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37 Years

335 Roosevelt Avenue

Transportation Impact Assessment

Residential Development

335 Roosevelt Avenue

Transportation Impact Assessment

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

July 2020

Novatech File: 110098
Ref: R-2020-053

NOVATECH
Engineers, Planners & Landscape Architects

July 31, 2020

City of Ottawa
Planning and Growth Management Department
110 Laurier Ave. W., 4th Floor,
Ottawa, Ontario K1P 1J1

Attention: **Mr. Wally Dubyk**
Project Manager, Infrastructure Approvals

Dear Mr. Dubyk:

Reference: **Residential Development, 335 Roosevelt Avenue**
Transportation Impact Assessment Report
Novatech File No. 110098

We are pleased to submit the following Transportation Impact Assessment Report in support of Official Plan Amendment and Zoning By-law Amendment applications for the 335 Roosevelt Avenue. The structure and format of this report is in accordance with the City of Ottawa Transportation Impact Assessment Guidelines (June 2017).

If you have any questions or comments regarding this report, please feel free to contact the undersigned.

Yours truly,

NOVATECH

B. Byvelds

Brad Byvelds, P. Eng.
Project Coordinator | Transportation/Traffic

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

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 licensed[1] or registered[2] 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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Dated at Ottawa (City) this 31 day of July, 2020 .

Name: Brad Byvelds
(Please Print)

Professional Title: P. Eng. - Project Coordinator

B. Byvelds

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

Office Contact Information (Please Print)	
Address:	240 Michael Cowpland Drive
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EXECUTIVE SUMMARY

This Transportation Impact Assessment (TIA) report has been prepared in support of Official Plan Amendment and Zoning By-law Amendment applications for 335 Roosevelt Avenue.

The subject site is surrounded by the following:

- A Multi-Use Pathway (MUP) and the OC Transpo East-West Transitway to the north;
- Wilmont Avenue and low density residential development to the south;
- A high density residential apartment building to the east; and
- Roosevelt Avenue and low density residential development to the west.

The site currently has gated accesses at Roosevelt Avenue and at Wilmont Avenue, restricting local traffic from shortcutting between Richmond Road and Churchill Avenue.

The proposed development consists of two high-rise residential buildings providing a total of 323 units, and four low-rise residential buildings containing a total of 38 units. A total of 335 underground parking spaces will be provided in a single two-level parking garage with access on both Wilmont Avenue and Roosevelt Avenue. Eight surface parking spaces will also be provided from the Wilmont Avenue access. The proposed development is anticipated to be constructed in two phases. Phase one will contain the east building and is anticipated to be constructed by 2024. Phase two will include the remainder of the development and is anticipated to be constructed by 2026.

The extension of Winston Avenue will serve as an access to the subject site, as well as a new landscaped pedestrian plaza with connectivity to the east-west MUP along the OC Transpo corridor which links to the Westboro and Dominion Transit Stations (future LRT stations). Details regarding the ownership, maintenance and liability of this pedestrian plaza will be discussed further with the City during the future Site Plan Control application.

The conclusions and recommendations of this TIA can be summarized as follows:

<u>Development Design</u>

- The extension of Winston Avenue will serve as an access to the subject site, as well as a new landscaped pedestrian plaza with connectivity to the east-west MUP along the OC Transpo corridor which links to the Westboro and Dominion Transit Stations (future LRT stations). Details regarding the ownership, maintenance and liability of this pedestrian plaza will be discussed further with the City during the future Site Plan Control application.
- The new pedestrian plaza will serve residents of the proposed development, as well as provide pedestrian connectivity to the MUP for the existing residential developments between Winston Avenue and Churchill Avenue, which are currently required to use either Churchill Avenue or Richmond Road/Roosevelt Avenue.
- Pedestrian facilities will be provided between the main building entrances, and the existing sidewalks along Winston Avenue and Roosevelt Avenue, as well as the east-west MUP along the OC Transpo corridor. A pedestrian pathway will also be provided south of the west building to Winston Avenue, which provides pedestrian connectivity between the surface visitor parking and the west building.
- All required TDM-supportive design and infrastructure measures in the TDM checklist are met.

- A new cul-de-sac/hammerhead design is proposed at the northern terminus of Roosevelt Avenue, partially within the OC Transpo corridor. This design will facilitate pick-up/drop-off activity near the main building entrance to the west building and will accommodate a turnaround area for fire services.
- Two loading bays are proposed south of the east and west buildings. The loading bays will be used for both move-in/move-out and garbage collection.

Parking

- The proposed 343 vehicular parking spaces adhere to the requirements of the City's ZBL.
- The proposed bicycle parking will be located in bike storage rooms at grade and within the underground parking garage, and will adhere to the requirements of the City's ZBL.

Boundary Street Design

- Roosevelt Avenue, Winston Avenue, and Wilmont Avenue meet the target BLOS and Auto LOS. However, none of the roadways meet the target PLOS A.
- To achieve the target PLOS A, either a 1.8m sidewalk with a 2.0m wide boulevard or a 2.0m sidewalk with a minimum 0.5m wide boulevard is required along all boundary roadways. This is identified for the City's consideration as funding becomes available.

Access Intersections Design

- The proposed accesses along Roosevelt Avenue and Winston Avenue/Wilmont Avenue will have a width of 6.0m, adhering to the requirements of the PABL and ZBL.
- The location of the Winston Avenue/Wilmont Avenue access adheres to the requirements of the PABL.
- The proposed Roosevelt Avenue access is located approximately 27m from the northern property line and 1.8m from the southern property line. As the Roosevelt Avenue access is at the terminus of the roadway, and the adjacent driveway is located on the south side of the single detached residential dwelling at 345 Roosevelt Avenue, a waiver to the PABL is requested.
- As the proposed driveways are located near the terminus of Roosevelt Avenue, Wilmont Street and Winston Avenue, traffic along the adjacent roadways is anticipated to be minimal. Side street stop control is recommended at the proposed accesses.

Transportation Demand Management

- The following measures will be implemented upon opening of the proposed development:
  - Designate internal coordinator,
  - Display local area maps with walking/cycling access routes and key destinations,
  - Display relevant transit schedules and route maps,
  - Unbundle parking from monthly rent, and
  - Provide a multi-modal travel option information package to new residents.
- The proposed development will provide bicycle parking spaces at a rate of 1 per unit, exceeding the requirement of the ZBL. The provision of additional bicycle parking spaces will encourage residents to use alternative modal shares and help achieve the target 25% non-auto modal shares.

Neighbourhood Traffic Management

- The weekday peak hour total traffic volumes along Wilmont Avenue and Roosevelt Avenue (adjacent to the residential units north of the commercial accesses) are

anticipated to be within the City's ATM thresholds, and overall capacity thresholds for a local roadway.
- The additional traffic generated by the proposed development during the weekday peak hours equates to one vehicle every 3-4 minutes and is not anticipated to have a significant impact on both Wilmont Avenue and Roosevelt Avenue.

Transit
- The proposed development is anticipated to generate an additional 129 transit trips (32 in, 97 out) during the weekday AM peak hour and 135 transit trips (84 in, 51 out) during the weekday PM peak hour.
- As the proposed development is located within a 600m walking distance of both the future Dominion and Westboro LRT stations, no capacity problems are anticipated.

MMLOS Analysis

Richmond Road/Churchill Avenue
- The Richmond Road/Churchill Avenue intersection does not meet the target PLOS, BLOS, TLOS, or TkLOS but meets the target Auto LOS.
- A reduction in the pedestrian crossing distance would have the greatest improvement to the PETSI score at this intersection. Leading pedestrian intervals are currently implemented at this intersection, improving overall pedestrian safety by enhancing the visibility of pedestrians in the intersection and reinforcing their right-of-way over turning vehicles.
- Consideration could be given by the City to providing a two-stage left turn bike box on all legs of this intersection.
- To achieve the target TkLOS D, an effective turn radius greater than 15m is required on all four corners of this intersection. Increasing the turn radius at this intersection could be considered by the City, however it should be noted that the increased radius will have a negative impact on the PLOS.

Richmond Road/Roosevelt Avenue
- The Richmond Road/Roosevelt Avenue intersection does not meet the target PLOS, BLOS, or TkLOS but meets the target TLOS and Auto LOS.
- A reduction in the pedestrian crossing distance would have the greatest improvement to the PETSI score at this intersection. Consideration could be given by the City to providing curb bulb-outs at this intersection to reduce the pedestrian crossing distance.
- Consideration could be given by the City to providing a two-stage left turn bike box on all legs of this intersection.
- To achieve the target TkLOS D, an effective turn radius greater than 15m is required on all four corners of this intersection. However, Roosevelt Avenue is not classified as a truck route, and Exhibit 22 of the MMLOS guidelines does not identify a TkLOS target for a local roadway that is not classified as a truck route within 600m of a rapid transit station or 300m of a school.

Background and Total Intersection Operations
- Under 2026 and 2031 background traffic conditions, all intersections are anticipated to operate with a LOS D or better during the weekday AM and PM peak hours.
- The 95th queue length on the northbound, southbound, and westbound approaches to the Richmond Road/Churchill Avenue intersection, and westbound approach to the Churchill

Avenue/Scott Street intersection may periodically extend through adjacent unsignalized intersections during the weekday AM and PM peak hours.

- The 95th percentile queue length on the northbound approach to the Churchill Avenue/Scott Street intersection is not anticipated to extend past the adjacent intersection of Wilmont Avenue.
- Traffic generated by the proposed development is not anticipated to have a significant impact on intersection operations within the study area. All study area intersections are anticipated to continue to operate with a LOS D or better during weekday peak hours.

1.0 SCREENING

1.1 Introduction

This Transportation Impact Assessment (TIA) report has been prepared in support of Official Plan Amendment and Zoning By-law Amendment applications for 335 Roosevelt Avenue.

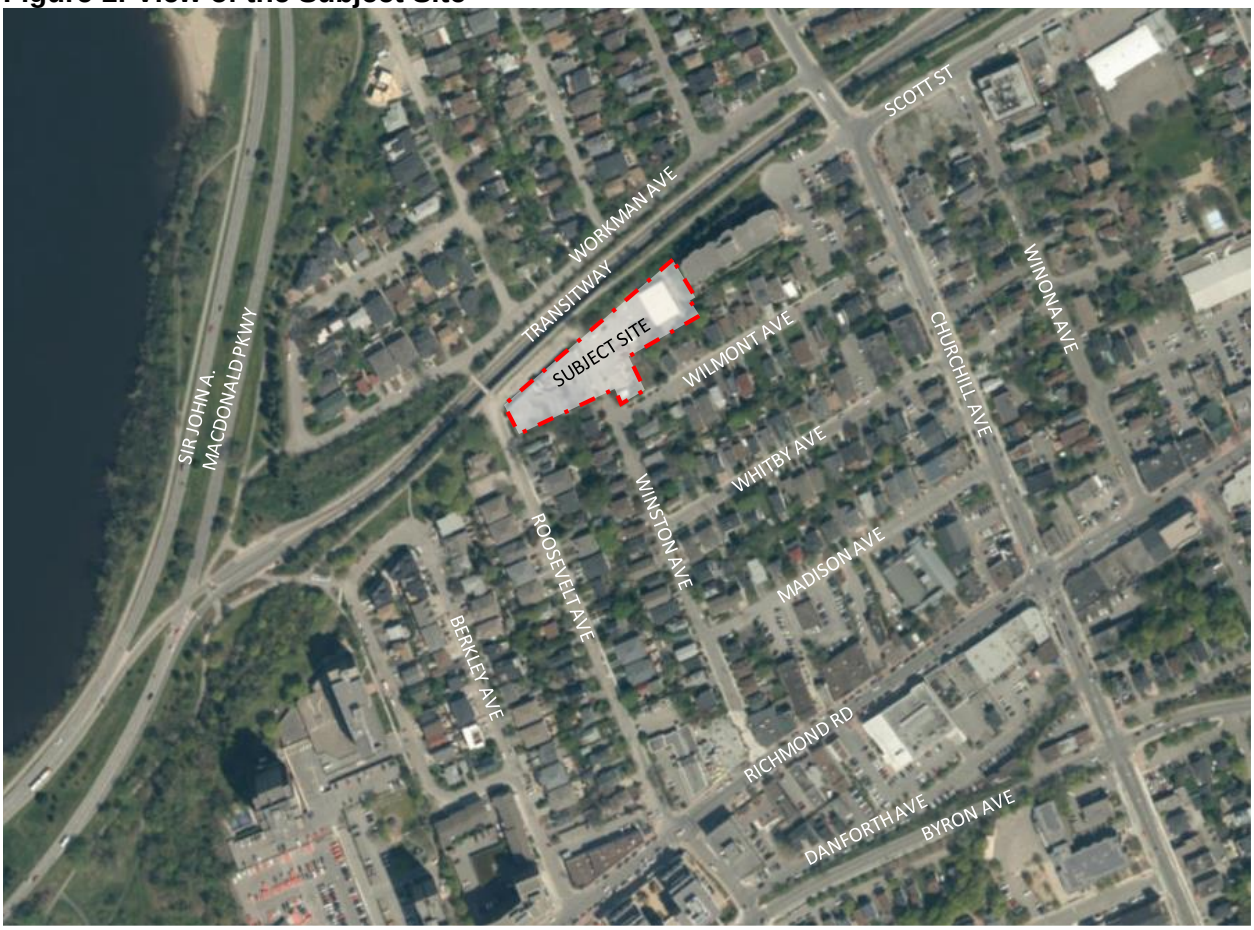
The subject site is surrounded by the following:

- A Multi-Use Pathway (MUP) and the OC Transpo East-West Transitway to the north;
- Wilmont Avenue and low density residential development to the south;
- A high density residential apartment building to the east; and
- Roosevelt Avenue and low density residential development to the west.

A view of the subject site is provided in **Figure 1.**

The site currently has gated accesses at Roosevelt Avenue and at Wilmont Avenue, restricting local traffic from shortcutting between Richmond Road and Churchill Avenue.

Figure 1: View of the Subject Site



1.2 Proposed Development

The proposed development consists of two high-rise residential buildings providing a total of 323 units, and four low-rise residential buildings containing a total of 38 units. A total of 335 underground parking spaces will be provided in a single two-level parking garage with access on both Wilmont Avenue and Roosevelt Avenue. Eight surface parking spaces will also be provided from the Wilmont Avenue access. The proposed development is anticipated to be constructed in two phases. Phase one will contain the east building and is anticipated to be constructed by 2024. Phase two will include the remainder of the development and is anticipated to be constructed by 2026.

The extension of Winston Avenue will serve as an access to the subject site, as well as a new landscaped pedestrian plaza with connectivity to the east-west MUP along the OC Transpo corridor which links to the Westboro and Dominion Transit Stations (future LRT stations). Details regarding the ownership, maintenance and liability of this pedestrian plaza will be discussed further with the City during the future Site Plan Control application.

The site plan is currently being developed and is subject to refinement. A copy of the proposed site plan is included in **Appendix A**.

1.3 Screening Form

The City's 2017 TIA Guidelines identify three triggers for completing a TIA report, including trip generation, location, and safety. The criteria for each trigger are outlined in the City's TIA Screening Form. The trigger results are as follows:

- Trip Generation Trigger – The development is anticipated to generate over 60 peak hour person trips; further assessment is required based on this trigger.

- Location Trigger – The development is located in a Transit Oriented Development (TOD) zone (within 600m of Dominion and Westboro Transit Stations); further assessment is required based on this trigger.

- Safety Trigger – No safety triggers outlined in the TIA Screening Form are met; no further assessment is required based on this trigger.

The proposed development satisfies the Trip Generation and Location Triggers for completing a TIA. A copy of the TIA screening form is included in **Appendix B**.

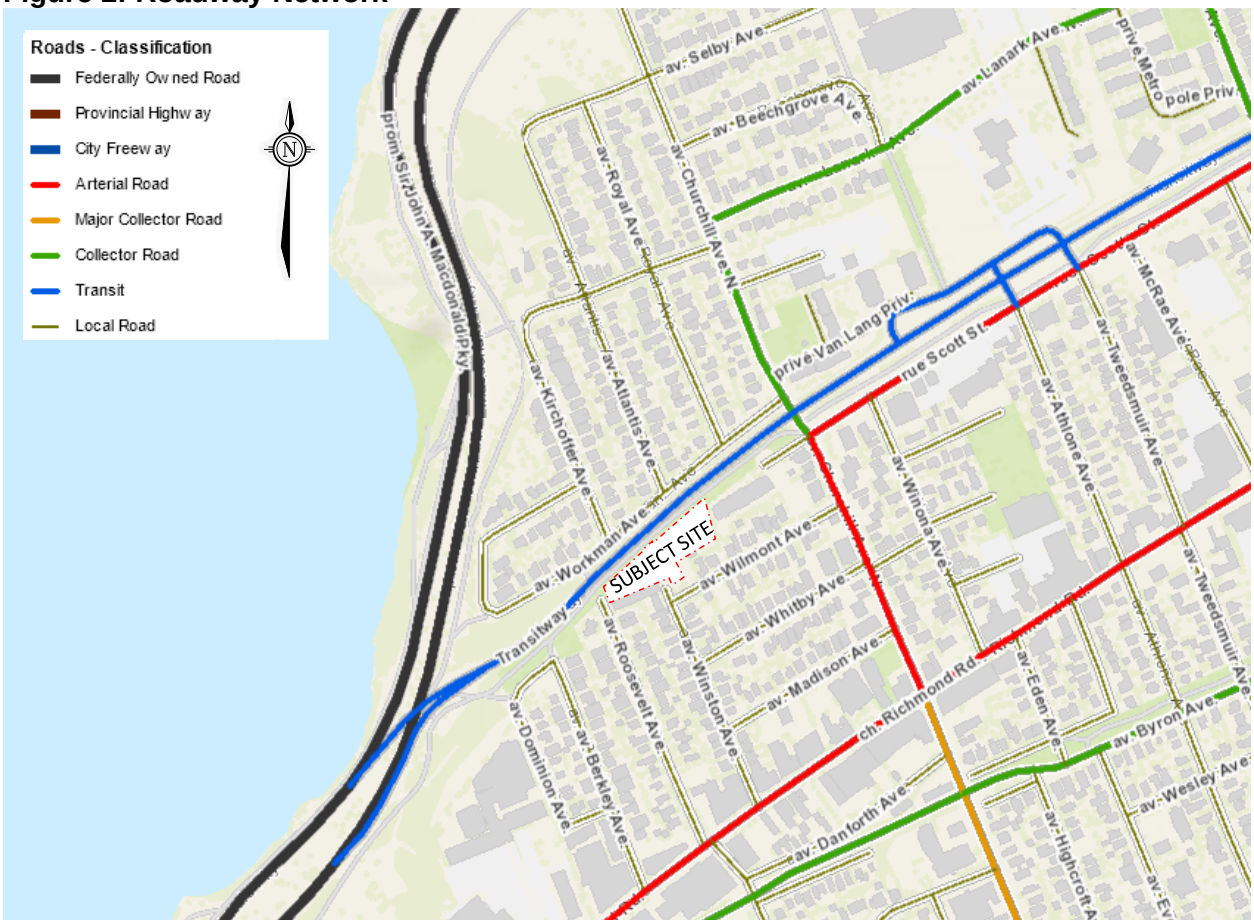
2.0 SCOPING

2.1 Existing Conditions

2.1.1 Roadways

The roadway network of the greater area surrounding the subject site is illustrated in **Figure 2**.

Figure 2: Roadway Network



The Sir John A. Macdonald Parkway falls within the jurisdiction of the National Capital Commission. All other roadways within the study area fall under the jurisdiction of the City of Ottawa.

Roosevelt Avenue is a local roadway that generally runs on a north-south alignment from Cole Avenue, terminating at the OC Transpo East-West Transitway. It has a two lane semi-urban cross section (curb/sidewalk on east side). Roosevelt Avenue has a posted speed limit of 40km/hr and is not designated as a truck route. One-hour street parking from 7:00 AM to 7:00 PM is permitted on the east side of the road, beginning approximately 75m north of the Richmond Road intersection. Parking is prohibited on the west side of the roadway.

Winston Avenue is a local roadway that runs on a north-south alignment from north of Richmond Road (closed to vehicles at Richmond Road), terminating at a gated entrance to the subject site. It has a two-lane urban cross section with concrete sidewalks on both sides south of Madison Avenue. North of Madison Avenue, it has a two-lane semi-urban cross section (curb/asphalt sidewalk on west side). Winston Avenue has a regulatory speed limit of 50km/hr and is not designated as a truck route. On-street parking is permitted on the east side of the roadway south of Whitby Avenue, and the west side of the roadway north of Whitby Avenue.

Wilmont Avenue is a local roadway that runs on an east-west alignment between Winston Avenue and Churchill Avenue. It has a two-lane urban cross section with curb/sidewalk on the north side

of the roadway, and a gutter on the south side of the roadway. Wilmont Avenue has a regulatory speed limit of 50km/hr and is not designated as truck route. On-street parking is permitted on both sides of the roadway.

Churchill Avenue is classified as a major collector roadway between Carling Avenue and Richmond Road, an arterial roadway between Richmond Road and Scott Street, a collector roadway between Scott Street and Lanark Avenue, and a local roadway north of Lanark Avenue. It runs on a north-south alignment between Carling Avenue and north of Ferndale Avenue. In the vicinity of the subject site, Churchill Avenue has a two-lane undivided urban cross section with a regulatory speed limit of 50km/hr. Churchill Avenue is designated as a truck route between Carling Avenue and Scott Street, permitting full loads. On-street parking is permitted on both sides of the Churchill Avenue between Richmond Road and Scott Street.

Richmond Road is an arterial roadway that generally runs on an east-west alignment between Baseline Road/Robertson Road and Island Park Drive/Wellington Street. In the vicinity of the subject site, it has a two-lane undivided urban cross section with on-street parking permitted on both sides of the roadway, and a regulatory speed limit of 50 km/hr.

Scott Street is classified as an arterial roadway east of Churchill Avenue, and a local roadway west of Churchill Avenue. It runs on an east-west alignment from Bayview Station Road/Albert Street, terminating in a cul-de-sac approximately 50m west of Churchill Avenue. East of Churchill Avenue, Scott Street has a two-lane semi-urban cross section (curb/sidewalk on south side) with parking permitted on the north side of the roadway, and a posted speed limit of 50 km/hr. East of Churchill Avenue, it is also designated as a truck route, permitting full loads.

2.1.2 Intersections

Richmond Road/Roosevelt Avenue

- Signalized intersection
- One approach lane in all directions
- Standard crosswalks are provided on all approaches

Richmond Road/Churchill Avenue

- Signalized intersection
- Eastbound/Westbound: one left turn lane, one shared through/right turn lane
- Northbound/Southbound: one approach lane
- Ladder crosswalks are provided on all approaches

Wilmont Avenue/Churchill Avenue

- Unsignalized, with free flow on Churchill Avenue and stop-control on Wilmont Avenue
- Standard crosswalk provided on the west approach

Scott Street/Churchill Avenue

- Unsignalized, with all-way stop-control
- Ladder crosswalks provided on the north and south approaches, standard crosswalks provided on the east and west approaches
- A bike lane is provided on the east approach
- Sharks teeth provided after the stop bar on all approaches

2.1.3 Driveways

In accordance with the City's 2017 TIA guidelines, a review of adjacent driveways along the boundary roads (within 200m of the subject site) are provided as follows:

Roosevelt Avenue, east side:

- Sixteen driveways to residential dwellings at 339, 345, 349, 351, 353, 355, 357, 361, 363, 365/367, 371, 373/375, 377, 381, 383, and 385/387 Roosevelt Avenue
- One driveway to a parking lot serving a funeral home at 403 Roosevelt Avenue

Winston Avenue, east side:

- Seven driveways to residential dwellings at 349, 353, 355, 365/367, 373/375/377, 383, and 393 Winston Avenue

Wilmont Avenue, north side:

- Ten driveways to residential dwellings at 379, 377, 375, 369, 367, 365, 361, 359, 353, and 349 Wilmont Avenue

Roosevelt Avenue, west side:

- Fourteen driveways to residential dwellings at 342, 350/352, 354/356, 358, 362, 364, 366, 368, 370, 372, 378, 382, 386, and 390 Roosevelt Avenue
- One driveway serving a gravel parking lot at 346 Roosevelt Avenue

Winston Avenue, west side:

- Fifteen driveways to residential dwellings at 344, 348, 350, 352, 354, 358, 362, 364, 368/370, 374, 376, 378, 382, 386/388, and 390 Winston Avenue

Wilmont Avenue, south side:

- Thirteen driveways to residential dwellings at 378, 376 (a, b, c), 374/372, 368/366, 364, 360, 356, 352, 350, 346, and 344 Wilmont Avenue

2.1.4 Pedestrian and Cycling Facilities

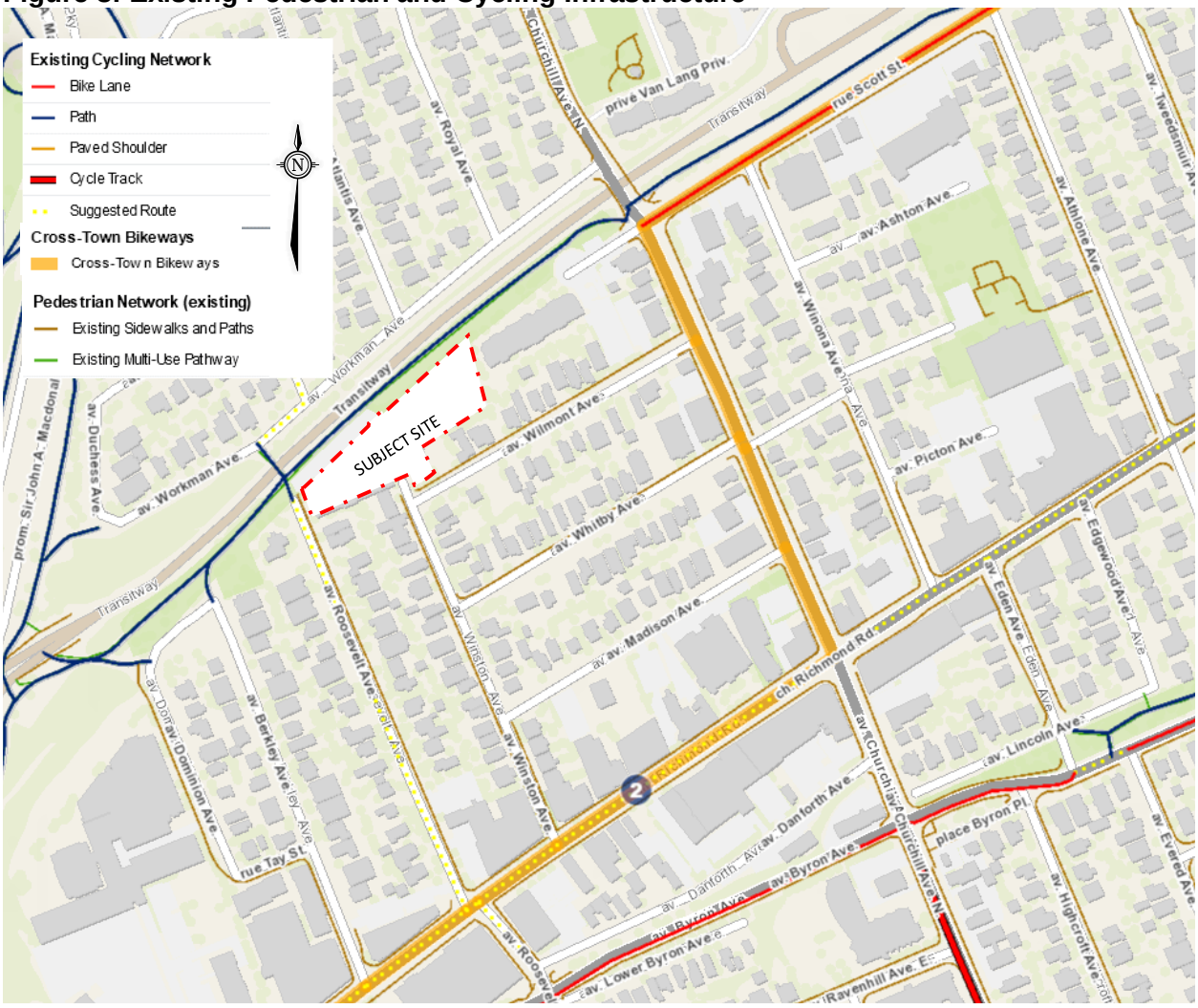
The existing pedestrian and cycling infrastructure provided in the greater area surrounding the subject site is illustrated in **Figure 3**.

Sidewalks are currently provided on both sides of Churchill Avenue, Richmond Road, and Winston Avenue (south of Madison Avenue), the east side of Roosevelt Avenue, the west side of Winston Avenue (north of Madison Avenue), the north side of Wilmont Avenue, and the south side of Scott Street (east of Churchill Avenue).

Richmond Road, Scott Street, and Churchill Avenue are designated as Spine Routes in the City's Ultimate Cycling Network. Roosevelt Avenue is classified as a Local Route. Cross-town Bikeway #2 runs east-west through the study area and utilizes Richmond Road (west of Churchill Avenue), Churchill Avenue between Richmond Road and Scott Street, and Scott Street east of Churchill Avenue.

Within the study area, bike lanes are provided on Scott Street and a cycling track is provided on Churchill Avenue south of Byron Avenue. A MUP is also located along the north side of Scott Street, providing connectivity to Westboro Transit Station. This MUP continues west past the terminus of Scott Street and provides connectivity to Dominion Transit Station and the MUP system along Sir John A. Macdonald Parkway.

Figure 3: Existing Pedestrian and Cycling Infrastructure



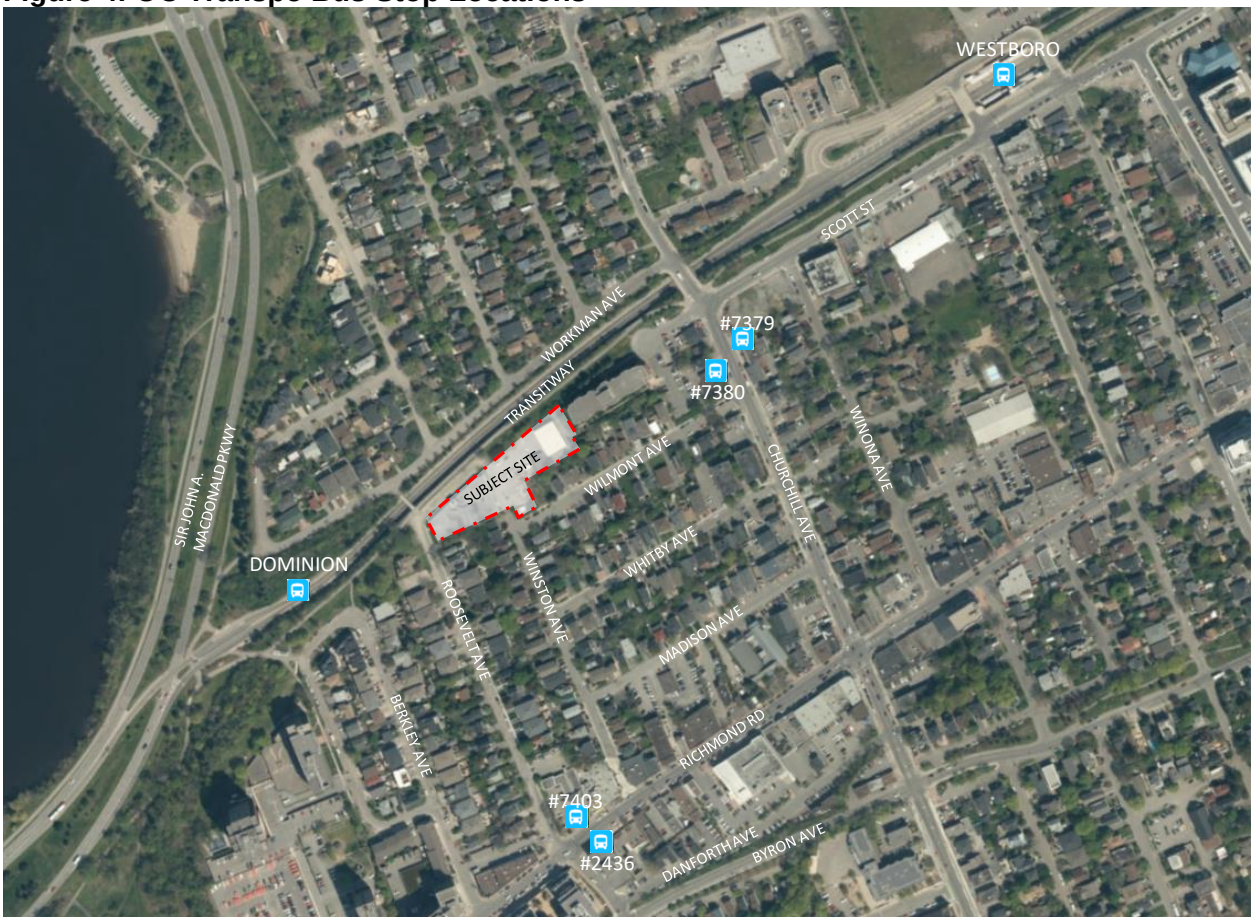
2.1.5 Transit

The locations of OC Transpo bus stops in the vicinity of the subject site are described as follows:

- Stops #7379 and #7380 are located along Churchill Avenue north of Wilmont Avenue, a walking distance of 250m-350m, and serve OC Transpo Routes: 50 and 153.
- Stops #7403 and #2436 are located along Richmond Road east of Roosevelt Avenue, at a walking distance of approximately 300m-350m, and serve OC Transpo Routes: 11 and 153.
- Dominion Transit Station is located along the OC Transpo Transitway west of the subject site, a walking distance of approximately 300m-400m, and serves numerous OC Transpo Routes.
- Westboro Transit Station is located along the OC Transpo Transitway east of the subject site, a walking distance of approximately 500m-600m, and serves numerous OC Transpo Routes.

The location of the aforementioned transit facilities in relation to the subject site is shown in **Figure 4**. Detailed route information and an excerpt from the OC Transpo System Map are included in **Appendix C**.

Figure 4: OC Transpo Bus Stop Locations



2.1.6 Existing Area Traffic Management Measures

Traffic calming measures have been implemented along Churchill Avenue including intersection and mid-block narrowings. These measures were implemented per the recommendations of the 1996 *Island Park, Kirkwood and Churchill Avenue Area Transportation Assessment and Traffic Calming Plan.* The report identified Churchill Avenue as having excessive traffic volumes and speeds that impacted the quality of life of the residents. Seasonal flex-posts are also implemented along Churchill Avenue at Roy Duncan Park, north of Workman Avenue.

2.1.7 Existing Traffic Volumes

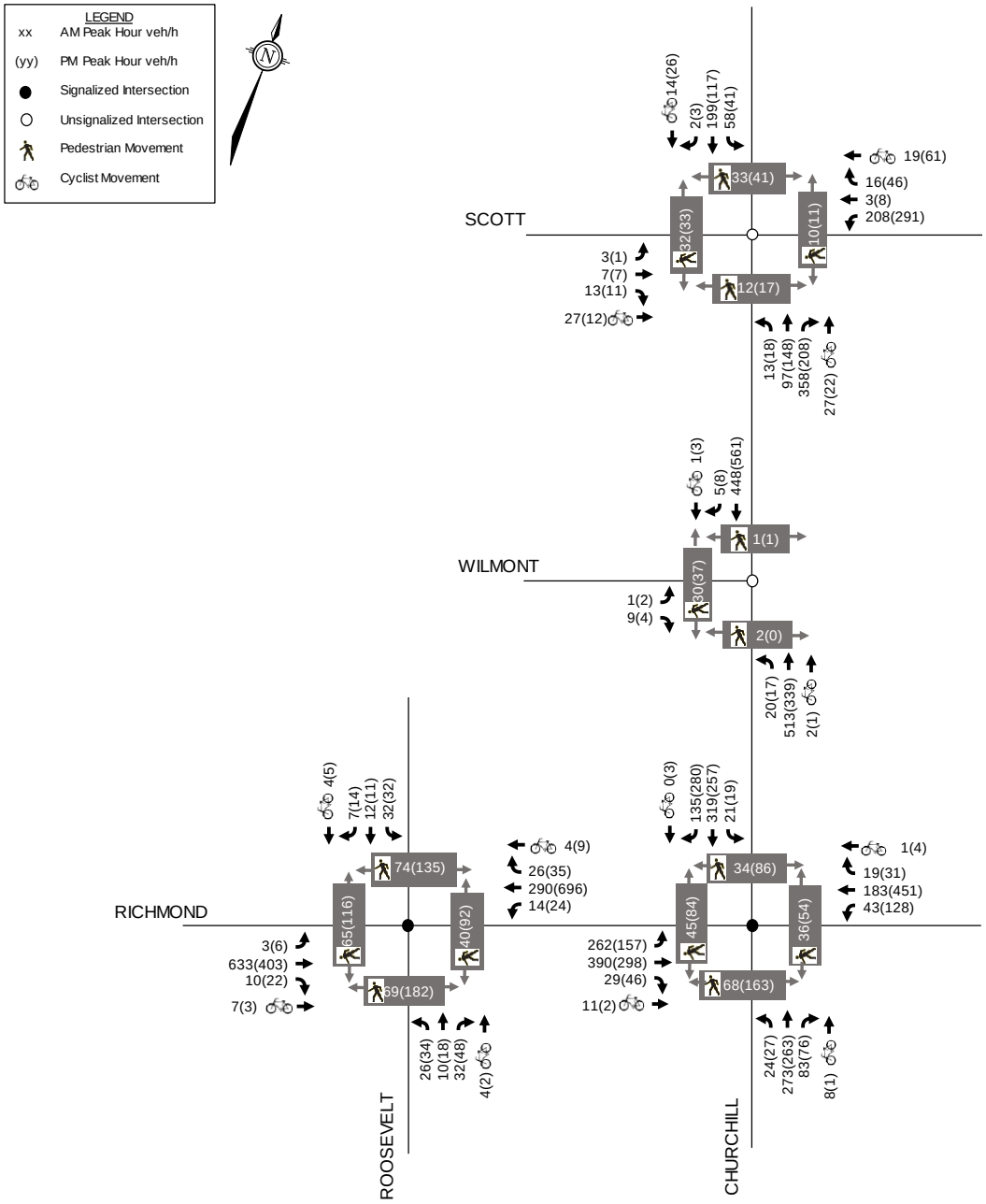
Weekday traffic counts were obtained from the City of Ottawa at the study area intersections to determine the existing pedestrian, cyclist and vehicular traffic volumes. The traffic counts were completed on the following dates:

- Churchill Avenue/Scott Street — August 13, 2019 (Tuesday)
- Roosevelt Avenue/Richmond Road — January 23, 2020 (Thursday)

- Churchill Avenue/Richmond Road January 23, 2020 (Thursday)
- Churchill Avenue/Wilmont Avenue January 13, 2016 (Wednesday)

Existing traffic volumes along the study area roadways are shown in **Figure 5**. Peak hour summary sheets of the above traffic counts are included in **Appendix D**.

Figure 5: Existing Traffic Volumes



2.1.8 Collision Records

Historical collision data from the last five years was obtained from the City's Public Works and Service Department for the study area intersection. Copies of the collision summary report are included in **Appendix E**.

The collision data has been evaluated to determine if there are any identifiable collision patterns. The following summarizes the number of collisions at each intersection from January 1, 2014 to December 31, 2018.

Table 1: Reported Collisions

Intersection	Impact Types					Total Number of Collisions
	Angle	Sideswipe	Rear End	Turning Movement	SMV[1]/ Other	
Churchill Avenue/ Richmond Road	7	5	9	4	6	**31**
Churchill Avenue/ Scott Street	-	1	-	-	3	**4**
Roosevelt Avenue/ Richmond Road	-	-	2	1	1	**4**
Churchill Avenue/ Wilmont Avenue	-	1	1	-	-	**2**

1. SMV = Single Motor Vehicle

Churchill Avenue/Richmond Road

A total of thirty-one collisions were reported at this intersection over the course of the last five years. Of these, there were nine rear end impacts, seven angle impacts, six 'other' impacts, five sideswipe impacts, and four turning movement impacts. Of the total thirty-one collisions, seven caused injuries, but none caused fatalities.

Of the nine rear end impacts, five occurred on the eastbound approach, two occurred on the westbound approach, and two occurred on the southbound approach. Three of the rear end impacts caused injuries, but none caused fatalities.

Of the seven angle impacts, four occurred between eastbound through and southbound through vehicles, one occurred between an eastbound through vehicle and a northbound through vehicle, one occurred between a westbound through vehicle and a northbound left turning vehicle, and one occurred between a northbound right turning vehicle and an eastbound stopped vehicle. All angle impacts were classified as property damage only.

Of the six 'other' impacts, four involved pedestrians and two involved unattended vehicles. Two of the collisions with pedestrians occurred with eastbound left turning vehicles, one pedestrian collision occurred with a southbound right turning vehicle, and one collision involving two pedestrians occurred with a westbound left turning vehicle. Of the total six 'other' impacts, four caused injuries, but none caused fatalities.

Of the five sideswipe impacts, two occurred between southbound right turning vehicles, one occurred between westbound vehicles, one occurred between northbound vehicles, and one occurred between eastbound vehicles. All sideswipe impacts were classified as property damage only.

Of the total four turning movement impacts, two involved eastbound left turning vehicles, one involved a southbound left turning vehicle, and one involved a northbound right turning tractor. All turning movement impacts were classified as property damage only.

As the aforementioned collision history does not reflect a collision pattern, no mitigation measures have been identified.

Churchill Avenue/Scott Street
A total of four collisions were reported at this intersection over the course of the last five years. Of these, there was one sideswipe impact and three 'other' impacts. One of the collisions involved a pedestrian. One of the collisions caused injuries, but none caused fatalities.

As the aforementioned collision history does not reflect a collision pattern, no mitigation measures have been identified.

Roosevelt Avenue/Richmond Road
A total of four collisions were reported at this intersection over the course of the last five years. Of these, there were two rear end impacts, one turning movement impact, and one 'other' impact. One collision involved a pedestrian, and one collision involved an OC Transpo bus. Two of the collisions caused injuries, but none caused fatalities.

As the aforementioned collision history does not reflect a collision pattern, no mitigation measures have been identified.

Churchill Avenue/Wilmont Avenue
A total of two collisions were reported at this intersection over the course of the last five years. Of these, there was one sideswipe impact and one rear end impact. Both collisions occurred on the southbound approach and were reported as property damage only.

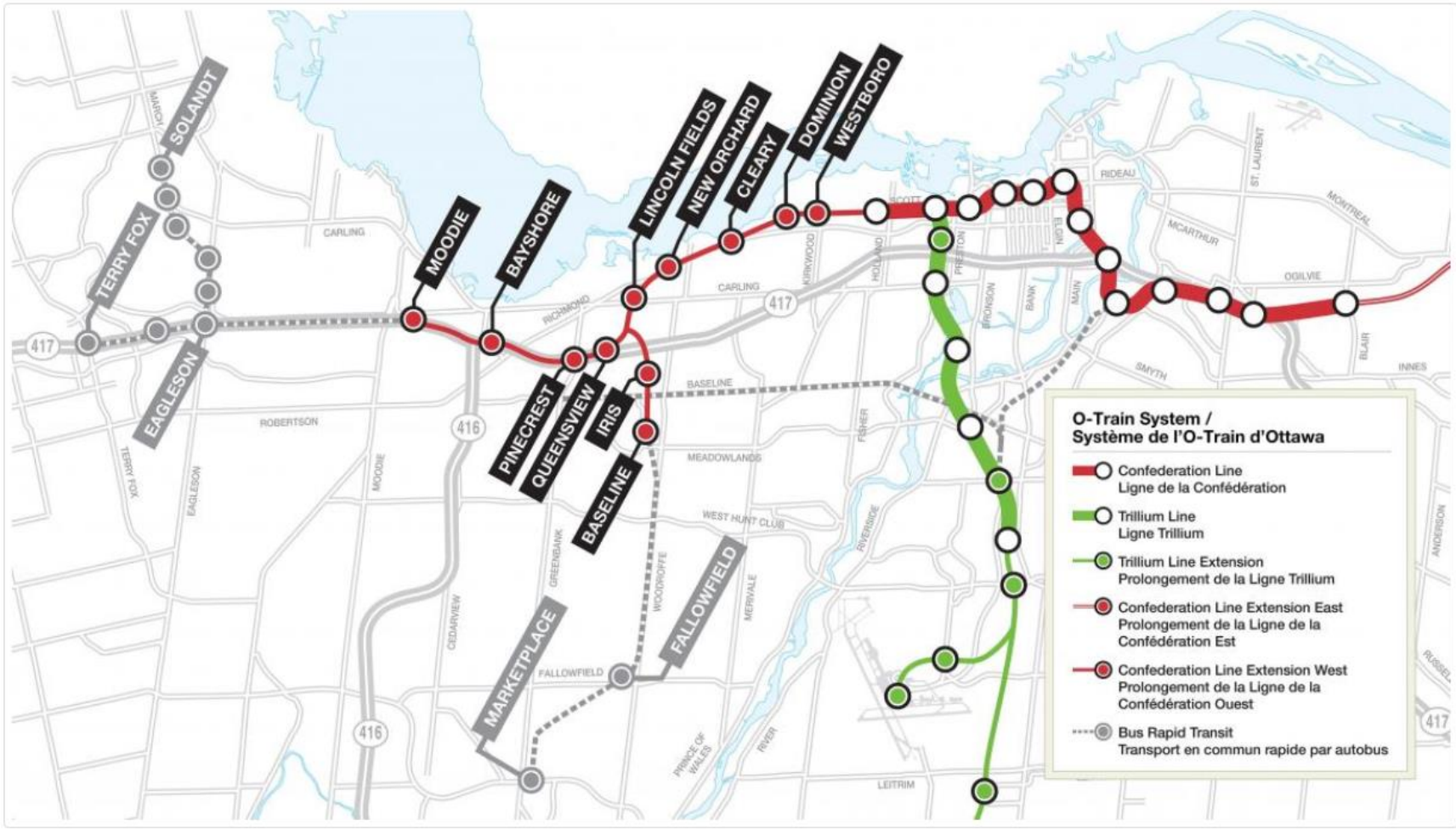
As the aforementioned collision history does not reflect a collision pattern, no mitigation measures have been identified.

2.2 Planned Conditions

The City of Ottawa's Transportation Master Plan (TMP) 2031 Affordable Rapid Transit and Transit Priority (RTTP) Network identifies the implementation of transit signal priority and queue jump lanes at select intersections along Richmond Road, Wellington Street W. and Somerset Street. In addition, the affordable RTTP Network identifies the extension of Light Rail Transit (LRT) to the east, west, and south (Phase 2).

Construction for Phase 2 of the LRT began in 2019. The Confederation Line Extension West is anticipated to be completed by 2025 and Westboro Transit Station and Dominion Transit Station will open as Westboro LRT Station and Dominion LRT Station. The proposed western Confederation Line extension is shown in **Figure 6**.

Figure 6: LRT Phase 2 - Confederation Line Extension West



During the LRT Phase 2 construction, buses will be routed off the existing Transitway, onto Scott Street which will be extended west of Churchill Avenue to Roosevelt Avenue, crossing to the north side of the Transitway on a temporary bridge at Roosevelt Avenue and extended westerly from Workman Avenue to the Sir John A. Macdonald Parkway. The proposed bus detour and temporary pedestrian connectivity is shown in **Figure 7**. This detour is anticipated to be built in 2022, and in use by buses only from 2022-2025. The existing multi-use pathway is to be reinstated post LRT Phase 2 construction.

As part of this LRT Phase 2 bus detour, upgrades to Scott Street and a new traffic control signal at the Scott Street/Churchill Avenue intersection are proposed. The signalization of the Scott Street at Churchill Avenue intersection is anticipated to occur by 2021 in order to accommodate bus volumes. As part of the signalization works, the intersection will be upgraded to include ladder crosswalks and cross-rides on all approaches. The interim design for Scott Street is shown in **Figure 8**. Ultimately, Scott Street will be improved to include cycle tracks and bike lanes along both sides of the road between Churchill Avenue and Island Park Drive. The ultimate design for Scott Street is shown in **Figure 9**. Although this design does not show signals at the Scott Street/Churchill Avenue intersection, it is noted that the new traffic signal control at this intersection is permanent and will remain in place after the bus detour.

Other area development includes:

- The mixed-use development at 2070 Scott Street, at the southeast corner of the Scott Street/Churchill Avenue intersection. The development proposes a 23-storey tower with 241 units and 5,500ft^2 of retail. An underground parking garage with access to Winona Avenue is proposed. A TIA was prepared by Stantec, dated November 2019, in support of this development. The estimated date of occupancy is 2022.

- The mixed-use development at 386 Richmond Road. This development proposes a six-storey building with 16 residential units, 230m^2 of office space, and 230m^2 of ground floor retail. No vehicle access is proposed, and no parking will be provided on site. A TIA was prepared by Parsons, dated October 2017, in support of this development. The estimated date of occupancy is 2020.

- The multi-use development at 398-406 Roosevelt Avenue. This development proposes 33 residential apartment units and 555m^2 of ground floor retail. A TIA was prepared by Parsons, date December 2017, in support of this development. The estimated date of full occupancy was 2019.

- The residential development at 371 Richmond Road. This development proposes a nine-story condominium providing 100 dwelling units. Access was to be provided via Madison Avenue. A Transportation Brief was prepared by Parsons, dated July 2014, in support of this development.

- The residential development along Roosevelt Avenue between Byron Avenue and Ravenhill Avenue. A Zoning By-Law amendment was sought to allow the construction of low-rise apartments dwellings on the block. The proposed rezoning would permit a maximum of 72 residential units (an increase of 37 units compared to existing/approved number of units). A TIA was prepared by Novatech, dated March 2018, in support of this development.

Figure 7: Scott Street Bus Detour

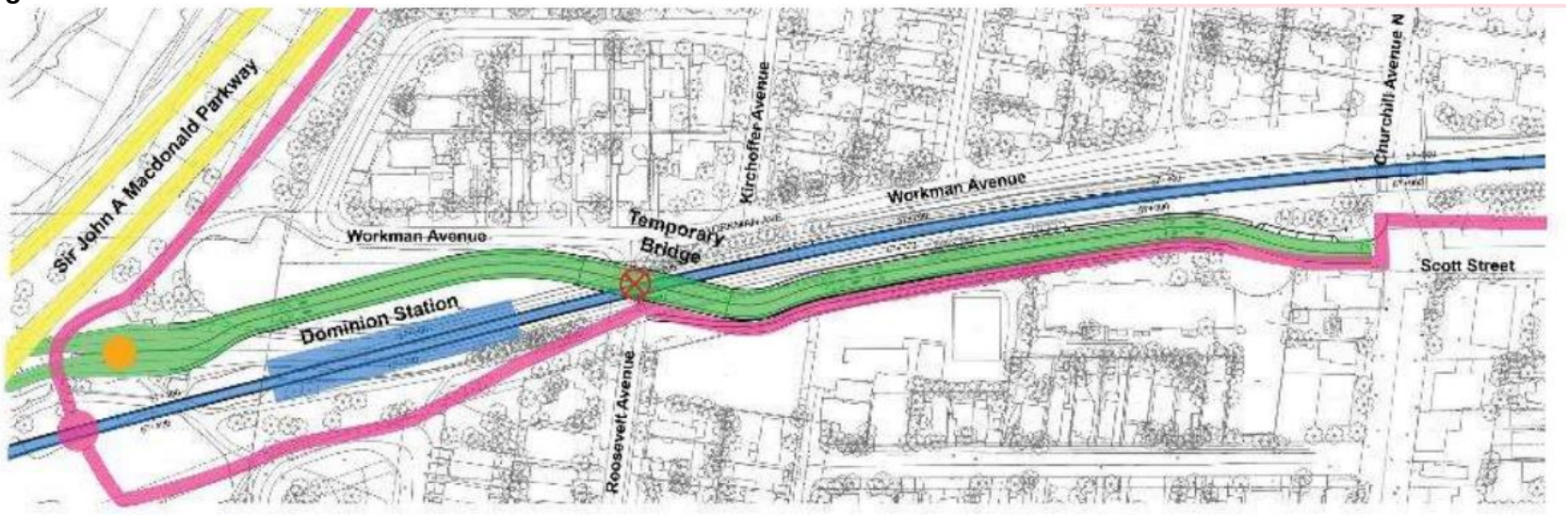


Figure 8: Scott Street Interim Design

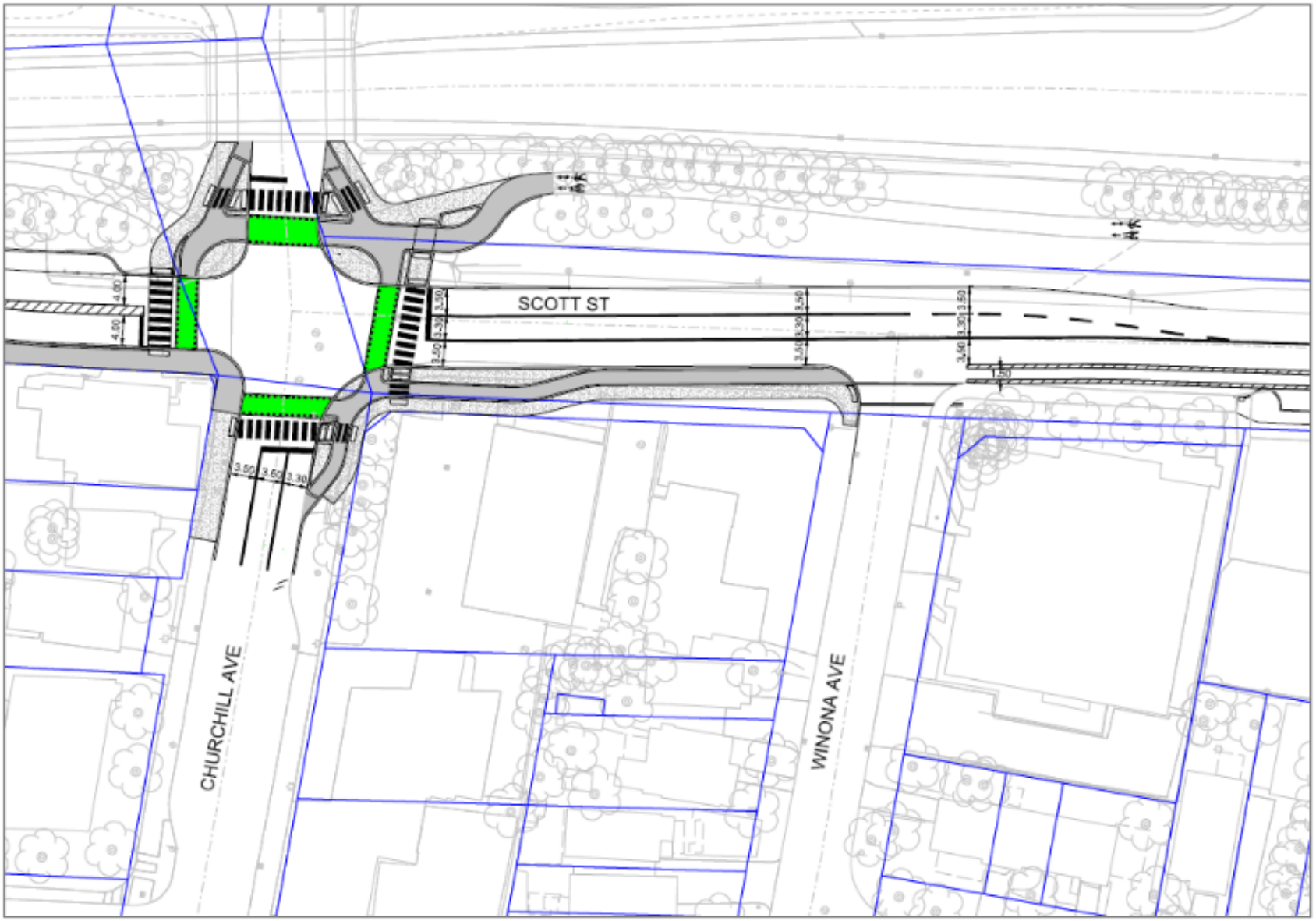
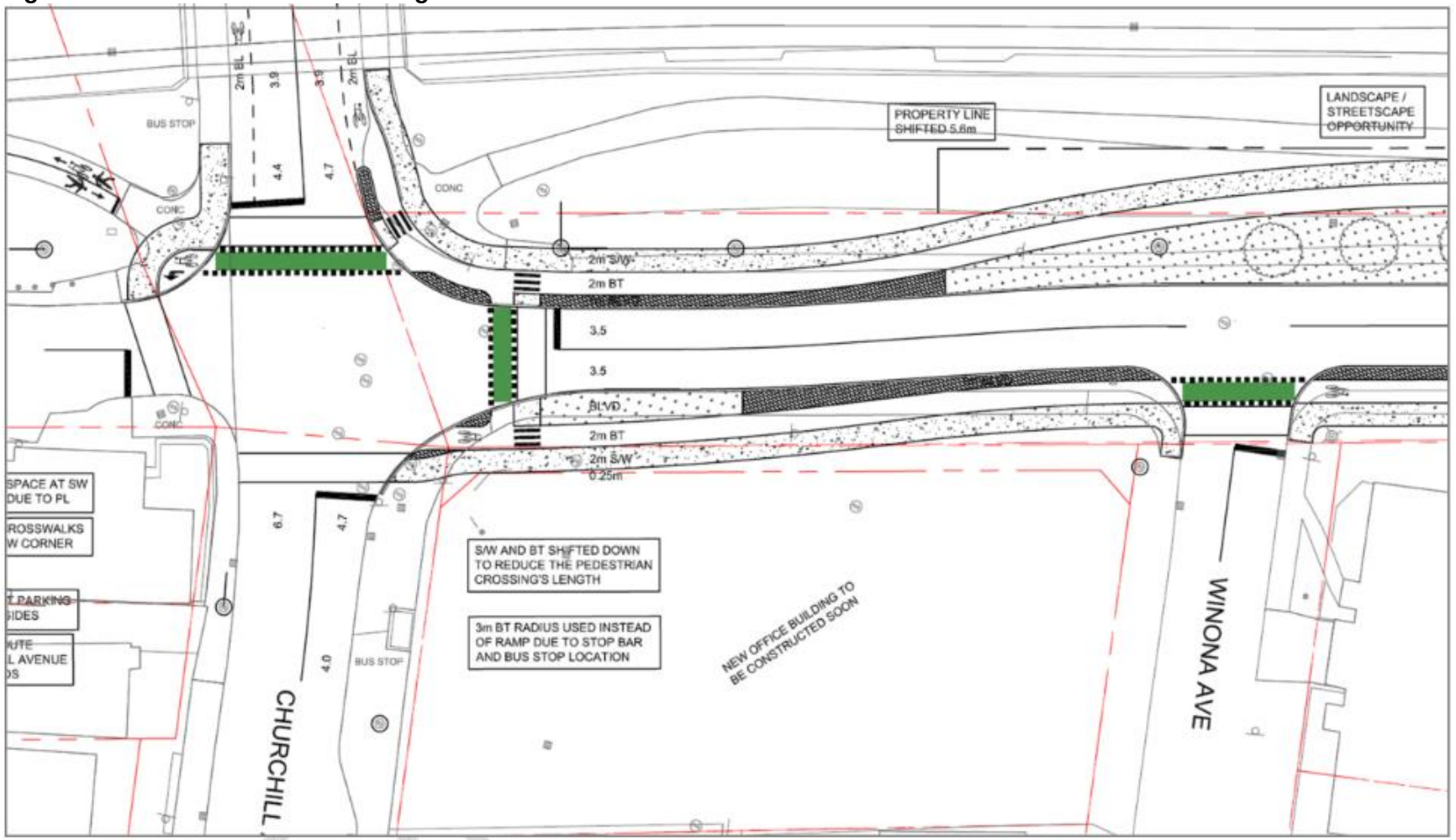


Figure 9: Scott Street Ultimate Design



- The residential development at 433-435 Churchill Avenue and 468-472 Byron Place. This development proposes 76 apartment units and two retails units with a combined gross floor area of 3,450ft^2. A TIA was prepared by Novatech, dated April 2019, in support of this development. The estimated date of full occupancy was 2020.

- A mixed-use development is proposed at 320 McRae Avenue. This development proposes 307 apartment units, 11 townhouses, and 9,494ft^2 of commercial land uses. A TIA, dated January 2020, was prepared by CGH Transportation in support of this redevelopment. The estimated date of full occupancy is 2022.

- The residential development at 1950 Scott Street. This development proposes 141 condominium/apartment units. A TIA Strategy Report was prepared by Parsons, dated July 2018, in support of this development. The date of full occupancy is 2020.

- The residential development at 1946 Scott Street. This development proposes a 12-storey building with approximately 60 apartment units. A TIA was prepared by Parsons, dated August 2017, in support of this development. The estimated date of full occupancy was 2019.

2.3 Study Area and Time Periods

A boundary street review will be conducted for Roosevelt Avenue, Wilmont Avenue, and Winston Avenue. The study area intersections include the proposed accesses and following intersections:

- Churchill Avenue/Scott Street,
- Churchill Avenue/Wilmont Avenue,
- Churchill Avenue/Richmond Road, and
- Roosevelt Avenue/Richmond Road.

A review of the adjacent street traffic at the Richmond Road/Churchill Avenue intersection was conducted. Based on a weekday count performed on January 23, 2020 and a Saturday count performed on July 11, 2015 at the Richmond Road/Churchill Avenue intersection, it was found that traffic along the study area roadways is highest during the weekday AM and PM peak hours. The intersection total traffic volumes are as follows:

- Weekday AM peak: 1,781 vehicles per hour
- Weekday PM peak: 2,033 vehicles per hour
- Saturday peak: 1,533 vehicles per hour

The selected time periods for the analysis are the weekday AM and PM peak hours, as they represent the 'worst case' combination of site generated traffic and adjacent street traffic. Analysis will be completed for the 2026 build-out year and 2031 horizon year.

2.4 Exemptions Review

This module reviews possible exemptions from the final TIA, as outlined in the TIA Guidelines. The applicable exemptions for this site are shown in **Table 3**.

Table 2: TIA Exemptions

Module	Element	Exemption Criteria	Exemption Applies
Design Review Component			
4.1 Development Design	*4.1.2* Circulation and Access	• Only required for site plans	Not Exempt
	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	Not Exempt
	4.2.2 Spillover Parking	• Only required for site plans where parking supply is 15% below unconstrained demand	Exempt
Network Impact Component			
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	Not Exempt
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	Not Exempt
4.8 Network Concept	*All elements*	• Only required when proposed development generates more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by the established zoning	Exempt

Based on the foregoing, the following modules will be included in the TIA report:

- Module 4.1: Development Design
- Module 4.2: Parking
- Module 4.3: Boundary Streets
- Module 4.4: Access Design
- Module 4.5: Transportation Demand Management
- Module 4.6: Neighbourhood Traffic Management
- Module 4.7: Transit
- Module 4.9: Intersection Design

3.0 FORECASTING

3.1 Development-Generated Traffic

3.1.1 Trip Generation

The proposed development, consisting of two residential buildings, will provide a total of 336 dwelling units.

Trips generated by the proposed residential uses during the weekday AM and PM peak hours have been estimated using the relevant recommended rates outlined in the 2009 TRANS *Trip Generation Manual*. The vehicle trip generation rates, taken from Table 6.3 of the TRANS report, correspond to High-Rise Apartments (10+ floors) and Mid-Rise Apartments (3-10 Floors) in the Urban Area (inside the greenbelt). The vehicle trip generation using the aforementioned rates have been converted to person trips using the assumed modal shares in the in Table 3.13 of the TRANS report. The directional split between inbound and outbound trips are based on the blended splits presented in Table 3.17 of the TRANS report.

As the TRANS manual does not include residential trip generation data for the Saturday peak hour, the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10th Edition* was used to identify a ratio of Saturday trips to PM peak hour trips. This ratio was then applied to the calculated TRANS person trips in the PM peak hour in order to estimate Saturday person trip generation. The directional splits between inbound and outbound trips for the Saturday peak hour is based on the splits identified in the ITE *Trip Generation Manual, 10th Edition*.

Estimates of the person trips generated by the proposed development are summarized in **Table 3**.

Table 3: Person Trip Generation

Land Use	Units	AM Peak (PPH[1])			PM Peak (PPH)			Saturday Peak (PPH)		
		IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT
High-Rise Apartments (10+ Floors)	323	51	160	211	135	83	218	125	102	227
Mid-Rise Apartments (3-10 Floors)	38	6	18	24	17	11	28	16	13	29
Total		**57**	**178**	**235**	**152**	**94**	**246**	**141**	**115**	**256**

The *2011 TRANS O-D Survey Report* indicates that the study area lies within the Ottawa West district. Additionally, the site is located within 600m of the Dominion Transit Station and Westboro Transit Station and is therefore considered a Transit-Oriented Development (TOD). In TOD zones, the transit share is assumed to increase significantly compared to any TRANS O-D district.

Using the *2011 TRANS O-D Survey Report*, the typical residential commuter pattern is represented by all observed trips from/within a district in the AM peak hour and all observed trips to/within a district in the PM peak hour. A comparison of the assumed modal shares for a TOD, and the modal shares for commuter trips in the Ottawa West district, is presented in **Table 4**.

Table 4: Modal Shares by District/Zone

Travel Mode	TOD Zone	Ottawa West
Auto Driver	15%	45%
Auto Passenger	5%	10%
Transit	65%	20%
Non-Auto	15%	25%

Given the sites proximity to the Dominion and Westboro Transit Stations which are both future LRT stations, the modal shares associated with the Ottawa West district have been adjusted to reflect a lower auto modal share and increased transit modal share. The adjusted TOD modal shares have been assumed for the weekday AM and PM peak periods. The modal shares observed for the Ottawa West region have been assumed for the Saturday peak period. A full breakdown of the projected site-generated person trips by modal share is shown in **Table 5**.

Table 5: Person Trips by Modal Share

Travel Mode	Modal Share[1]	AM Peak			PM Peak			Saturday Peak		
		IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT
Total Person Trips		*57*	*178*	*235*	*152*	*94*	*246*	*141*	*115*	*256*
Auto Driver	**15%/45%**	**8**	**27**	**35**	**23**	**14**	**37**	**64**	**51**	**115**
Auto Passenger	5%/10%	3	9	12	7	5	12	14	12	26
Transit	55%/20%	32	97	129	84	51	135	28	23	51
Non-Auto	25%/25%	14	45	59	38	24	62	35	29	64

1. Weekday/Saturday

From the previous table, the proposed development is projected to generate an additional 35 vehicle trips (8 in, 27 out) during the AM peak hour, 37 vehicle trips (23 in, 14 out) during the PM peak hour, and 115 vehicle trips (64 in, 51 out) in the Saturday peak hour.

As discussed in Section 4.3, the total traffic volumes on a weekday and Saturday at the Richmond Road/Churchill Avenue intersection were reviewed. The following table demonstrates the adjacent street traffic, the site generated traffic, and total traffic (adjacent traffic with the addition of site generated traffic) for the AM, PM, and Saturday peak hours.

Table 6: Adjacent Street Traffic and Site Generated Traffic

Period	Adjacent Street Traffic (vehicles per hour)	Site Generated Traffic (vehicles per hour)	Total Traffic (vehicles per hour)
AM Peak	1,781	35	1,816
PM Peak	2,033	37	2,070
Saturday Peak	1,533	115	1,648

As shown in Table 6, total traffic (adjacent street traffic plus site generated traffic) is highest during the weekday AM and PM peak hours. The selected time periods for the analysis are the weekday AM and PM peak hours, as they represent the 'worst case' combination of site generated traffic and adjacent street traffic.

3.1.2 Trip Distribution

Site generated traffic was distributed based on the peak hour traffic patterns within the study area. The distribution can be described as follows:

- 30% to/from the east via Richmond Road
- 25% to/from the east via Scott Street
- 20% to/from the west via Richmond Road
- 20% to/from the south via Churchill Avenue
- 5% to/from the south via Roosevelt Avenue

For the purpose of this analysis, it is assumed that all site traffic using the Winston Avenue access will travel to and from Churchill Avenue using Wilmont Avenue. The assignment of trips to the proposed site accesses has been assumed based on logical trip routing, and is summarized as follows:

Winston Avenue Access

- All trips to/from the east via Scott Street
- 50% of trips to/from the east via Richmond Road
- 50% of trips to/from the south via Churchill Avenue

Roosevelt Avenue Access

- All trips to/from the west via Richmond Road
- All trips to/from the south via Roosevelt Avenue
- 50% of trips to/from the east via Richmond Road
- 50% of trips to/from the south via Churchill Avenue

Traffic generated by the proposed development during the weekday AM and PM peak hours is shown in **Figure 10**.

3.2 Background Traffic

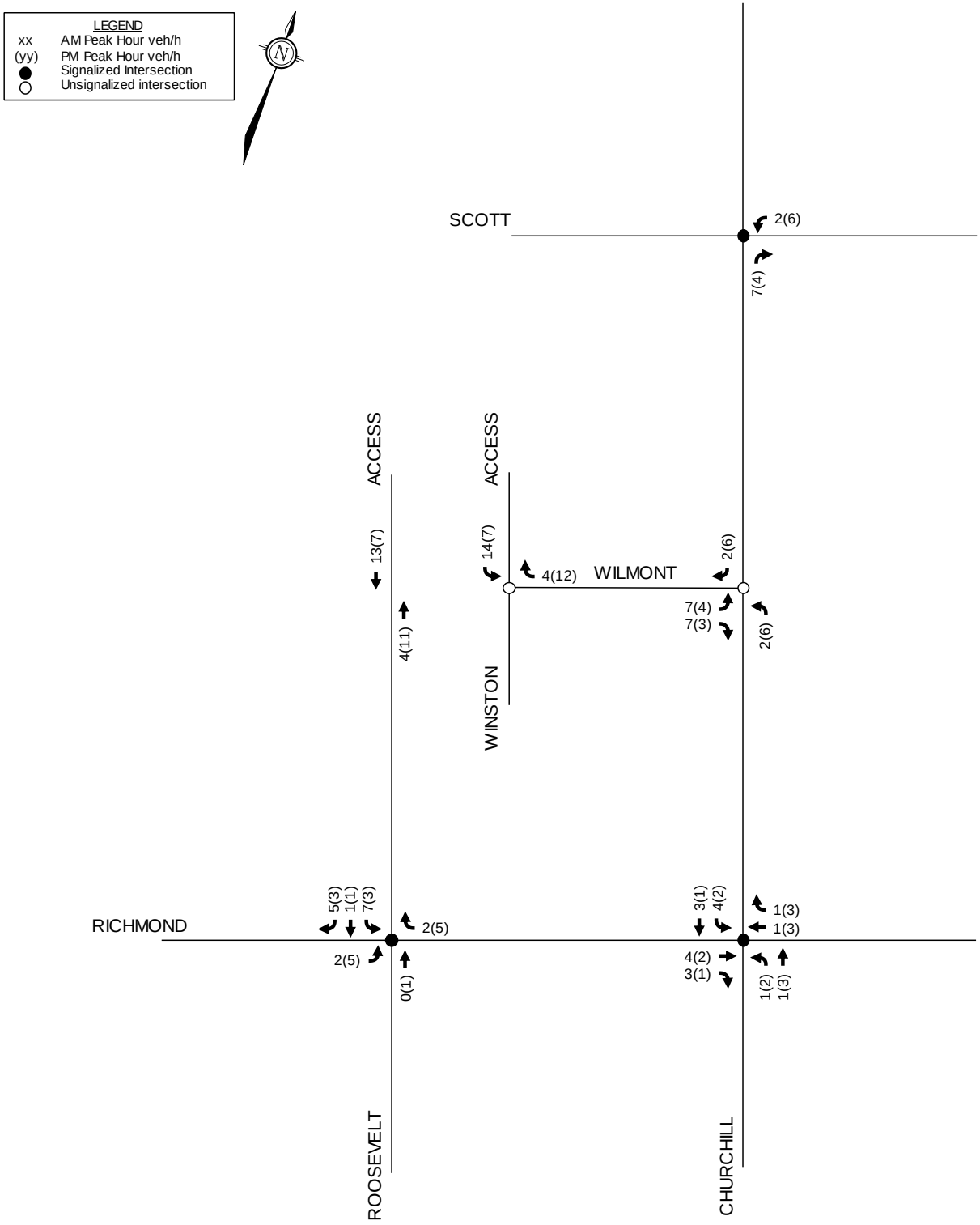
3.2.1 General Background Growth Rate

A review of historic traffic counts, as well as snapshots from the City's Long Range Transportation Model were reviewed to determine an appropriate background growth rate along the study area roadways.

Based on the historic traffic counts (2015, 2016, 2017, 2019, and 2020 at Churchill Avenue/Richmond Road), traffic volumes have generally decreased along the study area roadways. This is consistent with the 2031 and 2011 snapshots from the City's Long Range Transportation Model, which suggests no growth along the study area roadways. Summary sheets of the above counts and screenshots of the Long Range Model can be found in **Appendix D.**

Based on the foregoing, no background growth rate has been applied to the existing traffic volumes within the study area.

Figure 10: Site Generated Traffic



The OC Transpo LRT Phase 2 bus detour is anticipated to be in place from 2022 to 2025. As part of this detour, approximately 180 buses per direction are anticipated to be added along Scott Street. As the detour is anticipated to be decommissioned prior to the 2026 build-out year, additional bus traffic was not accounted for in the background traffic projections.

3.2.2 Other Area Development

A description of other study area developments is included in Section 4.2.

A review of traffic studies for the following study area developments suggest that traffic generated by these developments is expected to have a negligible impact on the adjacent roadways:

- The mixed-use development at 386 Richmond Road.
- The residential development along Byron Avenue and Ravenhill Avenue.
- The multi-use development at 398-406 Roosevelt Avenue.
- The residential development at 1946 Scott Street.

The projected traffic volumes generated by the following developments have been added to the background traffic at all relevant intersections within the study area:

- The residential development at 371 Richmond Road.
- The residential development at 433-435 Churchill Avenue and 468-472 Byron Place.
- The mixed-use development at 320 McRae Avenue, 1976 Scott Street and 315 Tweedsmuir Avenue.
- The residential development at 1950 Scott Street.
- The mixed-use development at 2070 Scott Street.

Excerpts of site generated traffic figures from the respective traffic studies for the above developments are included in **Appendix F**.

Background and total traffic volumes for the 2026 build-out and 2031 horizon years are shown in **Figure 11** and **12**.

3.3 Demand Rationalization

No capacity constraints are identified for any movement in the study area. Analysis of the study area intersections are included in Section 4.9.

Figure 11: 2026 and 2031 Background Traffic

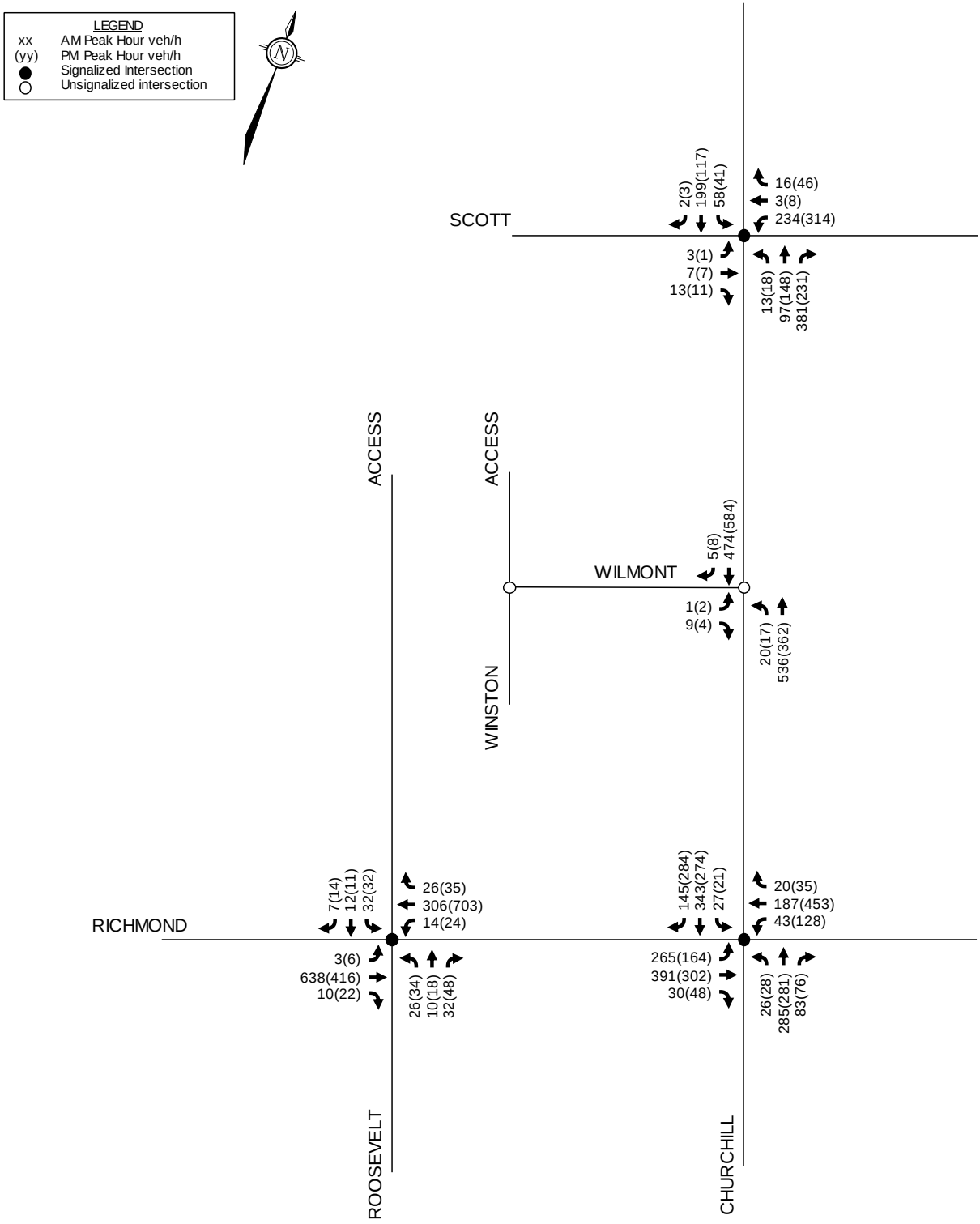
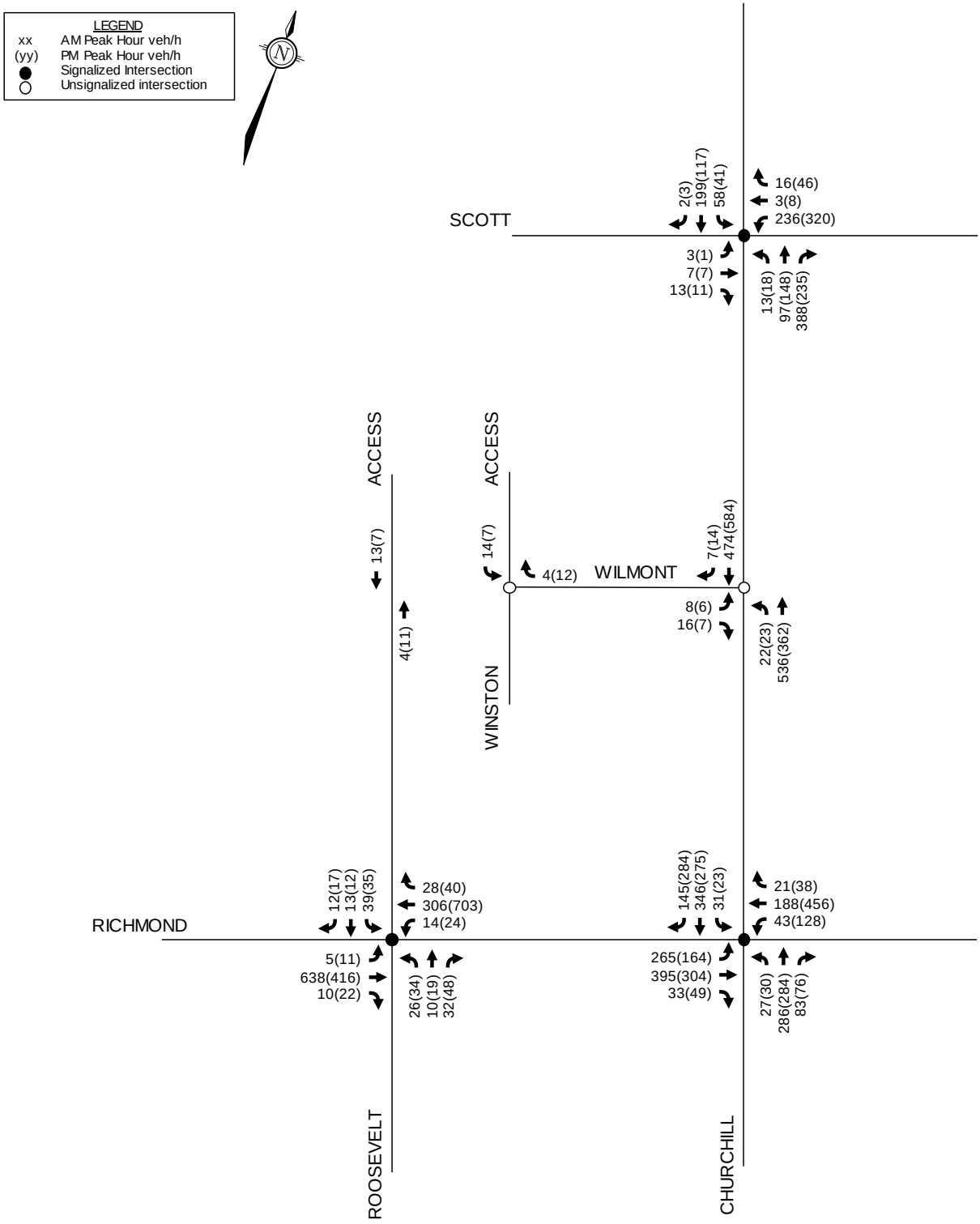


Figure 12: 2026 and 2029 Total Traffic



4.0 ANALYSIS

4.1 Development Design

4.1.1 Design for Sustainable Modes

The extension of Winston Avenue will serve as an access to the subject site, as well as a new landscaped pedestrian plaza with connectivity to the east-west MUP along the OC Transpo corridor which links to the Westboro and Dominion Transit Stations (future LRT stations). This new pedestrian plaza will serve residents of the proposed development, as well as provide pedestrian connectivity to the MUP for the existing residential developments between Winston Avenue and Churchill Avenue, which are currently required to use either Churchill Avenue or Richmond Road/Roosevelt Avenue. Details regarding the ownership, maintenance and liability of this pedestrian plaza will be discussed further with the City during the future Site Plan Control application.

The proposed Winston Avenue access will serve the underground parking garage, eight surface visitor parking spaces, and a pick-up/drop-off loop near the main entrance to the east building. An access to the underground parking garage is also proposed along Roosevelt Avenue.

Pedestrian facilities will be provided between the main building entrances, and the existing sidewalks along Winston Avenue and Roosevelt Avenue, as well as the east-west MUP along the OC Transpo corridor. A pedestrian pathway will also be provided south of the west building to Winston Avenue, which provides pedestrian connectivity between the surface visitor parking and the west building.

OC Transpo's service design guideline for peak period service is to provide service within a five minute (400m) walk of the home, school and work location of 95% of urban residents. There are several OC Transpo stops within this 400m walk, including OC Transpo stops #7406, #2436, #7380, #7379, and Dominion Transit Station (future LRT station).

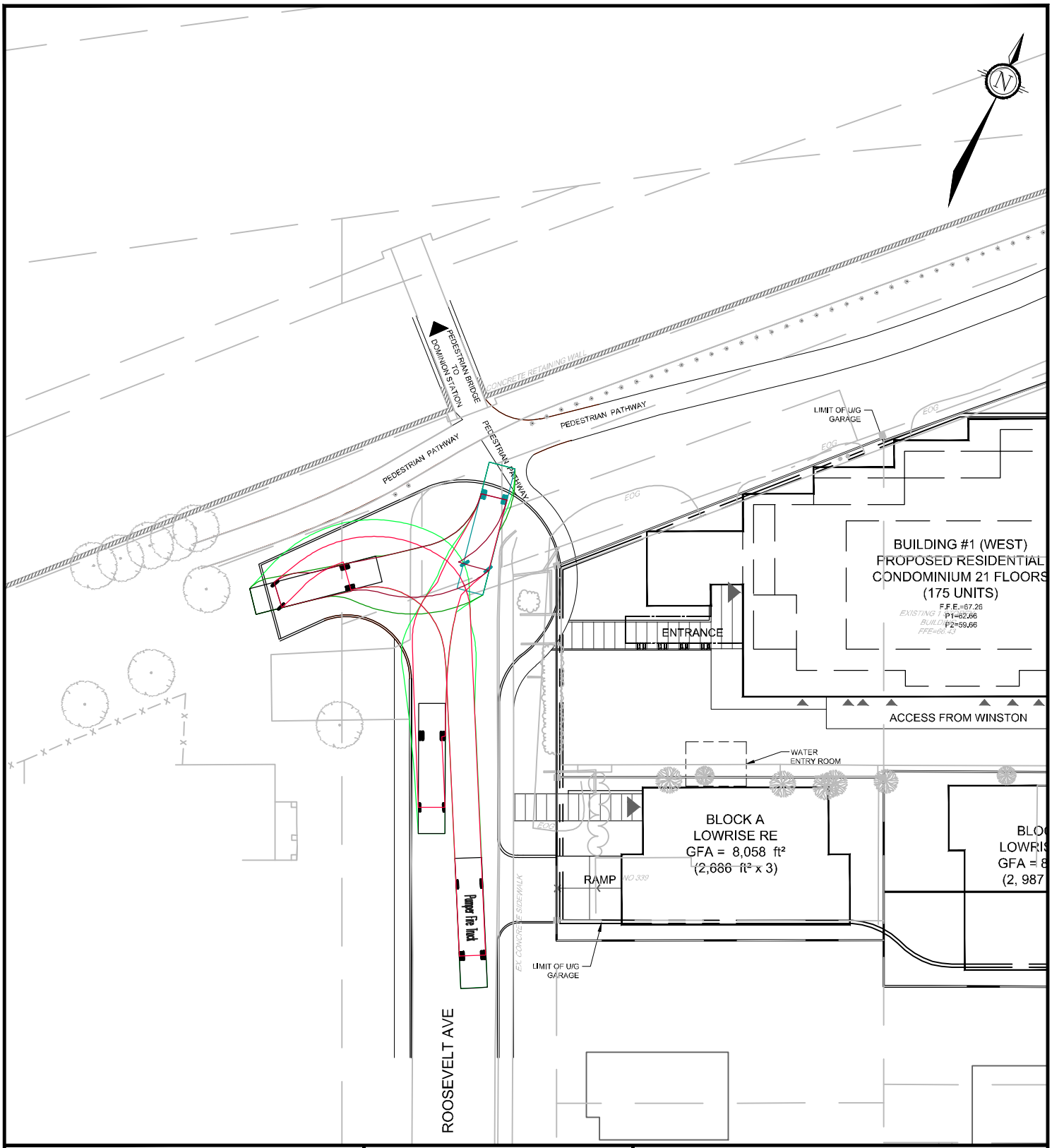
Bicycle parking for the proposed development will be in accordance with the minimum requirement of the City's Zoning By-law (ZBL), as described in Section 6.2.

A review of the Transportation Demand Management (TDM) – *Supportive Development Design and Infrastructure Checklist* has been conducted. A copy of the TDM checklist is included in **Appendix G**. All required TDM-supportive design and infrastructure measures in the TDM checklist are met.

4.1.2 Circulation and Access

A new cul-de-sac/hammerhead design is proposed at the northern terminus of Roosevelt Avenue, partially within the OC Transpo corridor. This design will facilitate pick-up/drop-off activity near the main building entrance to the west building and will accommodate a turnaround area for fire services. The turning movements of a Pumper Fire Truck at the proposed cul-de-sac/hammerhead are shown in **Figure 13**.

Two loading bays are proposed south of the east and west buildings. The turning movements of a Medium Single Unit (MSU) truck reversing into and driving out of the loading bays are shown in **Figure 14** and **15**.



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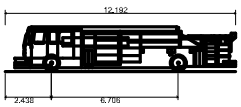

Pumper Fire Truck	
Overall Length	12.192m
Overall Width	2.489m
Overall Body Height	2.361m
Min Body Ground Clearance	0.200m
Track Width	2.489m
Lock-to-lock time	5.00s
Max Wheel Angle	45.00°

335 ROOSEVELT AVENUE

FIRE TRUCK TURNING MOVEMENTS

SCALE 1 : 500 (0, 5m, 10m, 20m)

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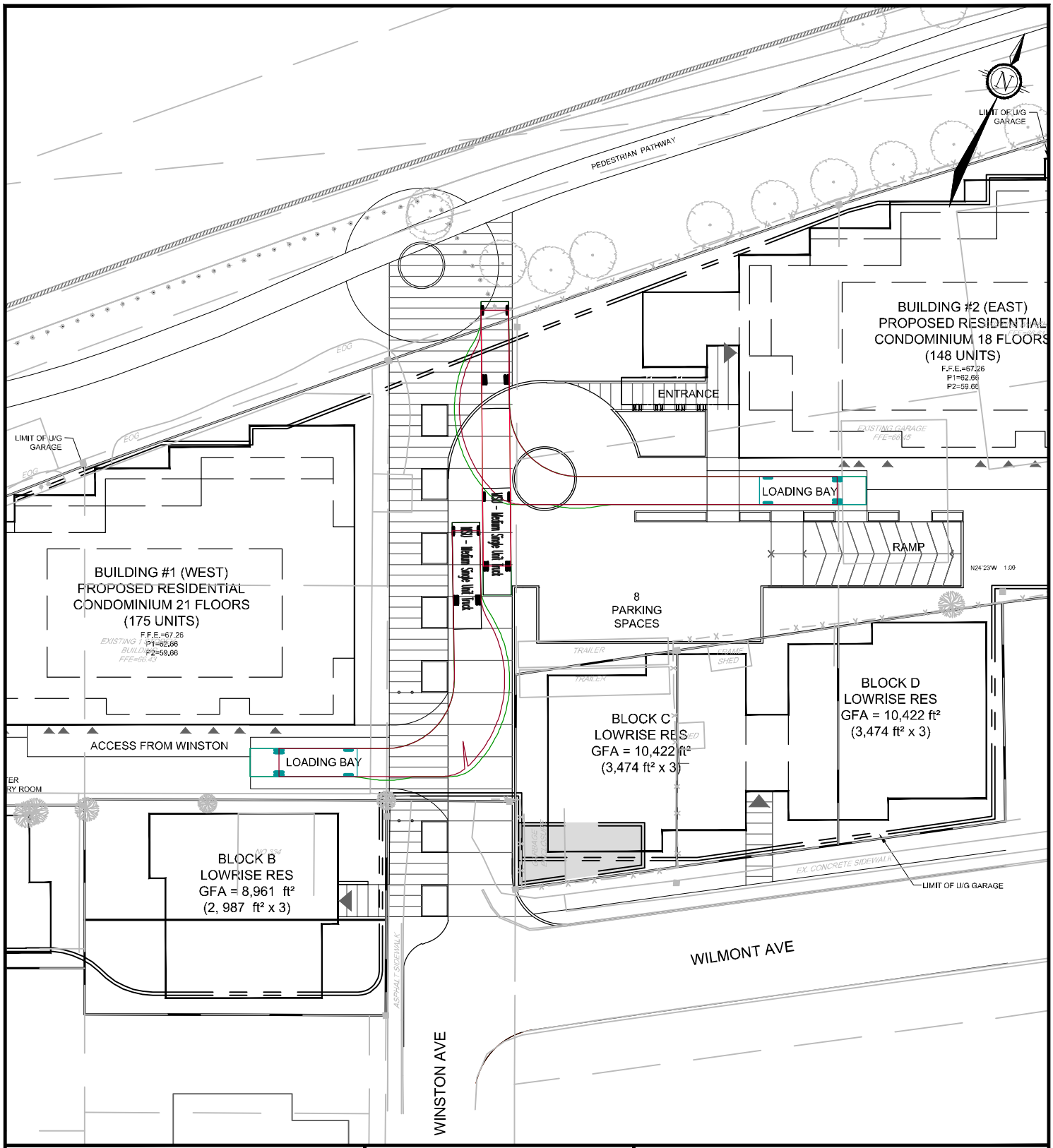

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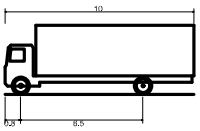

MSU - Medium Single Unit Truck

Overall Length	10.000m
Overall Width	2.600m
Overall Body Height	3.650m
Min Body Ground Clearance	0.445m
Track Width	2.600m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	11.100m

335 ROOSEVELT AVENUE

LOADING TURNING MOVEMENTS - REVERSE IN

SCALE 1 : 500 (0, 5m, 10m, 20m)

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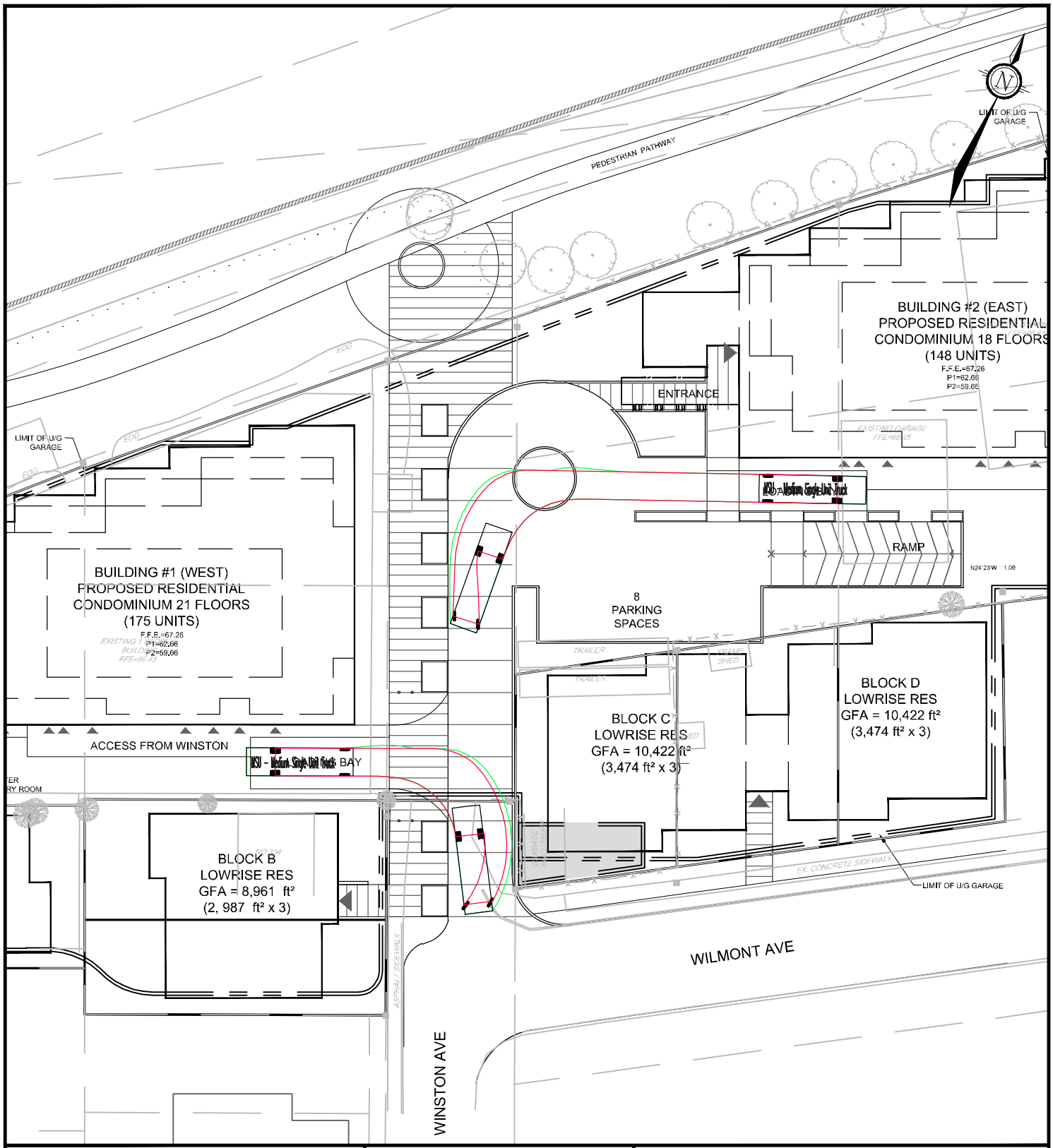

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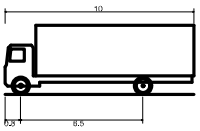

MSU - Medium Single Unit Truck	
Overall Length	10.000m
Overall Width	2.600m
Overall Body Height	3.650m
Min Body Ground Clearance	0.445m
Track Width	2.600m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	11.100m

335 ROOSEVELT AVENUE

LOADING TURNING MOVEMENTS - DRIVE OUT

SCALE 1 : 500 (0, 5m, 10m, 20m)

DATE JULY 2020 | JOB 110098 | FIGURE FIGURE 15

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Garbage collection will occur in the loading bays located south of the east and west buildings. As Transportation Association of Canada (TAC) Geometric Design Guidelines do not include a design vehicle for garbage trucks, an MSU truck driving in and reversing out has been used as the design vehicle. The turning movements of an MSU truck driving into and reversing out of the loading bays are shown in **Figures 16** and **17**.

4.2 Parking

The subject site is located in Area B on Schedule 1 and Area X on Schedule 1A of the City of Ottawa's Zoning By-Law (ZBL). Minimum vehicular and bicycle parking rates for the proposed development are identified in the ZBL and are summarized in the following table.

Table 7: Parking Requirements

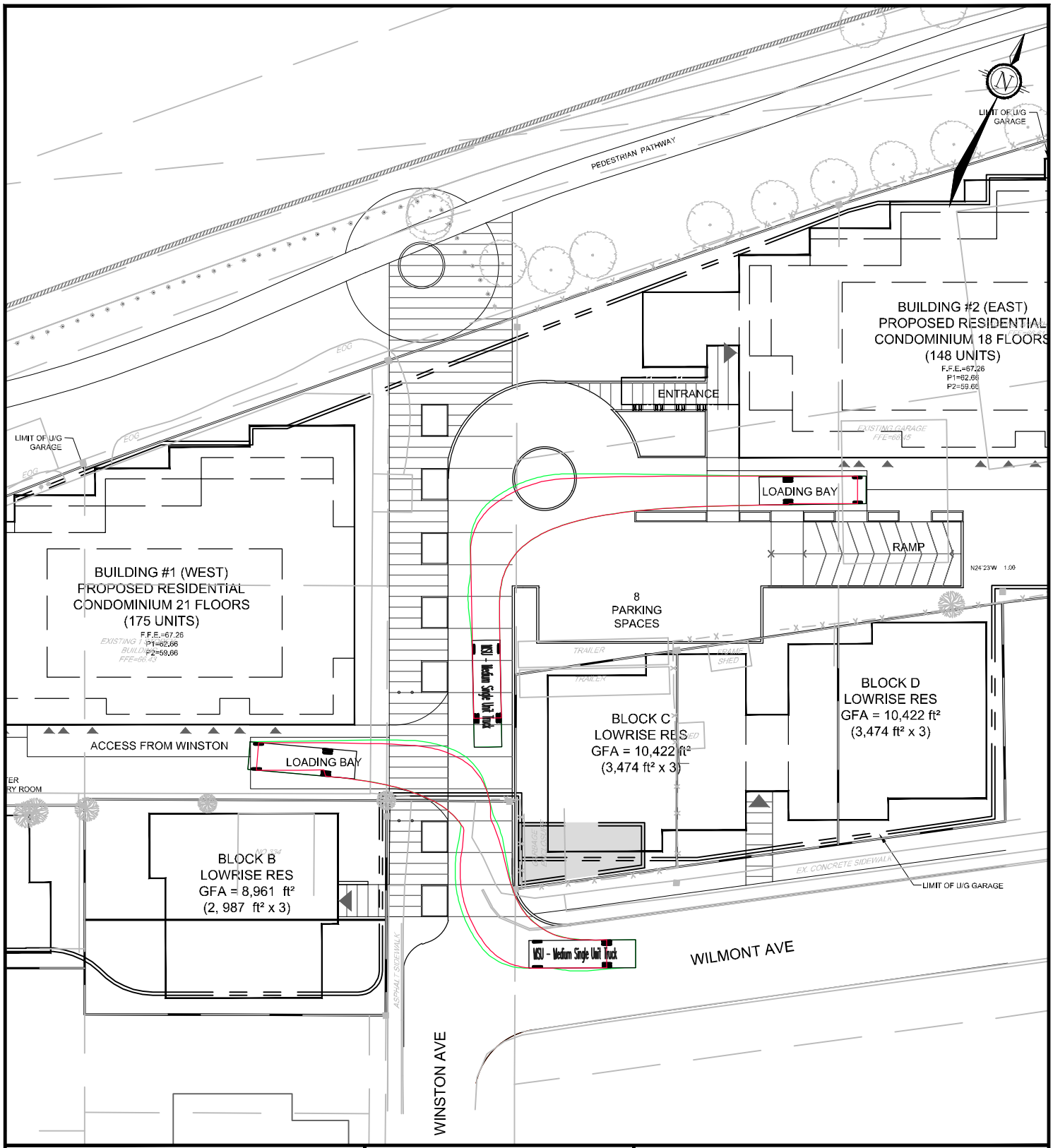
Land Use	Minimum Parking Rate	Units	Required	Provided
Vehicle Parking				
Mid-Rise Apartments	Resident: 0.5 per unit in excess of 12	361	156	311
	Visitor: 0.1 per unit in excess of 12;		32	32
Bicycle Parking				
Apartment Building	0.5 per unit	361	180	361

As the proposed development is also located within 600 metres of a rapid transit station, the number of vehicle parking spaces provided for a use must not exceed the maximum limits set out in the Section 103 of the City's ZBL. Based on the ZBL, a maximum of 1.75 parking spaces are permitted per unit (combined total of resident and visitor), equating to a maximum of 593 on-site parking spaces. The proposed 343 vehicular parking spaces adhere to the requirements of the City's ZBL.

The proposed bicycle parking will be located in bike storage rooms at grade and within the underground parking garage, and will exceed the requirements of the City's ZBL.

4.3 Boundary Streets

This section provides a review of the boundary streets using complete streets principles. The Multi-Modal Level of Service (MMLOS) guidelines produced by IBI Group in 2015 were used to evaluate the LOS of the boundary roadways for each mode of transportation. Schedule 'B' of the City of Ottawa's Official Plan indicates that Roosevelt Avenue, Wilmont Avenue and Winston Avenue are located within the General Urban Area. All boundary streets are also located within 600m of a rapid transit station.



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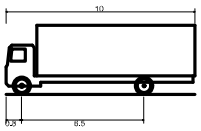

MSU - Medium Single Unit Truck	
Overall Length	10.000m
Overall Width	2.600m
Overall Body Height	3.650m
Min Body Ground Clearance	0.445m
Track Width	2.600m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	11.100m

335 ROOSEVELT AVENUE

GARBAGE TURNING MOVEMENTS - DRIVE IN

SCALE 1 : 500 (0, 5m, 10m, 20m)

DATE JULY 2020 | JOB 110098 | FIGURE FIGURE 16

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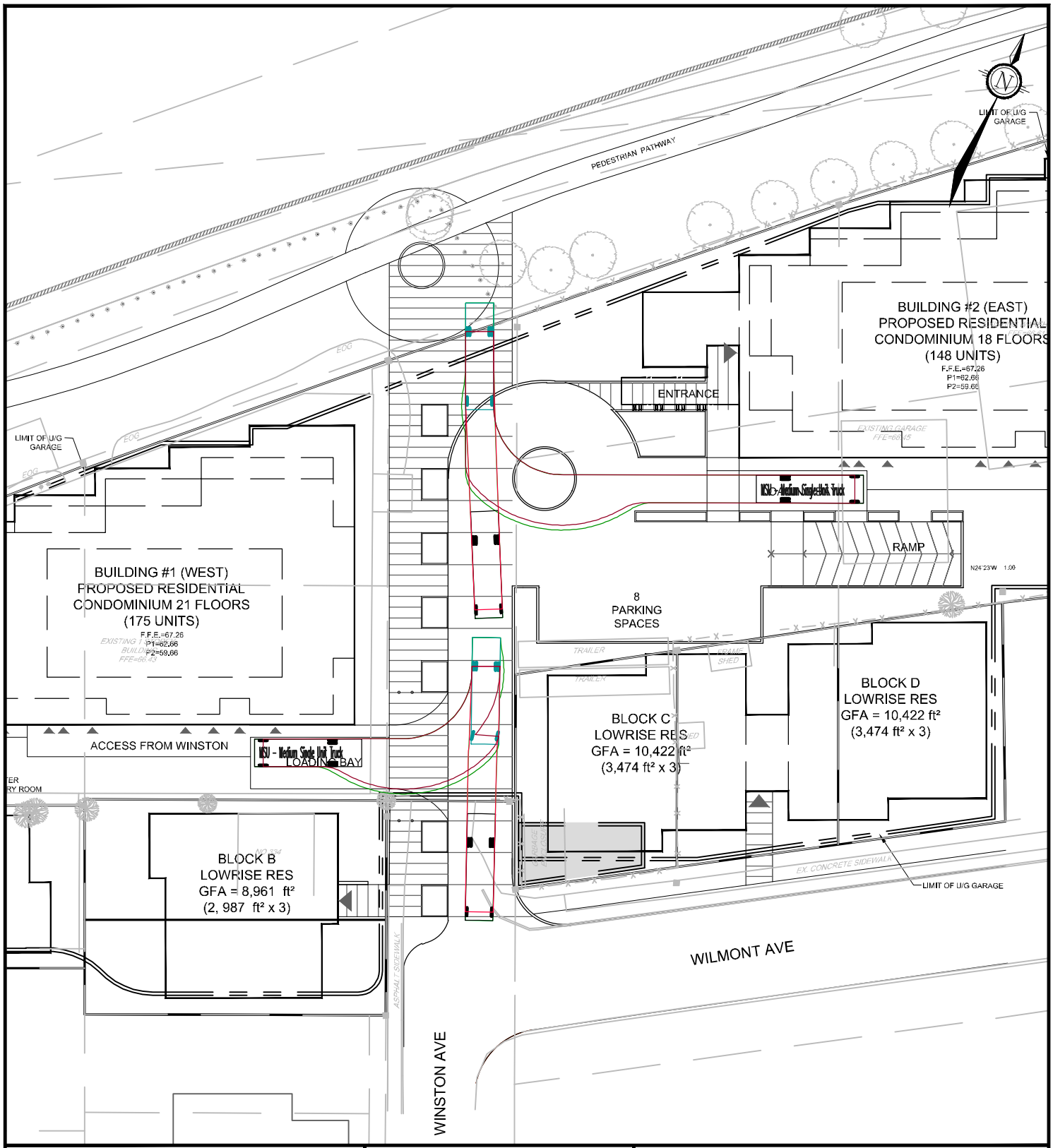

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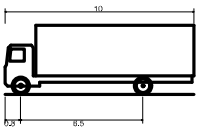

MSU - Medium Single Unit Truck	
Overall Length	10.000m
Overall Width	2.600m
Overall Body Height	3.650m
Min Body Ground Clearance	0.445m
Track Width	2.600m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	11.100m

335 ROOSEVELT AVENUE

GARBAGE TURNING MOVEMENTS - REVERSE OUT

SCALE 1 : 500 (0, 5m, 10m, 20m)

DATE JULY 2020 | JOB 110098 | FIGURE FIGURE 17

SHT8X11.DWG - 216mmx279mm

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Targets for the Pedestrian Level of Service (PLOS), Bicycle Level of Service (BLOS), and Vehicular Level of Service (Auto LOS) for the study area roadways are based on the targets for roadways within 600m of a rapid transit station, as identified in Exhibit 22 of the MMLOS guidelines. As none of the boundary roadways serve transit and are not classified as truck routes, the Transit Level of Service (TLOS) and Truck Level of Service (TkLOS) has not been reviewed.

A summary of the results of the segment MMLOS analysis for the boundary roadways is provided in the following table. Detailed segment MMLOS calculations can be found in **Appendix H**.

Table 8: Segment MMLOS Summary

Segment	PLOS	BLOS	TLOS	TkLOS	Auto LOS
Roosevelt Avenue	B	A	-	-	A
Target	**A**	**B**	**-**	**-**	**E**
Wilmont Avenue	C	B	-	-	A
Target	**A**	**D**	**-**	**-**	**A**
Winston Avenue	E	B	-	-	A
Target	**A**	**D**	**-**	**-**	**E**

Based on the foregoing, all roadways meet the target BLOS and Auto LOS. However, none of the roadways meet the target PLOS A.

The east side of Roosevelt Avenue has a 1.8m sidewalk and no boulevard which earns a PLOS of B. The north side of Wilmont Avenue has a 1.5m sidewalk with a 1.0m boulevard which earns a PLOS C. The west side of Winston Avenue has a 1.5m asphalt sidewalk and no boulevard which earns a PLOS E. To achieve the target PLOS A, either a 1.8m sidewalk with a 2.0m wide boulevard or a 2.0m sidewalk with a minimum 0.5m wide boulevard is required along all boundary roadways. This is identified for the City's consideration as funding becomes available.

4.4 Access Intersections Design

A new cul-de-sac area will be developed at the northern terminus of Roosevelt Avenue. This cul-de-sac will serve as a pick-up/drop-off loop near the main entrance to the west building, as well as provide access to the underground parking garage. A new access is also proposed at the northern terminus of Winston Avenue. This access will serve eight surface visitor parking spaces, a ramp to the underground parking garage, and a pick-up/drop-off loop near the main entrance to the east building.

Section 25 (c) of the City of Ottawa's Private Approach By-law (PABL) identifies a requirement for two-way accesses to have a width no greater than 9m, as measured at the street line. Section 107 (1)(a) of the ZBL identifies a minimum width of 6.0m and maximum width of 6.7m for a two-way driveway to a parking garage. The proposed accesses along Roosevelt Avenue and Winston Avenue/Wilmont Avenue will have a width of 6.0m, adhering to the requirements of the PABL and ZBL.

Section 25 (p) of the PABL identifies a minimum spacing requirement of 3.0m between the nearest limit of a private approach and the property line, as measured at the street line. The proposed Winston Avenue/Wilmont Avenue access adheres to the requirements of the PABL. The proposed Roosevelt Avenue access is located approximately 27m from the northern property line and 1.8m from the southern property line. As the Roosevelt Avenue access is at the terminus of the roadway, and the adjacent driveway is located on the south side of the single detached residential dwelling at 345 Roosevelt Avenue, a waiver to the PABL is requested.

As the proposed driveways are located near the terminus of Roosevelt Avenue, Wilmont Street and Winston Avenue, traffic along the adjacent roadways is anticipated to be minimal. Side street stop control is recommended at the proposed accesses.

4.5 Transportation Demand Management

A review of the Transportation Demand Management (TDM) – *Measures Checklist* has been conducted. A copy of the TDM checklist is included in **Appendix G**.

The following measures will be implemented upon opening of the proposed development:

- Designate internal coordinator,
- Display local area maps with walking/cycling access routes and key destinations,
- Display relevant transit schedules and route maps,
- Unbundle parking from monthly rent, and
- Provide a multi-modal travel option information package to new residents.

The proposed development will provide bicycle parking spaces at a rate of 1 per unit, exceeding the requirement of the ZBL. The provision of additional bicycle parking spaces will encourage residents to use alternative modal shares and help achieve the target 25% non-auto modal shares identified in Section 3.1.

4.6 Neighbourhood Traffic Management

Roosevelt Avenue, Winston Avenue, and Wilmont Avenue are local roadways that provide connectivity to the subject site. As the subject site only has frontage on the aforementioned local roadways, vehicular access to the development is proposed on Roosevelt Avenue and Winston Avenue (via Wilmont Avenue). The following table provides a summary of the existing traffic, proposed additional traffic, and total traffic volumes along both Roosevelt Avenue and Wilmont Avenue.

Table 9: Neighbourhood Traffic Impacts

Roadway	AM Peak			PM Peak		
	Existing[1]	Proposed	Total	Existing[1]	Proposed	Total
Wilmont Avenue						
Eastbound	10	14	**24**	6	7	**13**
Westbound	25	4	**29**	25	12	**37**
Two-way	35	18	**53**	31	19	**50**
Roosevelt Avenue						
Northbound	39	4	**43**	59	11	**70**
Southbound	51	13	**64**	57	7	**64**
Two-way	90	17	**107**	116	18	**134**

1. Based on existing traffic count at Richmond Road/Roosevelt Avenue intersection
2. Based on existing traffic count at Churchill Avenue/Wilmont Avenue intersection

The City of Ottawa Area Traffic Management (ATM) guidelines identify a maximum threshold of 1,000 vehicles per day, or 120 vehicles during the peak hour for local roadways. The total traffic volumes along Wilmont Avenue will be well within the aforementioned threshold for a local roadway during weekday peak hours. Roosevelt Avenue north of Richmond Road is anticipated to operate within the threshold during the AM peak hour. However, the 120 vehicle per hour threshold is anticipated to be exceeded along Roosevelt Avenue north of Richmond Road during the PM peak hour. Based on the traffic projections presented in this TIA, the proposed development is anticipated to add 18 two-way vehicle trips during the PM peak hour to Roosevelt Avenue. This equates to one vehicle every 3-4 minutes during the peak hour.

It is noted that a commercial plaza (including a pharmacy and Starbucks) and funeral home are located on the northeast and northwest corners of the Richmond Road/Roosevelt Avenue intersection, with access on Roosevelt Avenue. Traffic generated by these commercial developments are included in the traffic volumes along Roosevelt Avenue at Richmond Road. As such, traffic along Roosevelt Avenue adjacent to the existing residential dwellings north of the commercial accesses is anticipated to be lower and is not anticipated to exceed the ATM threshold of 120 vehicles.

The overall capacity of a local roadway is estimated at 400 vehicles per hour per lane based on the City's TRANS Long Range Transportation Model. Total traffic volumes along Roosevelt Avenue are projected to be 70 vehicles northbound and 64 vehicles southbound during the PM peak hour. This equates to a critical volume to capacity (V/C) ratio of 0.18, corresponding to a Level of Service (LOS) A, along Roosevelt Avenue.

Based on the foregoing, the weekday peak hour total traffic volumes along Wilmont Avenue and Roosevelt Avenue (adjacent to the residential units north of the commercial accesses) are anticipated to be within the City's ATM thresholds, and overall capacity thresholds for a local roadway. The additional traffic generated by the proposed development during the weekday peak hours equates to one vehicle every 3-4 minutes during peak hours and is not anticipated to have a significant impact on both Wilmont Avenue and Roosevelt Avenue. As such, no Neighbourhood Traffic Management measures are recommended along the adjacent roadways.

4.7 Transit

Based on the trip generation presented in Section 5.1, the proposed development is anticipated to generate an additional 129 transit trips (32 in, 97 out) during the weekday AM peak hour and 135 transit trips (84 in, 51 out) during the weekday PM peak hour.

As the proposed development is located within a 600m walking distance of both the future Dominion and Westboro LRT stations, no capacity problems are anticipated.

4.8 Network Concept

Per Section 2.4, this module is exempt from the analysis.

4.9 Network Intersections

4.9.1 Existing Intersection MMLOS Analysis

This section provides a review of the study area intersections using the complete streets principles. The MMLOS guidelines produced by IBI Group in October 2015 were used to evaluate the LOS of all signalized study area intersections for each mode of transportation. Schedule 'B' of the City of Ottawa's Official Plan indicates that the Richmond Road/Churchill Avenue and Richmond Road/Roosevelt Avenue intersections are located within the General Urban Area. Richmond Road is also classified as a Traditional Mainstreet within the study area.

Additionally, both intersections are located within 300m of the Churchill Alternative School (345 Ravenhill Avenue) and within 600m of a rapid transit station (Dominion and Westboro Transit Stations).

Aerial photos of the study area intersections are provided in Section 4.1.2.

Target PLOS, BLOS, TLOS, TkLOS, and Auto LOS for the study area intersections are based on targets for intersections within 300m of a school and 600m of a rapid transit station, as identified in Exhibit 22 of the MMLOS guidelines.

Although the north and south approaches to the Richmond Road/Churchill Avenue intersection are painted as one approach lane, the wide lane widths permit drivers to travel around a queued vehicle. For the purposes of the intersection capacity analysis, the north and south approaches to this intersection have been modeled as a left turn lane and a through/right turn lane.

A summary of the results of the intersection MMLOS analysis for the study area intersections is provided in the following table. Detailed intersection MMLOS calculations can be found in **Appendix H**.

Table 10: Intersection MMLOS Summary

Intersection	PLOS	BLOS	TLOS	TkLOS	Auto LOS
Richmond Road/Churchill Avenue	D	D	E	F	C
Target	**A**	**A**	**D**	**D**	**E**
Richmond Road/Roosevelt Avenue	D	B	C	F	C
Target	**A**	**A**	**D**	**D**	**E**

Richmond Road/Churchill Avenue

The Richmond Road/Churchill Avenue intersection does not meet the target PLOS, BLOS, TLOS, or TkLOS but meets the target Auto LOS.

The intersection is currently operating with a PLOS D. A reduction in the pedestrian crossing distance would have the greatest improvement to the PETSI score at this intersection. Leading pedestrian intervals are currently implemented at this intersection, improving overall pedestrian safety by enhancing the visibility of pedestrians in the intersection and reinforcing their right-of-way over turning vehicles.

The intersection is currently operating with a BLOS D, based on left turn characteristics alone. To achieve the target BLOS A, consideration could be given by the City to providing a two-stage left turn bike box on all legs of this intersection.

The east and west approaches to this intersection are currently operating with a TLOS D, meeting the target. However, the north and south approaches are currently operating with a TLOS E. As Churchill Avenue is not identified as a transit priority corridor, there is no target TLOS identified for this roadway.

The intersection is currently operating with a TkLOS F. To achieve the target TkLOS D, an effective turn radius greater than 15m is required on all four corners of this intersection. Increasing the turn radius at this intersection could be considered by the City, however it should be noted that the increased radius will have a negative impact on the PLOS.

Richmond Road/Roosevelt Avenue

The Richmond Road/Roosevelt Avenue intersection does not meet the target PLOS, BLOS, or TkLOS but meets the target TLOS and Auto LOS.

The intersection is currently operating with a PLOS D. A reduction in the pedestrian crossing distance would have the greatest improvement to the PETSI score at this intersection. Consideration could be given by the City to providing curb bulb-outs at this intersection to reduce the pedestrian crossing distance.

The intersection is currently operating with a BLOS B, based on left turn characteristics alone. To achieve the target BLOS A, consideration could be given by the City to providing a two-stage left turn bike box on all legs of this intersection.

The intersection is currently operating with a TkLOS F. To achieve the target TkLOS D, an effective turn radius greater than 15m is required on all four corners of this intersection. However, Roosevelt Avenue is not classified as a truck route, and Exhibit 22 of the MMLOS guidelines does not identify a TkLOS target for a local roadway that is not classified as a truck route within 600m of a rapid transit station or 300m of a school. As such, no modifications to improve the TkLOS at this intersection are recommended.

4.9.2 2026 and 2031 Background Intersection Operations

Intersection capacity analysis has been completed for the 2026 and 2031 background traffic conditions. The intersection parameters used in the analysis are consistent with the TIA guidelines (saturation flow rate: 1800 vphpl, PHF: 1.0). For the purposes of this analysis, it has been assumed that the transit detours along Scott Street have been removed and the geometry at the Churchill Avenue/Scott Street intersection is consistent with the Scott Street Ultimate Design presented in Figure 9.

The results of the synchro analysis are summarized in the following table for the weekday AM and PM peak hours. Detailed reports are included in **Appendix I**.

Table 11: 2026 and 2031 Background Intersection Operations

Intersection	AM Peak			PM Peak		
	Max V/C or Delay	LOS	Movement	Max V/C or Delay	LOS	Movement
Richmond Road/ Churchill Avenue	0.78	C	SBT/L	0.74	C	NBT/L
Richmond Road/ Roosevelt Avenue	0.47	A	EB	0.69	B	WB
Churchill Avenue/ Scott Street	0.73	C	WB	0.84	D	WB
Churchill Avenue/ Wilmont Avenue	12 sec	B	EB	15 sec	C	EB

Under background traffic conditions, all intersections are anticipated to operate with a LOS D or better during the weekday AM and PM peak hours.

The 95th queue length on the northbound, southbound, and westbound approaches to the Richmond Road/Churchill Avenue intersection, and westbound approach to the Churchill Avenue/Scott Street intersection may periodically extend through adjacent unsignalized intersections during the weekday AM and PM peak hours. The 95th percentile queue length on the northbound approach to the Churchill Avenue/Scott Street intersection is not anticipated to extend past the adjacent intersection of Wilmont Avenue.

4.9.3 2026 and 2031 Total Intersection Operations

Intersection capacity analysis has been completed for the 2029 total traffic conditions. The intersection parameters used in the analysis are consistent with the TIA guidelines (saturation flow rate: 1800 vphpl, PHF: 1.0). The results of the synchro analysis are summarized in the following table for the weekday AM and PM peak hours. Detailed reports are included in **Appendix I**.

Table 12: 2026 and 2031 Total Intersection Operations

Intersection	AM Peak			PM Peak		
	Max V/C or Delay	LOS	Movement	Max V/C or Delay	LOS	Movement
Richmond Road/ Churchill Avenue	0.78	C	SBT/L	0.72	C	NBT/L
Richmond Road/ Roosevelt Avenue	0.47	A	EB	0.70	B	WB
Churchill Avenue/ Scott Street	0.73	C	WB	0.85	D	WB
Churchill Avenue/ Wilmont Avenue	15 sec	B	EB	17 sec	C	EB

Based on the foregoing, traffic generated by the proposed development is not anticipated to have a significant impact on intersection operations within the study area. All study area intersections are anticipated to continue to operate with a LOS D or better during weekday peak hours.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the foregoing, the conclusions and recommendations of this TIA can be summarized as follows:

Development Design

- The extension of Winston Avenue will serve as an access to the subject site, as well as a new landscaped pedestrian plaza with connectivity to the east-west MUP along the OC Transpo corridor which links to the Westboro and Dominion Transit Stations (future LRT stations). Details regarding the ownership, maintenance and liability of this pedestrian plaza will be discussed further with the City during the future Site Plan Control application.
- The new pedestrian plaza will serve residents of the proposed development, as well as provide pedestrian connectivity to the MUP for the existing residential developments between Winston Avenue and Churchill Avenue, which are currently required to use either Churchill Avenue or Richmond Road/Roosevelt Avenue.
- Pedestrian facilities will be provided between the main building entrances, and the existing sidewalks along Winston Avenue and Roosevelt Avenue, as well as the east-west MUP along the OC Transpo corridor. A pedestrian pathway will also be provided south of the west building to Winston Avenue, which provides pedestrian connectivity between the surface visitor parking and the west building.
- All required TDM-supportive design and infrastructure measures in the TDM checklist are met.
- A new cul-de-sac/hammerhead design is proposed at the northern terminus of Roosevelt Avenue, partially within the OC Transpo corridor. This design will facilitate pick-up/drop-off activity near the main building entrance to the west building and will accommodate a turnaround area for fire services.
- Two loading bays are proposed south of the east and west buildings. The loading bays will be used for both move-in/move-out and garbage collection.

Parking

- The proposed 343 vehicular parking spaces adhere to the requirements of the City's ZBL.
- The proposed bicycle parking will be located in bike storage rooms at grade and within the underground parking garage, and will adhere to the requirements of the City's ZBL.

Boundary Street Design

- Roosevelt Avenue, Winston Avenue, and Wilmont Avenue meet the target BLOS and Auto LOS. However, none of the roadways meet the target PLOS A.
- To achieve the target PLOS A, either a 1.8m sidewalk with a 2.0m wide boulevard or a 2.0m sidewalk with a minimum 0.5m wide boulevard is required along all boundary roadways. This is identified for the City's consideration as funding becomes available.

Access Intersections Design

- The proposed accesses along Roosevelt Avenue and Winston Avenue/Wilmont Avenue will have a width of 6.0m, adhering to the requirements of the PABL and ZBL.
- The location of the Winston Avenue/Wilmont Avenue access adheres to the requirements of the PABL.
- The proposed Roosevelt Avenue access is located approximately 27m from the northern property line and 1.8m from the southern property line. As the Roosevelt Avenue access is at the terminus of the roadway, and the adjacent driveway is located on the south side of the single detached residential dwelling at 345 Roosevelt Avenue, a waiver to the PABL is requested.
- As the proposed driveways are located near the terminus of Roosevelt Avenue, Wilmont Street and Winston Avenue, traffic along the adjacent roadways is anticipated to be minimal. Side street stop control is recommended at the proposed accesses.

Transportation Demand Management

- The following measures will be implemented upon opening of the proposed development:
  - Designate internal coordinator,
  - Display local area maps with walking/cycling access routes and key destinations,
  - Display relevant transit schedules and route maps,
  - Unbundle parking from monthly rent, and
  - Provide a multi-modal travel option information package to new residents.
- The proposed development will provide bicycle parking spaces at a rate of 1 per unit, exceeding the requirement of the ZBL. The provision of additional bicycle parking spaces will encourage residents to use alternative modal shares and help achieve the target 25% non-auto modal shares.

Neighbourhood Traffic Management

- The weekday peak hour total traffic volumes along Wilmont Avenue and Roosevelt Avenue (adjacent to the residential units north of the commercial accesses) are anticipated to be within the City's ATM thresholds, and overall capacity thresholds for a local roadway.
- The additional traffic generated by the proposed development during the weekday peak hours equates to one vehicle every 3-4 minutes and is not anticipated to have a significant impact on both Wilmont Avenue and Roosevelt Avenue.

Transit

- The proposed development is anticipated to generate an additional 129 transit trips (32 in, 97 out) during the weekday AM peak hour and 135 transit trips (84 in, 51 out) during the weekday PM peak hour.
- As the proposed development is located within a 600m walking distance of both the future Dominion and Westboro LRT stations, no capacity problems are anticipated.

MMLOS Analysis

Richmond Road/Churchill Avenue

- The Richmond Road/Churchill Avenue intersection does not meet the target PLOS, BLOS, TLOS, or TkLOS but meets the target Auto LOS.
- A reduction in the pedestrian crossing distance would have the greatest improvement to the PETSI score at this intersection. Leading pedestrian intervals are currently implemented at this intersection, improving overall pedestrian safety by enhancing the visibility of pedestrians in the intersection and reinforcing their right-of-way over turning vehicles.
- Consideration could be given by the City to providing a two-stage left turn bike box on all legs of this intersection.
- To achieve the target TkLOS D, an effective turn radius greater than 15m is required on all four corners of this intersection. Increasing the turn radius at this intersection could be considered by the City, however it should be noted that the increased radius will have a negative impact on the PLOS.

Richmond Road/Roosevelt Avenue

- The Richmond Road/Roosevelt Avenue intersection does not meet the target PLOS, BLOS, or TkLOS but meets the target TLOS and Auto LOS.
- A reduction in the pedestrian crossing distance would have the greatest improvement to the PETSI score at this intersection. Consideration could be given by the City to providing curb bulb-outs at this intersection to reduce the pedestrian crossing distance.
- Consideration could be given by the City to providing a two-stage left turn bike box on all legs of this intersection.
- To achieve the target TkLOS D, an effective turn radius greater than 15m is required on all four corners of this intersection. However, Roosevelt Avenue is not classified as a truck route, and Exhibit 22 of the MMLOS guidelines does not identify a TkLOS target for a local roadway that is not classified as a truck route within 600m of a rapid transit station or 300m of a school.

Background and Total Intersection Operations

- Under 2026 and 2031 background traffic conditions, all intersections are anticipated to operate with a LOS D or better during the weekday AM and PM peak hours.
- The 95th queue length on the northbound, southbound, and westbound approaches to the Richmond Road/Churchill Avenue intersection, and westbound approach to the Churchill Avenue/Scott Street intersection may periodically extend through adjacent unsignalized intersections during the weekday AM and PM peak hours.
- The 95th percentile queue length on the northbound approach to the Churchill Avenue/Scott Street intersection is not anticipated to extend past the adjacent intersection of Wilmont Avenue.
- Traffic generated by the proposed development is not anticipated to have a significant impact on intersection operations within the study area. All study area intersections are anticipated to continue to operate with a LOS D or better during weekday peak hours.

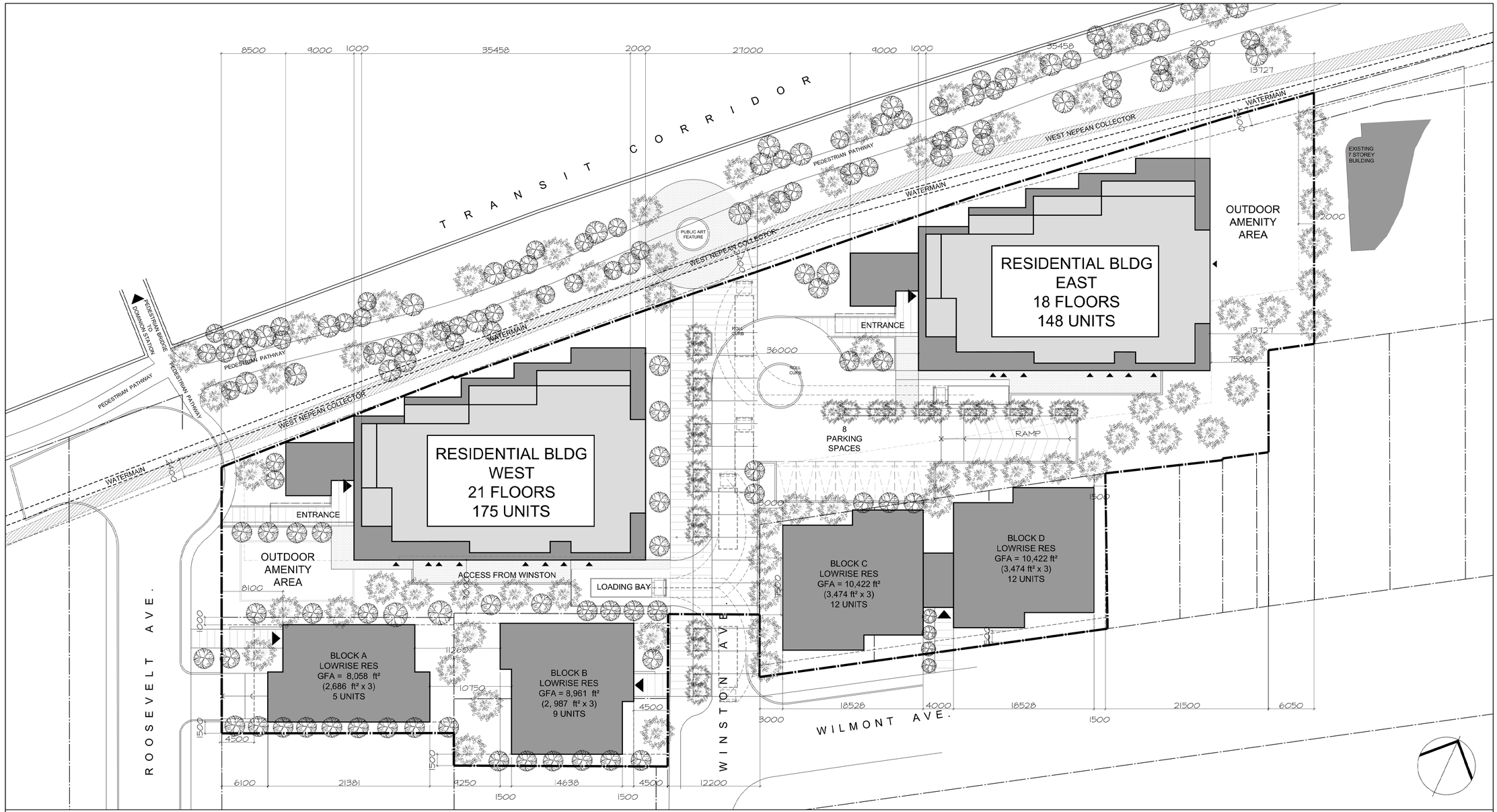
NOVATECH

Prepared by:

Brad Byvelds, P. Eng.
Project Coordinator | Transportation/Traffic

APPENDIX A

Site Plan



A1.00 SITE PLAN

A1.00 1 : 250

ZONING NOTES:

CURRENT ZONING: **R5B - Residential Fifth Density**
R3S - Residential Third Density
*There are two separate zones on the property.

LEGAL DESCRIPTION
LOTS 355, 339, 344, 379, 389
REGISTERED PLAN XXXXXX
CITY OF OTTAWA

LOT AREA : 7,168 m²
LOT WIDTH : 144.0 m
LOT DEPTH : 60.0 m

DEVELOPMENT STATS PHASE 1	REQUIRED	PROPOSED
LOT OF AREA 'A'	MIN 450 m²	7,168 m²
TOTAL UNITS		361
SETBACK ALONG ROOSEVELT	Varies (As per existing zones)	4.5 m
SETBACK ALONG WILMONT	Varies (As per existing zones)	1.5 m
SETBACK ALONG WINSTON	Varies (As per existing zones)	4.5 m
MAXIMUM HEIGHT	Varies (As per existing zones)	65 m
NUMBER OF STOREYS		21
BUILDING AREA		3,137 m²
GROSS FLOOR AREA (city def.)		xxxxx m²

PARKING REQUIREMENTS PHASE

1. REQUIRED PARKING

LAND USE	REQUIRED	PROVIDED VEHICLE PARKING
APARTMENT	181 PARKING SPACES MINIMUM	311 RESIDENTIAL PARKING SPACES PROVIDED FOR 361 UNITS * LOCATED IN UNDERGROUND PARKING GARAGE

2. REQUIRED VISITOR PARKING

LAND USE	REQUIRED	REQUIRED VISITOR PARKING
APARTMENT	32 VISITOR PARKING SPACES REQUIRED	32 VISITOR PARKING SPACES PROVIDED FOR 361 UNITS * 8 SPACES AT GRADE AND 24 LOCATED IN UNDERGROUND PARKING GARAGE
TOTAL PARKING PROVIDED		343 TOTAL PARKING PARKING SPACES

3. BICYCLE PARKING

REQUIRED BICYCLE PARKING SPACES
(0.5 SPACE/UNIT = 181 SPACES REQUIRED)

PROVIDED BICYCLE PARKING SPACES
152 SPACES AT GRADE,
211 SPACES LOCATED ON LEVEL P1

4. AMENITY SPACE REQUIREMENTS

REQUIRED AMENITY SPACE 6 m² REQUIRED PER UNIT
361 UNITS X 6 SQ.M. = 2,166 SQ.M. TOTAL AMENITY REQUIRED
REQUIRED AMENITY SPACE TO BE COMMON - 1,083 SQ.M.
PROVIDED COMMON AMENITY SPACE - 3,246 SQ.M.

PROVIDED AMENITY SPACE BREAKDOWN:
-GROUND FLOOR COMMON AMENITY - 2,378 m²
-LEVEL 5 COMMON AMENITY - 514 m²
-TOP FLOOR COMMON AMENITY - 354 m²
-PRIVATE BALCONY AMENITY - 2,048 m²
TOTAL AMENITY SPACE PROVIDED 5,244 m²

LOCATION PLAN

PROJECT TEAM

ARCHITECT
HOBIN ARCHITECTURE
RHEAL LABELLE
T 613.238.7200

no.	date	revision

It is the responsibility of the appropriate contractor to check and verify all dimensions on site and report all errors and/or omissions to the architect.

All contractors must comply with all pertinent codes and by-laws.

Do not scale drawings.

This drawing may not be used for construction until signed.

Hobin Architecture Incorporated
63 Pamilla Street
Ottawa, Ontario
Canada K1S 3K7
T: 613-238-7200
F: 613-235-2005
E: mail@hobinarc.com
hobinarc.com
HOBIN ARCHITECTURE

PROJECT/LOCATION:
335 ROOSEVELT
335 ROOSEVELT AVENUE

DRAWING TITLE:
SITE PLAN

DRAWN BY:	DATE:	SCALE:
RL	2020-07-29	1:250

ONTARIO ASSOCIATION OF ARCHITECTS
LARRY J. HOBIN LICENCE 3049

PROJECT: 1900.22

DRAWING NO.: A3-00

REVISION NO.:

2020-07-07
None

DWG 18064

APPENDIX B

TIA Screening Form

City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

Municipal Address	**335 Roosevelt Avenue**
Description of Location	**South of Transitway, north of Wilmont Avenue and east of Roosevelt Avenue**
Land Use Classification	**Residential**
Development Size (units)	**339 units**
Development Size (m^2)	
Number of Accesses and Locations	**Two accesses on Roosevelt Avenue and Wilmont Avenue**
Phase of Development	**1**
Buildout Year	**2024**

If available, please attach a sketch of the development or site plan to this form.

2. Trip Generation Trigger

Considering the Development's Land Use type and Size (as filled out in the previous section), please refer to the Trip Generation Trigger checks below.

Land Use Type	Minimum Development Size
Single-family homes	40 units
Townhomes or apartments	90 units
Office	3,500 m^2
Industrial	5,000 m^2
Fast-food restaurant or coffee shop	100 m^2
Destination retail	1,000 m^2
Gas station or convenience market	75 m^2

** If the development has a land use type other than what is presented in the table above, estimates of person-trip generation may be made based on average trip generation characteristics represented in the current edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.*

If the proposed development size is greater than the sizes identified above, the Trip Generation Trigger is satisfied.

3. Location Triggers

	Yes	No
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?		X
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?*	X	

**DPA and TOD are identified in the City of Ottawa Official Plan (DPA in Section 2.5.1 and Schedules A and B; TOD in Annex 6). See Chapter 4 for a list of City of Ottawa Planning and Engineering documents that support the completion of TIA).*

If any of the above questions were answered with 'Yes,' the Location Trigger is satisfied.

4. Safety Triggers

	Yes	No
Are posted speed limits on a boundary street 80 km/hr or greater?		X
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?		X
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)?		X
Is the proposed driveway within auxiliary lanes of an intersection?		X
Does the proposed driveway make use of an existing median break that serves an existing site?		X
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?		X
Does the development include a drive-thru facility?		X

If any of the above questions were answered with 'Yes,' the Safety Trigger is satisfied.

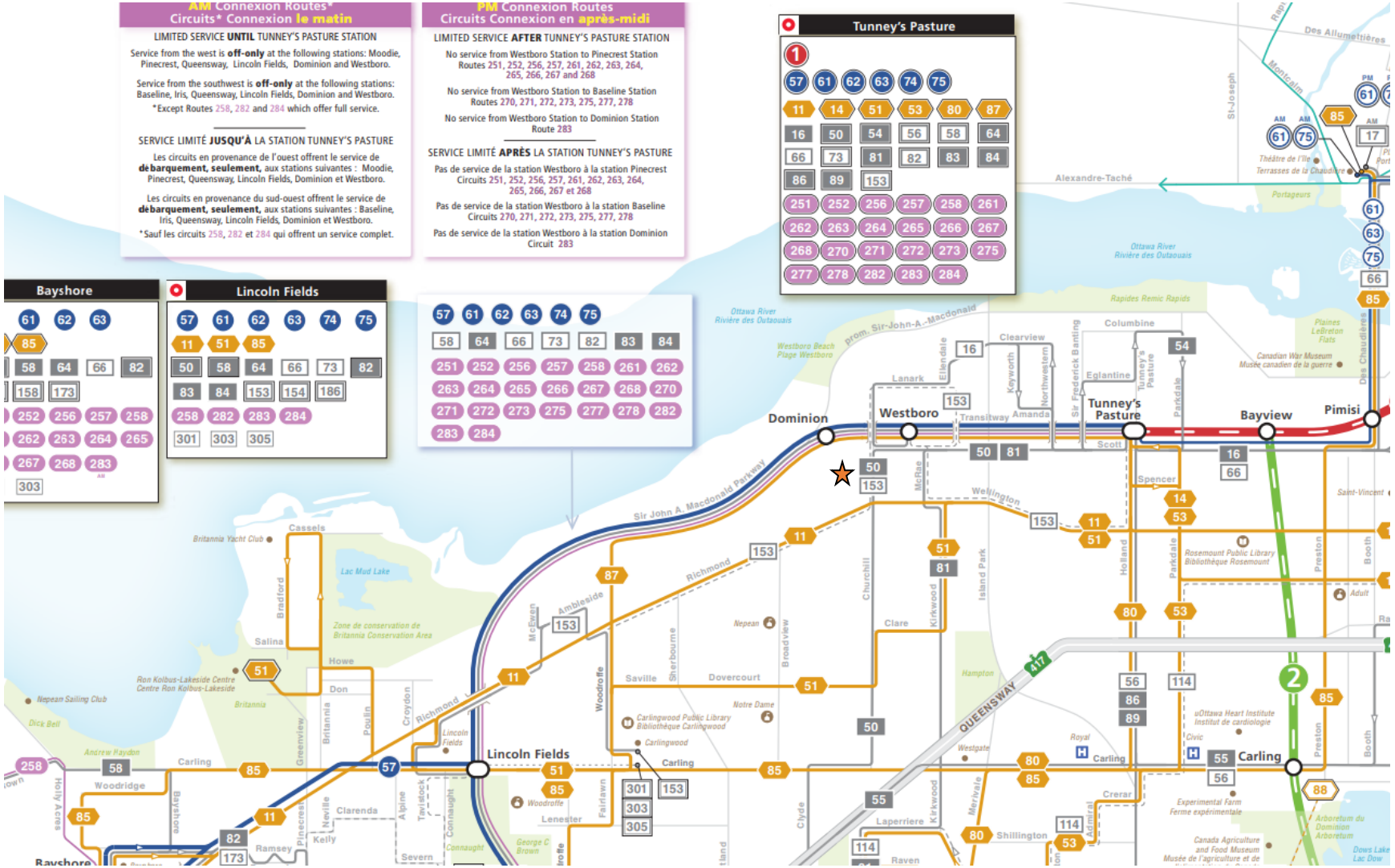
5. Summary

	Yes	No
Does the development satisfy the Trip Generation Trigger?	X	
Does the development satisfy the Location Trigger?	X	
Does the development satisfy the Safety Trigger?		X

If none of the triggers are satisfied, the TIA Study is complete. If one or more of the triggers is satisfied, the TIA Study must continue into the next stage (Screening and Scoping).

APPENDIX C

OC Transpo System Information



★ Subject Site

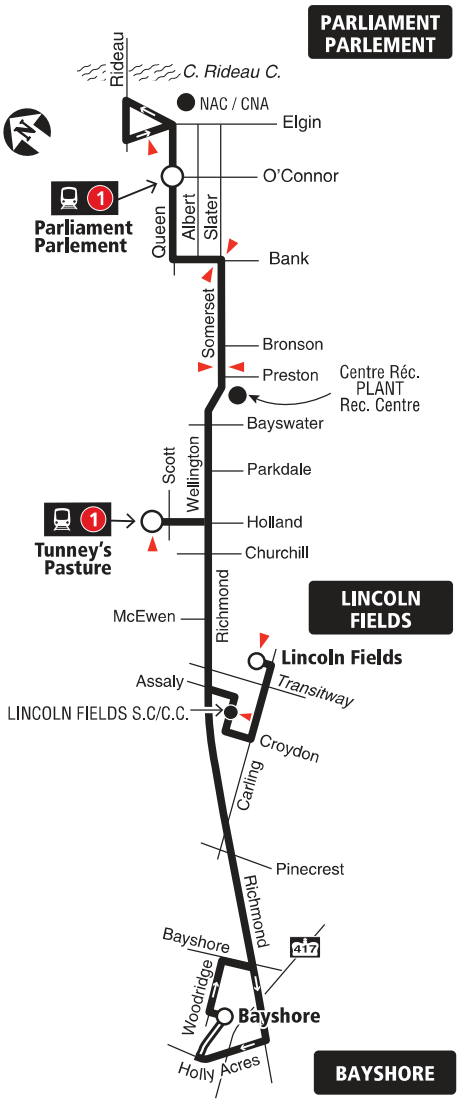
11 Fréquent

LINCOLN FIELDS BAYSHORE
PARLIAMENT PARLEMENT

7 days a week / 7 jours par semaine

All day service

Service toute la journée



2019.07

Future route after O-Train Line 1 is open
Trajet du circuit après l'ouverture de la Ligne 1 de l'O-Train

Lost and Found / Objets perdus..... **613-563-4011**

Security / Sécurité..... **613-741-2478**

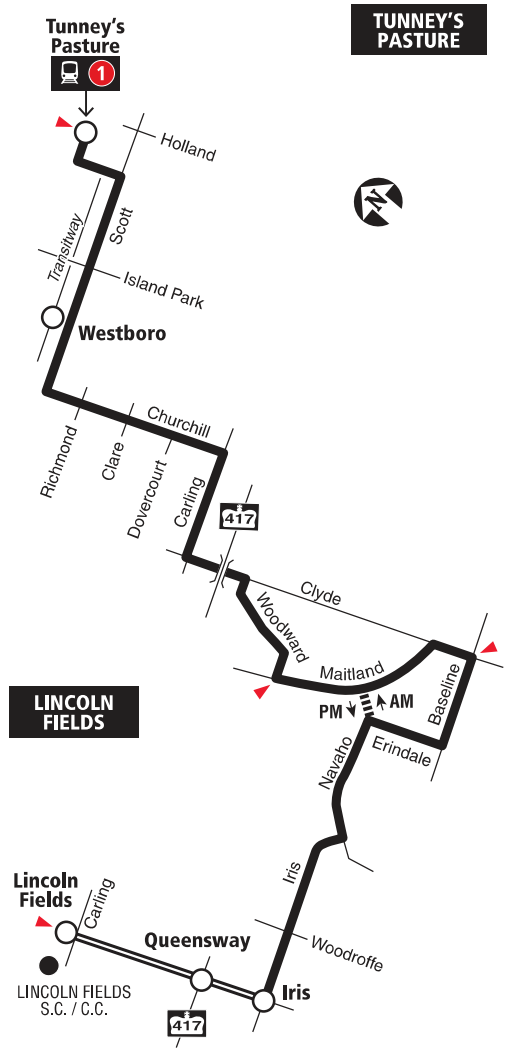
Transpo **INFO 613-741-4390**
octranspo.com

50 LINCOLN FIELDS / TUNNEY'S PASTURE

Local

Monday to Saturday / Lundi au samedi

No service Sat. eve. or all day Sunday / Aucun service le soir le sam. ou toute la journée dimanche



Transitway & Station

Peak Periods only / Périodes de pointe seulement

Timepoint / Heures de passage

2019.06

Schedule / Horaire 613-560-1000
Text / Texto 560560

plus your four digit bus stop number / *plus* votre numéro d'arrêt à quatre chiffres

Customer Service
Service à la clientèle **613-842-3600**

Lost and Found / Objets perdus..... **613-563-4011**

Security / Sécurité **613-741-2478**

Effective April 24, 2017
En vigueur 24 avril 2017

OC Transpo

INFO 613-741-4390
octranspo.com

153 LINCOLN FIELDS / TUNNEY'S PASTURE / CARLINGWOOD

Local

7 days a week / 7 jours par semaine

Selected time periods only
Périodes sélectionnées seulement

Station
Some trips / Quelques trajets
Timepoint / Heures de passage

2019.10

Schedule / Horaire.....613-560-1000
Text / Texto 560560
plus your four digit bus stop number / *plus* votre numéro d'arrêt à quatre chiffres

Customer Relations
Service à la clientèle **613-842-3600**
Lost and Found / Objets perdus..... **613-563-4011**
Security / Sécurité **613-741-2478**

Effective October 6, 2019
En vigueur 6 octobre 2019

OC Transpo
INFO 613-741-4390
octranspo.com

APPENDIX D

Traffic Count Data and Long Range Model Screenshots

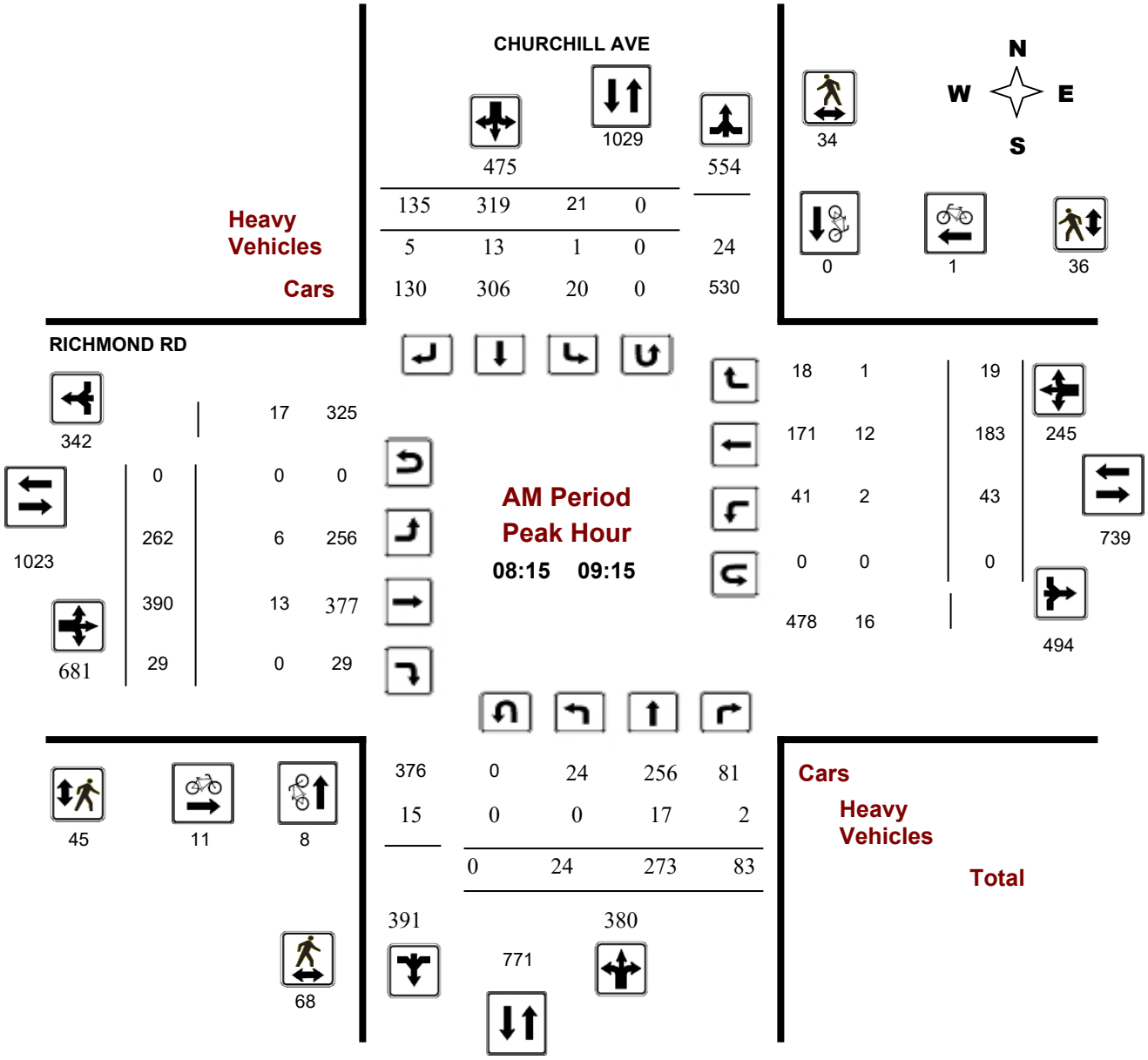
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

CHURCHILL AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39644

Start Time: 07:00 **Device:** Miovision



Comments

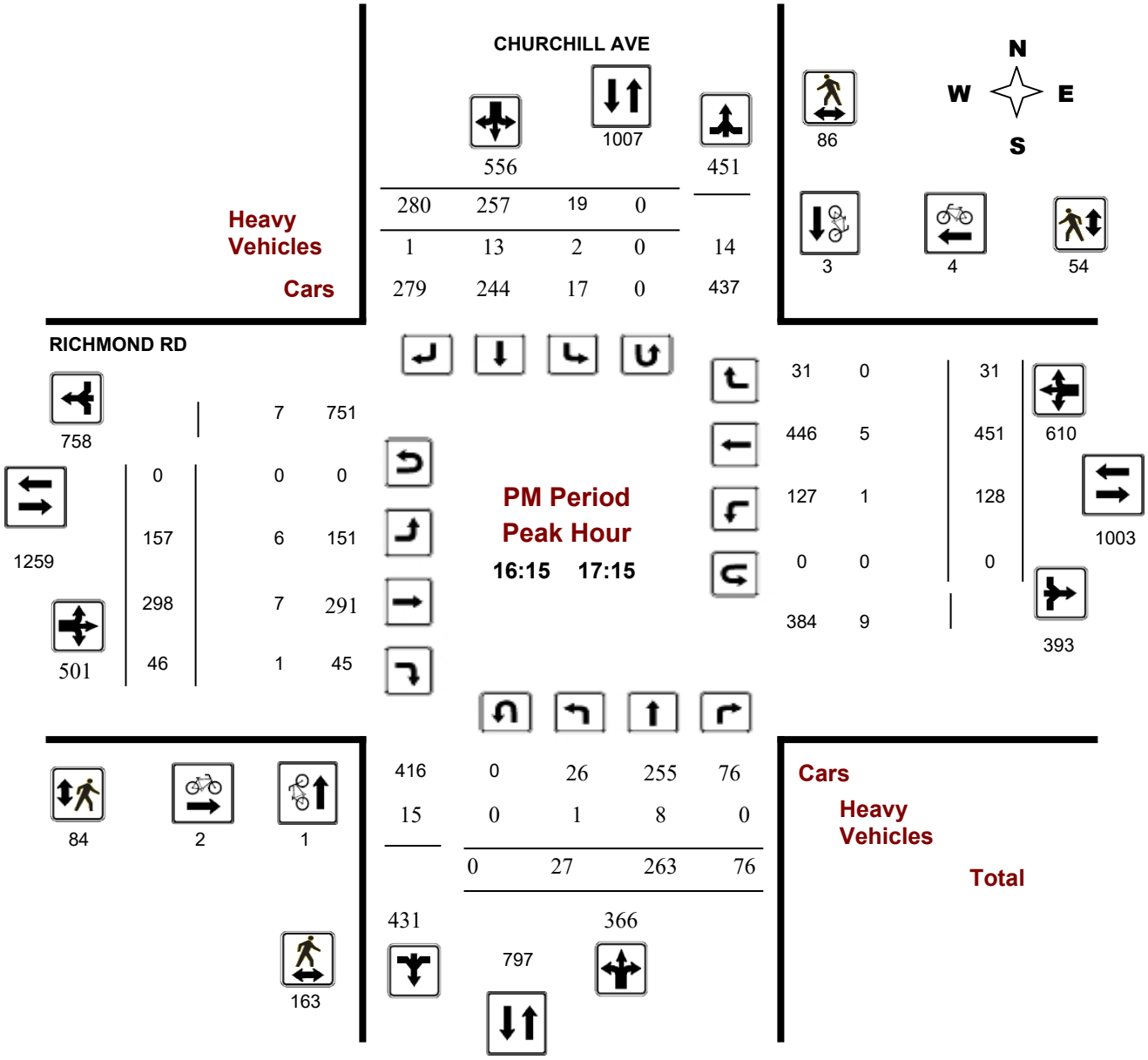
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

CHURCHILL AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39644

Start Time: 07:00 **Device:** Miovision



Comments

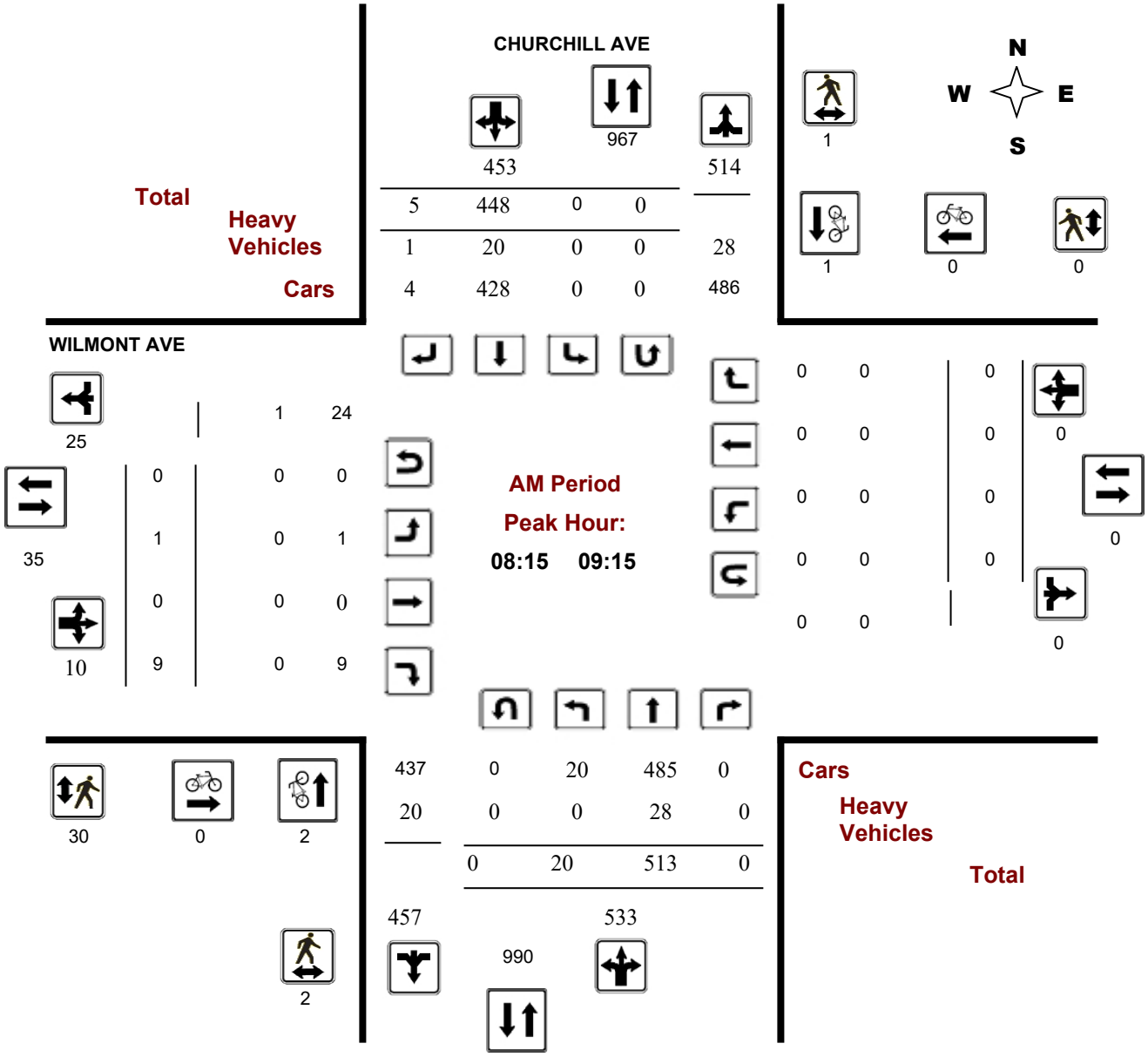
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

CHURCHILL AVE @ WILMONT AVE

Survey Date: Wednesday, January 13, 2016 **WO No:** 35638

Start Time: 07:00 **Device:** Miovision



Comments

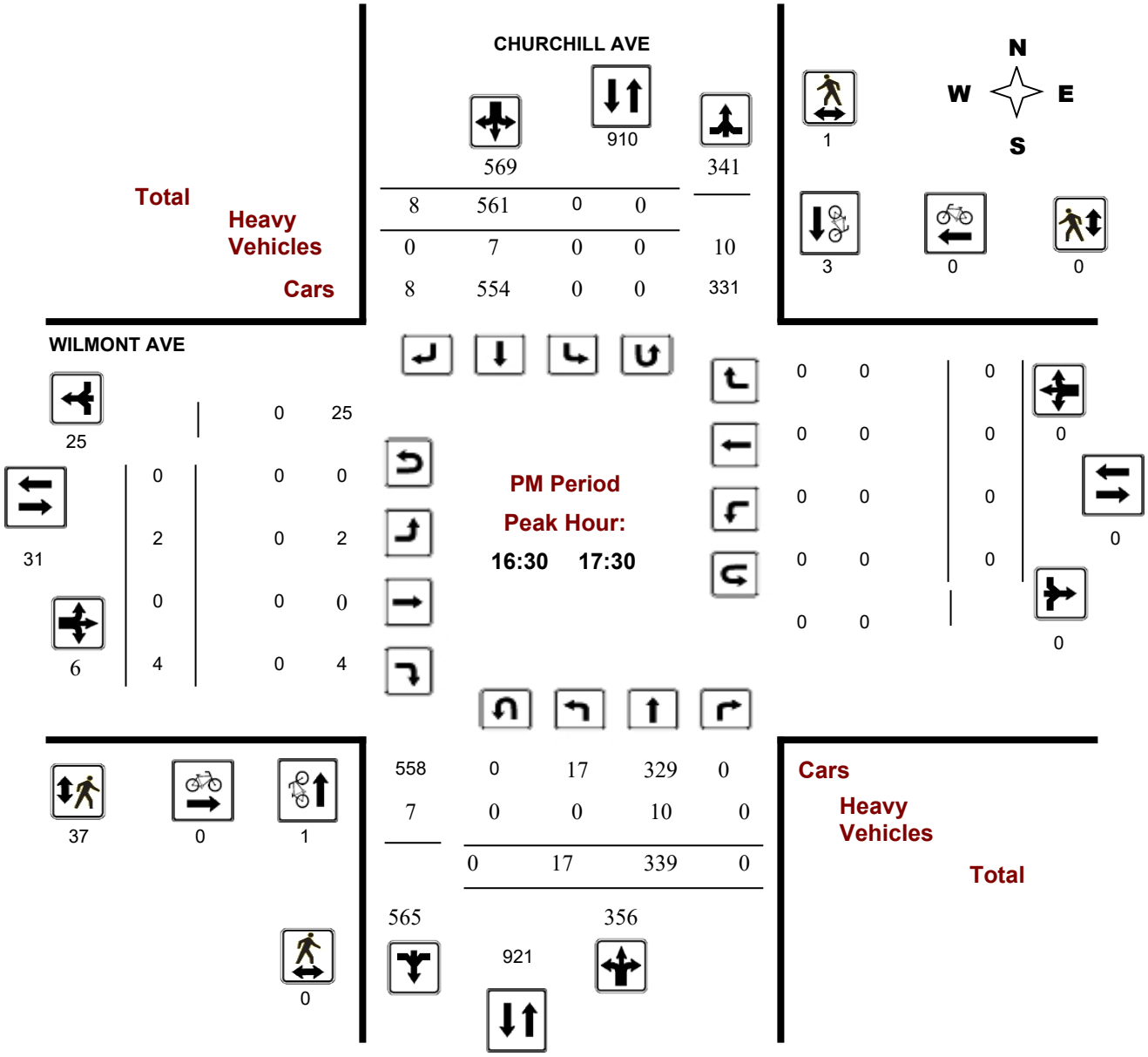
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

CHURCHILL AVE @ WILMONT AVE

Survey Date: Wednesday, January 13, 2016 **WO No:** 35638

Start Time: 07:00 **Device:** Miovision



Comments

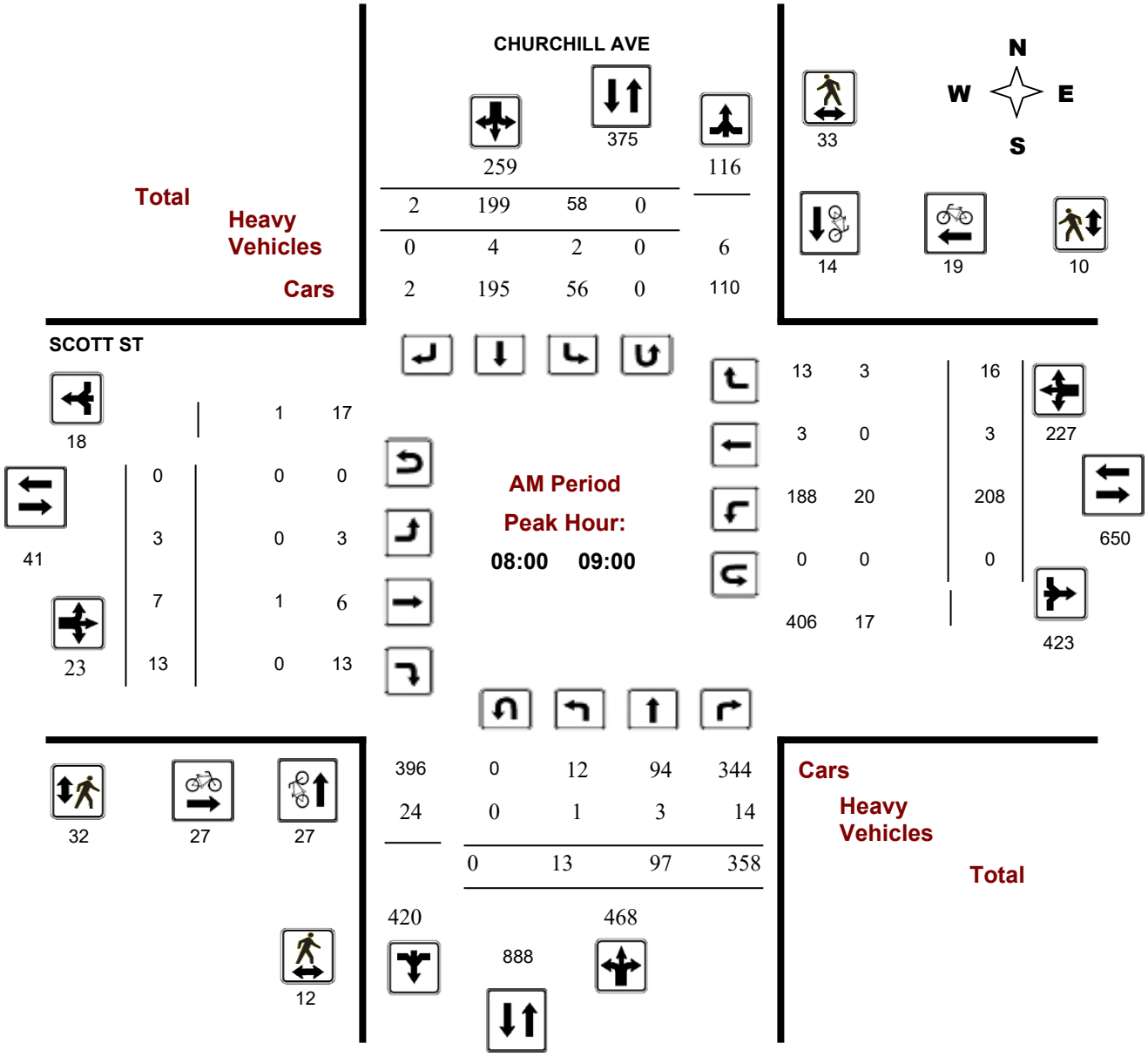
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

CHURCHILL AVE @ SCOTT ST

Survey Date: Tuesday, August 13, 2019 **WO No:** 38699

Start Time: 07:00 **Device:** Miovision



Comments

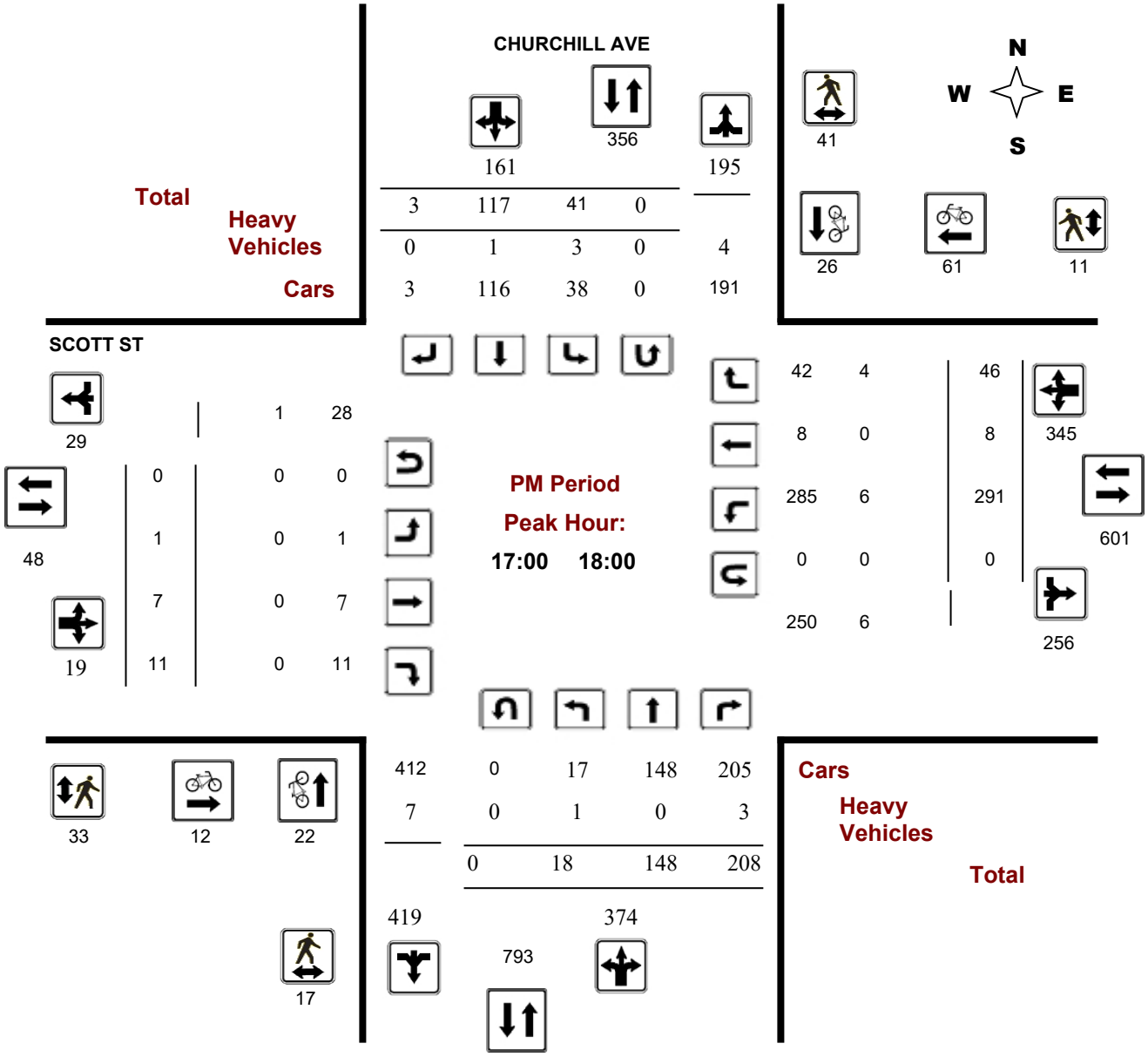
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

CHURCHILL AVE @ SCOTT ST

Survey Date: Tuesday, August 13, 2019 **WO No:** 38699

Start Time: 07:00 **Device:** Miovision



Comments

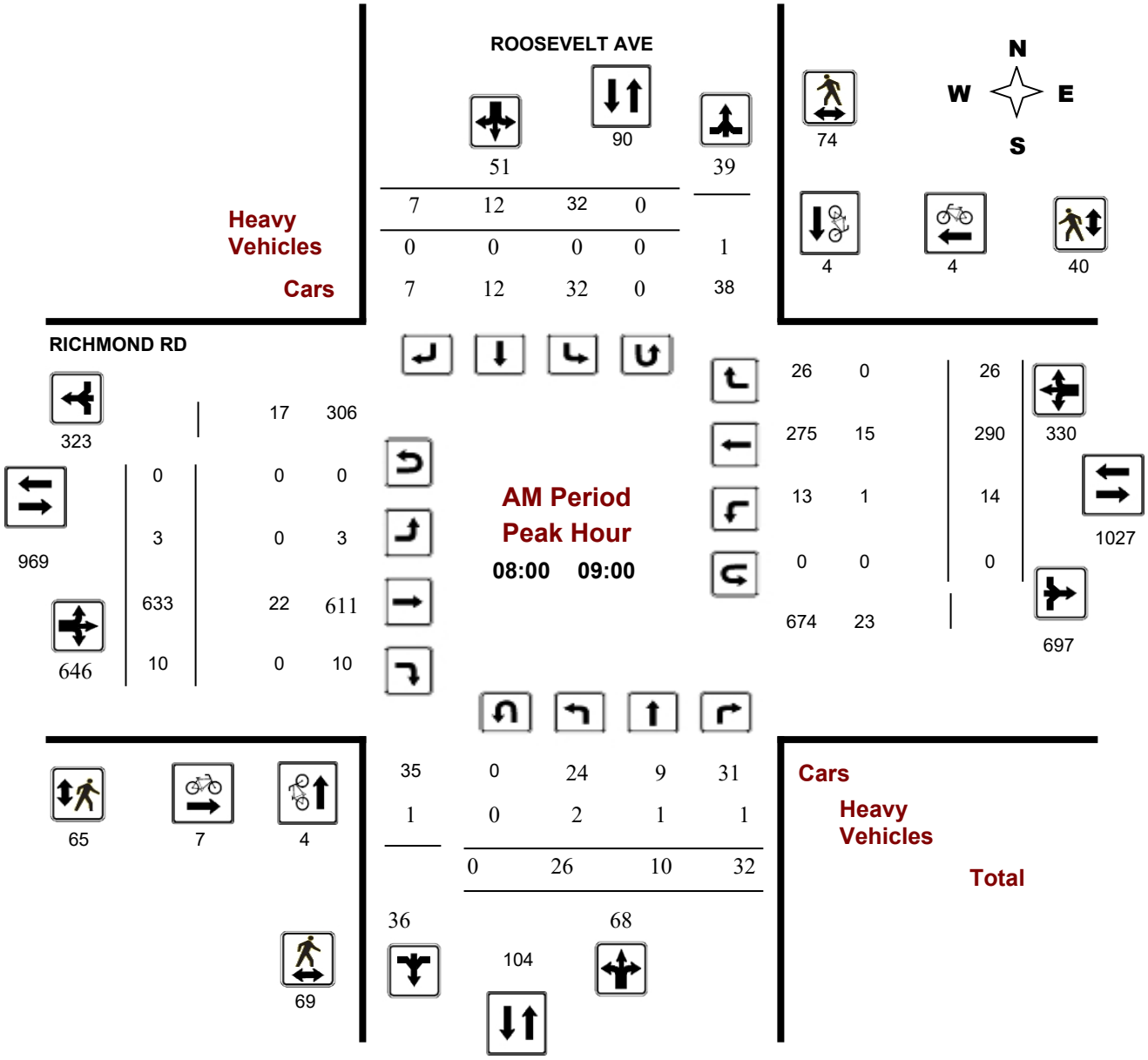
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ROOSEVELT AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39385

Start Time: 07:00 **Device:** Miovision



Comments 5472203 - THU JAN 23, 2020 - 8HRS - LORETTA

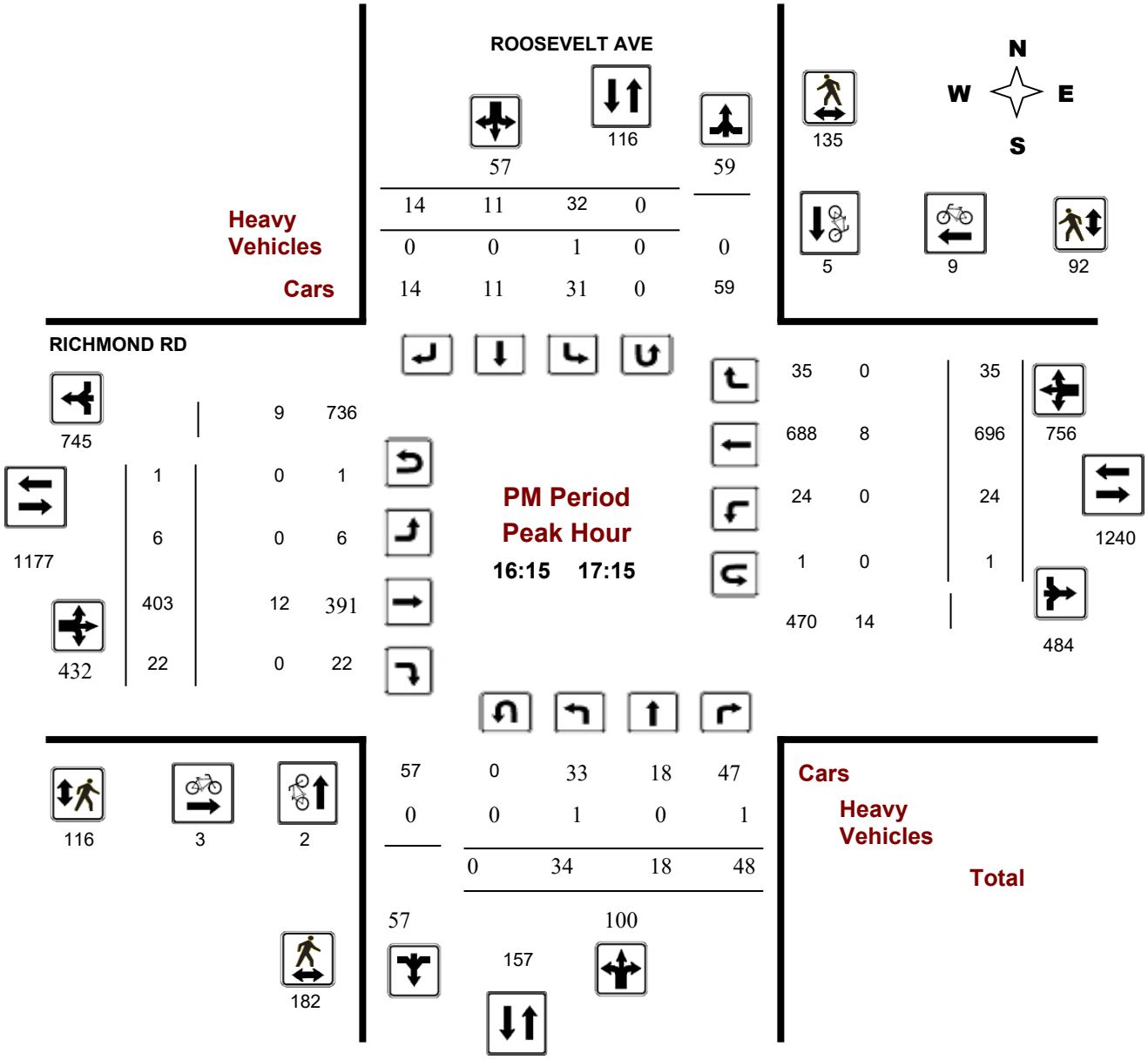
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ROOSEVELT AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39385

Start Time: 07:00 **Device:** Miovision



Comments 5472203 - THU JAN 23, 2020 - 8HRS - LORETTA

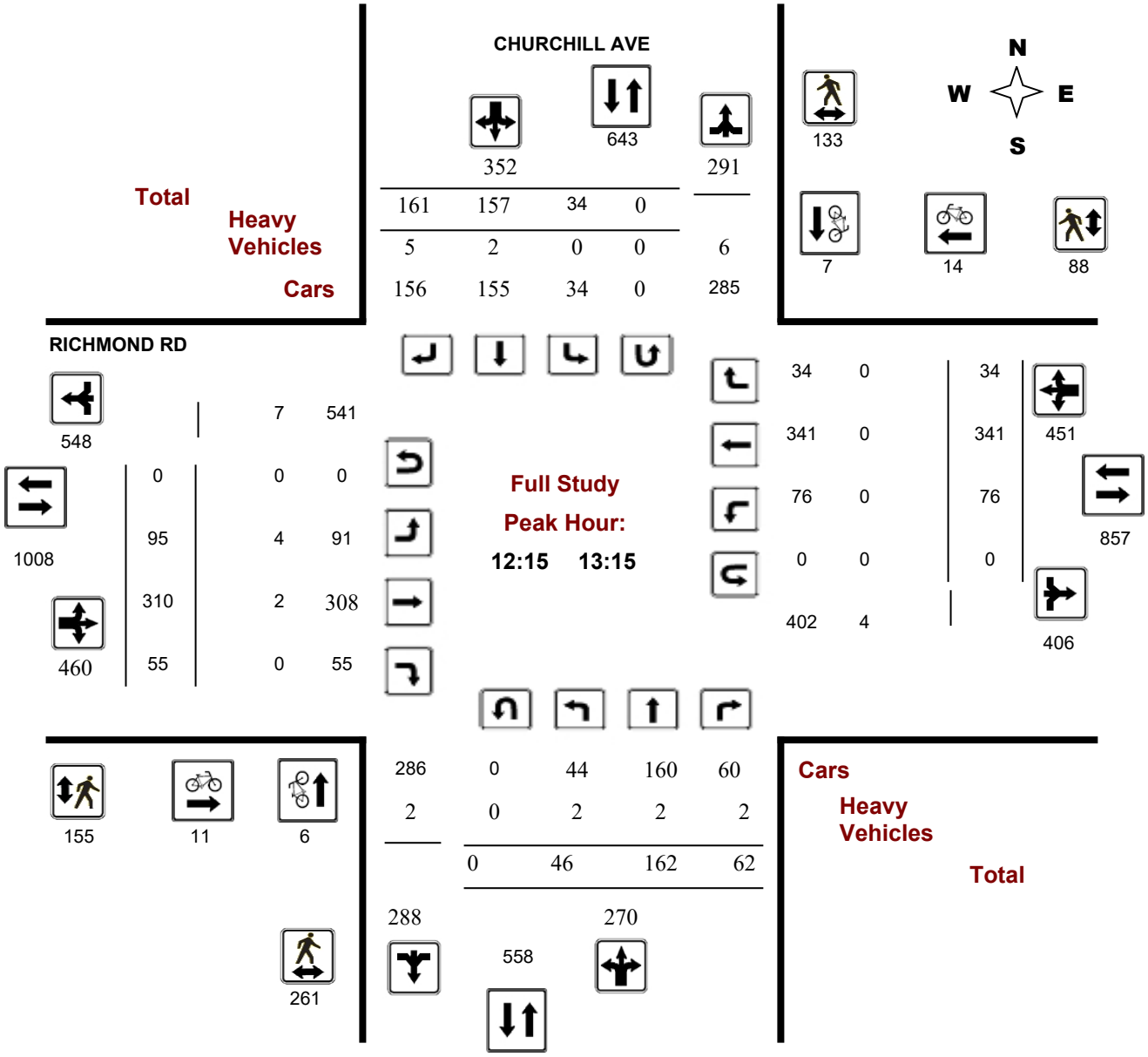
Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

CHURCHILL AVE @ RICHMOND RD

Survey Date: Saturday, July 11, 2015 **WO No:** 34945

Start Time: 11:00 **Device:** Miovision



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

CHURCHILL AVE @ RICHMOND RD

Survey Date: Thursday, January 23, 2020 **WO No:** 39644

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Thursday, January 23, 2020

Total Observed U-Turns

Northbound: 1 Southbound: 0

Eastbound: 0 Westbound: 2

AADT Factor

1.00

	CHURCHILL AVE								RICHMOND RD									
	Northbound				Southbound				Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	14	161	59	**234**	16	226	90	**332**	**566**	274	347	24	**645**	35	126	22	**183**	**828**	**1394**
08:00 09:00	16	270	93	**379**	21	296	136	**453**	**832**	287	373	32	**692**	40	182	16	**238**	**930**	**1762**
09:00 10:00	27	205	81	**313**	18	219	137	**374**	**687**	162	329	35	**526**	64	173	33	**270**	**796**	**1483**
11:30 12:30	42	173	77	**292**	36	195	161	**392**	**684**	122	289	72	**483**	79	308	33	**420**	**903**	**1587**
12:30 13:30	31	183	83	**297**	30	215	187	**432**	**729**	128	254	83	**465**	73	340	27	**440**	**905**	**1634**
15:00 16:00	28	201	84	**313**	18	247	276	**541**	**854**	145	283	78	**506**	116	393	29	**538**	**1044**	**1898**
16:00 17:00	28	260	71	**359**	16	256	270	**542**	**901**	145	279	57	**481**	132	453	25	**610**	**1091**	**1992**
17:00 18:00	25	238	84	**347**	19	234	261	**514**	**861**	162	266	42	**470**	117	410	39	**566**	**1036**	**1897**
Sub Total	211	1691	632	**2534**	174	1888	1518	**3580**	**6114**	1425	2420	423	**4268**	656	2385	224	**3265**	**7533**	**13647**
U Turns				**1**				**0**	**1**				**0**				**2**	**2**	**3**
Total	211	1691	632	**2535**	174	1888	1518	**3580**	**6115**	1425	2420	423	**4268**	656	2385	224	**3267**	**7535**	**13650**
EQ 12Hr	293	2350	878	**3524**	242	2624	2110	**4976**	**8500**	1981	3364	588	**5933**	912	3315	311	**4541**	**10474**	**18974**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	276	2215	828	**3321**	228	2473	1989	**4690**	**8500**	1867	3170	554	**5591**	859	3124	293	**4280**	**10474**	**18974**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**1**					
AVG 24Hr	362	2902	1085	**4350**	299	3240	2605	**6144**	**10494**	2445	4153	726	**7324**	1126	4093	384	**5606**	**12930**	**23424**
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

Work Order 38640

Turning Movement Count - Full Study Summary Report

CHURCHILL AVE @ RICHMOND RD

Survey Date: Thursday, August 01, 2019

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 1

AADT Factor .90

Full Study

	CHURCHILL AVE									RICHMOND RD									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	**NB TOT**	LT	ST	RT	**SB TOT**	**STR TOT**	LT	ST	RT	**EB TOT**	LT	ST	RT	**WB TOT**	**STR TOT**	**Grand Total**
07:00 08:00	15	132	39	**186**	8	194	93	**295**	**481**	197	280	30	**507**	26	123	21	**170**	**677**	**1158**
08:00 09:00	15	286	74	**375**	22	254	106	**382**	**757**	240	373	33	**646**	61	182	20	**263**	**909**	**1666**
09:00 10:00	24	211	70	**305**	23	197	159	**379**	**684**	158	303	38	**499**	39	200	24	**263**	**762**	**1446**
11:30 12:30	44	210	90	**344**	20	215	169	**404**	**748**	139	323	79	**541**	90	306	40	**436**	**977**	**1725**
12:30 13:30	43	156	73	**272**	24	232	155	**411**	**683**	150	305	71	**526**	81	319	45	**445**	**971**	**1654**
15:00 16:00	27	211	64	**302**	27	236	234	**497**	**799**	153	326	47	**526**	108	448	24	**580**	**1106**	**1905**
16:00 17:00	30	239	96	**365**	23	248	276	**547**	**912**	161	320	48	**529**	113	455	34	**602**	**1131**	**2043**
17:00 18:00	37	216	80	**333**	19	247	257	**523**	**856**	161	285	46	**492**	109	417	39	**565**	**1057**	**1913**
Sub Total	235	1661	586	**2482**	166	1823	1449	**3438**	**5920**	1359	2515	392	**4266**	627	2450	247	**3324**	**7590**	**13510**
U Turns				**0**				**0**	**0**				**0**				**1**	**1**	**1**
Total	235	1661	586	**2482**	166	1823	1449	**3438**	**5920**	1359	2515	392	**4266**	627	2450	247	**3325**	**7591**	**13511**
EQ 12Hr	327	2309	815	**3450**	231	2534	2014	**4779**	**8229**	1889	3496	545	**5930**	872	3405	343	**4622**	**10552**	**18781**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													**1.39**						
AVG 12Hr	294	2078	733	**3105**	208	2281	1813	**4301**	**7406**	1700	3146	490	**5337**	784	3065	309	**4160**	**9497**	**16903**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													**.90**						
AVG 24Hr	385	2722	960	**4068**	272	2988	2375	**5634**	**9702**	2227	4122	642	**6991**	1028	4015	405	**5449**	**12440**	**22142**
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

Work Order
37319

Turning Movement Count - Full Study Summary Report

CHURCHILL AVE @ RICHMOND RD

Survey Date: Wednesday, November 22, 2017

Total Observed U-Turns

Northbound: 0 Southbound: 0
Eastbound: 1 Westbound: 0

AADT Factor

.90

Full Study

	CHURCHILL AVE									RICHMOND RD									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	20	142	44	**206**	19	254	104	**377**	**583**	244	328	32	**604**	49	112	19	**180**	**784**	**1367**
08:00 09:00	29	290	81	**400**	17	283	131	**431**	**831**	312	401	34	**747**	56	173	30	**259**	**1006**	**1837**
09:00 10:00	31	227	81	**339**	10	226	127	**363**	**702**	174	321	38	**533**	63	194	21	**278**	**811**	**1513**
11:30 12:30	43	206	92	**341**	36	220	158	**414**	**755**	146	294	75	**515**	60	349	33	**442**	**957**	**1712**
12:30 13:30	49	195	92	**336**	21	199	144	**364**	**700**	154	354	87	**595**	72	298	25	**395**	**990**	**1690**
15:00 16:00	27	208	69	**304**	25	247	282	**554**	**858**	159	256	47	**462**	114	370	22	**506**	**968**	**1826**
16:00 17:00	25	271	64	**360**	17	244	309	**570**	**930**	151	272	46	**469**	138	474	23	**635**	**1104**	**2034**
17:00 18:00	27	291	67	**385**	15	237	312	**564**	**949**	191	329	55	**575**	129	479	25	**633**	**1208**	**2157**
Sub Total	251	1830	590	**2671**	160	1910	1567	**3637**	**6308**	1531	2555	414	**4500**	681	2449	198	**3328**	**7828**	**14136**
U Turns				**0**				**0**	**0**				**1**				**0**	**1**	**1**
Total	251	1830	590	**2671**	160	1910	1567	**3637**	**6308**	1531	2555	414	**4501**	681	2449	198	**3328**	**7829**	**14137**
EQ 12Hr	349	2544	820	**3713**	222	2655	2178	**5055**	**8768**	2128	3551	575	**6256**	947	3404	275	**4626**	**10882**	**19650**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													**1.39**						
AVG 12Hr	314	2289	738	**3341**	200	2389	1960	**4550**	**7891**	1915	3196	518	**5631**	852	3064	248	**4163**	**9794**	**17685**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													**.90**						
AVG 24Hr	411	2999	967	**4377**	262	3130	2568	**5960**	**10337**	2509	4187	678	**7376**	1116	4013	324	**5454**	**12830**	**23167**
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

Work Order 36417

Turning Movement Count - Full Study Summary Report

CHURCHILL AVE @ RICHMOND RD

Survey Date: Wednesday, October 26, 2016

Total Observed U-Turns

Northbound: 2 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor .90

Full Study

	CHURCHILL AVE									RICHMOND RD									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	29	156	34	**219**	23	206	118	**347**	**566**	233	331	29	**593**	32	149	17	**198**	**791**	**1357**
08:00 09:00	35	288	81	**404**	19	280	168	**467**	**871**	279	392	44	**715**	50	201	17	**268**	**983**	**1854**
09:00 10:00	33	213	76	**322**	30	240	148	**418**	**740**	180	329	42	**551**	51	198	34	**283**	**834**	**1574**
11:30 12:30	40	195	75	**310**	31	235	172	**438**	**748**	134	300	82	**516**	84	330	25	**439**	**955**	**1703**
12:30 13:30	43	198	94	**335**	34	199	158	**391**	**726**	147	312	67	**526**	90	318	23	**431**	**957**	**1683**
15:00 16:00	26	215	90	**331**	26	263	247	**536**	**867**	146	262	55	**463**	99	420	25	**544**	**1007**	**1874**
16:00 17:00	23	277	75	**375**	15	229	248	**492**	**867**	165	256	44	**465**	119	505	27	**651**	**1116**	**1983**
17:00 18:00	24	296	75	**395**	14	271	288	**573**	**968**	138	274	58	**470**	136	454	40	**630**	**1100**	**2068**
Sub Total	253	1838	600	**2691**	192	1923	1547	**3662**	**6353**	1422	2456	421	**4299**	661	2575	208	**3444**	**7743**	**14096**
U Turns				**2**				**0**	**2**				**0**				**0**	**0**	**2**
Total	253	1838	600	**2693**	192	1923	1547	**3662**	**6355**	1422	2456	421	**4299**	661	2575	208	**3444**	**7743**	**14098**
EQ 12Hr	352	2555	834	**3743**	267	2673	2150	**5090**	**8833**	1977	3414	585	**5976**	919	3579	289	**4787**	**10763**	**19596**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													**1.39**						
AVG 12Hr	317	2299	751	**3369**	240	2406	1935	**4581**	**7950**	1779	3072	527	**5378**	827	3221	260	**4308**	**9686**	**17636**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													**.90**						
AVG 24Hr	415	3012	983	**4413**	315	3151	2535	**6001**	**10414**	2330	4025	690	**7045**	1083	4220	341	**5644**	**12689**	**23103**
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

Work Order
34652

Turning Movement Count - Full Study Summary Report

CHURCHILL AVE @ RICHMOND RD

Survey Date: Monday, June 08, 2015

Total Observed U-Turns

Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 0

AADT Factor

.90

Full Study

	CHURCHILL AVE									RICHMOND RD									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	11	97	30	**138**	18	215	109	**342**	**480**	216	241	15	**472**	19	116	16	**151**	**623**	**1103**
08:00 09:00	27	220	69	**316**	19	285	186	**490**	**806**	255	310	38	**603**	47	230	27	**304**	**907**	**1713**
09:00 10:00	33	209	59	**301**	16	228	134	**378**	**679**	167	278	51	**496**	42	233	33	**308**	**804**	**1483**
11:30 12:30	25	120	43	**188**	39	299	188	**526**	**714**	106	214	43	**363**	63	500	50	**613**	**976**	**1690**
12:30 13:30	21	126	58	**205**	27	185	148	**360**	**565**	110	230	55	**395**	65	444	38	**547**	**942**	**1507**
15:00 16:00	26	175	71	**272**	39	332	323	**694**	**966**	127	227	36	**390**	91	654	40	**785**	**1175**	**2141**
16:00 17:00	30	185	49	**264**	25	446	517	**988**	**1252**	135	220	38	**393**	98	579	42	**719**	**1112**	**2364**
17:00 18:00	29	202	74	**305**	33	400	371	**804**	**1109**	139	211	20	**370**	119	695	66	**880**	**1250**	**2359**
Sub Total	202	1334	453	**1989**	216	2390	1976	**4582**	**6571**	1255	1931	296	**3482**	544	3451	312	**4307**	**7789**	**14360**
U Turns				**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total	202	1334	453	**1989**	216	2390	1976	**4582**	**6571**	1255	1931	296	**3482**	544	3451	312	**4307**	**7789**	**14360**
EQ 12Hr	281	1854	630	**2765**	300	3322	2747	**6369**	**9134**	1744	2684	411	**4840**	756	4797	434	**5987**	**10827**	**19961**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													**1.39**						
AVG 12Hr	253	1669	567	**2488**	270	2990	2472	**5732**	**8220**	1570	2416	370	**4356**	681	4317	390	**5388**	**9744**	**17964**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													**.90**						
AVG 24Hr	331	2186	742	**3260**	354	3917	3238	**7509**	**10769**	2057	3165	485	**5706**	892	5656	511	**7058**	**12764**	**23533**
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.

TRANS Regional Model

Version 2.13 - Assigned February 07, 2019

AM Peak Hour Total Traffic Volume

Westboro

2011 Model - Base Scenario

No Modifications

User Initials: SG
Plot Prepared: July 30, 2019
EMME Scenario: 21311

TRANS

Legend

AM Peak Hour Total Traffic Volume

1000 2000 3000 4000 5000

N

Distance (m)

50 100 150 200 250

TRANS Regional Model

Version 2.11 - Assigned July 26, 2019

AM Peak Hour Total Traffic Volume

Westboro

2031 Model - TMP Affordable Network

No Modifications

User Initials: SG
Plot Prepared: July 30, 2019
EMME Scenario: 21131

TRANS

Legend

AM Peak Hour Total Traffic Volume

1000 2000 3000 4000 5000

N

Distance (m)

50 100 150 200 250

APPENDIX E

Collision Records

City Operations - Transportation Services

Collision Details Report - Public Version

From: January 1, 2014 **To:** December 31, 2018

Location: CHURCHILL AVE @ RICHMOND RD

Traffic Control: Traffic signal

Total Collisions: 31

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Feb-26, Wed,14:52	Clear	Angle	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-May-01, Thu,19:54	Clear	SMV other	Non-fatal injury	Dry	East	Turning left	Pick-up truck	Pedestrian	1
2014-Jun-13, Fri,06:47	Rain	Angle	P.D. only	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Pick-up truck	Other motor vehicle	
2014-Oct-06, Mon,00:46	Clear	Angle	P.D. only	Dry	South	Going ahead	Unknown	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Oct-20, Mon,09:40	Clear	Sideswipe	P.D. only	Dry	North	Going ahead	Construction equipment	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Jan-16, Fri,10:39	Clear	Angle	P.D. only	Slush	West	Pulling away from shoulder or curb	Automobile, station wagon	Other motor vehicle	
					North	Turning left	Automobile, station wagon	Other motor vehicle	

2015-Jan-25, Sun,14:02	Clear	Rear end	Non-fatal injury	Dry	East	Turning left	Pick-up truck	Other motor vehicle
					East	Turning left	Automobile, station wagon	Other motor vehicle
					East	Turning left	Automobile, station wagon	Other motor vehicle
2015-Jan-31, Sat,20:21	Snow	Turning movement	P.D. only	Loose snow	East	Turning left	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Feb-26, Thu,17:03	Clear	Angle	P.D. only	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Pick-up truck	Other motor vehicle
2015-Apr-11, Sat,12:34	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle
					West	Turning left	Pick-up truck	Other motor vehicle
2015-Jun-18, Thu,09:14	Clear	Sideswipe	P.D. only	Dry	South	Turning right	Truck - tank	Other motor vehicle
					South	Turning right	Automobile, station wagon	Other motor vehicle
2015-Jul-24, Fri,14:25	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Stopped	Truck and trailer	Other motor vehicle
2015-Oct-03, Sat,11:00	Clear	Rear end	P.D. only	Dry	West	Slowing or stopping	Pick-up truck	Other motor vehicle
					West	Stopped	Pick-up truck	Other motor vehicle

2015-Nov-19, Thu,10:56	Clear	Rear end	P.D. only	Wet	West	Unknown	Unknown	Other motor vehicle	
					West	Stopped	Pick-up truck	Other motor vehicle	
2016-Jan-04, Mon,12:08	Clear	Rear end	P.D. only	Wet	South	Changing lanes	Pick-up truck	Other motor vehicle	
					South	Turning right	Automobile, station wagon	Other motor vehicle	
2016-Jun-02, Thu,14:22	Clear	SMV other	Non-fatal injury	Dry	South	Turning right	Automobile, station wagon	Pedestrian	1
2016-Jun-17, Fri,05:29	Clear	Angle	P.D. only	Dry	East	Going ahead	Pick-up truck	Other motor vehicle	
					South	Going ahead	Pick-up truck	Other motor vehicle	
2016-Aug-07, Sun,12:12	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Pick-up truck	Other motor vehicle	
2016-Aug-13, Sat,00:00	Clear	SMV unattended vehicle	P.D. only	Dry	North	Unknown	Unknown	Unattended vehicle	
2016-Dec-09, Fri,08:40	Clear	Rear end	P.D. only	Ice	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2016-Dec-31, Sat,12:01	Snow	SMV other	Non-fatal injury	Loose snow	East	Turning left	Automobile, station wagon	Pedestrian	1

2017-Jan-28, Sat,15:02	Snow	Rear end	Non-fatal injury	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle	1
					East	Stopped	Automobile, station wagon	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Sep-06, Wed,00:00	Clear	SMV unattended vehicle	P.D. only	Dry	Unknown	Unknown	Unknown	Unattended vehicle	
2017-Sep-26, Tue,19:08	Clear	Turning movement	P.D. only	Dry	North	Going ahead	Pick-up truck	Other motor vehicle	
					South	Turning left	Automobile, station wagon	Other motor vehicle	
2018-Feb-09, Fri,12:45	Clear	Sideswipe	P.D. only	Wet	East	Changing lanes	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Mar-12, Mon,10:21	Clear	Turning movement	P.D. only	Dry	North	Stopped	Pick-up truck	Other motor vehicle	
					North	Turning right	Truck - tractor	Other	
2018-Jun-09, Sat,10:48	Clear	Angle	P.D. only	Dry	North	Turning right	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Sep-11, Tue,18:51	Clear	Turning movement	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	

2018-Oct-27, Sat,21:39	Snow	SMV other	Non-fatal injury	Wet	West	Turning left	Passenger van	Pedestrian	2
2018-Nov-06, Tue,13:25	Rain	Rear end	Non-fatal injury	Wet	East	Going ahead	Truck - closed	Other motor vehicle	
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Dec-17, Mon,10:39	Clear	Sideswipe	P.D. only	Dry	South	Turning right	Automobile, station wagon	Other motor vehicle	
					South	Turning right	Truck - open	Other motor vehicle	

Location: CHURCHILL AVE @ SCOTT ST

Traffic Control: Stop sign

Total Collisions: 4

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2016-Feb-18, Thu,07:15	Clear	SMV other	P.D. only	Ice	North	Pulling away from shoulder or curb	Automobile, station wagon	Skidding/sliding	
2017-Feb-10, Fri,00:00	Clear	SMV unattended vehicle	P.D. only	Dry	East	Unknown	Unknown	Unattended vehicle	
2018-Jan-15, Mon,19:15	Clear	Sideswipe	P.D. only	Loose snow	North	Stopped	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Feb-05, Mon,16:24	Clear	SMV other	Non-fatal injury	Dry	West	Going ahead	Automobile, station wagon	Pedestrian	1

Location: CHURCHILL AVE @ WILMONT AVE

Traffic Control: Stop sign

Total Collisions: 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped

2017-Apr-26, Wed,17:20	Clear	Sideswipe	P.D. only	Dry	South	Pulling away from shoulder or curb	Construction equipment	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Oct-25, Thu,18:13	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	

Location: ROOSEVELT AVE @ RICHMOND RD

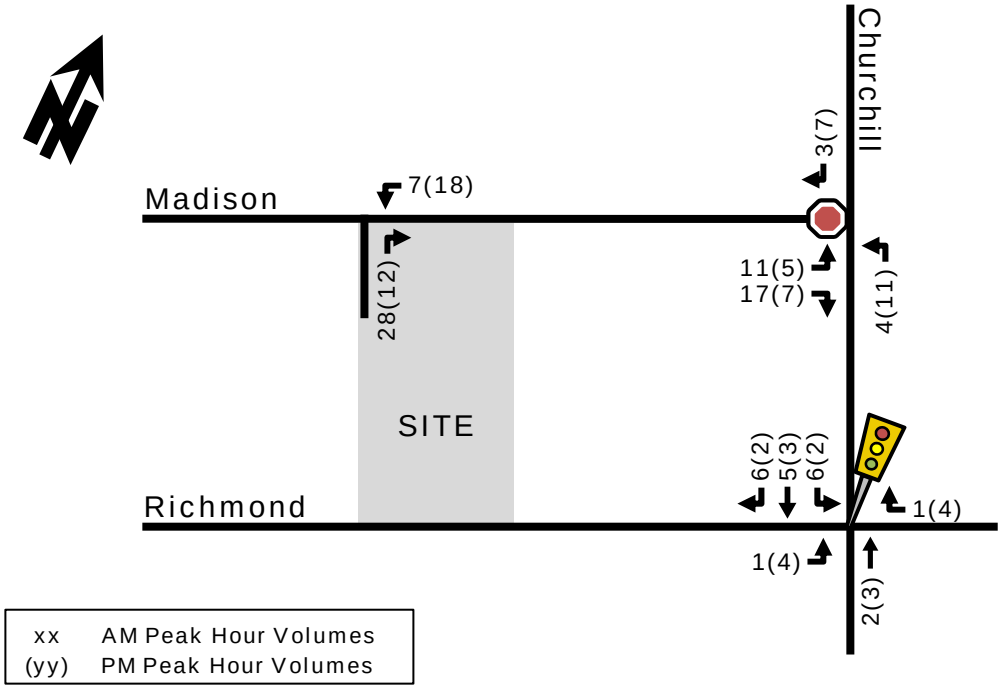
Traffic Control: Traffic signal **Total Collisions:** 4

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Jun-29, Sun,10:07	Clear	SMV other	Non-fatal injury	Dry	East	Going ahead	Automobile, station wagon	Pedestrian	1
2015-Nov-07, Sat,18:34	Clear	Turning movement	Non-fatal injury	Dry	West	Turning right	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Municipal transit bus	Other motor vehicle	
2016-Apr-09, Sat,10:57	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Jan-02, Tue,12:14	Snow	Rear end	P.D. only	Loose snow	East	Slowing or stopping	Passenger van	Other motor vehicle	
					East	Stopped	Automobile, station wagon	Other motor vehicle	

APPENDIX F

Relevant Traffic Study Excerpts

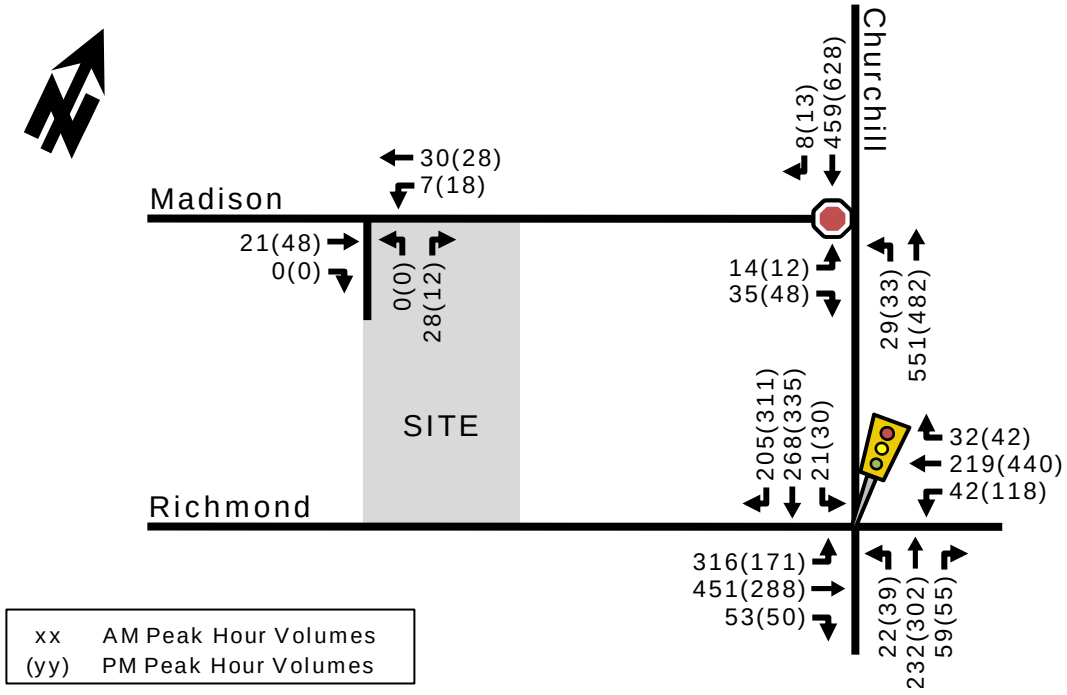
Figure 4: 'New' Site-Generated Traffic Volumes



4. Future Traffic Operations

For the purpose of this study, the total projected traffic volumes were derived by superimposing 'new' site-generated traffic (Figure 4) onto existing volumes (Figure 3). As the amount of site traffic generation does not require any traffic analysis based on the City guidelines, we have not accounted for any potential background growth. The resulting total projected traffic volumes used in the subsequent analysis are illustrated as Figure 5.

Figure 5: Projected Traffic Volumes



4.1.2 Trip Distribution

The assumed distribution of trips generated by the proposed development has been derived from existing traffic patterns on the roadways within the study area. As the proposed development is predominantly residential, the majority of peak hour trips are anticipated to be to/from work. It is appropriate for the assumed trip distribution to be based on the distribution of existing traffic volumes exiting the study area during the AM peak hour and arriving to the study area during the PM peak hour. The projected distribution of trips is summarized as follows:

- 35% to/from the east via either Byron Avenue or Richmond Road
- 30% to/from the west via either Byron Avenue or Richmond Road
- 20% to/from the north via Churchill Avenue
- 15% to/from the south via Churchill Avenue

Site generated traffic volumes are shown in **Figure 4**.

Figure 4: Site Generated Traffic

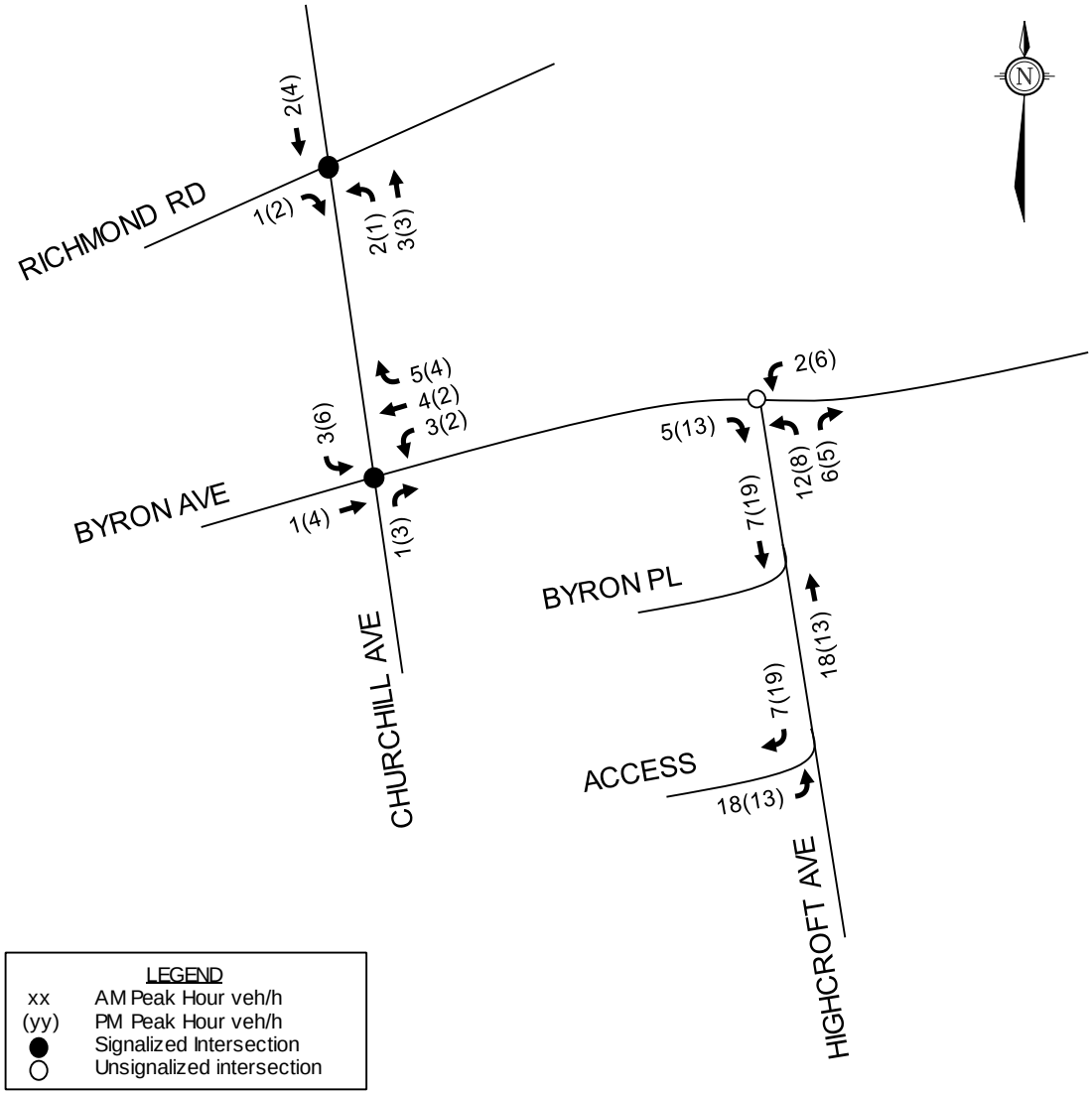
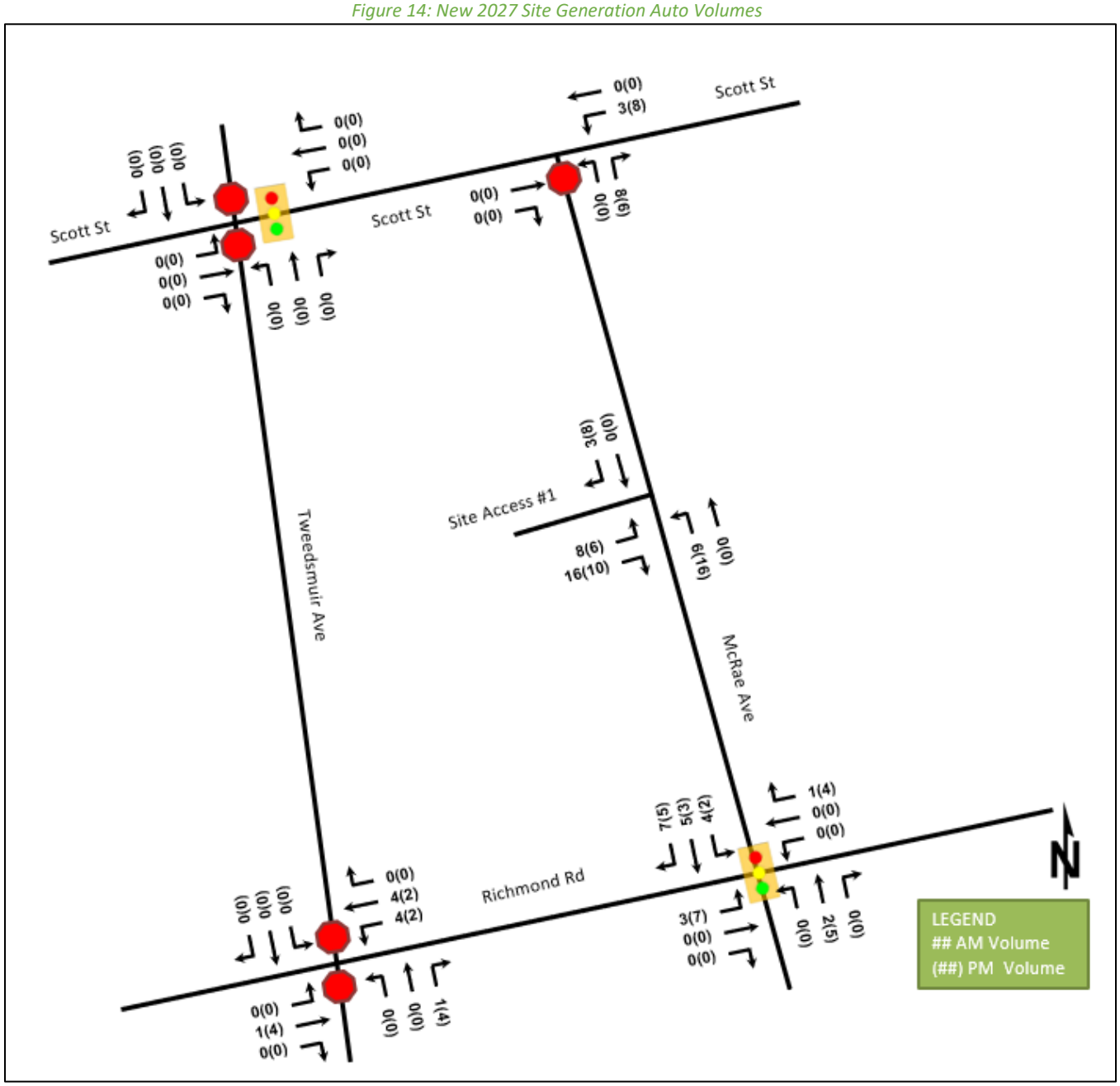


Figure 14: New 2027 Site Generation Auto Volumes



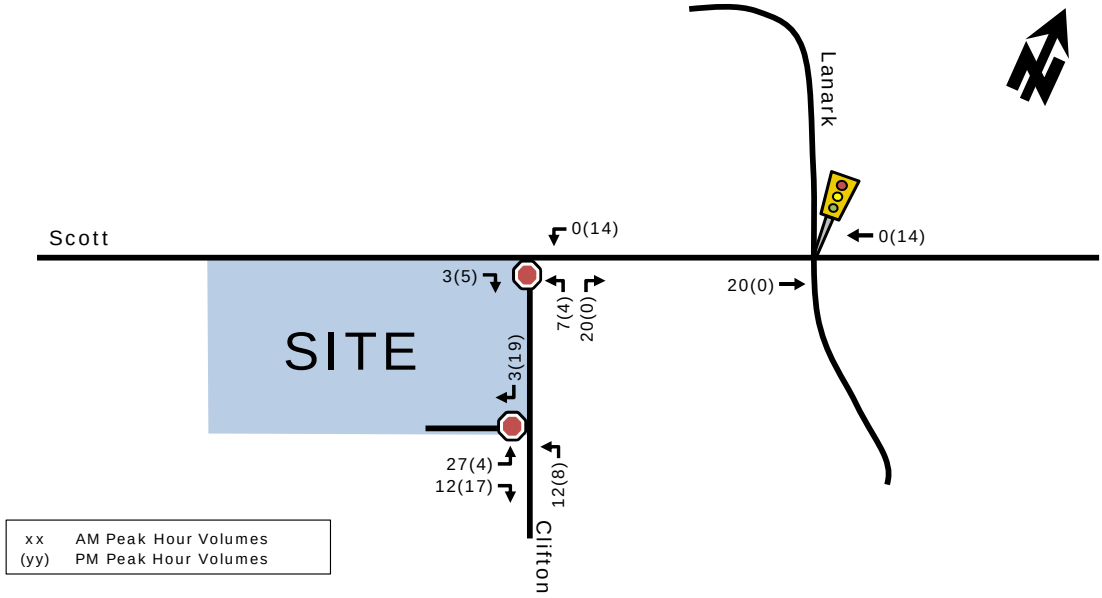
6 Background Network Travel Demands

6.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3.1. The opening of the Westboro LRT station and Dominion LRT station, isolated measure transit priority along Richmond Road and TOD policies have been accounted for within the modal share assumptions. No road improvements within the study horizons are noted for this area.

The additional connectivity provided by future bicycle spine routes along Scott Street and Richmond Road as part of the City of Ottawa ultimate cycling plan will improve the active mode network.

Figure 9: 'New' Site-Generated Traffic



It is noteworthy that the existing turn restrictions are understood to be in place to help prevent cut-through traffic through the neighbourhood. Based on the existing count data at the Clifton/Scott intersection, there are a number of drivers that do not comply with these existing turn restrictions. Some site-generated traffic originating/destined from/to the east will be required to travel along the southern portion on Clifton Road during the peak hours to comply with the existing turn restrictions. This is represented in Figure 9.

3.2. BACKGROUND NETWORK TRAVEL DEMANDS

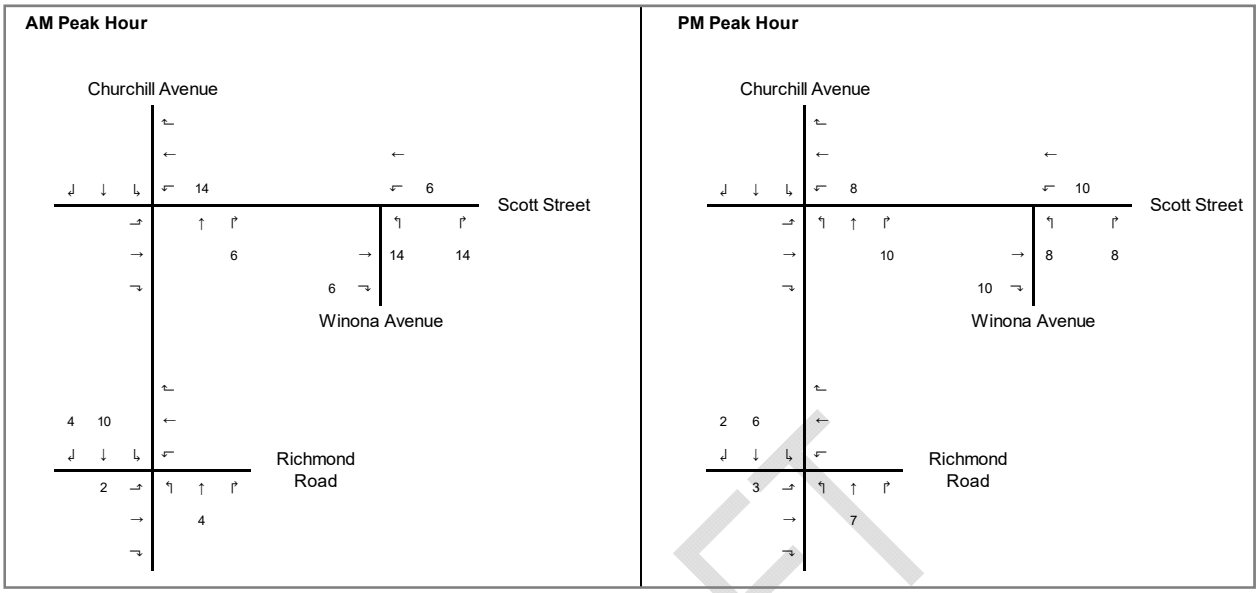
3.2.1. TRANSPORTATION NETWORK PLANS

Refer to section 2.1.3 Planned Conditions – Planned Study Area Transportation Network Changes.

3.2.2. BACKGROUND GROWTH

Background traffic growth for the area is expected to grow based on significant planned area developments. However, given Stage 2 LRT construction, the City is expecting to see negative vehicle growth along Scott Street in the future (see map attached as Appendix E). As such, for background traffic projections, the projected vehicle volumes from the planned area developments (1960 Scott Street and 320 McRae) were layered onto the existing traffic volumes for the build out year 2020. As the City expects to see a significant increase in transit modes once Stage 2 LRT is constructed in this area (2023) and a decline in traffic volumes, and as there is likely to be continued development growth in the area, the vehicle traffic volumes for horizon year 2025 is assumed to be the same as year 2020.

Figure 12 - Site Trips



3.2 BACKGROUND NETWORK TRAVEL DEMAND

3.2.1 Transportation Network Plans

As outlined in **Table 4** in **Section 2.1.3.1**, there are two transit projects that are expected to occur within the vicinity of the proposed development; Western Light Rail Transit and the Richmond Road Transit Signal Priority. Based on direction from the City of Ottawa, the Western LRT is planned to be implemented by the 2027 ultimate horizon of the subject development.

3.2.2 Background Growth

The City of Ottawa provided **Figure 13** below, which outlines the average annual growth rates based on trend lines. As illustrated in this figure, the average annual growth in the Westboro neighbourhood is in the range of 0.2% - 2.0%. To be conservative, a 2% annual background growth rate was used in the subject analysis.

APPENDIX G

TDM Checklists

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	☑
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☑
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☑
	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)*	☑
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)*	☑

		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 Official Plan policy 4.3.10)*	☑
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 Official Plan policy 4.3.10)*	☑
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 Official Plan policy 4.3.11)*	☑
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☑
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☐
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	☐
	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	☐
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)	☐

		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 Official Plan policy 4.3.6)*	☑
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 Zoning By-law Section 111)*	☑
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 Zoning By-law Section 111)*	☑
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	☐
	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 Zoning By-law Section 111)*	☑
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi-family residential developments	☐
	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)	☐
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☐
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	☐
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐

		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	☑
	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 Zoning By-law Section 94)*	☐
	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	☐
	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	☑
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	☐
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 Zoning By-law Section 104)*	☐
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 Zoning By-law Section 111)*	☐
	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)	☐

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	☑
	1.2	**Travel surveys**	
BETTER	1.2.1	Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐
	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 *(multi-family, condominium)*	☑
	2.2	**Bicycle skills training**	
BETTER	2.2.1	Offer on-site cycling courses for residents, or subsidize off-site courses	☐

			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 *(multi-family, condominium)*	☑
BETTER		3.1.2	Provide real-time arrival information display at entrances *(multi-family, condominium)*	☐
		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	☐
BETTER		3.2.2	Offer at least one year of free monthly transit passes on residence purchase/move-in	☐
		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 *(subdivision)*	☐
		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)	☐
		4.	**CARSHARING & BIKESHARING**	
		4.1	**Bikeshare stations & memberships**	
BETTER		4.1.1	Contract with provider to install on-site bikeshare station (*multi-family)*	☐
BETTER		4.1.2	Provide residents with bikeshare memberships, either free or subsidized *(multi-family)*	☐
		4.2	**Carshare vehicles & memberships**	
BETTER		4.2.1	Contract with provider to install on-site carshare vehicles and promote their use by residents	☐
BETTER		4.2.2	Provide residents with carshare memberships, either free or subsidized	☐
		5.	**PARKING**	
		5.1	**Priced parking**	
BASIC	★	5.1.1	Unbundle parking cost from purchase price *(condominium)*	☐
BASIC	★	5.1.2	Unbundle parking cost from monthly rent *(multi-family)*	☑

			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 information package to new residents	☑
		6.2	**Personalized trip planning**	
BETTER	★	6.2.1	Offer personalized trip planning to new residents	☐

APPENDIX H

MMLOS Analysis

Pedestrian Level of Service (PLOS)

Sidewalk Width	Boulevard Width	Avg. Daily Curb Lane Traffic Volume	Presence of On-Street Parking	Operating Speed	Segment PLOS
Roosevelt Avenue (East Side)					
1.8m	0m	< 3,000 vpd	Yes	40 km/h	B
Wilmont Avenue (North Side)					
1.5m	0.5-2.0m	< 3,000 vpd	Yes	50 km/h	C
Winston Avenue (West Side)					
1.5m	0m	< 3,000 vpd	Yes	50 km/h	E

Bicycle Level of Service (BLOS)

Road Class	Bike Route	Type of Bikeway	Travel Lanes (Per Direction)	Operating Speed	Segment BLOS
Roosevelt Avenue					
Local	Local Route	Mixed Traffic	1	40km/h	A
Wilmont Avenue					
Local	N/A	Mixed Traffic	1	50km/h	B
Winston Avenue					
Local	N/A	Mixed Traffic	1	50km/h	B

Vehicle Level of Service (Auto LOS)

Direction	Directional Capacity[1]	Traffic Volumes		V/C Ratio and LOS			
		AM Peak	PM Peak	AM Peak		PM Peak	
				V/C	LOS	V/C	LOS
Roosevelt Avenue							
Northbound	400	39	59	0.10	A	0.15	A
Southbound	400	51	57	0.12	A	0.14	A
Wilmont Avenue							
Eastbound	400	10	6	0.03	A	0.02	A
Westbound	400	25	25	0.06	A	0.06	A

1. Lane capacity based on the City's guidelines for the TRANS Long-Range Transportation Model

No traffic count data was available for Winston Avenue. Winston Avenue is a north-south local roadway that dead-ends north of Richmond Road and feeds onto Churchill Avenue via three east-west local roadways (Wilmont Avenue, Whitby Avenue and Madison Avenue). Currently, there are a total of approximately 40 properties on Winston Avenue, all of which are exclusively residential in nature. The lane capacity along Winston Avenue is estimated at 400 vehicles per hour per lane based on the City's TRANS Long Range Transportation Model. It is not anticipated that traffic generated by these residential uses will exceed the theoretical capacity along Winston Avenue. As such, an Auto LOS of A, which represents 240 vehicles per hour or less in each direction, has been assigned to Winston Avenue.

Pedestrian Level of Service (PLOS)

Criteria	North Approach		South Approach		East Approach		West Approach	
Richmond Road/Churchill Avenue								
PETSI SCORE								
CROSSING DISTANCE CONDITIONS								
Median > 2.4m in Width	No	88	No	88	No	88	No	88
Lanes Crossed (3.5m Lane Width)	4		4		4		4	
SIGNAL PHASING AND TIMING								
Left Turn Conflict	Perm + Prot	-8	Permissive	-8	Permissive	-8	Permissive	-8
Right Turn Conflict	Permissive or Yield	-5	Permissive or Yield	-5	Permissive or Yield	-5	Permissive or Yield	-5
Right Turn on Red	RTOR Allowed	-3	RTOR Allowed	-3	RTOR Allowed	-3	RTOR Allowed	-3
Leading Pedestrian Interval	Yes	0	Yes	0	Yes	0	Yes	0
CORNER RADIUS								
Parallel Radius	> 5m to 10m	-5	> 5m to 10m	-5	> 5m to 10m	-5	> 5m to 10m	-5
Parallel Right Turn Channel	No Right Turn Channel	-4	No Right Turn Channel	-4	No Right Turn Channel	-4	No Right Turn Channel	-4
Perpendicular Radius	N/A	0	N/A	0	N/A	0	N/A	0
Perpendicular Right Turn Channel	N/A	0	N/A	0	N/A	0	N/A	0
CROSSING TREATMENT								
Treatment	Zebra Stripe	-4	Zebra Stripe	-4	Zebra Stripe	-4	Zebra Stripe	-4
PETSI SCORE		**59**		**59**		**59**		**59**
LOS		**D**		**D**		**D**		**D**
DELAY SCORE								
Cycle Length		80		80		80		80
Pedestrian Walk Time		13.9		27.9		17.8		17.8
DELAY SCORE		**27.3**		**17**		**24.2**		**24.2**
LOS		**C**		**B**		**C**		**C**
OVERALL		**D**		**D**		**D**		**D**

Criteria	North Approach		South Approach		East Approach		West Approach	
Richmond Road/Roosevelt Avenue								
PETSI SCORE								
CROSSING DISTANCE CONDITIONS								
Median > 2.4m in Width	No	88	No	105	No	88	No	88
Lanes Crossed (3.5m Lane Width)	4		3		4		4	
SIGNAL PHASING AND TIMING								
Left Turn Conflict	Permissive	-8	Permissive	-8	Permissive	-8	Permissive	-8
Right Turn Conflict	Permissive or Yield	-5	Permissive or Yield	-5	Permissive or Yield	-5	Permissive or Yield	-5
Right Turn on Red	RTOR Allowed	-3	RTOR Allowed	-3	RTOR Allowed	-3	RTOR Allowed	-3
Leading Pedestrian Interval	No	-2	No	-2	No	-2	No	-2
CORNER RADIUS								
Parallel Radius	> 5m to 10m	-5	> 3m to 5m	-4	> 3m to 5m	-4	> 5m to 10m	-5
Parallel Right Turn Channel	No Right Turn Channel	-4	No Right Turn Channel	-4	No Right Turn Channel	-4	No Right Turn Channel	-4
Perpendicular Radius	N/A	0	N/A	0	N/A	0	N/A	0
Perpendicular Right Turn Channel	N/A	0	N/A	0	N/A	0	N/A	0
CROSSING TREATMENT								
Treatment	Standard	-7	Standard	-4	Standard	-7	Standard	-7
PETSI SCORE		**54**		**79**		**55**		**54**
LOS		**D**		**B**		**D**		**D**
DELAY SCORE								
Cycle Length		70		85		85		85
Pedestrian Walk Time		31.6		31.6		9.4		9.4
DELAY SCORE		**10.5**		**16.8**		**33.6**		**33.6**
LOS		**B**		**B**		**D**		**D**
OVERALL		**D**		**B**		**D**		**D**

Bicycle Level of Service (BLOS)

Approach	Bikeway Facility Type	Criteria	Travel Lanes and/or Speed	BLOS
Richmond Road/Churchill Avenue				
North Approach	Mixed Traffic	Right Turn Lane Characteristics	No Impact to LTS	A
		Left Turn Accommodation	No Lane Crossed; 50km/h	B
South Approach	Mixed Traffic	Right Turn Lane Characteristics	No Impact to LTS	A
		Left Turn Accommodation	No Lanes Crossed; 50km/h	B
East Approach	Mixed Traffic	Right Turn Lane Characteristics	No Impact to LTS	A
		Left Turn Accommodation	One Lane Crossed; 50km/h	D
West Approach	Mixed Traffic	Right Turn Lane Characteristics	No Impact to LTS	A
		Left Turn Accommodation	One Lanes Crossed; 50km/h	D
Richmond Road/Roosevelt Avenue				
North Approach	Mixed Traffic	Right Turn Lane Characteristics	No Impact to LTS	A
		Left Turn Accommodation	No Lane Crossed; 40km/h	B
South Approach	Mixed Traffic	Right Turn Lane Characteristics	No Impact to LTS	A
		Left Turn Accommodation	No Lanes Crossed; 40km/h	B
East Approach	Mixed Traffic	Right Turn Lane Characteristics	No Impact to LTS	A
		Left Turn Accommodation	No Lane Crossed; 50km/h	B
West Approach	Mixed Traffic	Right Turn Lane Characteristics	No Impact to LTS	A
		Left Turn Accommodation	No Lanes Crossed; 50km/h	B

Transit Level of Service (TLOS)

Approach	Delay (sec.)		TLOS
	AM Peak	PM Peak	
Richmond Road/Churchill Avenue			
East Approach	22 seconds	26 seconds	D
West Approach	14 seconds	12 seconds	C
North Approach	37 seconds	35 seconds	E
South Approach	40 seconds	37 seconds	E
Richmond Road/Roosevelt Avenue			
East Approach	6 seconds	16 seconds	C
West Approach	9 seconds	9 seconds	B
North Approach	N/A	N/A	N/A
South Approach	N/A	N/A	N/A

Truck Level of Service (TkLOS)

Approach	Effective Corner Radius	Number of Receiving Lanes on Departure from Intersection	LOS
Richmond Road/Churchill Avenue			
North	< 10m	One	F
South	< 10m	One	F
West	< 10m	One	F
East	< 10m	One	F
Richmond Road/Roosevelt Avenue			
North	< 10m	One	F
South	< 10m	One	F
West	< 10m	One	F
East	< 10m	One	F

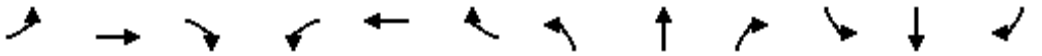
Vehicle Level of Service (Auto LOS)

Intersection	AM Peak			PM Peak		
	Max V/C or Delay	LOS	Movement	Max V/C or Delay	LOS	Movement
Signalized Intersections						
Richmond Road/ Churchill Avenue	0.79	C	NBT/L	0.69	B	NBT/L
Richmond Road/ Roosevelt Avenue	0.55	A	EB	0.76	C	WB
Unsignalized Intersections						
Churchill Avenue/ Scott Street	19 sec	C	NB	17 sec	C	WB
Churchill Avenue/ Wilmont Avenue	13 sec	B	EB	16 sec	C	EB

- The intersection parameters used in the analysis are consistent with the TIA guidelines (saturation flow rate: 1800 vphpl, PHF: 0.9)
- Detailed Synchro reports are included in **Appendix I**

APPENDIX I

Synchro Analysis Reports



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	262	390	29	43	183	19	24	273	83	21	319	135
Future Volume (vph)	262	390	29	43	183	19	24	273	83	21	319	135
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	25.0		0.0	15.0		15.0	15.0		15.0
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (m)	45.0			30.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97	0.99		0.94	0.99			1.00	0.89		1.00	0.88
Frt		0.990			0.986				0.850			0.850
Flt Protected	0.950			0.950				0.996			0.997	
Satd. Flow (prot)	1695	1734	0	1647	1668	0	0	1715	1517	0	1744	1488
Flt Permitted	0.489			0.496				0.838			0.962	
Satd. Flow (perm)	843	1734	0	812	1668	0	0	1438	1353	0	1678	1312
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			7				180			180
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		292.3			123.0			116.6			246.3	
Travel Time (s)		21.0			8.9			8.4			17.7	
Confl. Peds. (#/hr)	34		68	68		34	45		36	36		45
Confl. Bikes (#/hr)			11			1			8			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	3%	2%	5%	7%	5%	2%	6%	2%	5%	4%	4%
Adj. Flow (vph)	291	433	32	48	203	21	27	303	92	23	354	150
Shared Lane Traffic (%)												
Lane Group Flow (vph)	291	465	0	48	224	0	0	330	92	0	377	150
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		6	6		8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.1	31.1		31.1	31.1		30.0	30.0	30.0	30.0	30.0	30.0
Total Split (s)	14.0	40.1		31.1	31.1		30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	17.5%	50.1%		38.8%	38.8%		37.5%	37.5%	37.5%	37.5%	37.5%	37.5%
Maximum Green (s)	7.9	34.0		25.0	25.0		23.8	23.8	23.8	23.8	23.8	23.8
Yellow Time (s)	3.3	3.3		3.3	3.3		3.6	3.6	3.6	3.6	3.6	3.6

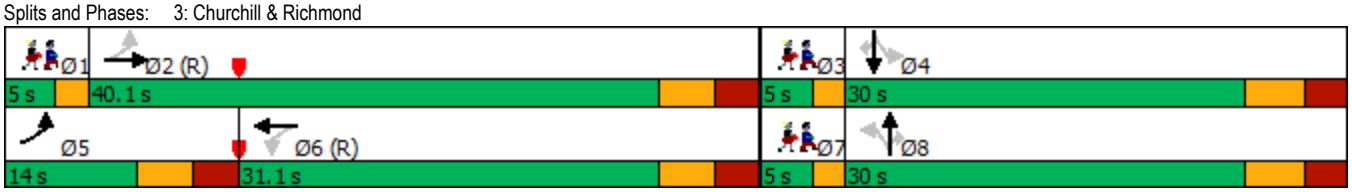
Lane Group	Ø1	Ø3	Ø7
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Storage Length (m)			
Storage Lanes			
Taper Length (m)			
Lane Util. Factor			
Ped Bike Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (k/h)			
Link Distance (m)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Heavy Vehicles (%)			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Enter Blocked Intersection			
Lane Alignment			
Median Width(m)			
Link Offset(m)			
Crosswalk Width(m)			
Two way Left Turn Lane			
Headway Factor			
Turning Speed (k/h)			
Number of Detectors			
Detector Template			
Leading Detector (m)			
Trailing Detector (m)			
Detector 1 Position(m)			
Detector 1 Size(m)			
Detector 1 Type			
Detector 1 Channel			
Detector 1 Extend (s)			
Detector 1 Queue (s)			
Detector 1 Delay (s)			
Detector 2 Position(m)			
Detector 2 Size(m)			
Detector 2 Type			
Detector 2 Channel			
Detector 2 Extend (s)			
Turn Type			
Protected Phases	1	3	7
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	3.0	3.0	3.0
Minimum Split (s)	5.0	5.0	5.0
Total Split (s)	5.0	5.0	5.0
Total Split (%)	6%	6%	6%
Maximum Green (s)	3.0	3.0	3.0
Yellow Time (s)	2.0	2.0	2.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
All-Red Time (s)	2.8	2.8		2.8	2.8		2.6	2.6	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1			6.2	6.2		6.2	6.2
Lead/Lag	Lead	Lag		Lag	Lag		Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		C-Max	C-Max		None	None	None	None	None	None
Walk Time (s)		14.0		14.0	14.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		15		15	15		15	15	15	15	15	15
Act Effct Green (s)	44.6	44.6		28.7	28.7			23.2	23.2		23.2	23.2
Actuated g/C Ratio	0.56	0.56		0.36	0.36			0.29	0.29		0.29	0.29
v/c Ratio	0.51	0.48		0.16	0.37			0.79	0.18		0.78	0.30
Control Delay	14.6	13.9		21.8	22.2			40.0	0.7		37.0	3.5
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	14.6	13.9		21.8	22.2			40.0	0.7		37.0	3.5
LOS	B	B		C	C			D	A		D	A
Approach Delay		14.2			22.1			31.4			27.5	
Approach LOS		B			C			C			C	
Queue Length 50th (m)	22.6	40.1		5.3	25.9			45.2	0.0		51.4	0.0
Queue Length 95th (m)	42.9	73.2		13.5	44.9			68.2	0.0		74.5	7.8
Internal Link Dist (m)		268.3			99.0			92.6			222.3	
Turn Bay Length (m)	30.0			25.0					15.0			15.0
Base Capacity (vph)	573	967		291	602			457	553		534	540
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	0.51	0.48		0.16	0.37			0.72	0.17		0.71	0.28

Intersection Summary

Area Type: Other
Cycle Length: 80.1
Actuated Cycle Length: 80.1
Offset: 43 (54%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 22.5 Intersection LOS: C
Intersection Capacity Utilization 87.6% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 3: Churchill & Richmond



Lane Group	Ø1	Ø3	Ø7
All-Red Time (s)	0.0	0.0	0.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0
Recall Mode	None	None	None
Walk Time (s)			
Flash Dont Walk (s)			
Pedestrian Calls (#/hr)			
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (m)			
Queue Length 95th (m)			
Internal Link Dist (m)			
Turn Bay Length (m)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

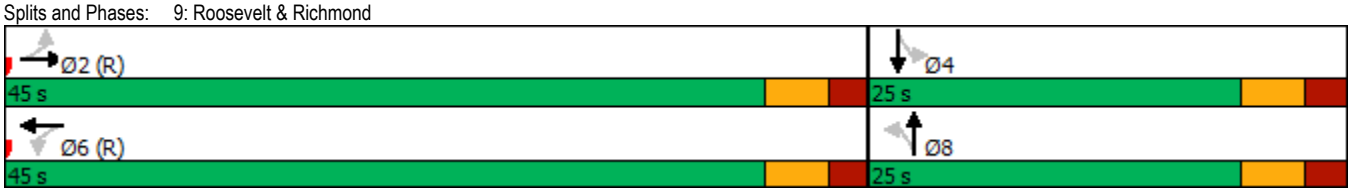
Intersection Summary

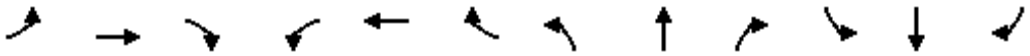
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	633	10	14	290	26	26	10	32	32	12	7
Future Volume (vph)	3	633	10	14	290	26	26	10	32	32	12	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.99			0.91			0.94	
Frt		0.998			0.989			0.936			0.981	
Flt Protected					0.998			0.981			0.969	
Satd. Flow (prot)	0	1761	0	0	1701	0	0	1563	0	0	1662	0
Flt Permitted		0.999			0.967			0.850			0.776	
Satd. Flow (perm)	0	1759	0	0	1646	0	0	1297	0	0	1275	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			10			36			8	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		84.5			292.3			66.1			286.3	
Travel Time (s)		6.1			21.0			5.9			25.8	
Confl. Peds. (#/hr)	74		69	69		74	65		40	40		65
Confl. Bikes (#/hr)			7			4			4			4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	3%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	3	703	11	16	322	29	29	11	36	36	13	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	717	0	0	367	0	0	76	0	0	57	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	34.4	34.4		34.4	34.4		25.0	25.0		25.0	25.0	
Total Split (s)	45.0	45.0		45.0	45.0		25.0	25.0		25.0	25.0	
Total Split (%)	64.3%	64.3%		64.3%	64.3%		35.7%	35.7%		35.7%	35.7%	
Maximum Green (s)	39.6	39.6		39.6	39.6		19.4	19.4		19.4	19.4	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.1	2.1		2.1	2.1		2.3	2.3		2.3	2.3	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.4			5.4			5.6			5.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	18.0	18.0		18.0	18.0		9.0	9.0		9.0	9.0	
Flash Dont Walk (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	15	15		0	0		15	15		15	15	
Act Effct Green (s)		51.4			51.4			11.8			11.8	
Actuated g/C Ratio		0.73			0.73			0.17			0.17	
v/c Ratio		0.55			0.30			0.31			0.26	
Control Delay		8.8			5.8			18.0			24.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.8			5.8			18.0			24.3	
LOS		A			A			B			C	
Approach Delay		8.8			5.8			18.0			24.3	
Approach LOS		A			A			B			C	
Queue Length 50th (m)		38.3			14.5			4.7			5.8	
Queue Length 95th (m)		99.9			39.1			13.2			12.9	
Internal Link Dist (m)		60.5			268.3			42.1			262.3	
Turn Bay Length (m)												
Base Capacity (vph)		1292			1211			385			359	
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		0.55			0.30			0.20			0.16	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 9.2		Intersection LOS: A	
Intersection Capacity Utilization 61.1%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 9: Roosevelt & Richmond

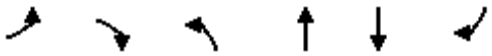




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	7	13	208	3	16	13	97	358	58	199	2
Future Volume (vph)	3	7	13	208	3	16	13	97	358	58	199	2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	3	8	14	231	3	18	14	108	398	64	221	2

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	25	252	520	287
Volume Left (vph)	3	231	14	64
Volume Right (vph)	14	18	398	2
Hadj (s)	-0.28	0.30	-0.39	0.07
Departure Headway (s)	6.3	6.3	4.9	5.6
Degree Utilization, x	0.04	0.44	0.71	0.45
Capacity (veh/h)	463	524	709	603
Control Delay (s)	9.6	14.1	18.8	13.2
Approach Delay (s)	9.6	14.1	18.8	13.2
Approach LOS	A	B	C	B

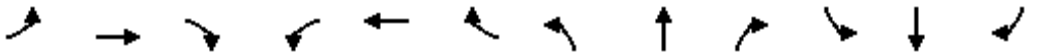
Intersection Summary				
Delay			16.0	
Level of Service			C	
Intersection Capacity Utilization			69.8%	ICU Level of Service
Analysis Period (min)			15	



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	9	20	513	448	5
Future Volume (Veh/h)	1	9	20	513	448	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1	10	22	570	498	6
Pedestrians	30			2	1	
Lane Width (m)	3.7			3.7	3.7	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	3			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				246		
pX, platoon unblocked	0.83					
vC, conflicting volume	1146	533	534			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1075	533	534			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	98	98			
cM capacity (veh/h)	192	530	1005			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	11	592	504
Volume Left	1	22	0
Volume Right	10	0	6
cSH	457	1005	1700
Volume to Capacity	0.02	0.02	0.30
Queue Length 95th (m)	0.6	0.5	0.0
Control Delay (s)	13.1	0.6	0.0
Lane LOS	B	A	
Approach Delay (s)	13.1	0.6	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		



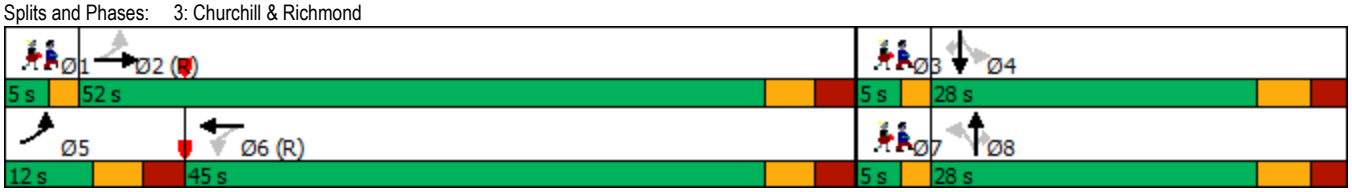
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	157	298	46	128	451	31	27	263	76	19	257	280
Future Volume (vph)	157	298	46	128	451	31	27	263	76	19	257	280
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	25.0		0.0	15.0		15.0	15.0		15.0
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (m)	45.0			30.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.96	0.96		0.83	0.99			0.99	0.85		1.00	0.77
Frt		0.980			0.990				0.850			0.850
Flt Protected	0.950			0.950				0.995			0.997	
Satd. Flow (prot)	1662	1677	0	1695	1747	0	0	1757	1517	0	1721	1517
Flt Permitted	0.248			0.535				0.923			0.960	
Satd. Flow (perm)	416	1677	0	790	1747	0	0	1613	1284	0	1650	1169
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			5				160			160
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		292.3			123.0			116.6			246.3	
Travel Time (s)		21.0			8.9			8.4			17.7	
Confl. Peds. (#/hr)	86		163	163		86	84		54	54		84
Confl. Bikes (#/hr)			2			4			1			3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	4%	2%	2%	2%	2%	2%	4%	3%	2%	11%	5%	2%
Adj. Flow (vph)	174	331	51	142	501	34	30	292	84	21	286	311
Shared Lane Traffic (%)												
Lane Group Flow (vph)	174	382	0	142	535	0	0	322	84	0	307	311
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		6	6		8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.1	31.1		31.1	31.1		24.2	24.2	24.2	24.2	24.2	24.2
Total Split (s)	12.0	52.0		45.0	45.0		28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	13.3%	57.8%		50.0%	50.0%		31.1%	31.1%	31.1%	31.1%	31.1%	31.1%
Maximum Green (s)	5.9	45.9		38.9	38.9		21.8	21.8	21.8	21.8	21.8	21.8
Yellow Time (s)	3.3	3.3		3.3	3.3		3.6	3.6	3.6	3.6	3.6	3.6

Lane Group	Ø1	Ø3	Ø7
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Storage Length (m)			
Storage Lanes			
Taper Length (m)			
Lane Util. Factor			
Ped Bike Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (k/h)			
Link Distance (m)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Heavy Vehicles (%)			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Enter Blocked Intersection			
Lane Alignment			
Median Width(m)			
Link Offset(m)			
Crosswalk Width(m)			
Two way Left Turn Lane			
Headway Factor			
Turning Speed (k/h)			
Number of Detectors			
Detector Template			
Leading Detector (m)			
Trailing Detector (m)			
Detector 1 Position(m)			
Detector 1 Size(m)			
Detector 1 Type			
Detector 1 Channel			
Detector 1 Extend (s)			
Detector 1 Queue (s)			
Detector 1 Delay (s)			
Detector 2 Position(m)			
Detector 2 Size(m)			
Detector 2 Type			
Detector 2 Channel			
Detector 2 Extend (s)			
Turn Type			
Protected Phases	1	3	7
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	3.0	3.0	3.0
Minimum Split (s)	5.0	5.0	5.0
Total Split (s)	5.0	5.0	5.0
Total Split (%)	6%	6%	6%
Maximum Green (s)	3.0	3.0	3.0
Yellow Time (s)	2.0	2.0	2.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
All-Red Time (s)	2.8	2.8		2.8	2.8		2.6	2.6	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1			6.2	6.2		6.2	6.2
Lead/Lag	Lead	Lag		Lag	Lag		Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		C-Max	C-Max		None	None	None	None	None	None
Walk Time (s)		14.0		14.0	14.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		15		15	15		15	15	15	15	15	15
Act Effct Green (s)	51.8	51.8		39.6	39.6			25.9	25.9		25.9	25.9
Actuated g/C Ratio	0.58	0.58		0.44	0.44			0.29	0.29		0.29	0.29
v/c Ratio	0.54	0.39		0.41	0.69			0.69	0.17		0.65	0.69
Control Delay	16.2	11.8		22.1	26.2			37.3	0.8		35.1	22.2
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	16.2	11.8		22.1	26.2			37.3	0.8		35.1	22.2
LOS	B	B		C	C			D	A		D	C
Approach Delay		13.2			25.4			29.7			28.6	
Approach LOS		B			C			C			C	
Queue Length 50th (m)	13.6	33.2		16.5	72.7			48.6	0.0		45.5	22.2
Queue Length 95th (m)	23.6	52.2		32.6	109.9			77.2	0.1		72.5	52.4
Internal Link Dist (m)		268.3			99.0			92.6			222.3	
Turn Bay Length (m)	30.0			25.0					15.0			15.0
Base Capacity (vph)	323	971		347	771			464	483		474	450
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	0.54	0.39		0.41	0.69			0.69	0.17		0.65	0.69

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 24.0		Intersection LOS: C	
Intersection Capacity Utilization 88.6%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 3: Churchill & Richmond



Lane Group	Ø1	Ø3	Ø7
All-Red Time (s)	0.0	0.0	0.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0
Recall Mode	None	None	None
Walk Time (s)			
Flash Dont Walk (s)			
Pedestrian Calls (#/hr)			
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (m)			
Queue Length 95th (m)			
Internal Link Dist (m)			
Turn Bay Length (m)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

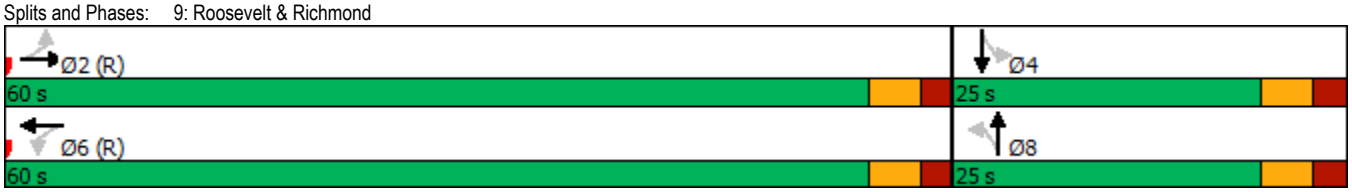
Intersection Summary

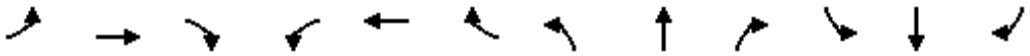
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	403	22	24	696	35	34	18	48	32	11	14
Future Volume (vph)	6	403	22	24	696	35	34	18	48	32	11	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98			0.98			0.82			0.84	
Frt		0.993			0.994			0.936			0.966	
Flt Protected		0.999			0.998			0.983			0.973	
Satd. Flow (prot)	0	1726	0	0	1750	0	0	1466	0	0	1560	0
Flt Permitted		0.989			0.978			0.883			0.805	
Satd. Flow (perm)	0	1708	0	0	1708	0	0	1210	0	0	1170	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			6			50			16	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		84.5			292.3			66.1			286.3	
Travel Time (s)		6.1			21.0			5.9			25.8	
Confl. Peds. (#/hr)	135		182	182		135	116		92	92		116
Confl. Bikes (#/hr)			3			9			2			5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	7	448	24	27	773	39	38	20	53	36	12	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	479	0	0	839	0	0	111	0	0	64	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	34.4	34.4		34.4	34.4		25.0	25.0		25.0	25.0	
Total Split (s)	60.0	60.0		60.0	60.0		25.0	25.0		25.0	25.0	
Total Split (%)	70.6%	70.6%		70.6%	70.6%		29.4%	29.4%		29.4%	29.4%	
Maximum Green (s)	54.6	54.6		54.6	54.6		19.4	19.4		19.4	19.4	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.1	2.1		2.1	2.1		2.3	2.3		2.3	2.3	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.4			5.4			5.6			5.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
Walk Time (s)	18.0	18.0		18.0	18.0		9.0	9.0		9.0	9.0	
Flash Dont Walk (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	15	15		0	0		15	15		15	15	
Act Effct Green (s)		54.6			54.6			19.4			19.4	
Actuated g/C Ratio		0.64			0.64			0.23			0.23	
v/c Ratio		0.44			0.76			0.35			0.23	
Control Delay		9.0			16.4			19.8			23.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.0			16.4			19.8			23.8	
LOS		A			B			B			C	
Approach Delay		9.0			16.4			19.8			23.8	
Approach LOS		A			B			B			C	
Queue Length 50th (m)		33.7			84.4			8.1			6.3	
Queue Length 95th (m)		52.4			134.2			22.2			16.7	
Internal Link Dist (m)		60.5			268.3			42.1			262.3	
Turn Bay Length (m)												
Base Capacity (vph)		1099			1099			314			279	
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		0.44			0.76			0.35			0.23	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 85			
Offset: 78 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 14.6		Intersection LOS: B	
Intersection Capacity Utilization 80.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 9: Roosevelt & Richmond

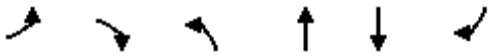




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	1	7	11	291	8	46	18	148	208	41	117	3
Future Volume (vph)	1	7	11	291	8	46	18	148	208	41	117	3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1	8	12	323	9	51	20	164	231	46	130	3

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	21	383	415	179
Volume Left (vph)	1	323	20	46
Volume Right (vph)	12	51	231	3
Hadj (s)	-0.30	0.14	-0.29	0.08
Departure Headway (s)	6.0	5.7	5.1	5.9
Degree Utilization, x	0.04	0.60	0.59	0.29
Capacity (veh/h)	478	601	663	563
Control Delay (s)	9.2	16.9	15.4	11.2
Approach Delay (s)	9.2	16.9	15.4	11.2
Approach LOS	A	C	C	B

Intersection Summary				
Delay			15.1	
Level of Service			C	
Intersection Capacity Utilization			58.6%	ICU Level of Service
Analysis Period (min)			15	



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	4	17	339	561	8
Future Volume (Veh/h)	2	4	17	339	561	8
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	2	4	19	377	623	9
Pedestrians	37				1	
Lane Width (m)	3.7				3.7	
Walking Speed (m/s)	1.1				1.1	
Percent Blockage	3				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				246		
pX, platoon unblocked	0.92					
vC, conflicting volume	1080	664	669			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1046	664	669			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	98			
cM capacity (veh/h)	221	444	889			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	6	396	632
Volume Left	2	19	0
Volume Right	4	0	9
cSH	332	889	1700
Volume to Capacity	0.02	0.02	0.37
Queue Length 95th (m)	0.4	0.5	0.0
Control Delay (s)	16.0	0.7	0.0
Lane LOS	C	A	
Approach Delay (s)	16.0	0.7	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	43.4%	ICU Level of Service	A
Analysis Period (min)	15		

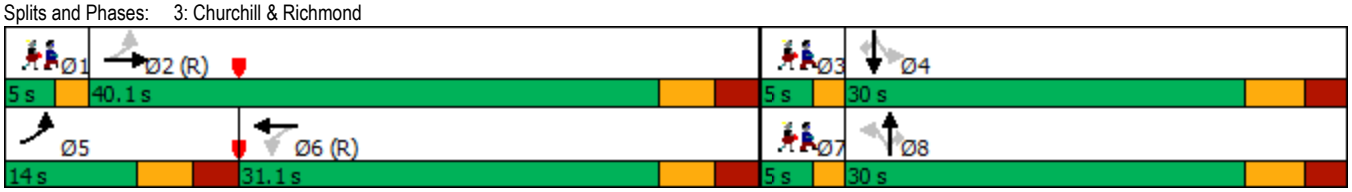
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	391	30	43	187	20	26	285	83	27	343	145
Future Volume (vph)	265	391	30	43	187	20	26	285	83	27	343	145
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	25.0		0.0	15.0		15.0	15.0		15.0
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (m)	45.0			30.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.96	0.99		0.94	0.99			1.00	0.89		1.00	0.88
Frt		0.989			0.986				0.850			0.850
Flt Protected	0.950			0.950				0.996			0.996	
Satd. Flow (prot)	1695	1732	0	1647	1668	0	0	1716	1517	0	1742	1488
Flt Permitted	0.510			0.516				0.852			0.955	
Satd. Flow (perm)	878	1732	0	840	1668	0	0	1462	1353	0	1665	1312
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			7				180			180
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		292.3			123.0			116.6			246.3	
Travel Time (s)		21.0			8.9			8.4			17.7	
Confl. Peds. (#/hr)	34		68	68		34	45		36	36		45
Confl. Bikes (#/hr)			11			1			8			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	3%	2%	5%	7%	5%	2%	6%	2%	5%	4%	4%
Adj. Flow (vph)	265	391	30	43	187	20	26	285	83	27	343	145
Shared Lane Traffic (%)												
Lane Group Flow (vph)	265	421	0	43	207	0	0	311	83	0	370	145
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		6	6		8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.1	31.1		31.1	31.1		30.0	30.0	30.0	30.0	30.0	30.0
Total Split (s)	14.0	40.1		31.1	31.1		30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	17.5%	50.1%		38.8%	38.8%		37.5%	37.5%	37.5%	37.5%	37.5%	37.5%
Maximum Green (s)	7.9	34.0		25.0	25.0		23.8	23.8	23.8	23.8	23.8	23.8
Yellow Time (s)	3.3	3.3		3.3	3.3		3.6	3.6	3.6	3.6	3.6	3.6

Lane Group	Ø1	Ø3	Ø7
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Storage Length (m)			
Storage Lanes			
Taper Length (m)			
Lane Util. Factor			
Ped Bike Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (k/h)			
Link Distance (m)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Heavy Vehicles (%)			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Enter Blocked Intersection			
Lane Alignment			
Median Width(m)			
Link Offset(m)			
Crosswalk Width(m)			
Two way Left Turn Lane			
Headway Factor			
Turning Speed (k/h)			
Number of Detectors			
Detector Template			
Leading Detector (m)			
Trailing Detector (m)			
Detector 1 Position(m)			
Detector 1 Size(m)			
Detector 1 Type			
Detector 1 Channel			
Detector 1 Extend (s)			
Detector 1 Queue (s)			
Detector 1 Delay (s)			
Detector 2 Position(m)			
Detector 2 Size(m)			
Detector 2 Type			
Detector 2 Channel			
Detector 2 Extend (s)			
Turn Type			
Protected Phases	1	3	7
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	3.0	3.0	3.0
Minimum Split (s)	5.0	5.0	5.0
Total Split (s)	5.0	5.0	5.0
Total Split (%)	6%	6%	6%
Maximum Green (s)	3.0	3.0	3.0
Yellow Time (s)	2.0	2.0	2.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
All-Red Time (s)	2.8	2.8		2.8	2.8		2.6	2.6	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1			6.2	6.2		6.2	6.2
Lead/Lag	Lead	Lag		Lag	Lag		Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		C-Max	C-Max		None	None	None	None	None	None
Walk Time (s)		14.0		14.0	14.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		15		15	15		15	15	15	15	15	15
Act Effct Green (s)	44.8	44.8		29.1	29.1			23.0	23.0		23.0	23.0
Actuated g/C Ratio	0.56	0.56		0.36	0.36			0.29	0.29		0.29	0.29
v/c Ratio	0.45	0.43		0.14	0.34			0.74	0.16		0.78	0.29
Control Delay	13.4	13.0		21.2	21.5			36.5	0.7		37.2	3.2
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	13.4	13.0		21.2	21.5			36.5	0.7		37.2	3.2
LOS	B	B		C	C			D	A		D	A
Approach Delay		13.2			21.5			28.9			27.6	
Approach LOS		B			C			C			C	
Queue Length 50th (m)	20.1	34.9		4.7	23.3			41.9	0.0		50.4	0.0
Queue Length 95th (m)	39.0	64.2		12.3	41.4			63.2	0.0		73.2	7.1
Internal Link Dist (m)		268.3			99.0			92.6			222.3	
Turn Bay Length (m)	30.0			25.0					15.0			15.0
Base Capacity (vph)	589	971		305	610			463	551		527	538
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	0.45	0.43		0.14	0.34			0.67	0.15		0.70	0.27

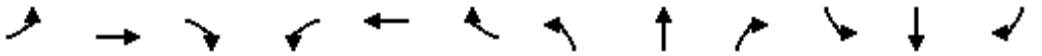
Intersection Summary			
Area Type:	Other		
Cycle Length: 80.1			
Actuated Cycle Length: 80.1			
Offset: 43 (54%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 21.7		Intersection LOS: C	
Intersection Capacity Utilization 94.2%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 3: Churchill & Richmond



Lane Group	Ø1	Ø3	Ø7
All-Red Time (s)	0.0	0.0	0.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0
Recall Mode	None	None	None
Walk Time (s)			
Flash Dont Walk (s)			
Pedestrian Calls (#/hr)			
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (m)			
Queue Length 95th (m)			
Internal Link Dist (m)			
Turn Bay Length (m)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary

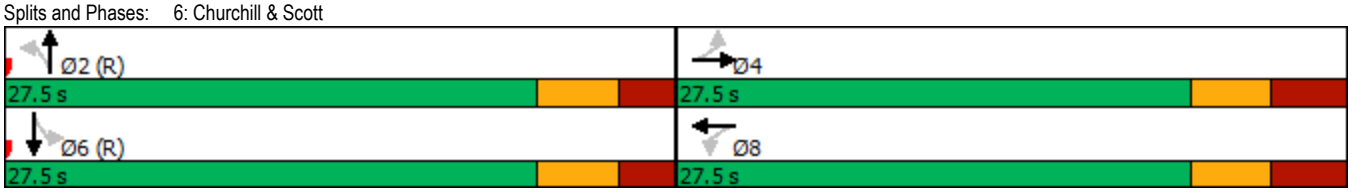


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	7	13	234	3	16	13	97	381	58	199	2
Future Volume (vph)	3	7	13	234	3	16	13	97	381	58	199	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	70.0		0.0	30.0		30.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			40.0			30.0			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.96			0.98			0.95			1.00	
Frt		0.924			0.991			0.895			0.999	
Flt Protected		0.994			0.956			0.999			0.989	
Satd. Flow (prot)	0	1236	0	0	1552	0	0	1493	0	0	1762	0
Flt Permitted		0.952			0.725			0.990			0.830	
Satd. Flow (perm)	0	1179	0	0	1160	0	0	1479	0	0	1476	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			7			376			1	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		72.6			123.8			85.2			89.5	
Travel Time (s)		5.2			8.9			6.1			6.4	
Confl. Peds. (#/hr)	33		12	12		33	32		10	10		32
Confl. Bikes (#/hr)			27			19			27			14
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	96%	2%	10%	98%	2%	2%	3%	4%	2%	2%	2%
Adj. Flow (vph)	3	7	13	234	3	16	13	97	381	58	199	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	23	0	0	253	0	0	491	0	0	259	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	27.5	27.5		27.5	27.5		26.7	26.7		26.7	26.7	
Total Split (s)	27.5	27.5		27.5	27.5		27.5	27.5		27.5	27.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	21.0	21.0		21.0	21.0		21.8	21.8		21.8	21.8	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
All-Red Time (s)	3.2	3.2		3.2	3.2		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.5			6.5			5.7			5.7	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		9.0	9.0		9.0	9.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		16.3			16.3			26.5			26.5	
Actuated g/C Ratio		0.30			0.30			0.48			0.48	
v/c Ratio		0.06			0.73			0.54			0.36	
Control Delay		8.4			28.7			5.8			12.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.4			28.7			5.8			12.3	
LOS		A			C			A			B	
Approach Delay		8.4			28.7			5.8			12.3	
Approach LOS		A			C			A			B	
Queue Length 50th (m)		0.7			21.3			6.1			15.3	
Queue Length 95th (m)		4.1			38.0			27.5			34.3	
Internal Link Dist (m)		48.6			99.8			61.2			65.5	
Turn Bay Length (m)												
Base Capacity (vph)		458			447			907			712	
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		0.05			0.57			0.54			0.36	

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 55			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 13.1		Intersection LOS: B	
Intersection Capacity Utilization 75.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 6: Churchill & Scott

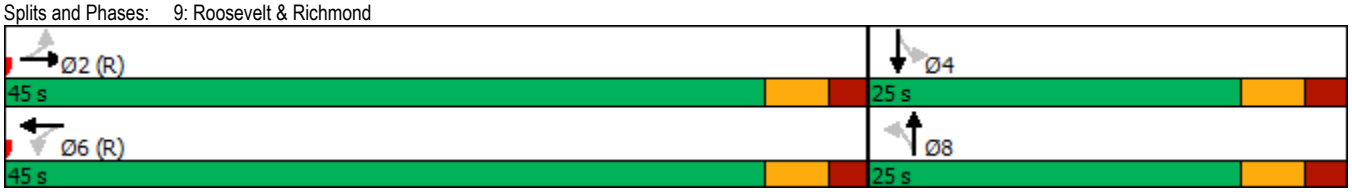


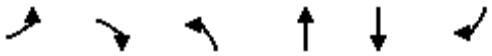
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	638	10	14	306	26	26	10	32	32	12	7
Future Volume (vph)	3	638	10	14	306	26	26	10	32	32	12	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.99			0.91			0.94	
Frt		0.998			0.990			0.936			0.981	
Flt Protected					0.998			0.981			0.970	
Satd. Flow (prot)	0	1761	0	0	1703	0	0	1563	0	0	1665	0
Flt Permitted		0.999			0.973			0.853			0.769	
Satd. Flow (perm)	0	1758	0	0	1658	0	0	1301	0	0	1264	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			10			32			7	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		84.5			292.3			66.1			286.3	
Travel Time (s)		6.1			21.0			5.9			25.8	
Confl. Peds. (#/hr)	74		69	69		74	65		40	40		65
Confl. Bikes (#/hr)			7			4			4			4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	3%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	3	638	10	14	306	26	26	10	32	32	12	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	651	0	0	346	0	0	68	0	0	51	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	34.4	34.4		34.4	34.4		25.0	25.0		25.0	25.0	
Total Split (s)	45.0	45.0		45.0	45.0		25.0	25.0		25.0	25.0	
Total Split (%)	64.3%	64.3%		64.3%	64.3%		35.7%	35.7%		35.7%	35.7%	
Maximum Green (s)	39.6	39.6		39.6	39.6		19.4	19.4		19.4	19.4	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.1	2.1		2.1	2.1		2.3	2.3		2.3	2.3	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.4			5.4			5.6			5.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	18.0	18.0		18.0	18.0		9.0	9.0		9.0	9.0	
Flash Dont Walk (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	15	15		0	0		15	15		15	15	
Act Effct Green (s)		55.6			55.6			11.8			11.8	
Actuated g/C Ratio		0.79			0.79			0.17			0.17	
v/c Ratio		0.47			0.26			0.28			0.23	
Control Delay		6.9			4.9			17.7			23.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		6.9			4.9			17.7			23.9	
LOS		A			A			B			C	
Approach Delay		6.9			4.9			17.7			23.9	
Approach LOS		A			A			B			C	
Queue Length 50th (m)		32.7			13.4			4.2			5.2	
Queue Length 95th (m)		84.7			36.4			12.2			12.0	
Internal Link Dist (m)		60.5			268.3			42.1			262.3	
Turn Bay Length (m)												
Base Capacity (vph)		1397			1319			383			355	
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			0.26			0.18			0.14	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.47			
Intersection Signal Delay: 7.7		Intersection LOS: A	
Intersection Capacity Utilization 61.4%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 9: Roosevelt & Richmond





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	9	20	536	474	5
Future Volume (Veh/h)	1	9	20	536	474	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1	9	20	536	474	5
Pedestrians	30			2	1	
Lane Width (m)	3.7			3.7	3.7	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	3			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				246	85	
pX, platoon unblocked	0.88	0.96	0.96			
vC, conflicting volume	1084	508	509			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	911	462	463			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	98			
cM capacity (veh/h)	255	556	1020			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	10	556	479
Volume Left	1	20	0
Volume Right	9	0	5
cSH	497	1020	1700
Volume to Capacity	0.02	0.02	0.28
Queue Length 95th (m)	0.5	0.5	0.0
Control Delay (s)	12.4	0.5	0.0
Lane LOS	B	A	
Approach Delay (s)	12.4	0.5	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	164	302	48	128	453	35	28	281	76	21	274	284
Future Volume (vph)	164	302	48	128	453	35	28	281	76	21	274	284
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	25.0		0.0	15.0		15.0	15.0		15.0
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (m)	45.0			30.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.95	0.96		0.82	0.99			0.99	0.85		1.00	0.77
Frt		0.979			0.989				0.850			0.850
Flt Protected	0.950			0.950				0.995			0.996	
Satd. Flow (prot)	1662	1673	0	1695	1743	0	0	1757	1517	0	1719	1517
Flt Permitted	0.298			0.551				0.908			0.949	
Satd. Flow (perm)	496	1673	0	806	1743	0	0	1587	1284	0	1630	1169
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			5				160			160
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		292.3			123.0			116.6			246.3	
Travel Time (s)		21.0			8.9			8.4			17.7	
Confl. Peds. (#/hr)	86		163	163		86	84		54	54		84
Confl. Bikes (#/hr)			2			4			1			3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	2%	2%	2%	2%	2%	4%	3%	2%	11%	5%	2%
Adj. Flow (vph)	164	302	48	128	453	35	28	281	76	21	274	284
Shared Lane Traffic (%)												
Lane Group Flow (vph)	164	350	0	128	488	0	0	309	76	0	295	284
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		6	6		8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.1	31.1		31.1	31.1		24.2	24.2	24.2	24.2	24.2	24.2
Total Split (s)	12.0	52.0		45.0	45.0		28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	13.3%	57.8%		50.0%	50.0%		31.1%	31.1%	31.1%	31.1%	31.1%	31.1%
Maximum Green (s)	5.9	45.9		38.9	38.9		21.8	21.8	21.8	21.8	21.8	21.8
Yellow Time (s)	3.3	3.3		3.3	3.3		3.6	3.6	3.6	3.6	3.6	3.6

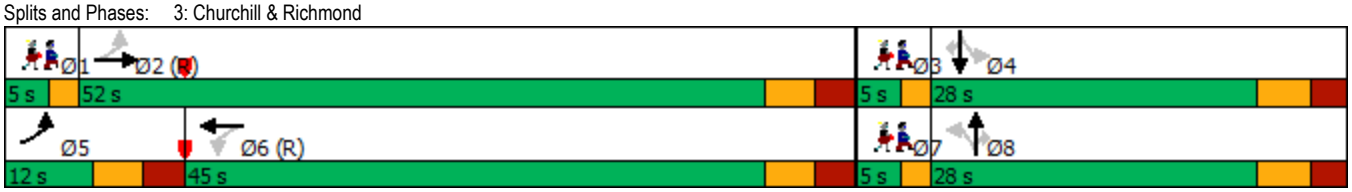
Lane Group	Ø1	Ø3	Ø7
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Storage Length (m)			
Storage Lanes			
Taper Length (m)			
Lane Util. Factor			
Ped Bike Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (k/h)			
Link Distance (m)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Heavy Vehicles (%)			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Enter Blocked Intersection			
Lane Alignment			
Median Width(m)			
Link Offset(m)			
Crosswalk Width(m)			
Two way Left Turn Lane			
Headway Factor			
Turning Speed (k/h)			
Number of Detectors			
Detector Template			
Leading Detector (m)			
Trailing Detector (m)			
Detector 1 Position(m)			
Detector 1 Size(m)			
Detector 1 Type			
Detector 1 Channel			
Detector 1 Extend (s)			
Detector 1 Queue (s)			
Detector 1 Delay (s)			
Detector 2 Position(m)			
Detector 2 Size(m)			
Detector 2 Type			
Detector 2 Channel			
Detector 2 Extend (s)			
Turn Type			
Protected Phases	1	3	7
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	3.0	3.0	3.0
Minimum Split (s)	5.0	5.0	5.0
Total Split (s)	5.0	5.0	5.0
Total Split (%)	6%	6%	6%
Maximum Green (s)	3.0	3.0	3.0
Yellow Time (s)	2.0	2.0	2.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
All-Red Time (s)	2.8	2.8		2.8	2.8		2.6	2.6	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1			6.2	6.2		6.2	6.2
Lead/Lag	Lead	Lag		Lag	Lag		Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		C-Max	C-Max		None	None	None	None	None	None
Walk Time (s)		14.0		14.0	14.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		15		15	15		15	15	15	15	15	15
Act Effct Green (s)	53.8	53.8		41.0	41.0			23.9	23.9		23.9	23.9
Actuated g/C Ratio	0.60	0.60		0.46	0.46			0.27	0.27		0.27	0.27
v/c Ratio	0.43	0.35		0.35	0.61			0.74	0.17		0.68	0.67
Control Delay	12.6	10.6		20.3	23.1			40.9	0.8		37.9	20.4
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	12.6	10.6		20.3	23.1			40.9	0.8		37.9	20.4
LOS	B	B		C	C			D	A		D	C
Approach Delay		11.3			22.6			33.0			29.4	
Approach LOS		B			C			C			C	
Queue Length 50th (m)	12.3	28.6		14.5	63.8			47.3	0.0		44.4	17.5
Queue Length 95th (m)	22.2	47.2		29.0	96.9			74.2	0.0		69.9	44.2
Internal Link Dist (m)		268.3			99.0			92.6			222.3	
Turn Bay Length (m)	30.0			25.0					15.0			15.0
Base Capacity (vph)	383	1006		367	797			435	468		447	437
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	0.43	0.35		0.35	0.61			0.71	0.16		0.66	0.65

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 23.6 Intersection LOS: C
Intersection Capacity Utilization 91.6% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 3: Churchill & Richmond



Lane Group	Ø1	Ø3	Ø7
All-Red Time (s)	0.0	0.0	0.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0
Recall Mode	None	None	None
Walk Time (s)			
Flash Dont Walk (s)			
Pedestrian Calls (#/hr)			
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (m)			
Queue Length 95th (m)			
Internal Link Dist (m)			
Turn Bay Length (m)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary

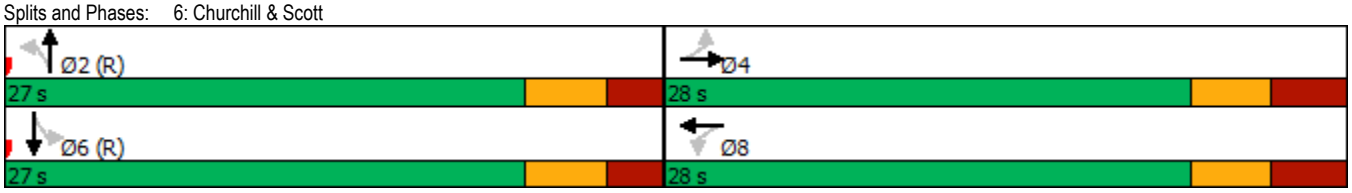
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	7	11	314	8	46	18	148	231	41	117	3
Future Volume (vph)	1	7	11	314	8	46	18	148	231	41	117	3
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	70.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			40.0			30.0			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.97			0.97			0.96			1.00	
Frt		0.922			0.983			0.921			0.997	
Flt Protected		0.997			0.959			0.998			0.987	
Satd. Flow (prot)	0	1187	0	0	1609	0	0	1584	0	0	1753	0
Flt Permitted		0.980			0.744			0.984			0.846	
Satd. Flow (perm)	0	1165	0	0	1225	0	0	1558	0	0	1499	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			15			149			2	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		72.6			123.8			85.2			89.5	
Travel Time (s)		5.2			8.9			6.1			6.4	
Confl. Peds. (#/hr)	41		17	17		41	33		11	11		33
Confl. Bikes (#/hr)			12			61			22			26
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	96%	2%	2%	96%	9%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	1	7	11	314	8	46	18	148	231	41	117	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	19	0	0	368	0	0	397	0	0	161	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	27.5	27.5		27.5	27.5		26.7	26.7		23.7	23.7	
Total Split (s)	28.0	28.0		28.0	28.0		27.0	27.0		27.0	27.0	
Total Split (%)	50.9%	50.9%		50.9%	50.9%		49.1%	49.1%		49.1%	49.1%	
Maximum Green (s)	21.5	21.5		21.5	21.5		21.3	21.3		21.3	21.3	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
All-Red Time (s)	3.2	3.2		3.2	3.2		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.5			6.5			5.7			5.7	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		9.0	9.0		9.0	9.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		19.2			19.2			23.6			23.6	
Actuated g/C Ratio		0.35			0.35			0.43			0.43	
v/c Ratio		0.05			0.84			0.53			0.25	
Control Delay		7.9			34.7			10.9			12.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		7.9			34.7			10.9			12.4	
LOS		A			C			B			B	
Approach Delay		7.9			34.7			10.9			12.4	
Approach LOS		A			C			B			B	
Queue Length 50th (m)		0.5			29.1			17.3			10.4	
Queue Length 95th (m)		3.5			#67.9			39.3			21.5	
Internal Link Dist (m)		48.6			99.8			61.2			65.5	
Turn Bay Length (m)												
Base Capacity (vph)		462			488			753			643	
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		0.04			0.75			0.53			0.25	

Intersection Summary

Area Type: Other
Cycle Length: 55
Actuated Cycle Length: 55
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 20.4 Intersection LOS: C
Intersection Capacity Utilization 64.8% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Churchill & Scott

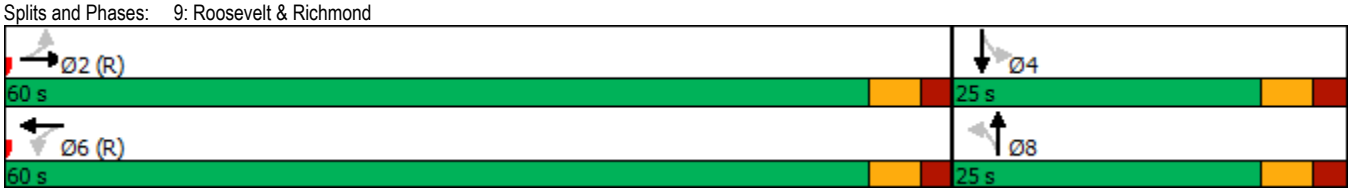


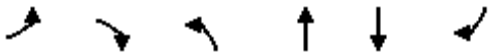
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	416	22	24	703	35	34	18	48	32	11	14
Future Volume (vph)	6	416	22	24	703	35	34	18	48	32	11	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98			0.98			0.82			0.84	
Frt		0.993			0.994			0.935			0.967	
Flt Protected		0.999			0.998			0.983			0.973	
Satd. Flow (prot)	0	1727	0	0	1751	0	0	1463	0	0	1563	0
Flt Permitted		0.992			0.980			0.889			0.816	
Satd. Flow (perm)	0	1713	0	0	1711	0	0	1216	0	0	1185	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			6			48			14	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		84.5			292.3			66.1			286.3	
Travel Time (s)		6.1			21.0			5.9			25.8	
Confl. Peds. (#/hr)	135		182	182		135	116		92	92		116
Confl. Bikes (#/hr)			3			9			2			5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	6	416	22	24	703	35	34	18	48	32	11	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	444	0	0	762	0	0	100	0	0	57	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	34.4	34.4		34.4	34.4		25.0	25.0		25.0	25.0	
Total Split (s)	60.0	60.0		60.0	60.0		25.0	25.0		25.0	25.0	
Total Split (%)	70.6%	70.6%		70.6%	70.6%		29.4%	29.4%		29.4%	29.4%	
Maximum Green (s)	54.6	54.6		54.6	54.6		19.4	19.4		19.4	19.4	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.1	2.1		2.1	2.1		2.3	2.3		2.3	2.3	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.4			5.4			5.6			5.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
Walk Time (s)	18.0	18.0		18.0	18.0		9.0	9.0		9.0	9.0	
Flash Dont Walk (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	15	15		0	0		15	15		15	15	
Act Effct Green (s)		54.6			54.6			19.4			19.4	
Actuated g/C Ratio		0.64			0.64			0.23			0.23	
v/c Ratio		0.40			0.69			0.32			0.20	
Control Delay		8.6			13.9			18.8			23.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.6			13.9			18.8			23.5	
LOS		A			B			B			C	
Approach Delay		8.6			13.9			18.8			23.5	
Approach LOS		A			B			B			C	
Queue Length 50th (m)		30.3			70.2			6.8			5.6	
Queue Length 95th (m)		47.4			109.7			19.8			15.3	
Internal Link Dist (m)		60.5			268.3			42.1			262.3	
Turn Bay Length (m)												
Base Capacity (vph)		1102			1101			314			281	
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		0.40			0.69			0.32			0.20	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 85			
Offset: 78 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 12.9		Intersection LOS: B	
Intersection Capacity Utilization 81.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 9: Roosevelt & Richmond





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	4	17	362	584	8
Future Volume (Veh/h)	2	4	17	362	584	8
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	4	17	362	584	8
Pedestrians	37				1	
Lane Width (m)	3.7				3.7	
Walking Speed (m/s)	1.1				1.1	
Percent Blockage	3				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				246	85	
pX, platoon unblocked	0.93					
vC, conflicting volume	1022	625	629			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	985	625	629			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	98			
cM capacity (veh/h)	242	468	920			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	6	379	592
Volume Left	2	17	0
Volume Right	4	0	8
cSH	357	920	1700
Volume to Capacity	0.02	0.02	0.35
Queue Length 95th (m)	0.4	0.4	0.0
Control Delay (s)	15.3	0.6	0.0
Lane LOS	C	A	
Approach Delay (s)	15.3	0.6	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

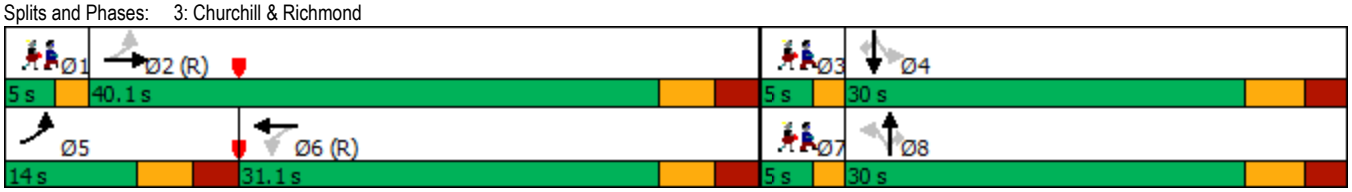
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	395	33	43	188	21	27	286	83	31	346	145
Future Volume (vph)	265	395	33	43	188	21	27	286	83	31	346	145
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	25.0		0.0	15.0		15.0	15.0		15.0
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (m)	45.0			30.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97	0.99		0.94	0.99			1.00	0.89		1.00	0.88
Frt		0.988			0.985				0.850			0.850
Flt Protected	0.950			0.950				0.996			0.996	
Satd. Flow (prot)	1695	1729	0	1647	1666	0	0	1716	1517	0	1742	1488
Flt Permitted	0.506			0.513				0.843			0.944	
Satd. Flow (perm)	871	1729	0	836	1666	0	0	1447	1353	0	1645	1312
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			7				180			180
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		292.3			123.0			116.6			246.3	
Travel Time (s)		21.0			8.9			8.4			17.7	
Confl. Peds. (#/hr)	34		68	68		34	45		36	36		45
Confl. Bikes (#/hr)			11			1			8			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	3%	2%	5%	7%	5%	2%	6%	2%	5%	4%	4%
Adj. Flow (vph)	265	395	33	43	188	21	27	286	83	31	346	145
Shared Lane Traffic (%)												
Lane Group Flow (vph)	265	428	0	43	209	0	0	313	83	0	377	145
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		6	6		8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.1	31.1		31.1	31.1		30.0	30.0	30.0	30.0	30.0	30.0
Total Split (s)	14.0	40.1		31.1	31.1		30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	17.5%	50.1%		38.8%	38.8%		37.5%	37.5%	37.5%	37.5%	37.5%	37.5%
Maximum Green (s)	7.9	34.0		25.0	25.0		23.8	23.8	23.8	23.8	23.8	23.8
Yellow Time (s)	3.3	3.3		3.3	3.3		3.6	3.6	3.6	3.6	3.6	3.6

Lane Group	Ø1	Ø3	Ø7
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Storage Length (m)			
Storage Lanes			
Taper Length (m)			
Lane Util. Factor			
Ped Bike Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (k/h)			
Link Distance (m)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Heavy Vehicles (%)			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Enter Blocked Intersection			
Lane Alignment			
Median Width(m)			
Link Offset(m)			
Crosswalk Width(m)			
Two way Left Turn Lane			
Headway Factor			
Turning Speed (k/h)			
Number of Detectors			
Detector Template			
Leading Detector (m)			
Trailing Detector (m)			
Detector 1 Position(m)			
Detector 1 Size(m)			
Detector 1 Type			
Detector 1 Channel			
Detector 1 Extend (s)			
Detector 1 Queue (s)			
Detector 1 Delay (s)			
Detector 2 Position(m)			
Detector 2 Size(m)			
Detector 2 Type			
Detector 2 Channel			
Detector 2 Extend (s)			
Turn Type			
Protected Phases	1	3	7
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	3.0	3.0	3.0
Minimum Split (s)	5.0	5.0	5.0
Total Split (s)	5.0	5.0	5.0
Total Split (%)	6%	6%	6%
Maximum Green (s)	3.0	3.0	3.0
Yellow Time (s)	2.0	2.0	2.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
All-Red Time (s)	2.8	2.8		2.8	2.8		2.6	2.6	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1			6.2	6.2		6.2	6.2
Lead/Lag	Lead	Lag		Lag	Lag		Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		C-Max	C-Max		None	None	None	None	None	None
Walk Time (s)		14.0		14.0	14.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		15		15	15		15	15	15	15	15	15
Act Effct Green (s)	44.4	44.4		28.8	28.8			23.4	23.4		23.4	23.4
Actuated g/C Ratio	0.55	0.55		0.36	0.36			0.29	0.29		0.29	0.29
v/c Ratio	0.46	0.45		0.14	0.35			0.74	0.16		0.78	0.28
Control Delay	13.7	13.4		21.4	21.8			36.1	0.7		37.5	3.2
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	13.7	13.4		21.4	21.8			36.1	0.7		37.5	3.2
LOS	B	B		C	C			D	A		D	A
Approach Delay		13.5			21.7			28.7			28.0	
Approach LOS		B			C			C			C	
Queue Length 50th (m)	20.4	36.1		4.7	23.9			41.9	0.0		51.3	0.0
Queue Length 95th (m)	39.0	65.5		12.3	41.8			63.9	0.0		75.2	7.1
Internal Link Dist (m)		268.3			99.0			92.6			222.3	
Turn Bay Length (m)	30.0			25.0					15.0			15.0
Base Capacity (vph)	580	960		299	602			462	554		525	541
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	0.46	0.45		0.14	0.35			0.68	0.15		0.72	0.27

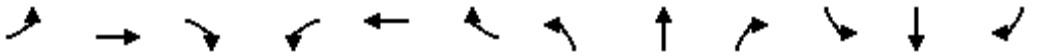
Intersection Summary			
Area Type:	Other		
Cycle Length: 80.1			
Actuated Cycle Length: 80.1			
Offset: 43 (54%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 21.9		Intersection LOS: C	
Intersection Capacity Utilization 95.3%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 3: Churchill & Richmond



Lane Group	Ø1	Ø3	Ø7
All-Red Time (s)	0.0	0.0	0.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0
Recall Mode	None	None	None
Walk Time (s)			
Flash Dont Walk (s)			
Pedestrian Calls (#/hr)			
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (m)			
Queue Length 95th (m)			
Internal Link Dist (m)			
Turn Bay Length (m)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary

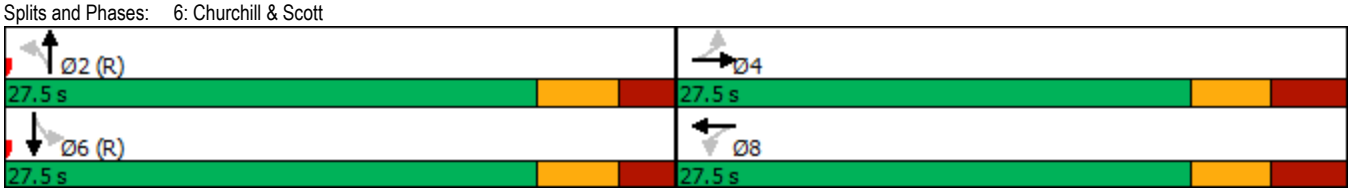


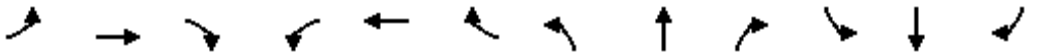
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	7	13	236	3	16	13	97	388	58	199	2
Future Volume (vph)	3	7	13	236	3	16	13	97	388	58	199	2
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	70.0		0.0	30.0		30.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			40.0			30.0			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.96			0.98			0.95			1.00	
Frt		0.924			0.992			0.895			0.999	
Flt Protected		0.994			0.956			0.999			0.989	
Satd. Flow (prot)	0	1236	0	0	1554	0	0	1493	0	0	1762	0
Flt Permitted		0.951			0.725			0.990			0.828	
Satd. Flow (perm)	0	1178	0	0	1162	0	0	1478	0	0	1473	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			7			382			1	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		72.6			123.8			85.2			89.5	
Travel Time (s)		5.2			8.9			6.1			6.4	
Confl. Peds. (#/hr)	33		12	12		33	32		10	10		32
Confl. Bikes (#/hr)			27			19			27			14
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	96%	2%	10%	98%	2%	2%	3%	4%	2%	2%	2%
Adj. Flow (vph)	3	7	13	236	3	16	13	97	388	58	199	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	23	0	0	255	0	0	498	0	0	259	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	27.5	27.5		27.5	27.5		26.7	26.7		26.7	26.7	
Total Split (s)	27.5	27.5		27.5	27.5		27.5	27.5		27.5	27.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	21.0	21.0		21.0	21.0		21.8	21.8		21.8	21.8	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
All-Red Time (s)	3.2	3.2		3.2	3.2		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.5			6.5			5.7			5.7	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		9.0	9.0		9.0	9.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		16.3			16.3			26.5			26.5	
Actuated g/C Ratio		0.30			0.30			0.48			0.48	
v/c Ratio		0.06			0.73			0.55			0.37	
Control Delay		8.4			28.8			5.9			12.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.4			28.8			5.9			12.3	
LOS		A			C			A			B	
Approach Delay		8.4			28.8			5.9			12.3	
Approach LOS		A			C			A			B	
Queue Length 50th (m)		0.7			21.3			6.2			15.3	
Queue Length 95th (m)		4.1			38.3			28.0			34.3	
Internal Link Dist (m)		48.6			99.8			61.2			65.5	
Turn Bay Length (m)												
Base Capacity (vph)		457			448			909			709	
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		0.05			0.57			0.55			0.37	

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 55			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 13.2		Intersection LOS: B	
Intersection Capacity Utilization 75.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 6: Churchill & Scott



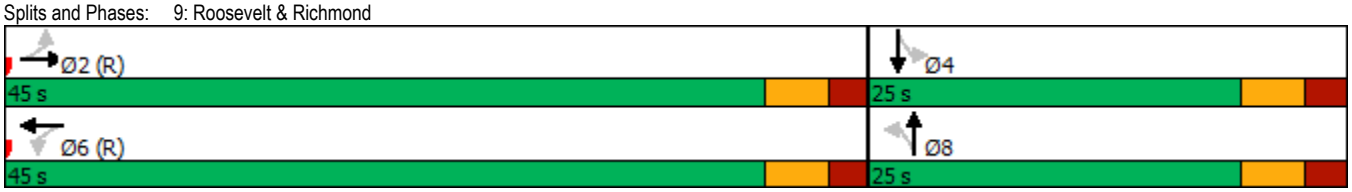


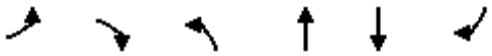
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	638	10	14	306	28	26	10	32	39	13	12
Future Volume (vph)	5	638	10	14	306	28	26	10	32	39	13	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.99			0.91			0.93	
Frt		0.998			0.989			0.936			0.975	
Flt Protected					0.998			0.981			0.970	
Satd. Flow (prot)	0	1761	0	0	1700	0	0	1563	0	0	1643	0
Flt Permitted		0.998			0.973			0.847			0.774	
Satd. Flow (perm)	0	1756	0	0	1656	0	0	1293	0	0	1257	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			10			32			12	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		84.5			292.3			66.1			286.3	
Travel Time (s)		6.1			21.0			5.9			25.8	
Confl. Peds. (#/hr)	74		69	69		74	65		40	40		65
Confl. Bikes (#/hr)			7			4			4			4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	3%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	5	638	10	14	306	28	26	10	32	39	13	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	653	0	0	348	0	0	68	0	0	64	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	34.4	34.4		34.4	34.4		25.0	25.0		25.0	25.0	
Total Split (s)	45.0	45.0		45.0	45.0		25.0	25.0		25.0	25.0	
Total Split (%)	64.3%	64.3%		64.3%	64.3%		35.7%	35.7%		35.7%	35.7%	
Maximum Green (s)	39.6	39.6		39.6	39.6		19.4	19.4		19.4	19.4	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.1	2.1		2.1	2.1		2.3	2.3		2.3	2.3	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.4			5.4			5.6			5.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	18.0	18.0		18.0	18.0		9.0	9.0		9.0	9.0	
Flash Dont Walk (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	15	15		0	0		15	15		15	15	
Act Effct Green (s)		55.6			55.6			11.8			11.8	
Actuated g/C Ratio		0.79			0.79			0.17			0.17	
v/c Ratio		0.47			0.26			0.28			0.29	
Control Delay		6.9			5.0			17.7			24.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		6.9			5.0			17.7			24.0	
LOS		A			A			B			C	
Approach Delay		6.9			5.0			17.7			24.0	
Approach LOS		A			A			B			C	
Queue Length 50th (m)		32.8			13.5			4.2			6.2	
Queue Length 95th (m)		85.0			36.5			12.2			13.8	
Internal Link Dist (m)		60.5			268.3			42.1			262.3	
Turn Bay Length (m)												
Base Capacity (vph)		1395			1317			381			357	
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			0.26			0.18			0.18	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.47			
Intersection Signal Delay: 7.9		Intersection LOS: A	
Intersection Capacity Utilization 62.2%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 9: Roosevelt & Richmond

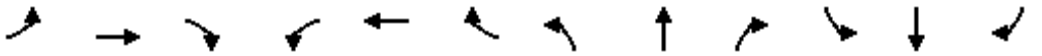




Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	16	22	536	474	7
Future Volume (Veh/h)	8	16	22	536	474	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	8	16	22	536	474	7
Pedestrians	30			2	1	
Lane Width (m)	3.7			3.7	3.7	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	3			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				246	85	
pX, platoon unblocked	0.88	0.96	0.96			
vC, conflicting volume	1088	510	511			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	916	463	465			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	97	98			
cM capacity (veh/h)	252	555	1018			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	24	558	481
Volume Left	8	22	0
Volume Right	16	0	7
cSH	396	1018	1700
Volume to Capacity	0.06	0.02	0.28
Queue Length 95th (m)	1.5	0.5	0.0
Control Delay (s)	14.7	0.6	0.0
Lane LOS	B	A	
Approach Delay (s)	14.7	0.6	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	164	304	49	128	456	38	30	284	76	23	275	284
Future Volume (vph)	164	304	49	128	456	38	30	284	76	23	275	284
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0		0.0	25.0		0.0	15.0		15.0	15.0		15.0
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (m)	45.0			30.0			15.0			15.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.95	0.96		0.82	0.99			0.99	0.85		0.99	0.77
Frt		0.979			0.988				0.850			0.850
Flt Protected	0.950			0.950				0.995			0.996	
Satd. Flow (prot)	1662	1672	0	1695	1739	0	0	1757	1517	0	1719	1517
Flt Permitted	0.287			0.550				0.910			0.944	
Satd. Flow (perm)	478	1672	0	805	1739	0	0	1590	1284	0	1621	1169
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			6				160			160
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		292.3			123.0			116.6			246.3	
Travel Time (s)		21.0			8.9			8.4			17.7	
Confl. Peds. (#/hr)	86		163	163		86	84		54	54		84
Confl. Bikes (#/hr)			2			4			1			3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	2%	2%	2%	2%	2%	4%	3%	2%	11%	5%	2%
Adj. Flow (vph)	164	304	49	128	456	38	30	284	76	23	275	284
Shared Lane Traffic (%)												
Lane Group Flow (vph)	164	353	0	128	494	0	0	314	76	0	298	284
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		6	6		8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.1	31.1		31.1	31.1		24.2	24.2	24.2	24.2	24.2	24.2
Total Split (s)	12.0	52.0		45.0	45.0		28.0	28.0	28.0	28.0	28.0	28.0
Total Split (%)	13.3%	57.8%		50.0%	50.0%		31.1%	31.1%	31.1%	31.1%	31.1%	31.1%
Maximum Green (s)	5.9	45.9		38.9	38.9		21.8	21.8	21.8	21.8	21.8	21.8
Yellow Time (s)	3.3	3.3		3.3	3.3		3.6	3.6	3.6	3.6	3.6	3.6

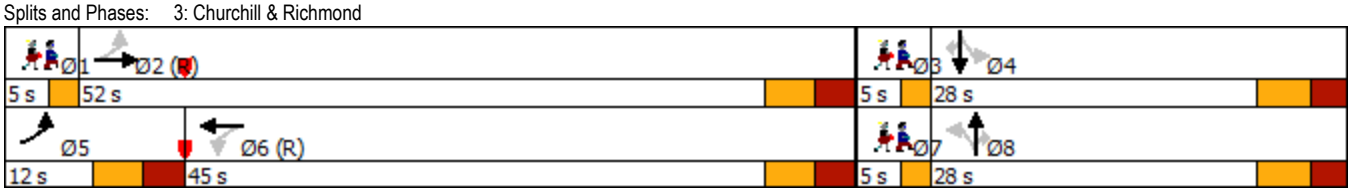
Lane Group	Ø1	Ø3	Ø7
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Storage Length (m)			
Storage Lanes			
Taper Length (m)			
Lane Util. Factor			
Ped Bike Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (k/h)			
Link Distance (m)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Heavy Vehicles (%)			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Enter Blocked Intersection			
Lane Alignment			
Median Width(m)			
Link Offset(m)			
Crosswalk Width(m)			
Two way Left Turn Lane			
Headway Factor			
Turning Speed (k/h)			
Number of Detectors			
Detector Template			
Leading Detector (m)			
Trailing Detector (m)			
Detector 1 Position(m)			
Detector 1 Size(m)			
Detector 1 Type			
Detector 1 Channel			
Detector 1 Extend (s)			
Detector 1 Queue (s)			
Detector 1 Delay (s)			
Detector 2 Position(m)			
Detector 2 Size(m)			
Detector 2 Type			
Detector 2 Channel			
Detector 2 Extend (s)			
Turn Type			
Protected Phases	1	3	7
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	3.0	3.0	3.0
Minimum Split (s)	5.0	5.0	5.0
Total Split (s)	5.0	5.0	5.0
Total Split (%)	6%	6%	6%
Maximum Green (s)	3.0	3.0	3.0
Yellow Time (s)	2.0	2.0	2.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
All-Red Time (s)	2.8	2.8		2.8	2.8		2.6	2.6	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Lost Time (s)	6.1	6.1		6.1	6.1			6.2	6.2		6.2	6.2
Lead/Lag	Lead	Lag		Lag	Lag		Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		C-Max	C-Max		None	None	None	None	None	None
Walk Time (s)		14.0		14.0	14.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		15		15	15		15	15	15	15	15	15
Act Effct Green (s)	52.9	52.9		40.2	40.2			24.8	24.8		24.8	24.8
Actuated g/C Ratio	0.59	0.59		0.45	0.45			0.28	0.28		0.28	0.28
v/c Ratio	0.45	0.36		0.36	0.63			0.72	0.16		0.67	0.65
Control Delay	13.3	11.1		20.7	24.0			39.1	0.7		36.6	19.6
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	13.3	11.1		20.7	24.0			39.1	0.7		36.6	19.6
LOS	B	B		C	C			D	A		D	B
Approach Delay		11.8			23.3			31.6			28.3	
Approach LOS		B			C			C			C	
Queue Length 50th (m)	12.7	29.9		14.5	64.8			47.3	0.0		44.1	17.1
Queue Length 95th (m)	22.2	47.4		29.0	98.6			75.3	0.0		70.7	44.2
Internal Link Dist (m)		268.3			99.0			92.6			222.3	
Turn Bay Length (m)	30.0			25.0					15.0			15.0
Base Capacity (vph)	366	987		359	781			447	476		455	443
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	0.45	0.36		0.36	0.63			0.70	0.16		0.65	0.64

Intersection Summary

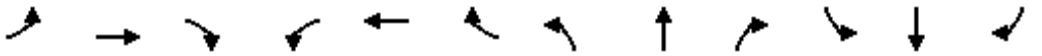
Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 23.4 — Intersection LOS: C
Intersection Capacity Utilization 92.4% — ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 3: Churchill & Richmond



Lane Group	Ø1	Ø3	Ø7
All-Red Time (s)	0.0	0.0	0.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0
Recall Mode	None	None	None
Walk Time (s)			
Flash Dont Walk (s)			
Pedestrian Calls (#/hr)			
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (m)			
Queue Length 95th (m)			
Internal Link Dist (m)			
Turn Bay Length (m)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			

Intersection Summary

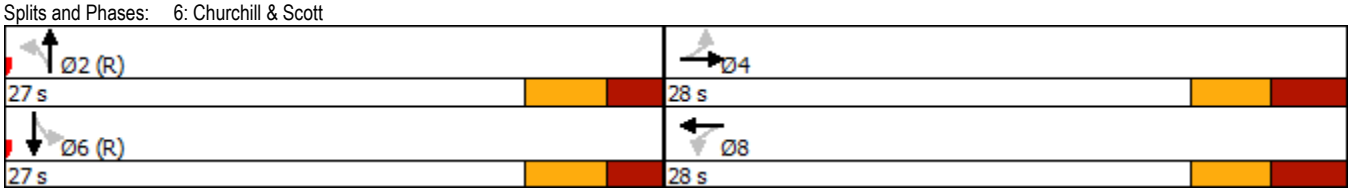


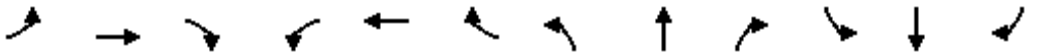
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	7	11	320	8	46	18	148	235	41	117	3
Future Volume (vph)	1	7	11	320	8	46	18	148	235	41	117	3
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	70.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.6			40.0			30.0			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.97			0.97			0.96			1.00	
Frt		0.922			0.983			0.921			0.997	
Flt Protected		0.997			0.959			0.998			0.987	
Satd. Flow (prot)	0	1187	0	0	1610	0	0	1583	0	0	1753	0
Flt Permitted		0.980			0.743			0.985			0.845	
Satd. Flow (perm)	0	1165	0	0	1225	0	0	1559	0	0	1497	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			15			151			2	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		72.6			123.8			85.2			89.5	
Travel Time (s)		5.2			8.9			6.1			6.4	
Confl. Peds. (#/hr)	41		17	17		41	33		11	11		33
Confl. Bikes (#/hr)			12			61			22			26
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	96%	2%	2%	96%	9%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	1	7	11	320	8	46	18	148	235	41	117	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	19	0	0	374	0	0	401	0	0	161	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	27.5	27.5		27.5	27.5		26.7	26.7		23.7	23.7	
Total Split (s)	28.0	28.0		28.0	28.0		27.0	27.0		27.0	27.0	
Total Split (%)	50.9%	50.9%		50.9%	50.9%		49.1%	49.1%		49.1%	49.1%	
Maximum Green (s)	21.5	21.5		21.5	21.5		21.3	21.3		21.3	21.3	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
All-Red Time (s)	3.2	3.2		3.2	3.2		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.5			6.5			5.7			5.7	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	14.0	14.0		14.0	14.0		9.0	9.0		9.0	9.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		19.3			19.3			23.5			23.5	
Actuated g/C Ratio		0.35			0.35			0.43			0.43	
v/c Ratio		0.05			0.85			0.53			0.25	
Control Delay		7.9			35.8			10.9			12.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		7.9			35.8			10.9			12.4	
LOS		A			D			B			B	
Approach Delay		7.9			35.8			10.9			12.4	
Approach LOS		A			D			B			B	
Queue Length 50th (m)		0.5			29.8			17.5			10.4	
Queue Length 95th (m)		3.5			#69.4			39.8			21.5	
Internal Link Dist (m)		48.6			99.8			61.2			65.5	
Turn Bay Length (m)												
Base Capacity (vph)		462			488			752			640	
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		0.04			0.77			0.53			0.25	

Intersection Summary			
Area Type:	Other		
Cycle Length: 55			
Actuated Cycle Length: 55			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 20.9		Intersection LOS: C	
Intersection Capacity Utilization 65.4%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: Churchill & Scott



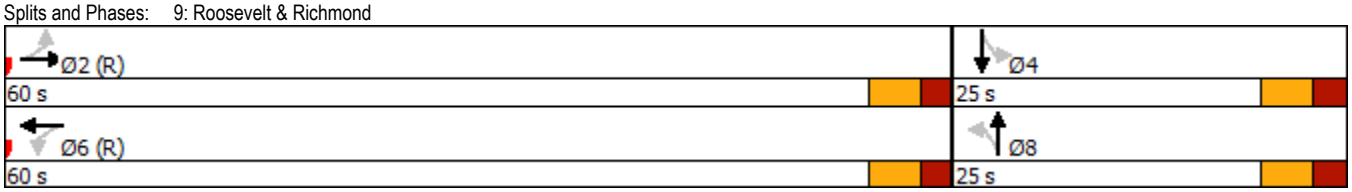


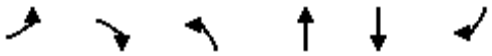
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	416	22	24	703	40	34	19	48	35	12	17
Future Volume (vph)	11	416	22	24	703	40	34	19	48	35	12	17
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98			0.98			0.82			0.84	
Frt		0.993			0.993			0.936			0.964	
Flt Protected		0.999			0.998			0.983			0.973	
Satd. Flow (prot)	0	1727	0	0	1746	0	0	1467	0	0	1549	0
Flt Permitted		0.981			0.980			0.888			0.815	
Satd. Flow (perm)	0	1694	0	0	1707	0	0	1219	0	0	1176	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			7			48			17	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		84.5			292.3			66.1			286.3	
Travel Time (s)		6.1			21.0			5.9			25.8	
Confl. Peds. (#/hr)	135		182	182		135	116		92	92		116
Confl. Bikes (#/hr)			3			9			2			5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	11	416	22	24	703	40	34	19	48	35	12	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	449	0	0	767	0	0	101	0	0	64	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	34.4	34.4		34.4	34.4		25.0	25.0		25.0	25.0	
Total Split (s)	60.0	60.0		60.0	60.0		25.0	25.0		25.0	25.0	
Total Split (%)	70.6%	70.6%		70.6%	70.6%		29.4%	29.4%		29.4%	29.4%	
Maximum Green (s)	54.6	54.6		54.6	54.6		19.4	19.4		19.4	19.4	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.1	2.1		2.1	2.1		2.3	2.3		2.3	2.3	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.4			5.4			5.6			5.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
Walk Time (s)	18.0	18.0		18.0	18.0		9.0	9.0		9.0	9.0	
Flash Dont Walk (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	
Pedestrian Calls (#/hr)	15	15		0	0		15	15		15	15	
Act Effct Green (s)		54.6			54.6			19.4			19.4	
Actuated g/C Ratio		0.64			0.64			0.23			0.23	
v/c Ratio		0.41			0.70			0.32			0.23	
Control Delay		8.7			14.1			18.9			23.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.7			14.1			18.9			23.4	
LOS		A			B			B			C	
Approach Delay		8.7			14.1			18.9			23.4	
Approach LOS		A			B			B			C	
Queue Length 50th (m)		31.0			71.0			7.0			6.2	
Queue Length 95th (m)		48.3			111.4			20.1			16.5	
Internal Link Dist (m)		60.5			268.3			42.1			262.3	
Turn Bay Length (m)												
Base Capacity (vph)		1090			1099			315			281	
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		0.41			0.70			0.32			0.23	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 85			
Offset: 78 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 13.1		Intersection LOS: B	
Intersection Capacity Utilization 79.0%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 9: Roosevelt & Richmond





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	7	23	362	584	14
Future Volume (Veh/h)	6	7	23	362	584	14
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	6	7	23	362	584	14
Pedestrians	37				1	
Lane Width (m)	3.7				3.7	
Walking Speed (m/s)	1.1				1.1	
Percent Blockage	3				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				246	85	
pX, platoon unblocked	0.93					
vC, conflicting volume	1037	628	635			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1001	628	635			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	98	97			
cM capacity (veh/h)	235	466	915			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	13	385	598
Volume Left	6	23	0
Volume Right	7	0	14
cSH	320	915	1700
Volume to Capacity	0.04	0.03	0.35
Queue Length 95th (m)	1.0	0.6	0.0
Control Delay (s)	16.7	0.8	0.0
Lane LOS	C	A	
Approach Delay (s)	16.7	0.8	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		