



Maritime Ontario Kanata West TIA Strategic Report

September 2020

Maritime Ontario Kanata West

TIA Strategy Report

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TIA Plan Reports

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

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

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

CERTIFICATION

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

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

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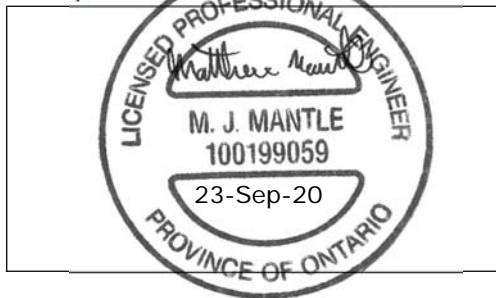


TABLE OF CONTENTS

1.	SCREENING FORM	1
2.	SCOPING REPORT	1
2.1.	EXISTING AND PLANNED CONDITIONS	1
2.1.1.	PROPOSED DEVELOPMENT	1
2.1.2.	EXISTING CONDITIONS	4
2.1.3.	PLANNED CONDITIONS.....	9
2.2.	STUDY AREA AND TIME PERIODS	12
2.3.	EXEMPTION REVIEW	12
3.	FORECASTING	13
3.1.	DEVELOPMENT GENERATED TRAVEL DEMAND.....	13
3.1.1.	TRIP GENERATION AND MODE SHARES	13
3.1.2.	TRIP DISTRIBUTION AND ASSIGNMENT.....	18
3.2.	BACKGROUND NETWORK TRAFFIC.....	19
3.2.1.	TRANSPORTATION NETWORK PLANS	19
3.2.2.	BACKGROUND GROWTH.....	19
3.2.3.	OTHER AREA DEVELOPMENTS.....	21
3.2.4.	TOTAL BACKGROUND TRAFFIC.....	22
3.3.	DEMAND RATIONALIZATION	24
4.	ANALYSIS.....	24
4.1.	DEVELOPMENT DESIGN	24
4.1.1.	DESIGN FOR SUSTAINABLE MODES	24
4.1.2.	CIRCULATION AND ACCESS.....	24
4.2.	PARKING.....	25
4.2.1.	PARKING SUPPLY.....	25
4.3.	BOUNDARY STREET DESIGN	25
4.4.	ACCESS INTERSECTION DESIGN.....	26
4.4.1.	LOCATION AND DESIGN OF ACCESS.....	26
4.4.2.	INTERSECTION CONTROL AND DESIGN.....	26
4.5.	TRANSPORTATION DEMAND MANAGEMENT.....	26
4.6.	NEIGHBOURHOOD TRAFFIC MANAGEMENT.....	26
4.7.	TRANSIT	26
4.8.	REVIEW OF NETWORK CONCEPT	26
4.9.	INTERSECTION DESIGN	26
4.9.1.	INTERSECTION CONTROL	26
4.9.2.	INTERSECTION DESIGN	26
5.	FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS	32

LIST OF FIGURES

FIGURE 1: TRANSPORT TRUCK SITE CIRCULATION	2
FIGURE 2: TRANSPORT TRUCK SIGHT LINES	2
FIGURE 3: LOCAL CONTEXT	2
FIGURE 4: PROPOSED SITE PLAN	3
FIGURE 5: AREA TRANSIT NETWORK	7
FIGURE 6: EXISTING PEAK HOUR TRAFFIC VOLUMES.....	8
FIGURE 7: RECORDED PEDESTRIAN VOLUMES AT CAMPEAU/JOURNEYMAN INTERSECTION.....	9
FIGURE 8: KANATA WEST BUSINESS PARK	10
FIGURE 9: OTHER AREA DEVELOPMENT.....	11
FIGURE 10: STUDY AREA	12
FIGURE 11: MARITIME ONTARIO BANTREE STREET FACILITY	13

FIGURE 12: MARITIME ONTARIO FACILITY SITE-GENERATED TRAFFIC (PHASE 1).....	18
FIGURE 13: MARITIME ONTARIO FACILITY SITE-GENERATED TRAFFIC (PHASE 2).....	19
FIGURE 14: FUTURE BACKGROUND 2021	20
FIGURE 15: FUTURE BACKGROUND 2026	20
FIGURE 16: FUTURE BACKGROUND 2031	21
FIGURE 17: OTHER AREA DEVELOPMENTS TOTAL TRAFFIC VOLUMES	22
FIGURE 18: TOTAL FUTURE BACKGROUND 2021 TRAFFIC VOLUMES	23
FIGURE 19: TOTAL FUTURE BACKGROUND 2026 TRAFFIC VOLUMES	23
FIGURE 20: TOTAL FUTURE BACKGROUND 2031 TRAFFIC VOLUMES	24
FIGURE 21: TOTAL PROJECTED 2021 TRAFFIC VOLUMES	29
FIGURE 22: TOTAL PROJECTED 2026 TRAFFIC VOLUMES	30
FIGURE 23: TOTAL PROJECTED 2031 TRAFFIC VOLUMES	31

LIST OF TABLES

TABLE 1: EXEMPTIONS REVIEW SUMMARY.....	12
TABLE 2: ITE TRIP GENERATION TRIP RATES	14
TABLE 3: ESTIMATED ITE 130 PERSON TRIPS (PHASE 1)	14
TABLE 4: ESTIMATED ITE 130 PERSON TRIPS (PHASE 2)	14
TABLE 5: O-D SURVEY MODE SHARE PERCENTAGES FOR KANATA/STITTSVILLE.....	14
TABLE 6: MODIFIED O-D SURVEY MODE SHARE PERCENTAGES	14
TABLE 7: ESTIMATED ITE 130 VEHICLE TRIPS (PHASE 1)	15
TABLE 8: ESTIMATED ITE 130 VEHICLE TRIPS (PHASE 2)	15
TABLE 9: BANTREE FACILITY ESTIMATED DELIVERY AND TRANSPORT VEHICLE TRIPS.....	16
TABLE 10: PROPOSED FACILITY ESTIMATED DELIVERY AND TRANSPORT VEHICLE TRIPS (PHASE 1).....	16
TABLE 11: PROPOSED FACILITY ESTIMATED DELIVERY AND TRANSPORT VEHICLE TRIPS (PHASE 2).....	16
TABLE 12: DELIVERY/TRANSPORT PERSON TRIPS- PHASE 1.....	17
TABLE 13: DELIVERY/TRANSPORT PERSON TRIPS- PHASE 2.....	17
TABLE 14: TOTAL SITE GENERATED TRIPS OF THE PROPOSED MARITIME ONTARIO FACILITY (PHASE 1).....	17
TABLE 15: MODE SHARE TOTAL PERSON TRIPS OF THE PROPOSED MARITIME ONTARIO FACILITY (PHASE 2)	18
TABLE 16: MMLOS - BOUNDARY ROAD ANALYSIS.....	25
TABLE 17: EXISTING CONDITIONS INTERSECTION PERFORMANCE	27
TABLE 18: TOTAL FUTURE BACKGROUND 2021 INTERSECTION PERFORMANCE.....	27
TABLE 19: TOTAL FUTURE BACKGROUND 2026 INTERSECTION PERFORMANCE.....	28
TABLE 20: TOTAL FUTURE BACKGROUND 2031 INTERSECTION PERFORMANCE.....	28
TABLE 21: TOTAL PROJECTED 2021 INTERSECTION PERFORMANCE.....	29
TABLE 22: TOTAL PROJECTED 2026 INTERSECTION PERFORMANCE.....	30
TABLE 23: TOTAL PROJECTED 2031 INTERSECTION PERFORMANCE.....	31

LIST OF APPENDICES

APPENDIX A	SCREENING FORM & CITY COMMENT RESPONSES
APPENDIX B	EXISTING PEAK HOUR TRAFFIC VOLUMES
APPENDIX C	COLLISION HISTORY DATA
APPENDIX D	SITE TRUCK TURNING FIGURE
APPENDIX E	TDM-SUPPORTIVE DEVELOPMENT DESIGN AND INFRASTRUCTURE CHECKLIST
APPENDIX F	MMLOS ANALYSIS RESULTS
APPENDIX G	TDM MEASURES CHECKLIST
APPENDIX H	SYNCHRO ANALYSIS RESULTS

TIA STRATEGY REPORT

Parsons has been retained by Tordar Investments Ltd to prepare a TIA in support of a Site Plan application for a proposed package sorting facility development in Ward 4: Kanata North. The following report represents Step 4 of the TIA process. This document follows the TIA process, as outlined in the City Transportation Impact Assessment (TIA) Guidelines (2017).

1. SCREENING FORM

The Screening Form was submitted to the City of Ottawa for review and verification of the need to complete a Transportation Impact Assessment (TIA). The Trip Generation trigger was met due to the size of the development. As such, a TIA Report was deemed required. The Screening Form is provided in Appendix A, along with responses to the City comments received for the Forecasting Report.

2. SCOPING REPORT

2.1. Existing and Planned Conditions

2.1.1. Proposed Development

The proposed development is located at 8700 Campeau Drive and is expected to occupy Blocks 37, 38 and 39 of the Kanata West Business Park. The site plan proposes three driveways. The east-most driveway will service the gated warehouse area located at the rear of the building and will have a single outbound lane plus three inbound lanes to provide queuing space for transports waiting to pass through the security checkpoint. The two other driveways are intended to service the employee/visitor parking area located along the southern building frontage.

For the purposes of the TIA, the development will be implemented in two phases:

- Phase 1 will consist of a two-storey office building with a gross floor area of 6,000 ft², a 60,000 ft² warehouse building, as well as parking for 50 tractors and 138 staff. The assumed horizon year is 2021 with the facility operating at only 25% of the ultimate capacity.
- Phase 2 will consist of the balance of Phase 1 capacity, plus the a 11,800 ft² expansion of the warehouse. The assumed horizon year is 2026, although in reality it could take upwards of 20 years for this level of operation to materialize depending on market conditions.

It is understood that it is preferable for transport trucks accessing the warehouse to circulate the site in a counter-clockwise rotation, as shown in Figure 1. This provides the transport truck operators the ability to see obstructions from the driver seat as the vehicle reverses into the loading dock/bay. Figure 2 below displays sightlines at two locations for transport truck operator during the reverse maneuver into the loading dock/bay. The subject site is currently vacant and zoned as IP – Business Park Industrial Zone. The local context of the site is provided as Figure 3 and the proposed Site Plan is provided as Figure 4.

Figure 1: Transport Truck Site Circulation

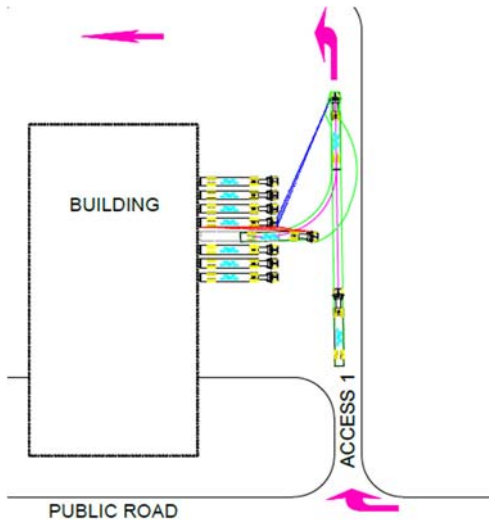


Figure 2: Transport Truck Sight Lines

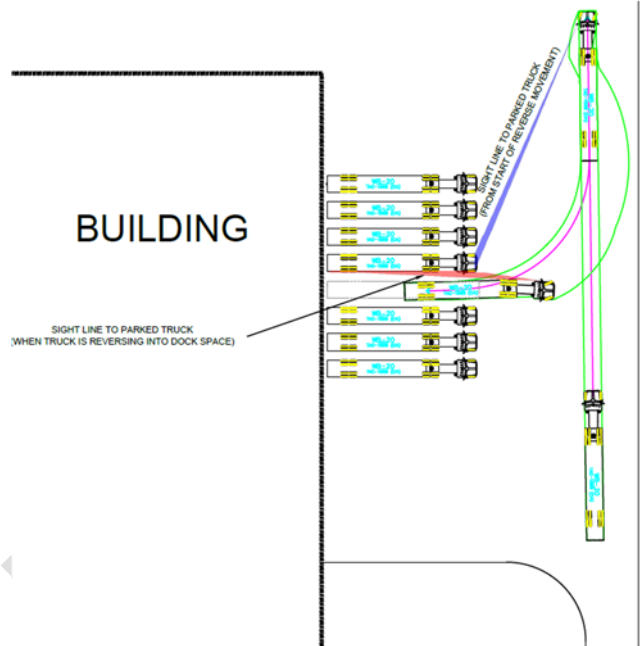


Figure 3: Local Context



2.1.2. Existing Conditions

AREA ROAD NETWORK

Campeau Drive is an east-west arterial roadway that currently extends from approximately 650m west of Palladium Drive to Eagleson Rd/March Rd in the east. Within the study area, Campeau Drive consists of two travel lanes along the proposed sites' frontage, then widens to a four-lane cross section approximately 150m west of the Campeau/Palladium intersection. The roadway has a posted speed limit of 60 km/h.

Palladium Drive is an arterial roadway that currently extends from approximately 270m north of Campeau Drive to south of the Hwy 417 EB Off Ramp, where it curves east and continues until Terry Fox Drive. East of Terry Fox Drive, Palladium Drive continues as Katimavik Road. The roadway consists of a four-lane cross section and a posted speed limit of 60 km/h north of the Hwy 417 WB On-Off Ramps, and 70 km/h south of the ramps.

Upper Canada Way is a proposed east-west local roadway, which will extend from Huntmar Drive in the east to Campeau Drive in the west. Its cross-section will consist of a single travel lane per direction. At study area intersections, auxiliary turn lanes are not provided, and the unposted speed limit is understood to be 50 km/h.

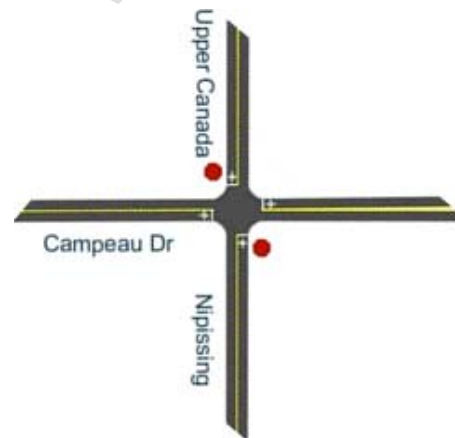
Kanata West Centre Drive is a north-south local roadway that extends south from Campeau Drive that services a shopping center. The road consists of a single travel lane in either direction and is assumed to have an unposted speed of 50km/h.

Cabela's Way is an east-west local roadway which extends from Cabela's Outfitters in the west to Palladium Drive in the east. Its cross-section consists of a single travel lane per direction. At study area intersections, auxiliary turn lanes are not provided, and the unposted speed limit is understood to be 50 km/h.

EXISTING STUDY AREA INTERSECTIONS

Campeau/Nipissing

The Upper Canada/Palladium intersection is anticipated to be a four-legged intersection with STOP Control on the north and south legs of the intersection. All approaches are expected to consist of a single shared movement lane. There are no anticipated restricted movements at this intersection.



Campeau /Kanata West Centre

Campeau/Kanata West Centre intersection is a T-intersection with full movement STOP control on the south leg (Kanata West Center drive). The south leg consists of dedicated northbound left-turn and right-turn lanes, and a southbound receiving lane. The west leg of Campeau has a two-lane cross-section with a single shared eastbound through right-turn lane and a single westbound receiving lane. The east leg is comprised of four travel lanes consisting of a through lane plus a dedicated left-turn heading westbound and two receiving lanes heading eastbound.



Campeau/Palladium

The Campeau/Palladium intersection is a four-legged roundabout intersection consisting of two approach lanes on each leg. The west and south legs consist of a single shared movement lane and a right-turn slip lane. The north leg consists of one shared through and right-turn lane and one shared through and left-turn lane. The east leg consists of one shared all movement lane and one left-turn lane. There are no prohibited movements at this intersection.



Cabela's/Palladium

The Cabela's/Palladium intersection is a 'T' intersection with STOP Control on the west leg of the intersection. The north leg of the intersection consists of a through lane and a shared through/right-turn lane. The south leg consists of two through lanes and an auxiliary left-turn lane. The west leg consists of a single right-turn lane. There is no left-turn movement coming from the west leg of the intersection.



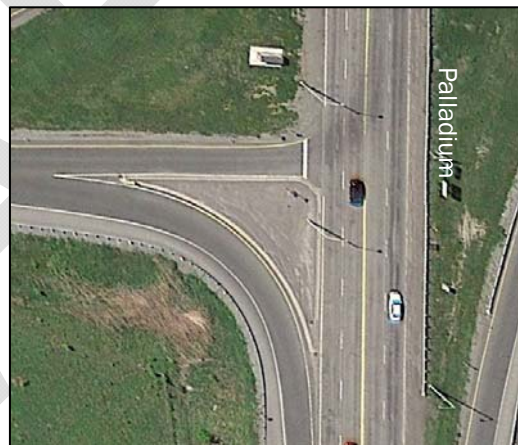
Hwy 417 WB On-Off Ramps/Palladium

The Hwy 417 WB On-Off Ramps/Palladium intersection is a signalized 'T' intersection composed of north, south and east legs. The north leg of the intersection consists of two through lanes and an auxiliary left-turn lane. The south leg of the intersection consists of two through lanes and the east leg of the intersection consists of two left-turn lanes and an auxiliary right-turn lane. There are no restricted movements at this intersection.



Hwy 417 EB Off Ramp/Palladium

The Hwy 417 EB Off ramp/Palladium intersection is a 'T' intersection with STOP Control on the west leg of the intersection. The north and south legs of the intersection consist of two through lanes, while the west leg consists of a single left-turn lane and an auxiliary right-turn lane.



EXISTING DRIVEWAYS TO ADJACENT DEVELOPMENTS

There are 3 driveways on the opposite side of the site on Campeau Drive which is occupied by a package delivery company. There are currently no other existing driveways near the development but it is anticipated that new driveways will be built as the area gets developed.

EXISTING AREA TRAFFIC MANAGEMENT MEASURES

Below are the existing area traffic management measures along both Palladium Drive and Campeau Drive:

- Roundabouts;
- Medians;
- Sidewalks;
- Streetscaping;
- Separated bike lanes; and,
- Zebra crosswalks at most major intersections.

PEDESTRIAN/CYCLING NETWORK

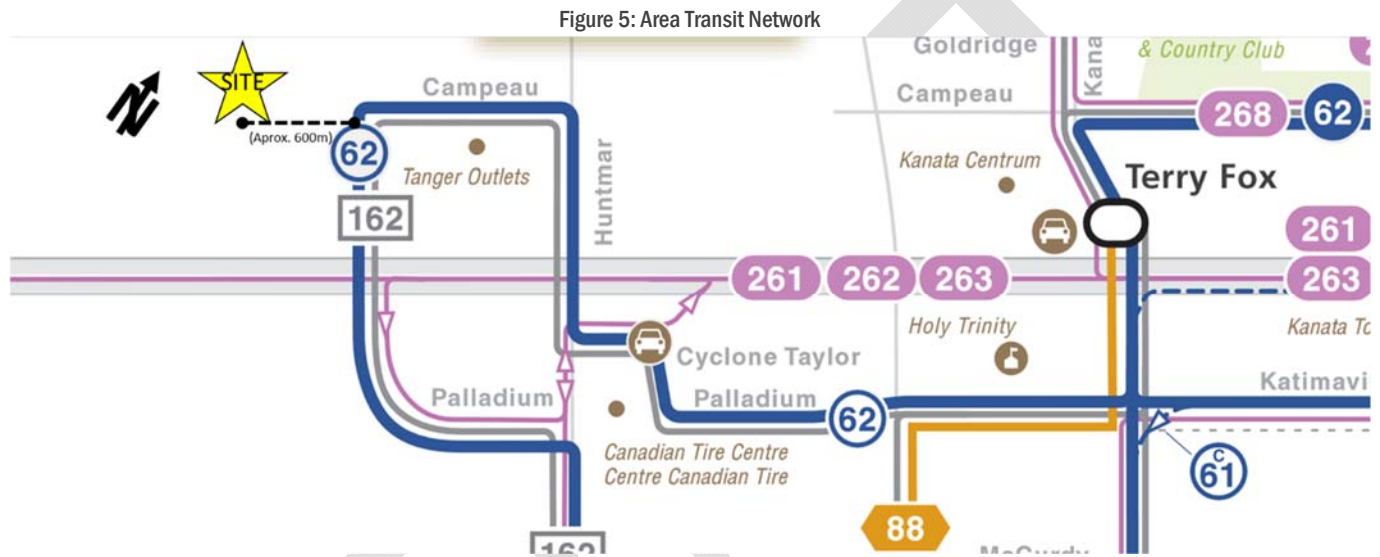
Within the study area, sidewalks are provided along the north and south sides of Campeau Drive, on the east and west sides of Palladium Drive up to the Hwy 417 WB On-Off Ramps, and on both sides south of Campeau Drive.

With regards to the cycling network along the sites' frontage, bicycle facilities are limited to mixed on-street conditions until the introduction of bike lanes that have been constructed approximately 325m east of the proposed site.

TRANSIT NETWORK

The current transit area network is provided as Figure 5 with nearby routes including:

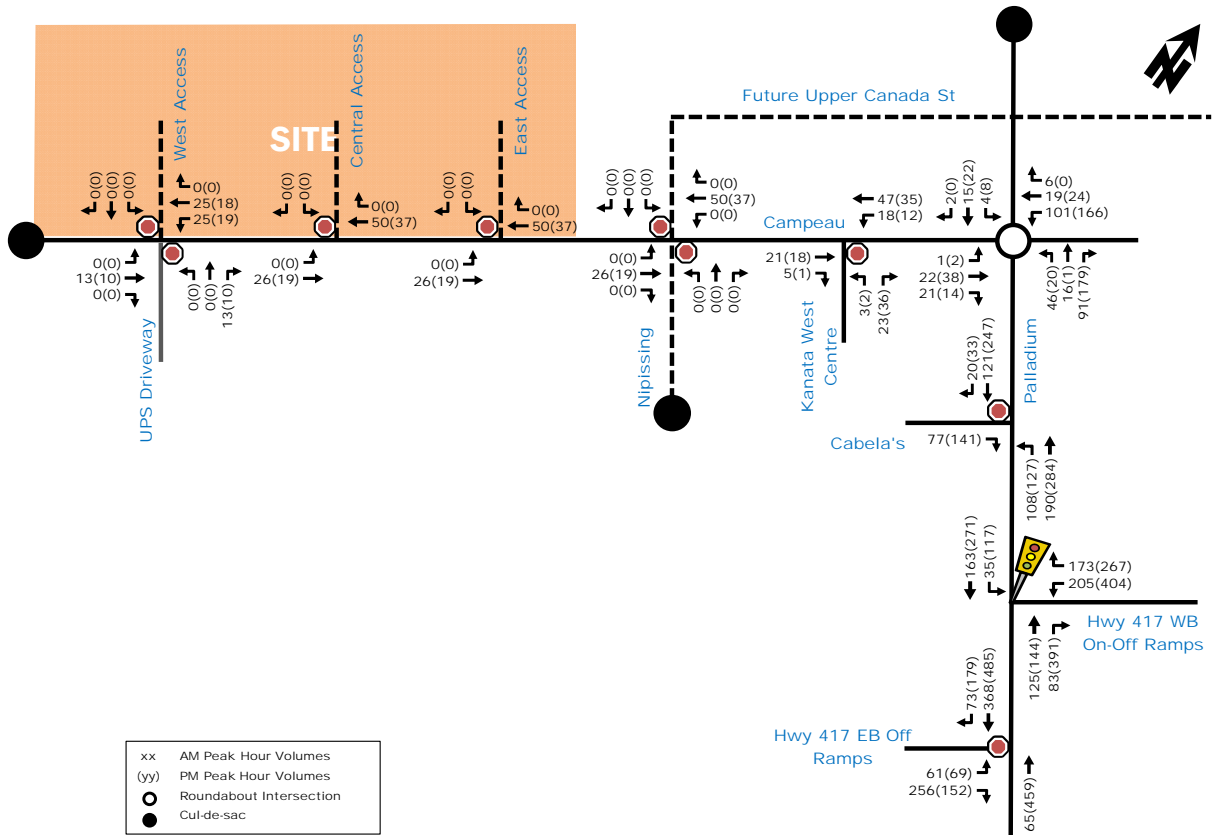
- **Route #62 (St-Laurent, Hurdman <-> Terry Fox, Stittsville):** identified by OC Transpo as a "Rapid Route", Route #62 operates 7 days a week, at an average rate of every 30 minutes during weekday peak hour periods. The nearest bus stops to the site are available at the intersection of Journeyman/Campeau.
- **Route #162 (Terry Fox <-> Stittsville):** identified by OC Transpo as a "Local Route", this route provides customized routing and scheduling to serve local destinations. Route #162 operates at an hourly rate between 1 and 3 pm and between 7:30 and 10:30 pm on weekdays. The nearest bus stops to the site are available at the intersection of Journeyman/Campeau.



VEHICLE PEAK HOUR TRAVEL DEMANDS

Traffic counts at the Hwy 417 Ramps were obtained from MTO (dated April 2018), while counts at other study area intersections were conducted recently by Parsons. The existing peak hour traffic volumes are illustrated in Figure 6. Note that the traffic volumes at the Hwy 417 Ramps were balanced using the volumes at the Cabela's/Palladium intersection. The raw peak hour traffic volume count data has been provided in Appendix B.

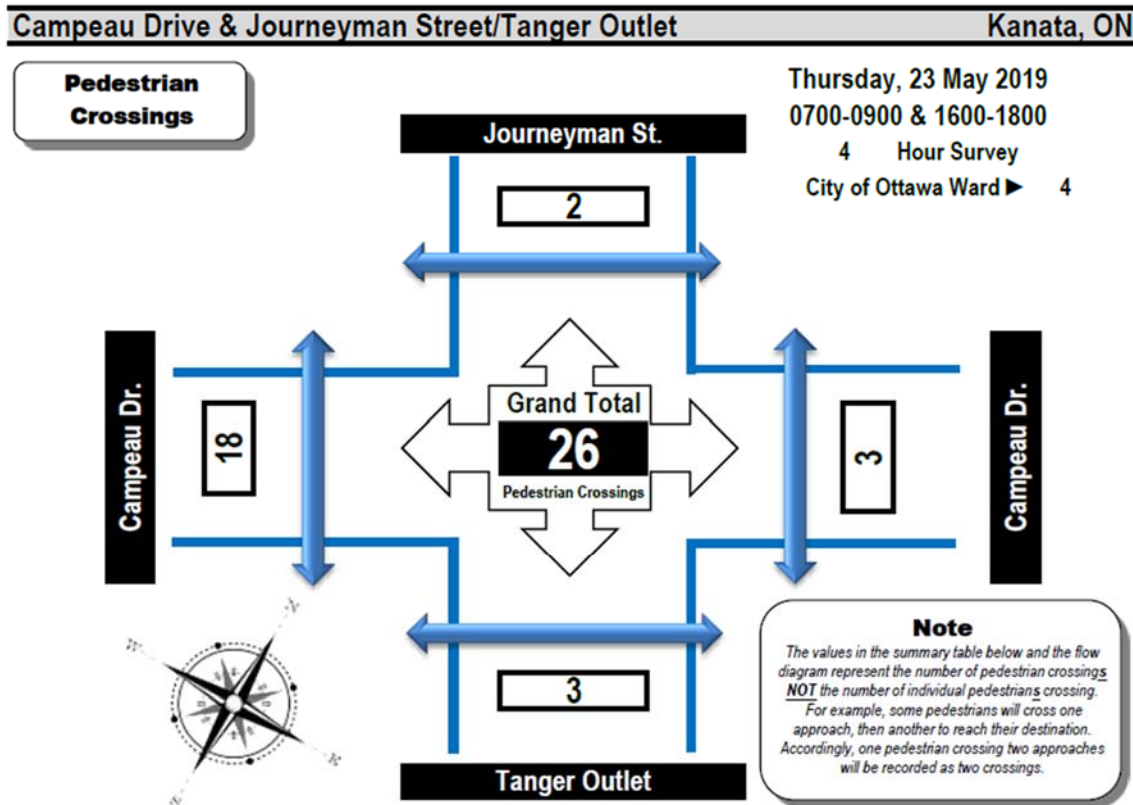
Figure 6: Existing Peak Hour Traffic Volumes



PEDESTRIAN AND CYCLING PEAK HOUR DEMANDS

Within the study area, pedestrians were recorded at Campeau/Journeyman intersection during the peak hour. As shown in Figure 7 below, a total 26 trips during a four-hour period between the hours of 7:00AM to 9:00AM and 4:00PM to 6:00PM, this is very few pedestrians, as the trips recorded represent the number of recorded crossings not the number of pedestrians. It is anticipated that pedestrian traffic throughout the study area will be low due to the location and the context of the business park.

Figure 7: Recorded Pedestrian Volumes at Campeau/Journeyman intersection



With regard to bicycle traffic, no cyclists were recorded using Campeau/Journeyman intersection during the study hours and are anticipated to have low volumes using roadways within the study area.

EXISTING ROAD SAFETY CONDITIONS

Although many features of the surrounding road network are relatively new as some intersections have been recently constructed, a five-year collision history data was requested and obtained from the City of Ottawa, which shows a total of 14 collisions occurring in the past five years at all intersections and road segments within the study area. Note that 13 of the collisions recorded resulted in property damage only and 1 resulted in a non-fatal injury. The reported incidents are composed of 5 (36%) Rear ends, 4 (29%) Turning Movements, 3 (21%) Sideswipe, 1 (7%) Angle, and 1 (7%) Other.

Since the roundabout was opened to traffic in late 2014, collisions of this nature are expected to be encountered in the first few years due to the unfamiliarity of drivers with the intersection configuration. As such, the number of collisions is not necessarily indicative of future trends at this intersection.

There were 7 collisions at the intersection of Palladium/Hwy 417 WB On-Off Ramps, however, there are no particular collision trends taking place. The remaining 7 collisions that occurred at various intersections and road segments within the study area show no particular trends in collision patterns either. It is worth noting that no collisions were recorded at the roundabout intersection of Campeau/Palladium. This is likely due to the recent opening of the intersection to traffic in 2017, as well as the relatively low current traffic volumes.

The collision data as provided by the City of Ottawa is attached as Appendix C.

2.1.3. Planned Conditions

PLANNED STUDY AREA TRANSPORTATION NETWORK CHANGES

Shown in Figure 8 below is the future plan of the Kanata West Business Park. A substantial portion of the road network has been constructed over the past few years. Future additions and improvements to the road network include the

construction of a new roadway named Upper Canada Street directly east of the proposed development site. Upper Canada Street will extend from Huntmar Drive in the east to connect to Campeau Drive in the west, where it continues as Nipissing Way south of Campeau Drive and terminates in a cul-de-sac.

Figure 8: Kanata West Business Park



Slightly further south, the intersection of Hwy 417 EB off Ramp/Palladium is planned to be realigned along with the future realignment of Palladium Drive. The purpose of the realignment is to accommodate a future adjacent area development at 195 Huntmar Drive, by providing it with better connectivity through an east-west collector roadway. A detailed discussion regarding the realignment can be found in a letter submitted by Parsons to the City in May 2018, as an addendum to a Community Transportation Study (CTS) that was prepared for the future development at 195 Huntmar Drive.

The City of Ottawa has also advised that east of the Kanata West Business Park, Campeau Drive connection between Huntmar Drive and Terry Fox Drive is anticipated to be completed in 2021. This will provide a continuous connection from Moodie Drive through to the cul-de-sac located west of Palladium Drive.

With regards to transit, the City of Ottawa Transportation Master Plan (TMP) does not identify any future changes to the existing transit network.

OTHER AREA DEVELOPMENT

Figure 9 below illustrates the other area developments described in this section, relative to the location of the proposed Maritime Ontario development site. The 1-km limit cited in the City of Ottawa TIA Guidelines to consider adjacent developments is also shown. A summary has been provided for these developments based on the latest available information from the City regarding adjacent site development applications.

Figure 9: Other Area Development



Kanata West Business Park

The Kanata West Business Park (shown in Figure 8) is a major development node in Ottawa’s west end. It contains a mix of retail, office and lodging developments, some of which have already been constructed in recent years. A Community Transportation Study (CTS) was prepared in December 2011 by Parsons (previously Delcan) depicting the transportation requirements of the road network based on trip generation of the various future developments. To keep up with development changes being made to the area and provide proper recommendations from a transportation perspective, 12 Addendums were submitted by Parsons to the City after the initial CTS, with the latest Addendum submitted in May 2017.

i - 8700 Campeau Drive (Kinaxis Offices)

A Transportation Impact Assessment (TIA) was submitted by Parsons in August 2019 in support of a proposed office development to be located at 8600 Campeau Drive (northwest corner of the Campeau/Palladium intersection shown in Figure 9). The proposed office building will consist of a five-storey building with a gross floor area of 150,000 ft² and is anticipated to generate up to 130 vehicles/hour during the respective peak hour period. This development was included in the future analysis.

ii - 8600 Campeau Drive (Wingate Hotel)

A Transportation Impact Assessment (TIA) was submitted by the IBI Group in May 2018 in support of a proposed hotel development to be located at 8600 Campeau Drive (northeast corner of the Campeau/Palladium intersection shown in Figure 9). The proposed hotel will consist of 120 hotel rooms within a four-storey building and is anticipated to generate up to 56 vehicles/hour during the respective peak hour period. This development was included in the future analysis.

iii - 3280 Palladium Drive (Medical Office Building)

Located in the northeast corner of Palladium Drive and the future Upper Canada Street (see Figure 9), the medical office building was constructed in 2018 and traffic from this site would be accounted for in the existing traffic counts.

iv - 450 Huntmar Dr

A Transportation Brief was prepared by Parsons in January 2017, addressing the transportation implications and requirements of Stages 3 and 4 of the Arcadia Subdivision. The residential development will be located on the north side

of Campeau Dr, approximately 450 m east of the Huntmar/Campeau intersection and will consist of a total of 146 Single Family Units and 255 Townhome Units. Due to the significance of this development with regards to the traffic volumes it generates within the study area, it was included in the future analysis despite being located outside the 1 km radius.

2.2. Study Area and Time Periods

As the proposed site is an industrial use development, the time periods assessed will be the weekday morning and afternoon peak hours and the anticipated buildout years are 2021 for Phase 1, and 2026 for Phase 2. The proposed study area is outlined below and highlighted in Figure 10.

- Campeau/Palladium intersection;
- Upper Canada/Nipissing/Campeau intersection;
- Cabela's/Palladium intersection;
- Hwy 417 EB/Palladium intersection;
- Hwy 417 WB/Palladium intersection;
- Cabela's/Campeau Dr intersection; and
- Upper Canada Way adjacent to the site
- Campeau Drive adjacent to the site;

Figure 10: Study Area



2.3. Exemption Review

The following modules/elements of the TIA process recommended to be exempt in the subsequent steps of the TIA process, based on the City's TIA guidelines and the subject site:

Table 1: Exemptions Review Summary

Module	Element	Exemption Consideration
4.1 Development Design	4.1.3 New Streets Network	Not required for applications involving site plans.
4.2 Parking	4.2.2 Spillover Parking	The parking is expected to meet By-Law requirements. Spillover demand can be accommodated within site-provided parking and on-street parking on adjacent roads
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	Traffic along Upper Canada Street is not impacted significantly as a result of this development. This is confirmed by the site-generated traffic volumes in the Forecasting section of the report.
4.8 Network Concept	All elements	Site plan not anticipated to generate more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by established zoning.

3. FORECASTING

3.1. Development Generated Travel Demand

3.1.1. Trip Generation and Mode Shares

The proposed development will consist of 557m² (6,000ft²) of office and a 5,575m² (60,000ft²) sort/warehouse area bringing the total Gross Floor Area (GFA) to 6,132m² (66,000 ft²) in the Phase 1 buildout. Phase 2 buildout will be comprised of an expansion of the sort/warehouse, bringing the total GFA to 7,232m² (77,800 ft²). Due to the unique nature and the limited amount of studies related to the delivery/sorting warehouse facilities, the sites total trip generation will be assessed by combining the following:

- ITE 130 - trip generation for Industrial Park to assess the warehouse and office space;
- Proxy trips for the transport truck arrivals and departures based off Bantree Street facility.

As shown in Figure 11, the existing Maritime Ontario Bantree facility is comprised of approximately 344m² (3,700 ft²) 2 storey office space/ancillary use space, 625m² (6,700 ft²) warehouse/sorting area, has 20 transport truck loading docks. The average trips generated by this facility, are as follows:

- Transport Delivery Trucks:
 - Depart facility between 6:00AM - 8:00AM (approximately 2 delivery veh/h)
 - Return to facility between 4:00PM - 6:00PM (approximately 2 delivery veh/h)

Figure 11: Maritime Ontario Bantree Street Facility



Industrial Park (Office/Ancillary Space and Sort Area) Trips Using ITE Trip Generation

This portion of the site generated trips include only the trips related to the operations of only the warehouse and office/ancillary space and does not include the delivery truck operations; these site generated trips will follow in the next few sections of the report. The office/ancillary space and the sort/warehouse area trip generation rates for Industrial Park land use were obtained from the ITE Trip Generation Manual (10th Edition) and are summarized in Table 2.

Table 2: ITE Trip Generation Trip Rates

Land Use	Data Source	Trip Rates (Fitted Curve Equations)	
		AM Peak	PM Peak
Industrial Park (Office/Ancillary Space and Sort Area)	ITE 130	$T = 0.40(X);$	$T = 0.40(X);$
Notes: $T = \text{Average Vehicle Trip Ends}$ $X = 1000 \text{ Sq. ft GFA}$			

The ITE vehicle trip rates shown in Table 2 were then multiplied by a factor of 1.28, which was calculated by assuming a default 10% non-auto mode share and an average vehicle occupancy of 1.15, in order to convert the vehicle trips provided by the ITE manual to person trips. The resulting person trips/h for Phases 1 and 2 are provided in Table 3 and Table 4 below. Note that the percentages of in and out traffic were also obtained from the ITE Trip Generation Manual.

Table 3: Estimated ITE 130 Person Trips (Phase 1)

Land Use	Area (ft ²)	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In (81%)	Out (19%)	Total	In (21%)	Out (79%)	Total
Industrial Park (Office/Ancillary Space and Sort/Warehouse Area)	66,000	27	7	34	7	27	34
Total Person Trips		27	7	34	7	27	34

Table 4: Estimated ITE 130 Person Trips (Phase 2)

Land Use	Area (ft ²)	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In (81%)	Out (19%)	Total	In (21%)	Out (79%)	Total
Industrial Park (Office/Ancillary Space and Sort/Warehouse Area)	77,800	32	8	40	8	32	40
Total Person Trips		32	8	40	8	32	40

As shown in Table 3, the total person trips generated by Phase 1 buildout are 34 person trips/hour during both the morning and afternoon weekday peak hour periods. As shown in Table 4, at Phase 2 buildout, the development will be generating approximately 40 person trips/hour during both the morning and afternoon weekday peak hour periods.

Vehicle trips may be determined using mode share percentages found in the 2011 NCR Household Origin-Destination Survey for the Kanata/Stittsville district (see Table 5). However, due to the location of the development at the edge of the urban boundaries of the City of Ottawa, as well as the delivery truck operations of the proposed Maritime Ontario facility, it is anticipated that there may be lower non-motorized trips and higher transit and auto driver trips. Additionally, as the number of bus stops are increased within the Kanata West Business Park and with the anticipated connection of Campeau Drive between Terry Fox Drive and Huntmar Drive being completed, transit availability is likely to increase. As such, the mode shares were slightly modified as shown in Table 6.

Table 5: O-D Survey Mode Share Percentages for Kanata/Stittsville

Travel Mode	Mode Share
Auto Driver	60%
Auto Passenger	15%
Transit	10%
Non-motorized	15%
Total Person Trips	100%

Table 6: Modified O-D Survey Mode Share Percentages

Travel Mode	Mode Share
Auto Driver	65%
Auto Passenger	15%
Transit	15%
Non-motorized	5%
Total Person Trips	100%

Based on the 65% mode share in Table 6 and the estimated employee person trips in Table 3 and Table 4, the employee vehicle trips anticipated to be generated by Phases 1 and 2 of the proposed facility are summarized in Table 7 and Table 8 below.

Table 7: Estimated ITE 130 Vehicle Trips (Phase 1)

Travel Mode	Mode Share	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In (81%)	Out (19%)	Total	In (21%)	Out (79%)	Total
Auto Driver	65%	18	5	23	5	18	23
Auto Passenger	15%	4	1	5	1	4	5
Transit	15%	4	1	5	1	4	5
Non-motorized	5%	1	0	1	0	1	1
Total Person Trips	100%	27	7	34	7	27	34
Total 'New' Auto Trips		18	5	23	5	18	23

Table 8: Estimated ITE 130 Vehicle Trips (Phase 2)

Travel Mode	Mode Share	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In (81%)	Out (19%)	Total	In (21%)	Out (79%)	Total
Auto Driver	65%	21	5	26	6	21	27
Auto Passenger	15%	6	1	6	1	5	6
Transit	15%	4	2	6	1	5	6
Non-motorized	5%	2	0	2	0	1	1
Total Person Trips	100%	32	8	40	8	32	40
Total 'New' Auto Trips		21	5	26	6	21	27

As shown in Table 7, the total number of vehicle trips anticipated to be generated by the employees of the proposed Maritime Ontario facility at Phase 1 buildout are approximately 23 vehicles/hour during the morning and afternoon peak hour periods. Phase 2 buildout, the number of vehicle trips increases to 26 and 27 vehicles/hour during the morning and afternoon peak hour periods, respectively.

Transport Truck Trips

Traffic volumes generated by transport delivery trucks are estimated using the existing Bantree Street Maritime Ontario Facility. Converting the information provided for the Bantree facility indicates that it performs as follows:

- Local delivery trips: 15 trucks operate between 6:00 AM and 9:00 PM. On average each truck makes 3 trips per day and the estimated trips generated are as follows:

$$\text{AM outbound delivery vehicle trips} = 15 \text{ veh} / (15\text{h}) = \underline{1 \text{ veh/h}}$$

$$\text{PM inbound delivery vehicle trips} = 15 \text{ veh} / (15\text{h}) = \underline{1 \text{ veh/h}}$$

- Out of town transport trips: Operate during off-peak (overnight) with approximately 1 truck per hour departing and arriving between the hours 6:00PM through to 7:00AM. Due to the transport trucks operating during off peak periods with a small amount of overlap in both the AM and PM peak hours, the conservative transport peak hour trips are as follows:

$$\text{AM inbound transport vehicle trips} = 1 \text{ veh/h}$$

$$\text{AM outbound vehicle trips} = 1 \text{ veh/h}$$

$$\text{PM inbound vehicle trips} = 1 \text{ veh/h}$$

$$\text{PM outbound transport vehicle trips} = 1 \text{ veh/h}$$

Table 9 below provides a summary of the estimated delivery and transport vehicle trips for the Bantree facility.

Table 9: Bantree Facility Estimated Delivery and Transport Vehicle Trips

Trip Type	AM Peak (Vehicle Trips/h)			PM Peak (Vehicle Trips/h)		
	In	Out	Total	In	Out	Total
Local Delivery Trucks/Driver Personal Vehicle	1	1	2	1	1	2
Out of Town Trucks/Driver Personal Vehicle	1	1	2	1	1	2
Total	2	2	4	2	2	4

The proposed site truck trips will be estimated using the existing Bantree facility trips for the sort/warehouse area of approximately 6,700ft² and applying a ratio of the proposed facility sort/warehouse area divided by the existing sort/warehouse area to the traffic volumes in Table 9. An example for each phase of how the calculations were performed can be seen below.

Phase 1 (66,000ft² Warehouse)

AM outbound delivery trucks = 66,000ft²/6,700ft² * 1 veh/h = 10 veh/h

To determine the AM inbound and PM outbound vehicle trips to account for the local delivery truck drivers arriving/departing their work shifts during the peak period the number of delivery peak hour vehicle trips from above and multiplying them by the vehicle mode share of 65% presented in Table 6.

AM inbound vehicle trips = 10 veh/h * 0.65 = 7 veh/h

PM outbound vehicle trips = 10 veh/h * 0.65 = 7 veh/h

Phase 2 (77,800ft² Warehouse)

AM outbound delivery trucks = 77,800ft²/6,700ft² * 1 veh/h = 12 veh/h

The mode shares are applied again in phase 2, to account for the commuting truck drivers.

AM inbound vehicle trips = 12 veh/h * 0.65 = 8 veh/h

PM outbound vehicle trips = 12 veh/h * 0.65 = 8 veh/h

The results for the projected trips of Phase 1 and Phase 2 are summarized in Table 10 and Table 11.

Table 10: Proposed Facility Estimated Delivery and Transport Vehicle Trips (Phase 1)

Trip Type	AM Peak (Vehicle Trips/h)			PM Peak (Vehicle Trips/h)		
	In	Out	Total	In	Out	Total
Local Delivery Trucks/Driver Personal Vehicle	7	10	17	10	7	17
Out of Town Transport Trucks/Driver Personal Vehicle	10	10	20	10	10	20
Total	17	20	37	20	17	37

Table 11: Proposed Facility Estimated Delivery and Transport Vehicle Trips (Phase 2)

Trip Type	AM Peak (Vehicle Trips/h)			PM Peak (Vehicle Trips/h)		
	In	Out	Total	In	Out	Total
Local Delivery Trucks/Driver Personal Vehicle	8	12	20	12	8	20
Out of Town Transport Trucks/Driver Personal Vehicle	12	12	24	12	12	24
Total	20	24	44	24	20	44

The total number of two-way vehicle trips anticipated to be generated by delivery and transport vehicles of the proposed Maritime Ontario facility during Phase 1 are 37 vehicles/hour during both the AM and PM peak periods. Phase 2 combined transport and delivery two-way vehicle trips are anticipated to be 44 vehicles/hour during the morning and afternoon peak hour periods.

The delivery/transport truck outbound AM and inbound PM peak trips account for 100% of the total trips generated by the delivery truck/transport trucks departing/arriving to and from the facility. Therefore, no modal shares have been applied to these trips. Table 12 and Table 13 below summarize the person trips per mode share for both Phase 1 and Phase 2.

Table 12: Delivery/Transport Person Trips- Phase 1

Travel Mode	Mode Share	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In	Out	Total	In	Out	Total
Delivery Service							
Truck/Delivery Driver	100 %	10	20	30	20	10	30
Auto Passenger	0 %	0	0	0	0	0	0
Transit	0 %	0	0	0	0	0	0
Non-motorized	0 %	0	0	0	0	0	0
Person Trips	100%	10	20	30	20	10	30
Employee Commute							
Auto Driver	65%	7	0	7	0	7	7
Auto Passenger	15%	1	0	1	0	1	1
Transit	15%	1	0	1	0	1	1
Non-motorized	5%	1	0	1	0	1	1
Person Trips	100%	10	0	10	0	10	10
Total Person Trips		20	20	40	20	20	40

Table 13: Delivery/Transport Person Trips- Phase 2

Travel Mode	Mode Share	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In	Out	Total	In	Out	Total
Delivery Service							
Truck/Delivery Driver	100 %	12	24	36	24	12	36
Auto Passenger	0 %	0	0	0	0	0	0
Transit	0 %	0	0	0	0	0	0
Non-motorized	0 %	0	0	0	0	0	0
Person Trips	100%	12	24	36	24	12	36
Employee Commute							
Auto Driver	65%	8	0	8	0	8	8
Auto Passenger	15%	2	0	2	0	2	2
Transit	15%	1	0	1	0	1	1
Non-motorized	5%	1	0	1	0	1	1
Person Trips	100%	12	0	12	0	12	12
Total Person Trips		24	24	48	24	24	48

Anticipated Total Trips of the Proposed Maritime Ontario Facility

The total site trips generated by the facility, employees, customers and delivery and transport vehicles, for Phases 1 and 2 are provided in Table 14 and Table 15. Table 14 provides a summed total of Phase 1 values from Table 7, and Table 12. Table 15 provides a summed total of Phase 2 values provided in Table 8, and Table 13.

Table 14: Total Site Generated Trips of the Proposed Maritime Ontario Facility (Phase 1)

Travel Mode	Mode Share	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In	Out	Total	In	Out	Total
Auto Driver	65%	35	25	60	25	35	60
Auto Passenger	15%	5	1	6	1	5	6
Transit	15%	5	1	6	1	5	6
Non-motorized	5%	2	0	2	0	2	2
Total Person Trips	100%	47	27	74	27	47	74
Total 'New' Auto Trips		35	25	60	25	35	60

Table 15: Mode Share Total Person Trips of the Proposed Maritime Ontario Facility (Phase 2)

Travel Mode	Mode Share	AM Peak (Person Trips/h)			PM Peak (Person Trips/h)		
		In	Out	Total	In	Out	Total
Auto Driver	65%	41	29	70	30	41	71
Auto Passenger	15%	8	1	9	1	7	8
Transit	15%	5	2	7	1	6	7
Non-motorized	5%	3	0	3	0	2	2
Total Person Trips	100%	57	32	89	32	56	88
Total 'New' Auto Trips		41	29	70	30	41	71

The Phase 1 total number of site generated vehicle trips for the proposed Maritime Ontario facility are 60 vehicles/hour during both the morning and afternoon peak hour periods. Phase 2 total site generated vehicle trips are 70 and 72 vehicles/hour, during the morning and afternoon peak hour periods, respectively.

3.1.2. Trip Distribution and Assignment

Based on the 2011 NCR Household Origin-Destination Survey (Kanata – Stittsville district) and the location of adjacent arterial roadways and neighbourhoods, the distribution of site-generated traffic volumes was estimated as follows:

- 25% to/from the north;
- 10% to/from the south;
- 60% to/from the east; and,
- 5% to/from the west.

The expected site-generated auto trips in Table 14 and Table 15 were then assigned to the road networks as shown in Figure 12 and Figure 13, by assessing the flow of existing traffic volumes and the estimated travel times.

Figure 12: Maritime Ontario Facility Site-Generated Traffic (Phase 1)

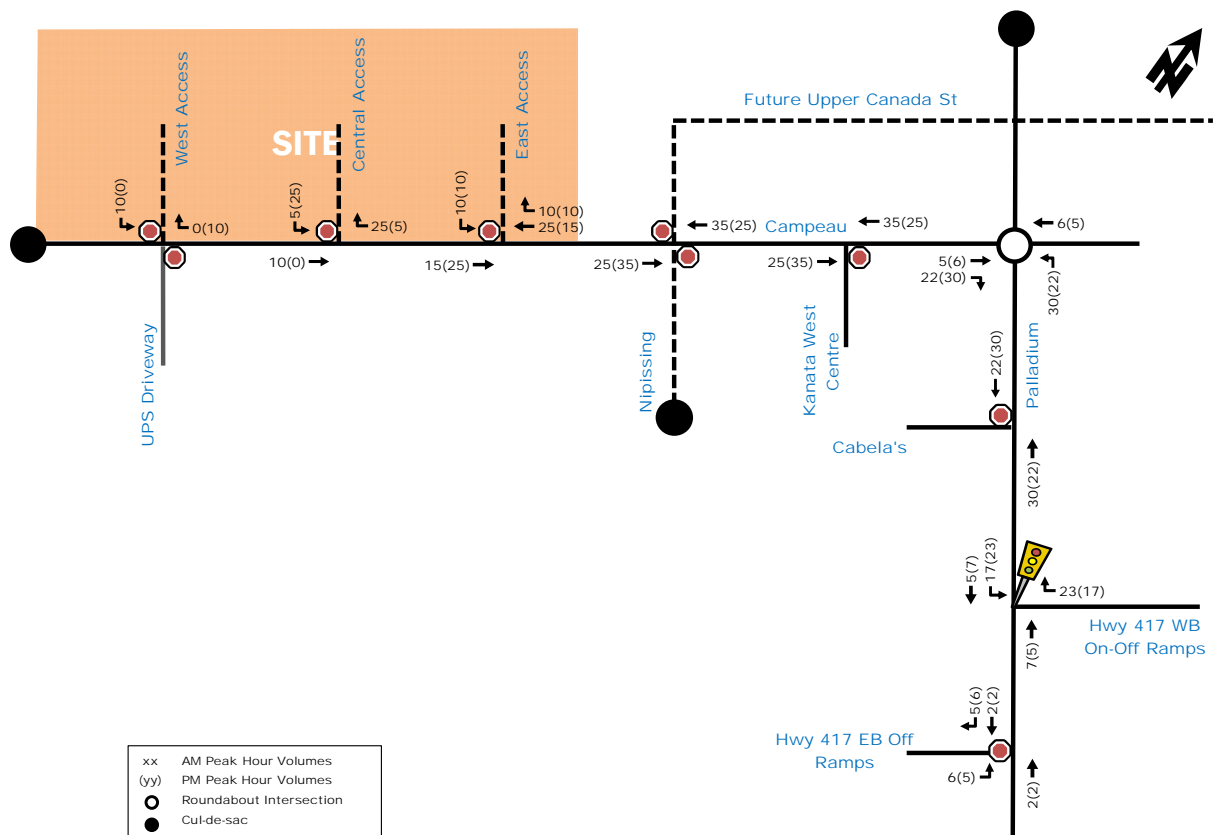
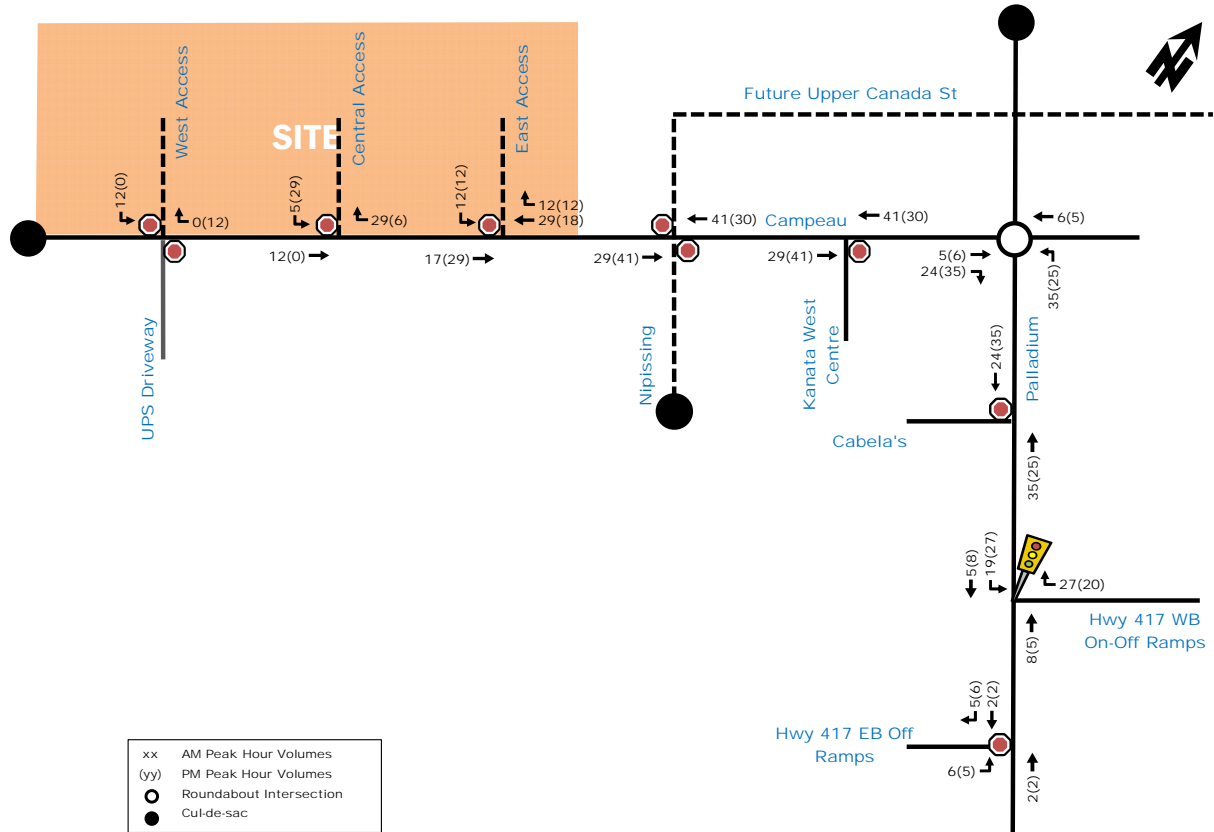


Figure 13: Maritime Ontario Facility Site-Generated Traffic (Phase 2)



It was assumed that 15% of site traffic would travel to/from Huntmar Rd in the east, while 85% would use Hwy 417. The majority of employees and customers (75%) were anticipated to use the sites' east access off Campeau, to enter and exit the development site. The remainder would use the west access. All transports are anticipated to use the east access, as it is the only driveway that provides access to the secure gated area at the rear of the proposed building/property.

3.2. Background Network Traffic

3.2.1. Transportation Network Plans

Refer to Section 2.1.3.

3.2.2. Background Growth

A large portion of the Kanata West Business Park and the ultimate road network to support it (see Figure 8) has already been constructed. Therefore, the existing traffic counts recently conducted by Parsons at study area intersections account for the current buildout. As previously noted, planned adjacent developments will be accounted for separately in this analysis. However, a 1% background growth rate was still applied to the existing traffic volumes to represent more conservative future buildout conditions.

The resulting future background traffic volumes for horizon years 2021, 2026 and 2031 are illustrated in Figure 14, Figure 15 and Figure 16.

Figure 14: Future Background 2021

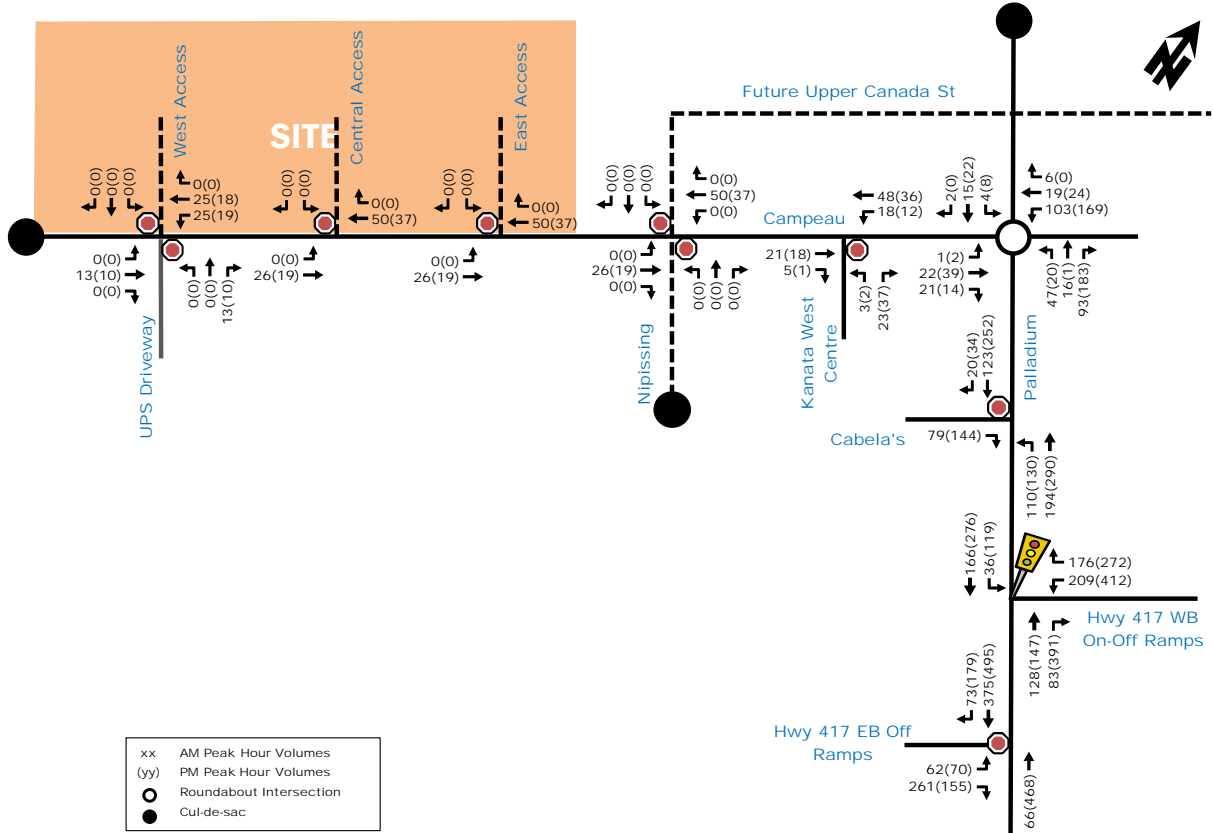


Figure 15: Future Background 2026

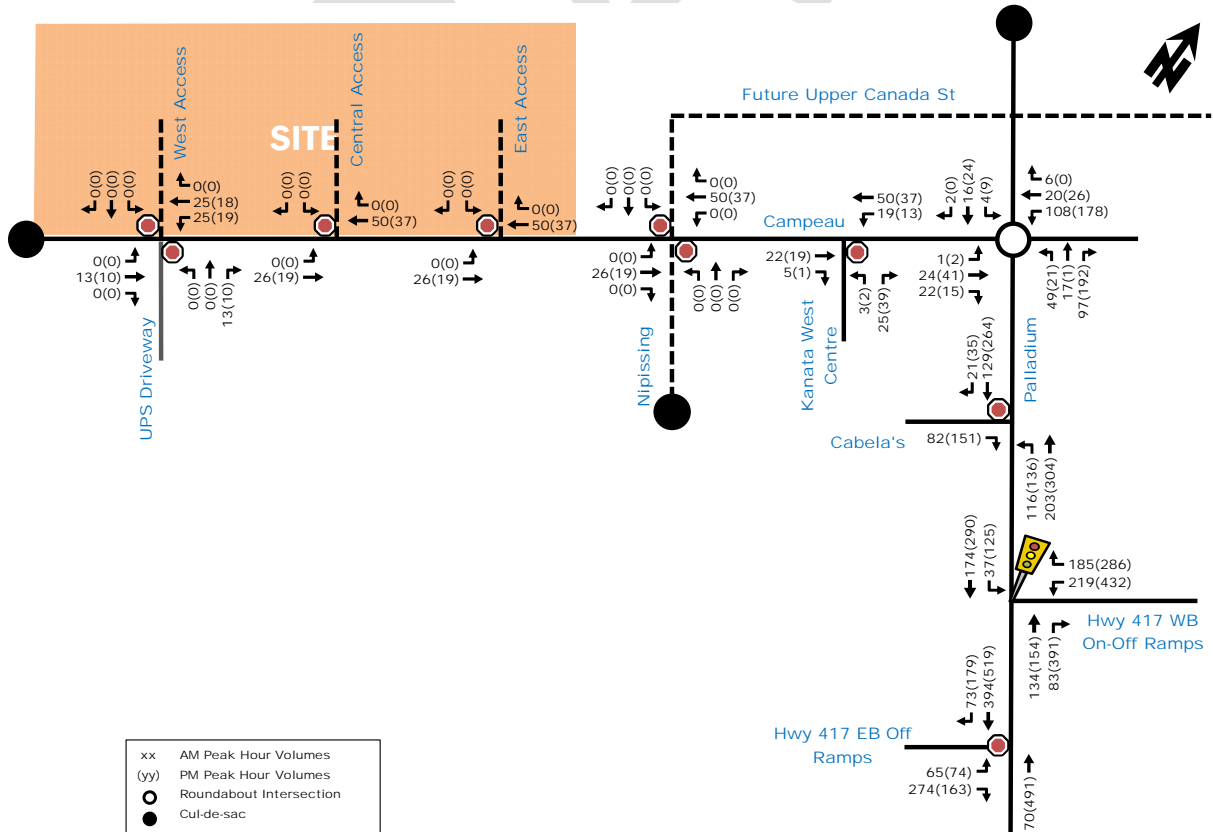
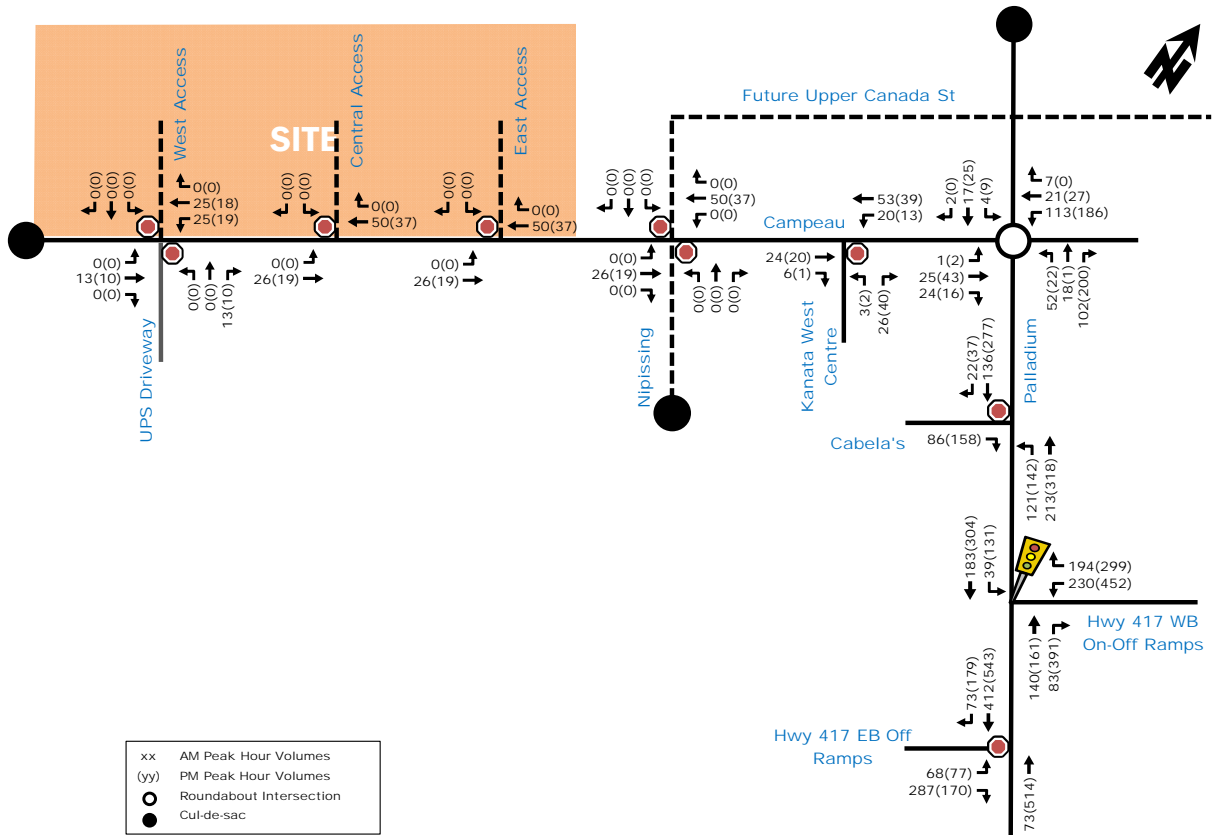


Figure 16: Future Background 2031



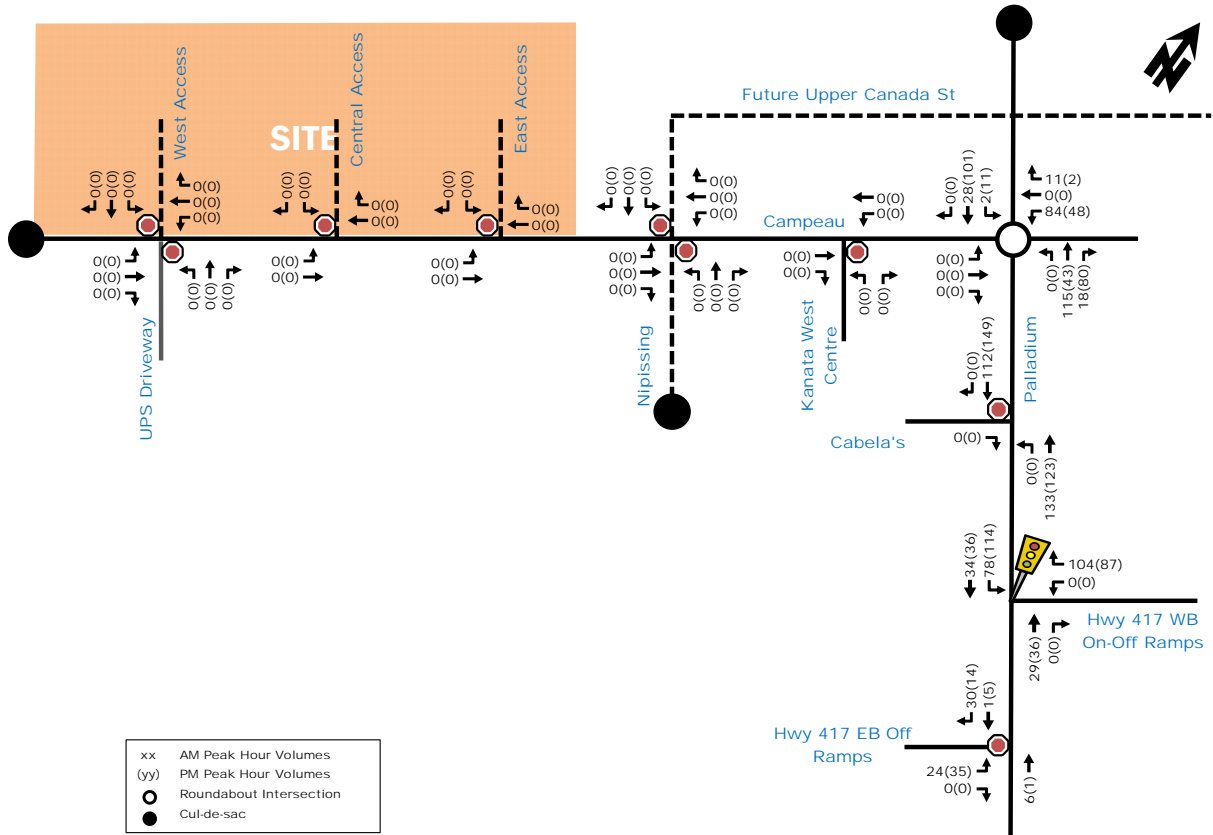
3.2.3. Other Area Developments

Other area developments that have initiated the City's development application process were outlined in Section 2.1.3. Based on the previous discussion, traffic volumes generated by the following other area developments were considered in future analysis (to be conducted in the Strategy section of the TIA process):

- 8600 Campeau Dr (Wingate Hotel)
- 8700 Campeau Dr (Kinaxis)
- 450 Huntmar Drive

Figure 17 illustrates the anticipated traffic volumes, generated within the study area by other area developments.

Figure 17: Other Area Developments Total Traffic Volumes



3.2.4. Total Background Traffic

Total background traffic represents the summation of background traffic growth (based on the 1% growth rate) in Figure 14, Figure 15 and Figure 16 and adjacent development traffic in Figure 17. The resulting total background traffic volumes for horizon years 2021, 2026 and 2031 are illustrated in Figure 18, Figure 19 and Figure 20.

Figure 18: Total Future Background 2021 Traffic Volumes

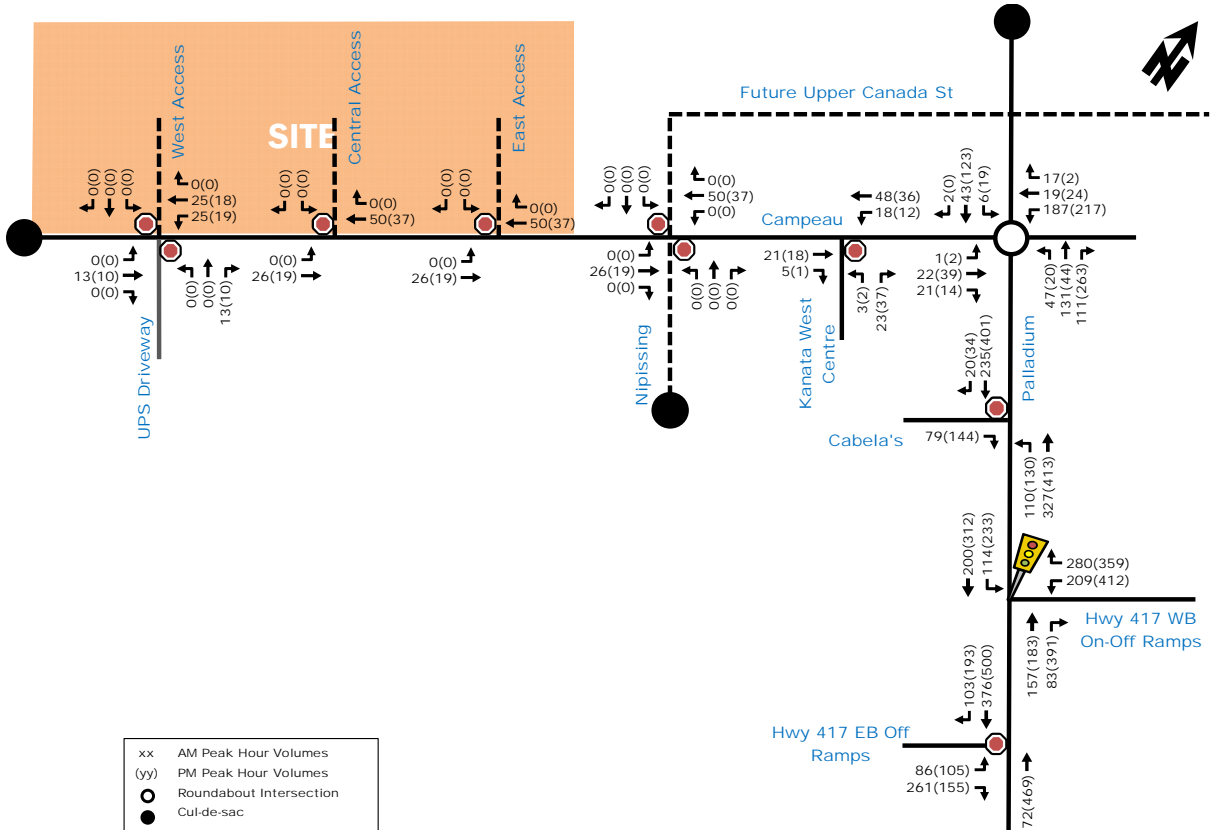


Figure 19: Total Future Background 2026 Traffic Volumes

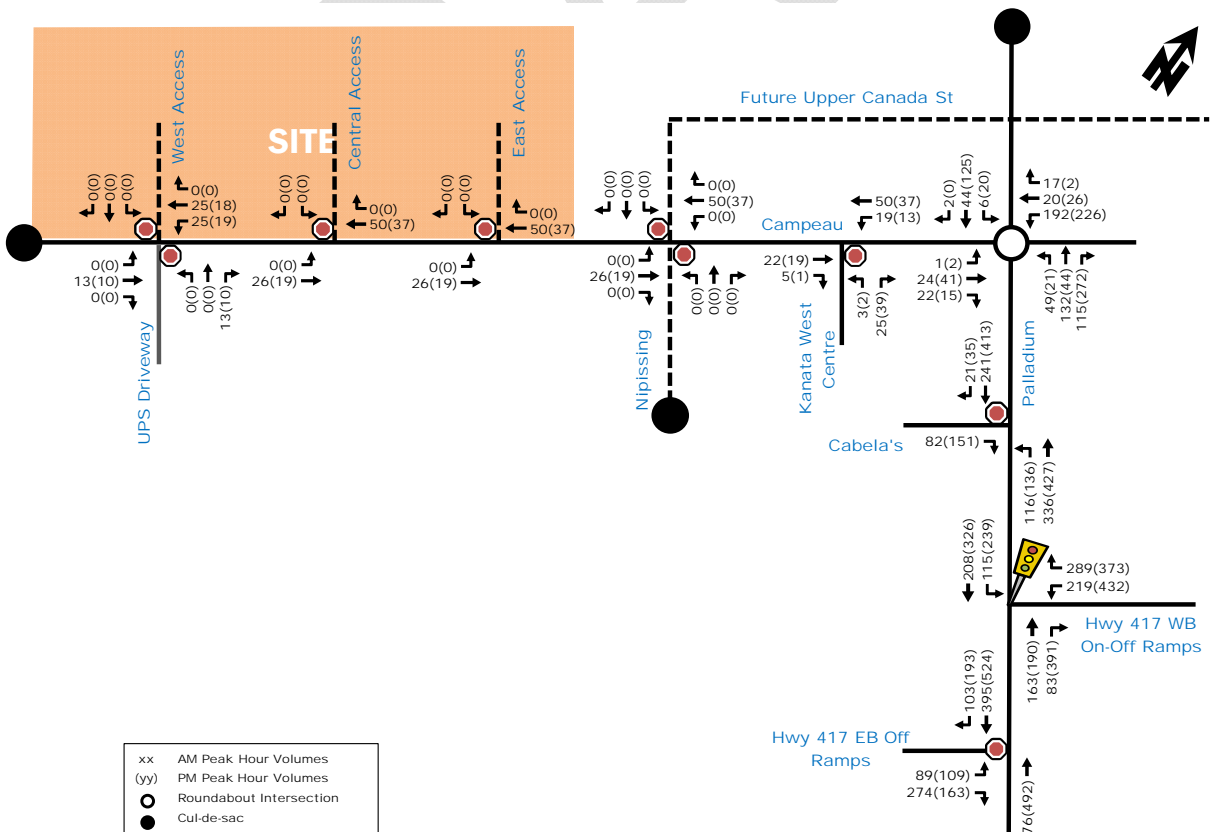
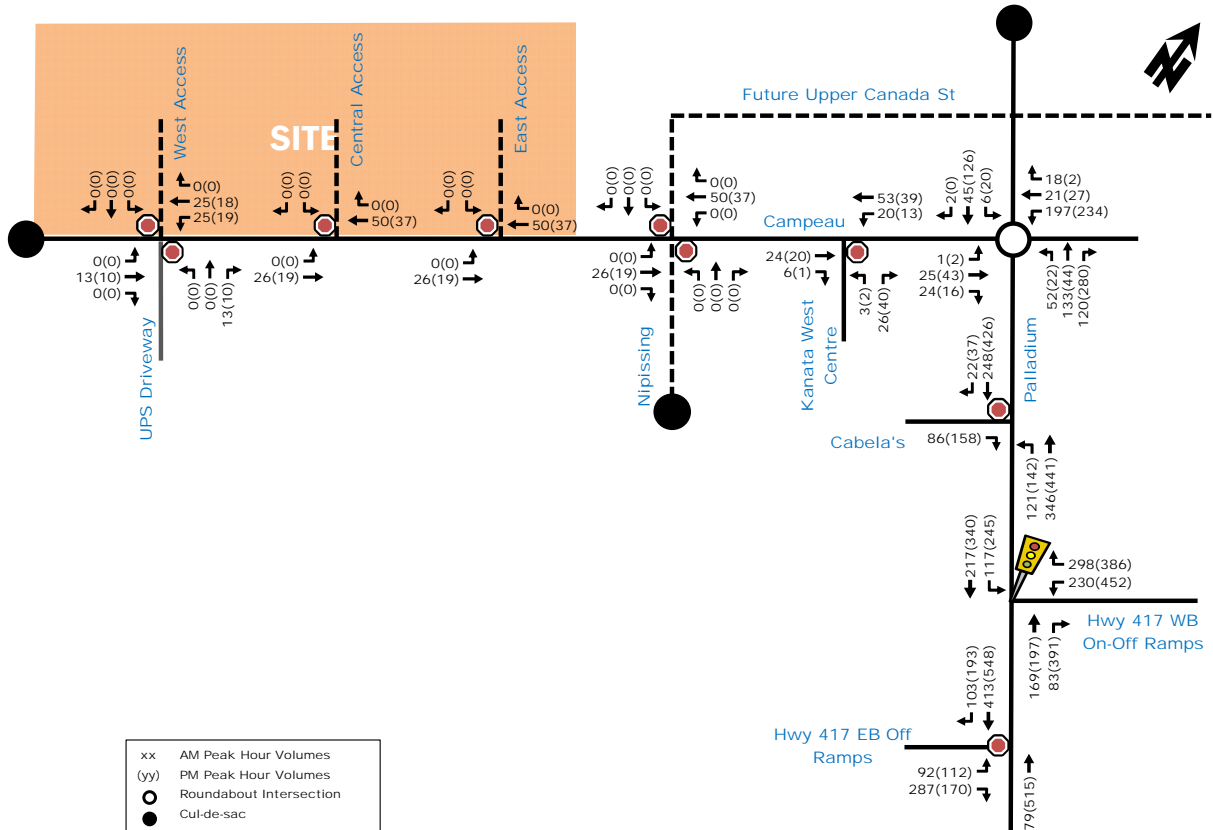


Figure 20: Total Future Background 2031 Traffic Volumes



3.3. Demand Rationalization

The study area road network is expected to accommodate projected volumes. There are currently no anticipated capacity issues. The capacity of the roadways will be further explored in a more detailed review of the total projected traffic volumes and intersection design in the following Analysis Section of the Report.

4. ANALYSIS

4.1. Development Design

4.1.1. Design for Sustainable Modes

Pedestrians and cyclists can access the development site through the series of sidewalks and unidirectional bike lanes that are currently provided throughout the study area. Sidewalks facilities will also be provided along both sides of the future Upper Canada Street, but there are no plans currently for bike lanes.

With regards to transit, two bus routes currently operate along Campeau Drive and Palladium Drive, as previously mentioned in Section 2.1.2. Furthermore, the nearest existing bus stop to the development site is along Campeau Drive, within approximately 900m walking distance.

4.1.2. Circulation and Access

Three accesses are proposed to serve the development site. Refer to the Site Plan in Figure 4 for the location of the accesses relative to the development and the boundary streets. The east and west accesses are to be used by transport and delivery trucks, while the central access leads to a parking lot that may be used primarily by employees. The site's truck maneuvering is anticipated to operate acceptably at the sites access and within the site as shown in Appendix D. The accesses are located at approximately 30m, 110m and 170m west of Campeau/Upper Canada. Trucks can access the trailer loading docks via the east access. An overnight parking lot for the tractors is accessed via the west access of the development. Further design review of the accesses is provided in Section 4.4.1.

As per the requirements of the TIA Guidelines, the TDM-supportive Development Design and Infrastructure Checklist is provided in Appendix E.

4.2. Parking

4.2.1. Parking Supply

Vehicle Parking

A total of 138 vehicle parking spaces (including three accessible spaces) are expected to be provided for employees of the planned development. The number of parking spaces provided exceeds the minimum parking space rates set by the City of Ottawa parking provisions. The parking spaces are 5.2m long and 2.60m wide, which meets the minimum requirements permitted by the City of Ottawa’s parking provisions By-Law. Additionally, parking spaces for 50 tractors will be provided on-site.

Bicycle Parking

No bicycle parking spaces are proposed.

4.3. Boundary Street Design

The proposed site’s boundary street is Campeau Drive. In the future, a new roadway, Upper Canada Street, will be constructed to the east of the development site. However, it is not considered a boundary street as it does not provide access to the site.

The geometry of the existing *Campeau Drive* (Arterial Road) consists of the following features:

- 1 vehicle travel lane in each direction,
- 2.0m sidewalks on both sides of the roadway,
- 0.5-2.0m wide boulevards,
- Less than 3000 avg daily curb lane traffic volumes,
- Posted speed limit of 60 km/h, and
- 3.7m wide lanes.

The multi-modal level of service analysis for the adjacent road segments of Campeau Drive is summarized in Table 16, with detailed analysis provided in Appendix F. The table also identifies the target LOS, with respect to each mode, based on the land-use designation and road classification of the development site and the boundary streets. The Transportation Master Plan (TMP) of the City of Ottawa identifies the land-use designation of the development site as an Urban Employment Area. The road classifications of the boundary streets were noted above.

Table 16: MMLoS - Boundary Road Analysis

Road Segment	Level of Service							
	Pedestrian (PLOS)		Bicycle (BLOS)		Transit (TLOS)		Truck (TkLOS)	
	PLOS	Target	BLOS	Target	TLOS	Target	TkLOS	Target
Campeau Drive	A	C	D	E	D	No target	B	D

Blue letters in the table above indicate that the respective LOS result meets its respective LOS target set by the MMLoS Guidelines. All travel modes related to each of the road segments are anticipated to meet the MMLoS requirements. Note that no targets are set for the Transit LOS as there is no transit corridor or transit priority area along the boundary streets.

4.4. Access Intersection Design

4.4.1. Location and Design of Access

As previously mentioned, three future accesses are planned to be provided for the development. Based on information provided by the site plan (Figure 4), the location and design of each of the accesses is described as follows:

- A 15.0m wide access on the east end of the site, providing three inbound lanes and one outbound lane for delivery trucks. The three inbound lanes are provided to prevent queuing of trucks at the entrance gate of the facility.
- A 7.5m wide access at the centre of the site, providing one inbound and one outbound lane for an employee parking lot.
- A 7.5m wide access at the west end of the site, providing one inbound and one outbound lane for a tractor parking lot.

Furthermore, no anticipated issues regarding onsite truck maneuvering. The figure showing the vehicle movements can be found in Appendix D.

4.4.2. Intersection Control and Design

STOP control will be provided for traffic exiting the site at all three Campeau Dr accesses. The future intersection of Campeau/Upper Canada/Nipissing is anticipated to provide STOP control for the north and south approaches, as well as single, full-movement lanes on all legs of the intersection. Intersection control at the existing study area intersections will remain unchanged.

Furthermore, intersection MMLoS analysis is typically conducted in TIAs for signalized intersections fronting the site, in either existing or future conditions. However, since there are no existing or proposed signalized intersections at the frontage of the development site, this analysis is not provided.

4.5. Transportation Demand Management

The TDM Measures Checklist is provided in Appendix G.

4.6. Neighbourhood Traffic Management

Exempt – see Section 2.3.

4.7. Transit

Refer to Section 2.1.2: Existing Conditions, for a description of the existing bus services within the study area. Based on the City of Ottawa TMP, there are no planned changes to the study area with regards to the transit network.

4.8. Review of Network Concept

Exempt – see Section 2.3.

4.9. Intersection Design

4.9.1. Intersection Control

Refer to Section 4.4.1: Location and Design of Access.

4.9.2. Intersection Design

Signalized and unsignalized intersections were assessed using the Synchro 10 Trafficware, while roundabouts were assessed using the Sidra 8.0 Intersection software. Critical movements at each intersection are identified based on the movement or approach providing either the highest volume-to-capacity (v/c) ratio (signalized intersections), or the highest average delay (unsignalized and roundabout intersections) at the respective intersection. It should be noted that, as per the TIA Guidelines, the Peak Hour Factor (PHF) was set to 0.90 for existing conditions analysis and to 1.0 for all future analysis scenarios. All detailed analysis results from Synchro and Sidra for existing and future conditions have been provided in Appendix H.

EXISTING CONDITIONS

Table 17 below summarizes traffic operational results of the signalized, unsignalized and roundabout intersections within the study area, based on existing conditions traffic volumes (see Table 17).

Table 17: Existing Conditions Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection 'As a Whole'		
	LOS	max. v/c or avg. delay (s)	Movement	Delay (s)	LOS	v/c
Palladium Dr/Hwy 417 WB On-Off Ramps (S)	A(A)	0.32(0.55)	WBR(NBR)	15.0(14.4)	A(A)	0.27(0.49)
Kanata West Centre Dr/Campeau Dr (U)	A(A)	8.6(8.6)	NB(NB)	3.0(4.0)	-	-
Cabelas Way/Palladium Dr (U)	A(B)	9.1(10.1)	EB(EB)	3.0(3.0)	-	-
Palladium Dr/Hwy 417 EB Off Ramp (U)	B(B)	12.1(13.9)	EB(EB)	4.6(2.3)	-	-
Campeau Dr/Palladium Dr (R)	A(A)	8.3(8.5)	WB(WB)	6.1(5.9)	-	-

Note: Analysis of signalized intersections assumes a PHF of 0.90 and a saturation flow rate of 1800 veh/h/lane.
(S) - Signalized intersection.
(U) - Unsignalized intersection.
(R) - Roundabout intersection.

As shown in Table 17, all critical movements at study area intersections are anticipated to result in a Level of Service (LOS) 'B' or better during morning and afternoon weekday peak hour periods. The signalized intersections 'as a whole' result in a LOS 'A' during both morning and afternoon weekday peak hour periods.

TOTAL FUTURE BACKGROUND 2021 CONDITIONS

Analysis of total future background 2021 was based on the traffic volumes shown in Figure 18. Table 18 below provides a summary of the analysis results.

Table 18: Total Future Background 2021 Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection 'As a Whole'		
	LOS	max. v/c or avg. delay (s)	Movement	Delay (s)	LOS	v/c
Palladium Dr/Hwy 417 WB On-Off Ramps (S)	A(A)	0.46(0.55)	WBR(NBR)	14.0(14.4)	A(A)	0.32(0.55)
Kanata West Centre Dr/Campeau Dr (U)	A(A)	8.6(8.6)	NB(NB)	3.0(4.0)	-	-
Cabelas Way/Palladium Dr (U)	A(B)	9.4(10.6)	EB(EB)	2.1(2.4)	-	-
Palladium Dr/Hwy 417 EB Off Ramp (U)	B(B)	11.7(14.4)	EB(EB)	4.5(2.6)	-	-
Campeau Dr/Palladium Dr (R)	A(A)	8.9(8.8)	WB(WB)	6.1(5.6)	-	-

Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.
(S) - Signalized intersection.
(U) - Unsignalized intersection.
(R) - Roundabout intersection.

As shown in Table 18, critical movements of the signalized intersection operate at a LOS 'A', with the intersection 'as a whole' operating at a LOS 'A' during both the morning and afternoon peak hours. Stop control intersections operate at a LOS 'B' or better, while the roundabouts operate at a LOS 'A' during the morning and afternoon peak hours.

TOTAL FUTURE BACKGROUND 2026 CONDITIONS

Analysis of total future background 2026 was based on the traffic volumes shown in Figure 19.

Table 19 below provides a summary of the analysis results.

Table 19: Total Future Background 2026 Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection 'As a Whole'		
	LOS	max. v/c or avg. delay (s)	Movement	Delay (s)	LOS	v/c
Palladium Dr/Hwy 417 WB On-Off Ramps (S)	A(A)	0.47(0.55)	WBR(WBR)	14.1(14.6)	A(A)	0.33(0.55)
Kanata West Centre Dr/Campeau Dr (U)	A(A)	8.6(8.6)	NB(NB)	3.1(4.0)	-	-
Cabelas Way/Palladium Dr (U)	A(B)	9.4(10.7)	EB(EB)	2.1(2.4)	-	-
Palladium Dr/Hwy 417 EB Off Ramp (U)	B(C)	12.0(15.1)	EB(EB)	4.6(2.8)	-	-
Campeau Dr/Palladium Dr (R)	A(A)	8.9(8.8)	WB(WB)	6.1(5.6)	-	-

Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.
(S) - Signalized intersection.
(U) - Unsignalized intersection.
(R) - Roundabout intersection.

The study area intersections are anticipated to operate similar to the 2021 total background conditions by showing only slight increase in delay and v/c ratios.

TOTAL FUTURE BACKGROUND 2031 CONDITIONS

Analysis of total future background 2031 was based on the traffic volumes shown in Figure 20. Table 20 below provides a summary of the analysis results.

Table 20: Total Future Background 2031 Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection 'As a Whole'		
	LOS	max. v/c or avg. delay (s)	Movement	Delay (s)	LOS	v/c
Palladium Dr/Hwy 417 WB On-Off Ramps (S)	A(A)	0.48(0.56)	WBR(WBR)	14.3(14.9)	A(A)	0.34(0.55)
Kanata West Centre Dr/Campeau Dr (U)	A(A)	8.6(8.6)	NB(NB)	3.0(4.0)	-	-
Cabelas Way/Palladium Dr (U)	A(B)	9.5(10.9)	EB(EB)	2.2(2.5)	-	-
Palladium Dr/Hwy 417 EB Off Ramp (U)	B(C)	12.3(15.7)	EB(EB)	4.8(2.9)	-	-
Campeau Dr/Palladium Dr (R)	A(A)	8.9(8.8)	WB(WB)	6.1(5.6)	-	-

Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.
(S) - Signalized intersection.
(U) - Unsignalized intersection.
(R) - Roundabout intersection.

The study area intersections are anticipated to operate similar to the 2021 total background conditions by showing only slight increase in delay and v/c ratios.

TOTAL PROJECTED 2021 CONDITIONS – PHASE 1 BUILD-OUT

The total projected 2021 traffic volumes were derived by superimposing the Phase 1 site-generated traffic volumes (Figure 12) onto total future background 2021 traffic volumes (Figure 18). The resulting total projected 2021 traffic volumes are illustrated in Figure 21.

Figure 21: Total Projected 2021 Traffic Volumes

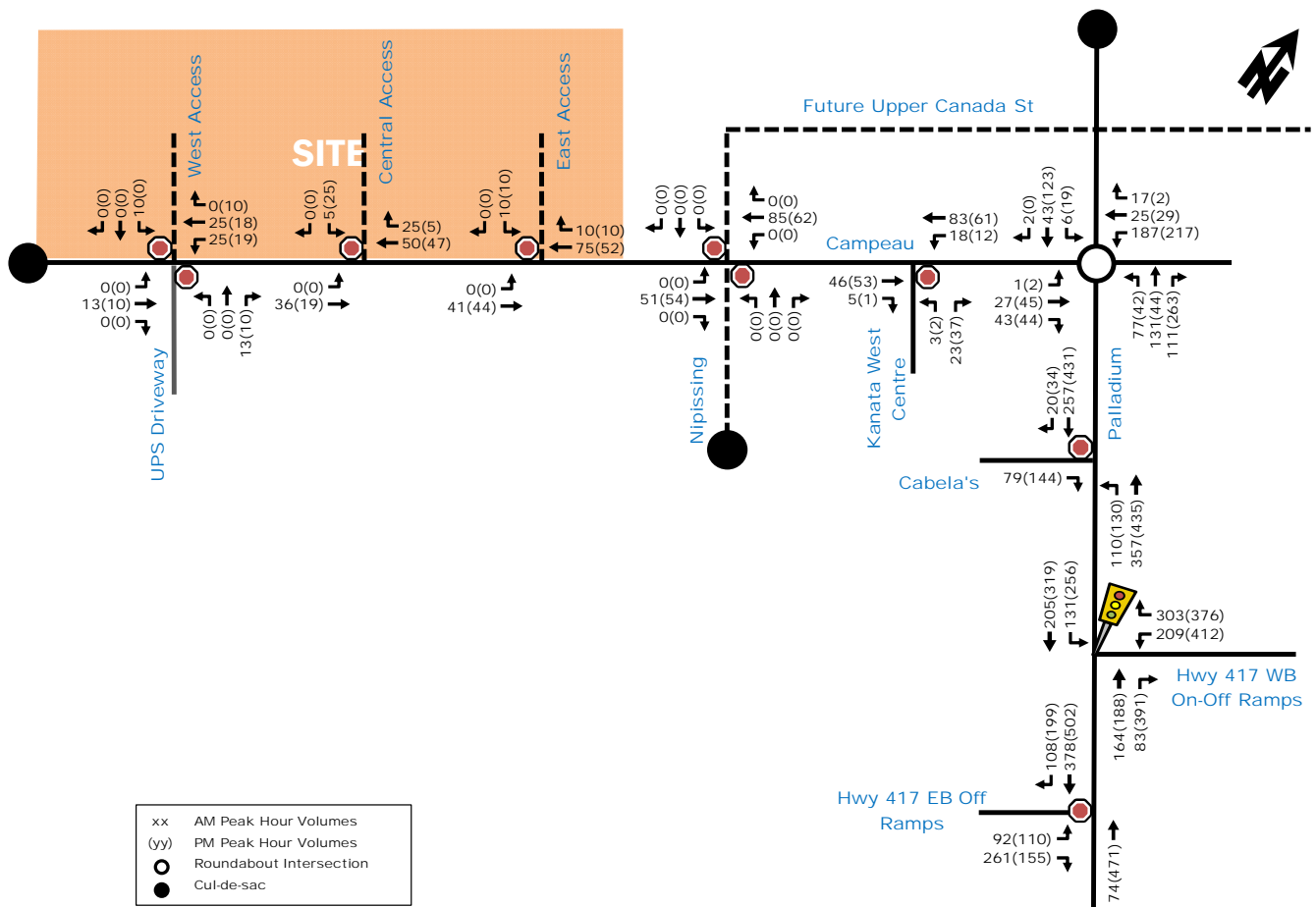


Table 21 below provides a summary of the critical Synchro analysis results at intersections within the study area, based on total projected 2021 traffic volumes.

Table 21: Total Projected 2021 Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection 'As a Whole'		
	LOS	max. v/c or avg. delay (s)	Movement	Delay (s)	LOS	v/c
Palladium Dr/Hwy 417 WB On-Off Ramps (S)	A(A)	0.48(0.55)	WBR(WBR)	13.9(14.5)	A(A)	0.34(0.55)
Kanata West Centre Dr/Campeau Dr (U)	A(A)	8.7(8.7)	NB(NB)	2.0(2.6)	-	-
Cabelas Way/Palladium Dr (U)	A(B)	9.5(10.8)	EB(EB)	2.0(2.3)	-	-
Palladium Dr/Hwy 417 EB Off Ramp (U)	B(B)	11.7(14.7)	EB(EB)	4.5(2.7)	-	-
Campeau Dr/East Access (U)	B(B)	10.3(10.2)	SB(SB)	0.8(0.9)	-	-
Campeau Dr/Central Access (U)	A(A)	9.0(9.0)	SB(SB)	0.4(2.3)	-	-
Campeau Dr/West Access (U)	B(A)	10.4(8.4)	SB(NB)	4.6(3.3)	-	-
Campeau Dr/Palladium Dr (R)	A(A)	8.9(8.8)	WB(WB)	6.2(5.6)	-	-

Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.
(S) - Signalized intersection.
(U) - Unsignalized intersection.
(R) - Roundabout intersection.

As shown in Table 21, all critical movements at study area intersections operate at a LOS 'B' or better during morning and afternoon weekday peak hour periods. The signalized intersection, 'as a whole' are anticipated to have a LOS 'A' during both morning and afternoon weekday peak hours. Moreover, the proposed development accesses are projected to operate at a LOS 'B' or better during the morning and afternoon weekday peak hour periods.

TOTAL PROJECTED 2026 CONDITIONS – PHASE 2 BUILD-OUT

The total projected 2026 traffic volumes shown in Figure 22, were derived by superimposing the Phase 2 site-generated traffic volumes (Figure 13) onto total future 2026 background traffic volumes (Figure 19).

Figure 22: Total Projected 2026 Traffic Volumes

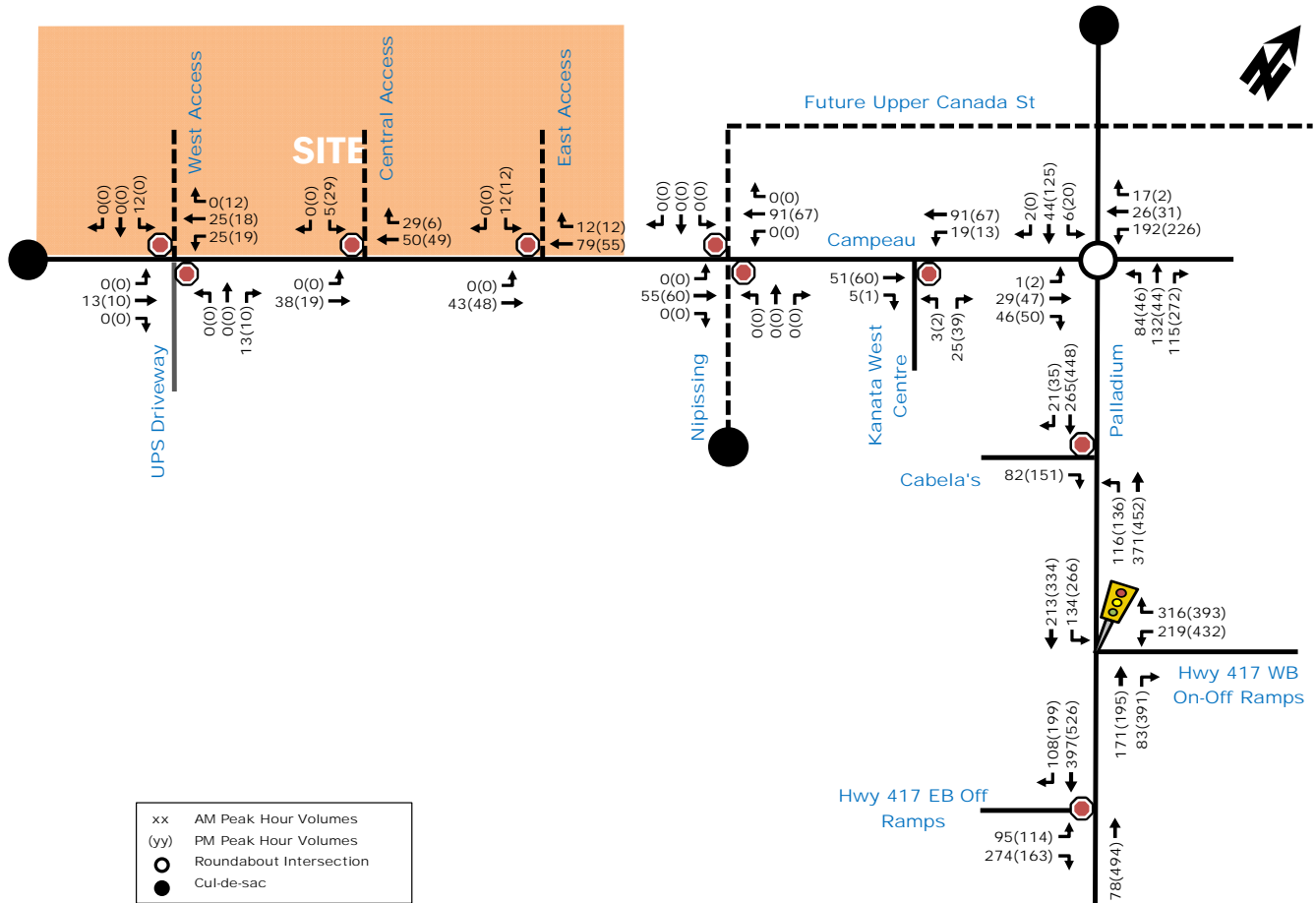


Table 22 below provides a summary of the critical Synchro analysis results at intersections within the study area, based on total projected 2026 traffic volumes.

Table 22: Total Projected 2026 Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection 'As a Whole'		
	LOS	max. v/c or avg. delay (s)	Movement	Delay (s)	LOS	v/c
Palladium Dr/Hwy 417 WB On-Off Ramps (S)	A(A)	0.50(0.57)	WBR(WBR)	14.0(14.7)	A(A)	0.35(0.56)
Kanata West Centre Dr/Campeau Dr (U)	A(A)	8.8(8.8)	NB(NB)	2.0(2.5)	-	-
Cabelas Way/Palladium Dr (U)	A(B)	9.5(10.9)	EB(EB)	2.0(2.3)	-	-
Palladium Dr/Hwy 417 EB Off Ramp (U)	B(C)	12.0(15.3)	EB(EB)	4.7(2.8)	-	-
Campeau Dr/East Access (U)	B(B)	10.4(10.2)	SB(SB)	0.9(1.0)	-	-
Campeau Dr/Central Access (U)	A(A)	9.0(9.0)	SB(SB)	0.4(2.5)	-	-
Campeau Dr/West Access (U)	B(A)	10.4(8.4)	SB(NB)	4.8(3.3)	-	-
Campeau Dr/Palladium Dr (R)	A(A)	8.9(8.8)	WB(WB)	6.2(5.7)	-	-

Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.
 (S) – Signalized intersection.
 (U) – Unsignalized intersection.
 (R) – Roundabout intersection.

As shown in Table 22, the study area intersections are anticipated to operate similar to total projected 2021 conditions, with slight increase in delays and v/c ratios at some intersections.

TOTAL PROJECTED 2031 CONDITIONS – FULL BUILD-OUT PLUS FIVE YEARS

The total projected 2031 traffic volumes shown in Figure 23 were derived by superimposing the total site-generated traffic volumes at Phase 2 full build-out (Figure 13) onto total future 2031 background traffic volumes (Figure 20).

Figure 23: Total Projected 2031 Traffic Volumes

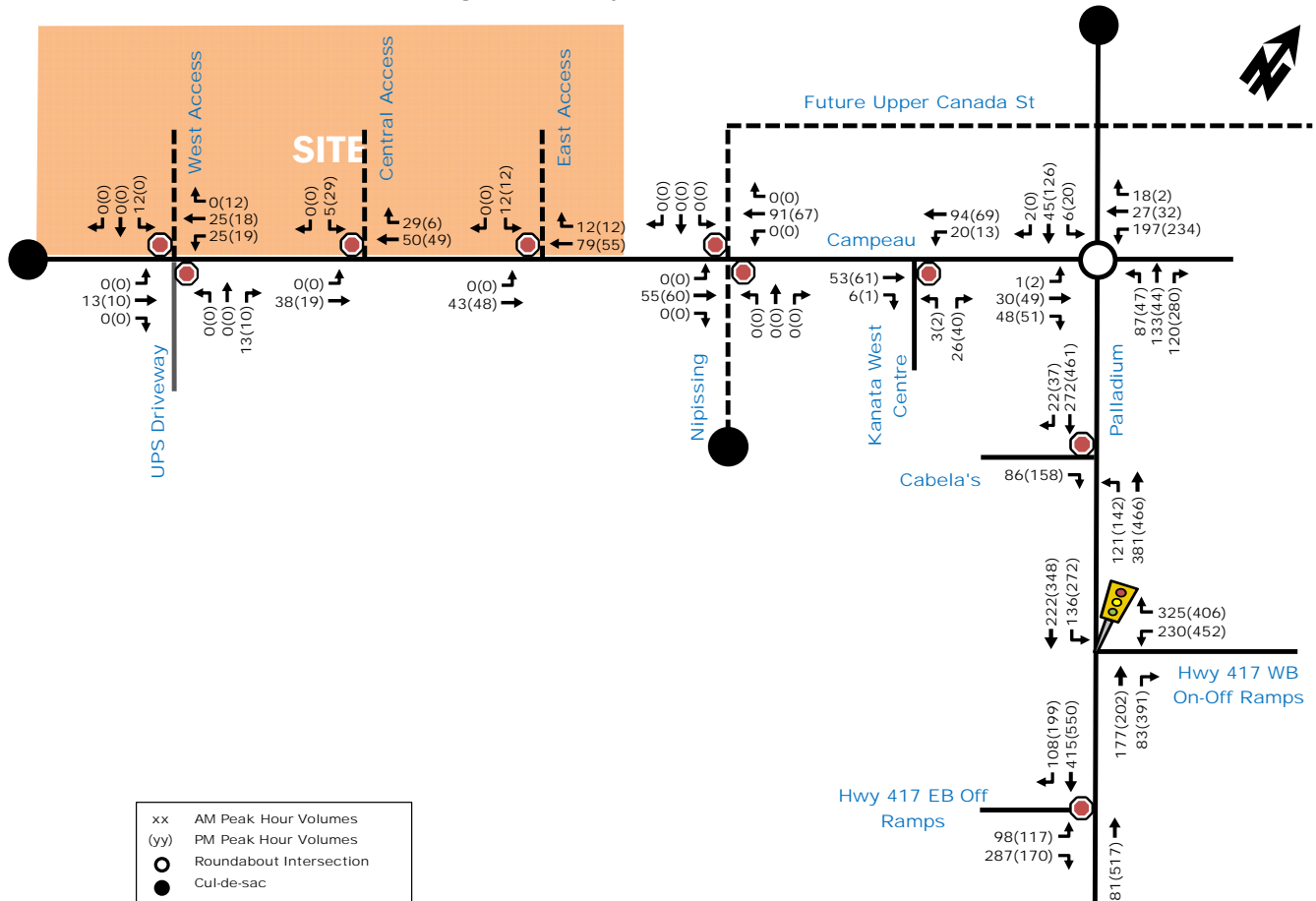


Table 23 below provides a summary of the critical Synchro analysis results at intersections within the study area, based on total projected 2031 traffic volumes.

Table 23: Total Projected 2031 Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection 'As a Whole'		
	LOS	max. v/c or avg. delay (s)	Movement	Delay (s)	LOS	v/c
Palladium Dr/Hwy 417 WB On-Off Ramps (S)	A(A)	0.50(0.58)	WBR(WBR)	14.2(14.9)	A(A)	0.36(0.57)
Kanata West Centre Dr/Campeau Dr (U)	A(A)	8.8(8.8)	NB(NB)	2.0(2.5)	-	-
Cabelas Way/Palladium Dr (U)	A(B)	9.6(11.1)	EB(EB)	2.1(2.4)	-	-
Palladium Dr/Hwy 417 EB Off Ramp (U)	B(C)	12.3(16.1)	EB(EB)	4.8(3.0)	-	-
Campeau Dr/East Access (U)	B(B)	10.3(10.2)	SB(SB)	0.9(1.0)	-	-
Campeau Dr/Central Access (U)	A(A)	9.0(9.0)	SB(SB)	0.4(2.5)	-	-
Campeau Dr/West Access (U)	B(A)	10.4(8.4)	SB(NB)	4.8(3.3)	-	-
Campeau Dr/Palladium Dr (R)	A(A)	8.9(8.8)	WB(WB)	6.2(5.7)	-	-

Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.
(S) - Signalized intersection.
(U) - Unsignalized intersection.
(R) - Roundabout intersection.

As shown in Table 23, the study area intersections are anticipated to operate similar to total projected 2026 conditions, with slight increase in delays and v/c ratios at some intersections.

5. FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Based on the results summarized herein the following transportation related conclusions are offered:

Proposed Development

- The proposed development will be constructed in two phases. Phase 1 will consist of a two-storey office building with a gross floor area of 6,000 ft², a 60,000 ft² warehouse building with a build-out year of 2021. Phase 2 will consist of the balance of Phase 1 capacity, plus the a 11,800 ft² expansion of the warehouse, with an assumed build-out year of 2026.
- The development is planned to provide a total of 138 vehicle parking spaces (including three accessible parking spaces), which meets the City of Ottawa's parking provisions requirements. There will also be trailer parking spaces and 50 tractor parking spaces on site.
- Three new, full-movement accesses are proposed to serve the development, all of which are located near the west end of Campeau Drive. The east access serves the trailer delivery vehicles, while the central access serves employee parking spaces and the west access serves tractor parking spaces.
- The projected number of vehicle trips anticipated to be generated by Phase 1 is 60 veh/h during both the morning and afternoon weekday peak hour periods. At Phase 2 buildout, the development is anticipated to generate 70 and 71 veh/h during the morning and afternoon weekday peak hour periods, respectively.
- Truck turning templates indicated that there are no issues regarding truck movements throughout the site.

Existing and Background Conditions

- All existing study area intersections were projected to operate at a LOS 'B' or better during morning and afternoon weekday peak hour periods.
- Background traffic growth rate was assumed to be 1% per year along Campeau Drive and Palladium Drive.
- The operational analysis of total future background 2021, 2026 and 2031 conditions indicated the following:
 - Study area intersections operate similar to existing conditions, with a LOS 'C' or better during morning and afternoon weekday peak hour periods; and,
 - MMLOS analysis of boundary streets was conducted based on future conditions of the study area. The boundary street analyzed was Campeau Drive and the analysis indicated that all MMLOS targets were met, with respect to each travel mode.

Projected Conditions

- Based on the analysis, all study area intersections in total projected 2021, 2026 and 2031 conditions are projected to operate at a LOS 'C' or better during morning and afternoon weekday peak hour periods.

Based on the foregoing, the proposed development fits well into the context of the surrounding area and has little impact on the study intersection operations. Therefore, it is recommended to proceed from a transportation perspective.

Prepared By:

Reviewed By:

Basel Ansari, E.I.T.

Matthew Mantle, P.Eng.
Transportation Engineer

Appendix A

SCREENING FORM & CITY COMMENT RESPONSES

DRAFT

Responses can be found in green following the comments below.

Please review the following comments;

Project No.: 477391 - 01000	Project Address: 8700 Campeau Dr, Blocks 37, 38 and 39
Applicant/Consultants/Developer: Parsons	Ward/Councillor: 4/Jenna Sudds

This comment response sheet is to address the Forecasting Report comments received on March 17, 2020.

Comments:

Transportation Engineering Services:

- Correct the intersection diagram of Campeau and Nipissing (two-way stop).

Corrections have been made.

- Correct Figure 13. The volumes shown do not correspond to a 75% HWY 417 25% Huntmar split. However, the 15% split shown in the figure seems reasonable.

Text has been corrected to match the 15% split shown in the figure.

- Ensure that the background developments listed in section 2.1.3 and shown in 3.2.3 match. The inclusion of 450 Huntmar Drive is supported as it will have a strong influence on the Campeau Drive / Palladium Drive roundabout.

Description of 450 Huntmar Drive has been added in Section 2.1.3.

Traffic Signal Operations:

- No comment.

Noted.

Development Review – Transportation:

- Correct reference to the "Hawthorne facility" on page 16.

Reference has been corrected.

City of Ottawa 2017 TIA Guidelines

Date

Novemeber 27, 2019

TIA Screening Form

Project

Maritime Ontario Kanata West

Project Number

908489-50081

Results of Screening	Yes/No
Development Satisfies the Trip Generation Trigger	Yes
Development Satisfies the Location Trigger	No
Development Satisfies the Safety Trigger	No

Module 1.1 - Description of Proposed Development	
Municipal Address	8700 Campeau Drive
Description of location	Located in the north-west quadrant of the future Upper Canada/Campeau intersection. Currently a vacant lot.
Land Use	Package sorting facility
Development Size	5,574 sq. m sorting/warehouse facility, 465 sq. m office space and future 1,858 sq. m additional sorting/warehouse expansion
Number of Accesses and Locations	Two proposed full movement accesses to Campeau Drive
Development Phasing	Two phases
Buildout Year	Assumed 2021 for Phase 1 and 2031 for Phase 2
Sketch Plan / Site Plan	See attached

Module 1.2 - Trip Generation Trigger		
Land Use Type	Industrial	
Development Size	7897	sq. m
Trip Generation Trigger Met?	Yes	

Module 1.3 - Location Triggers	
Development Proposes a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit, or Spine Bicycle Networks (See Sheet 3)	No
Development is in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone. (See Sheet 3)	No
Location Trigger Met?	No

Module 1.4 - Safety Triggers		
Posted Speed Limit on any boundary road	<80	km/h
Horizontal / Vertical Curvature on a boundary street limits sight lines at a proposed driveway	No	
A proposed driveway is 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) or within auxiliary lanes of an intersection;	No	
A proposed driveway makes use of an existing median break that serves an existing site	No	
There is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development	No	
The development includes a drive-thru facility	No	
Safety Trigger Met?	No	

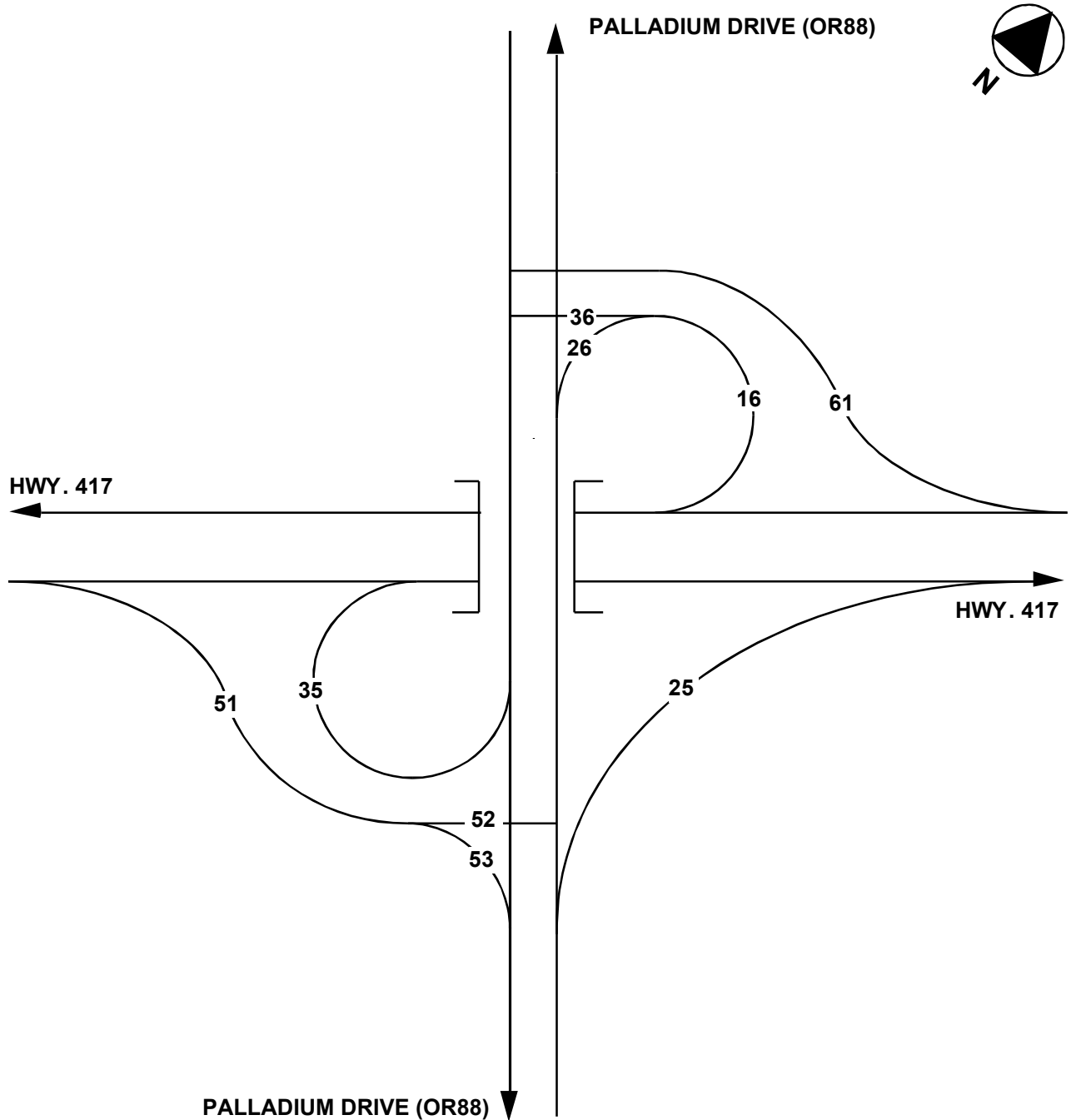
Appendix B

TRAFFIC VOLUMES

DRAFT

MINISTRY OF TRANSPORTATION INTERCHANGE FILE

HWY. 417 IC 142	KEYPOINT NUMBER 49562/000
AT PALLADIUM DRIVE (OR88)	M.T.O. DISTRICT OTTAWA
	O.P.P. DISTRICT 11 LONG SAULT





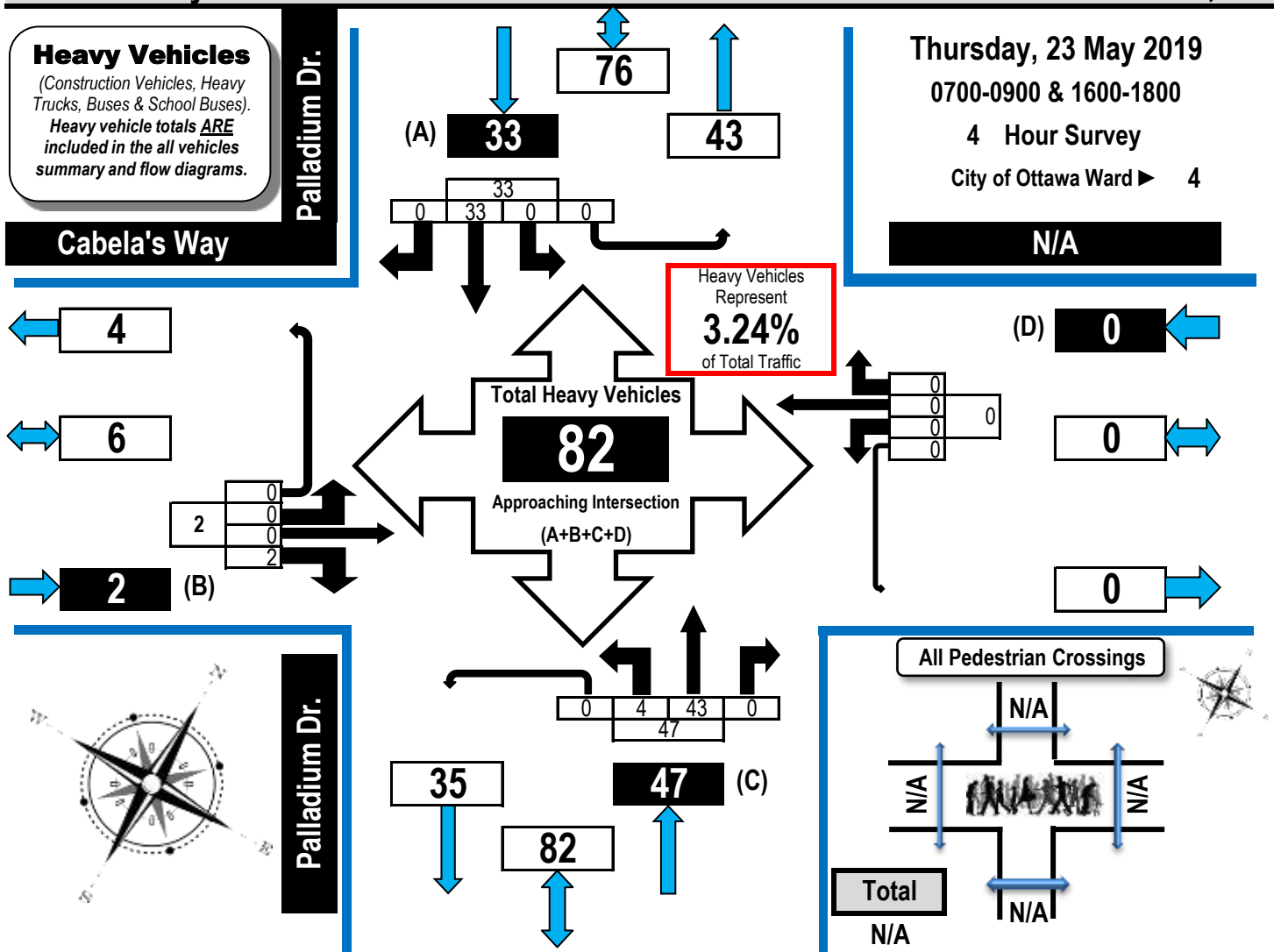
Turning Movement Count Heavy Vehicle Summary Flow Diagram

Heavy Trucks, Buses,
and School Buses

Cabela's Way & Palladium Drive Kanata, ON

Thursday, 23 May 2019
0700-0900 & 1600-1800
4 Hour Survey
City of Ottawa Ward ▶ 4

Heavy Vehicles
(Construction Vehicles, Heavy Trucks, Buses & School Buses).
Heavy vehicle totals ARE included in the all vehicles summary and flow diagrams.

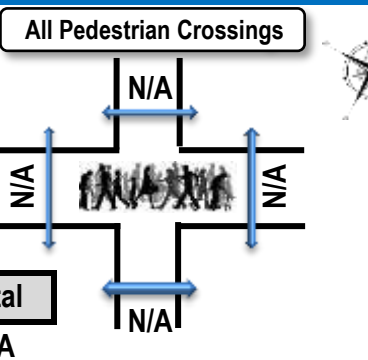


N/A

(D) **0**

0

0



Cabela's Way	N/A	Palladium Dr.	Palladium Dr.
Eastbound	Westbound	Northbound	Southbound

Time Period	Cabela's Way Eastbound					N/A Westbound					Palladium Dr. Northbound					Palladium Dr. Southbound					G.Tot.
	LT	ST	RT	UT	S. Tot.	LT	ST	RT	UT	S. Tot.	LT	ST	RT	UT	S. Tot.	LT	ST	RT	UT	S. Tot.	
0700-0800	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	0	2	0	0	2	8
0800-0900	0	0	1	0	1	0	0	0	0	0	2	7	0	0	9	0	18	0	0	18	28
1600-1700	0	0	1	0	1	0	0	0	0	0	0	5	0	0	5	0	7	0	0	7	13
1700-1800	0	0	0	0	0	0	0	0	0	0	2	25	0	0	27	0	6	0	0	6	33
Totals	0	0	2	0	2	0	0	0	0	0	4	43	0	0	47	0	33	0	0	33	82

Comments:

No bicycles observed during this traffic count. Campeau Drive is not yet open to Terry Fox Drive. Cabela's, Princess Auto and McDonalds represent the businesses now open. The majority of the heavy vehicle traffic are from the UPS facility on Campeau Drive.



Turning Movement Count

Summary Report

AADT and Expansion Factors

Automobiles, Taxis,
Light Trucks, Vans,
SUV's, Motorcycles,
Heavy Trucks, Buses,
and School Buses

Cabela's Way & Palladium Drive Kanata, ON

Survey Date: Thursday, 23 May 2019 **Start Time:** 0700 **AADT Factor:** 0.9
Weather AM: Clear +12°C **Survey Duration:** 4 Hrs. **Survey Hours:** 0700-0900 & 1600-1800
Weather PM: Overcast +18°C **Surveyor(s):** Carmody

Time Period	Cabela's Way					N/A					Palladium Dr.					Palladium Dr.					Street Total	Grand Total	
	Eastbound					Westbound					Northbound					Southbound							
	LT	ST	RT	UT	E/B Tot	LT	ST	RT	UT	W/B Tot	LT	ST	RT	UT	N/B Tot	LT	ST	RT	UT	S/B Tot			
0700-0800	1	0	79	0	80	0	0	0	0	0	80	100	128	0	0	228	0	90	21	0	111	339	419
0800-0900	0	0	77	0	77	0	0	0	0	0	77	108	190	0	1	299	0	121	20	0	141	440	517
1600-1700	0	0	145	0	145	0	0	0	0	0	145	130	272	0	0	402	0	244	27	1	272	674	819
1700-1800	2	0	138	0	140	0	0	0	0	0	140	108	261	0	0	369	0	233	33	0	266	635	775
Totals	3	0	439	0	442	0	0	0	0	0	442	446	851	0	1	1298	0	688	101	1	790	2088	2530

Equivalent 12 & 24-hour Vehicle Volumes Including the Annual Average Daily Traffic (AADT) Factor
Applicable to the Day and Month of the Turning Movement Count

Expansion factors are applied exclusively to standard weekday 8-hour turning movement counts conducted during the hours of 0700h - 1000h, 1130h - 1330h and 1500h - 1800h

Equivalent 12-hour vehicle volumes. These volumes are calculated by multiplying the 8-hour totals by the 8 → 12 expansion factor of 1.39

Equ. 12 Hr	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
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Average daily 12-hour vehicle volumes. These volumes are calculated by multiplying the equivalent 12-hour totals by the AADT factor of: 0.9

AADT 12-hr	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
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24-Hour AADT. These volumes are calculated by multiplying the average daily 12-hour vehicle volumes by the 12 → 24 expansion factor of 1.31

AADT 24 Hr	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
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AADT and expansion factors provided by the City of Ottawa

AM Peak Hour Factor → 0.87												Highest Hourly Vehicle Volume Between 0700h & 0900h											
AM Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
0800-0900	0	0	77	0	77	0	0	0	0	0	77	108	190	0	1	299	0	121	20	0	141	440	517

PM Peak Hour Factor → 0.91												Highest Hourly Vehicle Volume Between 1600h & 1800h											
PM Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
1615-1715	0	0	141	0	141	0	0	0	0	0	141	127	284	0	0	411	0	247	33	1	281	692	833

Comments:

No bicycles observed during this traffic count. Campeau Drive is not yet open to Terry Fox Drive. Cabela's, Princess Auto and McDonalds represent the businesses now open. The majority of the heavy vehicle traffic are from the UPS facility on Campeau Drive.

Notes:

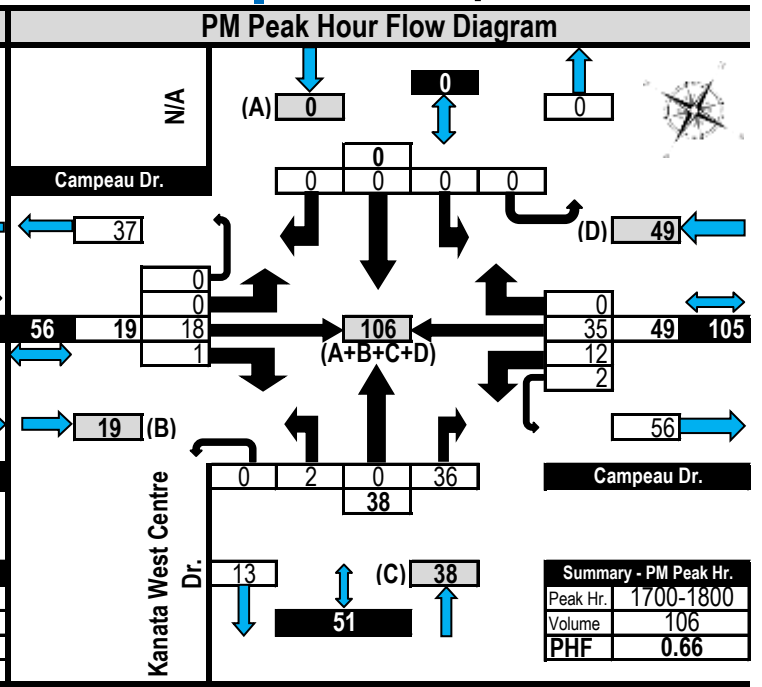
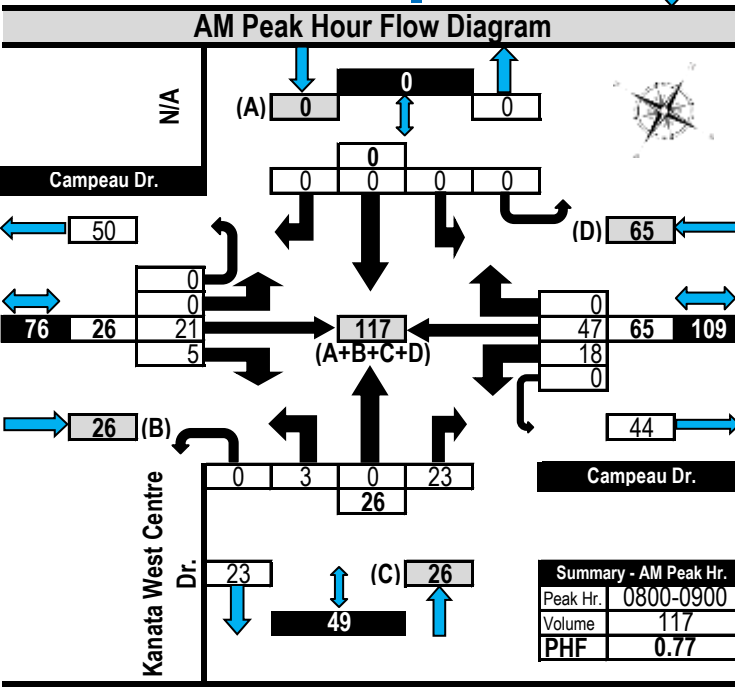
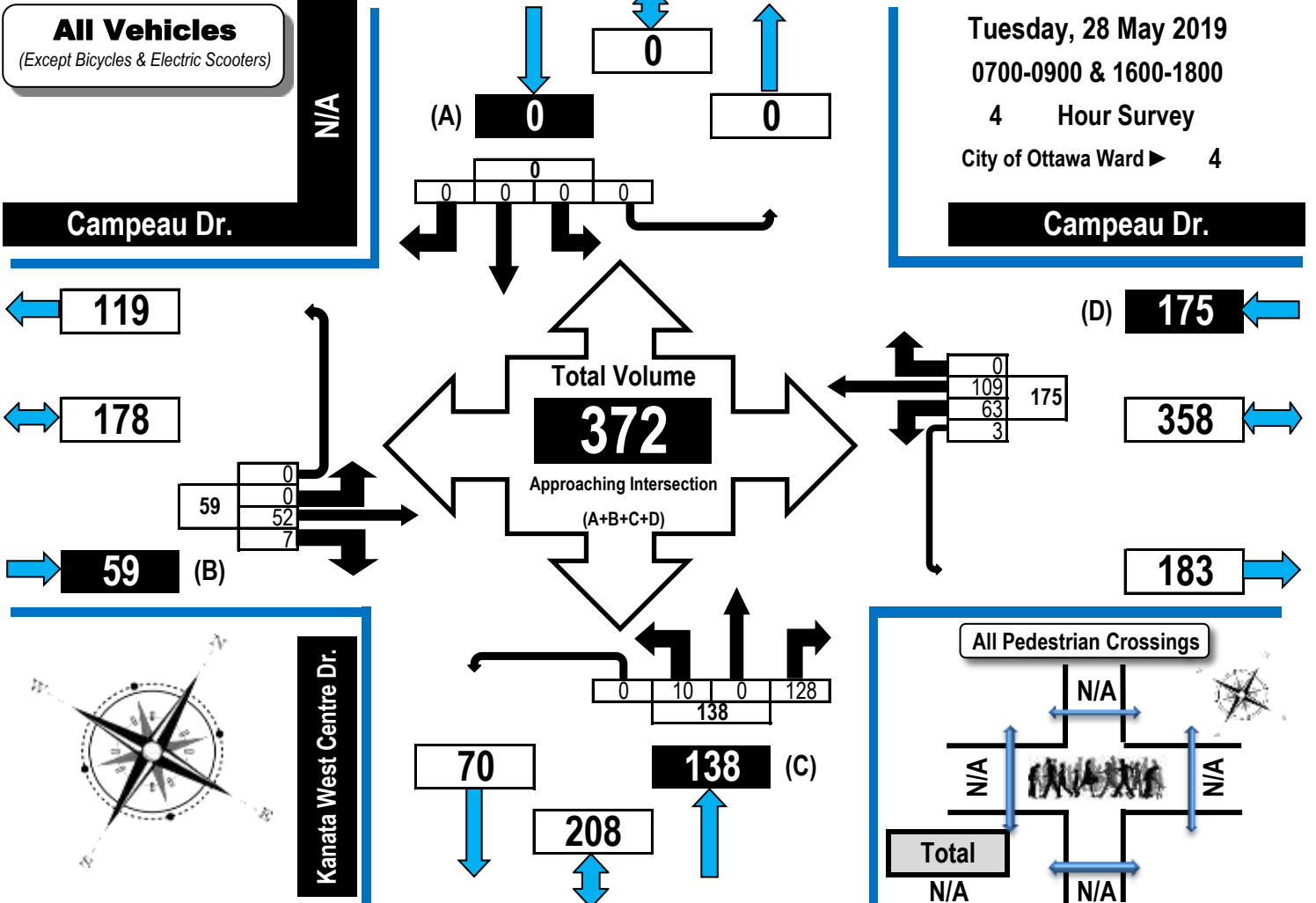
1. Includes all vehicle types except bicycles, electric bicycles, and electric scooters.
2. When expansion and AADT factors are applied, the results will differ slightly due to rounding.



Turning Movement Count Summary, AM and PM Peak Hour Flow Diagrams

Automobiles, Taxis, Light Trucks, Vans, SUV's, Motorcycles, Heavy Trucks, Buses, and School Buses

Campeau Drive & Kanata West Centre Drive Kanata, ON



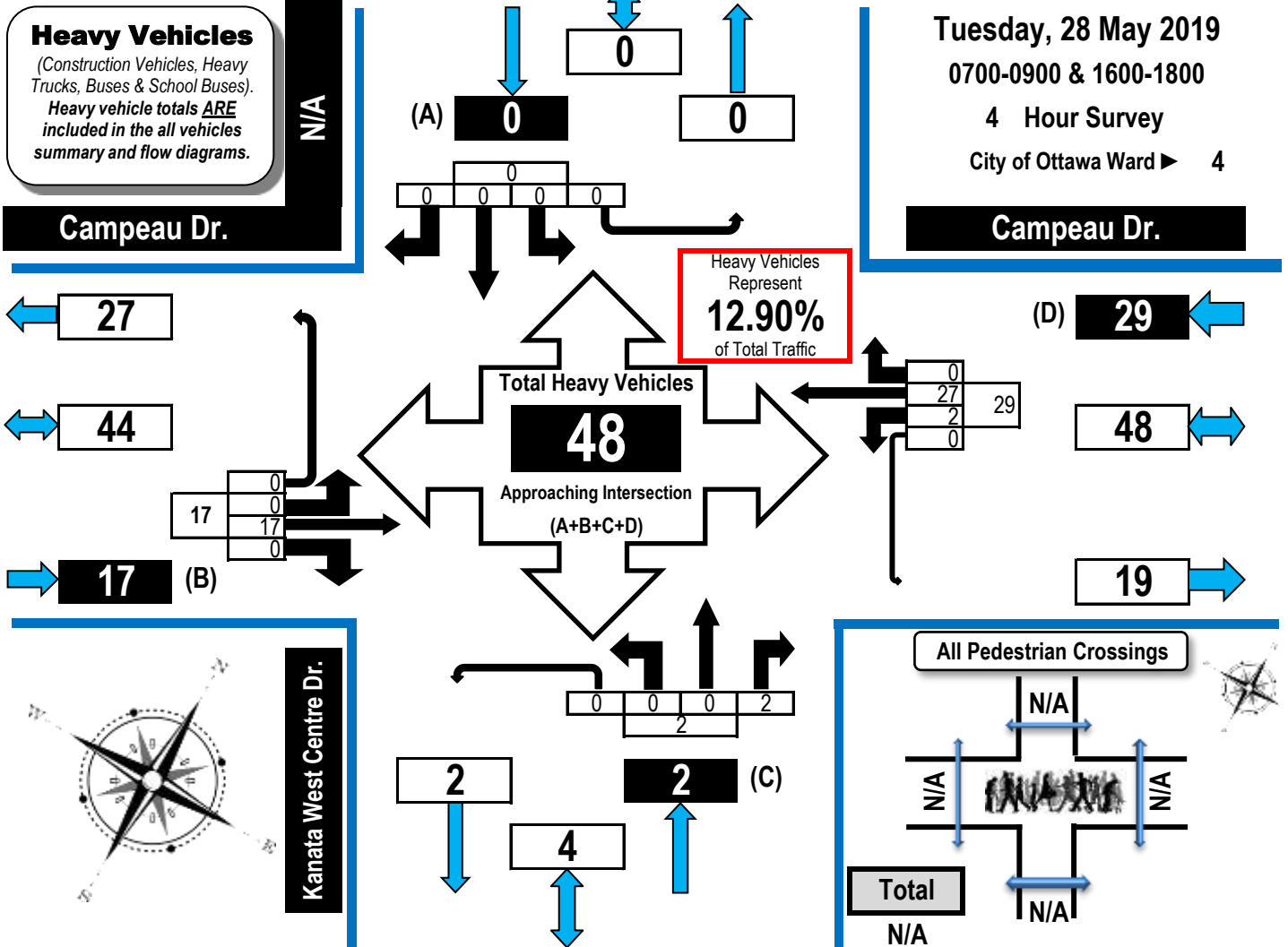


Turning Movement Count Heavy Vehicle Summary Flow Diagram

Heavy Trucks, Buses,
and School Buses

Campeau Drive & Kanata West Centre Drive Kanata, ON

Tuesday, 28 May 2019
0700-0900 & 1600-1800
4 Hour Survey
City of Ottawa Ward ▶ 4



Campeau Dr. Eastbound						Campeau Dr. Westbound					Kanata West Centre Dr. Northbound					N/A Southbound				
LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot	G.Tot.

Time Period	LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot	LT	ST	RT	UT	S. Tot	G.Tot.
0700-0800	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1
0800-0900	0	13	0	0	13	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	15
1600-1700	0	3	0	0	3	1	3	0	0	4	0	0	1	0	1	0	0	0	0	0	8
1700-1800	0	1	0	0	1	1	22	0	0	23	0	0	0	0	0	0	0	0	0	0	24
Totals	0	17	0	0	17	2	27	0	0	29	0	0	2	0	2	0	0	0	0	0	48

Comments:

Campeau Drive not yet open to Terry Fox Drive. Cabela's, Princess Auto and McDonalds represent the businesses now open. The majority of the heavy vehicles are associated with the UPS facility on Campeau Drive.



Turning Movement Count

Summary Report

AADT and Expansion Factors

Automobiles, Taxis,
Light Trucks, Vans,
SUV's, Motorcycles,
Heavy Trucks, Buses,
and School Buses

Campeau Drive & Kanata West Centre Drive Kanata, ON

Survey Date: Tuesday, 28 May 2019 Start Time: 0700 AADT Factor: 0.9
 Weather AM: Overcast +9°C Survey Duration: 4 Hrs. Survey Hours: 0700-0900 & 1600-1800
 Weather PM: Overcast +11°C Surveyor(s): Mousseau

Time Period	Campeau Dr.					Campeau Dr.					Kanata West Centre Dr.					N/A					Grand Total		
	Eastbound					Westbound					Northbound					Southbound							
	LT	ST	RT	UT	E/B Tot	LT	ST	RT	UT	W/B Tot	Street Total	LT	ST	RT	UT	N/B Tot	LT	ST	RT	UT		S/B Tot	Street Total
0700-0800	0	4	1	0	5	8	6	0	0	14	19	1	0	25	0	26	0	0	0	0	0	26	45
0800-0900	0	21	5	0	26	18	47	0	0	65	91	3	0	23	0	26	0	0	0	0	0	26	117
1600-1700	0	9	0	0	9	25	21	0	1	47	56	4	0	44	0	48	0	0	0	0	0	48	104
1700-1800	0	18	1	0	19	12	35	0	2	49	68	2	0	36	0	38	0	0	0	0	0	38	106
Totals	0	52	7	0	59	63	109	0	3	175	234	10	0	128	0	138	0	0	0	0	0	138	372

Equivalent 12 & 24-hour Vehicle Volumes Including the Annual Average Daily Traffic (AADT) Factor Applicable to the Day and Month of the Turning Movement Count

Expansion factors are applied exclusively to standard weekday 8-hour turning movement counts conducted during the hours of 0700h - 1000h, 1130h - 1330h and 1500h - 1800h

Equivalent 12-hour vehicle volumes. These volumes are calculated by multiplying the 8-hour totals by the 8 → 12 expansion factor of 1.39																						
Equ. 12 Hr	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Average daily 12-hour vehicle volumes. These volumes are calculated by multiplying the equivalent 12-hour totals by the AADT factor of: 0.9																						
AADT 12-hr	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

24-Hour AADT. These volumes are calculated by multiplying the average daily 12-hour vehicle volumes by the 12 → 24 expansion factor of 1.31																						
AADT 24 Hr	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

AADT and expansion factors provided by the City of Ottawa

AM Peak Hour Factor → 0.77											Highest Hourly Vehicle Volume Between 0700h & 0900h												
AM Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
0800-0900	0	21	5	0	26	18	47	0	0	65	91	3	0	23	0	26	0	0	0	0	0	26	117

PM Peak Hour Factor → 0.66											Highest Hourly Vehicle Volume Between 1600h & 1800h												
PM Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
1700-1800	0	18	1	0	19	12	35	0	2	49	68	2	0	36	0	38	0	0	0	0	0	38	106

Comments:

Campeau Drive not yet open to Terry Fox Drive. Cabela's, Princess Auto and McDonalds represent the businesses now open. The majority of the heavy vehicles are associated with the UPS facility on Campeau Drive.

Notes:

- Includes all vehicle types except bicycles, electric bicycles, and electric scooters.
- When expansion and AADT factors are applied, the results will differ slightly due to rounding.



Turning Movement Count

Summary Report

AADT and Expansion Factors

Automobiles, Taxis,
Light Trucks, Vans,
SUV's, Motorcycles,
Heavy Trucks, Buses,
and School Buses

Campeau Drive & Palladium Drive (ROUNDBABOUT)

Kanata, ON

Survey Date: Tuesday, 28 May 2019 **Start Time:** 0700 **AADT Factor:** 0.9
Weather AM: Overcast +9°C **Survey Duration:** 4 Hrs. **Survey Hours:** 0700-0900 & 1600-1800
Weather PM: Overcast +11°C **Surveyor(s):** Carmody

Time Period	Campeau Dr. Eastbound					Campeau Dr. Westbound					Palladium Dr. Northbound					Palladium Dr. Southbound					Grand Total		
	LT	ST	RT	UT	E/B Tot	LT	ST	RT	UT	W/B Tot	Street Total	LT	ST	RT	UT	N/B Tot	LT	ST	RT	UT		S/B Tot	Street Total
	0700-0800	2	23	6	0	31	91	9	7	0	107	138	6	17	70	5	98	1	2	0		0	3
0800-0900	1	22	21	0	44	101	19	6	0	126	170	46	16	91	12	165	4	15	2	0	21	186	356
1600-1700	2	37	14	0	53	169	30	1	0	200	253	17	1	151	111	280	10	15	0	0	25	305	558
1700-1800	0	41	14	0	55	144	17	1	0	162	217	28	4	146	116	294	4	14	1	0	19	313	530
Totals	5	123	55	0	183	505	75	15	0	595	778	97	38	458	244	837	19	46	3	0	68	905	1683

Equivalent 12 & 24-hour Vehicle Volumes Including the Annual Average Daily Traffic (AADT) Factor
Applicable to the Day and Month of the Turning Movement Count

Expansion factors are applied exclusively to standard weekday 8-hour turning movement counts conducted during the hours of 0700h - 1000h, 1130h - 1330h and 1500h - 1800h

Equivalent 12-hour vehicle volumes. These volumes are calculated by multiplying the 8-hour totals by the 8 → 12 expansion factor of 1.39

Equ. 12 Hr	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
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Average daily 12-hour vehicle volumes. These volumes are calculated by multiplying the equivalent 12-hour totals by the AADT factor of: 0.9

AADT 12-hr	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
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24-Hour AADT. These volumes are calculated by multiplying the average daily 12-hour vehicle volumes by the 12 → 24 expansion factor of 1.31

AADT 24 Hr	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
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AADT and expansion factors provided by the City of Ottawa

AM Peak Hour Factor → 0.82											Highest Hourly Vehicle Volume Between 0700h & 0900h												
AM Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
0800-0900	1	22	21	0	44	101	19	6	0	126	170	46	16	91	12	165	4	15	2	0	21	186	356

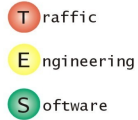
PM Peak Hour Factor → 0.95											Highest Hourly Vehicle Volume Between 1600h & 1800h												
PM Peak Hr	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	LT	ST	RT	UT	TOT	LT	ST	RT	UT	TOT	S.TOT	G.TOT
1615-1715	2	38	14	0	54	166	24	0	0	190	244	20	1	179	101	301	8	22	0	0	30	331	575

Comments:

Campeau Drive not yet open to Terry Fox Drive. Cabela's, Princess Auto and McDonalds represent the businesses now open in the Kanata West Business Park. The large number of northbound U-turns primarily originate from the Tanger Outlet access located south of Campeau Drive.

Notes:

1. Includes all vehicle types except bicycles, electric bicycles, and electric scooters.
2. When expansion and AADT factors are applied, the results will differ slightly due to rounding.



Weekly Volume Summary

Fri, May 17, 2019

Location: Hwy 417 at Palladium Dr - Ramp 16

LHRS/Offset: 49562 / 0.0

Region: Eastern

Pattern Type: n/a

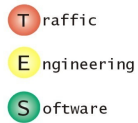
PCS#: n/a

Hwy. TVIS#: 49562016

Count Direction: N/A

Report Dates: Sep 13, 2018 to Sep 19, 2018

Hour Interval	Thu 18/09/13	Fri 14	Sat 15	Sun 16	Mon 17	Tue 18	Wed 19	Thu 20
0:00- 1:00		10	20	9	1	10	4	10
1:00- 2:00		3	14	3	1	9	3	4
2:00- 3:00		3	0	0	4	0	3	2
3:00- 4:00		7	5	2	1	4	0	2
4:00- 5:00		1	3	2	1	4	4	3
5:00- 6:00		8	3	3	8	7	10	5
6:00- 7:00		41	17	10	36	40	40	34
7:00- 8:00		79	32	23	74	90	79	81
8:00- 9:00		91	74	38	99	102	95	95
9:00-10:00		104	131	66	77	99	73	94
10:00-11:00		196	222	128	147	159	166	116
11:00-12:00		265	246	176	203	193	208	198
AM Total	0	808	767	460	652	717	685	644
12:00-13:00	229	303	287	250	255	222	227	
13:00-14:00	271	307	277	295	239	246	243	
14:00-15:00	335	410	335	283	281	297	281	
15:00-16:00	432	442	315	288	385	393	407	
16:00-17:00	483	461	277	218	438	503	478	
17:00-18:00	403	412	220	150	386	404	398	
18:00-19:00	186	242	125	94	213	230	198	
19:00-20:00	188	180	87	44	169	156	173	
20:00-21:00	157	162	97	23	142	109	146	
21:00-22:00	75	91	49	28	84	87	188	
22:00-23:00	22	197	31	23	14	21	322	
23:00-24:00	13	542	12	9	60	20	49	
PM Total	2,794	3,749	2,112	1,705	2,666	2,688	3,110	0
24 Hr. Total	2,794	4,557	2,879	2,165	3,318	3,405	3,795	644
Noon - Noon	3,602	4,516	2,572	2,357	3,383	3,373	3,754	
	ADT	AWD	AADT	AAWD	SADT	SAWDT	WADT	DHV
	3,365	3,528						



Weekly Volume Summary

Fri, May 17, 2019

Location: Hwy 417 at Palladium Dr - Ramp 25

LHRS/Offset: 49562 / 0.0

Region: Eastern

Pattern Type: n/a

PCS#: n/a

Hwy. TVIS#: 49562025

Count Direction: N/A

Report Dates: Sep 4, 2018 to Sep 10, 2018

Hour Interval	Tue 18/09/04	Wed 5	Thu 6	Fri 7	Sat 8	Sun 9	Mon 10	Tue 11
0:00- 1:00		8	3	12	13	17	5	2
1:00- 2:00		3	5	7	4	6	3	5
2:00- 3:00		4	5	4	8	12	6	2
3:00- 4:00		9	5	8	7	13	8	8
4:00- 5:00		5	11	10	9	5	11	11
5:00- 6:00		63	68	60	17	11	60	70
6:00- 7:00		280	271	260	41	36	290	277
7:00- 8:00		366	384	354	73	53	354	363
8:00- 9:00		247	277	304	126	76	308	255
9:00-10:00		194	192	207	164	136	179	183
10:00-11:00		155	201	179	194	154	199	169
11:00-12:00		205	177	207	224	158	177	186
AM Total	0	1,539	1,599	1,612	880	677	1,600	1,531
12:00-13:00	193	186	205	199	228	174	197	
13:00-14:00	168	167	153	196	211	159	176	
14:00-15:00	205	175	192	211	247	171	192	
15:00-16:00	223	215	201	216	198	171	212	
16:00-17:00	218	224	267	232	219	150	238	
17:00-18:00	277	242	257	269	192	117	251	
18:00-19:00	162	186	201	199	148	84	166	
19:00-20:00	129	131	148	112	107	79	157	
20:00-21:00	88	91	118	100	70	43	96	
21:00-22:00	74	78	74	69	50	27	56	
22:00-23:00	24	30	29	65	43	13	15	
23:00-24:00	11	15	24	29	19	7	6	
PM Total	1,772	1,740	1,869	1,897	1,732	1,195	1,762	0
24 Hr. Total	1,772	3,279	3,468	3,509	2,612	1,872	3,362	1,531
Noon - Noon	3,311	3,339	3,481	2,777	2,409	2,795	3,293	
	ADT	AWD	AADT	AAWD	SADT	SAWDT	WADT	DHV
	3,058	3,356						



Weekly Volume Summary

Fri, May 17, 2019

Location: Hwy 417 at Palladium Dr - Ramp 35

LHRS/Offset: 49562 / 0.0

Region: Eastern

Pattern Type: n/a

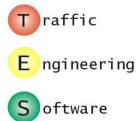
PCS#: n/a

Hwy. TVIS#: 49562035

Count Direction: N/A

Report Dates: Sep 4, 2018 to Sep 10, 2018

Hour Interval	Tue 18/09/04	Wed 5	Thu 6	Fri 7	Sat 8	Sun 9	Mon 10	Tue 11
0:00- 1:00		4	3	3	11	10	1	3
1:00- 2:00		2	2	0	4	4	2	0
2:00- 3:00		0	0	8	3	1	1	0
3:00- 4:00		0	1	1	2	4	1	0
4:00- 5:00		6	4	4	3	1	3	3
5:00- 6:00		11	14	13	4	2	13	14
6:00- 7:00		62	70	55	17	9	65	66
7:00- 8:00		82	78	81	29	11	95	76
8:00- 9:00		89	106	83	42	32	101	77
9:00-10:00		90	71	83	80	51	76	72
10:00-11:00		105	115	123	141	133	99	104
11:00-12:00		179	157	193	268	217	144	151
AM Total	0	630	621	647	604	475	601	566
12:00-13:00	206	189	180	210	286	338	196	
13:00-14:00	221	160	194	217	408	363	194	
14:00-15:00	239	179	211	224	413	440	177	
15:00-16:00	194	179	195	197	453	450	195	
16:00-17:00	183	163	156	206	454	431	146	
17:00-18:00	188	163	164	207	376	345	174	
18:00-19:00	167	136	151	156	314	226	109	
19:00-20:00	172	155	155	222	259	47	130	
20:00-21:00	168	152	164	207	197	28	129	
21:00-22:00	134	103	104	147	115	19	99	
22:00-23:00	16	27	15	34	28	11	7	
23:00-24:00	8	9	9	14	17	8	4	
PM Total	1,896	1,615	1,698	2,041	3,320	2,706	1,560	0
24 Hr. Total	1,896	2,245	2,319	2,688	3,924	3,181	2,161	566
Noon - Noon	2,526	2,236	2,345	2,645	3,795	3,307	2,126	
	ADT 2,711	AWD 2,308	AADT	AAWD	SADT	SAWDT	WADT	DHV



Weekly Volume Summary

Fri, May 17, 2019

Location: Hwy 417 at Palladium Dr - Ramp 51

LHRS/Offset: 49562 / 0.0

Region: Eastern

Pattern Type: n/a

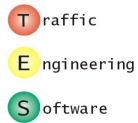
PCS#: n/a

Hwy. TVIS#: 49562051

Count Direction: N/A

Report Dates: Sep 4, 2018 to Sep 10, 2018

Hour Interval	Tue 18/09/04	Wed 5	Thu 6	Fri 7	Sat 8	Sun 9	Mon 10	Tue 11
0:00- 1:00		1	7	2	7	8	4	1
1:00- 2:00		3	3	1	4	12	1	0
2:00- 3:00		3	1	2	4	2	0	0
3:00- 4:00		3	3	2	1	6	4	3
4:00- 5:00		7	9	6	4	3	14	15
5:00- 6:00		72	60	46	8	7	60	65
6:00- 7:00		237	242	206	30	19	246	237
7:00- 8:00		315	318	251	64	42	323	319
8:00- 9:00		290	264	258	149	64	268	302
9:00-10:00		253	217	239	229	149	213	228
10:00-11:00		252	256	257	273	264	239	232
11:00-12:00		234	200	247	335	306	210	208
AM Total	0	1,670	1,580	1,517	1,108	882	1,582	1,610
12:00-13:00	235	187	186	229	327	287	219	
13:00-14:00	179	174	184	212	315	310	199	
14:00-15:00	206	180	187	189	261	289	176	
15:00-16:00	201	186	163	212	246	242	181	
16:00-17:00	209	230	236	244	212	170	210	
17:00-18:00	195	198	198	200	134	126	177	
18:00-19:00	156	129	159	167	113	65	120	
19:00-20:00	114	96	143	101	93	60	96	
20:00-21:00	49	39	66	70	53	39	31	
21:00-22:00	38	29	26	36	36	18	31	
22:00-23:00	15	21	15	17	17	16	12	
23:00-24:00	2	8	13	12	23	5	8	
PM Total	1,599	1,477	1,576	1,689	1,830	1,627	1,460	0
24 Hr. Total	1,599	3,147	3,156	3,206	2,938	2,509	3,042	1,610
Noon - Noon	3,269	3,057	3,093	2,797	2,712	3,209	3,070	
	ADT	AWD	AADT	AAWD	SADT	SAWDT	WADT	DHV
	3,030	3,122						



Weekly Volume Summary

Fri, May 17, 2019

Location: Hwy 417 at Palladium Dr - Ramp 61

LHRS/Offset: 49562 / 0.0

Region: Eastern

Pattern Type: n/a

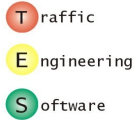
PCS#: n/a

Hwy. TVIS#: 49562061

Count Direction: N/A

Report Dates: Sep 4, 2018 to Sep 10, 2018

Hour Interval	Tue 18/09/04	Wed 5	Thu 6	Fri 7	Sat 8	Sun 9	Mon 10	Tue 11
0:00- 1:00		28	24	40	71	63	34	22
1:00- 2:00		13	19	10	36	33	10	6
2:00- 3:00		12	14	11	20	18	10	8
3:00- 4:00		13	13	15	16	20	6	15
4:00- 5:00		15	9	21	11	8	5	13
5:00- 6:00		42	41	50	24	13	46	48
6:00- 7:00		153	162	171	45	36	162	149
7:00- 8:00		225	273	260	135	67	298	261
8:00- 9:00		330	367	363	223	92	344	329
9:00-10:00		315	336	397	370	251	327	297
10:00-11:00		422	403	438	600	540	350	353
11:00-12:00		457	435	520	756	666	417	424
AM Total	0	2,025	2,096	2,296	2,307	1,807	2,009	1,925
12:00-13:00	499	466	506	576	774	723	506	
13:00-14:00	529	485	493	526	847	778	427	
14:00-15:00	559	519	551	585	824	775	547	
15:00-16:00	698	618	627	667	750	661	744	
16:00-17:00	727	685	651	729	603	513	681	
17:00-18:00	673	665	643	658	508	329	616	
18:00-19:00	501	531	507	549	426	215	456	
19:00-20:00	406	392	436	433	343	174	301	
20:00-21:00	239	257	312	231	222	155	229	
21:00-22:00	176	167	202	177	171	107	160	
22:00-23:00	80	92	94	128	94	71	73	
23:00-24:00	58	58	67	110	98	47	53	
PM Total	5,145	4,935	5,089	5,369	5,660	4,548	4,793	0
24 Hr. Total	5,145	6,960	7,185	7,665	7,967	6,355	6,802	1,925
Noon - Noon	7,170	7,031	7,385	7,676	7,467	6,557	6,718	



Weekly Volume Summary

Fri, May 17, 2019

Location: Hwy 417 at Palladium Dr - Ramp 61

LHRS/Offset: 49562 / 0.0

Region: Eastern

Pattern Type: n/a

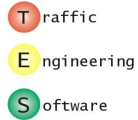
PCS#: n/a

Hwy. TVIS#: 49562061

Count Direction: N/A

Report Dates: Sep 4, 2018 to Sep 10, 2018

Hour Interval	Tue 18/09/04	Wed 5	Thu 6	Fri 7	Sat 8	Sun 9	Mon 10	Tue 11
0:00- 1:00		0	0	0	0	0	0	0
1:00- 2:00		0	0	0	0	0	0	0
2:00- 3:00		0	0	0	0	0	0	0
3:00- 4:00		0	0	0	0	0	0	0
4:00- 5:00		0	0	0	0	0	0	0
5:00- 6:00		0	0	0	0	0	0	0
6:00- 7:00		0	0	0	0	0	0	0
7:00- 8:00		0	0	0	0	0	0	0
8:00- 9:00		0	0	0	0	0	0	0
9:00-10:00		0	0	0	0	0	0	0
10:00-11:00		0	0	0	0	0	0	0
11:00-12:00		0	0	0	0	0	0	0
AM Total	0	0	0	0	0	0	0	0
12:00-13:00	0	0	0	0	0	0	0	
13:00-14:00	0	0	0	0	0	0	0	
14:00-15:00	0	0	0	0	0	0	0	
15:00-16:00	0	0	0	0	0	0	0	
16:00-17:00	0	0	0	0	0	0	0	
17:00-18:00	0	0	0	0	0	0	0	
18:00-19:00	0	0	0	0	0	0	0	
19:00-20:00	0	0	0	0	0	0	0	
20:00-21:00	0	0	0	0	0	0	0	
21:00-22:00	0	0	0	0	0	0	0	
22:00-23:00	0	0	0	0	0	0	0	
23:00-24:00	0	0	0	0	0	0	0	
PM Total	0	0	0	0	0	0	0	0
24 Hr. Total	0	0	0	0	0	0	0	0
Noon - Noon	0	0	0	0	0	0	0	0



Weekly Volume Summary

Fri, May 17, 2019

Location: Hwy 417 at Palladium Dr - Ramp 61

LHRS/Offset: 49562 / 0.0

Region: Eastern

Pattern Type: n/a

PCS#: n/a

Hwy. TVIS#: 49562061

Count Direction: N/A/N/A

Report Dates: Sep 4, 2018 to Sep 10, 2018

Hour Interval	Tue 18/09/04	Wed 5	Thu 6	Fri 7	Sat 8	Sun 9	Mon 10	Tue 11
0:00- 1:00		28	24	40	71	63	34	22
1:00- 2:00		13	19	10	36	33	10	6
2:00- 3:00		12	14	11	20	18	10	8
3:00- 4:00		13	13	15	16	20	6	15
4:00- 5:00		15	9	21	11	8	5	13
5:00- 6:00		42	41	50	24	13	46	48
6:00- 7:00		153	162	171	45	36	162	149
7:00- 8:00		225	273	260	135	67	298	261
8:00- 9:00		330	367	363	223	92	344	329
9:00-10:00		315	336	397	370	251	327	297
10:00-11:00		422	403	438	600	540	350	353
11:00-12:00		457	435	520	756	666	417	424
AM Total	0	2,025	2,096	2,296	2,307	1,807	2,009	1,925
12:00-13:00	499	466	506	576	774	723	506	
13:00-14:00	529	485	493	526	847	778	427	
14:00-15:00	559	519	551	585	824	775	547	
15:00-16:00	698	618	627	667	750	661	744	
16:00-17:00	727	685	651	729	603	513	681	
17:00-18:00	673	665	643	658	508	329	616	
18:00-19:00	501	531	507	549	426	215	456	
19:00-20:00	406	392	436	433	343	174	301	
20:00-21:00	239	257	312	231	222	155	229	
21:00-22:00	176	167	202	177	171	107	160	
22:00-23:00	80	92	94	128	94	71	73	
23:00-24:00	58	58	67	110	98	47	53	
PM Total	5,145	4,935	5,089	5,369	5,660	4,548	4,793	0
24 Hr. Total	5,145	6,960	7,185	7,665	7,967	6,355	6,802	1,925
Noon - Noon	7,170	7,031	7,385	7,676	7,467	6,557	6,718	
	ADT	AWD	AADT	AAWD	SADT	SAWDT	WADT	DHV
	7,143	7,076						



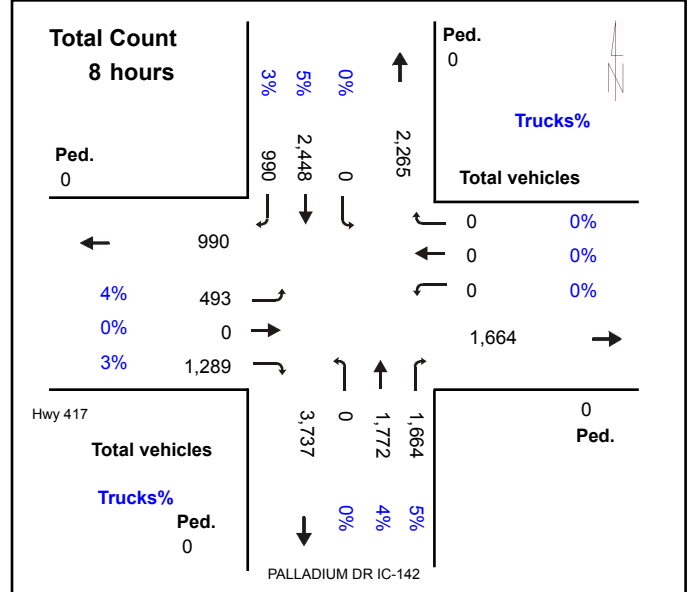
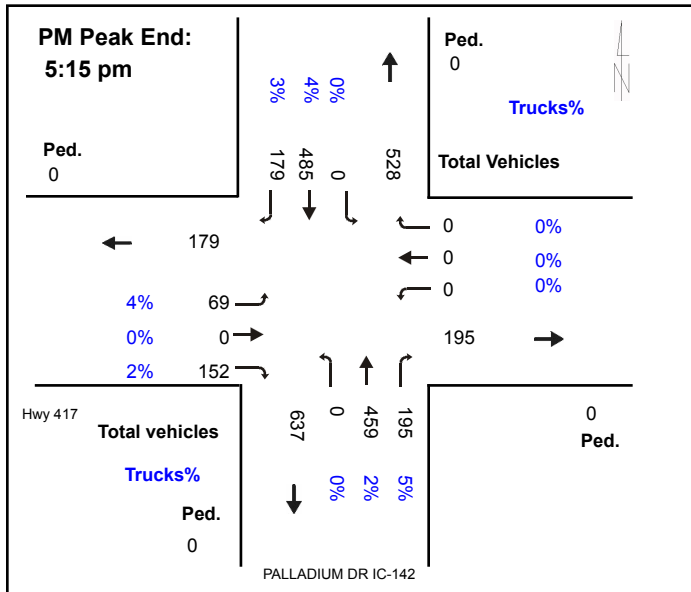
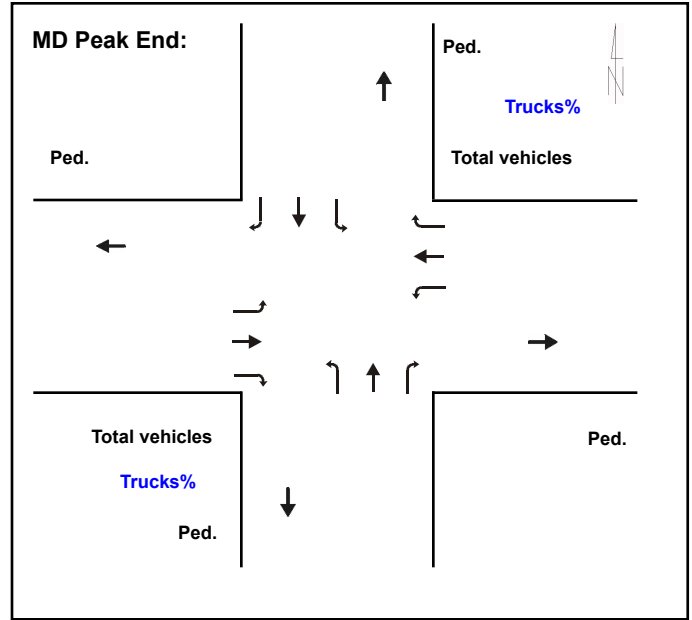
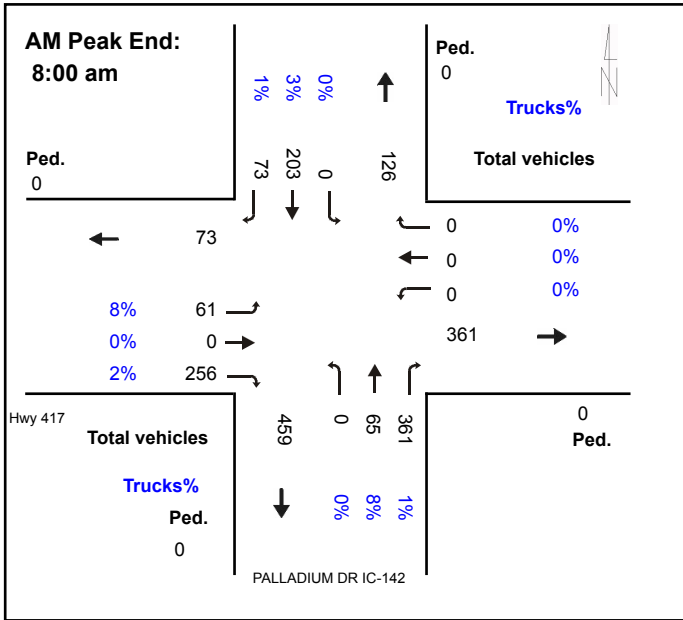
Hwy 417 @ PALLADIUM DR IC-142

Eastern

Intersection ID:495620000(--S--)

Count Day: Tuesday

Count Date: 24-Apr-2018



15 MIN REPORT

Intersection ID:495620000(--N--)

Hwy 417 @ PALLADIUM DR IC-142

Municipality: Eastern

Date: 24-Apr-2018

Time	NORTH APPROACH								EAST APPROACH								SOUTH APPROACH								WEST APPROACH								Total								
	Cars			Trucks			Heavies		Ped	Cars			Trucks			Heavies		Ped	Cars			Trucks			Heavies		Ped														
	Left	Thru	Right	Left	Thru	Right	Left	Thru		Right	Left	Thru	Right	Left	Thru	Right	Left		Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right											
Period1																																									
14:15	13	60	0	0	1	0	0	3	0	0	54	0	59	0	0	1	0	0	0	0	0	27	41	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	260
14:30	22	54	0	0	1	0	0	0	0	0	60	0	55	1	0	1	3	0	0	0	0	29	38	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	267
14:45	27	77	0	2	0	0	0	2	0	0	60	0	44	0	0	2	2	0	0	0	0	22	49	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	289
15:00	24	47	0	0	1	0	0	1	0	0	56	0	56	1	0	0	3	0	0	0	0	22	56	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	271
15:15	21	65	0	0	1	0	0	2	0	0	78	0	48	0	0	0	4	0	0	0	0	23	53	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	297
15:30	13	54	0	0	2	0	0	1	0	0	86	0	57	1	0	0	5	0	3	0	0	26	61	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	310
15:45	15	62	0	0	2	0	0	2	0	0	66	0	65	0	0	0	2	0	0	1	0	25	71	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	313
16:00	35	52	0	0	0	0	1	1	0	0	105	0	48	0	0	1	4	0	0	0	0	31	72	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	352
16:15	26	63	0	0	3	0	0	0	0	0	83	0	62	0	0	0	5	0	0	0	0	27	96	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	369
16:30	32	59	0	1	1	0	1	1	0	0	113	0	68	0	0	0	5	0	0	0	0	32	93	0	0	2	0	1	3	0	0	0	0	0	0	0	0	0	0	0	412
16:45	33	67	0	1	1	0	0	1	0	0	96	0	53	0	0	0	5	0	0	0	0	35	98	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	392
17:00	23	53	0	0	0	0	0	1	0	0	94	0	63	0	0	0	4	0	0	0	0	27	83	0	1	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	353
17:15	21	72	0	0	0	0	0	2	0	0	83	0	64	0	0	0	4	0	0	0	0	36	106	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	390
17:30	24	47	0	0	1	0	0	0	0	2	97	0	65	0	0	0	2	0	0	0	0	38	73	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	352
17:45	33	51	0	1	0	0	0	0	0	2	83	0	67	0	0	0	1	0	0	0	0	25	63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	326
18:00	16	49	0	0	0	0	0	0	0	0	76	0	49	1	0	0	3	0	0	0	0	23	42	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	260
Period2																																									
7:15	3	31	0	0	0	0	0	1	0	0	35	0	14	1	0	0	0	0	0	0	0	11	9	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	108
7:30	2	15	0	0	0	0	0	0	0	0	47	0	17	0	0	1	1	0	0	0	0	10	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	102
7:45	6	27	0	0	0	0	0	0	0	0	46	0	12	0	0	0	2	0	0	0	0	24	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	132
8:00	6	21	0	1	0	0	0	0	0	0	56	0	20	1	0	1	3	0	1	0	0	19	12	0	1	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	146
8:15	2	26	0	0	0	0	0	2	0	0	32	0	14	1	0	0	1	0	2	0	0	18	14	0	1	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	117
8:30	4	26	0	0	0	0	1	2	0	0	45	0	17	1	0	1	4	0	0	0	0	16	12	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	132
8:45	5	17	0	0	1	0	0	1	0	0	46	0	26	1	0	0	2	0	0	0	0	13	20	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	136
9:00	8	23	0	0	1	0	0	0	0	0	54	0	34	0	0	1	3	0	0	0	0	28	10	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	166
9:15	2	25	0	0	0	0	1	1	0	0	49	0	31	0	0	0	0	0	0	0	0	18	11	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	141
9:30	1	22	0	0	1	0	1	0	0	0	46	0	39	3	0	0	4	0	1	0	0	22	7	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	150
9:45	3	21	0	0	1	0	1	2	0	0	44	0	40	1	0	1	3	0	0	0	0	24	14	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	158
10:00	4	24	0	1	2	0	1	0	0	0	34	0	41	0	0	4	1	0	1	0	0	40	8	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	163
10:15	9	28	0	1	1	0	0	0	0	0	23	0	41	2	0	0	3	0	0	0	0	29	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	151
10:30	8	36	0	0	1	0	0	1	0	1	41	0	59	1	0	0	2	0	0	1	0	30	20	0	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	205
10:45	15	45	0	0	2	0	2	0	0	0	33	0	42	0	0	2	2	0	0	0	0	29	26	0	1	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	202
11:00	15	43	0	1	3	0	0	0	0	0	36	0	54	1	0	1	2	0	0	0	0	33	20	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	213



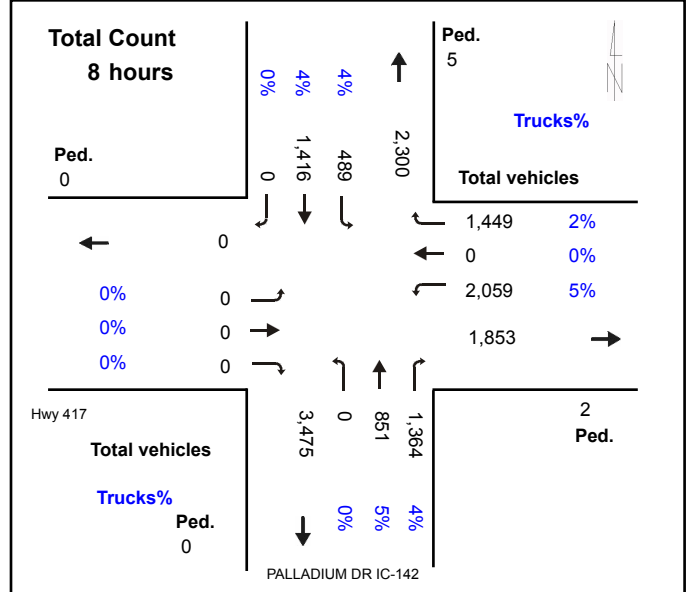
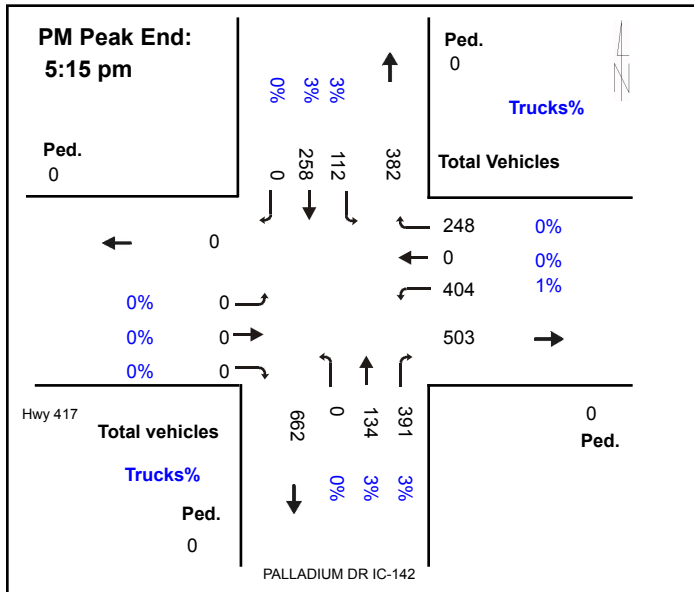
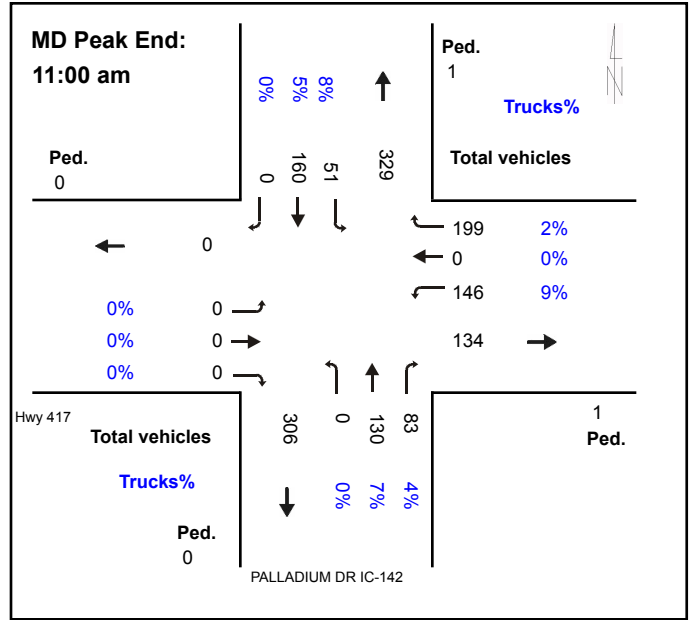
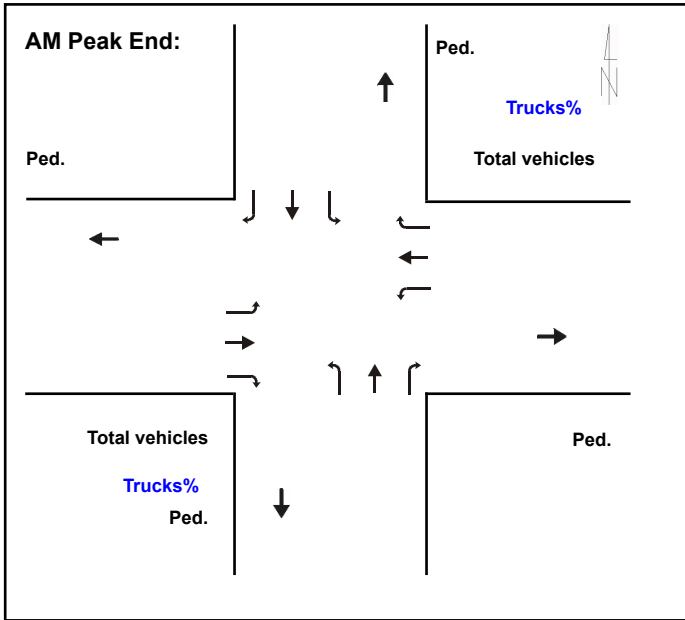
Hwy 417 @ PALLADIUM DR IC-142

Eastern

Intersection ID:495620000(--N--)

Count Day: Tuesday

Count Date: 24-Apr-2018



Appendix C

COLLISION HISTORY DATA

DRAFT

Total Area

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	5	3	3	1	0	0	0	1	13
Non-fatal injury	0	1	0	0	0	0	0	0	1
Non reportable	0	0	0	0	0	0	0	0	0
Total	5	4	3	1	0	0	0	1	14

#1 or 36% #2 or 29% #3 or 21% #4 or 7% #6 or 0% #6 or 0% #6 or 0% #4 or 7%

93%
7%
0%
100%

CAMPEAU DR/HUNTMAR DR

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2019	0	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	0	0	0	0	0	0	0	0	0
Non-fatal injury	0	0	0	0	0	0	0	0	0
Non reportable	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0

0%

CAMPEAU DR/JOURNEYMAN ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2019	0	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	0	0	0	0	0	0	0	0	0
Non-fatal injury	0	0	0	0	0	0	0	0	0
Non reportable	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0

0%

HUNTMAR DR/PALLADIUM DR N

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2019	0	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	0	0	0	0	0	0	0	0	0
Non-fatal injury	0	0	0	0	0	0	0	0	0
Non reportable	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0

0%

HWY 417 PALLADI IC142R36/PALLADIUM DR

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2019	7	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	1	2	2	1	0	0	0	1	7
Non-fatal injury	0	0	0	0	0	0	0	0	0
Non reportable	0	0	0	0	0	0	0	0	0
Total	1	2	2	1	0	0	0	1	7

14% 29% 29% 14% 0% 0% 0% 0% 14%

100%
0%
0%
100%

PALLADIUM DR, HWY417 IC142 RAMP52 to HWY417 IC142 RAMP53

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2019	1	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	0	0	0	0	0	0	0	0	0
Non-fatal injury	0	1	0	0	0	0	0	0	1
Non reportable	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	0	0	0	0	1

0% 100% 0% 0% 0% 0% 0% 0% 0%

0%
100%
0%
100%

PALLADIUM DR, HWY417 IC142 RAMP53 to HWY417 IC142 RAMP25

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2019	2	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	2	0	0	0	0	0	0	0	2
Non-fatal injury	0	0	0	0	0	0	0	0	0
Non reportable	0	0	0	0	0	0	0	0	0
Total	2	0	0	0	0	0	0	0	2

100% 0% 0% 0% 0% 0% 0% 0% 0%

100%
0%
0%
100%

PALLADIUM DR, HWY417 IC142 RAMP62 to HUNTMAR DR

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2019	3	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	1	1	1	0	0	0	0	0	3
Non-fatal injury	0	0	0	0	0	0	0	0	0
Non reportable	0	0	0	0	0	0	0	0	0
Total	1	1	1	0	0	0	0	0	3

33% 33% 33% 0% 0% 0% 0% 0% 0%

100%
0%
0%
100%

PALLADIUM DR/HWY 417 PALLADIU IC142R52

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2014-2019	1	n/a	1825	n/a

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	1	0	0	0	0	0	0	0	1
Non-fatal injury	0	0	0	0	0	0	0	0	0
Non reportable	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	0	0	0	0	1

100% 0% 0% 0% 0% 0% 0% 0% 0%

100%
0%
0%
100%



City Operations - Transportation Services

Collision Details Report - Public Version

From: January 1, 2013 **To:** December 31, 2017

Location: CAMPEAU DR @ HUNTMAR DR

Traffic Control: Roundabout

Total Collisions: 14

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2014-Oct-17, Fri, 10:50	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Slowing or stopping	Pick-up truck	Other motor vehicle	
2014-Oct-17, Fri, 14:04	Rain	Sideswipe	Non-fatal injury	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Dec-06, Sat, 10:00	Clear	Angle	P.D. only	Dry	South	Merging	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-May-12, Tue, 07:38	Clear	Angle	P.D. only	Dry	East	Going ahead	Delivery van	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Mar-14, Sat, 13:27	Rain	Angle	P.D. only	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Apr-29, Wed, 18:22	Clear	Sideswipe	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	

					North	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Jan-04, Sun,22:34	Freezing Rain	Sideswipe	P.D. only	Slush	West	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Dec-26, Fri,13:11	Clear	Sideswipe	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Jul-14, Tue,09:09	Clear	Angle	P.D. only	Dry	South	Merging	Pick-up truck	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2016-May-24, Tue,17:27	Clear	Sideswipe	P.D. only	Dry	North	Overtaking	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Farm tractor	Other motor vehicle
2016-Sep-12, Mon,18:14	Clear	Angle	P.D. only	Dry	East	Going ahead	Pick-up truck	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Oct-02, Mon,07:36	Clear	Angle	P.D. only	Dry	South	Merging	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Jun-14, Wed,09:50	Clear	Sideswipe	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle

2017-Jul-10, Mon, 17:47	Clear	Sideswipe	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Pick-up truck	Other motor vehicle

Location: CAMPEAU DR @ JOURNEYMAN ST

Traffic Control: Traffic signal

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Dec-26, Sat, 11:05	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Pick-up truck	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	

Location: HUNTMAR DR @ PALLADIUM DR N

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
2014-Jan-30, Thu, 19:30	Clear	Rear end	P.D. only	Loose snow	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2016-Dec-18, Sun, 15:12	Clear	SMV other	P.D. only	Slush	North	Going ahead	Automobile, station wagon	Curb	

Location: HWY 417 PALLADI IC142R36 @ PALLADIUM DR

Traffic Control: Traffic signal

Total Collisions: 7

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Mar-19, Wed, 10:30	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	

2016-May-07, Sat,14:32	Clear	Turning movement	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Pick-up truck	Other motor vehicle
2016-Sep-21, Wed,17:30	Clear	Sideswipe	P.D. only	Dry	South	Turning left	Pick-up truck	Other motor vehicle
					South	Turning left	Pick-up truck	Other motor vehicle
2016-Dec-19, Mon,16:35	Clear	Other	P.D. only	Wet	East	Reversing	Pick-up truck	Other motor vehicle
					West	Turning left	Pick-up truck	Other motor vehicle
2017-Nov-01, Wed,17:18	Rain	Turning movement	P.D. only	Wet	South	Turning left	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Dec-29, Fri,14:40	Clear	Sideswipe	P.D. only	Dry	South	Making "U" turn	Pick-up truck	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Dec-08, Fri,12:04	Clear	Angle	P.D. only	Dry	West	Turning right	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle

Location: PALLADIUM DR btwn HWY417 IC142 RAMP52 & HWY417 IC142 RAMP53

Traffic Control: No control

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2017-Nov-24, Fri,16:16	Clear	Turning movement	Non-fatal injury	Dry	South	Making "U" turn	Automobile, station wagon	Other motor vehicle	

South Going ahead Automobile, station wagon Other motor vehicle

Location: PALLADIUM DR btwn HWY417 IC142 RAMP53 & HWY417 IC142 RAMP25

Traffic Control: No control

Total Collisions: 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Nov-09, Sun,17:36	Clear	Rear end	P.D. only	Wet	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Pick-up truck	Other motor vehicle	
2013-Feb-25, Mon,19:00	Clear	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	

Location: PALLADIUM DR btwn HWY417 IC142 RAMP62 & HUNTMAR DR

Traffic Control: No control

Total Collisions: 3

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Oct-17, Fri,10:50	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle	
					East	Changing lanes	Pick-up truck	Other motor vehicle	
2015-Jul-26, Sun,15:15	Clear	Turning movement	P.D. only	Dry	North	Making "U" turn	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Motorcycle	Other motor vehicle	
2016-Nov-24, Thu,08:09	Snow	Rear end	P.D. only	Loose snow	North	Going ahead	Pick-up truck	Other motor vehicle	
					North	Making "U" turn	Automobile, station wagon	Other motor vehicle	

Location: PALLADIUM DR/HWY 417 PALLADIU IC142R52 @ HWY 4

Traffic Control: Stop sign

Total Collisions: 1

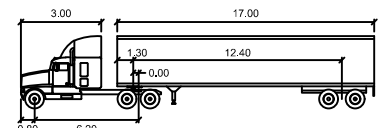
Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2017-Mar-18, Sat,17:31	Clear	Rear end	P.D. only	Dry	South	Making "U" turn	Pick-up truck	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	

Appendix D

Site Truck Turning Figure

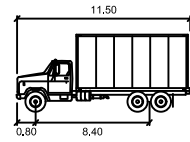
DRAFT

Maritime Ontario Site Truck Maneuvering - September 23, 2020



WB-20

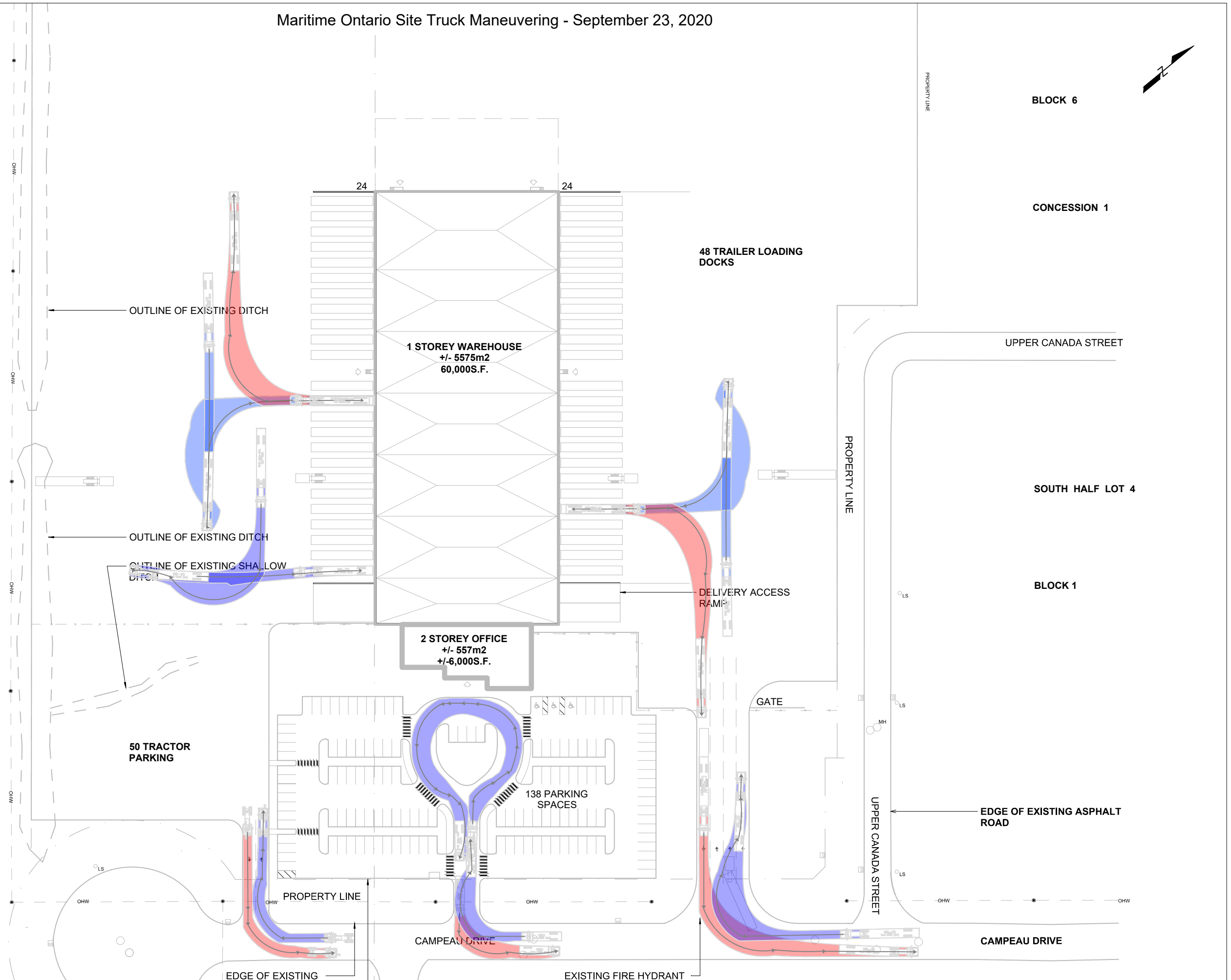
meters	
Tractor Width	: 2.60
Tractor Track	: 2.60
Tractor Lock to Lock Time	: 6.0
Tractor Steering Angle	: 28.2
Tractor Articulating Angle	: 70.0
Trailer Track	: 2.60
Trailer Lock to Lock Time	: 6.0
Trailer Steering Angle	: 28.2
Trailer Articulating Angle	: 70.0



HSU

meters	
Width	: 2.60
Track	: 2.60
Lock to Lock Time	: 6.0
Steering Angle	: 40.0

ROAD ALLOWANCE BETWEEN CONCESSIONS 1 AND 2 (NOT TRAVELLED)



Appendix E

TDM-SUPPORTIVE DEVELOPMENT DESIGN AND INFRASTRUCTURE CHECKLIST

DRAFT

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

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

TDM-supportive design & infrastructure measures: <i>Non-residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
1. WALKING & CYCLING: ROUTES		
1.1 Building location & access points		
BASIC	1.1.1 Locate building close to the street, and do not locate parking areas between the street and building entrances	<input type="checkbox"/>
BASIC	1.1.2 Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	<input type="checkbox"/>
BASIC	1.1.3 Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	<input type="checkbox"/>
1.2 Facilities for walking & cycling		
REQUIRED	1.2.1 Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations (<i>see Official Plan policy 4.3.3</i>)	<input type="checkbox"/> There are no major stops or rapid transit stations within 600m of the development site.
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 (<i>see Official Plan policy 4.3.12</i>)	<input checked="" type="checkbox"/>

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

TDM-supportive design & infrastructure measures: <i>Non-residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
2. WALKING & CYCLING: END-OF-TRIP FACILITIES		
2.1 Bicycle parking		
REQUIRED	2.1.1 Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible (see <i>Official Plan policy 4.3.6</i>)	<input type="checkbox"/> Bicycle parking not required given the location and land use of the warehouse.
REQUIRED	2.1.2 Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas (see <i>Zoning By-law Section 111</i>)	<input type="checkbox"/> Bicycle parking not required given the location and land use of the warehouse.
REQUIRED	2.1.3 Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored (see <i>Zoning By-law Section 111</i>)	<input type="checkbox"/> Bicycle parking not required given the location and land use of the warehouse.
BASIC	2.1.4 Provide bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met), plus the expected peak number of customer/visitor cyclists	<input type="checkbox"/>
BETTER	2.1.5 Provide bicycle parking spaces equivalent to the expected number of commuter and customer/visitor cyclists, plus an additional buffer (e.g. 25 percent extra) to encourage other cyclists and ensure adequate capacity in peak cycling season	<input type="checkbox"/>
2.2 Secure bicycle parking		
REQUIRED	2.2.1 Where more than 50 bicycle parking spaces are provided for a single office building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers (see <i>Zoning By-law Section 111</i>)	<input type="checkbox"/> Bicycle parking not required given the location and land use of the warehouse.
BETTER	2.2.2 Provide secure bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met)	<input type="checkbox"/>
2.3 Shower & change facilities		
BASIC	2.3.1 Provide shower and change facilities for the use of active commuters	<input type="checkbox"/>
BETTER	2.3.2 In addition to shower and change facilities, provide dedicated lockers, grooming stations, drying racks and laundry facilities for the use of active commuters	<input type="checkbox"/>
2.4 Bicycle repair station		
BETTER	2.4.1 Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	<input type="checkbox"/>

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

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

Appendix F

MMLOS ANALYSIS RESULTS

DRAFT

Multi-Modal Level of Service - Segments Form

Consultant Scenario Comments	Parsons	Project Date	477391 - 01000
	Future		16-Sep-20

SEGMENTS		Street	Campeau 1	Section 2	Section 3
Pedestrian	Sidewalk Width	-	≥ 2 m		
	Boulevard Width		0.5 - 2 m		
	Avg Daily Curb Lane Traffic Volume		≤ 3000		
	Operating Speed		> 50 to 60 km/h		
	On-Street Parking		no		
	Exposure to Traffic PLoS		A	-	-
	Effective Sidewalk Width				
	Pedestrian Volume				
Crowding PLoS	-	-	-		
Level of Service	-	-	-		
Bicycle	Type of Cycling Facility	D	Mixed Traffic		
	Number of Travel Lanes		≤ 2 (no centreline)		
	Operating Speed		≥ 50 to 60 km/h		
	# of Lanes & Operating Speed LoS		D	-	-
	Bike Lane (+ Parking Lane) Width				
	Bike Lane Width LoS		-	-	-
	Bike Lane Blockages				
	Blockage LoS		-	-	-
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge		
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes		
	Sidestreet Operating Speed		>40 to 50 km/h		
	Unsignalized Crossing - Lowest LoS		B	-	-
Level of Service	D	-	-		
Transit	Facility Type	D	Mixed Traffic		
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8		
	Level of Service		D	-	-
Truck	Truck Lane Width	B	> 3.7 m		
	Travel Lanes per Direction		1		
	Level of Service		B	-	-

Appendix G

TDM MEASURES CHECKLIST

DRAFT

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

Legend	
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance
★	The measure is one of the most dependably effective tools to encourage the use of sustainable modes

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

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

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

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

Appendix H

SYNCHRO ANALYSIS RESULTS

DRAFT

Existing Conditions

HCM Unsignalized Intersection Capacity Analysis
1: Kanata West & Campeau

Existing AM
09/16/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻		↻	↻	↻	
Traffic Volume (veh/h)	21	5	18	47	3	23
Future Volume (Veh/h)	21	5	18	47	3	23
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	23	6	20	52	3	26
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			29		118	26
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			29		118	26
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	98
cM capacity (veh/h)			1584		867	1050
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	29	20	52	29		
Volume Left	0	20	0	3		
Volume Right	6	0	0	26		
cSH	1700	1584	1700	1027		
Volume to Capacity	0.02	0.01	0.03	0.03		
Queue Length 95th (m)	0.0	0.3	0.0	0.7		
Control Delay (s)	0.0	7.3	0.0	8.6		
Lane LOS	A		A			
Approach Delay (s)	0.0	2.0	8.6			
Approach LOS	A		A			
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization			17.7%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

5: Palladium & Cabela's

Existing AM
09/16/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	77	108	190	121	20
Future Volume (Veh/h)	0	77	108	190	121	20
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)	0	86	120	211	134	22
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	199					
pX, platoon unblocked						
vC, conflicting volume	490	78	156			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	490	78	156			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	91	92			
cM capacity (veh/h)	464	967	1422			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	86	120	106	106	89	67
Volume Left	0	120	0	0	0	0
Volume Right	86	0	0	0	0	22
cSH	967	1422	1700	1700	1700	1700
Volume to Capacity	0.09	0.08	0.06	0.06	0.05	0.04
Queue Length 95th (m)	2.2	2.1	0.0	0.0	0.0	0.0
Control Delay (s)	9.1	7.8	0.0	0.0	0.0	0.0
Lane LOS	A	A				
Approach Delay (s)	9.1	2.8	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization			17.2%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
6: Palladium & Hwy417 WB

Existing AM
09/16/2020



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙↙	↙	↕↕	↘	↘	↕↕
Traffic Volume (vph)	205	173	125	83	35	163
Future Volume (vph)	205	173	125	83	35	163
Lane Group Flow (vph)	228	192	139	92	39	181
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	32.7	32.7	39.0	39.0	12.0	25.0
Total Split (s)	36.7	36.7	39.0	39.0	22.0	61.0
Total Split (%)	37.6%	37.6%	39.9%	39.9%	22.5%	62.4%
Yellow Time (s)	3.3	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	3.4	3.4	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	6.7	7.0	7.0	7.0	7.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	30.0	30.0	32.0	32.0	54.0	54.0
Actuated g/C Ratio	0.31	0.31	0.33	0.33	0.55	0.55
v/c Ratio	0.23	0.32	0.13	0.16	0.06	0.10
Control Delay	26.0	5.4	23.5	6.0	10.3	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.0	5.4	23.5	6.0	10.3	10.5
LOS	C	A	C	A	B	B
Approach Delay	16.6		16.5			10.5
Approach LOS	B		B			B
Queue Length 50th (m)	16.4	0.0	9.6	0.0	3.2	8.0
Queue Length 95th (m)	25.5	14.7	16.4	10.2	7.7	13.0
Internal Link Dist (m)	453.2		407.4			174.6
Turn Bay Length (m)		125.0		85.0	140.0	
Base Capacity (vph)	1009	598	1110	558	648	1873
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.32	0.13	0.16	0.06	0.10

Intersection Summary

Cycle Length: 97.7
 Actuated Cycle Length: 97.7
 Natural Cycle: 85
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.32
 Intersection Signal Delay: 15.0
 Intersection Capacity Utilization 38.1%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 6: Palladium & Hwy417 WB



HCM Unsignalized Intersection Capacity Analysis
7: Palladium & Hwy417 EB

Existing AM
09/16/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	61	256	0	65	368	73
Future Volume (Veh/h)	61	256	0	65	368	73
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)	68	284	0	72	409	81
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)	4					
Median type			None	None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	445	204	409			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	445	204	409			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	65	100			
cM capacity (veh/h)	542	802	1146			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	352	36	36	204	204	81
Volume Left	68	0	0	0	0	0
Volume Right	284	0	0	0	0	81
cSH	994	1700	1700	1700	1700	1700
Volume to Capacity	0.35	0.02	0.02	0.12	0.12	0.05
Queue Length 95th (m)	12.3	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	12.1	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	12.1	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization			34.1%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

1: Kanata West & Campeau

Existing PM
09/16/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	18	1	12	35	2	36
Future Volume (Veh/h)	18	1	12	35	2	36
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	20	1	13	39	2	40
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			21		86	20
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			21		86	20
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	96
cM capacity (veh/h)			1595		908	1057
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	21	13	39	42		
Volume Left	0	13	0	2		
Volume Right	1	0	0	40		
cSH	1700	1595	1700	1049		
Volume to Capacity	0.01	0.01	0.02	0.04		
Queue Length 95th (m)	0.0	0.2	0.0	1.0		
Control Delay (s)	0.0	7.3	0.0	8.6		
Lane LOS	A		A			
Approach Delay (s)	0.0	1.8	8.6			
Approach LOS					A	
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			17.4%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

5: Palladium & Cabela's

Existing PM
09/16/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	141	127	284	247	33
Future Volume (Veh/h)	0	141	127	284	247	33
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)	0	157	141	316	274	37
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	199					
pX, platoon unblocked						
vC, conflicting volume	732	156	311			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	732	156	311			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	82	89			
cM capacity (veh/h)	316	862	1246			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	157	141	158	158	183	128
Volume Left	0	141	0	0	0	0
Volume Right	157	0	0	0	0	37
cSH	862	1246	1700	1700	1700	1700
Volume to Capacity	0.18	0.11	0.09	0.09	0.11	0.08
Queue Length 95th (m)	5.0	2.9	0.0	0.0	0.0	0.0
Control Delay (s)	10.1	8.3	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	10.1	2.5	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization			24.2%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
6: Palladium & Hwy417 WB

Existing PM
09/16/2020



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙↙	↙	↑↑	↘	↘	↑↑
Traffic Volume (vph)	404	267	144	391	117	271
Future Volume (vph)	404	267	144	391	117	271
Lane Group Flow (vph)	449	297	160	434	130	301
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	32.7	32.7	39.0	39.0	12.0	25.0
Total Split (s)	36.7	36.7	39.0	39.0	22.0	61.0
Total Split (%)	37.6%	37.6%	39.9%	39.9%	22.5%	62.4%
Yellow Time (s)	3.3	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	3.4	3.4	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	6.7	7.0	7.0	7.0	7.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	30.0	30.0	32.0	32.0	54.0	54.0
Actuated g/C Ratio	0.31	0.31	0.33	0.33	0.55	0.55
v/c Ratio	0.44	0.44	0.14	0.55	0.20	0.16
Control Delay	28.9	5.4	23.7	5.4	11.5	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.9	5.4	23.7	5.4	11.5	11.0
LOS	C	A	C	A	B	B
Approach Delay	19.5		10.3			11.2
Approach LOS	B		B			B
Queue Length 50th (m)	34.9	0.0	11.1	0.0	11.2	13.8
Queue Length 95th (m)	48.8	17.8	18.4	20.5	20.1	20.4
Internal Link Dist (m)	453.2		407.4			174.6
Turn Bay Length (m)		125.0		85.0	140.0	
Base Capacity (vph)	1009	671	1110	788	640	1873
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.44	0.14	0.55	0.20	0.16

Intersection Summary

Cycle Length: 97.7
 Actuated Cycle Length: 97.7
 Natural Cycle: 85
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.55
 Intersection Signal Delay: 14.4
 Intersection Capacity Utilization 44.6%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 6: Palladium & Hwy417 WB



HCM Unsignalized Intersection Capacity Analysis
7: Palladium & Hwy417 EB

Existing PM
09/16/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	69	152	0	459	485	179
Future Volume (Veh/h)	69	152	0	459	485	179
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)	77	169	0	510	539	199
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)	4					
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	794	270	539			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	794	270	539			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	76	77	100			
cM capacity (veh/h)	325	728	1025			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	246	255	255	270	270	199
Volume Left	77	0	0	0	0	0
Volume Right	169	0	0	0	0	199
cSH	1039	1700	1700	1700	1700	1700
Volume to Capacity	0.24	0.15	0.15	0.16	0.16	0.12
Queue Length 95th (m)	7.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	13.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	13.9	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay	2.3					
Intersection Capacity Utilization	30.8%			ICU Level of Service	A	
Analysis Period (min)	15					

Future Background 2021

HCM Unsignalized Intersection Capacity Analysis
 1: Kanata West & Campeau

Future Background 2021 AM
 09/17/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	21	5	18	48	3	23
Future Volume (Veh/h)	21	5	18	48	3	23
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	21	5	18	48	3	23
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			26		108	24
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			26		108	24
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	98
cM capacity (veh/h)			1588		880	1053
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	26	18	48	26		
Volume Left	0	18	0	3		
Volume Right	5	0	0	23		
cSH	1700	1588	1700	1030		
Volume to Capacity	0.02	0.01	0.03	0.03		
Queue Length 95th (m)	0.0	0.3	0.0	0.6		
Control Delay (s)	0.0	7.3	0.0	8.6		
Lane LOS	A		A			
Approach Delay (s)	0.0	2.0	8.6			
Approach LOS	A					
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization			17.7%	ICU Level of Service	A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
5: Palladium & Cabela's

Future Background 2021 AM
09/17/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	79	110	327	235	20
Future Volume (Veh/h)	0	79	110	327	235	20
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)	0	79	110	327	235	20
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	199					
pX, platoon unblocked						
vC, conflicting volume	628	128	255			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	628	128	255			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	91	92			
cM capacity (veh/h)	380	899	1307			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	79	110	164	164	157	98
Volume Left	0	110	0	0	0	0
Volume Right	79	0	0	0	0	20
cSH	899	1307	1700	1700	1700	1700
Volume to Capacity	0.09	0.08	0.10	0.10	0.09	0.06
Queue Length 95th (m)	2.2	2.1	0.0	0.0	0.0	0.0
Control Delay (s)	9.4	8.0	0.0	0.0	0.0	0.0
Lane LOS	A	A				
Approach Delay (s)	9.4	2.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			20.6%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
6: Palladium & Hwy417 WB

Future Background 2021 AM
09/17/2020

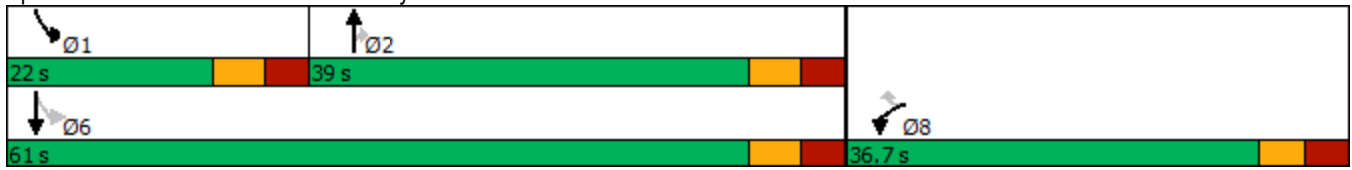


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙↙	↙	↕↕	↘	↘	↕↕
Traffic Volume (vph)	209	280	157	83	114	200
Future Volume (vph)	209	280	157	83	114	200
Lane Group Flow (vph)	209	280	157	83	114	200
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	32.7	32.7	39.0	39.0	12.0	25.0
Total Split (s)	36.7	36.7	39.0	39.0	22.0	61.0
Total Split (%)	37.6%	37.6%	39.9%	39.9%	22.5%	62.4%
Yellow Time (s)	3.3	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	3.4	3.4	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	6.7	7.0	7.0	7.0	7.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	30.0	30.0	32.0	32.0	54.0	54.0
Actuated g/C Ratio	0.31	0.31	0.33	0.33	0.55	0.55
v/c Ratio	0.21	0.42	0.14	0.15	0.18	0.11
Control Delay	25.7	5.4	23.6	6.1	11.3	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.7	5.4	23.6	6.1	11.3	10.6
LOS	C	A	C	A	B	B
Approach Delay	14.1		17.6			10.8
Approach LOS	B		B			B
Queue Length 50th (m)	15.0	0.0	10.8	0.0	9.7	8.8
Queue Length 95th (m)	23.6	17.3	18.2	9.8	18.0	14.1
Internal Link Dist (m)	453.2		407.4			174.6
Turn Bay Length (m)		125.0		85.0	140.0	
Base Capacity (vph)	1009	659	1110	552	641	1873
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.42	0.14	0.15	0.18	0.11

Intersection Summary

Cycle Length: 97.7
 Actuated Cycle Length: 97.7
 Natural Cycle: 85
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.42
 Intersection Signal Delay: 13.9
 Intersection Capacity Utilization 40.6%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 6: Palladium & Hwy417 WB



HCM Unsignalized Intersection Capacity Analysis
7: Palladium & Hwy417 EB












Future Background 2021 AM
09/17/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	86	261	0	72	376	103
Future Volume (Veh/h)	86	261	0	72	376	103
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)	86	261	0	72	376	103
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)	4					
Median type			None	None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	412	188	376			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	412	188	376			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	68	100			
cM capacity (veh/h)	568	822	1179			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	347	36	36	188	188	103
Volume Left	86	0	0	0	0	0
Volume Right	261	0	0	0	0	103
cSH	1093	1700	1700	1700	1700	1700
Volume to Capacity	0.32	0.02	0.02	0.11	0.11	0.06
Queue Length 95th (m)	10.5	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	11.7	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	11.7	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			4.5			
Intersection Capacity Utilization			34.7%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
1: Kanata West & Campeau

Future Background 2021 PM
09/17/2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	18	1	12	36	2	37
Future Volume (Veh/h)	18	1	12	36	2	37
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	18	1	12	36	2	37
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			19		78	18
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			19		78	18
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	97
cM capacity (veh/h)			1597		917	1060
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	19	12	36	39		
Volume Left	0	12	0	2		
Volume Right	1	0	0	37		
cSH	1700	1597	1700	1051		
Volume to Capacity	0.01	0.01	0.02	0.04		
Queue Length 95th (m)	0.0	0.2	0.0	0.9		
Control Delay (s)	0.0	7.3	0.0	8.6		
Lane LOS	A		A			
Approach Delay (s)	0.0	1.8	8.6			
Approach LOS	A					
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			17.4%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
5: Palladium & Cabela's













Future Background 2021 PM
09/17/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	144	130	413	401	34
Future Volume (Veh/h)	0	144	130	413	401	34
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)	0	144	130	413	401	34
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	199					
pX, platoon unblocked						
vC, conflicting volume	884	218	435			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	884	218	435			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	82	88			
cM capacity (veh/h)	252	787	1121			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	144	130	206	206	267	168
Volume Left	0	130	0	0	0	0
Volume Right	144	0	0	0	0	34
cSH	787	1121	1700	1700	1700	1700
Volume to Capacity	0.18	0.12	0.12	0.12	0.16	0.10
Queue Length 95th (m)	5.1	3.0	0.0	0.0	0.0	0.0
Control Delay (s)	10.6	8.6	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	10.6	2.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization			28.9%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
6: Palladium & Hwy417 WB

Future Background 2021 PM
09/17/2020

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	412	359	183	391	233	312
Future Volume (vph)	412	359	183	391	233	312
Lane Group Flow (vph)	412	359	183	391	233	312
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	32.7	32.7	39.0	39.0	12.0	25.0
Total Split (s)	36.7	36.7	39.0	39.0	22.0	61.0
Total Split (%)	37.6%	37.6%	39.9%	39.9%	22.5%	62.4%
Yellow Time (s)	3.3	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	3.4	3.4	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	6.7	7.0	7.0	7.0	7.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	30.0	30.0	32.0	32.0	54.0	54.0
Actuated g/C Ratio	0.31	0.31	0.33	0.33	0.55	0.55
v/c Ratio	0.41	0.50	0.16	0.52	0.37	0.17
Control Delay	28.3	5.5	23.9	5.3	13.2	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.3	5.5	23.9	5.3	13.2	11.1
LOS	C	A	C	A	B	B
Approach Delay	17.7		11.2			12.0
Approach LOS	B		B			B
Queue Length 50th (m)	31.6	0.0	12.8	0.0	21.5	14.4
Queue Length 95th (m)	44.7	19.2	20.7	19.2	34.8	21.1
Internal Link Dist (m)	453.2		407.4			174.6
Turn Bay Length (m)		125.0		85.0	140.0	
Base Capacity (vph)	1009	714	1110	759	631	1873
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.50	0.16	0.52	0.37	0.17

Intersection Summary

Cycle Length: 97.7	
Actuated Cycle Length: 97.7	
Natural Cycle: 85	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.52	
Intersection Signal Delay: 14.1	Intersection LOS: B
Intersection Capacity Utilization 51.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: Palladium & Hwy417 WB



HCM Unsignalized Intersection Capacity Analysis
7: Palladium & Hwy417 EB

Future Background 2021 PM
09/17/2020













Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	105	155	0	469	500	193
Future Volume (Veh/h)	105	155	0	469	500	193
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)	105	155	0	469	500	193
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)	4					
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	734	250	500			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	734	250	500			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	70	79	100			
cM capacity (veh/h)	355	750	1060			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	260	234	234	250	250	193
Volume Left	105	0	0	0	0	0
Volume Right	155	0	0	0	0	193
cSH	879	1700	1700	1700	1700	1700
Volume to Capacity	0.30	0.14	0.14	0.15	0.15	0.11
Queue Length 95th (m)	9.4	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	14.4	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	14.4	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay	2.6					
Intersection Capacity Utilization	31.4%			ICU Level of Service	A	
Analysis Period (min)	15					

Future Background 2026

HCM Unsignalized Intersection Capacity Analysis
1: Kanata West & Campeau

Future Background 2026 AM
09/17/2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	22	5	19	50	3	25
Future Volume (Veh/h)	22	5	19	50	3	25
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	22	5	19	50	3	25
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			27		112	24
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			27		112	24
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	98
cM capacity (veh/h)			1587		874	1052
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	27	19	50	28		
Volume Left	0	19	0	3		
Volume Right	5	0	0	25		
cSH	1700	1587	1700	1029		
Volume to Capacity	0.02	0.01	0.03	0.03		
Queue Length 95th (m)	0.0	0.3	0.0	0.6		
Control Delay (s)	0.0	7.3	0.0	8.6		
Lane LOS	A		A			
Approach Delay (s)	0.0	2.0	8.6			
Approach LOS	A					
Intersection Summary						
Average Delay			3.1			
Intersection Capacity Utilization			17.8%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
5: Palladium & Cabela's

Future Background 2026 AM
09/17/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	82	116	336	241	21
Future Volume (Veh/h)	0	82	116	336	241	21
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)	0	82	116	336	241	21
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	199					
pX, platoon unblocked						
vC, conflicting volume	652	131	262			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	652	131	262			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	91	91			
cM capacity (veh/h)	365	894	1299			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	82	116	168	168	161	101
Volume Left	0	116	0	0	0	0
Volume Right	82	0	0	0	0	21
cSH	894	1299	1700	1700	1700	1700
Volume to Capacity	0.09	0.09	0.10	0.10	0.09	0.06
Queue Length 95th (m)	2.3	2.2	0.0	0.0	0.0	0.0
Control Delay (s)	9.4	8.0	0.0	0.0	0.0	0.0
Lane LOS	A	A				
Approach Delay (s)	9.4	2.1	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			21.2%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
6: Palladium & Hwy417 WB

Future Background 2026 AM
09/17/2020



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙↙	↙	↕↕	↘	↘	↕↕
Traffic Volume (vph)	219	289	163	83	115	208
Future Volume (vph)	219	289	163	83	115	208
Lane Group Flow (vph)	219	289	163	83	115	208
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	32.7	32.7	39.0	39.0	12.0	25.0
Total Split (s)	36.7	36.7	39.0	39.0	22.0	61.0
Total Split (%)	37.6%	37.6%	39.9%	39.9%	22.5%	62.4%
Yellow Time (s)	3.3	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	3.4	3.4	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	6.7	7.0	7.0	7.0	7.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	30.0	30.0	32.0	32.0	54.0	54.0
Actuated g/C Ratio	0.31	0.31	0.33	0.33	0.55	0.55
v/c Ratio	0.22	0.43	0.15	0.15	0.18	0.11
Control Delay	25.9	5.4	23.7	6.1	11.3	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.9	5.4	23.7	6.1	11.3	10.6
LOS	C	A	C	A	B	B
Approach Delay	14.2		17.8			10.9
Approach LOS	B		B			B
Queue Length 50th (m)	15.7	0.0	11.3	0.0	9.8	9.2
Queue Length 95th (m)	24.6	17.6	18.7	9.8	18.0	14.6
Internal Link Dist (m)	453.2		407.4			174.6
Turn Bay Length (m)		125.0		85.0	140.0	
Base Capacity (vph)	1009	666	1110	552	639	1873
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.43	0.15	0.15	0.18	0.11

Intersection Summary

Cycle Length: 97.7	
Actuated Cycle Length: 97.7	
Natural Cycle: 85	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.43	
Intersection Signal Delay: 14.0	Intersection LOS: B
Intersection Capacity Utilization 40.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: Palladium & Hwy417 WB



HCM Unsignalized Intersection Capacity Analysis
7: Palladium & Hwy417 EB












Future Background 2026 AM
09/17/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	89	274	0	76	395	103
Future Volume (Veh/h)	89	274	0	76	395	103
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)	89	274	0	76	395	103
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)	4					
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	433	198	395			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	433	198	395			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	84	66	100			
cM capacity (veh/h)	551	811	1160			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	363	38	38	198	198	103
Volume Left	89	0	0	0	0	0
Volume Right	274	0	0	0	0	103
cSH	1074	1700	1700	1700	1700	1700
Volume to Capacity	0.34	0.02	0.02	0.12	0.12	0.06
Queue Length 95th (m)	11.4	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	12.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	12.0	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay	4.6					
Intersection Capacity Utilization	36.1%			ICU Level of Service	A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
1: Kanata West & Campeau

Future Background 2026 PM
09/17/2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	19	1	13	37	2	39
Future Volume (Veh/h)	19	1	13	37	2	39
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	19	1	13	37	2	39
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			20		82	20
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			20		82	20
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	96
cM capacity (veh/h)			1596		912	1058
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	20	13	37	41		
Volume Left	0	13	0	2		
Volume Right	1	0	0	39		
cSH	1700	1596	1700	1050		
Volume to Capacity	0.01	0.01	0.02	0.04		
Queue Length 95th (m)	0.0	0.2	0.0	0.9		
Control Delay (s)	0.0	7.3	0.0	8.6		
Lane LOS		A		A		
Approach Delay (s)	0.0	1.9		8.6		
Approach LOS				A		
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			17.4%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
5: Palladium & Cabela's

Future Background 2026 PM
09/17/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↖	↕	↕↗	↖
Traffic Volume (veh/h)	0	151	136	427	413	35
Future Volume (Veh/h)	0	151	136	427	413	35
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)	0	151	136	427	413	35
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	199					
pX, platoon unblocked						
vC, conflicting volume	916	224	448			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	916	224	448			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	81	88			
cM capacity (veh/h)	238	779	1109			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	151	136	214	214	275	173
Volume Left	0	136	0	0	0	0
Volume Right	151	0	0	0	0	35
cSH	779	1109	1700	1700	1700	1700
Volume to Capacity	0.19	0.12	0.13	0.13	0.16	0.10
Queue Length 95th (m)	5.4	3.2	0.0	0.0	0.0	0.0
Control Delay (s)	10.7	8.7	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	10.7	2.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization			29.8%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
6: Palladium & Hwy417 WB

Future Background 2026 PM
09/17/2020

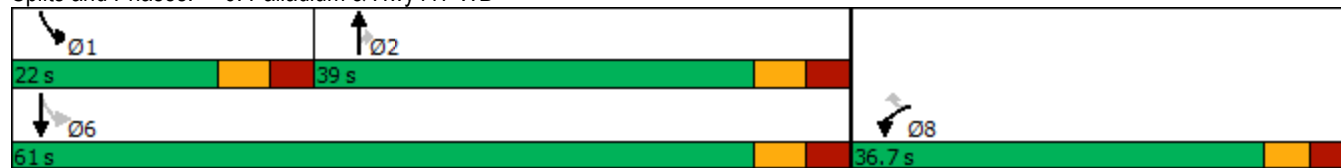


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	432	373	190	391	239	326
Future Volume (vph)	432	373	190	391	239	326
Lane Group Flow (vph)	432	373	190	391	239	326
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	32.7	32.7	39.0	39.0	12.0	25.0
Total Split (s)	36.7	36.7	39.0	39.0	22.0	61.0
Total Split (%)	37.6%	37.6%	39.9%	39.9%	22.5%	62.4%
Yellow Time (s)	3.3	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	3.4	3.4	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	6.7	7.0	7.0	7.0	7.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	30.0	30.0	32.0	32.0	54.0	54.0
Actuated g/C Ratio	0.31	0.31	0.33	0.33	0.55	0.55
v/c Ratio	0.43	0.52	0.17	0.52	0.38	0.17
Control Delay	28.6	5.6	23.9	5.3	13.4	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.6	5.6	23.9	5.3	13.4	11.1
LOS	C	A	C	A	B	B
Approach Delay	18.0		11.4			12.1
Approach LOS	B		B			B
Queue Length 50th (m)	33.4	0.0	13.3	0.0	22.1	15.1
Queue Length 95th (m)	46.8	19.6	21.4	19.2	35.6	22.0
Internal Link Dist (m)	453.2		407.4			174.6
Turn Bay Length (m)		125.0		85.0	140.0	
Base Capacity (vph)	1009	724	1110	759	629	1873
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.52	0.17	0.52	0.38	0.17

Intersection Summary

Cycle Length: 97.7
 Actuated Cycle Length: 97.7
 Natural Cycle: 85
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.52
 Intersection Signal Delay: 14.3
 Intersection Capacity Utilization 52.6%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 6: Palladium & Hwy417 WB



HCM Unsignalized Intersection Capacity Analysis
7: Palladium & Hwy417 EB

Future Background 2026 PM
09/17/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	109	163	0	492	524	193
Future Volume (Veh/h)	109	163	0	492	524	193
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)	109	163	0	492	524	193
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)	4					
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	770	262	524			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	770	262	524			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	68	78	100			
cM capacity (veh/h)	337	737	1039			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	272	246	246	262	262	193
Volume Left	109	0	0	0	0	0
Volume Right	163	0	0	0	0	193
cSH	841	1700	1700	1700	1700	1700
Volume to Capacity	0.32	0.14	0.14	0.15	0.15	0.11
Queue Length 95th (m)	10.7	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	15.1	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	15.1	0.0		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			32.6%	ICU Level of Service	A	
Analysis Period (min)			15			

Future Background 2031

HCM Unsignalized Intersection Capacity Analysis
 1: Kanata West & Campeau

Future Background 2031 AM
 09/17/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩		↩	↩	↩	
Traffic Volume (veh/h)	24	6	20	53	3	26
Future Volume (Veh/h)	24	6	20	53	3	26
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	24	6	20	53	3	26
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			30		120	27
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			30		120	27
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	98
cM capacity (veh/h)			1583		864	1048
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	30	20	53	29		
Volume Left	0	20	0	3		
Volume Right	6	0	0	26		
cSH	1700	1583	1700	1026		
Volume to Capacity	0.02	0.01	0.03	0.03		
Queue Length 95th (m)	0.0	0.3	0.0	0.7		
Control Delay (s)	0.0	7.3	0.0	8.6		
Lane LOS		A		A		
Approach Delay (s)	0.0	2.0		8.6		
Approach LOS				A		
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization			17.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
5: Palladium & Cabela's

Future Background 2031 AM
09/17/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	86	121	346	248	22
Future Volume (Veh/h)	0	86	121	346	248	22
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)	0	86	121	346	248	22
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	199					
pX, platoon unblocked						
vC, conflicting volume	674	135	270			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	674	135	270			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	90	91			
cM capacity (veh/h)	352	889	1290			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	86	121	173	173	165	105
Volume Left	0	121	0	0	0	0
Volume Right	86	0	0	0	0	22
cSH	889	1290	1700	1700	1700	1700
Volume to Capacity	0.10	0.09	0.10	0.10	0.10	0.06
Queue Length 95th (m)	2.4	2.4	0.0	0.0	0.0	0.0
Control Delay (s)	9.5	8.1	0.0	0.0	0.0	0.0
Lane LOS	A	A				
Approach Delay (s)	9.5	2.1	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			2.2			
Intersection Capacity Utilization			21.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
6: Palladium & Hwy417 WB

Future Background 2031 AM
09/17/2020

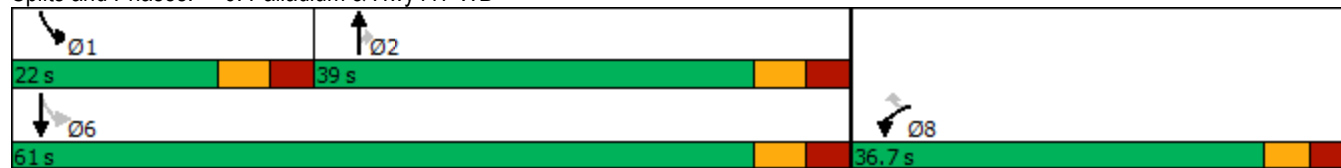


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	230	298	169	83	117	217
Future Volume (vph)	230	298	169	83	117	217
Lane Group Flow (vph)	230	298	169	83	117	217
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	32.7	32.7	39.0	39.0	12.0	25.0
Total Split (s)	36.7	36.7	39.0	39.0	22.0	61.0
Total Split (%)	37.6%	37.6%	39.9%	39.9%	22.5%	62.4%
Yellow Time (s)	3.3	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	3.4	3.4	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	6.7	7.0	7.0	7.0	7.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	30.0	30.0	32.0	32.0	54.0	54.0
Actuated g/C Ratio	0.31	0.31	0.33	0.33	0.55	0.55
v/c Ratio	0.23	0.44	0.15	0.15	0.18	0.12
Control Delay	26.0	5.4	23.7	6.1	11.3	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.0	5.4	23.7	6.1	11.3	10.7
LOS	C	A	C	A	B	B
Approach Delay	14.4		17.9			10.9
Approach LOS	B		B			B
Queue Length 50th (m)	16.5	0.0	11.7	0.0	10.0	9.7
Queue Length 95th (m)	25.7	17.8	19.3	9.8	18.4	15.2
Internal Link Dist (m)	453.2		407.4			174.6
Turn Bay Length (m)		125.0		85.0	140.0	
Base Capacity (vph)	1009	672	1110	552	637	1873
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.44	0.15	0.15	0.18	0.12

Intersection Summary

Cycle Length: 97.7
 Actuated Cycle Length: 97.7
 Natural Cycle: 85
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.44
 Intersection Signal Delay: 14.1
 Intersection Capacity Utilization 40.8%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 6: Palladium & Hwy417 WB



HCM Unsignalized Intersection Capacity Analysis
7: Palladium & Hwy417 EB












Future Background 2031 AM
09/17/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	92	287	0	79	413	103
Future Volume (Veh/h)	92	287	0	79	413	103
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)	92	287	0	79	413	103
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)	4					
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	452	206	413			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	452	206	413			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	83	64	100			
cM capacity (veh/h)	536	800	1142			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	379	40	40	206	206	103
Volume Left	92	0	0	0	0	0
Volume Right	287	0	0	0	0	103
cSH	1056	1700	1700	1700	1700	1700
Volume to Capacity	0.36	0.02	0.02	0.12	0.12	0.06
Queue Length 95th (m)	12.5	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	12.3	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	12.3	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay	4.8					
Intersection Capacity Utilization	37.5%			ICU Level of Service	A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
1: Kanata West & Campeau

Future Background 2031 PM
09/17/2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	20	1	13	39	2	40
Future Volume (Veh/h)	20	1	13	39	2	40
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	20	1	13	39	2	40
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			21		86	20
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			21		86	20
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	96
cM capacity (veh/h)			1595		908	1057
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	21	13	39	42		
Volume Left	0	13	0	2		
Volume Right	1	0	0	40		
cSH	1700	1595	1700	1049		
Volume to Capacity	0.01	0.01	0.02	0.04		
Queue Length 95th (m)	0.0	0.2	0.0	1.0		
Control Delay (s)	0.0	7.3	0.0	8.6		
Lane LOS		A		A		
Approach Delay (s)	0.0	1.8		8.6		
Approach LOS				A		
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			17.4%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
5: Palladium & Cabela's

Future Background 2031 PM
09/17/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	158	142	441	426	37
Future Volume (Veh/h)	0	158	142	441	426	37
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)	0	158	142	441	426	37
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	199					
pX, platoon unblocked						
vC, conflicting volume	949	232	463			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	949	232	463			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	79	87			
cM capacity (veh/h)	225	771	1095			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	158	142	220	220	284	179
Volume Left	0	142	0	0	0	0
Volume Right	158	0	0	0	0	37
cSH	771	1095	1700	1700	1700	1700
Volume to Capacity	0.21	0.13	0.13	0.13	0.17	0.11
Queue Length 95th (m)	5.8	3.4	0.0	0.0	0.0	0.0
Control Delay (s)	10.9	8.8	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	10.9	2.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			30.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
6: Palladium & Hwy417 WB

Future Background 2031 PM
09/17/2020



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	452	386	197	391	245	340
Future Volume (vph)	452	386	197	391	245	340
Lane Group Flow (vph)	452	386	197	391	245	340
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	32.7	32.7	39.0	39.0	12.0	25.0
Total Split (s)	36.7	36.7	39.0	39.0	22.0	61.0
Total Split (%)	37.6%	37.6%	39.9%	39.9%	22.5%	62.4%
Yellow Time (s)	3.3	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	3.4	3.4	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	6.7	7.0	7.0	7.0	7.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	30.0	30.0	32.0	32.0	54.0	54.0
Actuated g/C Ratio	0.31	0.31	0.33	0.33	0.55	0.55
v/c Ratio	0.45	0.53	0.18	0.52	0.39	0.18
Control Delay	28.9	5.7	24.0	5.3	13.5	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.9	5.7	24.0	5.3	13.5	11.2
LOS	C	A	C	A	B	B
Approach Delay	18.2		11.5			12.2
Approach LOS	B		B			B
Queue Length 50th (m)	35.2	0.0	13.8	0.0	22.8	15.7
Queue Length 95th (m)	49.1	20.1	22.0	19.2	36.6	22.9
Internal Link Dist (m)	453.2		407.4			174.6
Turn Bay Length (m)		125.0		85.0	140.0	
Base Capacity (vph)	1009	733	1110	759	627	1873
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.53	0.18	0.52	0.39	0.18

Intersection Summary

Cycle Length: 97.7
 Actuated Cycle Length: 97.7
 Natural Cycle: 85
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.53
 Intersection Signal Delay: 14.5
 Intersection Capacity Utilization 53.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 6: Palladium & Hwy417 WB



HCM Unsignalized Intersection Capacity Analysis
7: Palladium & Hwy417 EB

Future Background 2031 PM
09/17/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	112	170	0	515	548	193
Future Volume (Veh/h)	112	170	0	515	548	193
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)	112	170	0	515	548	193
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)	4					
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	806	274	548			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	806	274	548			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	65	77	100			
cM capacity (veh/h)	320	724	1018			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	282	258	258	274	274	193
Volume Left	112	0	0	0	0	0
Volume Right	170	0	0	0	0	193
cSH	805	1700	1700	1700	1700	1700
Volume to Capacity	0.35	0.15	0.15	0.16	0.16	0.11
Queue Length 95th (m)	12.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	15.7	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	15.7	0.0		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay	2.9					
Intersection Capacity Utilization	33.8%			ICU Level of Service	A	
Analysis Period (min)	15					

Total Projected 2021

HCM Unsignalized Intersection Capacity Analysis
 1: Kanata West & Campeau

Total Projected 2021 AM
 09/17/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔	↔	↔	
Traffic Volume (veh/h)	46	5	18	83	3	23
Future Volume (Veh/h)	46	5	18	83	3	23
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	46	5	18	83	3	23
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			51		168	48
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			51		168	48
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	98
cM capacity (veh/h)			1555		813	1020
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	51	18	83	26		
Volume Left	0	18	0	3		
Volume Right	5	0	0	23		
cSH	1700	1555	1700	991		
Volume to Capacity	0.03	0.01	0.05	0.03		
Queue Length 95th (m)	0.0	0.3	0.0	0.6		
Control Delay (s)	0.0	7.3	0.0	8.7		
Lane LOS		A		A		
Approach Delay (s)	0.0	1.3		8.7		
Approach LOS				A		
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			17.7%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: Campeau & East Access

Total Projected 2021 AM
09/17/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Volume (veh/h)	0	41	75	10	10	0
Future Volume (Veh/h)	0	41	75	10	10	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	41	75	10	10	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	85			121	80	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	85			121	80	
tC, single (s)	4.1			7.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			4.4	3.3	
p0 queue free %	100			99	100	
cM capacity (veh/h)	1512			686	980	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	41	85	10			
Volume Left	0	0	10			
Volume Right	0	10	0			
cSH	1512	1700	686			
Volume to Capacity	0.00	0.05	0.01			
Queue Length 95th (m)	0.0	0.0	0.3			
Control Delay (s)	0.0	0.0	10.3			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	10.3			
Approach LOS			B			
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			14.8%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
5: Palladium & Cabela's

Total Projected 2021 AM
09/17/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	79	110	357	257	20
Future Volume (Veh/h)	0	79	110	357	257	20
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)	0	79	110	357	257	20
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	199					
pX, platoon unblocked						
vC, conflicting volume	666	138	277			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	666	138	277			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	91	91			
cM capacity (veh/h)	359	884	1283			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	79	110	178	178	171	106
Volume Left	0	110	0	0	0	0
Volume Right	79	0	0	0	0	20
cSH	884	1283	1700	1700	1700	1700
Volume to Capacity	0.09	0.09	0.10	0.10	0.10	0.06
Queue Length 95th (m)	2.2	2.1	0.0	0.0	0.0	0.0
Control Delay (s)	9.5	8.1	0.0	0.0	0.0	0.0
Lane LOS	A	A				
Approach Delay (s)	9.5	1.9	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			21.3%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
6: Palladium & Hwy417 WB

Total Projected 2021 AM
09/17/2020



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙↙	↙	↕↕	↘	↘	↕↕
Traffic Volume (vph)	209	303	164	83	131	205
Future Volume (vph)	209	303	164	83	131	205
Lane Group Flow (vph)	209	303	164	83	131	205
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	32.7	32.7	39.0	39.0	12.0	25.0
Total Split (s)	36.7	36.7	39.0	39.0	22.0	61.0
Total Split (%)	37.6%	37.6%	39.9%	39.9%	22.5%	62.4%
Yellow Time (s)	3.3	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	3.4	3.4	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	6.7	7.0	7.0	7.0	7.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	30.0	30.0	32.0	32.0	54.0	54.0
Actuated g/C Ratio	0.31	0.31	0.33	0.33	0.55	0.55
v/c Ratio	0.21	0.45	0.15	0.15	0.21	0.11
Control Delay	25.7	5.4	23.7	6.1	11.5	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.7	5.4	23.7	6.1	11.5	10.6
LOS	C	A	C	A	B	B
Approach Delay	13.7		17.8			11.0
Approach LOS	B		B			B
Queue Length 50th (m)	15.0	0.0	11.4	0.0	11.3	9.1
Queue Length 95th (m)	23.6	17.9	18.9	9.8	20.2	14.4
Internal Link Dist (m)	453.2		407.4			174.6
Turn Bay Length (m)		125.0		85.0	140.0	
Base Capacity (vph)	1009	675	1110	552	639	1873
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.45	0.15	0.15	0.21	0.11

Intersection Summary

Cycle Length: 97.7
 Actuated Cycle Length: 97.7
 Natural Cycle: 85
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.45
 Intersection Signal Delay: 13.8
 Intersection Capacity Utilization 41.6%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 6: Palladium & Hwy417 WB



HCM Unsignalized Intersection Capacity Analysis
7: Palladium & Hwy417 EB

















Total Projected 2021 AM
09/17/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↙		↑↑	↓↓	↘
Traffic Volume (veh/h)	92	261	0	74	378	108
Future Volume (Veh/h)	92	261	0	74	378	108
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)	92	261	0	74	378	108
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)	4					
Median type			None	None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	415	189	378			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	415	189	378			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	84	68	100			
cM capacity (veh/h)	566	821	1177			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	353	37	37	189	189	108
Volume Left	92	0	0	0	0	0
Volume Right	261	0	0	0	0	108
cSH	1110	1700	1700	1700	1700	1700
Volume to Capacity	0.32	0.02	0.02	0.11	0.11	0.06
Queue Length 95th (m)	10.5	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	11.7	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	11.7	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			4.5			
Intersection Capacity Utilization			34.8%	ICU Level of Service	A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
8: UPS Access/West Access & Campeau

Total Projected 2021 AM
09/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	13	0	25	25	0	0	0	13	10	0	0
Future Volume (Veh/h)	0	13	0	25	25	0	0	0	13	10	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	13	0	25	25	0	0	0	13	10	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	25			13			88	88	13	101	88	25
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	25			13			88	88	13	101	88	25
tC, single (s)	5.1			4.1			7.1	6.5	6.2	8.1	6.5	7.2
tC, 2 stage (s)												
tF (s)	3.1			2.2			3.5	4.0	3.3	4.4	4.0	4.2
p0 queue free %	100			98			100	100	99	99	100	100
cM capacity (veh/h)	1133			1606			887	790	1067	676	790	827
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	13	50	13	10								
Volume Left	0	25	0	10								
Volume Right	0	0	13	0								
cSH	1133	1606	1067	676								
Volume to Capacity	0.00	0.02	0.01	0.01								
Queue Length 95th (m)	0.0	0.4	0.3	0.3								
Control Delay (s)	0.0	3.7	8.4	10.4								
Lane LOS		A	A	B								
Approach Delay (s)	0.0	3.7	8.4	10.4								
Approach LOS			A	B								
Intersection Summary												
Average Delay			4.6									
Intersection Capacity Utilization			23.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 9: Campeau & Central Access

Total Projected 2021 AM
 09/17/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩		↩	
Traffic Volume (veh/h)	0	36	50	25	5	0
Future Volume (Veh/h)	0	36	50	25	5	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	36	50	25	5	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	75				98	62
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	75				98	62
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1524				900	1002
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	36	75	5			
Volume Left	0	0	5			
Volume Right	0	25	0			
cSH	1524	1700	900			
Volume to Capacity	0.00	0.04	0.01			
Queue Length 95th (m)	0.0	0.0	0.1			
Control Delay (s)	0.0	0.0	9.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	9.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			14.4%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 1: Kanata West & Campeau

Total Projected 2021 PM
 09/17/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻		↻	↻	↻	
Traffic Volume (veh/h)	53	1	12	61	2	37
Future Volume (Veh/h)	53	1	12	61	2	37
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	53	1	12	61	2	37
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			54		138	54
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			54		138	54
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	96
cM capacity (veh/h)			1551		848	1014
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	54	12	61	39		
Volume Left	0	12	0	2		
Volume Right	1	0	0	37		
cSH	1700	1551	1700	1004		
Volume to Capacity	0.03	0.01	0.04	0.04		
Queue Length 95th (m)	0.0	0.2	0.0	0.9		
Control Delay (s)	0.0	7.3	0.0	8.7		
Lane LOS	A		A			
Approach Delay (s)	0.0	1.2	8.7			
Approach LOS	A					
Intersection Summary						
Average Delay			2.6			
Intersection Capacity Utilization			17.4%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: Campeau & East Access

Total Projected 2021 PM
09/17/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	44	52	10	10	0
Future Volume (Veh/h)	0	44	52	10	10	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	44	52	10	10	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	62			101	57	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	62			101	57	
tC, single (s)	4.1			7.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			4.4	3.3	
p0 queue free %	100			99	100	
cM capacity (veh/h)	1541			707	1009	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	44	62	10			
Volume Left	0	0	10			
Volume Right	0	10	0			
cSH	1541	1700	707			
Volume to Capacity	0.00	0.04	0.01			
Queue Length 95th (m)	0.0	0.0	0.3			
Control Delay (s)	0.0	0.0	10.2			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	10.2			
Approach LOS			B			
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			13.5%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

5: Palladium & Cabela's
















Total Projected 2021 PM
09/17/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	144	130	435	431	34
Future Volume (Veh/h)	0	144	130	435	431	34
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)	0	144	130	435	431	34
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	199					
pX, platoon unblocked						
vC, conflicting volume	926	232	465			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	926	232	465			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	81	88			
cM capacity (veh/h)	236	770	1093			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	144	130	218	218	287	178
Volume Left	0	130	0	0	0	0
Volume Right	144	0	0	0	0	34
cSH	770	1093	1700	1700	1700	1700
Volume to Capacity	0.19	0.12	0.13	0.13	0.17	0.10
Queue Length 95th (m)	5.2	3.1	0.0	0.0	0.0	0.0
Control Delay (s)	10.8	8.7	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	10.8	2.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			29.8%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
6: Palladium & Hwy417 WB

Total Projected 2021 PM
09/17/2020

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		 			 
Traffic Volume (vph)	412	376	188	391	256	319
Future Volume (vph)	412	376	188	391	256	319
Lane Group Flow (vph)	412	376	188	391	256	319
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	32.7	32.7	39.0	39.0	12.0	25.0
Total Split (s)	36.7	36.7	39.0	39.0	22.0	61.0
Total Split (%)	37.6%	37.6%	39.9%	39.9%	22.5%	62.4%
Yellow Time (s)	3.3	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	3.4	3.4	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	6.7	7.0	7.0	7.0	7.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	30.0	30.0	32.0	32.0	54.0	54.0
Actuated g/C Ratio	0.31	0.31	0.33	0.33	0.55	0.55
v/c Ratio	0.41	0.52	0.17	0.52	0.41	0.17
Control Delay	28.3	5.6	23.9	5.3	13.7	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.3	5.6	23.9	5.3	13.7	11.1
LOS	C	A	C	A	B	B
Approach Delay	17.5		11.3			12.3
Approach LOS	B		B			B
Queue Length 50th (m)	31.6	0.0	13.2	0.0	24.0	14.7
Queue Length 95th (m)	44.7	19.9	21.2	19.2	38.2	21.5
Internal Link Dist (m)	453.2		407.4			174.6
Turn Bay Length (m)		125.0		85.0	140.0	
Base Capacity (vph)	1009	726	1110	759	630	1873
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.52	0.17	0.52	0.41	0.17

Intersection Summary

Cycle Length: 97.7
 Actuated Cycle Length: 97.7
 Natural Cycle: 85
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.52
 Intersection Signal Delay: 14.1
 Intersection Capacity Utilization 53.0%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 6: Palladium & Hwy417 WB



HCM Unsignalized Intersection Capacity Analysis
7: Palladium & Hwy417 EB

















Total Projected 2021 PM
09/17/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	110	155	0	471	502	199
Future Volume (Veh/h)	110	155	0	471	502	199
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)	110	155	0	471	502	199
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)	4					
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	738	251	502			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	738	251	502			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	69	79	100			
cM capacity (veh/h)	354	749	1059			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	265	236	236	251	251	199
Volume Left	110	0	0	0	0	0
Volume Right	155	0	0	0	0	199
cSH	852	1700	1700	1700	1700	1700
Volume to Capacity	0.31	0.14	0.14	0.15	0.15	0.12
Queue Length 95th (m)	10.1	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	14.7	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	14.7	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay	2.7					
Intersection Capacity Utilization	31.4%			ICU Level of Service	A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
8: UPS Access/West Access & Campeau

Total Projected 2021 PM
09/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	10	0	19	18	10	0	0	10	0	0	0
Future Volume (Veh/h)	0	10	0	19	18	10	0	0	10	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	10	0	19	18	10	0	0	10	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	28			10			71	76	10	81	71	23
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	28			10			71	76	10	81	71	23
tC, single (s)	5.1			4.1			7.1	6.5	6.2	8.1	6.5	7.2
tC, 2 stage (s)												
tF (s)	3.1			2.2			3.5	4.0	3.3	4.4	4.0	4.2
p0 queue free %	100			99			100	100	99	100	100	100
cM capacity (veh/h)	1130			1610			912	805	1071	703	810	830
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	10	47	10	0								
Volume Left	0	19	0	0								
Volume Right	0	10	10	0								
cSH	1130	1610	1071	1700								
Volume to Capacity	0.00	0.01	0.01	0.00								
Queue Length 95th (m)	0.0	0.3	0.2	0.0								
Control Delay (s)	0.0	3.0	8.4	0.0								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	3.0	8.4	0.0								
Approach LOS			A	A								
Intersection Summary												
Average Delay			3.3									
Intersection Capacity Utilization			19.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 9: Campeau & Central Access

Total Projected 2021 PM
 09/17/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Volume (veh/h)	0	19	47	5	25	0
Future Volume (Veh/h)	0	19	47	5	25	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	19	47	5	25	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	52			68	50	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	52			68	50	
tC, single (s)	4.1			6.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	100			97	100	
cM capacity (veh/h)	1554			936	1019	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	19	52	25			
Volume Left	0	0	25			
Volume Right	0	5	0			
cSH	1554	1700	936			
Volume to Capacity	0.00	0.03	0.03			
Queue Length 95th (m)	0.0	0.0	0.6			
Control Delay (s)	0.0	0.0	9.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	9.0			
Approach LOS			A			
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			13.3%	ICU Level of Service	A	
Analysis Period (min)			15			

Total Projected 2026

HCM Unsignalized Intersection Capacity Analysis
1: Kanata West & Campeau

Total Projected 2026 AM
09/17/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻		↻	↻	↻	
Traffic Volume (veh/h)	51	5	19	91	3	25
Future Volume (Veh/h)	51	5	19	91	3	25
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	51	5	19	91	3	25
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			56		182	54
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			56		182	54
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	98
cM capacity (veh/h)			1549		797	1014
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	56	19	91	28		
Volume Left	0	19	0	3		
Volume Right	5	0	0	25		
cSH	1700	1549	1700	985		
Volume to Capacity	0.03	0.01	0.05	0.03		
Queue Length 95th (m)	0.0	0.3	0.0	0.7		
Control Delay (s)	0.0	7.4	0.0	8.8		
Lane LOS	A		A			
Approach Delay (s)	0.0	1.3	8.8			
Approach LOS	A					
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			17.8%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: Campeau & East Access

Total Projected 2026 AM
09/17/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	43	79	12	12	0
Future Volume (Veh/h)	0	43	79	12	12	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	43	79	12	12	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	91			128	85	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	91			128	85	
tC, single (s)	4.1			7.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			4.4	3.3	
p0 queue free %	100			98	100	
cM capacity (veh/h)	1504			679	974	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	43	91	12			
Volume Left	0	0	12			
Volume Right	0	12	0			
cSH	1504	1700	679			
Volume to Capacity	0.00	0.05	0.02			
Queue Length 95th (m)	0.0	0.0	0.4			
Control Delay (s)	0.0	0.0	10.4			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	10.4			
Approach LOS			B			
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			15.2%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

5: Palladium & Cabela's

Total Projected 2026 AM
09/17/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↘	↑↑	↓↓	
Traffic Volume (veh/h)	0	82	116	371	265	21
Future Volume (Veh/h)	0	82	116	371	265	21
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)	0	82	116	371	265	21
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	199					
pX, platoon unblocked						
vC, conflicting volume	693	143	286			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	693	143	286			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	91	91			
cM capacity (veh/h)	343	879	1273			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	82	116	186	186	177	109
Volume Left	0	116	0	0	0	0
Volume Right	82	0	0	0	0	21
cSH	879	1273	1700	1700	1700	1700
Volume to Capacity	0.09	0.09	0.11	0.11	0.10	0.06
Queue Length 95th (m)	2.3	2.3	0.0	0.0	0.0	0.0
Control Delay (s)	9.5	8.1	0.0	0.0	0.0	0.0
Lane LOS	A	A				
Approach Delay (s)	9.5	1.9	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			21.9%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
6: Palladium & Hwy417 WB

Total Projected 2026 AM
09/17/2020



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙↙	↙	↕↕	↘	↙	↕↕
Traffic Volume (vph)	219	316	171	83	134	213
Future Volume (vph)	219	316	171	83	134	213
Lane Group Flow (vph)	219	316	171	83	134	213
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	32.7	32.7	39.0	39.0	12.0	25.0
Total Split (s)	36.7	36.7	39.0	39.0	22.0	61.0
Total Split (%)	37.6%	37.6%	39.9%	39.9%	22.5%	62.4%
Yellow Time (s)	3.3	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	3.4	3.4	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	6.7	7.0	7.0	7.0	7.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	30.0	30.0	32.0	32.0	54.0	54.0
Actuated g/C Ratio	0.31	0.31	0.33	0.33	0.55	0.55
v/c Ratio	0.22	0.46	0.15	0.15	0.21	0.11
Control Delay	25.9	5.4	23.8	6.1	11.6	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.9	5.4	23.8	6.1	11.6	10.6
LOS	C	A	C	A	B	B
Approach Delay	13.8		18.0			11.0
Approach LOS	B		B			B
Queue Length 50th (m)	15.7	0.0	11.9	0.0	11.6	9.5
Queue Length 95th (m)	24.6	18.4	19.6	9.8	20.6	15.0
Internal Link Dist (m)	453.2		407.4			174.6
Turn Bay Length (m)		125.0		85.0	140.0	
Base Capacity (vph)	1009	684	1110	552	636	1873
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.46	0.15	0.15	0.21	0.11

Intersection Summary

Cycle Length: 97.7
 Actuated Cycle Length: 97.7
 Natural Cycle: 85
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.46
 Intersection Signal Delay: 13.9
 Intersection Capacity Utilization 41.8%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 6: Palladium & Hwy417 WB



HCM Unsignalized Intersection Capacity Analysis
7: Palladium & Hwy417 EB

















Total Projected 2026 AM
09/17/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	95	274	0	78	397	108
Future Volume (Veh/h)	95	274	0	78	397	108
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)	95	274	0	78	397	108
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)	4					
Median type			None	None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	436	198	397			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	436	198	397			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	83	66	100			
cM capacity (veh/h)	549	809	1158			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	369	39	39	198	198	108
Volume Left	95	0	0	0	0	0
Volume Right	274	0	0	0	0	108
cSH	1090	1700	1700	1700	1700	1700
Volume to Capacity	0.34	0.02	0.02	0.12	0.12	0.06
Queue Length 95th (m)	11.5	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	12.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	12.0	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			4.7			
Intersection Capacity Utilization			36.2%	ICU Level of Service	A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
8: UPS Access/West Access & Campeau

Total Projected 2026 AM
09/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	13	0	25	25	0	0	0	13	12	0	0
Future Volume (Veh/h)	0	13	0	25	25	0	0	0	13	12	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	13	0	25	25	0	0	0	13	12	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	25			13			88	88	13	101	88	25
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	25			13			88	88	13	101	88	25
tC, single (s)	5.1			4.1			7.1	6.5	6.2	8.1	6.5	7.2
tC, 2 stage (s)												
tF (s)	3.1			2.2			3.5	4.0	3.3	4.4	4.0	4.2
p0 queue free %	100			98			100	100	99	98	100	100
cM capacity (veh/h)	1133			1606			887	790	1067	676	790	827
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	13	50	13	12								
Volume Left	0	25	0	12								
Volume Right	0	0	13	0								
cSH	1133	1606	1067	676								
Volume to Capacity	0.00	0.02	0.01	0.02								
Queue Length 95th (m)	0.0	0.4	0.3	0.4								
Control Delay (s)	0.0	3.7	8.4	10.4								
Lane LOS		A	A	B								
Approach Delay (s)	0.0	3.7	8.4	10.4								
Approach LOS			A	B								
Intersection Summary												
Average Delay			4.8									
Intersection Capacity Utilization			23.6%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 9: Campeau & Central Access

Total Projected 2026 AM
 09/17/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Volume (veh/h)	0	38	50	29	5	0
Future Volume (Veh/h)	0	38	50	29	5	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	38	50	29	5	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	79			102	64	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	79			102	64	
tC, single (s)	4.1			6.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	100			99	100	
cM capacity (veh/h)	1519			896	1000	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	38	79	5			
Volume Left	0	0	5			
Volume Right	0	29	0			
cSH	1519	1700	896			
Volume to Capacity	0.00	0.05	0.01			
Queue Length 95th (m)	0.0	0.0	0.1			
Control Delay (s)	0.0	0.0	9.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	9.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			14.6%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 1: Kanata West & Campeau

Total Projected 2026 PM
 09/17/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	60	1	13	67	2	39
Future Volume (Veh/h)	60	1	13	67	2	39
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	60	1	13	67	2	39
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			61		154	60
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			61		154	60
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	96
cM capacity (veh/h)			1542		831	1005
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	61	13	67	41		
Volume Left	0	13	0	2		
Volume Right	1	0	0	39		
cSH	1700	1542	1700	995		
Volume to Capacity	0.04	0.01	0.04	0.04		
Queue Length 95th (m)	0.0	0.2	0.0	1.0		
Control Delay (s)	0.0	7.4	0.0	8.8		
Lane LOS	A		A			
Approach Delay (s)	0.0	1.2	8.8			
Approach LOS	A					
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			17.4%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: Campeau & East Access

Total Projected 2026 PM
09/17/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	48	55	12	12	0
Future Volume (Veh/h)	0	48	55	12	12	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	48	55	12	12	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	67			109	61	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	67			109	61	
tC, single (s)	4.1			7.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			4.4	3.3	
p0 queue free %	100			98	100	
cM capacity (veh/h)	1535			698	1004	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	48	67	12			
Volume Left	0	0	12			
Volume Right	0	12	0			
cSH	1535	1700	698			
Volume to Capacity	0.00	0.04	0.02			
Queue Length 95th (m)	0.0	0.0	0.4			
Control Delay (s)	0.0	0.0	10.2			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	10.2			
Approach LOS			B			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			13.8%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

5: Palladium & Cabela's

Total Projected 2026 PM
09/17/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	151	136	452	448	35
Future Volume (Veh/h)	0	151	136	452	448	35
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)	0	151	136	452	448	35
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	199					
pX, platoon unblocked						
vC, conflicting volume	964	242	483			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	964	242	483			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	80	87			
cM capacity (veh/h)	221	759	1076			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	151	136	226	226	299	184
Volume Left	0	136	0	0	0	0
Volume Right	151	0	0	0	0	35
cSH	759	1076	1700	1700	1700	1700
Volume to Capacity	0.20	0.13	0.13	0.13	0.18	0.11
Queue Length 95th (m)	5.6	3.3	0.0	0.0	0.0	0.0
Control Delay (s)	10.9	8.8	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	10.9	2.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			30.8%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
6: Palladium & Hwy417 WB

Total Projected 2026 PM
09/17/2020



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙↙	↙	↑↑	↘	↘	↑↑
Traffic Volume (vph)	432	393	195	391	266	334
Future Volume (vph)	432	393	195	391	266	334
Lane Group Flow (vph)	432	393	195	391	266	334
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	32.7	32.7	39.0	39.0	12.0	25.0
Total Split (s)	36.7	36.7	39.0	39.0	22.0	61.0
Total Split (%)	37.6%	37.6%	39.9%	39.9%	22.5%	62.4%
Yellow Time (s)	3.3	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	3.4	3.4	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	6.7	7.0	7.0	7.0	7.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	30.0	30.0	32.0	32.0	54.0	54.0
Actuated g/C Ratio	0.31	0.31	0.33	0.33	0.55	0.55
v/c Ratio	0.43	0.53	0.18	0.52	0.42	0.18
Control Delay	28.6	5.7	24.0	5.3	14.0	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.6	5.7	24.0	5.3	14.0	11.1
LOS	C	A	C	A	B	B
Approach Delay	17.7		11.5			12.4
Approach LOS	B		B			B
Queue Length 50th (m)	33.4	0.0	13.7	0.0	25.1	15.5
Queue Length 95th (m)	46.8	20.3	21.9	19.2	39.8	22.5
Internal Link Dist (m)	453.2		407.4			174.6
Turn Bay Length (m)		125.0		85.0	140.0	
Base Capacity (vph)	1009	738	1110	759	627	1873
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.53	0.18	0.52	0.42	0.18

Intersection Summary

Cycle Length: 97.7	
Actuated Cycle Length: 97.7	
Natural Cycle: 85	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 14.3	Intersection LOS: B
Intersection Capacity Utilization 54.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: Palladium & Hwy417 WB



HCM Unsignalized Intersection Capacity Analysis
7: Palladium & Hwy417 EB

Total Projected 2026 PM
09/17/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	114	163	0	494	526	199
Future Volume (Veh/h)	114	163	0	494	526	199
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)	114	163	0	494	526	199
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)	4					
Median type			None	None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	773	263	526			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	773	263	526			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	66	78	100			
cM capacity (veh/h)	336	735	1037			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	277	247	247	263	263	199
Volume Left	114	0	0	0	0	0
Volume Right	163	0	0	0	0	199
cSH	815	1700	1700	1700	1700	1700
Volume to Capacity	0.34	0.15	0.15	0.15	0.15	0.12
Queue Length 95th (m)	11.5	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	15.3	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	15.3	0.0		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			32.7%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 8: UPS Access/West Access & Campeau

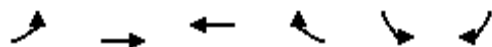
Total Projected 2026 PM
 09/17/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	0	10	0	19	18	12	0	0	10	0	0	0
Future Volume (Veh/h)	0	10	0	19	18	12	0	0	10	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	10	0	19	18	12	0	0	10	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	30			10			72	78	10	82	72	24
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	30			10			72	78	10	82	72	24
tC, single (s)	5.1			4.1			7.1	6.5	6.2	8.1	6.5	7.2
tC, 2 stage (s)												
tF (s)	3.1			2.2			3.5	4.0	3.3	4.4	4.0	4.2
p0 queue free %	100			99			100	100	99	100	100	100
cM capacity (veh/h)	1127			1610			911	803	1071	702	809	828
Direction, Lane #												
	EB 1	WB 1	NB 1	SB 1								
Volume Total	10	49	10	0								
Volume Left	0	19	0	0								
Volume Right	0	12	10	0								
cSH	1127	1610	1071	1700								
Volume to Capacity	0.00	0.01	0.01	0.00								
Queue Length 95th (m)	0.0	0.3	0.2	0.0								
Control Delay (s)	0.0	2.9	8.4	0.0								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	2.9	8.4	0.0								
Approach LOS			A	A								
Intersection Summary												
Average Delay			3.3									
Intersection Capacity Utilization			19.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 9: Campeau & Central Access

Total Projected 2026 PM
 09/17/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	19	49	6	29	0
Future Volume (Veh/h)	0	19	49	6	29	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	19	49	6	29	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	55			71	52	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	55			71	52	
tC, single (s)	4.1			6.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	100			97	100	
cM capacity (veh/h)	1550			933	1016	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	19	55	29			
Volume Left	0	0	29			
Volume Right	0	6	0			
cSH	1550	1700	933			
Volume to Capacity	0.00	0.03	0.03			
Queue Length 95th (m)	0.0	0.0	0.7			
Control Delay (s)	0.0	0.0	9.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	9.0			
Approach LOS			A			
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			13.3%	ICU Level of Service	A	
Analysis Period (min)			15			

Total Projected 2031

HCM Unsignalized Intersection Capacity Analysis
 1: Kanata West & Campeau

Total Projected 2031 AM
 09/17/2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↖	↗	↘	
Traffic Volume (veh/h)	53	6	20	94	3	26
Future Volume (Veh/h)	53	6	20	94	3	26
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	53	6	20	94	3	26
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			59		190	56
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			59		190	56
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	97
cM capacity (veh/h)			1545		789	1011
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	59	20	94	29		
Volume Left	0	20	0	3		
Volume Right	6	0	0	26		
cSH	1700	1545	1700	982		
Volume to Capacity	0.03	0.01	0.06	0.03		
Queue Length 95th (m)	0.0	0.3	0.0	0.7		
Control Delay (s)	0.0	7.4	0.0	8.8		
Lane LOS		A		A		
Approach Delay (s)	0.0	1.3		8.8		
Approach LOS				A		
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			17.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: Campeau & East Access

Total Projected 2031 AM
09/17/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	43	79	12	12	0
Future Volume (Veh/h)	0	43	79	12	12	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	43	79	12	12	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	91			128	85	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	91			128	85	
tC, single (s)	4.1			7.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			4.4	3.3	
p0 queue free %	100			98	100	
cM capacity (veh/h)	1504			679	974	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	43	91	12			
Volume Left	0	0	12			
Volume Right	0	12	0			
cSH	1504	1700	679			
Volume to Capacity	0.00	0.05	0.02			
Queue Length 95th (m)	0.0	0.0	0.4			
Control Delay (s)	0.0	0.0	10.4			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	10.4			
Approach LOS			B			
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			15.2%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
5: Palladium & Cabela's

Total Projected 2031 AM
09/17/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↘	↑↑	↑↓	
Traffic Volume (veh/h)	0	86	121	381	272	22
Future Volume (Veh/h)	0	86	121	381	272	22
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)	0	86	121	381	272	22
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage veh						
Upstream signal (m)	199					
pX, platoon unblocked						
vC, conflicting volume	716	147	294			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	716	147	294			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	90	90			
cM capacity (veh/h)	330	873	1264			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	86	121	190	190	181	113
Volume Left	0	121	0	0	0	0
Volume Right	86	0	0	0	0	22
cSH	873	1264	1700	1700	1700	1700
Volume to Capacity	0.10	0.10	0.11	0.11	0.11	0.07
Queue Length 95th (m)	2.5	2.4	0.0	0.0	0.0	0.0
Control Delay (s)	9.6	8.1	0.0	0.0	0.0	0.0
Lane LOS	A	A				
Approach Delay (s)	9.6	2.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			22.4%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
6: Palladium & Hwy417 WB

Total Projected 2031 AM
09/17/2020

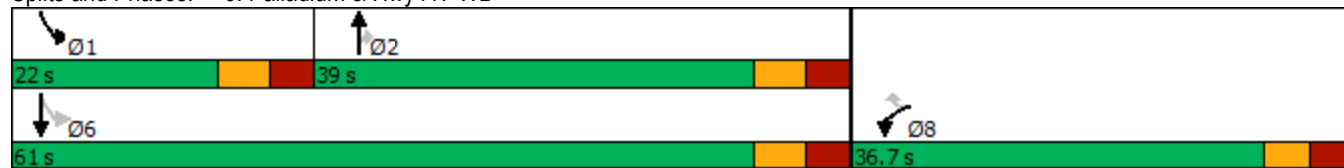


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙↙	↙	↕↕	↘	↘	↕↕
Traffic Volume (vph)	230	325	177	83	136	222
Future Volume (vph)	230	325	177	83	136	222
Lane Group Flow (vph)	230	325	177	83	136	222
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	32.7	32.7	39.0	39.0	12.0	25.0
Total Split (s)	36.7	36.7	39.0	39.0	22.0	61.0
Total Split (%)	37.6%	37.6%	39.9%	39.9%	22.5%	62.4%
Yellow Time (s)	3.3	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	3.4	3.4	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	6.7	7.0	7.0	7.0	7.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	30.0	30.0	32.0	32.0	54.0	54.0
Actuated g/C Ratio	0.31	0.31	0.33	0.33	0.55	0.55
v/c Ratio	0.23	0.47	0.16	0.15	0.21	0.12
Control Delay	26.0	5.4	23.8	6.1	11.6	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.0	5.4	23.8	6.1	11.6	10.7
LOS	C	A	C	A	B	B
Approach Delay	14.0		18.2			11.0
Approach LOS	B		B			B
Queue Length 50th (m)	16.5	0.0	12.4	0.0	11.8	9.9
Queue Length 95th (m)	25.7	18.5	20.1	9.8	20.9	15.5
Internal Link Dist (m)	453.2		407.4			174.6
Turn Bay Length (m)		125.0		85.0	140.0	
Base Capacity (vph)	1009	691	1110	552	634	1873
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.47	0.16	0.15	0.21	0.12

Intersection Summary

Cycle Length: 97.7
 Actuated Cycle Length: 97.7
 Natural Cycle: 85
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.47
 Intersection Signal Delay: 14.0
 Intersection Capacity Utilization 41.9%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 6: Palladium & Hwy417 WB



HCM Unsignalized Intersection Capacity Analysis
7: Palladium & Hwy417 EB

















Total Projected 2031 AM
09/17/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	98	287	0	81	415	108
Future Volume (Veh/h)	98	287	0	81	415	108
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)	98	287	0	81	415	108
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)	4					
Median type			None	None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	456	208	415			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	456	208	415			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	82	64	100			
cM capacity (veh/h)	533	799	1140			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	385	40	40	208	208	108
Volume Left	98	0	0	0	0	0
Volume Right	287	0	0	0	0	108
cSH	1071	1700	1700	1700	1700	1700
Volume to Capacity	0.36	0.02	0.02	0.12	0.12	0.06
Queue Length 95th (m)	12.5	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	12.3	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	12.3	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			4.8			
Intersection Capacity Utilization			37.5%	ICU Level of Service	A	
Analysis Period (min)	15					

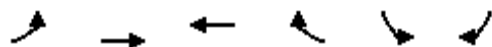
HCM Unsignalized Intersection Capacity Analysis
8: UPS Access/West Access & Campeau

Total Projected 2031 AM
09/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	13	0	25	25	0	0	0	13	12	0	0
Future Volume (Veh/h)	0	13	0	25	25	0	0	0	13	12	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	13	0	25	25	0	0	0	13	12	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	25			13			88	88	13	101	88	25
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	25			13			88	88	13	101	88	25
tC, single (s)	5.1			4.1			7.1	6.5	6.2	8.1	6.5	7.2
tC, 2 stage (s)												
tF (s)	3.1			2.2			3.5	4.0	3.3	4.4	4.0	4.2
p0 queue free %	100			98			100	100	99	98	100	100
cM capacity (veh/h)	1133			1606			887	790	1067	676	790	827
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	13	50	13	12								
Volume Left	0	25	0	12								
Volume Right	0	0	13	0								
cSH	1133	1606	1067	676								
Volume to Capacity	0.00	0.02	0.01	0.02								
Queue Length 95th (m)	0.0	0.4	0.3	0.4								
Control Delay (s)	0.0	3.7	8.4	10.4								
Lane LOS		A	A	B								
Approach Delay (s)	0.0	3.7	8.4	10.4								
Approach LOS			A	B								
Intersection Summary												
Average Delay			4.8									
Intersection Capacity Utilization			23.6%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 9: Campeau & Central Access












Total Projected 2031 AM
 09/17/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Volume (veh/h)	0	38	50	29	5	0
Future Volume (Veh/h)	0	38	50	29	5	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	38	50	29	5	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	79			102	64	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	79			102	64	
tC, single (s)	4.1			6.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	100			99	100	
cM capacity (veh/h)	1519			896	1000	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	38	79	5			
Volume Left	0	0	5			
Volume Right	0	29	0			
cSH	1519	1700	896			
Volume to Capacity	0.00	0.05	0.01			
Queue Length 95th (m)	0.0	0.0	0.1			
Control Delay (s)	0.0	0.0	9.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	9.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			14.6%	ICU Level of Service	A	
Analysis Period (min)			15			

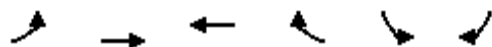
HCM Unsignalized Intersection Capacity Analysis
 1: Kanata West & Campeau

Total Projected 2031 PM
 09/17/2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	61	1	13	69	2	40
Future Volume (Veh/h)	61	1	13	69	2	40
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	61	1	13	69	2	40
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			62		156	62
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			62		156	62
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	96
cM capacity (veh/h)			1541		828	1004
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	62	13	69	42		
Volume Left	0	13	0	2		
Volume Right	1	0	0	40		
cSH	1700	1541	1700	993		
Volume to Capacity	0.04	0.01	0.04	0.04		
Queue Length 95th (m)	0.0	0.2	0.0	1.0		
Control Delay (s)	0.0	7.4	0.0	8.8		
Lane LOS	A		A			
Approach Delay (s)	0.0	1.2	8.8			
Approach LOS	A					
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			17.4%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
4: Campeau & East Access

Total Projected 2031 PM
09/17/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	48	55	12	12	0
Future Volume (Veh/h)	0	48	55	12	12	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	48	55	12	12	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	67			109	61	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	67			109	61	
tC, single (s)	4.1			7.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			4.4	3.3	
p0 queue free %	100			98	100	
cM capacity (veh/h)	1535			698	1004	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	48	67	12			
Volume Left	0	0	12			
Volume Right	0	12	0			
cSH	1535	1700	698			
Volume to Capacity	0.00	0.04	0.02			
Queue Length 95th (m)	0.0	0.0	0.4			
Control Delay (s)	0.0	0.0	10.2			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	10.2			
Approach LOS			B			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			13.8%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
5: Palladium & Cabela's

Total Projected 2031 PM
09/17/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↘	↕	↕	↘
Traffic Volume (veh/h)	0	158	142	466	461	37
Future Volume (Veh/h)	0	158	142	466	461	37
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)	0	158	142	466	461	37
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	199					
pX, platoon unblocked						
vC, conflicting volume	996	249	498			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	996	249	498			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	79	87			
cM capacity (veh/h)	209	751	1062			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	158	142	233	233	307	191
Volume Left	0	142	0	0	0	0
Volume Right	158	0	0	0	0	37
cSH	751	1062	1700	1700	1700	1700
Volume to Capacity	0.21	0.13	0.14	0.14	0.18	0.11
Queue Length 95th (m)	6.0	3.5	0.0	0.0	0.0	0.0
Control Delay (s)	11.1	8.9	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	11.1	2.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization			31.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
6: Palladium & Hwy417 WB

Total Projected 2031 PM
09/17/2020



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙↙	↙	↕↕	↘	↘	↕↕
Traffic Volume (vph)	452	406	202	391	272	348
Future Volume (vph)	452	406	202	391	272	348
Lane Group Flow (vph)	452	406	202	391	272	348
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	32.7	32.7	39.0	39.0	12.0	25.0
Total Split (s)	36.7	36.7	39.0	39.0	22.0	61.0
Total Split (%)	37.6%	37.6%	39.9%	39.9%	22.5%	62.4%
Yellow Time (s)	3.3	3.3	3.7	3.7	3.7	3.7
All-Red Time (s)	3.4	3.4	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.7	6.7	7.0	7.0	7.0	7.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	30.0	30.0	32.0	32.0	54.0	54.0
Actuated g/C Ratio	0.31	0.31	0.33	0.33	0.55	0.55
v/c Ratio	0.45	0.54	0.18	0.52	0.44	0.19
Control Delay	28.9	5.7	24.0	5.3	14.1	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.9	5.7	24.0	5.3	14.1	11.2
LOS	C	A	C	A	B	B
Approach Delay	17.9		11.7			12.5
Approach LOS	B		B			B
Queue Length 50th (m)	35.2	0.0	14.2	0.0	25.8	16.2
Queue Length 95th (m)	49.1	20.5	22.6	19.2	40.7	23.4
Internal Link Dist (m)	453.2		407.4			174.6
Turn Bay Length (m)		125.0		85.0	140.0	
Base Capacity (vph)	1009	747	1110	759	625	1873
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.54	0.18	0.52	0.44	0.19

Intersection Summary

Cycle Length: 97.7
 Actuated Cycle Length: 97.7
 Natural Cycle: 85
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.54
 Intersection Signal Delay: 14.5
 Intersection Capacity Utilization 55.1%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 6: Palladium & Hwy417 WB



HCM Unsignalized Intersection Capacity Analysis
7: Palladium & Hwy417 EB

















Total Projected 2031 PM
09/17/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	117	170	0	517	550	199
Future Volume (Veh/h)	117	170	0	517	550	199
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)	117	170	0	517	550	199
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)	4					
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	808	275	550			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	808	275	550			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	63	76	100			
cM capacity (veh/h)	318	722	1016			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	287	258	258	275	275	199
Volume Left	117	0	0	0	0	0
Volume Right	170	0	0	0	0	199
cSH	781	1700	1700	1700	1700	1700
Volume to Capacity	0.37	0.15	0.15	0.16	0.16	0.12
Queue Length 95th (m)	12.9	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	16.1	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	16.1	0.0		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay	3.0					
Intersection Capacity Utilization	33.8%			ICU Level of Service	A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 8: UPS Access/West Access & Campeau

Total Projected 2031 PM
 09/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	10	0	19	18	12	0	0	10	0	0	0
Future Volume (Veh/h)	0	10	0	19	18	12	0	0	10	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	0	10	0	19	18	12	0	0	10	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	30			10			72	78	10	82	72	24
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	30			10			72	78	10	82	72	24
tC, single (s)	5.1			4.1			7.1	6.5	6.2	8.1	6.5	7.2
tC, 2 stage (s)												
tF (s)	3.1			2.2			3.5	4.0	3.3	4.4	4.0	4.2
p0 queue free %	100			99			100	100	99	100	100	100
cM capacity (veh/h)	1127			1610			911	803	1071	702	809	828
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	10	49	10	0								
Volume Left	0	19	0	0								
Volume Right	0	12	10	0								
cSH	1127	1610	1071	1700								
Volume to Capacity	0.00	0.01	0.01	0.00								
Queue Length 95th (m)	0.0	0.3	0.2	0.0								
Control Delay (s)	0.0	2.9	8.4	0.0								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	2.9	8.4	0.0								
Approach LOS			A	A								
Intersection Summary												
Average Delay			3.3									
Intersection Capacity Utilization			19.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 9: Campeau & Central Access

Total Projected 2031 PM
 09/17/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Volume (veh/h)	0	19	49	6	29	0
Future Volume (Veh/h)	0	19	49	6	29	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	19	49	6	29	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	55			71	52	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	55			71	52	
tC, single (s)	4.1			6.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	100			97	100	
cM capacity (veh/h)	1550			933	1016	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	19	55	29			
Volume Left	0	0	29			
Volume Right	0	6	0			
cSH	1550	1700	933			
Volume to Capacity	0.00	0.03	0.03			
Queue Length 95th (m)	0.0	0.0	0.7			
Control Delay (s)	0.0	0.0	9.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	9.0			
Approach LOS			A			
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			13.3%	ICU Level of Service	A	
Analysis Period (min)			15			