	0	0	2	0	2	2
13:15 13:30	0	0	0	1	1	1
13:30 13:45	0	0	1	1	2	2
13:45 14:00	0	0	2	0	2	2
14:00 14:15	0	0	2	2	4	5
14:15 14:30	0	0	2	0	2	2
14:30 14:45	0	0	0	0	0	0
14:45 15:00	0	0	4	0	4	6
15:00 15:15	0	0	0	0	0	0
15:15 15:30	0	0	0	2	2	2
15:30 15:45	0	0	0	2	2	2
15:45 16:00	0	1	2	2	4	5
16:00 16:15	0	4	2	0	2	6
16:15 16:30	0	0	0	2	2	2
16:30 16:45	0	0	3	5	8	8
16:45 17:00	0	2	4	8	12	14
17:00 17:15	0	0	1	3	4	4
17:15 17:30	1	0	2	9	11	12
17:30 17:45	0	1	5	5	10	11
17:45 18:00	1	0	1	3	8	9
Total	8	11	58	64	122	141



Transportation Services - Traffic Services
Turning Movement Count - Study Results
KIRKWOOD AVE @ RICHMOND RD

Survey Date: Thursday, April 20, 2017
Start Time: 07:00

WO No: 36956
Device: Miovision

Full Study Pedestrian Volume
RICHMOND RD

Time Period	KIRKWOOD AVE		RICHMOND RD		Total	Grand Total
	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)		
07:00 07:15	0	3	1	0	1	4
07:15 07:30	3	7	1	2	3	13
07:30 07:45	9	7	6	4	10	26
07:45 08:00	16	14	1	4	5	35
08:00 08:15	14	9	1	5	6	29
08:15 08:30	7	11	3	4	7	25
08:30 08:45	3	9	5	1	6	18
08:45 09:00	10	11	1	0	1	22
09:00 09:15	8	3	3	1	4	15
09:15 09:30	13	6	1	1	2	21
09:30 09:45	8	15	6	2	8	31
09:45 10:00	14	14	1	0	1	29
10:00 10:15	16	17	2	1	3	36
10:15 10:30	13	3	14	2	3	30
10:30 10:45	11	19	10	3	13	45
10:45 11:00	11	4	2	2	4	34
11:00 11:15	11	11	5	2	7	29
11:15 11:30	8	17	8	1	9	34
11:30 11:45	16	14	7	2	9	39
11:45 12:00	16	13	7	1	8	37
12:00 12:15	16	13	7	1	8	37
12:15 12:30	15	22	11	3	14	51
12:30 12:45	11	11	12	1	2	35
12:45 13:00	13	20	10	6	16	51
13:00 13:15	13	20	5	4	9	42
13:15 13:30	25	15	14	5	19	59
13:30 13:45	13	11	7	3	10	34
13:45 14:00	22	19	2	5	7	48
14:00 14:15	18	17	5	6	11	46
14:15 14:30	16	23	8	2	10	49
14:30 14:45	20	21	18	6	24	65
14:45 15:00	21	20	9	9	18	59
15:00 15:15	20	18	6	4	10	48
Total	435	444	169	91	260	1139



Transportation Services - Traffic Services
Turning Movement Count - Study Results
KIRKWOOD AVE @ RICHMOND RD

Survey Date: Thursday, April 20, 2017
Start Time: 07:00

WO No: 36956
Device: Miovision

Full Study Heavy Vehicles

Time Period	Northbound				Southbound				Eastbound				Westbound				Grand Total			
	LT	ST	RT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT				
07:00	1	0	1	2	0	0	0	0	2	0	1	0	1	0	3	0	3	4	6	
07:15	5	0	4	9	0	0	0	0	9	0	4	2	6	2	2	0	4	10	19	
07:30	3	0	2	5	0	1	0	1	6	0	4	2	6	2	2	0	4	10	16	
07:45	08:00	2	1	3	6	0	2	0	8	0	3	3	6	0	3	0	3	9	17	
08:00	08:15	1	0	3	4	0	1	0	1	5	0	2	1	3	1	3	0	4	7	12
08:15	08:30	3	1	2	6	0	0	0	6	0	1	5	6	2	5	0	7	13	19	
08:30	08:45	0	0	3	3	0	1	0	1	4	0	3	5	8	2	1	0	3	11	15
08:45	09:00	4	0	2	6	0	1	0	1	7	0	4	2	6	2	3	0	5	11	18
09:00	09:15	0	0	2	2	0	0	0	2	0	4	2	6	1	3	0	4	10	12	
09:15	09:30	1	1	2	4	0	0	0	4	0	2	1	3	1	2	0	3	6	10	
09:30	09:45	0	0	4	4	1	0	0	1	5	1	2	1	4	3	5	0	8	12	17
09:45	10:00	2	0	2	4	0	0	0	4	0	5	1	6	4	4	0	8	14	18	
10:00	10:15	4	0	1	5	1	1	1	3	8	0	5	2	7	1	3	0	4	11	19
10:15	10:30	0	0	1	1	1	0	0	1	2	1	4	2	7	2	3	2	7	14	16
10:30	10:45	1	1	2	4	0	0	0	1	5	0	3	0	3	1	3	0	4	7	12
10:45	11:00	2	1	1	4	0	0	0	1	1	1	1	3	1	3	0	4	7	12	
11:00	11:15	1	1	1	3	0	0	0	1	5	0	3	0	3	1	5	0	6	9	14
11:15	11:30	3	1	1	5	0	0	0	0	6	0	4	2	6	3	5	0	8	14	20
11:30	11:45	4	0	2	6	0	0	0	6	0	4	2	6	3	5	0	8	14	20	
11:45	12:00	2	1	1	4	0	0	0	1	5	0	3	0	3	1	3	0	4	7	12
12:00	12:15	1	1	1	3	0	0	0	1	5	0	3	0	3	1	3	0	4	7	12
12:15	12:30	2	1	1	4	0	0	0	1	6	7	5	3	0	8	15	20	20	20	
12:30	12:45	3	1	1	5	0	0	0	0	5	0	2	1	3	1	5	0	6	9	14
12:45	13:00	4	0	2	6	0	0	0	6	0	4	2	6	3	5	0	8	14	20	
13:00	13:15	0	0	0	0	0	0	0	0	3	3	6	1	4	0	5	11	11	11	
13:15	13:30	1	0	3	4	0	0	0	4	0	1	2	1	2	1	2	0	3	5	9
13:30	13:45	0	0	2	2	0	0	0	2	0	2	4	6	2	2	0	4	10	12	
13:45	14:00	2	1	1	4	0	0	0	4	0	3	2	5	4	2	0	6	11	15	
14:00	14:15	2	1	1	4	0	0	0	4	0	2	1	3	0	3	0	3	6	11	
14:15	14:30	0	0	1	1	0	0	0	1	5	0	2	3	3	4	1	8	11	12	
14:30	14:45	0	0	2	2	1	1	0	2	4	0	1	2	3	0	4	6	10	10	
14:45	15:00	0	0	3	3	0	0	0	3	0	1	2	0	2	0	2	4	6	9	
15:00	15:15	0	0	1	1	0	0	0	1	4	0	1	2	0	2	0	4	6	10	
15:15	15:30	2	1	1	4	0	0	0	4	0	3	2	5	4	2	0	6	11	15	
15:30	15:45	2	0	2	4	0	0	0	4	0	2	1	3	0	3	0	3	6	11	
15:45	16:00	0	0	1	1	0	0	0	1	0	1	2	3	3	4	1	8	11	12	
16:00	16:15	0	0	2	2	1	1	0	2	4	0	1	1	2	3	1	0	4	6	10
16:15	16:30	4	0	3	7	0	0	0	7	0	1	1	2	0	2	0	2	4	11	11
16:30	16:45	0	0	1	1	0	0	0	1	0	2	1	3	4	1	0	5	8	9	
16:45	17:00	1	0	3	4	0	0	0	4	0	1	1	2	2	2	0	4	6	10	
17:00	17:15	0	0	1	1	0	0	0	1	0	2	3	5	4	3	1	8	13	14	
17:15	17:30	2	0	2	4	0	0	0	4	0	1	0	1	0	2	0	2	3	7	7
17:30	17:45	0	0	0	0	0	0	0	0	1	2	3	2	1	0	3	6	6	6	
17:45	18:00	4	0	1	5	0	0	0	5	0	1	2	3	2	1	0	3	6	11	
Total	None	52	7	60	119	4	10	2	16	135	2	76	62	140	61	88	4	153	293	428



Transportation Services - Traffic Services
Turning Movement Count - Study Results
KIRKWOOD AVE @ RICHMOND RD

Survey Date: Thursday, April 20, 2017
Start Time: 07:00

WO No: 36956
Device: Miovision

Full Study 15 Minute U-Turn Total

Time Period	Northbound		Southbound		Eastbound		Westbound		Total
	U-Turn	Total	U-Turn	Total	U-Turn	Total	U-Turn	Total	
07:00	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0
13:45	0	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	0	0
14:30	0	0	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0



Transportation Services - Traffic Services W.O. 369.49
Turning Movement Count - 15 Minute Summary Report

PATRICIA AVE @ RICHMOND RD

Time Period	Total Observed U-Turns																W	STR	TOT	Grand Total
	Northbound								Southbound											
	L	T	RT	ST	RT	LT	ST	RT	L	T	RT	ST	RT	LT	ST	RT				
07:00-07:15	2	0	1	3	4	0	8	12	15	8	40	1	49	1	52	4	57	106	121	
07:15-07:30	2	0	8	10	6	0	7	13	23	2	60	0	62	0	52	0	52	114	137	
07:30-07:45	3	0	5	8	0	0	10	10	18	5	71	1	78	1	62	2	65	143	161	
07:45-08:00	3	0	11	14	8	0	9	17	31	4	125	1	130	0	82	3	85	215	246	
08:00-08:15	13	0	4	17	7	0	7	14	31	3	99	1	103	1	76	4	81	184	215	
08:15-08:30	6	0	6	12	4	0	11	15	27	7	89	1	97	0	76	2	78	175	202	
08:30-08:45	1	0	5	6	5	0	13	18	24	3	96	0	99	0	85	0	85	184	208	
08:45-09:00	4	0	3	7	3	0	3	6	13	2	95	2	99	0	83	3	86	185	198	
09:00-09:15	1	0	2	3	1	0	2	3	6	5	92	0	97	0	89	6	95	192	198	
09:15-09:30	1	0	2	3	5	0	5	10	13	1	77	2	80	0	95	0	95	175	188	
09:30-09:45	1	0	2	3	5	0	10	15	18	2	92	1	95	0	91	1	92	187	205	
09:45-10:00	1	0	4	5	2	0	2	4	9	2	79	0	81	1	102	1	104	185	194	
11:30-11:45	3	0	2	5	3	0	5	8	13	4	92	2	98	0	103	2	105	203	216	
11:45-12:00	2	0	0	2	2	0	6	8	10	7	89	1	98	0	117	6	123	221	231	
12:00-12:15	1	0	0	1	3	0	6	9	10	8	101	2	111	0	109	7	116	227	237	
12:15-12:30	1	0	2	3	1	0	4	5	8	2	108	2	112	0	103	4	107	219	227	
12:30-12:45	1	0	0	1	5	0	6	11	12	4	119	2	125	1	111	1	113	238	250	
12:45-13:00	0	0	1	1	3	0	5	8	9	6	108	1	115	1	103	3	107	222	231	
13:00-13:15	1	0	0	1	2	0	3	5	6	7	104	3	114	1	88	1	90	204	210	
13:15-13:30	1	0	3	4	0	0	6	6	10	5	97	2	104	2	92	1	95	199	209	
15:00-15:15	0	0	1	1	2	0	8	10	11	7	111	2	120	0	115	5	120	240	251	
15:15-15:30	2	0	4	6	3	0	2	5	11	6	104	2	112	1	153	3	157	269	280	
15:30-15:45	0	0	1	1	6	0	6	12	13	2	107	1	110	0	134	1	135	245	258	
15:45-16:00	0	0	0	0	6	0	7	13	13	4	91	4	99	2	141	6	149	248	261	
16:00-16:15	0	0	1	1	1	0	1	2	3	5	107	3	115	2	188	2	192	307	310	
16:15-16:30	1	0	1	2	1	0	4	5	7	6	99	3	108	2	192	5	199	307	314	
16:30-16:45	0	0	1	1	4	0	7	11	12	4	108	7	120	1	238	4	244	364	376	
16:45-17:00	0	0	1	1	5	0	8	13	14	6	109	4	119	2	230	9	241	360	374	
17:00-17:15	1	0	1	2	5	0	5	10	12	4	131	3	138	4	194	8	206	344	356	
17:15-17:30	2	0	0	2	2	0	6	8	10	5	112	5	122	5	208	8	221	343	353	
17:30-17:45	0	0	3	3	4	0	7	11	14	4	119	9	133	1	194	5	200	333	347	
17:45-18:00	1	0	1	2	3	0	8	11	13	5	95	4	104	3	203	3	209	313	326	
TOTAL:	55	0	76	131	111	0	197	308	439	145	3126	72	3347	32	3961	110	4104	7451	7890	

Note: U-Turns are included in Totals. Comment:



Transportation Services - Traffic Services
Turning Movement Count - Cyclist Volume Report

Work Order
369.49

PATRICIA AVE @ RICHMOND RD

Count Date: Tuesday, April 25, 2017

Start Time: 07:00

Time Period	PATRICIA AVE			RICHMOND RD			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00-08:00	3	2	5	17	6	23	28
08:00-09:00	1	0	1	15	7	22	23
09:00-10:00	1	2	3	11	3	14	17
11:30-12:30	0	1	1	9	12	21	22
12:30-13:30	0	2	2	13	6	19	21
15:00-16:00	0	1	1	6	6	12	13
16:00-17:00	0	2	2	12	10	22	24
17:00-18:00	0	3	3	12	16	28	31
Total	5	13	18	95	66	161	179

Comment:

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.
2018-May-24

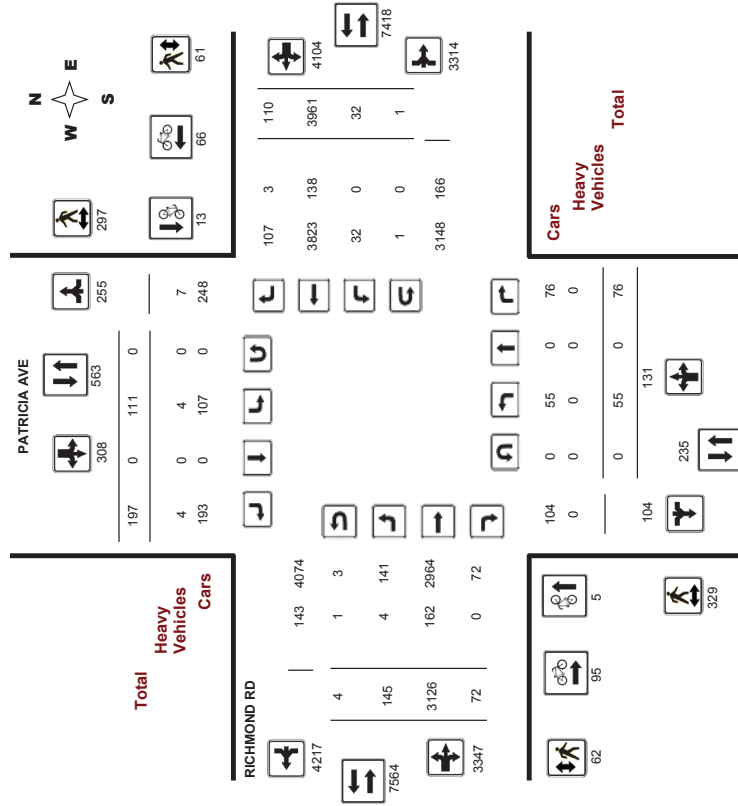


Transportation Services - Traffic Services
Turning Movement Count - Full Study Diagram

PATRICIA AVE @ RICHMOND RD

Survey Date: Tuesday, April 25, 2017

WO#: 36949
 Division: Mi



Transportation Services - Traffic Services

W.O.
36949

Turning Movement Count - Heavy Vehicle Report

PATRICIA AVE @ RICHMOND RD

Survey Date: Tuesday, April 25, 2017

Time Period	PATRICIA AVE						RICHMOND RD						Grand Total							
	Northbound			Southbound			Eastbound			Westbound										
	LT	ST	RT	N	LT	ST	RT	S	LT	ST	RT	E		LT	ST	RT	W	STR	TOT	
07:00-08:00	0	0	0	0	0	0	0	1	1	1	1	22	0	23	0	8	0	8	31	32
08:00-09:00	0	0	0	0	0	0	1	1	1	1	0	23	0	23	0	16	0	16	39	40
09:00-10:00	0	0	0	0	0	2	0	2	2	1	28	0	29	0	20	0	20	49	51	
11:30-12:30	0	0	0	0	1	0	0	1	1	1	23	0	24	0	23	3	26	50	51	
12:30-13:30	0	0	0	0	0	0	1	1	1	1	28	0	29	0	27	0	27	56	57	
15:00-16:00	0	0	0	0	1	0	1	2	2	0	14	0	14	0	15	0	15	29	31	
16:00-17:00	0	0	0	0	0	0	0	0	0	0	14	0	15	0	14	0	14	29	29	
17:00-18:00	0	0	0	0	0	0	0	0	0	0	10	0	10	0	15	0	15	25	25	
Sub Total	0	0	0	0	4	0	4	8	8	4	162	0	167	0	138	3	141	308	316	
U-Turns (Heavy Vehicles)	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	
Total	0	0	0	0	4	0	4	8	8	4	162	0	168	0	138	3	141	309	317	

Heavy Vehicles include Buses, Single-Unit Trucks and Articulated Trucks. Further, they ARE included in the Turning Movement Count Summary.



Transportation Services - Traffic Services
Turning Movement Count - Full Study Summary Report
PATRICIA AVE @ RICHMOND RD

Work Order
36949

Survey Date: Tuesday, April 25, 2017
Total Observed U-Turns
 Northbound: 0 Southbound: 0 AADT Factor: .90
 Eastbound: 4 Westbound: 1

Period	PATRICIA AVE												RICHMOND RD					Grand Total									
	Northbound						Southbound						Eastbound						Westbound								
	LT	ST	RT	TOT	NB	TOT	LT	ST	RT	TOT	SB	TOT	LT	ST	RT	TOT	EB		TOT	LT	ST	RT	TOT	WB	TOT		
07:00-08:00	10	0	25	35	18	0	34	52	87	19	296	3	318	2	248	9	259	577	664								
08:00-09:00	24	0	18	42	19	0	34	53	95	15	379	4	388	1	320	9	330	728	823								
09:00-10:00	4	0	10	14	13	0	19	32	46	10	340	3	353	1	377	8	386	739	785								
11:30-12:30	7	0	4	11	9	0	21	30	41	21	390	7	418	0	432	19	451	869	910								
12:30-13:30	3	0	4	7	10	0	20	30	37	22	428	8	458	5	394	6	405	863	900								
15:00-16:00	2	0	6	8	17	0	23	40	48	19	413	9	441	3	543	15	561	1002	1050								
16:00-17:00	1	0	4	5	11	0	20	31	36	21	423	17	461	7	848	20	875	1336	1372								
17:00-18:00	4	0	5	9	14	0	26	40	49	18	457	21	486	13	799	24	836	1332	1381								
Sub Total	55	0	76	131	111	0	197	308	439	145	3126	72	3343	32	3951	110	4103	7446	7885								
U-Turns	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	1	5	5								
Total	55	0	76	131	111	0	197	308	439	145	3126	72	3347	32	3951	110	4104	7451	7890								
EQ 12Hr	76	0	106	182	154	0	274	428	610	202	4345	100	4652	44	5506	153	5705	10357	10967								
Note: These values are calculated by multiplying the totals by the appropriate expansion factor. 1.39																											
AVG 12Hr	69	0	95	164	139	0	246	385	549	181	3911	90	4187	40	4955	138	5134	9321	9870								
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.																											
AVG 24Hr	90	0	125	215	182	0	323	505	720	238	5123	118	5485	52	6491	180	6726	12211	12931								
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor. 1.31																											

Comments:
 Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.



Transportation Services - Traffic Services
Turning Movement Count - Pedestrian Volume Report
PATRICIA AVE @ RICHMOND RD

Work Order
36949

Count Date: Tuesday, April 25, 2017
Start Time: 07:00

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00-07:15	3	2	1	1	2	7
07:15-07:30	7	3	3	1	4	14
07:30-07:45	10	4	1	1	2	16
07:45-08:00	19	9	5	3	8	36
07:00-08:00	39	18	10	6	16	73
08:00-08:15	13	9	4	3	7	29
08:15-08:30	15	3	5	0	5	23
08:30-08:45	7	8	2	5	7	22
08:45-09:00	0	7	0	2	9	9
08:00-09:00	35	27	11	10	21	83
09:00-09:15	4	9	2	1	3	16
09:15-09:30	15	4	2	0	2	21
09:30-09:45	9	6	2	0	2	17
09:45-10:00	3	8	1	0	1	12
09:00-10:00	31	27	7	1	8	66
11:30-11:45	8	15	2	1	3	26
11:45-12:00	8	26	6	4	10	44
12:00-12:15	15	11	3	1	4	30
12:15-12:30	22	19	2	2	4	45
11:30-12:30	53	71	13	8	21	145
12:30-12:45	12	15	0	0	0	27
12:45-13:00	18	19	4	0	4	41
13:00-13:15	17	12	1	1	2	31
13:15-13:30	9	4	2	0	2	15
12:30-13:30	56	50	7	1	8	114
15:00-15:15	5	11	0	5	5	21
15:15-15:30	9	9	2	4	6	24
15:30-15:45	8	9	0	0	0	17
15:45-16:00	9	7	1	4	5	21
15:00-16:00	31	36	3	13	16	83
16:00-16:15	8	12	1	0	1	21
16:15-16:30	8	3	2	5	7	18
16:30-16:45	6	11	4	3	7	24
16:45-17:00	10	12	3	3	6	28
16:00-17:00	32	38	10	11	21	91
17:00-17:15	14	10	4	3	4	28
17:15-17:30	14	8	0	5	5	27
17:30-17:45	7	7	0	1	1	25
17:45-18:00	7	5	2	2	2	14
17:00-18:00	52	30	1	11	94	749
Total	329	297	62	61	123	749

Comment:



Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

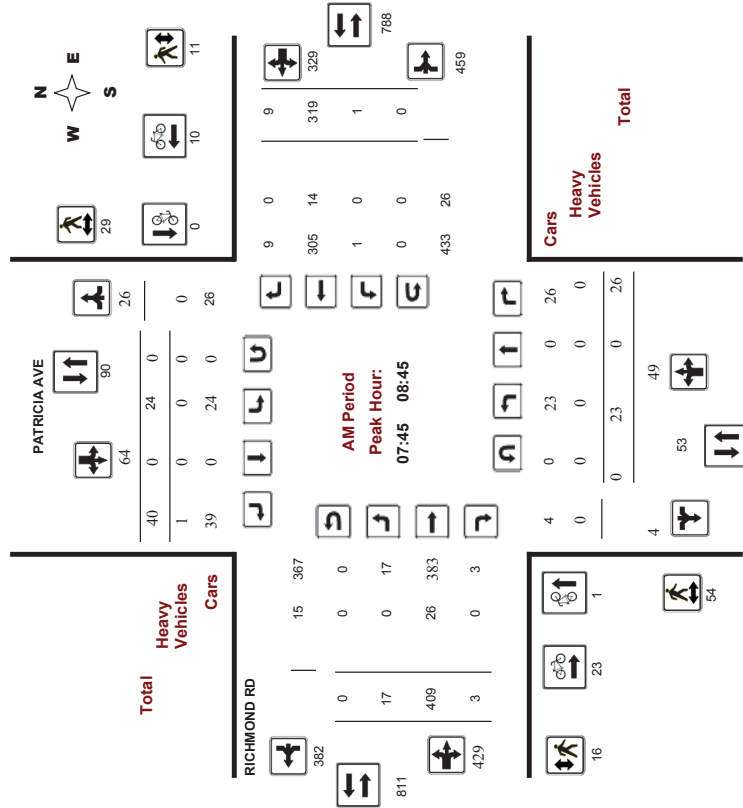
PATRICIA AVE @ RICHMOND RD

Survey Date: Tuesday, April 25, 2017

WO No: 36949

Start Time: 07:00

Device: Miovision



Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

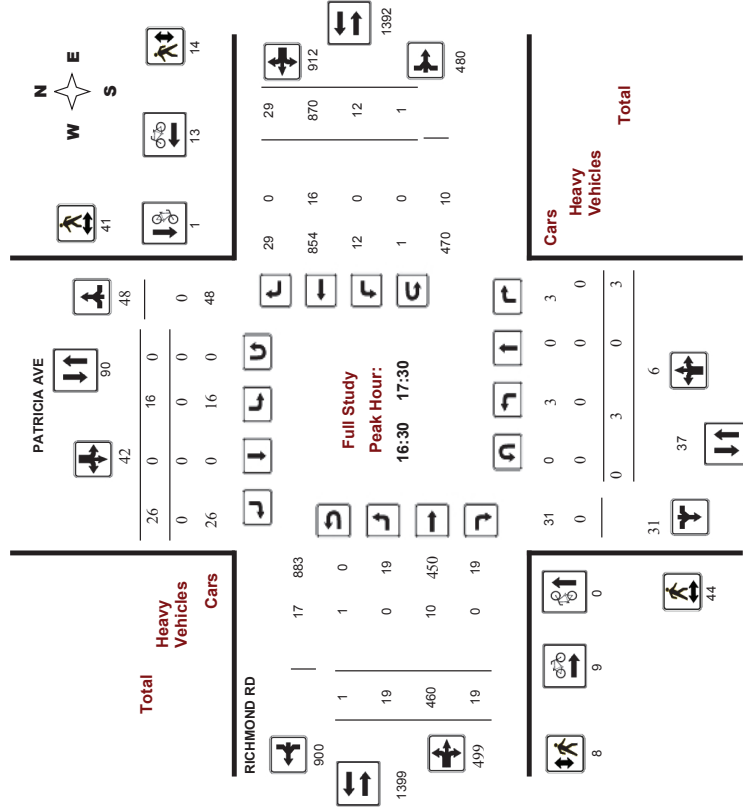
PATRICIA AVE @ RICHMOND RD

Survey Date: Tuesday, April 25, 2017

WO No: 36949

Start Time: 07:00

Device: Miovision





Transportation Services - Traffic Services

Work Order
36949

Turning Movement Count - 15 Min U-Turn Total Report

PATRICIA AVE @ RICHMOND RD

Survey Date: Tuesday, April 25, 2017

Time Period	Northbound		Southbound		Eastbound		Westbound		Total
	U-Turn	Total	U-Turn	Total	U-Turn	Total	U-Turn	Total	
07:00	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	1	0	0	0	1
07:45	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	1	0	0	0	1
12:00	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	1	1	0	0	2
17:00	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	1	0	0	0	1
17:45	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	4	1	0	0	5



Transportation Services - Traffic Services

Turning Movement Count - Study Results

ISLAND PARK DR @ RICHMOND RD

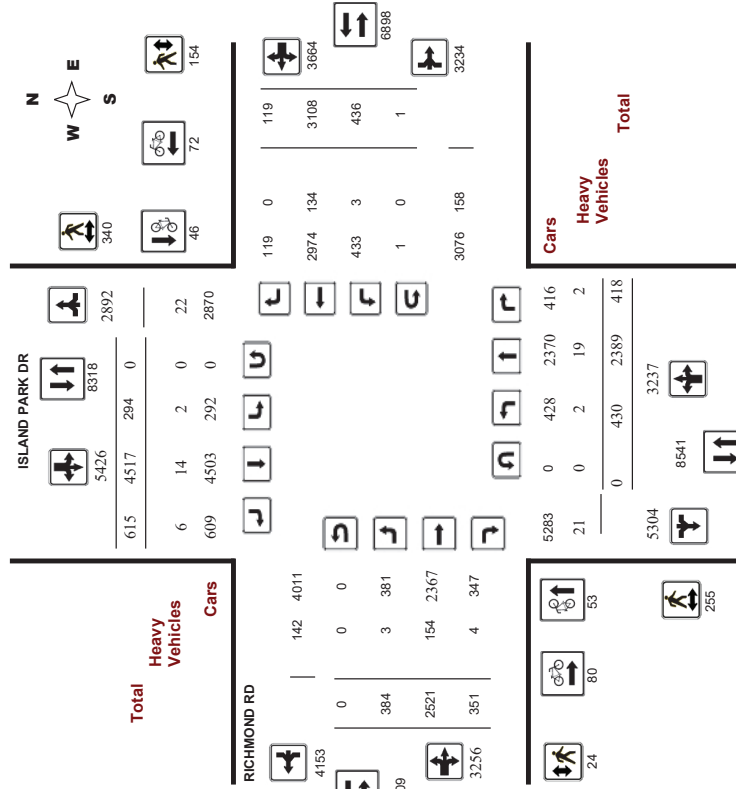
Survey Date: Tuesday, April 25, 2017

WO No: 36954

Start Time: 07:00

Device: Miovision

Full Study Diagram



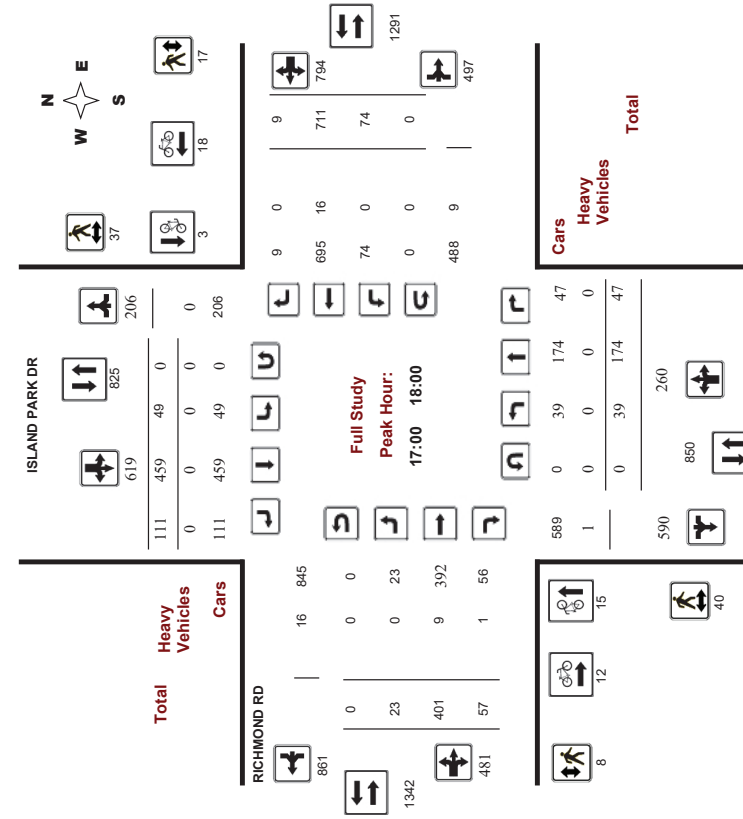


Transportation Services - Traffic Services
Turning Movement Count - Study Results
ISLAND PARK DR @ RICHMOND RD

Survey Date: Tuesday, April 25, 2017
Start Time: 07:00

WO No: 36954
Device: Miovision

Full Study Peak Hour Diagram



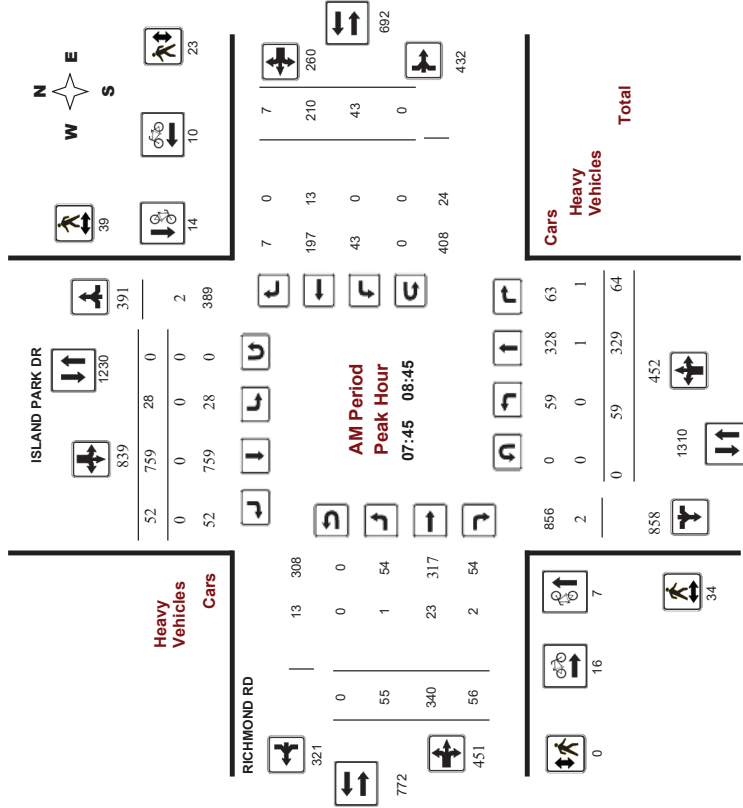
Comments



Transportation Services - Traffic Services
Turning Movement Count - Peak Hour Diagram
ISLAND PARK DR @ RICHMOND RD

Survey Date: Tuesday, April 25, 2017
Start Time: 07:00

WO No: 36954
Device: Miovision



Comments



Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

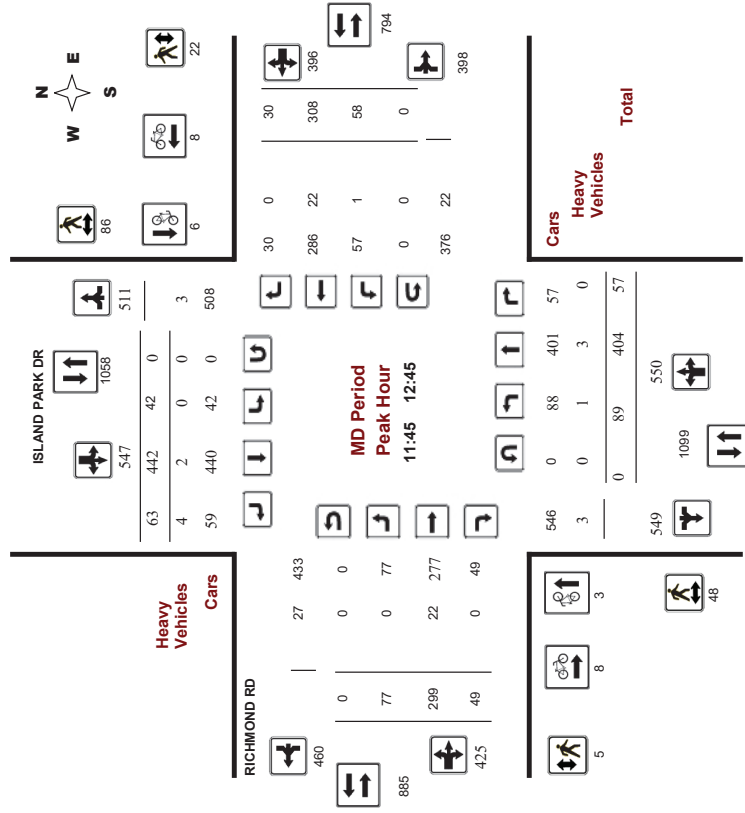
ISLAND PARK DR @ RICHMOND RD

Survey Date: Tuesday, April 25, 2017

WO No: 36954

Start Time: 07:00

Device: Miovision



Comments



Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

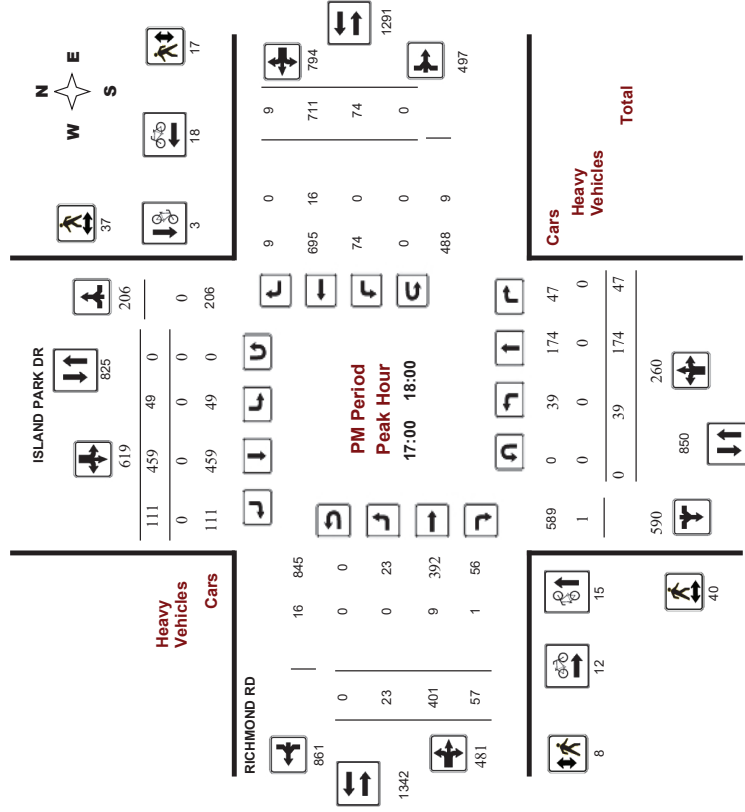
ISLAND PARK DR @ RICHMOND RD

Survey Date: Tuesday, April 25, 2017

WO No: 36954

Start Time: 07:00

Device: Miovision



Comments



Transportation Services - Traffic Services
Turning Movement Count - Study Results
ISLAND PARK DR @ RICHMOND RD

Survey Date: Tuesday, April 25, 2017
Start Time: 07:00

WO No: 36954
Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Tuesday, April 25, 2017
Total Observed U-Turns AADT Factor
 Northbound: 0 Southbound: 0
 Eastbound: 0 Westbound: 1

Period	Northbound				Southbound				Eastbound				Westbound				WB TOT	STR TOT	Grand Total
	LT	ST	RT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT			
07:00-08:00	47	266	36	349	31	766	52	849	1198	34	230	49	313	34	160	9	203	516	1714
08:00-09:00	60	331	63	454	35	764	54	853	1307	48	331	40	419	43	213	10	266	685	1992
09:00-10:00	62	340	55	457	31	626	80	737	1194	49	281	42	372	32	250	18	300	672	1866
11:30-12:30	95	380	57	532	41	459	71	571	1103	72	276	45	393	57	291	31	379	772	1875
12:30-13:30	53	444	68	565	39	403	62	504	1069	80	312	35	427	54	297	21	372	799	1888
15:00-16:00	40	341	57	438	29	524	83	636	1074	57	327	47	431	60	446	12	518	949	2023
16:00-17:00	34	113	35	182	39	516	102	657	839	21	363	36	420	82	740	9	831	1251	2090
17:00-18:00	39	174	47	260	49	459	111	619	879	23	401	57	481	74	711	9	794	1275	2154
Sub Total	430	2389	418	3237	294	4517	615	5426	8663	384	2521	351	3256	436	3108	119	3663	6919	15582
U-Turns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	
Total	430	2389	418	3237	294	4517	615	5426	8663	384	2521	351	3256	436	3108	119	3664	6920	15583
EQ 12hr	588	3321	581	4489	409	6279	855	7542	12042	534	3504	488	4526	606	4320	165	5083	9619	21660
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.																			
AVG 12hr	507	2817	493	3816	347	5326	725	6397	10838	453	2972	414	3839	514	3654	140	4320	8657	19494
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.																			
AVG 24hr	664	3690	646	5000	454	6976	950	8380	13380	593	3894	542	5029	673	4800	184	5659	10688	24068
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.																			
Note: U-Turns provided for approach totals. Refer to "U-Turn" Report for specific breakdown.																			



Transportation Services - Traffic Services
Turning Movement Count - Study Results
ISLAND PARK DR @ RICHMOND RD

Survey Date: Tuesday, April 25, 2017
Start Time: 07:00

WO No: 36954
Device: Miovision

Full Study 15 Minute Increments

ISLAND PARK DR **ISLAND PARK DR** **ISLAND PARK DR**
 Northbound Southbound Westbound

Time Period	Northbound				Southbound				Eastbound				Westbound				W TOT	STR TOT	Grand Total	
	LT	ST	RT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT				
07:00	10	57	9	76	9	201	9	219	1	3	32	35	3	35	1	39	1	39	377	
07:15	07:30	9	53	9	71	10	188	14	212	1	9	54	64	7	77	3	44	1	44	414
07:30	07:45	11	68	5	84	7	188	15	210	3	8	53	64	13	36	3	52	3	52	414
07:45	08:00	17	88	13	118	5	189	14	208	0	14	91	20	125	11	56	1	68	0	519
08:00	08:15	13	80	26	119	8	198	11	217	1	16	91	12	119	6	48	2	56	1	511
08:15	08:30	15	79	10	104	10	197	11	218	0	8	78	13	99	12	54	2	68	0	489
08:30	08:45	14	82	15	111	5	175	16	186	1	17	80	11	108	14	52	2	68	1	483
08:45	09:00	18	90	12	120	12	194	16	222	3	7	82	4	93	11	59	4	74	3	509
09:00	09:15	14	101	14	129	8	175	10	193	2	14	73	11	98	9	67	6	82	2	502
09:15	09:30	14	93	13	120	8	170	23	201	4	17	64	4	85	8	61	3	72	4	478
09:30	09:45	12	80	16	108	4	147	23	174	1	11	77	14	102	11	59	7	78	1	462
09:45	10:00	22	66	12	100	11	134	24	169	0	7	67	13	87	4	63	2	69	0	425
10:00	10:15	23	87	12	122	9	112	22	143	3	15	70	8	93	10	66	8	84	3	442
10:15	10:30	23	106	23	152	16	114	18	148	2	21	62	7	90	13	80	12	105	2	495
10:30	10:45	24	81	8	113	10	111	17	138	2	19	72	18	109	16	73	7	96	2	456
10:45	11:00	25	106	14	145	6	122	14	142	3	17	72	12	101	18	72	4	94	3	482
11:00	11:15	17	111	12	140	10	95	14	119	3	20	93	12	125	11	83	7	101	3	485
11:15	11:30	15	106	26	147	8	111	21	140	4	20	79	10	109	14	89	2	85	4	481
11:30	11:45	12	110	12	134	8	100	16	124	2	18	69	6	93	11	76	7	94	2	445
11:45	12:00	15	125	16	156	4	125	16	145	1	19	79	13	111	14	92	2	108	1	520
12:00	12:15	17	111	12	140	10	95	14	119	3	20	93	12	125	11	83	7	101	3	485
12:15	12:30	15	106	26	147	8	111	21	140	4	20	79	10	109	14	89	2	85	4	481
12:30	12:45	9	117	18	144	13	97	11	121	1	22	71	7	100	18	69	5	92	1	457
12:45	13:00	12	110	12	134	8	100	16	124	2	18	69	6	93	11	76	7	94	2	445
13:00	13:15	15	125	16	156	4	125	16	145	1	19	79	13	111	14	92	2	108	1	520
13:15	13:30	13	109	15	137	13	134	26	173	1	17	75	11	103	17	120	4	141	1	554
13:30	13:45	2	63	19	84	9	129	19	157	0	14	91	11	116	12	110	2	124	0	481
13:45	14:00	10	44	7	61	3	136	22	161	2	7	82	12	101	17	124	4	145	2	468
14:00	14:15	12	35	12	59	12	149	28	189	3	4	87	11	102	20	142	0	162	3	512
14:15	14:30	10	22	7	39	6	129	26	161	1	3	86	10	99	26	188	4	218	1	517
14:30	14:45	6	30	5	41	8	134	24	166	0	8	96	9	113	16	204	2	222	0	542
14:45	15:00	6	26	11	43	13	104	24	141	0	6	94	6	106	20	206	3	229	0	519
15:00	15:15	7	37	0	44	4	119	20	143	0	6	110	13	129	17	185	1	203	0	519
15:15	15:30	6	37	6	49	14	113	27	154	0	8	100	14	122	24	184	5	213	0	538
15:30	15:45	10	44	13	67	14	114	27	155	0	6	98	16	120	14	190	0	204	0	546
15:45	16:00	16	56	28	100	17	113	37	167	0	3	93	14	110	19	152	3	174	0	551
Total:	430	2389	418	3237	294	4517	615	5426	45	384	2521	351	3256	436	3108	119	3664	45	15,983	

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services
Turning Movement Count - Study Results
ISLAND PARK DR @ RICHMOND RD

Survey Date: Tuesday, April 25, 2017
Start Time: 07:00

WO No: 36954
Device: Miovision

Full Study Cyclist Volume

ISLAND PARK DR RICHMOND RD

Time Period	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00 07:15	3	1	4	6	1	7	11
07:15 07:30	1	3	4	4	0	4	8
07:30 07:45	3	6	9	4	3	7	16
07:45 08:00	3	1	4	8	4	12	16
08:00 08:15	1	8	9	5	4	9	18
08:15 08:30	2	2	4	2	1	3	7
08:30 08:45	1	3	4	1	1	2	6
08:45 09:00	2	2	4	0	0	0	4
09:00 09:15	1	1	2	2	1	3	5
09:15 09:30	1	1	2	4	0	4	6
09:30 09:45	2	1	3	4	2	6	9
09:45 10:00	0	0	0	2	1	3	3
10:00 10:15	1	1	2	1	3	4	6
10:15 10:30	1	3	4	3	1	4	8
10:30 10:45	1	1	2	2	2	3	5
10:45 11:00	1	2	3	3	2	5	8
11:00 11:15	0	0	0	3	2	5	8
11:15 11:30	0	0	0	1	3	4	4
11:30 11:45	0	0	0	0	1	1	1
11:45 12:00	0	0	0	0	1	1	1
12:00 12:15	0	0	0	0	0	0	0
12:15 12:30	0	0	0	1	3	4	4
12:30 12:45	0	0	0	0	1	1	1
12:45 13:00	0	0	0	0	1	1	1
13:00 13:15	0	0	0	0	0	0	0
13:15 13:30	0	0	0	0	3	3	3
13:30 13:45	2	0	2	2	2	4	6
13:45 14:00	1	0	1	2	3	5	6
14:00 14:15	1	0	1	1	3	4	5
14:15 14:30	2	0	2	1	0	1	3
14:30 14:45	2	2	4	0	2	2	6
14:45 15:00	3	2	5	8	5	13	18
15:00 15:15	2	1	3	1	2	3	6
15:15 15:30	1	1	2	2	4	6	8
15:30 15:45	5	2	7	5	5	10	17
15:45 16:00	3	1	4	3	5	8	12
16:00 16:15	4	0	4	1	6	7	11
16:15 16:30	4	0	4	80	72	152	251
Total	53	46	99	80	72	152	251



Transportation Services - Traffic Services
Turning Movement Count - Study Results
ISLAND PARK DR @ RICHMOND RD

Survey Date: Tuesday, April 25, 2017
Start Time: 07:00

WO No: 36954
Device: Miovision

Full Study Pedestrian Volume

ISLAND PARK DR RICHMOND RD

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	3	3	6	0	3	3	9
07:15 07:30	4	4	8	2	0	2	10
07:30 07:45	5	13	18	0	7	7	25
07:45 08:00	15	12	27	0	5	5	32
08:00 08:15	5	12	17	0	4	4	21
08:15 08:30	10	8	18	0	6	6	24
08:30 08:45	4	7	11	0	8	8	19
08:45 09:00	0	11	11	0	11	11	22
09:00 09:15	3	10	13	0	0	0	13
09:15 09:30	11	9	20	1	5	6	26
09:30 09:45	8	7	15	0	4	4	19
09:45 10:00	3	11	14	0	2	2	16
10:00 10:15	4	17	21	0	8	8	29
10:15 10:30	6	28	34	0	5	5	39
10:30 10:45	7	14	21	1	3	4	25
10:45 11:00	23	28	51	2	11	13	64
11:00 11:15	12	16	28	2	3	5	33
11:15 11:30	15	16	31	1	7	8	39
11:30 11:45	10	13	23	0	6	6	29
11:45 12:00	9	9	18	0	1	1	19
12:00 12:15	7	3	10	1	3	4	14
12:15 12:30	9	9	18	0	1	1	19
12:30 12:45	7	3	10	1	3	4	14
12:45 13:00	6	9	15	4	5	9	24
13:00 13:15	14	6	20	1	15	16	36
13:15 13:30	7	6	13	1	5	6	19
13:30 13:45	8	7	15	0	2	2	17
13:45 14:00	9	6	15	0	3	3	18
14:00 14:15	3	9	12	0	3	3	15
14:15 14:30	4	9	13	0	2	2	15
14:30 14:45	15	6	21	4	2	4	25
14:45 15:00	10	14	24	4	6	10	34
15:00 15:15	9	8	17	0	5	5	22
15:15 15:30	6	9	15	2	4	6	21
15:30 15:45	9	9	18	2	4	6	24
15:45 16:00	8	7	15	0	2	2	17
16:00 16:15	9	6	15	0	3	3	18
16:15 16:30	3	9	12	0	3	3	15
16:30 16:45	4	9	13	0	2	2	15
16:45 17:00	15	6	21	4	2	4	25
17:00 17:15	10	14	24	4	6	10	34
17:15 17:30	9	8	17	0	5	5	22
17:30 17:45	6	9	15	2	4	6	21
17:45 18:00	6	9	15	2	4	6	21
Total	255	340	595	24	154	178	773



Transportation Services - Traffic Services

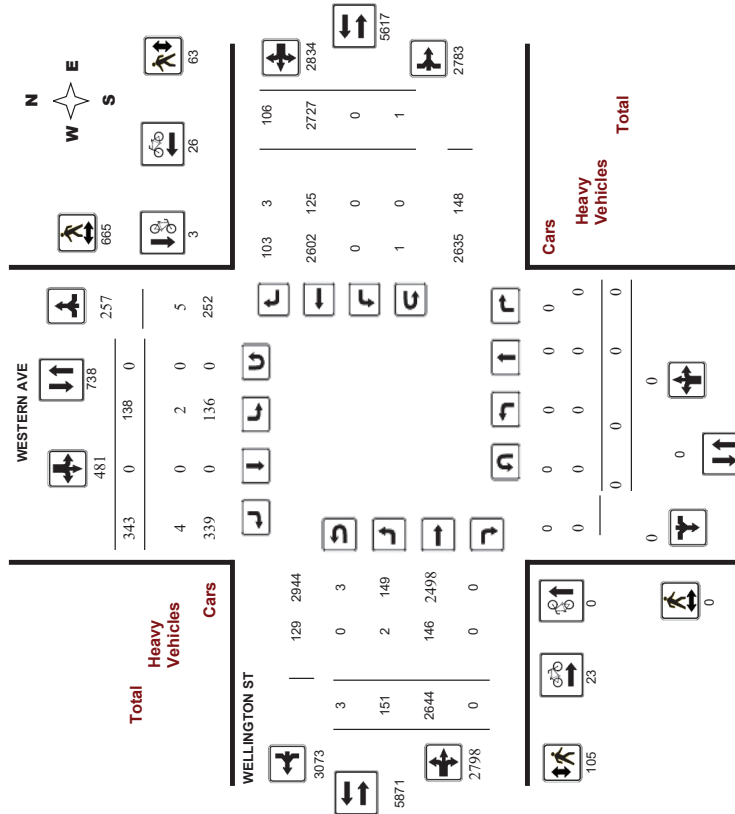
Turning Movement Count - Study Results

WESTERN AVE @ WELLINGTON ST

Survey Date: Thursday, February 22, 2018
Start Time: 07:00

WO No: 37567
Device: Miovision

Full Study Diagram



Transportation Services - Traffic Services

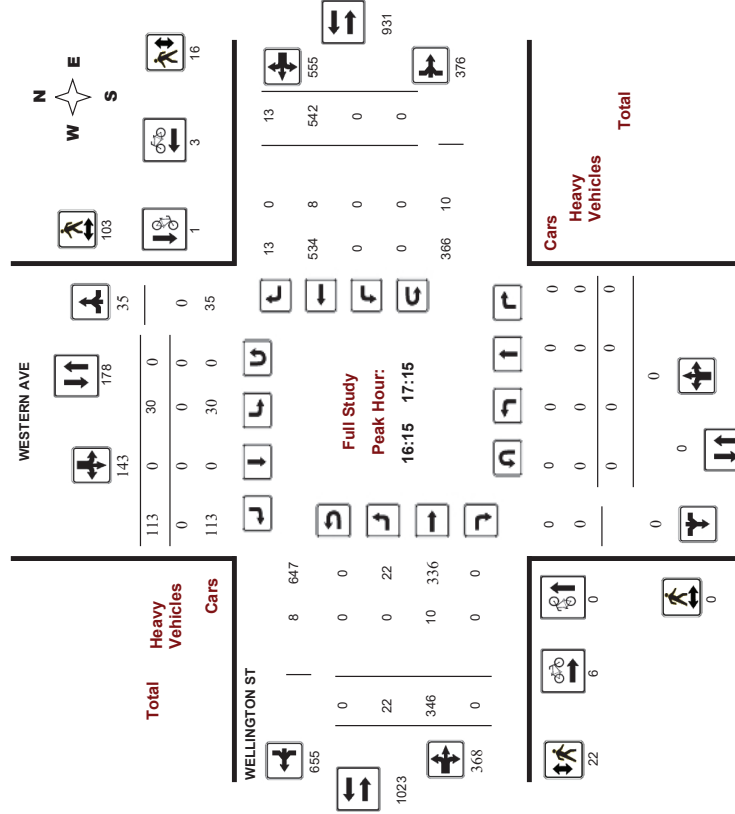
Turning Movement Count - Study Results

WESTERN AVE @ WELLINGTON ST

Survey Date: Thursday, February 22, 2018
Start Time: 07:00

WO No: 37567
Device: Miovision

Full Study Peak Hour Diagram





Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

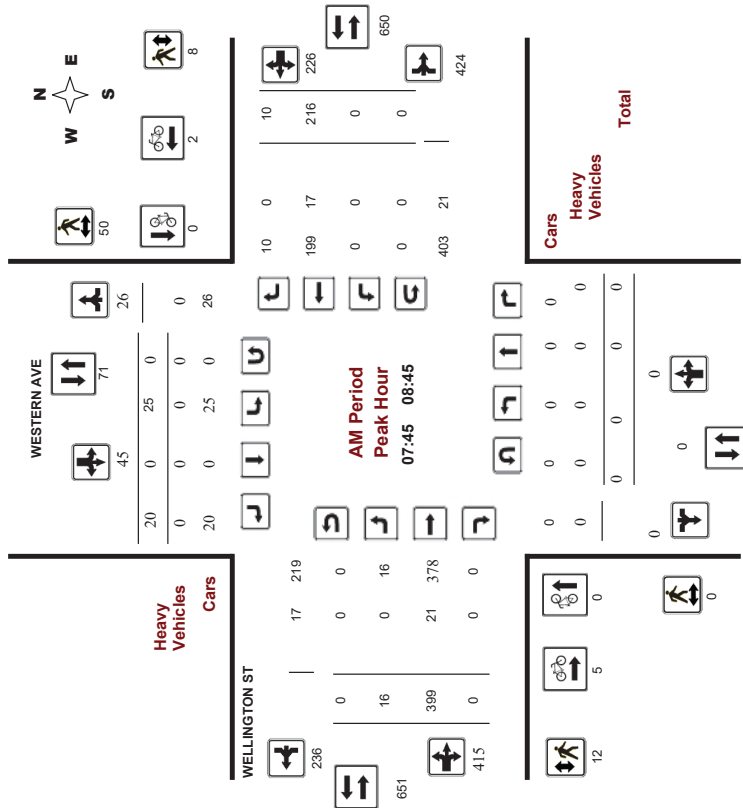
WESTERN AVE @ WELLINGTON ST

Survey Date: Thursday, February 22, 2018

Start Time: 07:00

WO No: 37567

Device: Miovision



Comments



Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

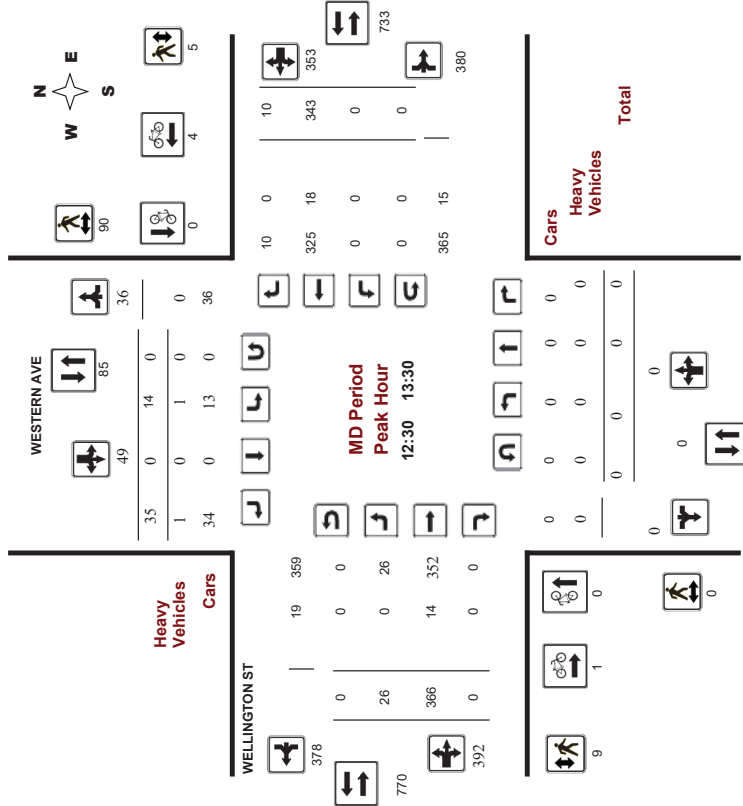
WESTERN AVE @ WELLINGTON ST

Survey Date: Thursday, February 22, 2018

Start Time: 07:00

WO No: 37567

Device: Miovision



Comments



Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

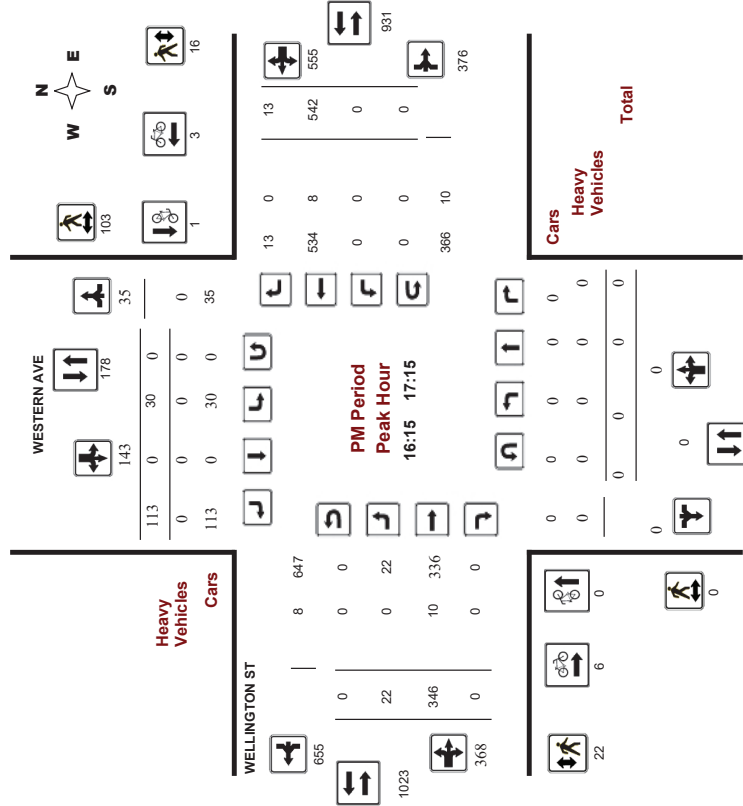
WESTERN AVE @ WELLINGTON ST

Survey Date: Thursday, February 22, 2018

Start Time: 07:00

WO No: 37567

Device: Miovision



Comments



Transportation Services - Traffic Services

Turning Movement Count - Study Results

WESTERN AVE @ WELLINGTON ST

Survey Date: Thursday, February 22, 2018

Start Time: 07:00

WO No: 37567

Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Thursday, February 22, 2018

Total Observed U-Turns

Southbound: 0

Eastbound: 3

AADT Factor

90

WESTERN AVE

WELLINGTON ST

Period	Northbound				Southbound				Eastbound				Westbound				STR TOT	WB TOT	STR TOT	Grand Total
	LT	ST	RT	TOT	NB	LT	ST	RT	TOT	SB	LT	ST	RT	TOT	EB	LT				
07:00 08:00	0	0	0	0	0	5	0	17	22	14	269	0	283	0	166	9	175	458	480	
08:00 09:00	0	0	0	0	0	29	0	19	48	48	13	373	0	386	0	235	10	245	631	
09:00 10:00	0	0	0	0	0	12	0	13	25	13	272	0	285	0	231	10	241	526	551	
11:30 12:30	0	0	0	0	0	12	0	31	43	43	25	362	0	407	0	306	21	327	734	
12:30 13:30	0	0	0	0	0	14	0	35	49	49	26	366	0	392	0	343	10	353	745	
15:00 16:00	0	0	0	0	0	16	0	48	64	64	20	302	0	322	0	422	14	436	758	
16:00 17:00	0	0	0	0	0	33	0	110	143	143	20	328	0	348	0	549	9	558	906	
17:00 18:00	0	0	0	0	0	17	0	70	87	87	20	352	0	372	0	475	23	498	870	
Sub Total	0	0	0	0	0	138	0	343	481	481	151	2644	0	2795	0	2727	106	2833	6109	
U-Turns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total	0	0	0	0	0	138	0	343	481	481	151	2644	0	2798	0	2727	106	2834	6113	
EQ 12hr	0	0	0	0	0	192	0	477	669	669	210	3675	0	3889	0	3791	147	3939	7628	
AVG 12hr	0	0	0	0	0	163	0	404	567	567	178	3117	0	3299	0	3215	125	3341	7045	
AVG 24hr	0	0	0	0	0	213	0	530	743	743	233	4084	0	4321	0	4212	164	4377	8698	

Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor. 1.31

Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor. 0.9

Note: These volumes are calculated by multiplying the totals by the appropriate expansion factor. 1.39



Transportation Services - Traffic Services
Turning Movement Count - Study Results
WESTERN AVE @ WELLINGTON ST

Survey Date: Thursday, February 22, 2018
Start Time: 07:00

WO No: 37567
Device: Miovision

Full Study 15 Minute Increments
WESTERN AVE

Time Period	Northbound				Southbound				Eastbound				Westbound				Grand Total		
	LT	ST	RT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT			
07:00	0	0	0	0	0	0	0	0	2	43	0	45	0	40	3	43	0	96	
07:15	0	0	0	0	0	0	0	0	1	2	54	0	56	0	42	1	43	0	100
07:30	0	0	0	0	0	0	0	0	2	5	60	0	62	0	39	0	39	1	111
07:45	0	0	0	0	0	0	0	0	3	6	0	112	0	117	0	45	5	173	
08:00	0	0	0	0	0	0	0	0	4	11	0	96	0	100	0	45	3	189	
08:15	0	0	0	0	0	0	0	0	7	14	0	94	0	97	0	61	0	173	
08:30	0	0	0	0	0	0	0	0	8	6	14	0	4	97	0	65	1	181	
08:45	0	0	0	0	0	0	0	0	7	2	9	0	2	86	0	54	5	167	
09:00	0	0	0	0	0	0	0	0	2	0	2	0	0	87	0	71	0	128	
09:15	0	0	0	0	0	0	0	0	3	0	4	0	3	67	0	48	5	134	
09:30	0	0	0	0	0	0	0	0	4	7	0	0	72	0	54	1	167		
09:45	0	0	0	0	0	0	0	0	3	7	1	5	79	0	75	1	183		
10:00	0	0	0	0	0	0	0	0	4	7	0	5	54	0	54	3	123		
10:15	0	0	0	0	0	0	0	0	5	0	8	13	2	100	0	66	2	183	
10:30	0	0	0	0	0	0	0	0	3	0	7	10	0	13	103	0	88	5	219
10:45	0	0	0	0	0	0	0	0	2	0	8	10	0	6	83	0	90	0	191
11:00	0	0	0	0	0	0	0	0	2	0	8	10	0	4	96	0	100	0	185
11:15	0	0	0	0	0	0	0	0	4	0	8	10	0	7	11	4	75	0	191
11:30	0	0	0	0	0	0	0	0	4	0	7	11	1	3	99	0	102	0	184
11:45	0	0	0	0	0	0	0	0	5	0	7	12	0	11	94	0	105	0	202
12:00	0	0	0	0	0	0	0	0	4	0	10	11	1	9	83	0	92	0	190
12:15	0	0	0	0	0	0	0	0	1	0	10	11	0	3	90	0	96	2	207
12:30	0	0	0	0	0	0	0	0	5	0	7	12	0	4	75	0	79	0	180
12:45	0	0	0	0	0	0	0	0	5	0	7	12	0	4	75	0	79	0	180
13:00	0	0	0	0	0	0	0	0	4	0	13	17	1	10	84	0	94	0	198
13:15	0	0	0	0	0	0	0	0	4	0	15	19	0	3	76	0	79	0	198
13:30	0	0	0	0	0	0	0	0	3	0	13	16	0	3	67	0	70	0	217
13:45	0	0	0	0	0	0	0	0	6	0	18	24	0	7	69	0	77	0	245
14:00	0	0	0	0	0	0	0	0	9	0	36	45	0	7	81	0	88	0	279
14:15	0	0	0	0	0	0	0	0	6	0	28	34	0	3	89	0	92	0	271
14:30	0	0	0	0	0	0	0	0	12	0	28	40	0	3	89	0	92	0	285
14:45	0	0	0	0	0	0	0	0	3	0	21	24	0	9	87	0	96	0	261
15:00	0	0	0	0	0	0	0	0	10	0	11	21	0	5	90	0	95	0	246
15:15	0	0	0	0	0	0	0	0	3	0	23	26	0	4	95	0	99	0	241
15:30	0	0	0	0	0	0	0	0	1	0	15	16	0	2	80	0	82	0	209
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	138	0	343	481	6	151	2644	0	2798	0	6,113
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total:	0	0	0	0	0	0	0	0	3	0	3	3	0	23	26	3	49	0	52

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services
Turning Movement Count - Study Results
WESTERN AVE @ WELLINGTON ST

Survey Date: Thursday, February 22, 2018
Start Time: 07:00

WO No: 37567
Device: Miovision

Full Study Cyclist Volume
WESTERN AVE

Time Period	Northbound		Southbound		Street Total		Eastbound		Westbound		Street Total		Grand Total
	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	LT	ST	
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0	0	0	0	0
13:45	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0
Total:	0	0	0	0	0	0	0	0	0	0	0	0	0



Transportation Services - Traffic Services
Turning Movement Count - Study Results
WESTERN AVE @ WELLINGTON ST

Survey Date: Thursday, February 22, 2018
Start Time: 07:00

WO No: 37567
Device: Miovision

Full Study Pedestrian Volume
WESTERN AVE
WESTERN AVE

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	0	3	3	0	0	0	3
07:15 07:30	0	13	13	0	0	0	13
07:30 07:45	0	11	11	3	5	8	19
07:45 08:00	0	11	11	2	1	3	14
08:00 08:15	0	11	11	3	0	3	14
08:15 08:30	0	12	12	5	1	6	18
08:30 08:45	0	16	16	2	6	8	24
08:45 09:00	0	12	12	1	2	3	15
09:00 09:15	0	12	12	3	1	4	16
09:15 09:30	0	7	7	0	0	0	7
09:30 09:45	0	16	16	1	1	2	18
09:45 10:00	0	10	10	4	0	4	14
11:30 11:45	0	22	22	5	2	7	29
11:45 12:00	0	9	9	1	1	2	11
12:00 12:15	0	23	23	0	1	1	24
12:15 12:30	0	52	52	3	3	6	58
12:30 12:45	0	27	27	3	1	4	31
12:45 13:00	0	19	19	3	3	6	25
13:00 13:15	0	27	27	2	0	2	29
13:15 13:30	0	17	17	1	1	2	19
15:00 15:15	0	25	25	3	1	4	29
15:15 15:30	0	29	29	3	1	4	33
15:30 15:45	0	44	44	10	0	10	54
15:45 16:00	0	28	28	4	2	6	34
16:00 16:15	0	35	35	4	6	10	45
16:15 16:30	0	19	19	7	2	9	28
16:30 16:45	0	37	37	10	4	14	51
16:45 17:00	0	26	26	4	6	10	36
17:00 17:15	0	21	21	1	4	5	26
17:15 18:00	0	18	18	2	4	6	24
17:30 17:45	0	28	28	6	3	9	37
17:45 17:55	0	25	25	9	1	10	35
Total	0	665	665	105	63	168	833



Transportation Services - Traffic Services
Turning Movement Count - Study Results
WESTERN AVE @ WELLINGTON ST

Survey Date: Thursday, February 22, 2018
Start Time: 07:00

WO No: 37567
Device: Miovision

Full Study Heavy Vehicles
WESTERN AVE
WESTERN AVE

Time Period	Northbound			Southbound			Eastbound			Westbound			W	STR	Grand Total
	LT	ST	RT	LT	ST	RT	LT	ST	RT	LT	ST	RT			
07:00 07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
07:15 07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
07:30 07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
07:45 08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
08:00 08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
08:15 08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
08:30 08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
08:45 09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15
09:00 09:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
09:15 09:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
09:30 09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
09:45 10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
11:30 11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
11:45 12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
12:00 12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
12:15 12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
12:30 12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
12:45 13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
13:00 13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
13:15 13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
15:00 15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
15:15 15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
15:30 15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
15:45 16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
16:00 16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
16:15 16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
16:30 16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
16:45 17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
17:00 17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
17:15 17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
17:30 17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
17:45 17:55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	282



Transportation Services - Traffic Services

Turning Movement Count - Study Results

WESTERN AVE @ WELLINGTON ST

Survey Date: Thursday, February 22, 2018
Start Time: 07:00

WO No: 37567
Device: Miovision

Full Study 15 Minute U-Turn Total

WESTERN AVE WELLINGTON ST

Time Period	Northbound U-Turn Total		Southbound U-Turn Total		Eastbound U-Turn Total		Westbound U-Turn Total		Total
	U-Turn	Total	U-Turn	Total	U-Turn	Total	U-Turn	Total	
07:00	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	1	1	1
09:15	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	1	1	0	0	1
12:15	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0
13:00	0	0	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	1	1	0	0	1
16:15	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	3	3	1	1	4



Transportation Services - Traffic Services

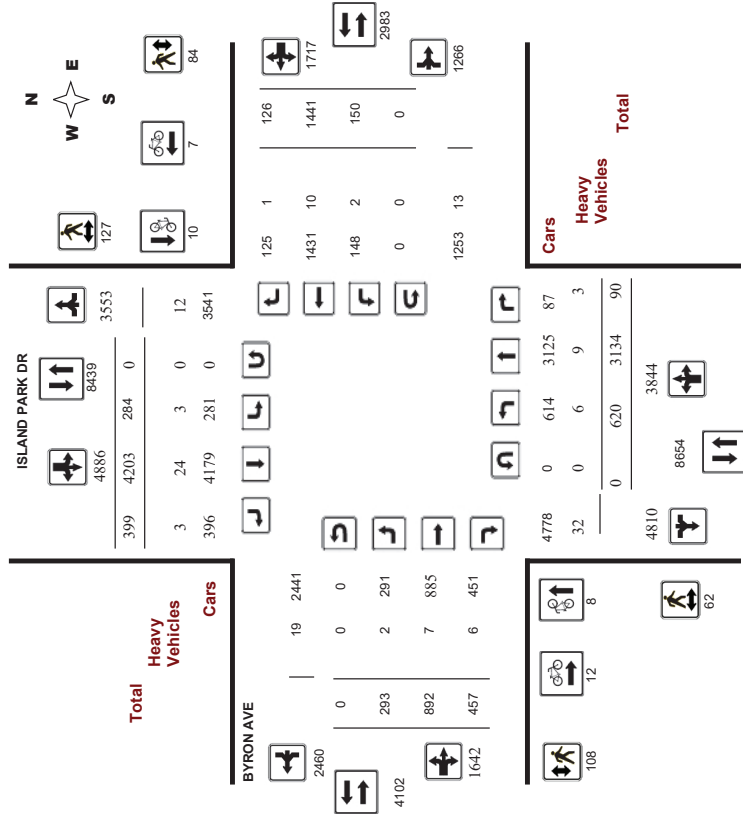
Turning Movement Count - Study Results

BYRON AVE @ ISLAND PARK DR

Survey Date: Thursday, January 23, 2020
Start Time: 07:00

WO No: 39390
Device: Miovision

Full Study Diagram



5472208 - THU JAN 23, 2020 - 8HRS - LORETTA



Transportation Services - Traffic Services

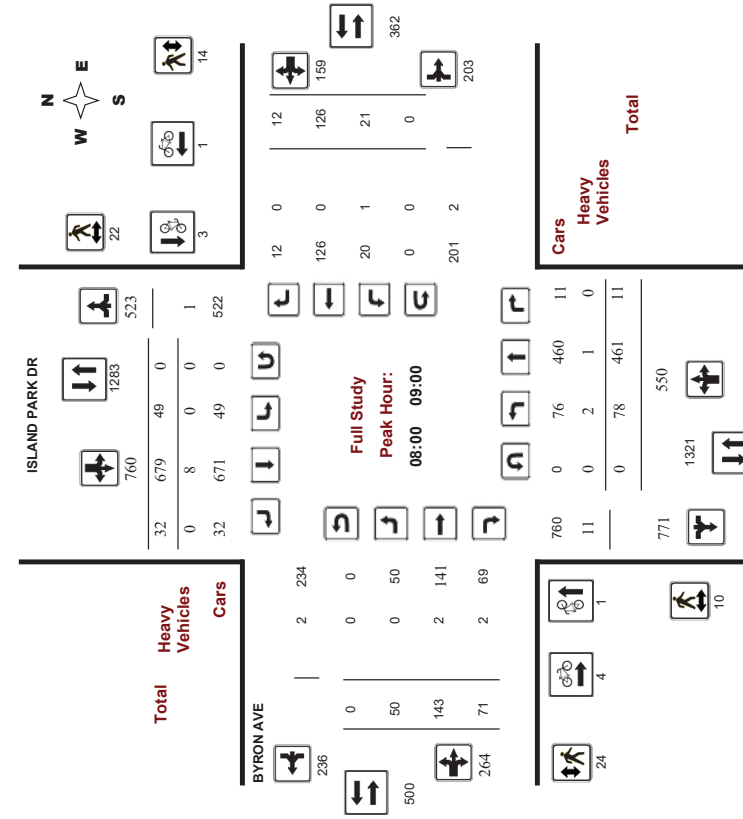
Turning Movement Count - Study Results

BYRON AVE @ ISLAND PARK DR

Survey Date: Thursday, January 23, 2020
Start Time: 07:00

WO No: 39390
Device: Miovision

Full Study Peak Hour Diagram



5472208 - THU JAN 23, 2020 - 8HRS - LORETTA



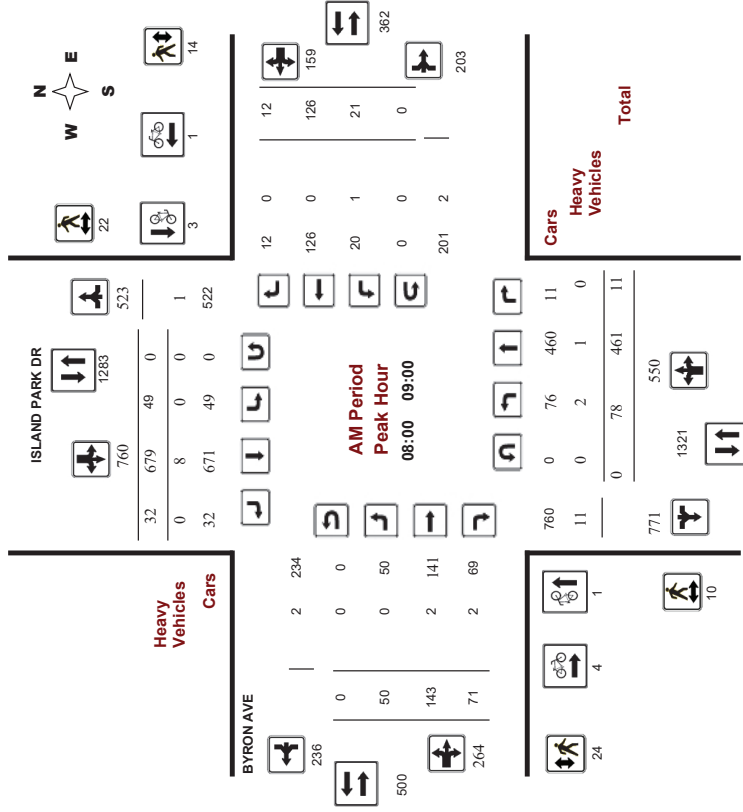
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BYRON AVE @ ISLAND PARK DR

Survey Date: Thursday, January 23, 2020
Start Time: 07:00

WO No: 39390
Device: Miovision



Comments 5472208 - THU JAN 23, 2020 - 8HRS - LORETTA



Transportation Services - Traffic Services
Turning Movement Count - Study Results
BYRON AVE @ ISLAND PARK DR

Survey Date: Thursday, January 23, 2020 **WO No:** 39390
Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Thursday, January 23, 2020 **Total Observed U-Turns** **AAADT Factor**
 Northbound: 0 Southbound: 0 1.00
 Eastbound: 0 Westbound: 0

Period	Northbound				Southbound				Eastbound				Westbound				WB TOT	STR TOT	Grand Total
	LT	ST	RT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT			
07:00-08:00	71	335	5	411	64	654	30	748	1159	31	72	34	137	7	71	6	84	221	1380
08:00-09:00	78	461	11	550	49	679	32	760	1310	50	143	71	264	21	126	12	159	423	1733
09:00-10:00	87	404	8	499	41	551	30	622	1121	39	101	37	177	8	75	14	97	274	1385
11:30-12:30	94	432	10	536	36	405	40	481	1017	40	91	49	180	17	168	27	212	392	1409
12:30-13:30	80	408	15	503	33	392	37	462	965	31	100	65	196	12	178	21	211	407	1372
15:00-16:00	64	403	12	479	19	494	88	601	1080	32	102	84	218	26	242	20	288	506	1586
16:00-17:00	68	343	7	418	20	555	73	648	1066	36	134	55	225	39	340	14	393	616	1684
17:00-18:00	78	348	22	448	22	473	69	564	1012	34	149	62	245	20	241	12	273	518	1530
Sub Total	620	3134	90	3844	284	4203	399	4886	8730	293	892	457	1642	150	1441	126	1717	3359	12089
U-Turns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total	620	3134	90	3844	284	4203	399	4886	8730	293	892	457	1642	150	1441	126	1717	3359	12089
EQ 12hr	862	4356	125	5343	395	5842	555	6792	12135	407	1240	635	2282	208	2003	175	2387	4669	16804
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.																			
AVG 12hr	812	4106	118	5036	372	5506	523	6401	12135	384	1169	599	2151	196	1888	165	2249	4669	16804
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.																			
AVG 24hr	1064	5378	154	6597	487	7213	685	8385	14982	503	1531	784	2818	257	2473	216	2947	5765	20747
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.																			
Note: U-Turns provided for approach totals. Refer to "U-Turn" Report for specific breakdown.																			



Transportation Services - Traffic Services
Turning Movement Count - Study Results
BYRON AVE @ ISLAND PARK DR

Survey Date: Thursday, January 23, 2020 **WO No:** 39390
Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

Survey Date: Thursday, January 23, 2020 **Total Observed U-Turns** **AAADT Factor**
 Northbound: 0 Southbound: 0 1.00
 Eastbound: 0 Westbound: 0

Time Period	Northbound				Southbound				Eastbound				Westbound				W TOT	STR TOT	Grand Total
	LT	ST	RT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT	LT	ST	RT	TOT			
07:00-07:15	10	84	0	84	13	165	5	183	0	2	13	5	20	0	7	1	8	0	305
07:15-07:30	13	65	1	79	13	165	7	185	1	5	15	10	30	3	11	0	14	1	308
07:30-07:45	24	81	2	107	16	162	6	184	2	14	13	8	35	3	23	1	27	2	353
07:45-08:00	24	105	2	131	22	162	12	186	2	10	31	11	52	1	30	4	35	2	414
08:00-08:15	17	80	3	100	15	168	6	189	3	12	40	21	73	1	22	2	25	3	387
08:15-08:30	26	105	1	132	12	178	4	194	2	11	26	20	57	5	27	3	35	2	418
08:30-08:45	12	134	3	149	9	147	11	167	4	18	38	20	76	7	33	5	45	4	437
08:45-09:00	23	142	4	169	13	186	11	210	2	9	39	10	58	8	44	2	54	2	491
09:00-09:15	24	74	3	101	12	137	6	155	0	13	35	11	59	2	27	3	32	0	347
09:15-09:30	15	123	3	141	11	149	7	167	1	12	25	11	48	2	9	1	12	1	368
09:30-09:45	18	98	0	116	11	141	9	161	1	9	19	6	34	1	24	3	28	1	339
09:45-10:00	30	109	2	141	7	124	8	139	0	5	22	9	36	3	15	7	25	0	341
10:00-10:15	25	130	0	155	8	97	10	115	2	11	17	9	37	3	31	3	37	2	344
11:45-12:00	27	103	6	136	10	98	3	111	1	9	26	14	49	4	40	8	52	1	348
12:00-12:15	24	96	1	121	8	106	16	130	3	11	27	13	51	3	45	6	54	3	356
12:15-12:30	18	103	3	124	10	114	11	125	0	9	21	13	43	7	52	10	69	0	361
12:30-12:45	17	110	5	132	9	113	12	134	3	8	22	17	47	1	39	8	48	3	361
12:45-13:00	16	87	3	106	9	100	6	115	2	10	24	12	46	3	43	4	50	2	317
13:00-13:15	24	108	5	137	7	87	9	103	0	8	32	14	54	4	55	3	62	0	356
13:15-13:30	23	103	2	128	8	92	10	110	2	5	22	22	49	4	41	6	51	2	338
15:00-15:15	16	135	3	154	7	112	25	144	2	9	24	25	58	5	48	2	55	2	411
15:15-15:30	13	104	3	120	6	128	23	157	0	9	35	21	65	6	63	6	75	0	417
15:30-15:45	12	83	3	98	3	131	16	150	3	7	26	19	52	6	59	7	72	3	372
15:45-16:00	23	81	3	107	3	123	24	150	4	7	17	19	43	9	72	5	86	4	386
16:00-16:15	16	99	2	117	4	156	17	177	4	6	26	16	48	5	87	2	94	4	436
16:15-16:30	16	89	1	106	7	140	20	167	2	14	37	12	63	14	77	4	95	2	431
16:30-16:45	14	90	3	107	6	130	16	152	0	8	33	13	54	6	85	3	94	0	407
16:45-17:00	22	65	1	88	3	129	20	152	0	8	38	14	60	14	91	5	110	0	410
17:00-17:15	19	66	6	91	7	107	14	128	0	10	33	21	64	7	80	2	89	0	372
17:15-17:30	15	86	3	104	7	121	25	153	0	7	39	13	59	7	60	5	72	0	368
17:30-17:45	25	102	8	135	4	104	15	123	2	8	44	17	69	4	53	2	59	2	386
17:45-18:00	19	94	5	118	4	118	4	141	5	118	4	141	5	118	4	141	5	384	
Total:	620	3134	90	3844	284	4203	399	4886	48	283	892	457	1642	150	1441	126	1717	48	12,089

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services
Turning Movement Count - Study Results
BYRON AVE @ ISLAND PARK DR

Survey Date: Thursday, January 23, 2020
Start Time: 07:00

WO No: 39390
Device: Miovision

Full Study Cyclist Volume

Time Period	ISLAND PARK DR			Street Total	Eastbound	Westbound	Street Total	Grand Total
	Northbound	Southbound	Westbound					
07:00 07:15	0	0	0	0	0	0	0	0
07:15 07:30	1	1	0	2	1	0	1	3
07:30 07:45	0	0	1	0	1	1	2	2
07:45 08:00	0	0	2	0	2	0	2	2
08:00 08:15	0	0	1	0	1	2	2	2
08:15 08:30	1	1	0	2	0	0	2	2
08:30 08:45	0	1	3	1	0	3	4	4
08:45 09:00	0	1	0	1	0	0	1	1
09:00 09:15	1	0	1	1	0	1	1	2
09:15 09:30	0	2	0	2	0	0	0	2
09:30 09:45	0	0	0	0	0	0	0	0
09:45 10:00	0	0	0	0	0	0	0	0
10:00 10:15	0	0	0	0	0	0	0	0
10:15 10:30	0	0	1	0	1	2	2	2
10:30 10:45	0	0	0	0	0	1	1	1
10:45 11:00	0	0	0	0	0	0	0	0
11:00 11:15	0	0	0	0	0	0	0	0
11:15 11:30	0	0	0	0	0	0	0	0
11:30 11:45	0	0	0	0	0	0	0	0
11:45 12:00	0	0	0	0	0	0	0	0
12:00 12:15	0	0	0	0	0	0	0	0
12:15 12:30	0	0	0	0	0	0	0	0
12:30 12:45	0	0	0	0	0	0	0	0
12:45 13:00	0	0	0	0	0	1	1	1
13:00 13:15	0	0	0	0	0	0	0	0
13:15 13:30	0	0	0	0	0	0	0	0
13:30 13:45	0	0	0	0	0	0	0	0
13:45 14:00	0	0	0	0	0	0	0	0
14:00 14:15	0	0	0	0	0	0	0	0
14:15 14:30	0	0	0	0	0	0	0	0
14:30 14:45	0	0	0	0	0	0	0	0
14:45 15:00	0	0	0	0	0	0	0	0
15:00 15:15	0	0	0	0	0	0	0	0
15:15 15:30	0	0	0	0	0	0	0	0
15:30 15:45	0	0	0	0	0	0	0	0
15:45 16:00	1	0	0	1	0	0	1	1
16:00 16:15	1	0	0	1	0	0	1	1
16:15 16:30	1	0	0	1	0	1	1	2
16:30 16:45	2	2	0	4	0	0	4	4
16:45 17:00	0	0	0	0	0	0	0	0
17:00 17:15	0	0	1	0	1	2	2	2
17:15 17:30	0	1	0	1	0	0	1	1
17:30 17:45	0	0	0	0	0	1	1	1
17:45 18:00	0	1	0	1	0	0	1	1
Total	8	10	12	18	7	19	37	



Transportation Services - Traffic Services
Turning Movement Count - Study Results
BYRON AVE @ ISLAND PARK DR

Survey Date: Thursday, January 23, 2020
Start Time: 07:00

WO No: 39390
Device: Miovision

Full Study Pedestrian Volume

Time Period	ISLAND PARK DR			Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total					
07:00 07:15	0	0	0	0	2	1	3	3
07:15 07:30	2	7	9	9	3	6	9	18
07:30 07:45	0	5	5	5	5	1	6	11
07:45 08:00	2	8	10	10	6	3	9	19
08:00 08:15	3	5	8	8	6	3	9	17
08:15 08:30	1	8	9	9	1	5	6	15
08:30 08:45	3	6	9	9	12	5	17	26
08:45 09:00	3	3	6	6	5	1	6	12
09:00 09:15	1	3	4	4	1	2	3	7
09:15 09:30	0	1	1	1	3	5	8	9
09:30 09:45	0	4	4	4	1	1	2	6
09:45 10:00	1	1	2	2	1	0	1	4
10:00 10:15	2	3	5	5	1	0	1	6
10:15 10:30	0	0	0	0	0	0	0	0
10:30 10:45	0	3	3	3	4	1	5	8
10:45 11:00	2	2	4	4	3	2	5	9
11:00 11:15	2	2	4	4	3	2	5	9
11:15 11:30	2	2	4	4	3	2	5	9
11:30 11:45	0	5	5	5	1	1	2	7
11:45 12:00	0	3	3	3	3	1	4	7
12:00 12:15	2	1	3	3	3	1	4	7
12:15 12:30	2	1	3	3	4	1	5	8
12:30 12:45	0	5	5	5	1	1	2	7
12:45 13:00	0	3	3	3	3	1	4	7
13:00 13:15	2	1	3	3	4	1	5	8
13:15 13:30	2	2	4	4	1	2	3	7
13:30 13:45	3	3	6	6	4	1	5	11
13:45 14:00	5	2	7	7	2	6	8	15
14:00 14:15	3	7	10	10	3	4	7	17
14:15 14:30	7	7	14	14	4	8	12	26
14:30 14:45	5	2	7	7	7	2	9	16
14:45 15:00	3	4	7	7	5	4	9	16
15:00 15:15	1	4	5	5	4	5	9	14
15:15 15:30	0	4	4	4	1	2	3	7
15:30 15:45	4	5	9	9	2	6	8	17
15:45 16:00	1	3	4	4	1	2	3	7
16:00 16:15	2	8	10	10	3	3	6	16
16:15 16:30	4	8	12	12	9	3	12	24
16:30 16:45	1	3	4	4	1	2	3	7
16:45 17:00	0	8	8	8	2	6	8	16
17:00 17:15	4	8	12	12	4	3	7	19
17:15 17:30	1	3	4	4	1	2	3	7
17:30 17:45	2	8	10	10	3	3	6	16
17:45 18:00	2	3	5	5	3	0	3	8
Total	62	127	189	189	108	84	192	381

Appendix C

Synchro Intersection Worksheets – Existing Conditions

Lanes, Volumes, Timings
1: Island Park & Scott

07-21-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	105	456	54	43	198	22	41	272	90	57	678	92
Traffic Volume (vph)	105	456	54	43	198	22	41	272	90	57	678	92
Future Volume (vph)	1658	1745	1483	1658	1705	0	0	1666	0	1668	1705	0
Satd. Flow (prot)	0.552		0.250		0.398			0.454				
FI Permitted												
Satd. Flow (perm)	924	1745	1423	434	1705	0	0	667	0	783	1705	0
Satd. Flow (RTOR)		40			21							10
Lane Group Flow (vph)	117	507	60	48	244	0	0	448	0	63	855	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	NA	
Protected Phases												
Permitted Phases	4	4	4	8	8	2	2	6	6	6	6	
Detector Phase	4	4	4	8	8	2	2	6	6	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	32.0	32.0	32.0	32.0	32.0	34.5	34.5	34.5	34.5	34.5	34.5	
Total Split (s)	42.0	42.0	42.0	42.0	42.0	53.0	53.0	53.0	53.0	53.0	53.0	
Total Split (%)	44.2%	44.2%	44.2%	44.2%	44.2%	55.8%	55.8%	55.8%	55.8%	55.8%	55.8%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	3.5	3.5	3.5	3.5	3.5	3.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.5	6.5	6.5	6.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max	Max	Max	Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	
Act Effct Green (s)	36.0	36.0	36.0	36.0	36.0	46.5	46.5	46.5	46.5	46.5	46.5	
Actuated G/C Ratio	0.38	0.38	0.38	0.38	0.38	0.49	0.49	0.49	0.49	0.49	0.49	
v/c Ratio	0.33	0.77	0.11	0.29	0.38	1.33	1.33	1.33	1.33	1.33	1.33	
Control Delay	24.4	35.1	9.7	26.7	22.8	193.1	193.1	193.1	193.1	193.1	193.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	24.4	35.1	9.7	26.7	22.8	193.1	193.1	193.1	193.1	193.1	193.1	
LOS	C	D	A	C	C	F	F	F	F	F	F	
Approach Delay	31.0			23.5		193.1		193.1		58.3		
Approach LOS	C			C		F		F		E		
Queue Length 50th (m)	15.0	80.0	2.3	6.1	30.8	~106.9		6.2		~158.3		
Queue Length 95th (m)	29.3	#119.7	10.0	15.7	50.3	#170.3		13.9		#237.5		
Internal Link Dist (m)		206.8		289.3		318.7		431.8				
Turn Bay Length (m)	50.0		25.0	245.0		25.0		25.0		25.0		
Base Capacity (vph)	350	661	564	164	650	337		383		839		
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	0.33	0.77	0.11	0.29	0.38	1.33		1.33		1.33		
Intersection Summary												
Cycle Length: 95												
Actuated Cycle Length: 95												
Offset: 38 (40%), Referenced to phase 2:NBLT and 6:SBTL, Start of Green												
Natural Cycle: 90												
Control Type: Actuated-Coordinated												

Lanes, Volumes, Timings
1: Island Park & Scott

07-21-2020

Maximum v/c Ratio: 1.33	Intersection LOS: E
Intersection Signal Delay: 71.8	ICU Level of Service G
Intersection Capacity Utilization 107.7%	
Analysis Period (min) 15	
Description: As per signal timing plan provided on July 21, 2020.	
~ 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.	



Lanes, Volumes, Timings
2: Kirkwood & Richmond

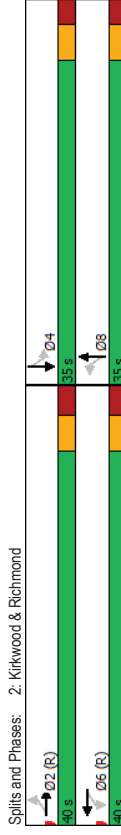
07-21-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	2	4	4	2	2	2	2	2	2	2	2	2
Traffic Volume (vph)	314	128	159	227	2	137	38	94	4	41	0	0
Future Volume (vph)	314	128	159	227	2	137	38	94	4	41	0	0
Satd. Flow (prot)	0	3095	0	3245	0	1688	1529	0	0	1738	0	0
Flt Permitted	0.954		0.645		0.724					0.984		
Satd. Flow (perm)	0	2953	0	0	2110	0	1251	1529	0	0	1716	0
Satd. Flow (RTOR)	106		1		104							
Lane Group Flow (vph)	0	493	0	0	431	0	152	146	0	0	50	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2	2	6	6	6	8	8	8	4	4	4	4
Detector Phase	2	2	6	6	6	8	8	8	4	4	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	31.1	31.1	31.1	31.1	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6
Total Split (s)	40.0	40.0	40.0	40.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	53.3%	53.3%	53.3%	53.3%	46.7%	46.7%	46.7%	46.7%	46.7%	46.7%	46.7%	46.7%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.8	2.8	2.8	2.8	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
Lead/Lag Optimize?												
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	33.9	33.9	33.9	33.9	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4
Actuated G/C Ratio	0.45	0.45	0.45	0.45	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
v/c Ratio	0.35	0.45	0.45	0.45	0.31	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Control Delay	11.2	11.2	11.2	11.2	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.2	11.2	11.2	11.2	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
LOS	B	B	B	B	B	B	B	B	B	B	B	B
Approach Delay	11.2	11.2	11.2	11.2	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B
Queue Length 50th (m)	17.4	21.1	21.1	21.1	14.5	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Queue Length 95th (m)	27.5	32.7	32.7	32.7	28.0	14.1	14.1	14.1	14.1	14.1	14.1	14.1
Internal Link Dist (m)	282.3	180.4	180.4	180.4	201.3	128.2	128.2	128.2	128.2	128.2	128.2	128.2
Turn Bay Length (m)												
Base Capacity (vph)	1392	954	954	954	490	662	662	662	662	662	662	662
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.45	0.45	0.45	0.31	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Intersection Summary												
Cycle Length: 75												
Actuated Cycle Length: 75												
Offset: 25 (33%), Referenced to phase 2EBTL and 6:WBTL, Start of Green												
Natural Cycle: 60												
Control Type: Actuated-Coordinated												

Lanes, Volumes, Timings
2: Kirkwood & Richmond

07-21-2020

Maximum v/c Ratio: 0.45	Intersection LOS: B
Intersection Signal Delay: 13.2	ICU Level of Service D
Intersection Capacity Utilization 74.8%	
Analysis Period (min) 15	
Description: As per signal timing plan provided on July 21, 2020.	
Advance pedestrian time assumed in phase timing.	



Lanes, Volumes, Timings
3: Private/Patricia & Richmond

07-21-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	17	403	3	1	325	9	23	0	26	24	0	40
Traffic Volume (vph)	17	403	3	1	325	9	23	0	26	24	0	40
Future Volume (vph)	0	3804	0	0	3287	0	0	1560	0	0	1535	0
Satd. Flow (prot)	0.935			0.954			0.846				0.852	
Flt Permitted	0	3092	0	0	3145	0	0	1338	0	0	1326	0
Satd. Flow (RTOR)	2			7			41				44	
Lane Group Flow (vph)	0	470	0	0	372	0	0	55	0	0	71	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2	2	2	6	6	6	8	8	8	4	4	4
Permitted Phases	2	2	2	6	6	6	8	8	8	4	4	4
Detector Phase	2	2	2	6	6	6	8	8	8	4	4	4
Switch Phase	2	2	2	6	6	6	8	8	8	4	4	4
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	33.8	33.8	33.8	33.8	33.8	33.8	21.5	21.5	21.5	21.5	21.5	21.5
Total Split (s)	53.0	53.0	53.0	53.0	53.0	53.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	70.7%	70.7%	70.7%	70.7%	70.7%	70.7%	29.3%	29.3%	29.3%	29.3%	29.3%	29.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	5.8	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag Optimize?												
Recall Mode	Max	Max	Max	Max	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	55.8			55.8			11.1					11.1
Actuated g/C Ratio	0.80			0.80			0.16					0.16
v/c Ratio	0.19			0.15			0.22					0.29
Control Delay	3.7			3.5			13.9					16.2
Queue Delay	0.0			0.0			0.0					0.0
Total Delay	3.7			3.5			13.9					16.2
LOS	A			A			B					B
Approach Delay	3.7			3.5			13.9					16.2
Approach LOS	A			A			B					B
Queue Length 50th (m)	9.3			7.0			1.6					3.1
Queue Length 95th (m)	19.2			15.0			10.1					12.8
Internal Link Dist (m)	180.4			177.6			16.2					168.6
Turn Bay Length (m)												
Base Capacity (vph)	2481			2525			349					348
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	0.19			0.15			0.16					0.20
Intersection Summary												
Cycle Length: 75												
Actuated Cycle Length: 68.5												
Natural Cycle: 60												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.29												

Lanes, Volumes, Timings
3: Private/Patricia & Richmond

07-21-2020

Intersection Signal Delay: 5.1	Intersection LOS: A
Intersection Capacity Utilization 44.9%	ICU Level of Service A
Analysis Period (min) 15	
Description: As per signal timing plan provided on July 21, 2020.	
Splits and Phases: 3: Private/Patricia & Richmond	
→ Ø2	← Ø2
← Ø6	→ Ø6
← Ø8	→ Ø8
← Ø4	→ Ø4

Lanes, Volumes, Timings
4: Island Park & Richmond/Wellington

07-21-2020

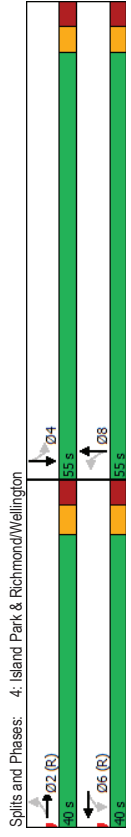
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	55	340	50	39	210	7	65	362	70	28	684	52
Traffic Volume (vph)	55	340	50	39	210	7	65	362	70	28	684	52
Future Volume (vph)	0	3204	0	0	3267	0	1688	1688	0	1688	1724	0
Satd. Flow (prot)	0.962	0.819	0.122									
Flt Permitted	0	2761	0	0	2685	0	213	1688	0	657	1724	0
Satd. Flow (perm)	16											
Satd. Flow (RTOR)	0	495	0	0	284	0	72	480	0	31	818	0
Lane Group Flow (vph)	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Turn Type	2	2	6	6	6	8	8	8	8	4	4	4
Permitted Phases	2	2	6	6	6	8	8	8	8	4	4	4
Detector Phase												
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	31.3	31.3	31.3	31.3	31.3	21.9	21.9	21.9	21.9	21.9	21.9	21.9
Total Split (s)	40.0	40.0	40.0	40.0	40.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	42.1%	42.1%	42.1%	42.1%	42.1%	57.9%	57.9%	57.9%	57.9%	57.9%	57.9%	57.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.9	2.9	2.9	2.9	2.9	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	6.3	5.9	5.9	5.9	5.9	5.9	5.9	5.9
Lead/Lag Optimize?												
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	33.7	33.7	33.7	33.7	33.7	49.1	49.1	49.1	49.1	49.1	49.1	49.1
Actuated g/C Ratio	0.35	0.35	0.35	0.35	0.35	0.52	0.52	0.52	0.52	0.52	0.52	0.52
v/c Ratio	0.50	0.30	0.30	0.30	0.30	0.65	0.55	0.55	0.55	0.09	0.92	0.92
Control Delay	25.4	25.4	22.9	22.9	22.9	45.5	19.6	19.6	19.6	3.7	14.3	14.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.4	25.4	22.9	22.9	22.9	45.5	19.6	19.6	19.6	3.7	14.3	14.3
LOS	C	C	C	C	C	D	B	B	B	A	B	B
Approach Delay	25.4	25.4	22.9	22.9	22.9	23.0	23.0	23.0	23.0	13.9	13.9	13.9
Approach LOS	C	C	C	C	C	C	C	C	C	B	B	B
Queue Length 50th (m)	35.7	35.7	19.3	19.3	19.3	7.9	44.6	44.6	44.6	0.6	17.0	17.0
Queue Length 95th (m)	50.6	50.6	29.4	29.4	29.4	m152	81.8	81.8	81.8	m0.9	m19.2	m19.2
Internal Link Dist (m)	177.6	177.6	213.6	213.6	213.6	268.0	268.0	268.0	268.0	318.7	318.7	318.7
Turn Bay Length (m)						15.0	15.0	15.0	15.0	10.0	10.0	10.0
Base Capacity (vph)	989	989	954	954	954	110	879	879	879	339	893	893
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.30	0.30	0.30	0.30	0.65	0.55	0.55	0.55	0.09	0.92	0.92

Intersection Summary	
Cycle Length: 95	
Actuated Cycle Length: 95	
Offset: 28 (29%), Referenced to phase 2EBTL and 6:WBT_L, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	

Lanes, Volumes, Timings
4: Island Park & Richmond/Wellington

07-21-2020

Maximum v/c Ratio: 0.92	Intersection LOS: C
Intersection Signal Delay: 20.0	ICU Level of Service H
Intersection Capacity Utilization 111.7%	
Analysis Period (min) 15	
Description: As per signal timing plan provided on July 21, 2020.	
m Volume for 95th percentile queue is metered by upstream signal.	



Lanes, Volumes, Timings
5: Private/Western & Wellington

07-21-2020

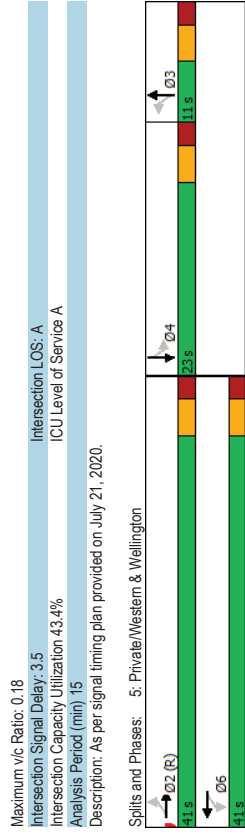
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T
Traffic Volume (vph)	16	399	0	0	216	10	0	0	0	25	0	20
Future Volume (vph)	16	399	0	0	216	10	0	0	0	25	0	20
Satd. Flow (prot)	0	3809	0	0	1724	0	0	1745	0	0	1878	0
Flt Permitted	0.941											0.950
Satd. Flow (perm)	0	3110	0	0	1724	0	0	1745	0	0	1541	0
Satd. Flow (RTOR)	4											116
Lane Group Flow (vph)	0	461	0	0	251	0	0	0	0	0	50	0
Turn Type	Perm	NA			NA				Perm	NA		
Permitted Phases	2	2		6	6		3	3		4		4
Detector Phase	2	2		6	6		3	3		4		4
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	5.0		10.0		10.0
Minimum Split (s)	20.5	20.5		20.5	20.5		10.5	10.5		22.5		22.5
Total Split (s)	41.0	41.0		41.0	41.0		11.0	11.0		23.0		23.0
Total Split (%)	54.7%	54.7%		54.7%	54.7%		14.7%	14.7%		30.7%		30.7%
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3		3.3
All-Red Time (s)	2.2	2.2		2.2	2.2		2.2	2.2		2.2		2.2
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Lost Time (s)	5.5	5.5		5.5	5.5		5.5	5.5		5.5		5.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode												
C-Max												
C-Max	61.0	61.0		61.0	61.0		None	None		None		None
Act Effct Green (s)	0.81	0.81		0.81	0.81		0.15	0.15		0.15		0.15
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.15	0.15		0.15		0.15
v/c Ratio	3.5	3.5		3.5	3.5		1.0	1.0		1.0		1.0
Control Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0
Total Delay	3.5	3.5		3.5	3.5		1.0	1.0		1.0		1.0
LOS	A	A		A	A		A	A		A		A
Approach Delay	3.5	3.5		3.5	3.5		1.0	1.0		1.0		1.0
Approach LOS	A	A		A	A		A	A		A		A
Queue Length 50th (m)	9.0	9.2		9.2	9.2		0.0	0.0		0.0		0.0
Queue Length 95th (m)	19.5	23.1		23.1	23.1		0.2	0.2		0.2		0.2
Internal Link Dist (m)	213.6	167.2		167.2	167.2		9.8	9.8		311.8		311.8
Turn Bay Length (m)												
Base Capacity (vph)	2529	1403		1403	1403		448	448		448		448
Starvation Cap Reductn	0	0		0	0		0	0		0		0
Spillback Cap Reductn	0	0		0	0		0	0		0		0
Storage Cap Reductn	0	0		0	0		0	0		0		0
Reduced v/c Ratio	0.18	0.18		0.18	0.18		0.11	0.11		0.11		0.11
Intersection Summary												
Cycle Length: 75												
Actuated Cycle Length: 75												
Offset: 27 (36%), Referenced to phase 2EBTL, Start of Green												
Natural Cycle: 55												
Control Type: Actuated-Coordinated												

Scenario 1 70 Richmond Road AM Peak Hour Existing

Synchro 11 Report
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Lanes, Volumes, Timings
5: Private/Western & Wellington

07-21-2020



Scenario 1 70 Richmond Road AM Peak Hour Existing

Synchro 11 Report
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Lanes, Volumes, Timings
6: Island Park & Byron

07-21-2020

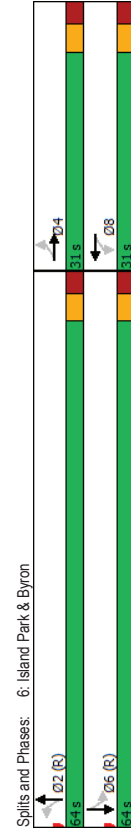
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	143	71	21	126	12	78	461	11	49	679	32
Future Volume (vph)	50	143	71	21	126	12	78	461	11	49	679	32
Satd. Flow (prot)	0	1643	0	0	1707	0	0	1726	0	0	1725	0
Flt Permitted	0.877		0.904			0.803				0.932		
Satd. Flow (perm)	0	1443	0	0	1550	0	0	1394	0	0	1611	0
Satd. Flow (RTOR)	19		4									
Lane Group Flow (vph)	0	294	0	0	176	0	0	611	0	0	844	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4		8	8		2	2		6		6
Permitted Phases	4	4		8	8		2	2		6		6
Detector Phase	4	4		8	8		2	2		6		6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	32.7	32.7	32.7	32.7	32.7	32.7
Total Split (s)	31.0	31.0	31.0	31.0	31.0	64.0	64.0	64.0	64.0	64.0	64.0	64.0
Total Split (%)	32.6%	32.6%	32.6%	32.6%	32.6%	67.4%	67.4%	67.4%	67.4%	67.4%	67.4%	67.4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag Optimize?												
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	21.6	21.6	21.6	21.6	21.6	21.6	61.7	61.7	61.7	61.7	61.7	61.7
Actuated G/C Ratio	0.23	0.23	0.23	0.23	0.23	0.23	0.65	0.65	0.65	0.65	0.65	0.65
v/c Ratio	0.86	0.86	0.86	0.50	0.50	0.68	0.68	0.68	0.81	0.81	0.81	0.81
Control Delay	56.6	56.6	56.6	35.5	35.5	16.1	16.1	16.1	13.0	13.0	13.0	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.6	56.6	56.6	35.5	35.5	16.1	16.1	16.1	13.0	13.0	13.0	13.0
LOS	E	E	E	D	D	B	B	B	B	B	B	B
Approach Delay	56.6	56.6	56.6	35.5	35.5	16.1	16.1	16.1	13.0	13.0	13.0	13.0
Approach LOS	E	E	E	D	D	B	B	B	B	B	B	B
Queue Length 50th (m)	47.7	47.7	47.7	26.9	26.9	66.5	66.5	66.5	47.6	47.6	47.6	47.6
Queue Length 95th (m)	#83.6	#83.6	#83.6	45.3	45.3	113.1	113.1	113.1	m61.7	m61.7	m61.7	m61.7
Internal Link Dist (m)	377.2	377.2	377.2	388.4	388.4	224.9	224.9	224.9	288.0	288.0	288.0	288.0
Turn Bay Length (m)												
Base Capacity (vph)	393	393	393	410	410	905	905	905	1046	1046	1046	1046
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.75	0.75	0.43	0.43	0.68	0.68	0.68	0.81	0.81	0.81	0.81

Intersection Summary	
Cycle Length:	95
Actuated Cycle Length:	95
Offset:	73 (77%), Referenced to phase 2:NBLT and 6:SBTL, Start of Green
Natural Cycle:	70
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
6: Island Park & Byron

07-21-2020

Maximum v/c Ratio:	0.86
Intersection Signal Delay:	22.7
Intersection LOS:	C
ICU Level of Service E	
Intersection Capacity Utilization:	65.9%
Analysis Period (min):	15
Description:	As per signal timing plan provided on July 21, 2020.
# 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.	



Lanes, Volumes, Timings
1: Island Park & Scott

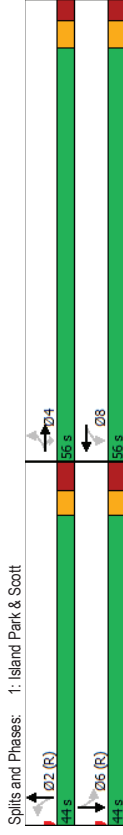
07-21-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	105	277	44	201	449	101	15	257	13	27	393	73
Traffic Volume (vph)	105	277	44	201	449	101	15	257	13	27	393	73
Future Volume (vph)	1658	1745	1483	1658	1662	0	0	1725	0	1658	1688	0
Satd. Flow (prot)	0.263			0.523				0.878		0.487		
Flt Permitted	429	1745	1391	890	1662	0	0	1519	0	834	1688	0
Satd. Flow (perm)	49			16				3		11		
Lane Group Flow (vph)	117	308	49	223	611	0	0	317	0	30	518	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	NA	
Protected Phases	4	4	4	8	8	2	2	6	6			
Detector Phase	4	4	4	8	8	2	2	6	6			
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	32.0	32.0	32.0	32.0	32.0	34.5	34.5	34.5	34.5	34.5	34.5	
Total Split (s)	56.0	56.0	56.0	56.0	56.0	44.0	44.0	44.0	44.0	44.0	44.0	
Total Split (%)	56.0%	56.0%	56.0%	56.0%	56.0%	44.0%	44.0%	44.0%	44.0%	44.0%	44.0%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	3.5	3.5	3.5	3.5	3.5	3.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.5	6.5	6.5	6.5	
Lead/Lag												
Lead/Lag Optimize?												
Recall Mode	Max	Max	Max	Max	Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	
Act Effct Green (s)	50.0	50.0	50.0	50.0	50.0	37.5	37.5	37.5	37.5	37.5	37.5	
Actuated G/C Ratio	0.50	0.50	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38	
v/c Ratio	0.55	0.35	0.07	0.50	0.73	0.56	0.10	0.81	0.10	0.81	0.10	
Control Delay	29.1	16.6	4.1	21.6	25.4	29.0	21.4	39.2	21.4	39.2	21.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	29.1	16.6	4.1	21.6	25.4	29.0	21.4	39.2	21.4	39.2	21.4	
LOS	C	B	A	C	C	C	C	C	C	C	D	
Approach Delay	18.4			24.4		29.0		38.2				
Approach LOS	B			C		C		D				
Queue Length 50th (m)	15.0	34.8	0.0	27.7	87.1	47.3		3.7		87.1		
Queue Length 95th (m)	35.5	53.6	5.5	49.5	130.2	74.3		10.0		#140.4		
Internal Link Dist (m)	206.8			289.3		318.7		431.8				
Turn Bay Length (m)	50.0	25.0	245.0			25.0		25.0				
Base Capacity (vph)	214	872	720	445	839	571		312		639		
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	0.65	0.35	0.07	0.50	0.73	0.56		0.10		0.81		
Intersection Summary												
Cycle Length: 100												
Actuated Cycle Length: 100												
Offset: 2 (2%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green												
Natural Cycle: 70												
Control Type: Actuated-Coordinated												

Lanes, Volumes, Timings
1: Island Park & Scott

07-21-2020

Maximum v/c Ratio: 0.81	Intersection LOS: C
Intersection Signal Delay: 27.2	ICU Level of Service E
Intersection Capacity Utilization 84.1%	
Analysis Period (min): 15	
Description: As per signal timing plan provided on July 21, 2020.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	



Splits and Phases: 1: Island Park & Scott

Lanes, Volumes, Timings
2: Kirkwood & Richmond

07-21-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	2	260	140	203	549	12	175	39	157	6	51	8
Traffic Volume (vph)	2	260	140	203	549	12	175	39	157	6	51	8
Future Volume (vph)	0	2975	0	3257	0	1658	1494	0	1696	0	1696	0
Satd. Flow (prot)	0.953		0.711		0.804							0.965
Flt Permitted	0	2834	0	2304	0	1353	1494	0	1643	0	1643	0
Satd. Flow (perm)	154		2		174							9
Satd. Flow (RTOR)	0	447	0	849	0	194	217	0	0	0	73	0
Lane Group Flow (vph)	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Turn Type	2	2	6	6	6	8	8	8	4	4	4	4
Permitted Phases	2	2	6	6	6	8	8	8	4	4	4	4
Detector Phase	2	2	6	6	6	8	8	8	4	4	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	31.1	31.1	31.1	31.1	31.1	27.6	27.6	27.6	27.6	27.6	27.6	27.6
Total Split (s)	45.0	45.0	45.0	45.0	45.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	52.9%	52.9%	52.9%	52.9%	52.9%	47.1%	47.1%	47.1%	47.1%	47.1%	47.1%	47.1%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.8	2.8	2.8	2.8	2.8	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.1	5.6	5.6	5.6	5.6	5.6	5.6	5.6
Lead/Lag Optimize?												
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)	53.8	53.8	53.8	53.8	53.8	19.5	19.5	19.5	19.5	19.5	19.5	19.5
Actuated g/C Ratio	0.63	0.63	0.63	0.63	0.63	0.23	0.23	0.23	0.23	0.23	0.23	0.23
v/c Ratio	0.24	0.24	0.24	0.24	0.24	0.58	0.58	0.58	0.58	0.58	0.58	0.58
Control Delay	5.5	5.5	5.5	5.5	5.5	12.4	12.4	12.4	12.4	12.4	12.4	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.5	5.5	5.5	5.5	5.5	12.4	12.4	12.4	12.4	12.4	12.4	12.4
LOS	A	A	A	A	A	B	B	B	B	B	B	B
Approach Delay	5.5	5.5	5.5	5.5	5.5	12.4	12.4	12.4	12.4	12.4	12.4	12.4
Approach LOS	A	A	A	A	A	B	B	B	B	B	B	B
Queue Length 50th (m)	10.1	10.1	10.1	10.1	10.1	41.3	41.3	41.3	41.3	41.3	41.3	41.3
Queue Length 95th (m)	19.8	19.8	19.8	19.8	19.8	70.1	70.1	70.1	70.1	70.1	70.1	70.1
Internal Link Dist (m)	282.3	282.3	282.3	282.3	282.3	180.4	180.4	180.4	180.4	180.4	180.4	180.4
Turn Bay Length (m)	1849	1849	1849	1849	1849	1457	1457	1457	1457	1457	1457	1457
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.24	0.24	0.24	0.24	0.58	0.58	0.58	0.58	0.58	0.58	0.58
Intersection Summary												
Cycle Length: 85												
Actuated Cycle Length: 85												
Offset: 79 (93%), Referenced to phase 2EBTL and 6:WBTL, Start of Green												
Natural Cycle: 60												
Control Type: Actuated-Coordinated												

Lanes, Volumes, Timings
2: Kirkwood & Richmond

07-21-2020

Maximum v/c Ratio: 0.62	Intersection LOS: B
Intersection Signal Delay: 13.5	ICU Level of Service D
Intersection Capacity Utilization 76.0%	
Analysis Period (min) 15	
Description: As per signal timing plan provided on July 21, 2020.	
Advance pedestrian time assumed in the phase timing.	



Lanes, Volumes, Timings
3: Private/Patricia & Richmond

07-21-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	20	364	19	13	750	29	3	0	3	16	0	26
Traffic Volume (vph)	20	364	19	13	750	29	3	0	3	16	0	26
Future Volume (vph)	0	3272	0	0	3285	0	0	1561	0	0	1545	0
Satd. Flow (prot)	0.897			0.946			0.829				0.872	
Flt Permitted	0	2935	0	0	3109	0	0	1318	0	0	1362	0
Satd. Flow (RTOR)	13			10			36				36	
Satd. Flow (vph)	0	447	0	0	879	0	0	6	0	0	47	0
Lane Group Flow (vph)	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Turn Type	2	2	2	6	6	6	8	8	8	4	4	4
Protected Phases	2	2	2	6	6	6	8	8	8	4	4	4
Permitted Phases	2	2	2	6	6	6	8	8	8	4	4	4
Detector Phase	2	2	2	6	6	6	8	8	8	4	4	4
Switch Phase	2	2	2	6	6	6	8	8	8	4	4	4
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	33.8	33.8	33.8	33.8	33.8	33.8	21.5	21.5	21.5	21.5	21.5	21.5
Total Split (s)	63.0	63.0	63.0	63.0	63.0	63.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	74.1%	74.1%	74.1%	74.1%	74.1%	74.1%	25.9%	25.9%	25.9%	25.9%	25.9%	25.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	5.8	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max	Max	Max	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	69.7	69.7	69.7	69.7	69.7	69.7	11.2	11.2	11.2	11.2	11.2	11.2
Actuated G/C Ratio	0.84	0.84	0.84	0.84	0.84	0.84	0.13	0.13	0.13	0.13	0.13	0.13
v/c Ratio	0.18	0.18	0.18	0.34	0.34	0.34	0.03	0.03	0.03	0.03	0.03	0.03
Control Delay	3.0	3.0	3.0	3.7	3.7	3.7	0.2	0.2	0.2	0.2	0.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.0	3.0	3.0	3.7	3.7	3.7	0.2	0.2	0.2	0.2	0.2	0.2
LOS	A	A	A	A	A	A	A	A	A	A	A	B
Approach Delay	3.0	3.0	3.0	3.7	3.7	3.7	0.2	0.2	0.2	0.2	0.2	0.2
Approach LOS	A	A	A	A	A	A	A	A	A	A	A	B
Queue Length 50th (m)	8.6	8.6	8.6	20.6	20.6	20.6	0.0	0.0	0.0	0.0	0.0	1.8
Queue Length 95th (m)	17.6	17.6	17.6	38.6	38.6	38.6	0.0	0.0	0.0	0.0	0.0	10.2
Internal Link Dist (m)	180.4	180.4	180.4	177.6	177.6	177.6	16.2	16.2	16.2	16.2	16.2	168.6
Turn Bay Length (m)												
Base Capacity (vph)	2461	2461	2461	2606	2606	2606	291	291	291	291	291	300
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.18	0.18	0.34	0.34	0.34	0.02	0.02	0.02	0.02	0.02	0.16

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 83.2

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.34

Lanes, Volumes, Timings
3: Private/Patricia & Richmond

07-21-2020

Intersection Signal Delay: 3.9	Intersection LOS: A
Intersection Capacity Utilization 52.4%	ICU Level of Service A
Analysis Period (min) 15	
Description: As per signal timing plan provided on July 21, 2020.	
Splits and Phases: 3: Private/Patricia & Richmond	

Scenario 1 70 Richmond Road PM Peak Hour Existing

Lanes, Volumes, Timings
4: Island Park & Richmond/Wellington

07-21-2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T
Traffic Volume (vph)	23	301	61	79	576	9	54	241	65	49	490
Future Volume (vph)	23	301	61	79	576	9	54	241	65	49	490
Satd. Flow (prot)	0	3177	0	0	3285	0	1688	1673	0	1688	1688
Flt Permitted	0.880			0.823		0.189			0.488		
Satd. Flow (perm)	0	2797	0	0	2708	0	330	1673	0	839	1688
Satd. Flow (RTOR)	30			2			21		18		
Lane Group Flow (vph)	0	428	0	0	738	0	60	340	0	54	667
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	2	2	6	6	6	8	8	8	4	4	4
Permitted Phases	2	2	6	6	6	8	8	8	4	4	4
Detector Phase	2	2	6	6	6	8	8	8	4	4	4
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	31.3	31.3	31.3	31.3	31.3	21.9	21.9	21.9	21.9	21.9	21.9
Total Split (s)	40.0	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	45.0	45.0
Total Split (%)	47.1%	47.1%	47.1%	47.1%	47.1%	52.9%	52.9%	52.9%	52.9%	52.9%	52.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.9	2.9	2.9	2.9	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	6.3	5.9	5.9	5.9	5.9	5.9	5.9

Lead/Lag Optimize?

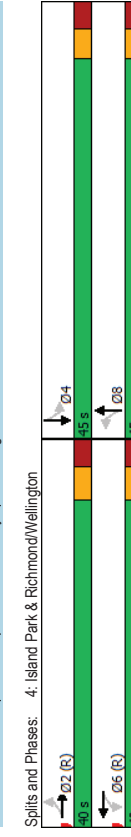
Recall Mode	C-Max	C-Max	C-Max	Max	Max	Max
Act Effct Green (s)	33.7	33.7	39.1	39.1	39.1	39.1
Actuated G/C Ratio	0.40	0.40	0.46	0.46	0.46	0.46
v/c Ratio	0.38	0.69	0.40	0.44	0.14	0.85
Control Delay	18.1	25.3	19.4	12.4	14.5	32.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.1	25.3	19.4	12.4	14.5	32.2
LOS	B	C	B	B	B	C
Approach Delay	18.1	25.3	13.5	13.5	30.9	30.9
Approach LOS	B	C	B	B	C	C
Queue Length 50th (m)	23.4	50.9	3.4	17.5	4.9	90.0
Queue Length 95th (m)	35.0	70.6	m8.4	m37.0	11.8	#154.8
Internal Link Dist (m)	177.6	213.6	268.0	268.0	318.7	318.7
Turn Bay Length (m)			15.0	15.0	10.0	10.0
Base Capacity (vph)	1127	1074	151	780	385	786
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	0.38	0.69	0.40	0.44	0.14	0.85

Intersection Summary

Cycle Length: 85
Actuated Cycle Length: 85
Offset: 63 (62%), Referenced to phase 2EBTL and 6:WBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85
Intersection Signal Delay: 23.6
Intersection LOS: C
Intersection Capacity Utilization: 104.5%
ICU Level of Service G
Analysis Period (min): 15

Description: As per signal timing plan provided on July 21, 2020.
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: Island Park & Richmond/Wellington

Lanes, Volumes, Timings
5: Private/Western & Wellington

07-21-2020

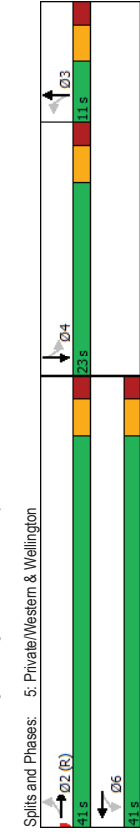
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T
Traffic Volume (vph)	22	346	0	0	542	13	0	0	0	30	0	113
Future Volume (vph)	22	346	0	0	542	13	0	0	0	30	0	113
Satd. Flow (prot)	0	306	0	0	1729	0	0	1745	0	0	1492	0
Flt Permitted	0.908											0.950
Satd. Flow (perm)	0	2979	0	0	1729	0	0	1745	0	0	1432	0
Satd. Flow (RTOR)	0	408	0	0	616	0	0	0	0	0	159	0
Lane Group Flow (vph)	Perm	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Turn Type	2	2	6	6	6	3	3	3	3	4	4	4
Permitted Phases	2	2	6	6	6	3	3	3	3	4	4	4
Detector Phase	2	2	6	6	6	3	3	3	3	4	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0	10.0	10.0	10.0
Minimum Split (s)	20.5	20.5	20.5	20.5	20.5	10.5	10.5	10.5	10.5	22.5	22.5	22.5
Total Split (s)	41.0	41.0	41.0	41.0	41.0	11.0	11.0	11.0	11.0	23.0	23.0	23.0
Total Split (%)	54.7%	54.7%	54.7%	54.7%	54.7%	14.7%	14.7%	14.7%	14.7%	30.7%	30.7%	30.7%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Recall Mode	C-Max	C-Max	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	46.5	46.5	46.5	46.5	46.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
Actuated G/C Ratio	0.62	0.62	0.62	0.62	0.62	0.23	0.23	0.23	0.23	0.23	0.23	0.23
v/c Ratio	0.22	0.22	0.22	0.22	0.22	0.37	0.37	0.37	0.37	0.37	0.37	0.37
Control Delay	6.6	6.6	6.6	6.6	6.6	10.2	10.2	10.2	10.2	10.2	10.2	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.6	6.6	6.6	6.6	6.6	10.2	10.2	10.2	10.2	10.2	10.2	10.2
LOS	A	A	B	B	B	B	B	B	B	B	B	B
Approach Delay	6.6	6.6	11.1	11.1	11.1	10.2	10.2	10.2	10.2	10.2	10.2	10.2
Approach LOS	A	A	B	B	B	B	B	B	B	B	B	B
Queue Length 50th (m)	11.8	11.8	45.3	45.3	45.3	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Queue Length 95th (m)	17.8	17.8	72.0	72.0	72.0	17.8	17.8	17.8	17.8	17.8	17.8	17.8
Internal Link Dist (m)	213.6	213.6	167.2	167.2	167.2	9.8	9.8	9.8	9.8	9.8	9.8	9.8
Turn Bay Length (m)												
Base Capacity (vph)	1846	1846	1072	1072	1072	430	430	430	430	430	430	430
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.22	0.57	0.57	0.57	0.37	0.37	0.37	0.37	0.37	0.37	0.37

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	

Lanes, Volumes, Timings
5: Private/Western & Wellington

07-21-2020

Maximum v/c Ratio: 0.57	Intersection LOS: A
Intersection Signal Delay: 9.4	ICU Level of Service A
Intersection Capacity Utilization: 53.0%	
Analysis Period (min): 15	
Description: As per signal timing plan provided on July 21, 2020.	



Lanes, Volumes, Timings
6: Island Park & Byron

07-21-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	36	134	55	39	340	14	68	34.3	7	20	555	73
Traffic Volume (vph)	36	134	55	39	340	14	68	34.3	7	20	555	73
Future Volume (vph)	0	1657	0	0	1724	0	0	1726	0	0	1706	0
Satd. Flow (prot)	0.831			0.947			0.813				0.980	
Flt Permitted	0	1382	0	0	1639	0	0	1414	0	0	1675	0
Satd. Flow (perm)	21			2			2				2	
Lane Group Flow (vph)	0	250	0	0	437	0	0	465	0	0	720	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases	4	4		8	8		2	2		6	6	
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	23.0	23.0		23.0	23.0		32.7	32.7		32.7	32.7	
Total Split (s)	35.0	35.0		35.0	35.0		50.0	50.0		50.0	50.0	
Total Split (%)	41.2%	41.2%		41.2%	41.2%		58.8%	58.8%		58.8%	58.8%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.7	2.7		2.7	2.7		2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	26.1	26.1		26.1	26.1		47.2	47.2		47.2	47.2	
Actuated G/C Ratio	0.31	0.31		0.31	0.31		0.56	0.56		0.56	0.56	
v/c Ratio	0.57	0.87		0.87	0.87		0.59	0.78		0.78	0.78	
Control Delay	27.5	27.5		45.9	45.9		17.4	17.4		29.8	29.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	27.5	27.5		45.9	45.9		17.4	17.4		29.8	29.8	
LOS	C	C		D	D		B	B		C	C	
Approach Delay	27.5	27.5		45.9	45.9		17.4	17.4		29.8	29.8	
Approach LOS	C	C		D	D		B	B		C	C	
Queue Length 50th (m)	29.8	63.6		63.6	63.6		49.5	49.5		104.6	104.6	
Queue Length 95th (m)	51.4	#107.8		#107.8	#107.8		82.4	82.4		m133.2	m133.2	
Internal Link Dist (m)	377.2	388.4		388.4	388.4		224.9	224.9		288.0	288.0	
Turn Bay Length (m)												
Base Capacity (vph)	485	560		560	560		784	784		929	929	
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	0.52	0.78		0.78	0.78		0.59	0.59		0.78	0.78	
Intersection Summary												
Cycle Length: 85												
Actuated Cycle Length: 85												
Offset: 82 (96%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green												
Natural Cycle: 70												
Control Type: Actuated-Coordinated												

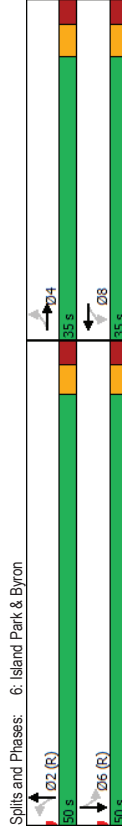
Scenario 1 70 Richmond Road PM Peak Hour Existing

Synchro 11 Report
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Lanes, Volumes, Timings
6: Island Park & Byron

07-21-2020

Maximum v/c Ratio: 0.87	Intersection LOS: C
Intersection Signal Delay: 30.2	ICU Level of Service E
Intersection Capacity Utilization 89.9%	
Analysis Period (min) 15	
Description: As per signal timing plan provided on July 21, 2020.	
# 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.	



Scenario 1 70 Richmond Road PM Peak Hour Existing

Synchro 11 Report
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Appendix D

Collision Data

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Traffic Control Condition	Classification Of Accident	Initial Impact Type	Road Surface Condition
2015-01-29	2015	16:12	BASSETT LANE @ ISLAND PARK DR	03 - Snow	05 - Dusk	02 - Stop sign		02 - Non-fatal injury	07 - SUV other	03 - Loose snow
2016-02-03	2016	20:33	BASSETT LANE @ ISLAND PARK DR	01 - Clear	07 - Dark	01 - Stop sign		02 - Non-fatal injury	07 - SUV other	01 - Dry
2016-02-22	2016	17:20	BYRON AVE @ ISLAND PARK DR	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2016-03-05	2016	7:45	BYRON AVE @ ISLAND PARK DR	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2015-02-02	2015	15:15	BYRON AVE @ ISLAND PARK DR	01 - Clear	03 - Dawn	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2015-03-22	2015	0:48	BYRON AVE @ ISLAND PARK DR	01 - Clear	07 - Dark	01 - Traffic signal		03 - P.D. only	07 - SUV other	03 - Loose snow
2015-05-30	2015	9:12	BYRON AVE @ ISLAND PARK DR	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2015-08-24	2015	12:00	BYRON AVE @ ISLAND PARK DR	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2015-11-19	2015	5:04	BYRON AVE @ ISLAND PARK DR	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	02 - Wet
2015-11-19	2015	5:04	BYRON AVE @ ISLAND PARK DR	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	02 - Wet
2016-11-22	2016	12:49	BYRON AVE @ ISLAND PARK DR	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2017-02-12	2017	18:02	BYRON AVE @ ISLAND PARK DR	03 - Snow	07 - Dark	01 - Traffic signal		03 - P.D. only	05 - Turning movement	03 - Loose snow
2017-03-08	2017	8:01	BYRON AVE @ ISLAND PARK DR	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	02 - Wet
2017-08-14	2017	15:09	BYRON AVE @ ISLAND PARK DR	01 - Clear	01 - Daylight	01 - Traffic signal		02 - Non-fatal injury	03 - Rear end	01 - Dry
2017-09-01	2017	9:40	BYRON AVE @ ISLAND PARK DR	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	02 - Wet
2017-10-30	2017	9:17	BYRON AVE @ ISLAND PARK DR	02 - Rain	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	02 - Wet
2017-12-10	2017	11:19	BYRON AVE @ ISLAND PARK DR	03 - Snow	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	02 - Wet
2018-01-05	2018	17:50	BYRON AVE @ ISLAND PARK DR	01 - Clear	07 - Dawn	01 - Traffic signal		03 - P.D. only	03 - Rear end	02 - Wet
2018-07-20	2018	15:00	BYRON AVE @ ISLAND PARK DR	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2018-08-15	2018	10:49	BYRON AVE @ ISLAND PARK DR	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2018-08-19	2018	16:00	BYRON AVE @ ISLAND PARK DR	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2014-01-05	2014	11:42	HILSON AVE @ RICHMOND RD	03 - Snow	07 - Dark	02 - Stop sign		02 - Non-fatal injury	03 - Loose snow	03 - Loose snow
2017-03-05	2017	8:40	ISLAND PARK DR @ MAILES AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2017-03-05	2017	8:40	ISLAND PARK DR @ MAILES AVE	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2014-01-20	2014	12:15	ISLAND PARK DR @ RICHMOND RD	02 - Rain	01 - Daylight	01 - Traffic signal		02 - Non-fatal injury	04 - Sideswipe	01 - Dry
2014-07-08	2014	16:44	ISLAND PARK DR @ RICHMOND RD	02 - Rain	01 - Daylight	01 - Traffic signal		03 - P.D. only	05 - Turning movement	02 - Wet
2014-07-11	2014	17:48	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2014-08-02	2014	15:11	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2014-08-24	2014	12:19	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2014-09-17	2014	8:40	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	02 - Wet
2014-10-04	2014	11:50	ISLAND PARK DR @ RICHMOND RD	02 - Rain	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	02 - Wet
2014-10-04	2014	11:50	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	02 - Wet
2014-10-18	2014	13:40	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2014-11-02	2014	19:05	ISLAND PARK DR @ RICHMOND RD	01 - Clear	07 - Dark	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2015-02-01	2015	16:45	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2015-02-14	2015	14:00	ISLAND PARK DR @ RICHMOND RD	03 - Snow	01 - Daylight	01 - Traffic signal		03 - P.D. only	99 - Other	04 - Slush
2015-02-28	2015	11:31	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	02 - Wet
2015-03-18	2015	10:27	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2015-04-21	2015	12:30	ISLAND PARK DR @ RICHMOND RD	01 - Clear	07 - Dawn	01 - Traffic signal		03 - P.D. only	02 - Angle	01 - Dry
2015-04-21	2015	12:30	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	02 - Angle	01 - Dry
2015-05-23	2015	16:30	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	07 - SUV other	02 - Wet
2015-05-26	2015	21:33	ISLAND PARK DR @ RICHMOND RD	01 - Clear	07 - Dark	01 - Traffic signal		02 - Non-fatal injury	03 - Rear end	01 - Dry
2015-07-17	2015	13:40	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2015-07-31	2015	15:29	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	02 - Angle	01 - Dry
2015-10-14	2015	12:46	ISLAND PARK DR @ RICHMOND RD	01 - Clear	07 - Dark	01 - Traffic signal		02 - Non-fatal injury	04 - Sideswipe	01 - Dry
2015-10-20	2015	12:56	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2015-10-20	2015	12:56	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2016-01-29	2016	12:27	ISLAND PARK DR @ RICHMOND RD	02 - Rain	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2016-06-04	2016	14:00	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2016-06-07	2016	18:37	ISLAND PARK DR @ RICHMOND RD	02 - Rain	01 - Daylight	01 - Traffic signal		03 - P.D. only	05 - Turning movement	02 - Wet
2016-09-02	2016	16:30	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2016-10-13	2016	7:27	ISLAND PARK DR @ RICHMOND RD	01 - Clear	07 - Dark	01 - Traffic signal		02 - Non-fatal injury	02 - Angle	01 - Dry
2016-10-28	2016	20:10	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	02 - Wet
2016-11-14	2016	17:30	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2017-01-03	2017	13:29	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	05 - Turning movement	02 - Wet
2017-01-20	2017	12:54	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	05 - Turning movement	04 - Slush
2017-03-28	2017	17:56	ISLAND PARK DR @ RICHMOND RD	02 - Rain	01 - Daylight	01 - Traffic signal		03 - P.D. only	05 - Turning movement	01 - Dry
2017-04-30	2017	11:15	ISLAND PARK DR @ RICHMOND RD	02 - Rain	01 - Daylight	01 - Traffic signal		03 - P.D. only	05 - Turning movement	02 - Wet
2017-09-26	2017	15:26	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	02 - Wet
2018-02-03	2018	15:04	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2018-04-10	2018	14:40	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		02 - Non-fatal injury	07 - SUV other	01 - Dry
2018-04-10	2018	14:40	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		02 - Non-fatal injury	07 - SUV other	01 - Dry
2018-06-23	2018	20:51	ISLAND PARK DR @ RICHMOND RD	02 - Rain	05 - Dusk	01 - Traffic signal		03 - P.D. only	05 - Turning movement	02 - Wet
2018-09-28	2018	21:55	ISLAND PARK DR @ RICHMOND RD	02 - Rain	07 - Dark	01 - Traffic signal		03 - P.D. only	05 - Turning movement	02 - Wet
2018-10-09	2018	12:02	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2018-10-27	2018	18:11	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2018-11-26	2018	17:25	ISLAND PARK DR @ RICHMOND RD	02 - Rain	07 - Dark	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2018-12-27	2018	20:23	ISLAND PARK DR @ RICHMOND RD	02 - Rain	07 - Dark	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2018-12-27	2018	20:23	ISLAND PARK DR @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2015-01-31	2015	12:45	ISLAND PARK DR @ SCOTT ST	01 - Clear	01 - Daylight	01 - Traffic signal		02 - Non-fatal injury	04 - Sideswipe	01 - Dry
2015-02-19	2015	16:45	ISLAND PARK DR @ SCOTT ST	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	06 - Ice
2015-06-13	2015	11:18	ISLAND PARK DR @ SCOTT ST	01 - Clear	01 - Daylight	01 - Traffic signal		02 - Non-fatal injury	04 - Sideswipe	01 - Dry
2015-08-25	2015	17:33	ISLAND PARK DR @ SCOTT ST	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2015-10-29	2015	6:15	ISLAND PARK DR @ SCOTT ST	02 - Rain	03 - Dawn	01 - Traffic signal		03 - P.D. only	05 - Turning movement	01 - Dry
2015-11-23	2015	8:31	ISLAND PARK DR @ SCOTT ST	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2016-01-21	2016	16:43	ISLAND PARK DR @ SCOTT ST	01 - Clear	05 - Dusk	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2016-01-21	2016	16:43	ISLAND PARK DR @ SCOTT ST	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2016-06-04	2016	16:20	ISLAND PARK DR @ SCOTT ST	02 - Rain	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2016-07-15	2016	16:00	ISLAND PARK DR @ SCOTT ST	02 - Rain	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	02 - Wet
2016-07-15	2016	16:04	ISLAND PARK DR @ SCOTT ST	02 - Rain	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	02 - Wet
2016-08-25	2016	11:53	ISLAND PARK DR @ SCOTT ST	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2016-08-31	2016	15:25	ISLAND PARK DR @ SCOTT ST	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2016-09-07	2016	17:45	ISLAND PARK DR @ SCOTT ST	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2016-09-21	2016	16:00	ISLAND PARK DR @ SCOTT ST	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2016-09-21	2016	16:00	ISLAND PARK DR @ SCOTT ST	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	01 - Dry
2017-01-20	2017	17:25	ISLAND PARK DR @ SCOTT ST	02 - Rain	05 - Dusk	01 - Traffic signal		03 - P.D. only	04 - Sideswipe	02 - Wet
2017-06-09	2017	17:27	ISLAND PARK DR @ SCOTT ST	01 - Clear	01 - Daylight	01 - Traffic signal		02 - Non-fatal injury	04 - Sideswipe	02 - Wet
2017-06-19	2017	17:39	ISLAND PARK DR @ SCOTT ST	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	01 - Approaching	01 - Dry
2017-08-27	2017	10:35	ISLAND PARK DR @ SCOTT ST	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	02 - Angle	01 - Dry
2017-10-20	2017	9:50	ISLAND PARK DR @ SCOTT ST	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2017-11-26	2017	0:37	ISLAND PARK DR @ SCOTT ST	01 - Clear	07 - Dark	01 - Traffic signal		03 - P.D. only	03 - Rear end	01 - Dry
2017-11-26	2017	12:30	ISLAND PARK DR @ SCOTT ST	01 - Clear	01 - Daylight	01 - Traffic signal		03 - P.D. only	01 - Approaching	01 - Dry

2018-09-27	2018	2033	ISLAND PARK DR @ SCOTT ST (0002126)	01 - Clear	07 - Dark	01 - Traffic signal	03 - P.D. only	05 - Turning movement	01 - Dry
2018-10-17	2018	1908	ISLAND PARK DR @ SCOTT ST (0002126)	01 - Clear	05 - Dusk	01 - Traffic signal	02 - Non-fatal injury	05 - Turning movement	01 - Dry
2018-11-11	2018	1715	ISLAND PARK DR @ SCOTT ST (0002126)	01 - Clear	05 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	01 - Dry
2018-03-29	2018	1135	ISLAND PARK DR @ BASSETT LANE & BYRON AVE	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	03 - Rear end	01 - Dry
2018-03-29	2018	945	ISLAND PARK DR @ BASSETT LANE & BYRON AVE (32A234)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	01 - Dry
2014-03-12	2014	1545	ISLAND PARK DR @ WAIN MAILES AVE & RICHMOND RD	03 - Snow	01 - Daylight	10 - No control	03 - P.D. only	04 - Sideswipe	01 - Dry
2015-10-16	2016	1700	ISLAND PARK DR @ WAIN MAILES AVE & RICHMOND RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SUV other	01 - Dry
2016-05-18	2018	957	ISLAND PARK DR @ WAIN MAILES AVE & RICHMOND RD	03 - Snow	07 - Dark	10 - No control	03 - P.D. only	03 - Rear end	03 - Loose snow
2018-01-31	2018	500	ISLAND PARK DR @ WAIN MAILES AVE & RICHMOND RD (32A236)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	03 - Loose snow
2018-01-31	2018	500	ISLAND PARK DR @ WAIN MAILES AVE & RICHMOND RD (32A236)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	03 - Loose snow
2014-10-04	2014	1600	ISLAND PARK DR @ WAIN RICHMOND RD & BASSETT LANE	02 - Rain	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	02 - Wet
2014-10-28	2014	1830	ISLAND PARK DR @ WAIN RICHMOND RD & BASSETT LANE	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	03 - Rear end	02 - Wet
2015-10-13	2015	1304	ISLAND PARK DR @ WAIN RICHMOND RD & BASSETT LANE	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	01 - Dry
2015-10-13	2015	1318	ISLAND PARK DR @ WAIN RICHMOND RD & BASSETT LANE	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	01 - Dry
2016-01-30	2016	1730	ISLAND PARK DR @ WAIN RICHMOND RD & BASSETT LANE	05 - Dusk	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	02 - Wet
2016-05-17	2016	1510	ISLAND PARK DR @ WAIN RICHMOND RD & BASSETT LANE	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	01 - Dry
2016-06-15	2016	1649	ISLAND PARK DR @ WAIN RICHMOND RD & BASSETT LANE	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	01 - Dry
2016-06-15	2016	1649	ISLAND PARK DR @ WAIN RICHMOND RD & BASSETT LANE	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	01 - Dry
2017-12-26	2017	1805	ISLAND PARK DR @ WAIN RICHMOND RD & BASSETT LANE	03 - Snow	07 - Dark	10 - No control	03 - P.D. only	07 - SUV other	03 - Loose snow
2018-02-12	2018	917	ISLAND PARK DR @ WAIN RICHMOND RD & BASSETT LANE (32A235)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	01 - Dry
2018-03-18	2018	645	ISLAND PARK DR @ WAIN RICHMOND RD & BASSETT LANE (32A235)	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	03 - Rear end	01 - Dry
2018-06-29	2018	1455	ISLAND PARK DR @ WAIN RICHMOND RD & BASSETT LANE (32A235)	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	03 - Rear end	01 - Dry
2014-11-14	2014	1600	ISLAND PARK DR @ WAIN SCOTT ST & MAILES AVE (32A237)	01 - Clear	05 - Dusk	10 - No control	03 - P.D. only	02 - Angle	01 - Dry
2014-11-14	2014	1519	ISLAND PARK DR @ WAIN SCOTT ST & MAILES AVE (32A237)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	02 - Angle	01 - Dry
2014-11-14	2014	1519	ISLAND PARK DR @ WAIN SCOTT ST & MAILES AVE (32A237)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	02 - Angle	01 - Dry
2014-02-31	2014	1100	KIRKWOOD AVE @ RICHMOND RD	02 - Rain	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	02 - Wet
2014-03-18	2014	1242	KIRKWOOD AVE @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	02 - Wet
2014-09-08	2014	1542	KIRKWOOD AVE @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	01 - Dry
2014-09-15	2014	1753	KIRKWOOD AVE @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	02 - Angle	01 - Dry
2014-09-18	2014	034	KIRKWOOD AVE @ RICHMOND RD	02 - Rain	07 - Dark	01 - Traffic signal	03 - P.D. only	02 - Angle	01 - Dry
2014-09-18	2014	1732	KIRKWOOD AVE @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	07 - SUV other	01 - Dry
2014-12-08	2014	1844	KIRKWOOD AVE @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	04 - Sideswipe	01 - Dry
2015-06-15	2015	1529	KIRKWOOD AVE @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	04 - Sideswipe	01 - Dry
2015-06-18	2015	1529	KIRKWOOD AVE @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	04 - Sideswipe	01 - Dry
2015-10-28	2015	1551	KIRKWOOD AVE @ RICHMOND RD	02 - Rain	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	02 - Wet
2016-02-12	2016	1442	KIRKWOOD AVE @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	02 - Angle	02 - Wet
2016-06-11	2016	2041	KIRKWOOD AVE @ RICHMOND RD	01 - Clear	05 - Dusk	01 - Traffic signal	02 - Non-fatal injury	07 - SUV other	01 - Dry
2016-07-19	2016	1621	KIRKWOOD AVE @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	04 - Sideswipe	01 - Dry
2016-10-08	2016	1937	KIRKWOOD AVE @ RICHMOND RD	01 - Clear	07 - Dark	01 - Traffic signal	02 - Non-fatal injury	03 - Rear end	01 - Dry
2016-12-18	2016	1800	KIRKWOOD AVE @ RICHMOND RD	03 - Snow	07 - Dark	01 - Traffic signal	03 - P.D. only	03 - Rear end	01 - Dry
2017-06-14	2017	2135	KIRKWOOD AVE @ RICHMOND RD	01 - Clear	07 - Dark	01 - Traffic signal	03 - P.D. only	03 - Rear end	01 - Dry
2017-08-16	2017	1618	KIRKWOOD AVE @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	03 - Rear end	01 - Dry
2017-09-20	2017	1549	KIRKWOOD AVE @ RICHMOND RD	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	03 - Rear end	01 - Dry
2017-11-06	2017	2000	KIRKWOOD AVE @ RICHMOND RD	01 - Clear	07 - Dark	01 - Traffic signal	03 - P.D. only	05 - Turning movement	01 - Dry
2018-05-22	2018	1459	KIRKWOOD AVE @ RICHMOND RD (0002080)	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	05 - Turning movement	01 - Dry
2018-06-09	2018	1317	KIRKWOOD AVE @ RICHMOND RD (0002080)	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	05 - Turning movement	01 - Dry
2018-06-09	2018	1317	KIRKWOOD AVE @ RICHMOND RD (0002080)	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	05 - Turning movement	01 - Dry
2018-08-31	2018	1036	KIRKWOOD AVE @ RICHMOND RD (0002080)	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	05 - Turning movement	01 - Dry
2018-08-31	2018	1007	KIRKWOOD AVE @ RICHMOND RD (0002080)	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	05 - Turning movement	01 - Dry
2018-09-10	2018	2000	KIRKWOOD AVE @ RICHMOND RD (0002080)	01 - Clear	07 - Dark	01 - Traffic signal	02 - Non-fatal injury	07 - SUV other	02 - Wet
2018-09-12	2018	1625	KIRKWOOD AVE @ RICHMOND RD (0002080)	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	05 - Turning movement	01 - Dry
2018-09-13	2018	1805	KIRKWOOD AVE @ RICHMOND RD (0002080)	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	05 - Turning movement	01 - Dry
2015-07-24	2015	2150	LEIGHTON TER @ RICHMOND RD	01 - Clear	07 - Dark	02 - Stop sign	02 - Non-fatal injury	06 - SUV unattended vehicle	01 - Dry
2015-07-24	2015	1436	LEIGHTON TER @ RICHMOND RD (0002037)	01 - Clear	01 - Daylight	02 - Stop sign	02 - Non-fatal injury	02 - Angle	01 - Dry
2015-07-24	2015	1436	LEIGHTON TER @ RICHMOND RD (0002037)	01 - Clear	01 - Daylight	02 - Stop sign	02 - Non-fatal injury	02 - Angle	01 - Dry
2018-10-26	2018	1510	LEIGHTON TER @ RICHMOND RD (0002037)	01 - Clear	01 - Daylight	02 - Stop sign	02 - Non-fatal injury	02 - Angle	01 - Dry
2018-11-18	2018	1535	LEIGHTON TER @ RICHMOND RD (0002037)	01 - Clear	01 - Daylight	02 - Stop sign	02 - Non-fatal injury	02 - Angle	01 - Dry
2014-04-06	2014	205	PATRICIA AVE @ RICHMOND RD	01 - Clear	07 - Dark	01 - Traffic signal	03 - P.D. only	04 - Sideswipe	01 - Dry
2016-01-31	2016	1534	PATRICIA AVE @ RICHMOND RD	01 - Clear	07 - Dark	01 - Traffic signal	03 - P.D. only	04 - Sideswipe	01 - Dry
2018-06-13	2018	1047	PATRICIA AVE @ RICHMOND RD (0005568)	01 - Clear	01 - Daylight	01 - Traffic signal	03 - P.D. only	03 - Rear end	02 - Wet
2014-09-03	2014	1632	RICHMOND RD @ WAIN HILSON AVE & PATRICIA AVE	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Non-fatal injury	07 - SUV other	01 - Dry
2017-11-20	2017	513	RICHMOND RD @ WAIN HILSON AVE & PATRICIA AVE	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	03 - Rear end	01 - Dry
2018-04-19	2018	1006	RICHMOND RD @ WAIN HILSON AVE & PATRICIA AVE	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	03 - Rear end	01 - Dry
2018-04-19	2018	1006	RICHMOND RD @ WAIN HILSON AVE & PATRICIA AVE	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	03 - Rear end	01 - Dry
2014-11-24	2014	1558	RICHMOND RD @ WAIN LEIGHTON TER & ISLAND PARK DR	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	05 - Turning movement	01 - Dry
2016-07-06	2016	2130	RICHMOND RD @ WAIN LEIGHTON TER & ISLAND PARK DR	02 - Rain	07 - Dark	10 - No control	03 - P.D. only	06 - SUV unattended vehicle	02 - Wet
2014-01-09	2014	2222	RICHMOND RD @ WAIN PATRICIA AVE & LEIGHTON TER	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	06 - SUV unattended vehicle	02 - Wet
2014-07-16	2014	1415	RICHMOND RD @ WAIN PATRICIA AVE & LEIGHTON TER	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	04 - Sideswipe	01 - Dry
2014-11-24	2014	1501	RICHMOND RD @ WAIN PATRICIA AVE & LEIGHTON TER	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	04 - Sideswipe	01 - Dry
2016-05-09	2016	1600	RICHMOND RD @ WAIN PATRICIA AVE & LEIGHTON TER	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	04 - Sideswipe	01 - Dry
2016-05-09	2016	1600	RICHMOND RD @ WAIN PATRICIA AVE & LEIGHTON TER	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	04 - Sideswipe	01 - Dry
2018-11-21	2018	1010	RICHMOND RD @ WAIN PATRICIA AVE & LEIGHTON TER (32AP1)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	06 - SUV unattended vehicle	01 - Dry
2018-11-21	2018	1232	RICHMOND RD @ WAIN PATRICIA AVE & LEIGHTON TER (32AP1)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	06 - SUV unattended vehicle	01 - Dry
2014-08-20	2014	1730	WELLINGTON ST @ WAIN ISLAND PARK DR & PICCADILLY AVE	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	05 - Turning movement	01 - Dry
2016-03-22	2016	2005	WELLINGTON ST @ WAIN ISLAND PARK DR & PICCADILLY AVE	03 - Snow	07 - Dark	10 - No control	03 - P.D. only	04 - Sideswipe	02 - Wet
2016-10-28	2016	1425	WELLINGTON ST @ WAIN ISLAND PARK DR & PICCADILLY AVE	02 - Rain	01 - Daylight	10 - No control	03 - P.D. only	02 - Angle	02 - Wet

Appendix E

TRANS Model Plots

TRANS Regional Model

Version 2.15 - Assigned June 16, 2020

AM Peak Hour Total Traffic Volume

Richmond Road Area Growth

2011 Model - Basecase

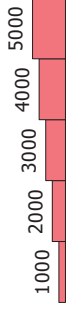
N/A

User Initials: TIMW
Plot Prepared: August 10, 2020
EMME Scenario: 21711



Legend

AM Peak Hour Total Traffic Volume



Distance (m)

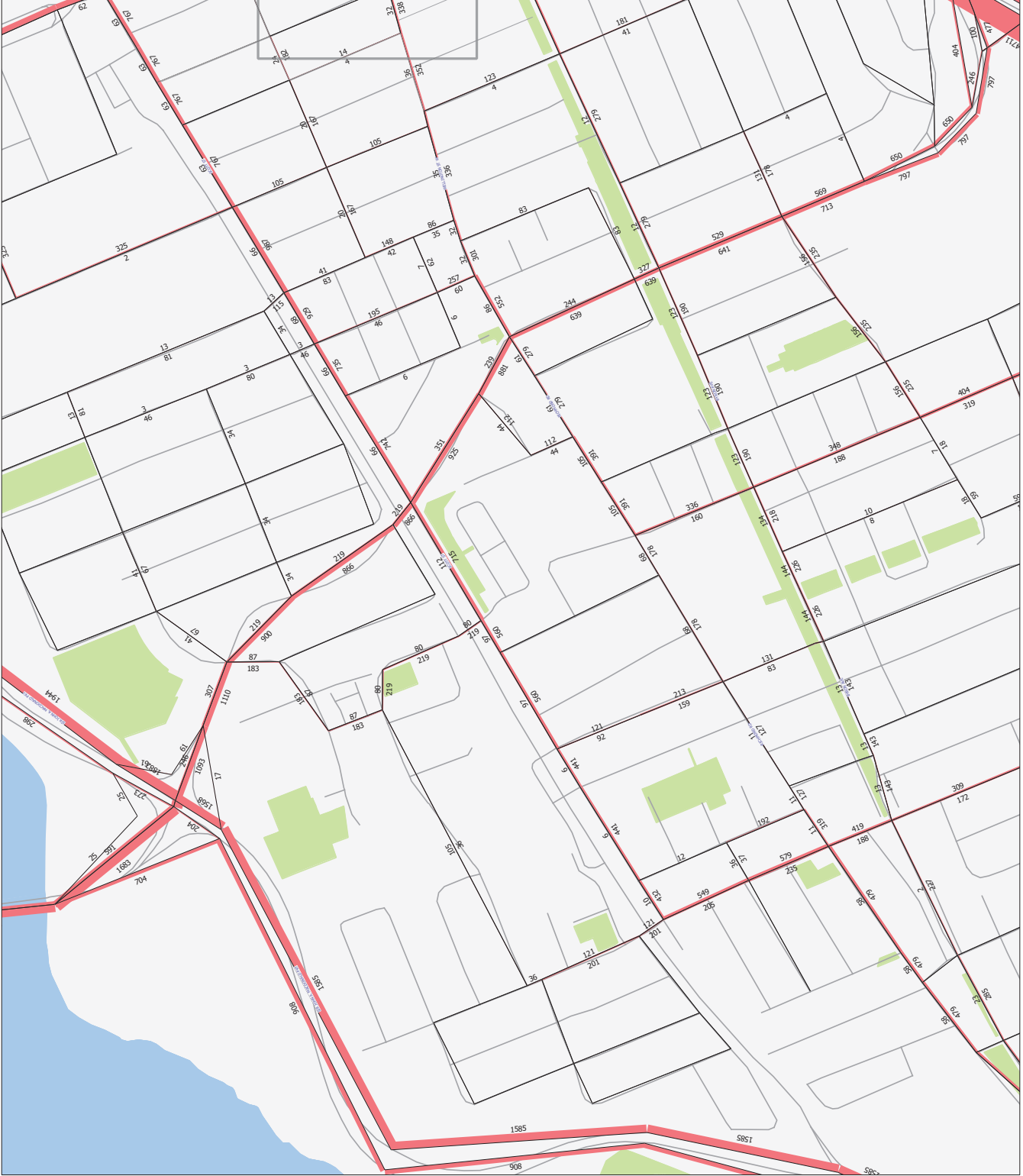


N

The TRANS model is continuously refined & maintained, and all information is provided in good faith. However, model outputs are provided "as is", and no warranty or guarantee is provided as to the accuracy, reliability or reasonableness of the results. In using this data, you agree to accept any and all risks arising from any incorrect, incomplete, or misleading information.

Recipients are required to use caution and professional judgement in using and interpreting model outputs. In particular, caution should be used when focusing on a geographically limited area (such as a single road or intersection), as the model is primarily designed to simulate regional-scale phenomena and has been calibrated at a regional level.

As a general good practice, it is recommended that the user confirm the network coding within the area of interest, and compare base year forecasts against traffic count data to assess the extent to which the model may be over- or under-estimating the travel demand.



TRANS Regional Model

Version 2.15 - Assigned June 16, 2020

AM Peak Hour Total Traffic Volume

Richmond Road Area Growth

2031 Model - Basecase

N/A

User Initials: TIMW
Plot Prepared: August 10, 2020
EMME Scenario: 21711



Legend

AM Peak Hour Total Traffic Volume



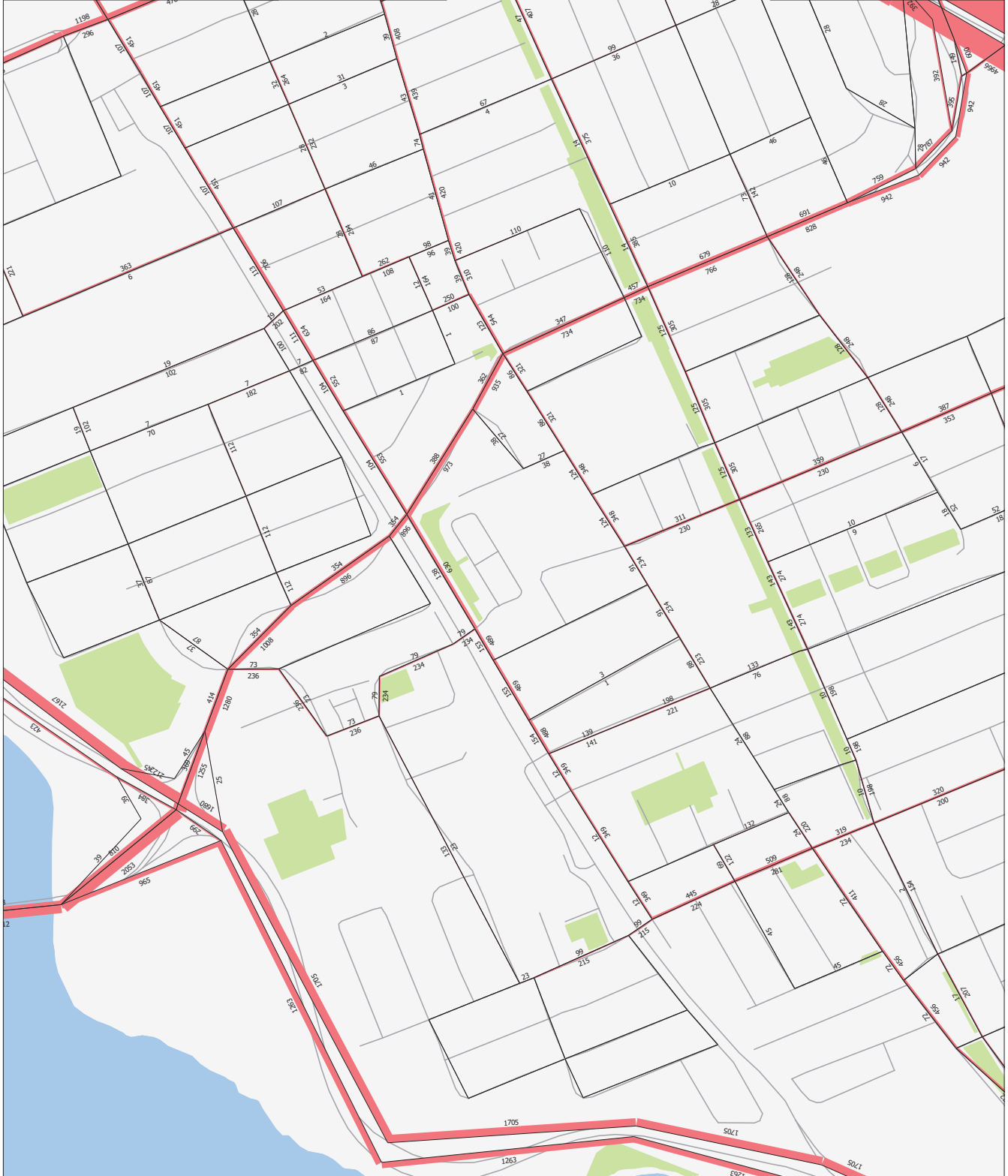
Distance (m)



The TRANS model is continuously refined & maintained, and all information is provided in good faith. However, model outputs are provided "as is", and no warranty or guarantee is provided as to the accuracy, reliability or reasonableness of the results. In using this data, you agree to accept any and all risks arising from any incorrect, incomplete, or misleading information.

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As general good practice, it is recommended that the user confirm the network coding within the area of interest, and compare base year forecasts against traffic count data to assess the extent to which the model may be over- or under-estimating the travel demand.



Appendix F

Synchro Intersection Worksheets – 2022 Future Background Conditions

Lanes, Volumes, Timings
1: Island Park & Scott

08-19-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	105	456	54	43	207	22	41	296	90	57	682	92
Traffic Volume (vph)	105	456	54	43	207	22	41	296	90	57	682	92
Future Volume (vph)	1658	1745	1483	1658	1707	0	0	1671	0	1658	1705	0
Satd. Flow (prot)	0.571	0.305						0.361		0.467		
Flt Permitted												
Satd. Flow (perm)	954	1745	1423	528	1707	0	0	942	0	805	1705	0
Satd. Flow (RTOR)												
Lane Group Flow (vph)	105	456	54	43	229	0	0	427	0	57	774	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	NA	
Protected Phases		4		8	8		2			6		
Detector Phase	4	4	4	8	8	2	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	32.0	32.0	32.0	32.0	32.0	34.5	34.5	34.5	34.5	34.5	34.5	34.5
Total Split (s)	42.0	42.0	42.0	42.0	42.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0
Total Split (%)	44.2%	44.2%	44.2%	44.2%	44.2%	55.8%	55.8%	55.8%	55.8%	55.8%	55.8%	55.8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag Optimize?												
Recall Mode	Max	Max	Max	Max	Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	36.0	36.0	36.0	36.0	36.0	46.5	46.5	46.5	46.5	46.5	46.5	46.5
Actuated g/C Ratio	0.38	0.38	0.38	0.38	0.38	0.49	0.49	0.49	0.49	0.49	0.49	0.49
v/c Ratio	0.29	0.69	0.10	0.21	0.35	0.91	0.91	0.91	0.14	0.14	0.92	0.92
Control Delay	23.4	31.4	9.0	23.6	22.5	50.5	50.5	50.5	14.6	14.6	40.9	40.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.4	31.4	9.0	23.6	22.5	50.5	50.5	50.5	14.6	14.6	40.9	40.9
LOS	C	C	A	C	C	D	D	D	B	B	D	D
Approach Delay	28.0			22.7	50.5						39.1	
Approach LOS	C			C	D						D	
Queue Length 50th (m)	13.2	69.1	1.6	5.3	28.8			70.9		5.5	125.5	
Queue Length 95th (m)	26.2	103.7	8.9	13.5	47.3			#69.5		12.7	#203.7	
Internal Link Dist (m)	206.8			289.3				318.7			431.8	
Turn Bay Length (m)	50.0		25.0	245.0						25.0		
Base Capacity (vph)	361	661	564	200	650			471		394	839	
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	0.29	0.69	0.10	0.21	0.35			0.91		0.14	0.92	
Intersection Summary												
Cycle Length: 95												
Actuated Cycle Length: 95												
Offset: 38 (40%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green												
Natural Cycle: 80												
Control Type: Actuated-Coordinated												

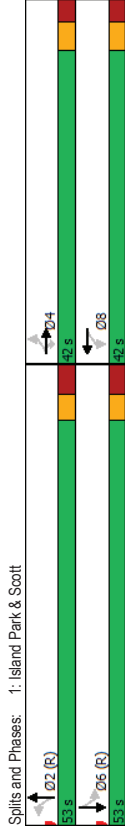
Scenario: 70 Richmond Road AM Peak Hour FB 2023

Synchro 11 Report
Page 1

Lanes, Volumes, Timings
1: Island Park & Scott

08-19-2020

Maximum v/c Ratio: 0.92	Intersection LOS: D
Intersection Signal Delay: 36.1	ICU Level of Service G
Intersection Capacity Utilization 108.8%	
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	



Scenario: 70 Richmond Road AM Peak Hour FB 2023

Synchro 11 Report
Page 2

Lanes, Volumes, Timings
2: Kirkwood & Richmond

08-19-2020

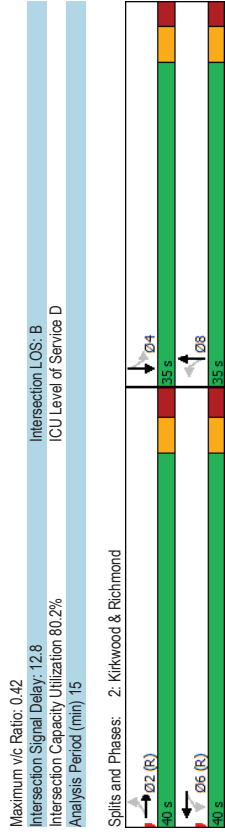
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	2	318	132	169	241	2	143	38	103	21	55	13
Traffic Volume (vph)	2	318	132	169	241	2	143	38	103	21	55	13
Future Volume (vph)	0	309.1	0	324.5	0	1658	1523	0	0	1684	0	0
Satd. Flow (prot)	0.954			0.662		0.699				0.927		
Flt Permitted	0	2948	0	0	2163	0	1208	1523	0	0	1576	0
Satd. Flow (perm)	109			1		103				13		
Lane Group Flow (vph)	0	452	0	0	412	0	143	141	0	0	89	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2	2	2	6	6	6	8	8	8	4	4	4
Permitted Phases	2	2	2	6	6	6	8	8	8	4	4	4
Detector Phase												
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	31.1	31.1	31.1	31.1	31.1	27.6	27.6	27.6	27.6	27.6	27.6	27.6
Total Split (s)	40.0	40.0	40.0	40.0	40.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	53.3%	53.3%	53.3%	53.3%	53.3%	46.7%	46.7%	46.7%	46.7%	46.7%	46.7%	46.7%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.8	2.8	2.8	2.8	2.8	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.1	5.6	5.6	5.6	5.6	5.6	5.6	5.6
Lead/Lag Optimize?												
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	33.9	33.9	33.9	33.9	33.9	29.4	29.4	29.4	29.4	29.4	29.4	29.4
Actuated g/C Ratio	0.45	0.45	0.45	0.45	0.45	0.39	0.39	0.39	0.39	0.39	0.39	0.39
v/c Ratio	0.32	0.42	0.42	0.30	0.21	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Control Delay	10.5	10.5	10.5	15.6	18.0	6.3	6.3	6.3	6.3	13.6	13.6	13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.5	10.5	10.5	15.6	18.0	6.3	6.3	6.3	6.3	13.6	13.6	13.6
LOS	B	B	B	B	B	A	A	A	A	B	B	B
Approach Delay	10.5	10.5	10.5	15.6	18.0	12.2	12.2	12.2	12.2	13.6	13.6	13.6
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B
Queue Length 50th (m)	15.1	15.1	15.1	19.7	19.7	13.6	13.6	13.6	13.6	6.7	6.7	6.7
Queue Length 95th (m)	24.6	24.6	24.6	30.7	30.7	26.5	26.5	26.5	26.5	13.4	13.4	13.4
Internal Link Dist (m)	282.3	282.3	282.3	180.4	180.4	201.3	201.3	201.3	201.3	128.2	128.2	128.2
Turn Bay Length (m)												
Base Capacity (vph)	1392	1392	1392	978	978	473	473	473	473	625	625	625
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.42	0.42	0.30	0.21	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Intersection Summary												
Cycle Length: 75												
Actuated Cycle Length: 75												
Offset: 25 (33%), Referenced to phase 2EBTL and 6:WBTL, Start of Green												
Natural Cycle: 60												
Control Type: Actuated-Coordinated												

Scenario: 70 Richmond Road AM Peak Hour FB 2023

Synchro 11 Report
Page 3

Lanes, Volumes, Timings
2: Kirkwood & Richmond

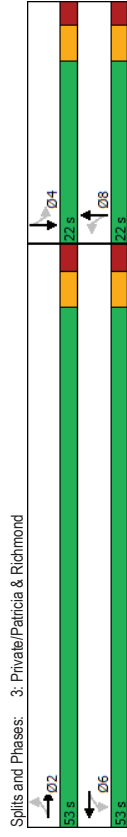
08-19-2020



Scenario: 70 Richmond Road AM Peak Hour FB 2023

Synchro 11 Report
Page 4

Intersection Signal Delay: 4.9
 Intersection Capacity Utilization 45.7%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	17	434	3	1	346	9	23	0	26	24	0
Traffic Volume (vph)	17	434	3	1	346	9	23	0	26	24	0
Future Volume (vph)	0	3303	0	0	3287	0	0	1559	0	0	1536
Satd. Flow (prot)	0.938	0.954	0.954	0.954	0.954	0.954	0.818	0.818	0.818	0.856	0.856
Flt Permitted	0	3102	0	0	3145	0	0	1292	0	0	1332
Satd. Flow (RTOR)	2	7	41	41	41	41	41	41	41	41	41
Lane Group Flow (vph)	0	454	0	0	356	0	0	49	0	0	64
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	2	2	6	6	6	6	8	8	8	4	4
Permitted Phases	2	2	6	6	6	6	8	8	8	4	4
Detector Phase	2	2	6	6	6	6	8	8	8	4	4
Switch Phase	2	2	6	6	6	6	8	8	8	4	4
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	33.8	33.8	33.8	33.8	33.8	33.8	21.5	21.5	21.5	21.5	21.5
Total Split (s)	53.0	53.0	53.0	53.0	53.0	53.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	70.7%	70.7%	70.7%	70.7%	70.7%	70.7%	29.3%	29.3%	29.3%	29.3%	29.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	5.8	5.5	5.5	5.5	5.5	5.5
Lead/Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	None	None	None	None	None
Act Effct Green (s)	55.8	55.8	55.8	55.8	55.8	55.8	11.1	11.1	11.1	11.1	11.1
Actuated g/C Ratio	0.80	0.80	0.80	0.80	0.80	0.80	0.16	0.16	0.16	0.16	0.16
v/c Ratio	0.18	0.14	0.14	0.14	0.14	0.14	0.20	0.20	0.26	0.26	0.26
Control Delay	3.7	3.5	3.5	3.5	3.5	3.5	12.8	12.8	15.7	15.7	15.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.7	3.5	3.5	3.5	3.5	3.5	12.8	12.8	15.7	15.7	15.7
LOS	A	A	A	A	A	A	B	B	B	B	B
Approach Delay	3.7	3.5	3.5	3.5	3.5	3.5	12.8	12.8	15.7	15.7	15.7
Approach LOS	A	A	A	A	A	A	B	B	B	B	B
Queue Length 50th (m)	9.0	6.6	6.6	6.6	6.6	6.6	0.9	0.9	2.6	2.6	2.6
Queue Length 95th (m)	18.6	14.3	14.3	14.3	14.3	14.3	8.8	8.8	11.9	11.9	11.9
Internal Link Dist (m)	180.4	177.6	177.6	177.6	177.6	177.6	16.2	16.2	168.6	168.6	168.6
Turn Bay Length (m)	2489	2525	2525	2525	2525	2525	338	338	347	347	347
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.18	0.18	0.18

Intersection Summary	Value
Cycle Length: 75	75
Actuated Cycle Length: 69.5	69.5
Natural Cycle: 60	60
Control Type: Semi Act-Uncoord	Semi Act-Uncoord
Maximum v/c Ratio: 0.26	0.26

Lanes, Volumes, Timings
4: Island Park & Richmond/Wellington

08-19-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	368	50	54	228	16	65	379	75	31	684	53
Future Volume (vph)	58	368	50	54	228	16	65	379	75	31	684	53
Satd. Flow (prot)	0	3209	0	0	3242	0	1688	1686	0	1688	1724	0
Flt Permitted	0.862			0.791			0.182			0.403		
Satd. Flow (perm)	0	2766	0	0	2573	0	318	1686	0	693	1724	0
Satd. Flow (RTOR)	15			7			16			6		
Lane Group Flow (vph)	0	476	0	0	298	0	65	454	0	31	737	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Permitted Phases	2	2	6	6	6	8	8	8	4	4	4	4
Detector Phase	2	2	6	6	6	8	8	8	4	4	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	31.3	31.3	31.3	31.3	31.3	21.9	21.9	21.9	21.9	21.9	21.9	21.9
Total Split (s)	40.0	40.0	40.0	40.0	40.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	42.1%	42.1%	42.1%	42.1%	42.1%	57.9%	57.9%	57.9%	57.9%	57.9%	57.9%	57.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.9	2.9	2.9	2.9	2.9	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	6.3	5.9	5.9	5.9	5.9	5.9	5.9	5.9

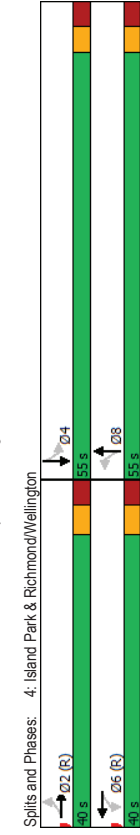
Lead/Lag Optimize?

Recall Mode	C-Max	C-Max	C-Max	Max	Max	Max
Act Effct Green (s)	33.7	33.7	33.7	49.1	49.1	49.1
Actuated g/C Ratio	0.35	0.35	0.35	0.52	0.52	0.52
v/c Ratio	0.48	0.32	0.32	0.40	0.52	0.09
Control Delay	25.0	23.0	23.0	24.6	18.0	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.0	23.0	23.0	24.6	18.0	3.8
LOS	C	C	C	C	B	A
Approach Delay	25.0	23.0	23.0	18.9	18.9	9.9
Approach LOS	C	C	C	B	B	A
Queue Length 50th (m)	34.1	20.1	20.1	5.3	34.4	0.6
Queue Length 95th (m)	48.5	30.7	30.7	m13.9	74.2	m0.9
Internal Link Dist (m)	177.6	213.6	213.6	268.0	318.7	318.7
Turn Bay Length (m)				15.0	10.0	10.0
Base Capacity (vph)	990	917	917	164	879	368
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	0.48	0.32	0.32	0.40	0.52	0.09

Intersection Summary

Cycle Length: 95
Actuated Cycle Length: 95
Offset: 28 (29%), Referenced to phase 2EBTL and 6:WBT_L, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83
Intersection Signal Delay: 17.5
Intersection LOS: B
Intersection Capacity Utilization: 111.7%
ICU Level of Service H
Analysis Period (min): 15
m Volume for 95th percentile queue is metered by upstream signal.



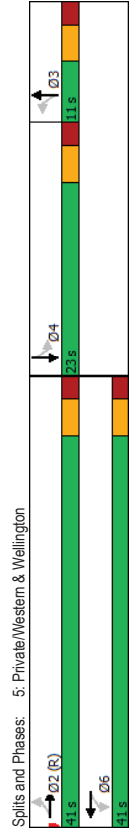
Lanes, Volumes, Timings
5: Private/Western & Wellington

08-19-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	16	432	0	0	231	10	0	0	0	25	0	20
Traffic Volume (vph)	16	432	0	0	231	10	0	0	0	25	0	20
Future Volume (vph)	0	3309	0	0	1724	0	0	1745	0	0	1577	0
Satd. Flow (prot)	0.943											0.950
Flt Permitted	0	3117	0	0	1724	0	0	1745	0	0	1539	0
Satd. Flow (RTOR)	4											116
Lane Group Flow (vph)	0	448	0	0	241	0	0	0	0	0	45	0
Turn Type	Perm	NA								Perm	NA	
Protected Phases	2	2	6	6	6	3	3	3	4			4
Permitted Phases	2	2	6	6	6	3	3	3	4			4
Detector Phase												
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	5.0	5.0	5.0	10.0	10.0	10.0	10.0
Minimum Split (s)	20.5	20.5	20.5	20.5	20.5	10.5	10.5	10.5	22.5	22.5	22.5	22.5
Total Split (s)	41.0	41.0	41.0	41.0	41.0	11.0	11.0	11.0	23.0	23.0	23.0	23.0
Total Split (%)	54.7%	54.7%	54.7%	54.7%	54.7%	14.7%	14.7%	14.7%	30.7%	30.7%	30.7%	30.7%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5							5.5			5.5
Lead/Lag						Lag	Lag	Lag	Lead	Lead	Lead	Lead
Recall Mode						Yes	Yes	Yes	Yes	Yes	Yes	Yes
Act Effct Green (s)	61.0					None	None	None	None	None	None	11.4
Actuated G/C Ratio	0.81					0.81						0.15
v/c Ratio	0.18					0.17						0.14
Control Delay	3.5					3.9						0.8
Queue Delay	0.0					0.0						0.0
Total Delay	3.5					3.9						0.8
LOS	A					A						A
Approach Delay	3.5					3.9						0.8
Approach LOS	A					A						A
Queue Length 50th (m)	8.7					8.7						0.0
Queue Length 95th (m)	18.8					22.1						0.0
Internal Link Dist (m)	213.6					167.2		9.8				311.8
Turn Bay Length (m)												
Base Capacity (vph)	2535					1403						448
Starvation Cap Reductn	0					0						0
Spillback Cap Reductn	0					0						0
Storage Cap Reductn	0					0						0
Reduced v/c Ratio	0.18					0.17						0.10

Intersection Summary	
Cycle Length:	75
Actuated Cycle Length:	75
Offset:	27 (36%), Referenced to phase 2EBTL, Start of Green
Natural Cycle:	55
Control Type:	Actuated-Coordinated

Maximum v/c Ratio: 0.18
Intersection Signal Delay: 3.5
Intersection LOS: A
ICU Level of Service A
Intersection Capacity Utilization 44.3%
Analysis Period (min) 15



Lanes, Volumes, Timings
5: Private/Western & Wellington

08-19-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	16	432	0	0	231	10	0	0	0	25	0	20
Traffic Volume (vph)	16	432	0	0	231	10	0	0	0	25	0	20
Future Volume (vph)	0	3309	0	0	1724	0	0	1745	0	0	1577	0
Satd. Flow (prot)	0.943											0.950
Flt Permitted	0	3117	0	0	1724	0	0	1745	0	0	1539	0
Satd. Flow (RTOR)	4											116
Lane Group Flow (vph)	0	448	0	0	241	0	0	0	0	0	45	0
Turn Type	Perm	NA								Perm	NA	
Protected Phases	2	2	6	6	6	3	3	3	4			4
Permitted Phases	2	2	6	6	6	3	3	3	4			4
Detector Phase												
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	5.0	5.0	5.0	10.0	10.0	10.0	10.0
Minimum Split (s)	20.5	20.5	20.5	20.5	20.5	10.5	10.5	10.5	22.5	22.5	22.5	22.5
Total Split (s)	41.0	41.0	41.0	41.0	41.0	11.0	11.0	11.0	23.0	23.0	23.0	23.0
Total Split (%)	54.7%	54.7%	54.7%	54.7%	54.7%	14.7%	14.7%	14.7%	30.7%	30.7%	30.7%	30.7%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5							5.5			5.5
Lead/Lag						Lag	Lag	Lag	Lead	Lead	Lead	Lead
Recall Mode						Yes	Yes	Yes	Yes	Yes	Yes	Yes
Act Effct Green (s)	61.0					None	None	None	None	None	None	11.4
Actuated G/C Ratio	0.81					0.81						0.15
v/c Ratio	0.18					0.17						0.14
Control Delay	3.5					3.9						0.8
Queue Delay	0.0					0.0						0.0
Total Delay	3.5					3.9						0.8
LOS	A					A						A
Approach Delay	3.5					3.9						0.8
Approach LOS	A					A						A
Queue Length 50th (m)	8.7					8.7						0.0
Queue Length 95th (m)	18.8					22.1						0.0
Internal Link Dist (m)	213.6					167.2		9.8				311.8
Turn Bay Length (m)												
Base Capacity (vph)	2535					1403						448
Starvation Cap Reductn	0					0						0
Spillback Cap Reductn	0					0						0
Storage Cap Reductn	0					0						0
Reduced v/c Ratio	0.18					0.17						0.10

Lanes, Volumes, Timings
6: Island Park & Byron

08-19-2020

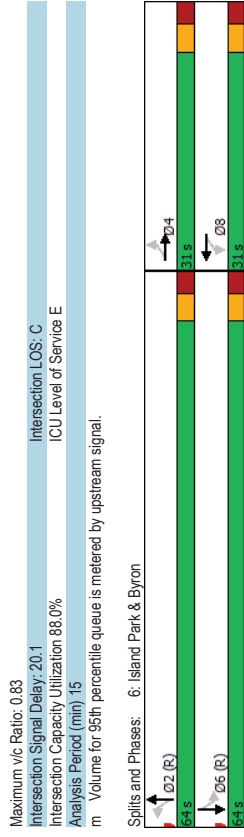
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔		↔	↔	↔
Traffic Volume (vph)	50	152	71	21	127	12	78	487	11	49	694	32
Future Volume (vph)	50	152	71	21	127	12	78	487	11	49	694	32
Satd. Flow (prot)	0	1646	0	0	1705	0	0	1726	0	0	1725	0
Flt Permitted	0.895			0.909			0.822				0.938	
Satd. Flow (perm)	18	1475	0	0	1558	0	0	1427	0	0	1622	0
Satd. Flow (RTOR)	4			4								
Lane Group Flow (vph)	0	273	0	0	160	0	0	576	0	0	775	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Permitted Phases	4	4		8	8		2	2		6	6	
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	32.7	32.7	32.7	32.7	32.7	32.7
Total Split (s)	31.0	31.0	31.0	31.0	31.0	31.0	64.0	64.0	64.0	64.0	64.0	64.0
Total Split (%)	32.6%	32.6%	32.6%	32.6%	32.6%	32.6%	67.4%	67.4%	67.4%	67.4%	67.4%	67.4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag Optimize?												
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	20.4	20.4	20.4	20.4	20.4	20.4	62.9	62.9	62.9	62.9	62.9	62.9
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21	0.21	0.66	0.66	0.66	0.66	0.66	0.66
v/c Ratio	0.83	0.83	0.47	0.47	0.47	0.47	0.61	0.61	0.61	0.61	0.61	0.61
Control Delay	53.3	53.3	35.6	35.6	35.6	35.6	13.6	13.6	13.6	13.6	13.6	13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.3	53.3	35.6	35.6	35.6	35.6	13.6	13.6	13.6	13.6	13.6	13.6
LOS	D	D	D	D	D	D	B	B	B	B	B	B
Approach Delay	53.3	53.3	35.6	35.6	35.6	35.6	13.6	13.6	13.6	13.6	13.6	13.6
Approach LOS	D	D	D	D	D	D	B	B	B	B	B	B
Queue Length 50th (m)	44.4	44.4	24.8	24.8	24.8	24.8	55.1	55.1	55.1	55.1	55.1	55.1
Queue Length 95th (m)	63.5	63.5	41.3	41.3	41.3	41.3	98.9	98.9	98.9	98.9	98.9	98.9
Internal Link Dist (m)	377.2	377.2	388.4	388.4	388.4	388.4	224.9	224.9	224.9	224.9	224.9	224.9
Turn Bay Length (m)												
Base Capacity (vph)	401	401	412	412	412	412	944	944	944	944	944	944
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.68	0.39	0.39	0.39	0.39	0.61	0.61	0.61	0.61	0.61	0.61
Intersection Summary												
Cycle Length: 95												
Actuated Cycle Length: 95												
Offset: 73 (77%), Referenced to phase 2:NBLT and 6:SBTL, Start of Green												
Natural Cycle: 65												
Control Type: Actuated-Coordinated												

Scenario: 70 Richmond Road AM Peak Hour FB 2023

Synchro 11 Report
Page 11

Lanes, Volumes, Timings
6: Island Park & Byron

08-19-2020



Scenario: 70 Richmond Road AM Peak Hour FB 2023

Synchro 11 Report
Page 12

Lanes, Volumes, Timings
1: Island Park & Scott

08-19-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	105	290	44	201	449	101	15	269	13	27	425	73
Future Volume (vph)	105	290	44	201	449	101	15	269	13	27	425	73
Satd. Flow (prot)	1658	1745	1483	1658	1660	0	0	1725	0	1658	1691	0
Flt Permitted	0.312		0.540				0.939			0.506		
Satd. Flow (perm)	528	1745	1391	918	1660	0	0	1624	0	866	1691	0
Satd. Flow (RTOR)		44		16			3				10	
Lane Group Flow (vph)	105	290	44	201	550	0	0	297	0	27	498	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	NA	
Protected Phases		4		8		8		2		6		6
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	32.0	32.0	32.0	32.0	32.0	34.5	34.5	34.5	34.5	34.5	34.5	34.5
Total Split (s)	56.0	56.0	56.0	56.0	56.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0
Total Split (%)	56.0%	56.0%	56.0%	56.0%	56.0%	44.0%	44.0%	44.0%	44.0%	44.0%	44.0%	44.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag Optimize?												
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	50.0	50.0	50.0	50.0	50.0	37.5	37.5	37.5	37.5	37.5	37.5	37.5
Actuated g/C Ratio	0.50	0.50	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38	0.38
v/c Ratio	0.40	0.33	0.06	0.44	0.66	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Control Delay	21.3	16.3	4.2	19.8	22.7	27.0	27.0	21.2	21.2	37.0	37.0	37.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.3	16.3	4.2	19.8	22.7	27.0	27.0	21.2	21.2	37.0	37.0	37.0
LOS	C	B	A	B	C	C	C	C	C	D	D	D
Approach Delay	16.3		21.9		27.0		27.0		36.2			
Approach LOS	B		C		D		D		D			
Queue Length 50th (m)	12.2	32.3	0.0	23.9	74.0		42.9		3.3		82.3	
Queue Length 95th (m)	26.5	50.1	5.2	42.9	110.3		67.0		9.1		#124.6	
Internal Link Dist (m)		206.8		289.3			318.7		431.8			
Turn Bay Length (m)	50.0		25.0	245.0					25.0			
Base Capacity (vph)	264	872	717	459	838		610		324		640	
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	0.40	0.33	0.06	0.44	0.66		0.49		0.08		0.78	

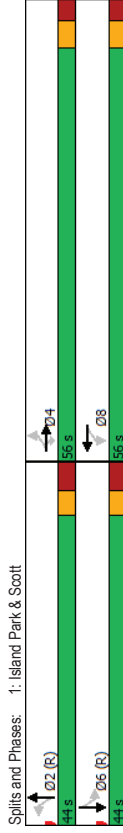
Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 2 (2%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Scenario: 70 Richmond Road PM Peak Hour FB 2023

Lanes, Volumes, Timings
1: Island Park & Scott

08-19-2020

Maximum v/c Ratio: 0.78	Intersection LOS: C
Intersection Signal Delay: 25.2	ICU Level of Service E
Intersection Capacity Utilization 84.8%	
Analysis Period (min): 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	



Scenario: 70 Richmond Road PM Peak Hour FB 2023

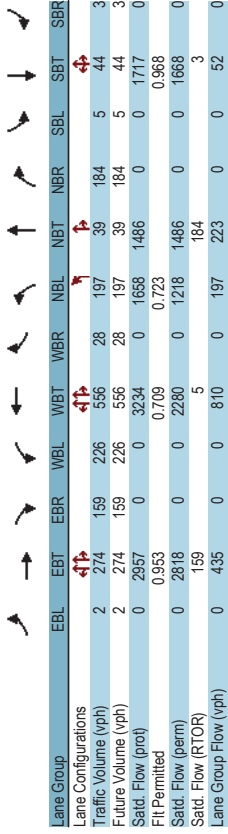
Lanes, Volumes, Timings
2: Kirkwood & Richmond

08-19-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	2	274	159	226	556	28	197	39	184	5	44	3
Traffic Volume (vph)	2	274	159	226	556	28	197	39	184	5	44	3
Future Volume (vph)	0	2957	0	0	3234	0	1658	1486	0	0	1717	0
Satd. Flow (prot)	0.953			0.709		0.723					0.968	
Flt Permitted	0	2818	0	0	2280	0	1218	1486	0	0	1668	0
Satd. Flow (perm)	159			5		184					3	
Lane Group Flow (vph)	0	435	0	0	810	0	197	223	0	0	52	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2	2	2	6	6	6	8	8	8	4	4	4
Permitted Phases	2	2	2	6	6	6	8	8	8	4	4	4
Detector Phase	2	2	2	6	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	31.1	31.1	31.1	31.1	31.1	27.6	27.6	27.6	27.6	27.6	27.6	27.6
Total Split (s)	45.0	45.0	45.0	45.0	45.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	52.9%	52.9%	52.9%	52.9%	52.9%	47.1%	47.1%	47.1%	47.1%	47.1%	47.1%	47.1%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.8	2.8	2.8	2.8	2.8	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.1	5.6	5.6	5.6	5.6	5.6	5.6	5.6
Lead/Lag												
Lead/Lag Optimize?												
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)	53.5	53.5	53.5	53.5	53.5	19.8	19.8	19.8	19.8	19.8	19.8	19.8
Actuated G/C Ratio	0.63	0.63	0.63	0.63	0.63	0.23	0.23	0.23	0.23	0.23	0.23	0.23
v/c Ratio	0.24	0.24	0.24	0.24	0.24	0.56	0.56	0.56	0.56	0.13	0.13	0.13
Control Delay	5.4	5.4	5.4	5.4	5.4	12.2	12.2	12.2	12.2	22.7	22.7	22.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.4	5.4	5.4	5.4	5.4	12.2	12.2	12.2	12.2	22.7	22.7	22.7
LOS	A	A	A	B	B	D	D	A	A	C	C	C
Approach Delay	5.4	5.4	5.4	12.2	12.2	24.5	24.5	22.7	22.7	22.7	22.7	22.7
Approach LOS	A	A	A	B	B	C	C	C	C	C	C	C
Queue Length 50th (m)	9.4	9.4	9.4	38.3	38.3	28.3	28.3	4.8	4.8	6.1	6.1	6.1
Queue Length 95th (m)	19.0	19.0	19.0	66.5	66.5	45.3	45.3	19.6	19.6	13.1	13.1	13.1
Inlet Link Dist (m)	282.3	282.3	282.3	180.4	180.4	201.3	201.3	128.2	128.2	128.2	128.2	128.2
Turn Bay Length (m)												
Base Capacity (vph)	1832	1832	1832	1436	1436	492	492	710	710	676	676	676
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.24	0.24	0.56	0.56	0.40	0.40	0.31	0.31	0.08	0.08	0.08
Intersection Summary												
Cycle Length	85											
Actuated Cycle Length	85											
Offset	79 (93%), Referenced to phase 2EBTL and 6:WBTL, Start of Green											
Natural Cycle	60											
Control Type	Actuated-Coordinated											

Scenario: 70 Richmond Road PM Peak Hour FB 2023
Synchro 11 Report
Page 4

Scenario: 70 Richmond Road PM Peak Hour FB 2023
Synchro 11 Report
Page 3



Lanes, Volumes, Timings
3: Private/Patricia & Richmond

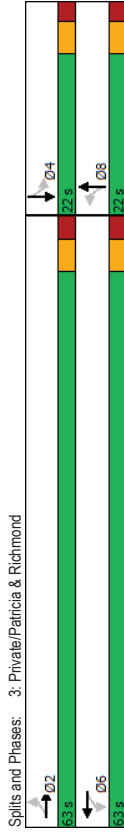
08-19-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	20	400	19	13	796	29	3	0	3	16	0	26
Future Volume (vph)	20	400	19	13	796	29	3	0	3	16	0	26
Satd. Flow (prot)	0	3276	0	0	3286	0	0	1561	0	0	1543	0
Flt Permitted	0.905			0.947			0.830				0.872	
Satd. Flow (perm)	0	2968	0	0	3113	0	0	1319	0	0	1360	0
Satd. Flow (RTOR)	12			9			36				36	
Lane Group Flow (vph)	0	439	0	0	838	0	0	6	0	0	42	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2	2	2	6	6	6	8	8	8	4	4	4
Permitted Phases	2	2	2	6	6	6	8	8	8	4	4	4
Detector Phase	2	2	2	6	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	33.8	33.8	33.8	33.8	33.8	33.8	21.5	21.5	21.5	21.5	21.5	21.5
Total Split (s)	63.0	63.0	63.0	63.0	63.0	63.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	74.1%	74.1%	74.1%	74.1%	74.1%	74.1%	25.9%	25.9%	25.9%	25.9%	25.9%	25.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	5.8	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag Optimize?												
Recall Mode	Max	Max	Max	Max	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	70.2	70.2	70.2	70.2	70.2	70.2	11.2	11.2	11.2	11.2	11.2	11.2
Actuated G/C Ratio	0.84	0.84	0.84	0.84	0.84	0.84	0.13	0.13	0.13	0.13	0.13	0.13
v/c Ratio	0.18	0.18	0.18	0.32	0.32	0.32	0.03	0.03	0.03	0.03	0.03	0.03
Control Delay	3.0	3.0	3.0	3.6	3.6	3.6	0.3	0.3	0.3	0.3	0.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.0	3.0	3.0	3.6	3.6	3.6	0.3	0.3	0.3	0.3	0.3	0.3
LOS	A	A	A	A	A	A	A	A	A	A	A	B
Approach Delay	3.0	3.0	3.0	3.6	3.6	3.6	0.3	0.3	0.3	0.3	0.3	0.3
Approach LOS	A	A	A	A	A	A	A	A	A	A	A	B
Queue Length 50th (m)	8.4	8.4	8.4	19.2	19.2	19.2	0.0	0.0	0.0	0.0	0.0	1.0
Queue Length 95th (m)	17.3	17.3	17.3	36.3	36.3	36.3	0.0	0.0	0.0	0.0	0.0	9.0
Internal Link Dist (m)	180.4	180.4	180.4	177.6	177.6	177.6	16.2	16.2	16.2	16.2	16.2	168.6
Turn Bay Length (m)												
Base Capacity (vph)	2492	2492	2492	2613	2613	2613	290	290	290	290	290	298
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.18	0.18	0.32	0.32	0.32	0.02	0.02	0.02	0.02	0.02	0.14
Intersection Summary												
Cycle Length: 85												
Actuated Cycle Length: 83.6												
Natural Cycle: 60												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.32												

Lanes, Volumes, Timings
3: Private/Patricia & Richmond

08-19-2020

Intersection Signal Delay: 3.7	Intersection LOS: A
Intersection Capacity Utilization 53.7%	ICU Level of Service A
Analysis Period (min) 15	





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	29	328	61	88	613	15	54	241	76	56	512	118
Traffic Volume (vph)	29	328	61	88	613	15	54	241	76	56	512	118
Future Volume (vph)	0	3187	0	0	3279	0	1688	1664	0	1688	1688	0
Satd. Flow (prot)	0.8/0			0.8/23		0.2/21						
Flt Permitted	0	2777	0	0	2703	0	386	1664	0	878	1688	0
Satd. Flow (perm)	27			3		25						18
Lane Group Flow (vph)	0	418	0	0	716	0	54	317	0	56	630	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2	2	6	6	6	8	8	8	4	4	4	4
Detector Phase	2	2	6	6	6	8	8	8	4	4	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	31.3	31.3	31.3	31.3	31.3	21.9	21.9	21.9	21.9	21.9	21.9	21.9
Total Split (s)	40.0	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
Total Split (%)	47.1%	47.1%	47.1%	47.1%	47.1%	52.9%	52.9%	52.9%	52.9%	52.9%	52.9%	52.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.9	2.9	2.9	2.9	2.9	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	6.3	5.9	5.9	5.9	5.9	5.9	5.9	5.9

Lead-Lag Optimize?

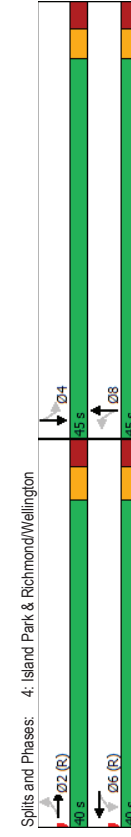
Recall Mode	C-Max	C-Max	C-Max	Max	Max	Max
Act Effct Green (s)	33.7	33.7	39.1	39.1	39.1	39.1
Actuated g/C Ratio	0.40	0.40	0.46	0.46	0.46	0.46
v/c Ratio	0.37	0.67	0.31	0.41	0.14	0.80
Control Delay	18.1	24.7	15.2	11.1	14.5	28.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.1	24.7	15.2	11.1	14.5	28.7
LOS	B	C	B	B	B	C
Approach Delay	18.1	24.7	24.7	11.7	27.5	27.5
Approach LOS	B	C	C	B	C	C
Queue Length 50th (m)	23.0	48.8	3.1	15.9	5.1	81.9
Queue Length 95th (m)	34.4	67.9	m/7.4	m/29.5	12.0	#/40.8
Internal Link Dist (m)	177.6	213.6	268.0	268.0	318.7	318.7
Turn Bay Length (m)	1117	1073	177	778	403	786
Base Capacity (vph)	0	0	0	0	0	0
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	0.37	0.67	0.31	0.41	0.14	0.80

Intersection Summary

Cycle Length: 85
Actuated Cycle Length: 85
Offset: 63 (62%), Referenced to phase 2EBTL and 6:WBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80
Intersection Signal Delay: 22.1
Intersection LOS: C
Intersection Capacity Utilization: 106.5%
ICU Level of Service G
Analysis Period (min): 15

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



Splits and Phases: 4: Island Park & Richmond/Wellington

Phase	Duration (s)
D2 (R)	9.0 s
D4	4.5 s
D6 (R)	4.5 s
D8	4.5 s

Lanes, Volumes, Timings
5: Private/Western & Wellington

08-19-2020

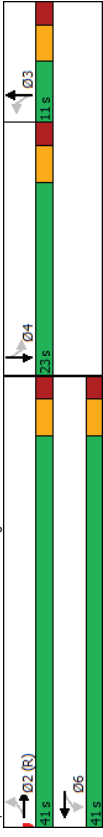
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T
Traffic Volume (vph)	22	379	0	0	581	13	0	0	0	30	0	113
Future Volume (vph)	22	379	0	0	581	13	0	0	0	30	0	113
Satd. Flow (prot)	0	3306	0	0	1729	0	0	1745	0	0	1492	0
Flt Permitted	0.914										0.950	
Satd. Flow (perm)	0	3019	0	0	1729	0	0	1745	0	0	1432	0
Satd. Flow (RTOR)	2										116	
Lane Group Flow (vph)	0	401	0	0	594	0	0	0	0	0	143	0
Turn Type	Perm	NA			NA					Perm	NA	
Protected Phases	2	2		6	6	3	3	3		4		4
Permitted Phases	2	2		6	6	3	3	3		4		4
Detector Phase	2	2		6	6	3	3	3		4		4
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	5.0	5.0	5.0		10.0		10.0
Minimum Split (s)	20.5	20.5		20.5	20.5	10.5	10.5	10.5		22.5		22.5
Total Split (s)	41.0	41.0		41.0	41.0	11.0	11.0	11.0		23.0		23.0
Total Split (%)	54.7%	54.7%		54.7%	54.7%	14.7%	14.7%	14.7%		30.7%		30.7%
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3		3.3
All-Red Time (s)	2.2	2.2		2.2	2.2	2.2	2.2	2.2		2.2		2.2
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	5.5	5.5		5.5	5.5	5.5	5.5	5.5		5.5		5.5
Lead/Lag						Lag	Lag	Lag		Lead		Lead
Recall Mode						Yes	Yes	Yes		Yes		Yes
Act Effct Green (s)	46.6	46.6		46.6	46.6	None	None	None		None		None
Actuated G/C Ratio	0.62	0.62		0.62	0.62	0.62	0.62	0.62		0.62		0.62
v/c Ratio	0.21	0.21		0.55	0.55	0.34	0.34	0.34		0.34		0.34
Control Delay	6.6	6.6		10.7	10.7	9.9	9.9	9.9		9.9		9.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	6.6	6.6		10.7	10.7	9.9	9.9	9.9		9.9		9.9
LOS	A	A		B	B	A	A	A		A		A
Approach Delay	6.6	6.6		10.7	10.7	9.9	9.9	9.9		9.9		9.9
Approach LOS	A	A		B	B	A	A	A		A		A
Queue Length 50th (m)	11.5	11.5		42.8	42.8	3.0	3.0	3.0		3.0		3.0
Queue Length 95th (m)	17.3	17.3		68.3	68.3	16.2	16.2	16.2		16.2		16.2
Internal Link Dist (m)	213.6	213.6		167.2	167.2	9.8	9.8	9.8		9.8		9.8
Turn Bay Length (m)												
Base Capacity (vph)	1873	1873		1073	1073	423	423	423		423		423
Starvation Cap Reductn	0	0		0	0	0	0	0		0		0
Spillback Cap Reductn	0	0		0	0	0	0	0		0		0
Storage Cap Reductn	0	0		0	0	0	0	0		0		0
Reduced v/c Ratio	0.21	0.21		0.55	0.55	0.34	0.34	0.34		0.34		0.34

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	

Lanes, Volumes, Timings
5: Private/Western & Wellington

08-19-2020

Maximum v/c Ratio: 0.55
Intersection Signal Delay: 9.1
Intersection LOS: A
ICU Level of Service B
Intersection Capacity Utilization 55.1%
Analysis Period (min) 15



Lanes, Volumes, Timings
6: Island Park & Byron

06-19-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	36	135	55	39	361	14	68	354	7	20	589	73
Traffic Volume (vph)	36	135	55	39	361	14	68	354	7	20	589	73
Future Volume (vph)	0	1657	0	0	1724	0	0	1726	0	0	1710	0
Satd. Flow (prot)	0.845			0.952		0.834					0.993	
Flt Permitted	0	1408	0	0	1648	0	0	1450	0	0	1682	0
Satd. Flow (perm)	21			2								
Satd. Flow (RTOR)	0	226	0	0	414	0	0	429	0	0	682	0
Lane Group Flow (vph)	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Turn Type	4	4	8	8	8	2	2	2	6	6	6	6
Permitted Phases	4	4	8	8	8	2	2	2	6	6	6	6
Detector Phase	4	4	8	8	8	2	2	2	6	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	23.0	23.0	23.0	32.7	32.7	32.7	32.7	32.7	32.7	32.7
Total Split (s)	35.0	35.0	35.0	35.0	35.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	41.2%	41.2%	41.2%	41.2%	41.2%	58.8%	58.8%	58.8%	58.8%	58.8%	58.8%	58.8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag Optimize?												
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	25.2	25.2	25.2	25.2	25.2	48.1	48.1	48.1	48.1	48.1	48.1	48.1
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30	0.57	0.57	0.57	0.57	0.57	0.57	0.57
v/c Ratio	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Control Delay	26.3	26.3	26.3	26.3	26.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.3	26.3	26.3	26.3	26.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3
LOS	C	C	C	D	D	B	B	B	B	B	B	C
Approach Delay	26.3	26.3	26.3	44.1	44.1	15.3	15.3	15.3	15.3	15.3	15.3	27.3
Approach LOS	C	C	C	D	D	B	B	B	B	B	B	C
Queue Length 50th (m)	26.7	26.7	26.7	60.8	60.8	41.5	41.5	41.5	41.5	41.5	41.5	96.5
Queue Length 95th (m)	45.5	45.5	45.5	#92.9	#92.9	72.2	72.2	72.2	72.2	72.2	72.2	m 132.0
Internal Link Dist (m)	377.2	377.2	377.2	388.4	388.4	224.9	224.9	224.9	224.9	224.9	224.9	288.0
Turn Bay Length (m)												
Base Capacity (vph)	494	494	494	563	563	819	819	819	819	819	819	951
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.46	0.46	0.74	0.74	0.52	0.52	0.52	0.52	0.52	0.52	0.72

Scenario: 70 Richmond Road PM Peak Hour FB 2023

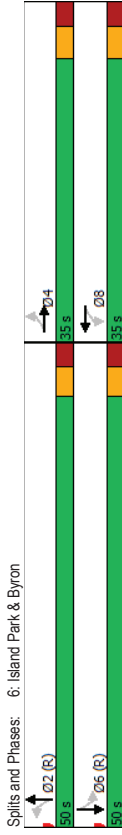
Synchro 11 Report

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Lanes, Volumes, Timings
6: Island Park & Byron

06-19-2020

Maximum v/c Ratio: 0.84	Intersection LOS: C
Intersection Signal Delay: 28.2	ICU Level of Service F
Intersection Capacity Utilization 92.3%	
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	



Scenario: 70 Richmond Road PM Peak Hour FB 2023

Synchro 11 Report

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Appendix G

Synchro Intersection Worksheets – 2027 Future Background Conditions

Lanes, Volumes, Timings
1: Island Park & Scott

08-19-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	105	456	54	43	223	22	41	318	90	57	682	92
Traffic Volume (vph)	105	456	54	43	223	22	41	318	90	57	682	92
Future Volume (vph)	1658	1745	1483	1658	1710	0	0	1673	0	1658	1705	0
Satd. Flow (prot)	0.551			0.305				0.564		0.452		
Flt Permitted	921	1745	1423	528	1710	0	0	949	0	779	1705	0
Satd. Flow (perm)	40			6				19		10		
Satd. Flow (RTOR)	105	456	54	43	245	0	0	449	0	57	774	0
Lane Group Flow (vph)	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	NA	
Turn Type	4	4	4	8	8	8	2	2	6	6	6	
Protected Phases	4	4	4	8	8	8	2	2	6	6	6	
Detector Phase	4	4	4	8	8	8	2	2	6	6	6	
Switch Phase	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
Minimum Initial (s)	32.0	32.0	32.0	32.0	32.0	34.5	34.5	34.5	34.5	34.5	34.5	
Minimum Split (s)	42.0	42.0	42.0	42.0	42.0	53.0	53.0	53.0	53.0	53.0	53.0	
Total Split (%)	44.2%	44.2%	44.2%	44.2%	44.2%	55.8%	55.8%	55.8%	55.8%	55.8%	55.8%	
Total Split (s)	3.3	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0	3.0	3.0	
Yellow Time (s)	2.7	2.7	2.7	2.7	2.7	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Lost Time Adjust (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.5	6.5	6.5	6.5	
Total Lost Time (s)												
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max	Max	Max	Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	
Act Effct Green (s)	36.0	36.0	36.0	36.0	36.0	46.5	46.5	46.5	46.5	46.5	46.5	
Actuated g/C Ratio	0.38	0.38	0.38	0.38	0.38	0.49	0.49	0.49	0.49	0.49	0.49	
v/c Ratio	0.30	0.69	0.10	0.21	0.38	0.95	0.95	0.15	0.92	0.15	0.92	
Control Delay	23.7	31.4	9.0	23.6	22.9	57.5	57.5	14.8	40.9	14.8	40.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	23.7	31.4	9.0	23.6	22.9	57.5	57.5	14.8	40.9	14.8	40.9	
LOS	C	C	A	C	C	E	E	B	D	B	D	
Approach Delay	28.1			23.0		57.5		39.1				
Approach LOS	C			C		E		D				
Queue Length 50th (m)	13.3	69.1	1.6	5.3	31.1	75.7		5.5	125.5			
Queue Length 95th (m)	26.5	103.7	8.9	13.5	50.8	#127.3		12.7	#203.7			
Internal Link Dist (m)	206.8			289.3		318.7						
Turn Bay Length (m)	50.0		25.0	245.0		25.0						
Base Capacity (vph)	349	661	564	200	651	474		474	381	839		
Starvation Cap Reductn	0	0	0	0	0	0		0	0	0		
Spillback Cap Reductn	0	0	0	0	0	0		0	0	0		
Storage Cap Reductn	0	0	0	0	0	0		0	0	0		
Reduced v/c Ratio	0.30	0.69	0.10	0.21	0.38	0.95		0.95	0.15	0.92		
Intersection Summary												
Cycle Length: 95												
Actuated Cycle Length: 95												
Offset: 38 (40%), Referenced to phase 2:NBLT and 6:SBTL, Start of Green												
Natural Cycle: 80												
Control Type: Actuated-Coordinated												

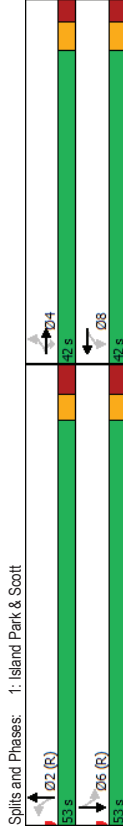
Scenario: 70 Richmond Road AM Peak Hour FB 2028

Synchro 11 Report
Page 1

Lanes, Volumes, Timings
1: Island Park & Scott

08-19-2020

Maximum v/c Ratio: 0.95	Intersection LOS: D
Intersection Signal Delay: 37.7	ICU Level of Service H
Intersection Capacity Utilization 109.9%	
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	



Scenario: 70 Richmond Road AM Peak Hour FB 2028

Synchro 11 Report
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Lanes, Volumes, Timings
2: Kirkwood & Richmond

08-19-2020

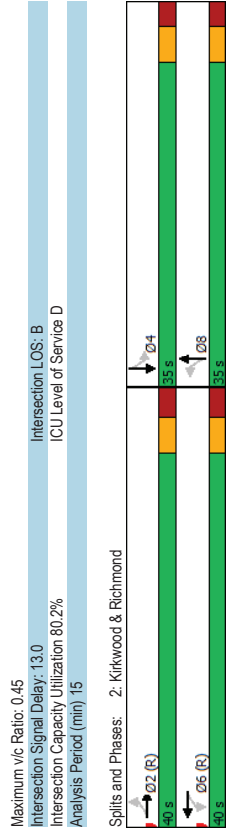
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	322	134	180	256	2	143	38	103	21	55	13
Future Volume (vph)	2	322	134	180	256	2	143	38	103	21	55	13
Satd. Flow (prot)	0	3091	0	0	3245	0	1658	1523	0	0	1684	0
Flt Permitted	0.954			0.659		0.659					0.927	
Satd. Flow (perm)	0	2948	0	0	2154	0	1209	1523	0	0	1576	0
Satd. Flow (RTOR)	110			1		103					13	
Lane Group Flow (vph)	0	458	0	0	438	0	143	141	0	0	89	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2	2		6	6		8	8		4	4	
Permitted Phases	2	2		6	6		8	8		4	4	
Detector Phase												
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	31.1	31.1	31.1	31.1	31.1	27.6	27.6	27.6	27.6	27.6	27.6	27.6
Total Split (s)	40.0	40.0	40.0	40.0	40.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	53.3%	53.3%	53.3%	53.3%	53.3%	46.7%	46.7%	46.7%	46.7%	46.7%	46.7%	46.7%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.8	2.8	2.8	2.8	2.8	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1			6.1		5.6		5.6		5.6		5.6
Lead/Lag Optimize?												
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	33.9	33.9	33.9	33.9	33.9	29.4	29.4	29.4	29.4	29.4	29.4	29.4
Actuated g/C Ratio	0.45	0.45	0.45	0.45	0.45	0.39	0.39	0.39	0.39	0.39	0.39	0.39
v/c Ratio	0.33	0.33	0.33	0.33	0.33	0.30	0.21	0.21	0.21	0.21	0.21	0.21
Control Delay	10.6	10.6	10.6	10.6	10.6	18.0	6.3	6.3	6.3	13.6	13.6	13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.6	10.6	10.6	10.6	10.6	18.0	6.3	6.3	6.3	13.6	13.6	13.6
LOS	B	B	B	B	B	B	A	A	A	B	B	B
Approach Delay	10.6	10.6	10.6	10.6	10.6	12.2	12.2	12.2	12.2	13.6	13.6	13.6
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B
Queue Length 50th (m)	15.4	15.4	15.4	15.4	15.4	13.6	3.3	3.3	3.3	6.7	6.7	6.7
Queue Length 95th (m)	25.0	25.0	25.0	25.0	25.0	26.5	13.4	13.4	13.4	15.3	15.3	15.3
Internal Link Dist (m)	282.3	282.3	282.3	282.3	282.3	201.3	201.3	201.3	201.3	128.2	128.2	128.2
Turn Bay Length (m)												
Base Capacity (vph)	1392	1392	1392	1392	1392	473	659	659	659	625	625	625
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.33	0.33	0.33	0.33	0.45	0.30	0.21	0.21	0.14	0.14	0.14
Intersection Summary												
Cycle Length: 75												
Actuated Cycle Length: 75												
Offset: 25 (33%), Referenced to phase 2EBTL and 6:WBTL, Start of Green												
Natural Cycle: 60												
Control Type: Actuated-Coordinated												

Scenario: 70 Richmond Road AM Peak Hour FB 2028

Synchro 11 Report
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Lanes, Volumes, Timings
2: Kirkwood & Richmond

08-19-2020



Scenario: 70 Richmond Road AM Peak Hour FB 2028

Synchro 11 Report
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Lanes, Volumes, Timings
3: Private/Patricia & Richmond

08-19-2020

EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
17	439	3	1	368	9	23	0	26	24	0	40
17	439	3	1	368	9	23	0	26	24	0	40
0	3804	0	0	3287	0	0	1559	0	0	1536	0
0	0.937	0	0	0.954	0	0.818	0	0	0	0.856	0
0	3099	0	0	3145	0	0	1292	0	0	1332	0
0	459	0	0	378	0	0	49	0	0	64	0
2	2	2	6	6	6	8	8	8	4	4	4
2	2	2	6	6	6	8	8	8	4	4	4
10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
33.8	33.8	33.8	33.8	33.8	21.5	21.5	21.5	21.5	21.5	21.5	21.5
53.0	53.0	53.0	53.0	53.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
70.7%	70.7%	70.7%	70.7%	70.7%	29.3%	29.3%	29.3%	29.3%	29.3%	29.3%	29.3%
3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
2.5	2.5	2.5	2.5	2.5	2.2	2.2	2.2	2.2	2.2	2.2	2.2
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.8	5.8	5.8	5.8	5.8	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Max	Max	Max	Max	Max	None	None	None	None	None	None	None
55.8	55.8	55.8	55.8	55.8	11.1	11.1	11.1	11.1	11.1	11.1	11.1
0.80	0.80	0.80	0.80	0.80	0.16	0.16	0.16	0.16	0.16	0.16	0.16
0.18	0.18	0.15	0.15	0.15	0.20	0.20	0.26	0.26	0.26	0.26	0.26
3.7	3.7	3.5	3.5	3.5	12.8	12.8	15.7	15.7	15.7	15.7	15.7
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.7	3.7	3.5	3.5	3.5	12.8	12.8	15.7	15.7	15.7	15.7	15.7
A	A	A	A	A	B	B	B	B	B	B	B
3.7	3.7	3.5	3.5	3.5	12.8	12.8	15.7	15.7	15.7	15.7	15.7
A	A	A	A	A	B	B	B	B	B	B	B
9.1	9.1	7.1	7.1	7.1	0.9	0.9	2.6	2.6	2.6	2.6	2.6
18.7	18.7	15.2	15.2	15.2	8.8	8.8	11.9	11.9	11.9	11.9	11.9
180.4	180.4	177.6	177.6	177.6	16.2	16.2	168.6	168.6	168.6	168.6	168.6
2486	2486	2524	2524	2524	338	338	347	347	347	347	347
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0.18	0.18	0.15	0.15	0.15	0.14	0.14	0.18	0.18	0.18	0.18	0.18

Scenario: 70 Richmond Road AM Peak Hour FB 2028
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Lanes, Volumes, Timings
3: Private/Patricia & Richmond

08-19-2020

EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
17	439	3	1	368	9	23	0	26	24	0	40
17	439	3	1	368	9	23	0	26	24	0	40
0	3804	0	0	3287	0	0	1559	0	0	1536	0
0	0.937	0	0	0.954	0	0.818	0	0	0	0.856	0
0	3099	0	0	3145	0	0	1292	0	0	1332	0
0	459	0	0	378	0	0	49	0	0	64	0
2	2	2	6	6	6	8	8	8	4	4	4
2	2	2	6	6	6	8	8	8	4	4	4
10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
33.8	33.8	33.8	33.8	33.8	21.5	21.5	21.5	21.5	21.5	21.5	21.5
53.0	53.0	53.0	53.0	53.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
70.7%	70.7%	70.7%	70.7%	70.7%	29.3%	29.3%	29.3%	29.3%	29.3%	29.3%	29.3%
3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
2.5	2.5	2.5	2.5	2.5	2.2	2.2	2.2	2.2	2.2	2.2	2.2
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.8	5.8	5.8	5.8	5.8	5.5	5.5	5.5	5.5	5.5	5.5	5.5



Scenario: 70 Richmond Road AM Peak Hour FB 2028
Synchro 11 Report
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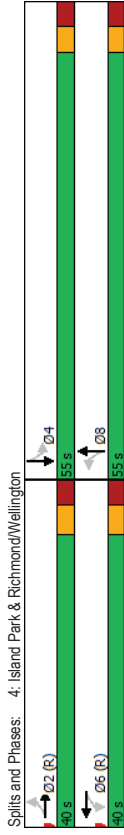
Lanes, Volumes, Timings
4: Island Park & Richmond/Wellington

08-19-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB
Traffic Volume (vph)	58	372	50	54	245	16	65	408	75	31	684	53
Future Volume (vph)	58	372	50	54	245	16	65	408	75	31	684	53
Satd. Flow (prot)	0	3210	0	0	3246	0	1688	1690	0	1688	1724	0
Flt Permitted	0.859			0.796			0.182			0.379		
Satd. Flow (perm)	0	2757	0	0	2591	0	318	1690	0	652	1724	0
Satd. Flow (RTOR)	14			6			14			6		
Lane Group Flow (vph)	0	480	0	0	315	0	65	483	0	31	737	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2	2	6	6	6	6	8	8	8	4	4	4
Detector Phase	2	2	6	6	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	31.3	31.3	31.3	31.3	31.3	21.9	21.9	21.9	21.9	21.9	21.9	21.9
Total Split (s)	40.0	40.0	40.0	40.0	40.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	42.1%	42.1%	42.1%	42.1%	42.1%	57.9%	57.9%	57.9%	57.9%	57.9%	57.9%	57.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.9	2.9	2.9	2.9	2.9	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	6.3	5.9	5.9	5.9	5.9	5.9	5.9	5.9
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	33.7	33.7	33.7	33.7	33.7	49.1	49.1	49.1	49.1	49.1	49.1	49.1
Actuated g/C Ratio	0.35	0.35	0.35	0.35	0.35	0.52	0.52	0.52	0.52	0.52	0.52	0.52
v/c Ratio	0.49	0.49	0.34	0.34	0.34	0.40	0.55	0.09	0.83	0.09	0.83	0.83
Control Delay	25.2	25.2	23.4	23.4	23.4	25.4	19.6	3.8	10.1	3.8	10.1	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.2	25.2	23.4	23.4	23.4	25.4	19.6	3.8	10.1	3.8	10.1	10.1
LOS	C	C	C	C	C	C	B	A	B	A	B	B
Approach Delay	25.2	25.2	23.4	23.4	23.4	20.3	20.3	20.3	20.3	20.3	20.3	20.3
Approach LOS	C	C	C	C	C	C	C	C	C	C	C	A
Queue Length 50th (m)	34.5	34.5	21.5	21.5	21.5	6.0	42.1	0.6	14.8	0.6	14.8	14.8
Queue Length 95th (m)	49.1	49.1	32.6	32.6	32.6	m13.2	81.3	m0.9	m18.5	m0.9	m18.5	18.5
Internal Link Dist (m)	177.6	177.6	213.6	213.6	213.6	268.0	268.0	268.0	268.0	268.0	268.0	318.7
Turn Bay Length (m)						15.0	15.0	15.0	15.0	15.0	15.0	15.0
Base Capacity (vph)	987	987	922	922	922	164	880	336	893	336	893	893
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.49	0.34	0.34	0.34	0.40	0.55	0.09	0.83	0.09	0.83	0.83

Intersection Summary	
Cycle Length:	95
Actuated Cycle Length:	95
Offset:	28 (29%), Referenced to phase 2EBTL and 6:WBT_L, Start of Green
Natural Cycle:	70
Control Type:	Actuated-Coordinated

Maximum v/c Ratio: 0.83
Intersection Signal Delay: 18.1
Intersection LOS: B
Intersection Capacity Utilization: 111.7%
ICU Level of Service H
Analysis Period (min): 15
Volume for 95th percentile queue is metered by upstream signal.



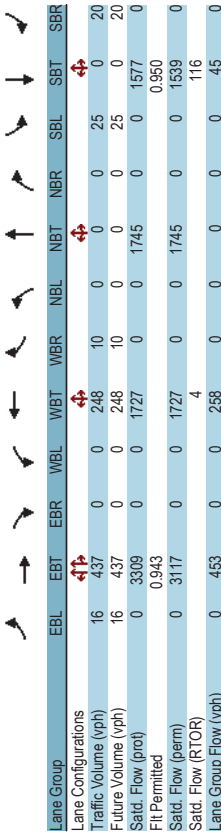
Lanes, Volumes, Timings
5: Private/Western & Wellington

08-19-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	16	437	0	0	248	10	0	0	0	25	0	20
Traffic Volume (vph)	16	437	0	0	248	10	0	0	0	25	0	20
Future Volume (vph)	0	3809	0	0	1727	0	0	1745	0	0	1577	0
Satd. Flow (prot)	0.943											0.950
Flt Permitted	0	3117	0	0	1727	0	0	1745	0	0	1539	0
Satd. Flow (RTOR)	4											116
Lane Group Flow (vph)	0	453	0	0	258	0	0	0	0	0	45	0
Turn Type	Perm	NA			NA					Perm	NA	
Protected Phases	2	2	6	6	6	3	3	3	4	4	4	4
Permitted Phases	2	2	6	6	6	3	3	3	4	4	4	4
Detector Phase	2	2	6	6	6	3	3	3	4	4	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	5.0	5.0	5.0	10.0	10.0	10.0	10.0
Minimum Split (s)	20.5	20.5	20.5	20.5	20.5	10.5	10.5	10.5	22.5	22.5	22.5	22.5
Total Split (s)	41.0	41.0	41.0	41.0	41.0	11.0	11.0	11.0	23.0	23.0	23.0	23.0
Total Split (%)	54.7%	54.7%	54.7%	54.7%	54.7%	14.7%	14.7%	14.7%	30.7%	30.7%	30.7%	30.7%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5			5.5			5.5		5.5		5.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode												
C-Max												
C-Max	61.0				61.0							11.4
Act Effct Green (s)	0.81				0.81							0.15
Actuated g/C Ratio	0.18				0.18							0.14
v/c Ratio	3.5				3.9							0.8
Control Delay	0.0				0.0							0.0
Queue Delay	0.0				0.0							0.0
Total Delay	3.5				3.9							0.8
LOS	A				A							A
Approach Delay	3.5				3.9							0.8
Approach LOS	A				A							A
Queue Length 50th (m)	8.8				9.5							0.0
Queue Length 95th (m)	19.1				23.6							0.0
Internal Link Dist (m)	213.6				167.2			9.8				311.8
Turn Bay Length (m)												
Base Capacity (vph)	2535				1405							448
Starvation Cap Reductn	0				0							0
Spillback Cap Reductn	0				0							0
Storage Cap Reductn	0				0							0
Reduced v/c Ratio	0.18				0.18							0.10
Intersection Summary												
Cycle Length: 75												
Actuated Cycle Length: 75												
Offset: 27 (36%), Referenced to phase 2EBTL, Start of Green												
Natural Cycle: 55												
Control Type: Actuated-Coordinated												

Lanes, Volumes, Timings
5: Private/Western & Wellington

08-19-2020



Lanes, Volumes, Timings
6: Island Park & Byron

08-19-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	50	168	71	21	129	12	78	524	11	49	694	32
Traffic Volume (vph)	50	168	71	21	129	12	78	524	11	49	694	32
Future Volume (vph)	0	1681	0	0	1707	0	0	1730	0	0	1725	0
Satd. Flow (prot)	0.904			0.907			0.830				0.934	
Flt Permitted	0	1495	0	0	1555	0	0	1442	0	0	1615	0
Satd. Flow (RTOR)	17			4								
Lane Group Flow (vph)	0	289	0	0	162	0	0	613	0	0	775	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	8	2	2	2	6	6	6	6
Detector Phase	4	4	8	8	8	2	2	2	6	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	23.0	23.0	23.0	32.7	32.7	32.7	32.7	32.7	32.7	32.7
Total Split (s)	31.0	31.0	31.0	31.0	31.0	64.0	64.0	64.0	64.0	64.0	64.0	64.0
Total Split (%)	32.6%	32.6%	32.6%	32.6%	32.6%	67.4%	67.4%	67.4%	67.4%	67.4%	67.4%	67.4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag Optimize?												
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	21.1	21.1	21.1	21.1	21.1	62.2	62.2	62.2	62.2	62.2	62.2	62.2
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22	0.65	0.65	0.65	0.65	0.65	0.65	0.65
v/c Ratio	0.84	0.84	0.47	0.47	0.47	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Control Delay	54.0	54.0	34.9	34.9	34.9	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.0	54.0	34.9	34.9	34.9	15.0	15.0	15.0	15.0	15.0	15.0	15.0
LOS	D	D	C	C	C	B	B	B	B	B	B	B
Approach Delay	54.0	54.0	34.9	34.9	34.9	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Approach LOS	D	D	C	C	C	B	B	B	B	B	B	B
Queue Length 50th (m)	47.2	47.2	24.8	24.8	24.8	63.4	63.4	63.4	63.4	63.4	63.9	63.9
Queue Length 95th (m)	#76.7	#76.7	41.9	41.9	41.9	109.8	109.8	109.8	109.8	109.8	m64.9	m64.9
Internal Link Dist (m)	377.2	377.2	388.4	388.4	388.4	224.9	224.9	224.9	224.9	224.9	288.0	288.0
Turn Bay Length (m)												
Base Capacity (vph)	405	405	412	412	412	943	943	943	943	943	1057	1057
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.71	0.39	0.39	0.39	0.65	0.65	0.65	0.65	0.65	0.73	0.73
Intersection Summary												
Cycle Length: 95												
Actuated Cycle Length: 95												
Offset: 73 (77%), Referenced to phase 2:NBLT and 6:SBTL, Start of Green												
Natural Cycle: 65												
Control Type: Actuated-Coordinated												

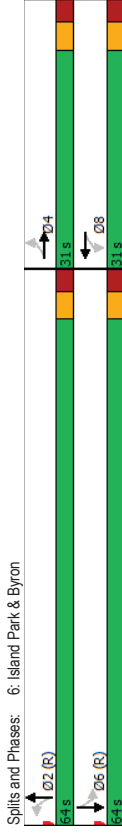
Scenario: 70 Richmond Road AM Peak Hour FB 2028

Synchro 11 Report
Page 11

Lanes, Volumes, Timings
6: Island Park & Byron

08-19-2020

Maximum v/c Ratio: 0.84	Intersection LOS: C
Intersection Signal Delay: 20.9	ICU Level of Service E
Intersection Capacity Utilization 90.7%	
Analysis Period (min): 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	



Scenario: 70 Richmond Road AM Peak Hour FB 2028

Synchro 11 Report
Page 12

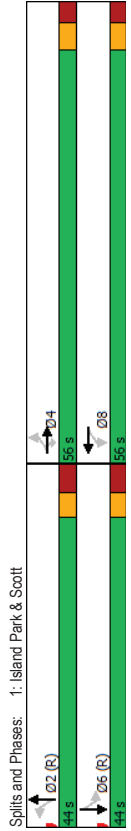
Lanes, Volumes, Timings
1: Island Park & Scott

08-19-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	105	312	44	201	449	101	15	269	13	27	457	73
Traffic Volume (vph)	105	312	44	201	449	101	15	269	13	27	457	73
Future Volume (vph)	1658	1745	1483	1658	1660	0	0	1725	0	1658	1694	0
Satd. Flow (prot)	0.312		0.520					0.883		0.506		
Flt Permitted	528	1745	1391	885	1660	0	0	1527	0	866	1694	0
Satd. Flow (perm)	16							3		9		
Satd. Flow (RTOR)	105	312	44	201	550	0	0	297	0	27	530	0
Lane Group Flow (vph)	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	NA	
Turn Type	4	4	4	8	8	2	2	6	6	6	6	
Protected Phases	4	4	4	8	8	2	2	6	6	6	6	
Detector Phase	4	4	4	8	8	2	2	6	6	6	6	
Switch Phase	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
Minimum Initial (s)	32.0	32.0	32.0	32.0	32.0	34.5	34.5	34.5	34.5	34.5	34.5	
Minimum Split (s)	56.0	56.0	56.0	56.0	56.0	44.0	44.0	44.0	44.0	44.0	44.0	
Total Split (%)	56.0%	56.0%	56.0%	56.0%	56.0%	44.0%	44.0%	44.0%	44.0%	44.0%	44.0%	
Total Split (s)	3.3	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0	3.0	3.0	
Yellow Time (s)	2.7	2.7	2.7	2.7	2.7	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Lost Time Adjust (s)	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.5	6.5	6.5	6.5	
Total Lost Time (s)												
Lead/Lag Optimize?												
Recall Mode	50.0	50.0	50.0	50.0	50.0	37.5	37.5	37.5	37.5	37.5	37.5	
Act Effct Green (s)	0.50	0.50	0.50	0.50	0.50	0.38	0.38	0.38	0.38	0.38	0.38	
Actuated g/C Ratio	0.40	0.36	0.06	0.45	0.66	0.52	0.08	0.08	0.08	0.08	0.08	
v/c Ratio	21.3	16.7	4.2	20.4	22.7	27.9	21.2	40.7	21.2	40.7	40.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Queue Delay	21.3	16.7	4.2	20.4	22.7	27.9	21.2	40.7	21.2	40.7	40.7	
Total Delay	C	B	A	C	C	C	C	C	C	C	D	
LOS	16.6	16.6	22.0	22.0	27.9	39.8	39.8	39.8	39.8	39.8	39.8	
Approach Delay	B	B	C	C	C	C	C	C	C	C	D	
Approach LOS	12.2	35.3	0.0	24.2	74.0	48.5	48.5	48.5	48.5	3.3	90.3	
Queue Length 50th (m)	26.5	54.2	5.2	43.7	110.3	68.6	68.6	68.6	68.6	9.1	#145.4	
Queue Length 95th (m)	206.8	206.8	289.3	289.3	318.7	318.7	318.7	318.7	318.7	431.8	431.8	
Internal Link Dist (m)	50.0	25.0	245.0	289.3	289.3	25.0	25.0	25.0	25.0	25.0	25.0	
Turn Bay Length (m)	264	872	717	442	838	574	574	574	574	324	640	
Base Capacity (vph)	0	0	0	0	0	0	0	0	0	0	0	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.40	0.36	0.06	0.45	0.66	0.52	0.08	0.08	0.08	0.08	0.83	

Intersection Summary
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 2 (2%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 26.4
 Intersection LOS: C
 Intersection Capacity Utilization: 66.3%
 ICU Level of Service: E
 Analysis Period (min): 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.



08-19-2020

Lanes, Volumes, Timings
1: Island Park & Scott

Lanes, Volumes, Timings
2: Kirkwood & Richmond

08-19-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	2	291	169	228	563	28	214	39	199	5	44	3
Traffic Volume (vph)	2	291	169	228	563	28	214	39	199	5	44	3
Future Volume (vph)	0	291	169	0	0	3234	0	1688	1483	0	0	1717
Satd. Flow (prot)	0	2957	0	0	0	0.701	0.723					0.968
Flt Permitted	0.953											
Satd. Flow (perm)	0	2818	0	0	2257	0	1217	1483	0	0	1668	0
Satd. Flow (RTOR)	169			5			199					3
Lane Group Flow (vph)	0	462	0	0	819	0	214	238	0	0	52	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2	2		6	6	6	8	8	8	4	4	4
Permitted Phases	2	2		6	6	6	8	8	8	4	4	4
Detector Phase	2	2		6	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	31.1	31.1	31.1	31.1	31.1	27.6	27.6	27.6	27.6	27.6	27.6	27.6
Total Split (s)	45.0	45.0	45.0	45.0	45.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	52.9%	52.9%	52.9%	52.9%	52.9%	47.1%	47.1%	47.1%	47.1%	47.1%	47.1%	47.1%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.8	2.8	2.8	2.8	2.8	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.1	5.6	5.6	5.6	5.6	5.6	5.6	5.6
Lead/Lag Optimize?												
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)	52.5	52.5	52.5	52.5	52.5	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Actuated G/C Ratio	0.62	0.62	0.62	0.62	0.62	0.24	0.24	0.24	0.24	0.24	0.24	0.24
v/c Ratio	0.26	0.26	0.26	0.26	0.26	0.59	0.59	0.59	0.59	0.59	0.59	0.59
Control Delay	5.8	5.8	5.8	5.8	5.8	13.3	13.3	13.3	13.3	13.3	13.3	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	5.8	5.8	5.8	5.8	13.3	13.3	13.3	13.3	13.3	13.3	13.3
LOS	A	A	A	B	B	D	D	A	A	C	C	C
Approach Delay	5.8	5.8	5.8	13.3	13.3	24.6	24.6	21.8	21.8	21.8	21.8	21.8
Approach LOS	A	A	A	B	B	C	C	C	C	C	C	C
Queue Length 50th (m)	10.1	10.1	10.1	39.2	39.2	31.2	4.8	6.1	6.1	6.1	6.1	6.1
Queue Length 95th (m)	21.4	21.4	21.4	71.7	71.7	48.0	19.4	12.7	12.7	12.7	12.7	12.7
Internal Link Dist (m)	282.3	282.3	282.3	180.4	180.4	201.3	201.3	128.2	128.2	128.2	128.2	128.2
Turn Bay Length (m)												
Base Capacity (vph)	1805	1805	1805	1396	1396	492	718	676	676	676	676	676
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.26	0.26	0.59	0.59	0.43	0.33	0.08	0.08	0.08	0.08	0.08
Intersection Summary												
Cycle Length: 85												
Actuated Cycle Length: 85												
Offset: 79 (93%), Referenced to phase 2EBTL and 6:WBTL, Start of Green												
Natural Cycle: 60												
Control Type: Actuated-Coordinated												

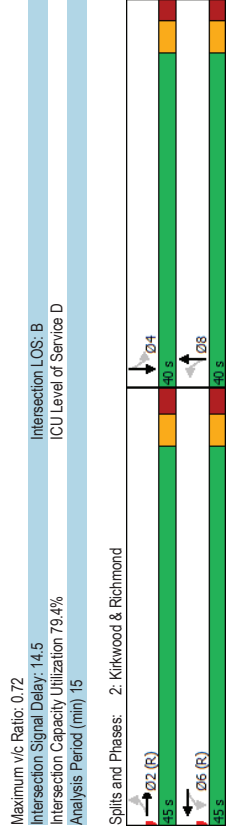
Scenario: 70 Richmond Road PM Peak Hour FB 2028

Synchro 11 Report

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Lanes, Volumes, Timings
2: Kirkwood & Richmond

08-19-2020



Scenario: 70 Richmond Road PM Peak Hour FB 2028

Synchro 11 Report

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Lanes, Volumes, Timings
3: Private/Patricia & Richmond

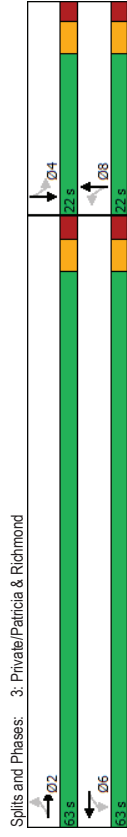
08-19-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	20	424	19	13	805	29	3	0	3	16	0
Future Volume (vph)	20	424	19	13	805	29	3	0	3	16	0
Satd. Flow (prot)	0	3277	0	0	3286	0	0	1561	0	0	1543
Flt Permitted	0.907			0.947			0.830				0.872
Satd. Flow (perm)	0	2976	0	0	3113	0	0	1319	0	0	1360
Satd. Flow (RTOR)	11			9			36				36
Lane Group Flow (vph)	0	463	0	0	847	0	0	6	0	0	42
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	2	2	2	6	6	6	8	8	8	4	4
Permitted Phases	2	2	2	6	6	6	8	8	8	4	4
Detector Phase	2	2	2	6	6	6	8	8	8	4	4
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	33.8	33.8	33.8	33.8	33.8	33.8	21.5	21.5	21.5	21.5	21.5
Total Split (s)	63.0	63.0	63.0	63.0	63.0	63.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	74.1%	74.1%	74.1%	74.1%	74.1%	74.1%	25.9%	25.9%	25.9%	25.9%	25.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	5.8	5.5	5.5	5.5	5.5	5.5
Lead/Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	None	None	None	None	None
Act Effct Green (s)	70.2	70.2	70.2	70.2	70.2	70.2	11.2	11.2	11.2	11.2	11.2
Actuated g/C Ratio	0.84	0.84	0.84	0.84	0.84	0.84	0.13	0.13	0.13	0.13	0.13
v/c Ratio	0.19	0.19	0.19	0.32	0.32	0.32	0.03	0.03	0.03	0.03	0.03
Control Delay	3.0	3.0	3.0	3.6	3.6	3.6	0.3	0.3	0.3	0.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.0	3.0	3.0	3.6	3.6	3.6	0.3	0.3	0.3	0.3	0.3
LOS	A	A	A	A	A	A	A	A	A	A	B
Approach Delay	3.0	3.0	3.0	3.6	3.6	3.6	0.3	0.3	0.3	0.3	0.3
Approach LOS	A	A	A	A	A	A	A	A	A	A	B
Queue Length 50th (m)	9.0	9.0	9.0	19.5	19.5	19.5	0.0	0.0	0.0	0.0	1.0
Queue Length 95th (m)	18.3	18.3	18.3	36.7	36.7	36.7	0.0	0.0	0.0	0.0	9.0
Internal Link Dist (m)	180.4	180.4	180.4	177.6	177.6	177.6	16.2	16.2	16.2	16.2	168.6
Turn Bay Length (m)											
Base Capacity (vph)	2499	2499	2499	2613	2613	2613	290	290	290	298	298
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.19	0.19	0.32	0.32	0.32	0.02	0.02	0.02	0.02	0.14
Intersection Summary											
Cycle Length: 85											
Actuated Cycle Length: 83.6											
Natural Cycle: 60											
Control Type: Semi Act-Uncoord											
Maximum v/c Ratio: 0.32											

Lanes, Volumes, Timings
3: Private/Patricia & Richmond

08-19-2020

Intersection Signal Delay: 3.7	Intersection LOS: A
Intersection Capacity Utilization 54.0%	ICU Level of Service A
Analysis Period (min) 15	

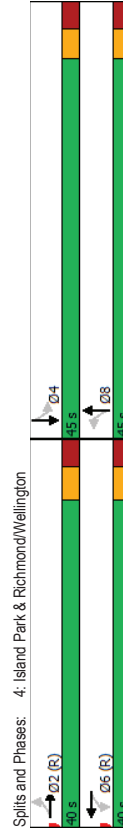


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	29	348	61	88	621	15	54	241	76	56	552	118
Traffic Volume (vph)	29	348	61	88	621	15	54	241	76	56	552	118
Future Volume (vph)	0	3193	0	0	3279	0	1658	1664	0	1658	1692	0
Satd. Flow (prot)	0.872	0.819	0.187									
Flt Permitted	0	2789	0	0	2690	0	326	1664	0	878	1692	0
Satd. Flow (perm)	0.25	3										
Lane Group Flow (vph)	0	438	0	0	724	0	54	317	0	56	670	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2	2	6	6	6	8	8	8	4	4	4	4
Detector Phase	2	2	6	6	6	8	8	8	4	4	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	31.3	31.3	31.3	31.3	31.3	21.9	21.9	21.9	21.9	21.9	21.9	21.9
Total Split (s)	40.0	40.0	40.0	40.0	40.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
Total Split (%)	47.1%	47.1%	47.1%	47.1%	47.1%	52.9%	52.9%	52.9%	52.9%	52.9%	52.9%	52.9%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.9	2.9	2.9	2.9	2.9	2.9	2.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	6.3	5.9	5.9	5.9	5.9	5.9	5.9	5.9

Recall Mode	C-Max	C-Max	C-Max	Max	Max	Max
Act Effct Green (s)	33.7	33.7	39.1	39.1	39.1	39.1
v/c Ratio	0.40	0.40	0.46	0.46	0.46	0.46
Control Delay	18.5	25.0	17.5	11.2	14.5	32.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.5	25.0	17.5	11.2	14.5	32.5
LOS	B	C	B	B	B	C
Approach Delay	18.5	25.0	12.1	12.1	31.1	31.1
Approach LOS	B	C	B	B	C	C
Queue Length 50th (m)	24.4	49.6	3.0	15.5	5.1	90.8
Queue Length 95th (m)	36.3	69.1	m/2	m30.2	12.0	#155.7
Internal Link Dist (m)	177.6	213.6	268.0	268.0	318.7	318.7
Turn Bay Length (m)			15.0	15.0	10.0	10.0
Base Capacity (vph)	1120	1068	149	778	403	787
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	0.39	0.68	0.36	0.41	0.14	0.85

Intersection Summary
Cycle Length: 85
Actuated Cycle Length: 85
Offset: 63 (62%), Referenced to phase 2EBTL and 6:WBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio:	0.85
Intersection Signal Delay:	23.6
Intersection LOS:	C
Intersection Capacity Utilization:	106.8%
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	



Splits and Phases: 4: Island Park & Richmond/Wellington

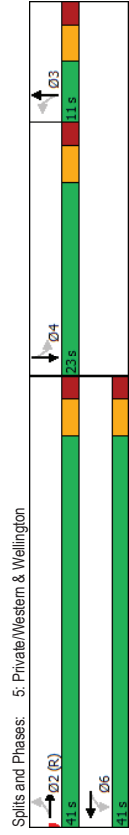
Lanes, Volumes, Timings
5: Private/Western & Wellington

08-19-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	22	407	0	0	588	13	0	0	0	30	0	113
Traffic Volume (vph)	22	407	0	0	588	13	0	0	0	30	0	113
Future Volume (vph)	0	306	0	0	1730	0	0	1745	0	0	1492	0
Satd. Flow (prot)	0.916											0.950
FI Permitted	0	3028	0	0	1730	0	0	1745	0	0	1432	0
Satd. Flow (RTOR)	0	429	0	0	601	0	0	0	0	0	143	0
Lane Group Flow (vph)	Perm	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Turn Type	2	2	6	6	6	3	3	3	3	4	4	4
Protected Phases	2	2	6	6	6	3	3	3	3	4	4	4
Permitted Phases	2	2	6	6	6	3	3	3	3	4	4	4
Detector Phase	2	2	6	6	6	3	3	3	3	4	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0	10.0	10.0	10.0
Minimum Split (s)	20.5	20.5	20.5	20.5	20.5	10.5	10.5	10.5	10.5	22.5	22.5	22.5
Total Split (s)	41.0	41.0	41.0	41.0	41.0	11.0	11.0	11.0	11.0	23.0	23.0	23.0
Total Split (%)	54.7%	54.7%	54.7%	54.7%	54.7%	14.7%	14.7%	14.7%	14.7%	30.7%	30.7%	30.7%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag												
Recall Mode	C-Max	C-Max	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	46.6	46.6	0.62	0.62	0.62	0.56	0.56	0.56	0.56	0.23	0.23	0.23
Actuated g/C Ratio	0.23	0.23	0.23	0.23	0.23	0.34	0.34	0.34	0.34	0.0	0.0	0.0
v/c Ratio	6.7	6.7	10.8	10.8	10.8	9.9	9.9	9.9	9.9	9.9	9.9	9.9
Control Delay	6.7	6.7	10.8	10.8	10.8	9.9	9.9	9.9	9.9	9.9	9.9	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	6.7	10.8	10.8	10.8	9.9	9.9	9.9	9.9	9.9	9.9	9.9
LOS	A	A	B	B	B	A	A	A	A	A	A	A
Approach Delay	6.7	6.7	10.8	10.8	10.8	9.9	9.9	9.9	9.9	9.9	9.9	9.9
Approach LOS	A	A	B	B	B	A	A	A	A	A	A	A
Queue Length 50th (m)	12.5	12.5	43.7	43.7	43.7	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Queue Length 95th (m)	18.6	18.6	69.4	69.4	69.4	16.2	16.2	16.2	16.2	16.2	16.2	16.2
Internal Link Dist (m)	213.6	213.6	167.2	167.2	167.2	9.8	9.8	9.8	9.8	9.8	9.8	9.8
Turn Bay Length (m)												
Base Capacity (vph)	1879	1879	1074	1074	1074	423	423	423	423	423	423	423
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.23	0.56	0.56	0.56	0.34	0.34	0.34	0.34	0.34	0.34	0.34

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	

Maximum v/c Ratio: 0.56
Intersection Signal Delay: 9.2
Intersection LOS: A
ICU Level of Service B
Intersection Capacity Utilization 55.5%
Analysis Period (min) 15



Lanes, Volumes, Timings
6: Island Park & Byron

08-19-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	36	137	55	39	398	14	68	354	7	20	634	73
Traffic Volume (vph)	36	137	55	39	398	14	68	354	7	20	634	73
Future Volume (vph)	0	1657	0	0	1728	0	0	1728	0	0	1711	0
Satd. Flow (prot)	0.840			0.954			0.824				0.984	
Flt Permitted	0	1400	0	0	1653	0	0	1432	0	0	1685	0
Satd. Flow (RTOR)	20			2								
Lane Group Flow (vph)	0	228	0	0	451	0	0	429	0	0	727	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases	4	4		8	8		2	2		6	6	
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	23.0	23.0		23.0	23.0		32.7	32.7		32.7	32.7	
Total Split (s)	35.0	35.0		35.0	35.0		50.0	50.0		50.0	50.0	
Total Split (%)	41.2%	41.2%		41.2%	41.2%		58.8%	58.8%		58.8%	58.8%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.7	2.7		2.7	2.7		2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		5.7	5.7		5.7	5.7	
Lead/Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	26.4			26.4			46.9			46.9		
Actuated g/C Ratio	0.31			0.31			0.55			0.55		
v/c Ratio	0.51			0.88			0.54			0.78		
Control Delay	25.5			46.7			16.3			30.4		
Queue Delay	0.0			0.0			0.0			0.0		
Total Delay	25.5			46.7			16.3			30.4		
LOS	C			D			B			C		
Approach Delay	25.5			46.7			16.3			30.4		
Approach LOS	C			D			B			C		
Queue Length 50th (m)	26.2			65.7			44.4			105.8		
Queue Length 95th (m)	46.3			#112.2			72.7			m 134.0		
Internal Link Dist (m)	377.2			388.4			224.9			288.0		
Turn Bay Length (m)												
Base Capacity (vph)	490			565			790			929		
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	0.47			0.80			0.54			0.78		

Scenario: 70 Richmond Road PM Peak Hour FB 2028

Synchro 11 Report
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Lanes, Volumes, Timings
6: Island Park & Byron

08-19-2020

Maximum v/c Ratio: 0.88	Intersection LOS: C
Intersection Signal Delay: 30.5	ICU Level of Service F
Intersection Capacity Utilization 95.3%	
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	



Scenario: 70 Richmond Road PM Peak Hour FB 2028

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Appendix H

MMLOS Analysis

Multi-Modal Level of Service - Segments Form

Consultant Scenario Comments	CGH Transportation Inc.	Project Date	2018-08
	Existing / Future		2022-05-11

SEGMENTS		Street A	Richmond 1	Island Park 2	- 3
Pedestrian	Sidewalk Width	-	≥ 2 m	1.8 m	
	Boulevard Width		0.5 - 2 m	> 2 m	
	Avg Daily Curb Lane Traffic Volume		≤ 3000	> 3000	
	Operating Speed		> 50 to 60 km/h	> 30 to 50 km/h	
	On-Street Parking		yes	no	
	Exposure to Traffic PLoS		A	C	-
	Effective Sidewalk Width				
Pedestrian Volume					
Crowding PLoS	-	-	-		
Level of Service	-	-	-		
Bicycle	Type of Cycling Facility	F	Mixed Traffic	Curbside Bike Lane	
	Number of Travel Lanes		4-5 lanes total	≤ 1 each direction	
	Operating Speed		≥ 50 to 60 km/h	≤ 50 km/h	
	# of Lanes & Operating Speed LoS		E	A	-
	Bike Lane (+ Parking Lane) Width			<1.2 m	
	Bike Lane Width LoS		-	F	-
	Bike Lane Blockages			Rare	
	Blockage LoS		-	A	-
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge	
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes	
	Sidestreet Operating Speed		>40 to 50 km/h	>40 to 50 km/h	
Unsignalized Crossing - Lowest LoS	B	A	-		
Level of Service	E	F	-		
Transit	Facility Type	D	Mixed Traffic		
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8		
	Level of Service		D	-	-
Truck	Truck Lane Width	C	≤ 3.3 m		
	Travel Lanes per Direction		> 1		
	Level of Service		C	-	-
Auto	Level of Service	Not Applicable			

Appendix I

TDM Checklist

TDM Measures Checklist:
Non-Residential Developments (office, institutional, retail or industrial)

Legend

BASIC The measure is generally feasible and effective, and in most cases would benefit the development and its users

BETTER The measure could maximize support for users of sustainable modes, and optimize development performance

★ The measure is one of the most dependably effective tools to encourage the use of sustainable modes

TDM measures: <i>Non-residential developments</i>		Check if proposed & add descriptions
1. TDM PROGRAM MANAGEMENT		
1.1 Program coordinator		
BASIC ★	1.1.1 Designate an internal coordinator, or contract with an external coordinator	<input type="checkbox"/>
1.2 Travel surveys		
BETTER	1.2.1 Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	<input type="checkbox"/>
2. WALKING AND CYCLING		
2.1 Information on walking/cycling routes & destinations		
BASIC	2.1.1 Display local area maps with walking/cycling access routes and key destinations at major entrances	<input checked="" type="checkbox"/>
2.2 Bicycle skills training		
<i>Commuter travel</i>		
BETTER ★	2.2.1 Offer on-site cycling courses for commuters, or subsidize off-site courses	<input type="checkbox"/>
2.3 Valet bike parking		
<i>Visitor travel</i>		
BETTER	2.3.1 Offer secure valet bike parking during public events when demand exceeds fixed supply (e.g. for festivals, concerts, games)	<input type="checkbox"/>

TDM measures: <i>Non-residential developments</i>		Check if proposed & add descriptions
3. TRANSIT		
3.1 Transit information		
BASIC	3.1.1 Display relevant transit schedules and route maps at entrances	<input checked="" type="checkbox"/>
BASIC	3.1.2 Provide online links to OC Transpo and STO information	<input checked="" type="checkbox"/>
BETTER	3.1.3 Provide real-time arrival information display at entrances	<input type="checkbox"/>
3.2 Transit fare incentives		
<i>Commuter travel</i>		
BETTER	3.2.1 Offer preloaded PRESTO cards to encourage commuters to use transit	<input type="checkbox"/>
BETTER ★	3.2.2 Subsidize or reimburse monthly transit pass purchases by employees	<input type="checkbox"/>
<i>Visitor travel</i>		
BETTER	3.2.3 Arrange inclusion of same-day transit fare in price of tickets (e.g. for festivals, concerts, games)	<input type="checkbox"/>
3.3 Enhanced public transit service		
<i>Commuter travel</i>		
BETTER	3.3.1 Contract with OC Transpo to provide enhanced transit services (e.g. for shift changes, weekends)	<input type="checkbox"/>
<i>Visitor travel</i>		
BETTER	3.3.2 Contract with OC Transpo to provide enhanced transit services (e.g. for festivals, concerts, games)	<input type="checkbox"/>
3.4 Private transit service		
<i>Commuter travel</i>		
BETTER	3.4.1 Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for shift changes, weekends)	<input type="checkbox"/>
<i>Visitor travel</i>		
BETTER	3.4.2 Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for festivals, concerts, games)	<input type="checkbox"/>

TDM measures: Non-residential developments		Check if proposed & add descriptions
4. RIDESHARING		
<i>Commuter travel</i>		
4.1	Ridematching service	<input type="checkbox"/>
BASIC	4.1.1 Provide a dedicated ridematching portal at OttawaRideMatch.com	<input type="checkbox"/>
4.2 Carpool parking price incentives		
<i>Commuter travel</i>		
BETTER	4.2.1 Provide discounts on parking costs for registered carpools	<input type="checkbox"/>
4.3 Vanpool service		
<i>Commuter travel</i>		
BETTER	4.3.1 Provide a vanpooling service for long-distance commuters	<input type="checkbox"/>
5. CARSHARING & BIKESHARING		
5.1 Bikeshare stations & memberships		
BETTER	5.1.1 Contract with provider to install on-site bikeshare station for use by commuters and visitors	<input type="checkbox"/>
<i>Commuter travel</i>		
BETTER	5.1.2 Provide employees with bikeshare memberships for local business travel	<input type="checkbox"/>
5.2 Carshare vehicles & memberships		
<i>Commuter travel</i>		
BETTER	5.2.1 Contract with provider to install on-site carshare vehicles and promote their use by tenants	<input type="checkbox"/>
BETTER	5.2.2 Provide employees with carshare memberships for local business travel	<input type="checkbox"/>
6. PARKING		
6.1 Priced parking		
<i>Commuter travel</i>		
BASIC	6.1.1 Charge for long-term parking (daily, weekly, monthly)	<input type="checkbox"/>
BASIC	6.1.2 Unbundle parking cost from lease rates at multi-tenant sites	<input type="checkbox"/>
<i>Visitor travel</i>		
BETTER	6.1.3 Charge for short-term parking (hourly)	<input type="checkbox"/>

TDM measures: Non-residential developments		Check if proposed & add descriptions
7. TDM MARKETING & COMMUNICATIONS		
7.1 Multimodal travel information		
<i>Commuter travel</i>		
BASIC	7.1.1 Provide a multimodal travel option information package to new/relocating employees and students	<input type="checkbox"/>
<i>Visitor travel</i>		
BETTER	7.1.2 Include multimodal travel option information in invitations or advertising that attract visitors or customers (e.g. for festivals, concerts, games)	<input type="checkbox"/>
7.2 Personalized trip planning		
<i>Commuter travel</i>		
BETTER	7.2.1 Offer personalized trip planning to new/relocating employees	<input type="checkbox"/>
7.3 Promotions		
<i>Commuter travel</i>		
BETTER	7.3.1 Deliver promotions and incentives to maintain awareness, build understanding, and encourage trial of sustainable modes	<input type="checkbox"/>
8. OTHER INCENTIVES & AMENITIES		
8.1 Emergency ride home		
<i>Commuter travel</i>		
BETTER	8.1.1 Provide emergency ride home service to non-driving commuters	<input type="checkbox"/>
8.2 Alternative work arrangements		
<i>Commuter travel</i>		
BASIC	8.2.1 Encourage flexible work hours	<input type="checkbox"/>
BETTER	8.2.2 Encourage compressed workweeks	<input type="checkbox"/>
BETTER	8.2.3 Encourage telework	<input type="checkbox"/>
8.3 Local business travel options		
<i>Commuter travel</i>		
BASIC	8.3.1 Provide local business travel options that minimize the need for employees to bring a personal car to work	<input type="checkbox"/>
8.4 Commuter incentives		
<i>Commuter travel</i>		
BETTER	8.4.1 Offer employees a taxable, mode-neutral commuting allowance	<input type="checkbox"/>
8.5 On-site amenities		
<i>Commuter travel</i>		
BETTER	8.5.1 Provide on-site amenities/services to minimize mid-day or mid-commute errands	<input type="checkbox"/>

TDM Measures Checklist:
Residential Developments **multi-family, condominium or subdivision**

Legend

BASIC The measure is generally feasible and effective, and in most cases would benefit the development and its users

BETTER The measure could maximize support for users of sustainable modes, and optimize development performance

★ The measure is one of the most dependably effective tools to encourage the use of sustainable modes

TDM measures: Residential developments		Check if proposed & add descriptions
1. TDM PROGRAM MANAGEMENT		
1.1 Program coordinator		
BASIC ★	1.1.1 Designate an internal coordinator, or contract with an external coordinator	<input type="checkbox"/>
1.2 Travel surveys		
BETTER	1.2.1 Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	<input type="checkbox"/>
2. WALKING AND CYCLING		
2.1 Information on walking/cycling routes & destinations		
BASIC	2.1.1 Display local area maps with walking/cycling access routes and key destinations at major entrances (<i>multi-family, condominium</i>)	<input checked="" type="checkbox"/>
2.2 Bicycle skills training		
BETTER	2.2.1 Offer on-site cycling courses for residents, or subsidize off-site courses	<input type="checkbox"/>

TDM measures: Residential developments		Check if proposed & add descriptions
3. TRANSIT		
3.1 Transit information		
BASIC	3.1.1 Display relevant transit schedules and route maps at entrances (<i>multi-family, condominium</i>)	<input checked="" type="checkbox"/>
BETTER	3.1.2 Provide real-time arrival information display at entrances (<i>multi-family, condominium</i>)	<input type="checkbox"/>
3.2 Transit fare incentives		
BASIC ★	3.2.1 Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit	<input checked="" type="checkbox"/>
BETTER	3.2.2 Offer at least one year of free monthly transit passes on residence purchase/move-in	<input type="checkbox"/>
3.3 Enhanced public transit service		
BETTER ★	3.3.1 Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels (<i>subdivision</i>)	<input type="checkbox"/>
3.4 Private transit service		
BETTER	3.4.1 Provide shuttle service for seniors homes or lifestyle communities (e.g. scheduled mall or supermarket runs)	<input type="checkbox"/>
4. CARSHARING & BIKESHARING		
4.1 Bikeshare stations & memberships		
BETTER	4.1.1 Contract with provider to install on-site bikeshare station (<i>multi-family</i>)	<input type="checkbox"/>
BETTER	4.1.2 Provide residents with bikeshare memberships, either free or subsidized (<i>multi-family</i>)	<input type="checkbox"/>
4.2 Carshare vehicles & memberships		
BETTER	4.2.1 Contract with provider to install on-site carshare vehicles and promote their use by residents	<input type="checkbox"/>
BETTER	4.2.2 Provide residents with carshare memberships, either free or subsidized	<input type="checkbox"/>
5. PARKING		
5.1 Priced parking		
BASIC ★	5.1.1 Unbundle parking cost from purchase price (<i>condominium</i>)	<input checked="" type="checkbox"/>
BASIC ★	5.1.2 Unbundle parking cost from monthly rent (<i>multi-family</i>)	<input checked="" type="checkbox"/>

TDM measures: Residential developments		Check if proposed & add descriptions
6. TDM MARKETING & COMMUNICATIONS		
6.1 Multimodal travel information		
BASIC ★	6.1.1 Provide a multimodal travel option package to new residents	<input type="checkbox"/>
6.2 Personalized trip planning		
BETTER ★	6.2.1 Offer personalized trip planning to new residents	<input type="checkbox"/>

TDM-Supportive Development Design and Infrastructure Checklist: Non-Residential Developments (office, institutional, retail or industrial)

Legend

REQUIRED	The Official Plan or Zoning By-law provides related guidance that must be followed
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance

TDM-supportive design & infrastructure measures: Non-residential developments		Check if completed & add descriptions, explanations or plan/drawing references
1. WALKING & CYCLING: ROUTES		
1.1 Building location & access points		
BASIC	1.1.1 Locate building close to the street, and do not locate parking areas between the street and building entrances	<input checked="" type="checkbox"/>
BASIC	1.1.2 Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	<input checked="" type="checkbox"/>
BASIC	1.1.3 Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	<input checked="" type="checkbox"/>
1.2 Facilities for walking & cycling		
REQUIRED	1.2.1 Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations (see Official Plan policy 4.3.3)	<input checked="" type="checkbox"/>
REQUIRED	1.2.2 Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings; between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible (see Official Plan policy 4.3.12)	<input checked="" type="checkbox"/>

TDM-supportive design & infrastructure measures: Non-residential developments		Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3 Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks (see <i>Official Plan policy 4.3.10</i>)	<input checked="" type="checkbox"/>
REQUIRED	1.2.4 Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps (see <i>Official Plan policy 4.3.10</i>)	<input checked="" type="checkbox"/>
REQUIRED	1.2.5 Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on-road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians (see <i>Official Plan policy 4.3.11</i>)	<input type="checkbox"/>
BASIC	1.2.6 Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	<input checked="" type="checkbox"/>
BASIC	1.2.7 Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	<input checked="" type="checkbox"/>
BASIC	1.2.8 Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	<input type="checkbox"/>
1.3 Amenities for walking & cycling		
BASIC	1.3.1 Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	<input type="checkbox"/>
BASIC	1.3.2 Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	<input type="checkbox"/>

TDM-supportive design & infrastructure measures: Non-residential developments		Check if completed & add descriptions, explanations or plan/drawing references
2. WALKING & CYCLING: END-OF-TRIP FACILITIES		
2.1 Bicycle parking		
REQUIRED	2.1.1 Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible (see <i>Official Plan policy 4.3.6</i>)	<input checked="" type="checkbox"/>
REQUIRED	2.1.2 Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas (see <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
REQUIRED	2.1.3 Ensure that bicycle parking spaces and access aisles meet minimum dimensions, that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored (see <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
BASIC	2.1.4 Provide bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met), plus the expected peak number of customer/visitor cyclists	<input type="checkbox"/>
BETTER	2.1.5 Provide bicycle parking spaces equivalent to the expected number of commuter and customer/visitor cyclists, plus an additional buffer (e.g. 25 percent extra) to encourage other cyclists and ensure adequate capacity in peak cycling season	<input type="checkbox"/>
2.2 Secure bicycle parking		
REQUIRED	2.2.1 Where more than 50 bicycle parking spaces are provided for a single office building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers (see <i>Zoning By-law Section 111</i>)	<input type="checkbox"/>
BETTER	2.2.2 Provide secure bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met)	<input type="checkbox"/>
2.3 Shower & change facilities		
BASIC	2.3.1 Provide shower and change facilities for the use of active commuters	<input type="checkbox"/>
BETTER	2.3.2 In addition to shower and change facilities, provide dedicated lockers, grooming stations, drying racks and laundry facilities for the use of active commuters	<input type="checkbox"/>
2.4 Bicycle repair station		
BETTER	2.4.1 Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	<input type="checkbox"/>

TDM-supportive design & infrastructure measures: Non-residential developments		Check if completed & add descriptions, explanations or plan/drawing references
3. TRANSIT		
3.1 Customer amenities		
BASIC	3.1.1 Provide shelters, lighting and benches at any on-site transit stops	<input type="checkbox"/>
BASIC	3.1.2 Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	<input type="checkbox"/>
BETTER	3.1.3 Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	<input type="checkbox"/>
4. RIDESHARING		
4.1 Pick-up & drop-off facilities		
BASIC	4.1.1 Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	<input type="checkbox"/>
4.2 Carpool parking		
BASIC	4.2.1 Provide signed parking spaces for carpools in a priority location close to a major building entrance, sufficient in number to accommodate the mode share target for carpools	<input type="checkbox"/>
BETTER	4.2.2 At large developments, provide spaces for carpools in a separate, access-controlled parking area to simplify enforcement	<input type="checkbox"/>
5. CARSHARING & BIKESHARING		
5.1 Carshare parking spaces		
BETTER	5.1.1 Provide carshare parking spaces in permitted non-residential zones, occupying either required or provided parking spaces (see <i>Zoning By-law Section 94</i>)	<input type="checkbox"/>
5.2 Bikeshare station location		
BETTER	5.2.1 Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	<input type="checkbox"/>

TDM-supportive design & infrastructure measures: Non-residential developments		Check if completed & add descriptions, explanations or plan/drawing references
6. PARKING		
6.1 Number of parking spaces		
REQUIRED	6.1.1 Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	<input checked="" type="checkbox"/>
BASIC	6.1.2 Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	<input type="checkbox"/>
BASIC	6.1.3 Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly (see <i>Zoning By-law Section 104</i>)	<input type="checkbox"/>
BETTER	6.1.4 Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking (see <i>Zoning By-law Section 111</i>)	<input type="checkbox"/>
6.2 Separate long-term & short-term parking areas		
BETTER	6.2.1 Separate short-term and long-term parking areas using signage or physical barriers, to permit access controls and simplify enforcement (i.e. to discourage employees from parking in visitor spaces, and vice versa)	<input type="checkbox"/>
7. OTHER		
7.1 On-site amenities to minimize off-site trips		
BETTER	7.1.1 Provide on-site amenities to minimize mid-day or mid-commute errands	<input type="checkbox"/>

**TDM-Supportive Development Design and Infrastructure Checklist:
Residential Developments (multi-family or condominium)**

Legend	
REQUIRED	The Official Plan or Zoning By-law provides related guidance that must be followed
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance

TDM-supportive design & infrastructure measures: Residential developments		Check if completed & add descriptions, explanations or plan/drawing references
1. WALKING & CYCLING: ROUTES		
1.1 Building location & access points		
BASIC	1.1.1 Locate building close to the street, and do not locate parking areas between the street and building entrances	<input checked="" type="checkbox"/>
BASIC	1.1.2 Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	<input checked="" type="checkbox"/>
BASIC	1.1.3 Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	<input checked="" type="checkbox"/>
1.2 Facilities for walking & cycling		
REQUIRED	1.2.1 Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations (see <i>Official Plan policy 4.3.3</i>)	<input checked="" type="checkbox"/>
REQUIRED	1.2.2 Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible (see <i>Official Plan policy 4.3.12</i>)	<input checked="" type="checkbox"/>

TDM-supportive design & infrastructure measures: Residential developments		Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3 Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks (see <i>Official Plan policy 4.3.10</i>)	<input checked="" type="checkbox"/>
REQUIRED	1.2.4 Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps (see <i>Official Plan policy 4.3.10</i>)	<input checked="" type="checkbox"/>
REQUIRED	1.2.5 Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on-road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians (see <i>Official Plan policy 4.3.11</i>)	<input type="checkbox"/>
BASIC	1.2.6 Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	<input checked="" type="checkbox"/>
BASIC	1.2.7 Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	<input checked="" type="checkbox"/>
BASIC	1.2.8 Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	<input type="checkbox"/>
1.3 Amenities for walking & cycling		
BASIC	1.3.1 Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	<input type="checkbox"/>
BASIC	1.3.2 Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	<input type="checkbox"/>

TDM-supportive design & infrastructure measures: Residential developments		Check if completed & add descriptions, explanations or plan/drawing references
2. WALKING & CYCLING: END-OF-TRIP FACILITIES		
2.1 Bicycle parking		
REQUIRED	2.1.1 Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible (see <i>Official Plan policy 4.3.6</i>)	<input checked="" type="checkbox"/>
REQUIRED	2.1.2 Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas (see <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
REQUIRED	2.1.3 Ensure that bicycle parking spaces and access aisles meet minimum dimensions, that no more than 50% of spaces are vertical spaces, and that parking racks are securely anchored (see <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
BASIC	2.1.4 Provide bicycle parking spaces equivalent to the expected number of resident-owned bicycles, plus the expected peak number of visitor cyclists	<input type="checkbox"/>
2.2 Secure bicycle parking		
REQUIRED	2.2.1 Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers (see <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
BETTER	2.2.2 Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi-family residential developments	<input checked="" type="checkbox"/>
2.3 Bicycle repair station		
BETTER	2.3.1 Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	<input type="checkbox"/>
3. TRANSIT		
3.1 Customer amenities		
BASIC	3.1.1 Provide shelters, lighting and benches at any on-site transit stops	<input type="checkbox"/>
BASIC	3.1.2 Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	<input type="checkbox"/>
BETTER	3.1.3 Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	<input type="checkbox"/>

TDM-supportive design & infrastructure measures: Residential developments		Check if completed & add descriptions, explanations or plan/drawing references
4. RIDESHARING		
4.1 Pick-up & drop-off facilities		
BASIC	4.1.1 Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	<input type="checkbox"/>
5. CARSHARING & BIKESHARING		
5.1 Carshare parking spaces		
BETTER	5.1.1 Provide up to three carshare parking spaces in an R3, R4 or R5 Zone for specified residential uses (see <i>Zoning By-law Section 94</i>)	<input type="checkbox"/>
5.2 Bikeshare station location		
BETTER	5.2.1 Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	<input type="checkbox"/>
6. PARKING		
6.1 Number of parking spaces		
REQUIRED	6.1.1 Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	<input checked="" type="checkbox"/>
BASIC	6.1.2 Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	<input type="checkbox"/>
BASIC	6.1.3 Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly (see <i>Zoning By-law Section 104</i>)	<input type="checkbox"/>
BETTER	6.1.4 Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking (see <i>Zoning By-law Section 111</i>)	<input type="checkbox"/>
6.2 Separate long-term & short-term parking areas		
BETTER	6.2.1 Provide separate areas for short-term and long-term parking (using signage or physical barriers) to permit access controls and simplify enforcement (i.e. to discourage residents from parking in visitor spaces, and vice versa)	<input type="checkbox"/>