



BA Group

3430 CARLING AVENUE CITY OF OTTAWA

Residential Development
Transportation Impact Assessment

Step 5 – Final Report

Prepared For: Rohit Communities Ontario Inc.

March 2023



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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 sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
3. I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
4. I am either a licensed or registered professional in good standing, whose field of expertise is either transportation engineering or transportation planning.

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



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CITY COMMENTS (FEBRUARY 15, 2023)

A Site Plan Application for 3430 Carling Avenue was submitted to the City of Ottawa in December 2022, which included a Transportation Impact Assessment, titled *3430 Carling Avenue, City of Ottawa, Step 4 Strategy* (prepared by BA Group). On February 15, 2023, the City of Ottawa provided comments pertaining to this application.

The City's transportation-related comments are included below in **bold** along with the accompanying responses prepared by BA Group in *italics*.

1. **Section 2.1.1 Proposed Development**

The first paragraph states that the proposed development is approximately 200m east of the Carling Avenue at Moodie Drive Intersection. This is inaccurate, please correct.

The correct distance of 700m was included in the final TIA.

2. **Under Table 6, the land use code should read “multi-unit high-rise”.**

The multi-unit high-rise LUC was included in the final TIA.

3. **Section 2.1.2.1 Roads and Traffic Control**

It is stated within the description of Moodie Drive that the intersection of Carling Avenue and Moodie Drive includes an eastbound left turn auxiliary lane. This is inaccurate, please correct.

The description of the geometry of the Carling Avenue at Moodie Drive intersection was revised in Section 2.1.2.1 of the final TIA.

4. **Section 2.1.2.5 Traffic Volumes**

Include pedestrian and cycling volumes

Figure 5 was modified in the final TIA to include the pedestrian and cyclist volumes.

5. **Section 2.2.3 Horizon Year**

2029 Future Background Conditions must also be provided to compare against 2029 Ultimate Conditions.

The site traffic that the subject development is anticipated to generate is negligible as compared to the existing and projected volumes along Carling Avenue. In addition, the analysis for the 2029 Ultimate horizon found that the intersections are projected to operate well within acceptable thresholds. The ‘worst’ individual movement at all study area intersections is projected at a LOS C, which is for the northbound thru at the Carling Avenue at Moodie Drive intersection, which is not a movement that the subject development will contribute to. Furthermore, the future background horizon is typically only done for the build-out year, and not for the +5-year horizon. As such, including a 2029 Future Background horizon for the subject development will not add value nor will it conclude anything different than the horizons that were analyzed as part of this TIS.



6. Section 4.1.1 Design for Sustainable Modes

Recommend the accessible parking spaces provided on the surface include access aisles complete with curb ramps and TWSIs per Section 3.1 of the City of Ottawa Accessibility Design Standards.

The design of the accessible parking spaces on the surface is the responsibility of the project architect.

7. Section 4.2.1 Parking Supply

Please include the calculation for required accessible parking and the provided accessible parking in the body of the TIA report and on the site plan.

Section 4.2.1 of the final TIA includes the required and proposed accessible parking spaces.

Updating the site plan is the responsibility of the project architect.

8. Section 4.4.1 Location and Design of Access

Ensure the new site access is designed per City of Ottawa standard drawing SC7.1.

The design of the site access is the responsibility of the project architect.

9. Section 4.3.1 Boundary Street Design

From the site plan, landscaping plan, and civil plans, it appears that the sidewalk along the site's frontage is being reconstructed. If the sidewalk is being reconstructed, consider reconstructing the sidewalk at a width of 2.0m sidewalk with a boulevard between the sidewalk and vehicle lanes. This will improve pedestrian level of service per the City's MMLOS guidelines, and the boulevard will help facilitate snow storage.

Clarify in the design drawings that the eastbound right-turn taper for the existing west access is being removed. Ensure the new sidewalk ties-in with the existing sidewalk west of the eastbound right-turn taper. Show this on the site plan.

The sidewalk across the site frontage is not being reconstructed, but rather left in place as it currently is.

The eastbound right-turn taper for the existing west access is being removed and the sidewalk along Carling Avenue will be extended as part of the subject development. Reflecting this on the site plan is the responsibility of the project architect.

10. Section 4.5.3 TDM Program

Indicate and illustrate the location of the permanent bike repair station adjacent to the main bicycle parking area. The repair station cannot be found in the site plan or floor plans.

Please consider use of pre-paid Presto passes as an additional TDM measure.

Adding the bicycle repair stations to the site plan / floor plans is the responsibility of the project architect.



PRESTO passes were considered; however, the development is not proposing to include PRESTO passes as a means of TDM. The proposed TDM measures are included in Section 4.5 of the final TIA.

11. Traffic Signal Design

No comments for this current circulation. Traffic Signal Design Unit reserves the right to make future comments based on subsequent submissions.

If there are any future proposed changes in the existing roadway geometry that would require the installation of a pedestrian crossover (Type B or Type C), the signalization of an intersection or modifications to an existing signalized intersection, the City of Ottawa Traffic Signal Design Unit would be required to complete a traffic signal plant design and would need to be engaged in reviews during the functional design stage.

Noted.

12. Streetlighting

No comments with the TIA for this circulation. Street lighting reserves the right to make future comments based on subsequent submissions.

Future considerations as follows:

If there are any proposed changes to the existing roadway geometry, the City of Ottawa Street Light Asset Management Group is required to provide a full street light design. Upon completion of a proposed roadway geometry design changes, please submit digital Micro Station drawings with proposed roadway geometry changes to the Street Lighting Department, so that we may proceed with the detailed street light design and coordination with the Street Light maintenance provider and all necessary parties. Be advised that the applicant will be 100% responsible for all costs associated with any Street Light design as a result of the roadway geometry change.

Alterations and / or repairs are required where the existing street light plant is directly, indirectly or adversely affected by the scope of work under this circulation, due to the proposed road reconstruction process. All street light plant alterations and / or repairs must be performed by the City of Ottawa's Street Light maintenance provider.

Noted.



1.0 SCREENING

1.1 SUMMARY OF DEVELOPMENT

TABLE 1 SUMMARY OF DEVELOPMENT

Municipal Address	3430 Carling Avenue
Description of Location	South side of Carling Avenue, between Moodie Drive and Bedale Drive. Existing property includes a one-storey restaurant with surface parking.
Land Use Classification	Residential
Development Size (units)	Two buildings with a total of 186 units
Development Size (ft ²)	N/A
Number of Accesses and Locations	Existing: 2 full movements uncontrolled accesses to Carling Avenue Proposed: 1 full movements minor stop-controlled access to Carling Avenue, approximately 760m east of Moodie Drive.
Phase of Development	1 Phase
Buildout Year	2024

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

1.2 TRIP GENERATION TRIGGER

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

TABLE 2 TRIP GENERATION TRIGGERS

Land Use Type	Minimum Development Size	Triggered
Single-Family Homes	40 units	x
Townhomes or Apartments	90 units	✓
Office	3,500 m ²	x
Industrial	5,000 m ²	x
Fast-Food Restaurant / Coffee Shop	100 m ²	x
Destination Retail	1,000 m ²	x
Gas Station / Convenience Market	75 m ²	x

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

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



1.3 LOCATION TRIGGERS

TABLE 3 LOCATION TRIGGERS

	Yes	No
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit, or Spine Bicycle Networks?		✓
Is the development in a Design Priority Area (DPA) or a Transit-Oriented Development (TOD) zone?*		✓

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

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

1.4 SAFETY TRIGGERS

TABLE 4 SAFETY TRIGGERS

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

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

1.5 SCREENING SUMMARY

TABLE 5 SCREENING SUMMARY

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

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



2.0 SCOPING

2.1 EXISTING AND PLANNED CONDITIONS

2.1.1 Proposed Development

Rohit Communities Ontario Inc. is preparing a Site Plan Control application for a proposed residential development in the Crystal Bay – Lakeview Park community in Ottawa. The proposed development is located at 3430 Carling Avenue, approximately 760m east of the Carling Avenue at Moodie Drive intersection. The site is bound by Carling Avenue to the north, existing residential to the west and south, and existing commercial to the east. The development includes two six-storey residential buildings, with a combined total of 186 units.

Figure 1 illustrates the location of the subject development. The subject site is currently zoned as General Mixed-Use (GM) Zone. The purpose of the GM Zone, according to the City of Ottawa’s Zoning By-Law, is to:

- Allow residential, commercial and institutional uses, or mixed use development in the General Urban Area and in the Upper Town, Lowertown and Sandy Hill West Character Areas of the Central Area designations of the Official Plan;
- Limit commercial uses to individual occupancies or in groupings in well defined areas such that they do not affect the development of the designated Traditional and Arterial Mainstreets as viable mixed-use areas;
- Permit the uses that are often large and serve or draw from broader areas than the surrounding community and which may generate traffic, noise or other impacts provided the anticipated impacts are adequately mitigated or otherwise addressed; and
- Impose development standards that will ensure that the uses are compatible and complement surrounding land uses.

Figure 2 includes the proposed site plan and is provided for reference.

TABLE 6 PROPOSED LAND USES AND LAND USE CODES

Land Use	Size	Land Use Code (LUC)
Residential	186 units	221 – Multifamily Housing (High-Rise)



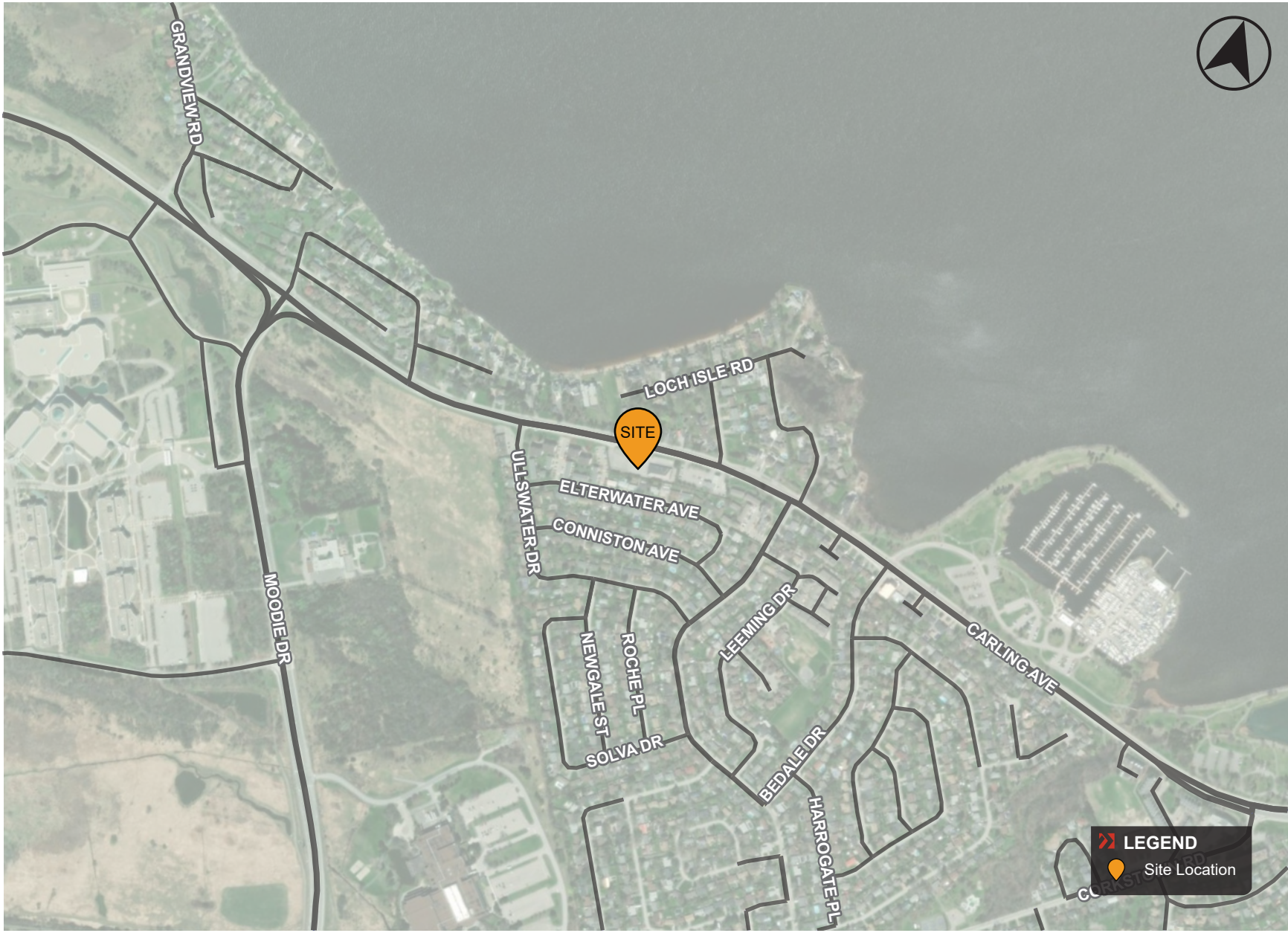


FIGURE 1 SITE LOCATION



FIGURE 2 SITE PLAN

2.1.2 Existing Conditions

2.1.2.1 Roads and Traffic Control

The roadways under consideration in the study area are described as follows:

Carling Avenue	Within the vicinity of the subject site, Carling Avenue is a municipal four-lane arterial roadway with a wide painted median down the centre. The posted speed limit along Carling Avenue across the frontage of the subject site is 60 km/h. A sidewalk is provided along the south side and an asphalt multi-use pathway is provided along the northside.
Moodie Drive	Within the vicinity of the subject site, Moodie Drive is a municipal four-lane arterial roadway with a painted median. The posted speed limit along Moodie Drive, within the vicinity of the subject site, is 80 km/h. A sidewalk and an on-street cycle lane is provided along the east side of Moodie Drive. Along the west side, there is a sidewalk that transitions into a multi-use pathway as well as paved shoulders. The intersection with Carling Avenue is signalized and includes a westbound left turn auxiliary lane, as well as eastbound and northbound right turn channelized lanes.
Bedale Drive	Bedale Drive is a two-lane municipal local road with a posted speed limit of 40 km/h. A sidewalk is provided along the east side of Bedale Drive. The intersection with Carling Avenue is signalized with eastbound and westbound auxiliary left turn lanes and an eastbound auxiliary right turn lane.

There are three commercial accesses to the property directly east of the subject site, on the south side of Carling Avenue. In addition, there are numerous residential driveways on the north side of Carling Avenue. All these accesses are within 200m of the subject site access.

Figure 3 illustrates the existing lane configuration and traffic control.





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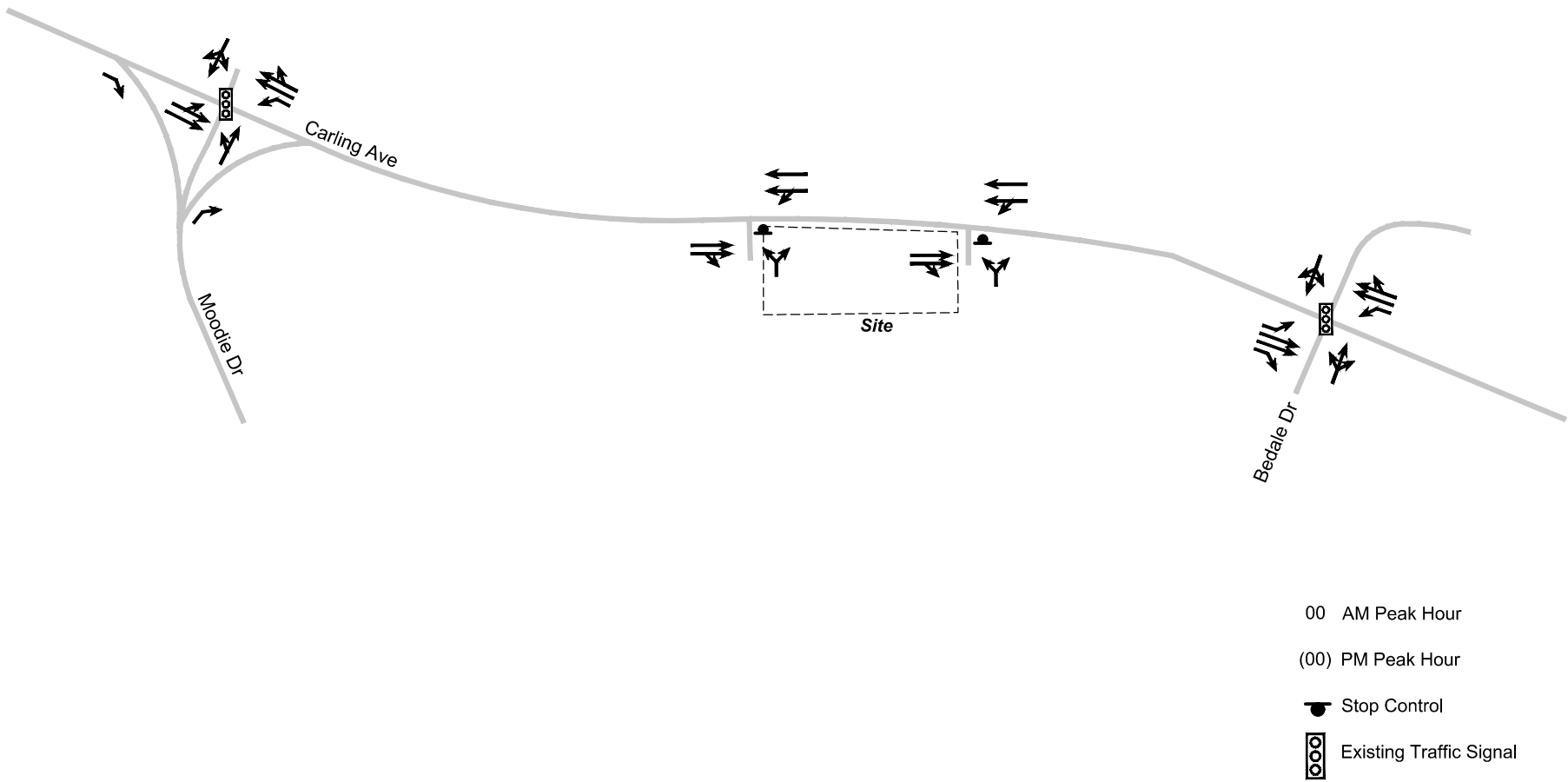


FIGURE 3 EXISTING LANE CONFIGURATION AND TRAFFIC CONTROL

2.1.2.2 Walking and Cycling

Within the vicinity of the subject site, a sidewalk is provided along the south side of Carling Avenue and an asphalt multi-use pathway (MUP) is provided along the north side of Carling Avenue. This MUP ties into the Sir John A Macdonald Parkway that travels to Downtown Ottawa.

2.1.2.3 Transit

Transit service is currently provided in the immediate vicinity of the proposed development via the following routes:

Route 57 Route 57 is a Rapid Route that runs between Crystal Bay and Tunney's Pasture. It operates with 30-minute headways during both the weekday morning and afternoon peaks.

Route 58 Route 58 is a Local Route that runs between Crystal Bay and Lincoln Fields. It operates with 10–30-minute headways during both the weekday morning and afternoon peaks.

Route 66 Route 66 is a Local Route that runs between Kanata-Solandt and Gatineau. It operates with 15-30-minute headways during both the weekday morning and afternoon peaks.

Route 258 Route 258 is a Connexion Route that runs between Tunney's Pasture Station and Grandview. It operates once per hour during both the morning and afternoon peaks.

The subject development is situated in the middle of two transit stops along Carling Avenue that are both serviced by the two aforementioned transit routes. These transit stops are approximately 100m and 130m away from the subject development.

Figure 4 illustrates nearby transit routes and bus stop locations.



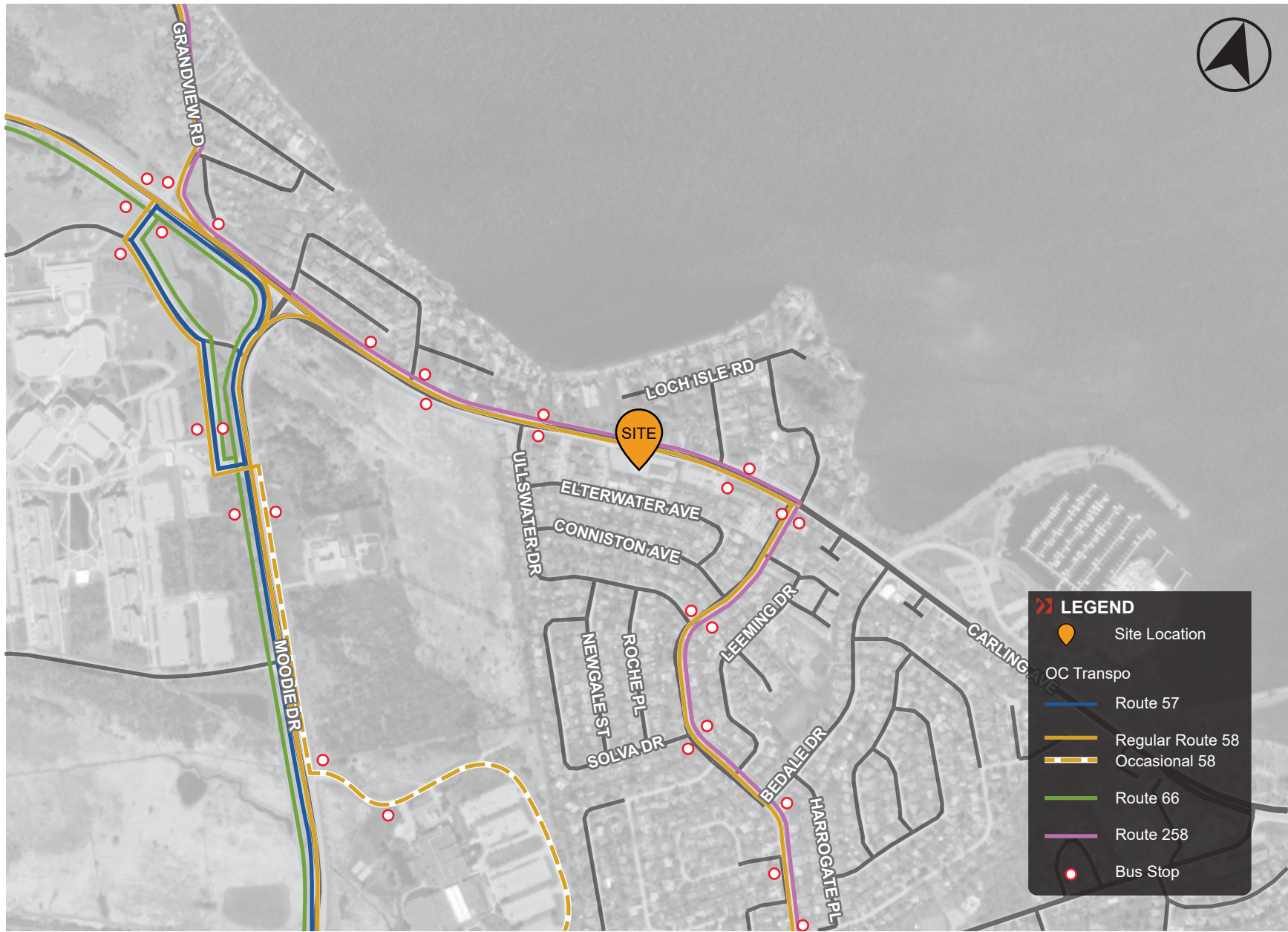


FIGURE 4 STUDY AREA TRANSIT ROUTES AND STOPS

2.1.2.4 Traffic Management Measures

No traffic management measures are currently provided in the vicinity of the subject site.

2.1.2.5 Traffic Volumes

Traffic volumes at the study area intersections were collected at both signalized study area intersections in November of 2022. These volumes were used to generate the traffic volumes at the site access location. **Figure 5** illustrates the 2022 traffic volumes at the study area intersections.

It should be noted that the traffic volumes in this report were rounded up to the nearest five vehicles.

Appendix A contains the traffic data and is provided for reference.



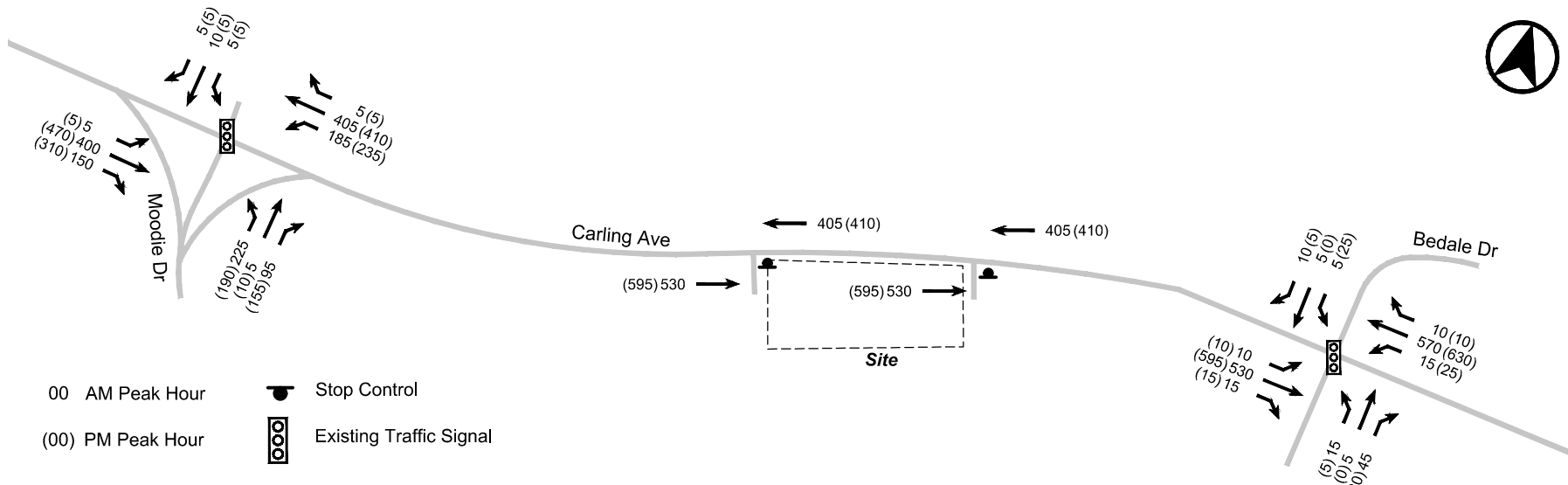


FIGURE 5A 2022 EXISTING VEHICULAR VOLUMES

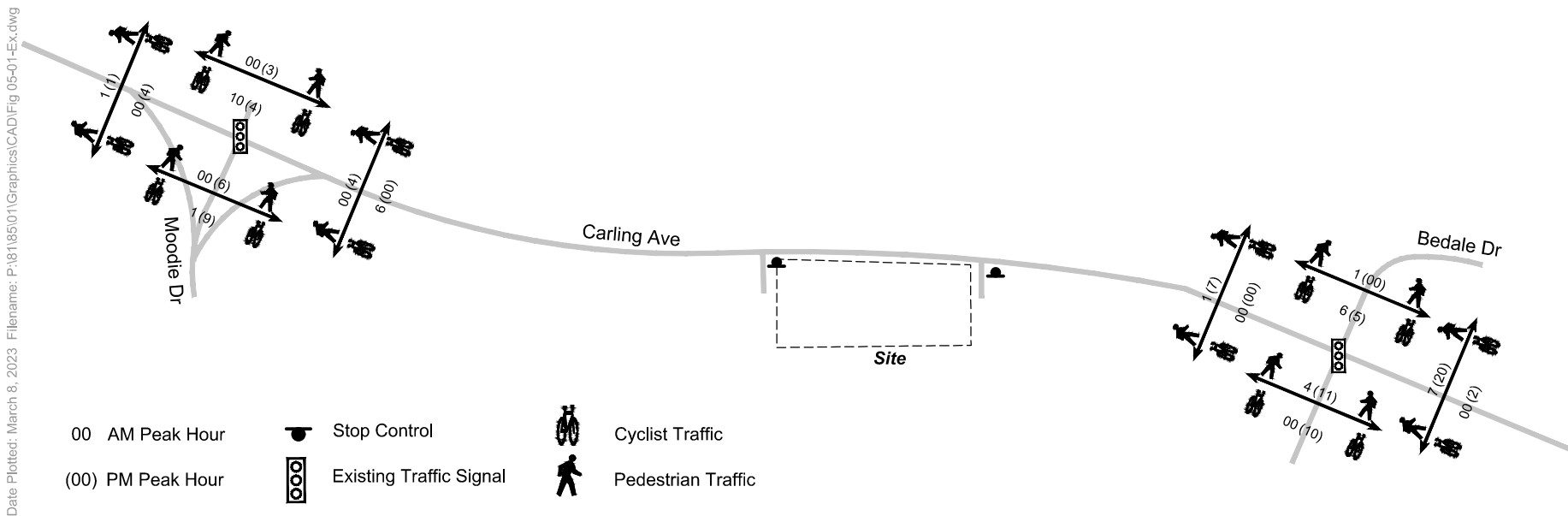


FIGURE 5B 2022 EXISTING CYCLIST AND PEDESTRIAN VOLUMES

2.1.2.6 Collision History

Collision data was provided by the City of Ottawa for the period January 2016 to December 2020 in the vicinity of the subject site. The data was reviewed to determine if any intersections or road segments exhibited an identifiable collision pattern during the five (5) year period.

Table 7 includes the collision summary for the study area intersections as well as the segment of Carling Avenue across the frontage of the subject development.

TABLE 7 COLLISION DATA

		Carling at Moodie	Carling at Bedale	Carling, between Sunny Brae and Ullswater (across the frontage of the subject site)
Classification	Property Damage Only	20	2	3
	Non-Fatal Injury	8	3	1
	Fatal Injury	1	0	0
Collision Type	Rear End	6	1	3
	Angle / Turning	15	2	1
	Sideswipe	2	0	0
	Single Motor Vehicle	5	2	0
	Other	1	0	0
Event	Other motor vehicle	23	2	4
	Ran off road	1	0	0
	Cyclist	1	1	0
	Pedestrian	0	1	0
	Animal	3	0	0
	Pole (utility, power)	1	1	0

Per the data above, the Carling Avenue at Moodie Drive experienced the majority of the collisions between the years 2016 and 2020. Upon further review, the angle / turning collision type were the most prevalent, encompassing over 50% of the total collisions at this location. These collisions were further reviewed to determine if there are any discernable patterns. It should also be noted that the fatal injury that occurred at this intersection involved an angle / turning collision type. **Table 8** below further breaks down the angle / turning collision types at the Carling Avenue at Moodie Drive intersection.



TABLE 8 CARLING AVENUE AT MOODIE DRIVE ANGLE / TURNING COLLISIONS

		Carling at Moodie
Environment	Clear	14
	Snow	1
Surface Conditions	Dry	11
	Wet	3
	Loose Snow	1
Turning Vehicle Direction	Eastbound – Turning Left	5
	Westbound – Turning Left	10

Per the data above, the vast majority of the collisions occurred during clear environmental conditions (93%) and on dry surface conditions (73%). However, it is noted that the majority (67%) of the collisions at this location occurred between westbound left turning vehicles and eastbound through vehicles. Upon reviewing the signal timing plans, it was found that the westbound left turn phase is permissive / protected, which may be a contributing factor to the collisions. The City may wish to explore modifying the westbound left turn phase to be fully protected.

Appendix B contains the collision data and is provided for reference.

2.1.3 Planned Conditions

2.1.3.1 Road Network Modifications

Per the City of Ottawa’s 2013 Transportation Master Plan, there is one transportation improvement project that is currently planned within the vicinity of the subject development, which is Stage 2 of the City’s Light Rail Transit. This will extend the LRT from Tunney’s Pasture Station to Moodie Drive. Stage 2 is currently under construction and is scheduled to be in operation by the end of 2026. The Moodie Station is located approximately 2km away from the subject development.

2.1.3.2 Future Background Developments

Per the City of Ottawa’s Development Applications website, there is one development scheduled to occur within the vicinity of the subject site, as outlined below.

3368 Carling Avenue

This development is located at the southeast quadrant of the Carling Avenue at Bedale Drive intersection. It is planned to include one residential building containing 15 residential units. Per the Transportation Impact Assessment prepared by Stantec in 2016, the development is anticipated to generate 8 and 9 two-way vehicle trips during the AM and PM peak hours, respectively. As this volume is negligible compared to the traffic volumes along Carling Avenue, it was not considered in the subject analysis.



2.2 STUDY AREA AND TIME PERIODS

2.2.1 Study Area

The proposed study area is limited to the following intersections:

1. Carling Avenue at Moodie Drive;
2. Carling Avenue at Bedale Drive; and
3. Carling Avenue at Site Access.

2.2.2 Time Periods

The scope of the transportation assessment proposes the following analysis time periods:

1. Weekday AM peak hour of roadway; and
2. Weekday PM peak hour of roadway.

2.2.3 Horizon Years

The scope of the transportation assessment proposes the following horizon years:

1. 2022 Existing Conditions;
2. 2024 Future Background Conditions;
3. 2024 Total Future Conditions (site build-out); and
4. 2029 Ultimate Conditions (5 years beyond build-out).



2.3 EXEMPTIONS REVIEW

Table 9 summarizes the Exemptions Review table from the City of Ottawa’s 2017 Transportation Impact Assessment Guidelines.

TABLE 9 EXEMPTIONS REVIEW

Module	Element	Exemption Consideration	Exempted?
Design Review Component			
4.1 Development Design	4.1.2 Circulation and Access	Only required for site plans	No
	4.1.3 New Street Networks	Only required for plans of subdivision	Yes
4.2 Parking	4.2.1 Parking Supply	Only required for site plans	No
	4.2.2 Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand	Yes
Network Impact Component			
4.5 Transportation Demand Management	All Elements	Not required for site plans expected to have fewer than 60 employees and / or students on location at any given time	No
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Yes
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by established zoning	Yes
4.9 Intersection Design	All Elements	Not required if site generation trigger is not met.	No



3.0 FORECASTING

3.1 DEVELOPMENT GENERATED TRAVEL DEMAND

3.1.1 Trip Generation and Mode Shares

The City of Ottawa's *TRANS Trip Generation Manual* (October 2020) was used to forecast trip generation for the proposed development. Land use code 221 – Multifamily Housing (high-rise) was thought to be the most representative of the proposed site. As there is one access serving both proposed residential buildings, the total number of units was combined for the trip generation, distribution, and assignment purposes. It should be noted that the below analysis was completed using a previous version of the site plan that included 198 residential units. The latest version of the site plan that corresponds with this submission includes 186 residential units. However, the analysis was not revised as the change is deemed negligible and the below analysis represents a more conservative approach.

Table 10 outlines the trip generation rates that were used.

TABLE 10 TRIP GENERATION RATES

Land Use	Units	AM Peak Hour	PM Peak Hour
Person Trip Rates			
221 – Multi Unit (High-Rise)	198	0.80	0.90
Person Trips			
221 – Multi Unit (High-Rise)	198	158	178

Pre the above table, the proposed development is anticipated to generate 158 and 178 person trips during the AM and PM peak hours, respectively. Using the modal splits for High-Rise Multifamily Housing from the *TRANS Trip Generation Manual*, the person trips were distributed across the various modes of transportation, as outlined in **Table 11** below.

TABLE 11 MODAL SHARE BREAK DOWN – PEAK PERIOD

Travel Mode	AM Peak Period		PM Peak Period	
	Mode Share	Trips	Mode Share	Trips
Auto Drive	40%	63	40%	71
Auto Passenger	12%	19	15%	27
Transit	38%	60	33%	58
Cycling	2%	3	1%	2
Walking	8%	13	11%	20

These peak period trips were then converted to peak hour trips using the conversion rates obtained from the *TRANS Trip Generation Manual*. **Table 12** below outlines these conversion factors.



TABLE 12 PEAK PERIOD TO PEAK HOUR CONVERSION RATES

Travel Mode	AM Conversion Rate	PM Conversion Rate
Auto Driver	0.48	0.44
Auto Passenger	0.31	0.29
Transit	0.55	0.47
Cycling	0.58	0.48
Walking	0.58	0.52

Using the conversion rates from **Table 12** above, the trips per modal share were calculated based on the AM and PM peak hours, as can be seen in **Table 13** below. The inbound / outbound splits were taken to be 31% / 69% for the AM peak hour and 58% / 42% for the PM peak hour, per the *Trans Trip Generation Manual*.

TABLE 13 PEAK HOUR PERSON TRIPS BY TRAVEL MODE

Travel Mode	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Auto Driver	9	18	27	22	13	35
Auto Passenger	2	3	5	5	3	8
Transit	10	19	29	19	11	30
Cycling	1	1	2	1	0	1
Walking	2	4	6	7	4	11
Total Person Trips	24	45	69	54	31	85

3.1.2 Trip Distribution

The distribution of traffic to / from the proposed development was based on the 2011 OD Survey (Ottawa Inner Area). The site generated traffic was distributed as 10% to / from the west (via Carling Avenue), 65% to / from the South (via Moodie Drive) and 25% to / from the east (via Carling Avenue).

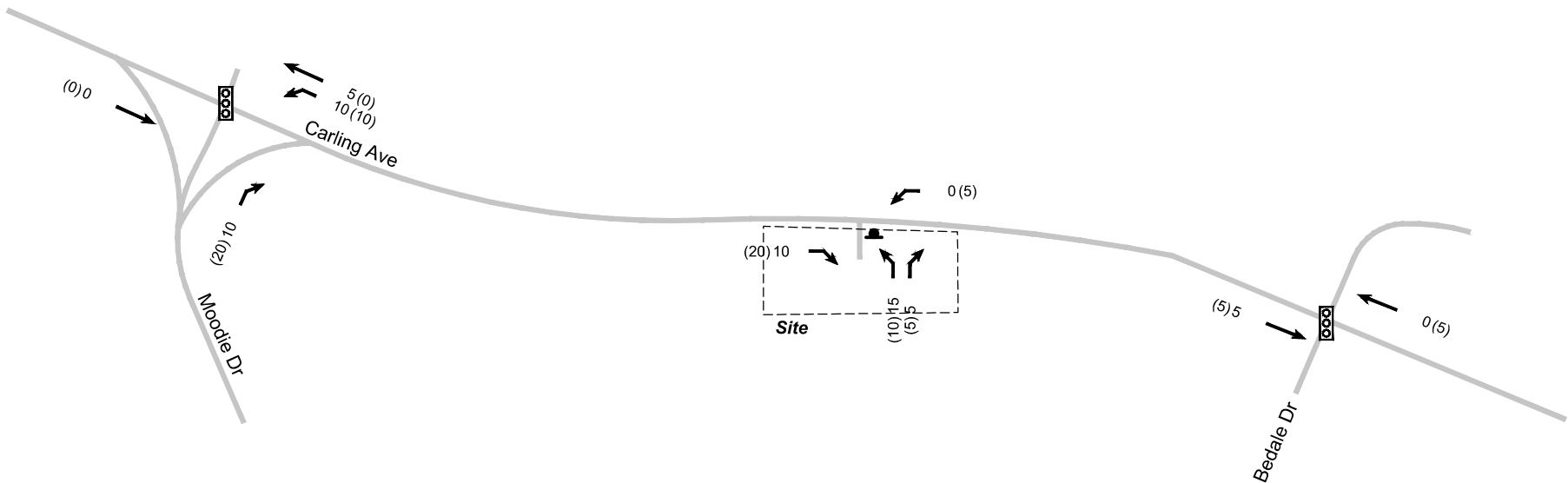
3.1.3 Trip Assignment

Using the distribution from **Section 3.1.2** above, the site trips were assigned to the proposed site access accordingly and are shown in **Figure 6**. It should be noted that the traffic volumes were rounded up to the nearest five vehicles.





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- 00 AM Peak Hour
- (00) PM Peak Hour
- Stop Control
- Existing Traffic Signal

FIGURE 6 SITE GENERATED TRAFFIC

3.2 BACKGROUND NETWORK TRAVEL DEMAND

3.2.1 Transportation Network Plans

As outlined in **Section 2.1.3.1**, there are no road infrastructure projects that are included in the City's 2013 TMP within the vicinity of the subject site.

3.2.2 Background Growth Rate

Traffic along Carling Avenue is not anticipated to increase significantly within the study horizon years. As such, an annual growth rate of 2% was applied to the movements along both Carling Avenue and Moodie Drive.

3.2.3 Other Developments

As outlined in **Section 2.1.3.2**, there is one nearby development scheduled to occur, however, as this development is anticipated to have a negligible impact on the transportation environment, it was not considered in the subject analysis.

3.3 DEMAND RATIONALIZATION

Demand rationalization is not needed along Carling Avenue as the existing and projected volumes can easily be accommodated on the transportation network, as seen in **Section 4.0** below.



4.0 STRATEGY

4.1 DEVELOPMENT DESIGN

4.1.1 Design for Sustainable Modes

Bicycle Facilities: a total of 194 bicycle parking spaces will be provided for the proposed development.

The westerly building includes a bicycle storage room that contains 54 bicycle parking spaces on the ground floor, in the southeastern corner of the building. To access this room, there is a door on the eastern façade of the building that leads directly to it. There is also a bicycle rack along the southern façade of this building that includes bicycle parking for up to 4 bicycles.

The easterly building includes a bicycle storage room that contains 40 bicycle parking spaces on the ground floor, in the southwestern corner of the building. To access this room, there is a door on the western façade of the building that leads directly to it. There is also a bicycle rack along the southern façade of this building that includes bicycle parking for up to 4 bicycles.

There are also two bicycle storage rooms in the underground parking garage, one per level. On the P1 level, there are 51 proposed bicycle parking spaces and on the P2 level there are 41 proposed bicycle parking spaces.

Pedestrian Facilities: Pedestrian connections will be provided that will connect each proposed building to the existing sidewalk along Carling Avenue.

Transit Facilities: Transit stops for OC Transpo routes 58 and 258 are located along Carling Avenue, approximately 120m from the subject site.

Parking Areas: A total of 284 vehicle parking spaces will be provided for the proposed development. The underground parking garage includes 247 resident vehicle parking spaces and 21 visitor parking spaces. In addition, there will be 16 visitor parking spaces at grade along the southern façade of the buildings. Included in the aforementioned vehicle parking spaces is 4 accessible parking spaces. These will be located both in the underground parking garage (2) as well as on the surface (2) along the south side of the building.

4.1.2 Circulation and Access

One site access (site driveway) is proposed to serve both residential buildings, in the approximate location of the existing easterly site access to the property, along Carling Avenue. This access will be a full movements access with stop control along the minor approach (i.e., the site access approach). This site driveway will lead to the garbage pick up, central to the site, the visitor parking at the south side of the site, as well as the ramp that will lead down to the underground parking garage.

The garbage areas will be located within the two buildings, adjacent to the proposed internal drive aisle. Garbage trucks will enter the site, collect the garbage from the westerly building, proceed south to turn around on site, and then head north on the internal drive aisle to pick up the garbage from the easterly building. The truck will then exit the site to Carling Avenue at the proposed site access.



4.1.3 New Street Networks

Exempt during Screening and Scoping.

4.2 PARKING

4.2.1 Parking Supply

Auto Parking

As per Schedule 1A of the City of Ottawa's Official Plan, the subject site is located within Area C: Suburban Area. Based on this designation, the City of Ottawa's Zoning By-Law 2008-250 (Section 101 and 102) was reviewed to determine the minimum parking space requirement for the proposed development. The minimum resident vehicular parking space rate for mid-high rise apartment buildings is 1.2 per dwelling unit. As such, the 186 residential units require 224 residential vehicular parking spaces. The proposed development includes 247 residential vehicular parking spaces, which meets this By-Law requirement.

As per Section 101 (1) of the By-Law, for buildings within Area C, in addition to the parking required under Section 101, off-street visitor parking must be provided for dwelling units at the rate set out in Table 101 (By-Law 2016-249). As such, 0.2 visitor parking spaces are required per dwelling unit for the subject development. Thus, 37 visitor vehicular parking spaces are required. The proposed development includes 37 visitor vehicular parking spaces, which meets this By-Law.

As per Section 111 of the By-Law, when the capacity of the parking area is between 200-299, the minimum number of spaces that need to be reserved for persons with disabilities is 3. The proposed development includes a total of 4 accessible parking spaces (2 on the surface and 2 underground), thus meeting the by-law requirements.

Section 4.1.1 includes a detailed summary of where these auto vehicle parking spaces are located on site.

Bicycle Parking

As per Table 111A in Section 111 of the By-Law, for an apartment building, a minimum of 0.5 bicycle parking spaces are required for each dwelling unit. The 186 dwelling units require 93 bicycle parking spaces. The proposed development includes 194 bicycle parking spaces, which meets this By-Law requirement.

4.2.2 Spillover Parking

The City of Ottawa's Zoning By-Law requires a total of 261 (224 resident + 37 visitor) parking spaces while the ITE Parking Generation Manual, 5th Edition, suggests a parking supply of 244 spots. The subject development includes 284 parking spaces in total, thus, the parking supply based on both guidelines is not 15% below the demand. As such, this module can be exempt.



4.3 BOUNDARY STREET DESIGN

4.3.1 Design Concept

A multi-modal level of service analysis was performed along the segment of Carling Avenue across the frontage of the subject site. As the subject site is located in the General Urban Area, it is subject to a PLOS target of C, a BLOS target of D, a TLOS target of D, and a TkLOS target of D.

The segment of Carling Avenue across the subject site currently operates with a PLOS of F, which does not meet the desired target of C. This is due to the lack of boulevard between the sidewalk and roadway. To meet the PLOS target of C, the sidewalk would need to be widened to 2.0m and a boulevard would need to be provided with a minimum width of 2.0m.

The segment also does not meet the BLOS target of D across the frontage of the subject site due to lack of cycling facilities. To meet the BLOS target, curbside bike lanes with a width between 1.2m – 1.5m would need to be implemented.

The segment of Carling Avenue across the frontage of the subject site currently meets the TLOS and TkLOS targets.

Table 14 below outlines the existing segment MMLOS results.

Appendix C contains the detailed MMLOS analysis.

TABLE 14 2022 EXISTING SEGMENT MULTI-MODAL LEVEL OF SERVICE

	Carling Avenue (across site frontage)	
	Target	Existing
PLOS	C	F
BLOS	D	F
TLOS	D	D
TkLOS	D	D

4.4 ACCESS INTERSECTIONS DESIGN

4.4.1 Location and Design of Access

The subject development is planned to feature one access will be located in the approximate same location as the existing easterly access to the subject site. This access will be roughly 290m west of the Carling Avenue at Crystal Beach Drive intersection. This access will be a 6.7m wide full movements access and will be stop-controlled along the minor approach (i.e., the site access approach). It will lead to the surface visitor parking lot along the south façade of the building as well as the underground parking garage.



4.4.2 Intersection Control

The site access will be a low-volume driveway, and thus, will operate as a full movements minor stop-controlled intersection along the site access approach.

4.4.3 Intersection Design

Section 4.9.2 contains the detailed intersection and MMLOS analyses under all horizons.

4.5 TRANSPORTATION DEMAND MANAGEMENT

4.5.1 Context for TDM

The subject site is not located within a Design Priority Area nor a Transit-Oriented Development zone, as prescribed by the City of Ottawa's Official Plan. As such, modal shares were taken from the City of Ottawa's *TRANS Trip Generation Manual* (October 2020). The mode shares for the Bayshore / Cedarview District are outlined in **Table 15** below.

TABLE 15 MODAL SHARE BREAK DOWN

Travel Mode	AM Peak Period	PM Peak Period
	Mode Share	Mode Share
Auto Drive	40%	40%
Auto Passenger	12%	15%
Transit	38%	33%
Cycling	2%	1%
Walking	8%	11%

As outlined in **Section 4.2.1**, the development will be providing sufficient resident and visitor vehicle parking spaces to meet the applicable Zoning By-Laws.

4.5.2 Need and Opportunity

Although the proposed development will meet the Zoning By-Law requirements in terms of vehicle parking spaces, the modal share targets set forth by the City suggest that some Transportation Demand Management (TDM) measures need to be considered. By incorporating some TDM measures, the subject site will help to contribute to the City's overall goal of reducing the reliance on the automobile as the primary source of transportation.



4.5.3 TDM Program

The City of Ottawa's TDM checklists were used in the development of design supportive and additional TDM measures.

As part of the TDM Supportive Development Design and Infrastructure Checklist, the following features have been considered:

- Locate building close to the street and do not locate parking areas between the street and the building entrances.
- Locate building entrances in order to minimize walking distances to sidewalks and transit stops / stations.
- Locate building doors and windows to ensure visibility from public sidewalks and building entrances.
- Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances.
- Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments differentiate pedestrian areas from vehicle areas.
- Make sidewalks and open space easily accessible through features such as gradual grade transitions, depressed curbs at street corners.
- Provide links to the existing or planned network of public sidewalks.
- Provide safe, direct and attractive walking routes from building entrances to nearby transit stops.
- Provide bicycle parking in highly visible and lighted areas and sheltered from the weather wherever possible.
- Provide the number of bicycle parking spaces identified for various land uses in different parts of Ottawa.
- Ensure that bicycle parking spaces and access aisles meet minimum dimensions.
- Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building / structure, a secure area, or bicycle lockers.
- Provide a permanent bike repair station adjacent to the main bicycle parking area. There are two proposed bicycle repair stations located with each of the two bicycle parking areas (one per building).
- Provide a designated area for carpool drivers to drop off or pick up passengers without using fire lanes or other no-stopping zones. [the proposed site will have surface visitor parking areas that can be used for pick-up and drop-off.]
- Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for.

As part of the TDM Measures Checklist, the development is also proposing to unbundle the parking cost from purchase price.

Appendix D contains the TDM Checklists.

4.6 NEIGHBOURHOOD TRAFFIC MANAGEMENT

Exempted during Screening and Scoping.



4.7 TRANSIT

4.7.1 Route Capacity

There are two transit routes along Carling Avenue, both with transit stops within 150m of the subject development. Based on the OC Transpo schedule, at these transit stops, there are approximately 15 buses during the AM peak period (6:00 – 9:00) and 17 buses during the PM peak period (15:00 – 18:00). Standard buses in OC Transpo’s vehicle fleet have seated capacities of 36 to 55 seats depending on the transit bus manufacturer, which is equivalent to a capacity of 540 - 825 passengers during the AM peak period and 612 - 935 passengers during the PM peak hour.

Based on information provided by OC Transpo, the transit ridership on these two bus routes in the vicinity of the subject site amount to 10 transit users during each peak period. This accounts for 1% - 2% of the transit capacity during each of the peak periods. Thus, there is a plethora of residual capacity on these two bus routes at the location of the subject site.

The forecasted transit trips for the proposed development are 60 AM peak period trips and 58 PM peak period trips. As such, the forecasted transit trips for the proposed development accounts for roughly 7% - 11% and 6% - 9% of transit capacity during the AM and PM peak periods, respectively. Based on the residual capacity of the existing transit routes in the vicinity of the subject site, the projected transit trips can be accommodated on the existing OC Transpo bus routes.

4.8 REVIEW OF NETWORK CONCEPT

Exempted during Screening and Scoping.

4.9 INTERSECTION DESIGN

4.9.1 Intersection Control

The existing intersection control will be maintained as the default control for all study area intersections under all horizons. The existing signal timing plans for the Carling Avenue at Moodie Drive and Carling Avenue at Bedale Drive intersections were obtained from the City of Ottawa and were used in the analysis.

4.9.2 Intersection Design

4.9.2.1 2022 Existing Conditions

Figure 5 illustrates 2022 Existing AM and PM peak hour volumes at the study area intersections.

Intersection Capacity Analysis

Table 16 summarizes the results of the Synchro analysis under 2022 existing conditions. Both existing signalized intersections currently operate within the acceptable thresholds with residual capacity remaining. As such, no intersection modifications are required.

Appendix E contains details intersection performance worksheets.



TABLE 16 2022 EXISTING INTERSECTION OPERATIONS

Intersection		Intersection Control	LOS	v/c	Delay	Queue 95 th (m)
Carling Avenue at Moodie Drive (Signalized)	EB	Left / Through	A (A)	0.24 (0.30)	15.7 (14.4)	50 (51)
		Right	A (A)	0.10 (0.22)	14.4 (14.1)	13 (17)
	WB	Left	A (A)	0.30 (0.41)	8.3 (6.8)	34 (34)
		Through / Right	A (A)	0.19 (0.19)	7.9 (5.9)	34 (27)
	NB	Left / Through	C (B)	0.76 (0.69)	54.3 (41.6)	77 (55)
		Right	A (A)	0.07 (0.11)	36.2 (30.0)	12 (14)
	SB	Left / Through / Right	A (A)	0.04 (0.03)	35.9 (29.3)	8 (6)
	Overall			A (A)	0.44 (0.50)	20.0 (15.9)
Carling Avenue at Bedale Drive (Signalized)	EB	Left	A (A)	0.02 (0.02)	3.0 (2.4)	3 (3)
		Through	A (A)	0.22 (0.24)	3.6 (3.0)	28 (32)
		Right	A (A)	0.01 (0.01)	2.9 (2.4)	1 (1)
	WB	Left	A (A)	0.03 (0.05)	3.0 (2.6)	4 (5)
		Through / Right	A (A)	0.25 (0.25)	3.7 (3.1)	31 (34)
	NB	Left / Through / Right	A (A)	0.12 (0.02)	26.6 (27.7)	10 (5)
	SB	Left / Through / Right	A (A)	0.06 (0.02)	26.3 (27.7)	5 (5)
	Overall			A (A)	0.22 (0.22)	5.2 (4.2)

Multi-Modal Level of Service Analysis – Intersections

A multi-modal level of service assessment was performed on the two signalized intersections under 2022 existing conditions. The same targets were used as previously outlined in **Section 4.3.1. Table 17** below includes the results from the assessment.

Carling Avenue at Moodie Drive

The Carling Avenue at Moodie Drive intersection currently does not meet the PLOS target due to the number of lanes pedestrians have to cross on the west and east legs of the intersection. To meet the PLOS target of C, the number of lanes would need to be reduced in the east and west directions to four lanes total and the northbound and southbound left turns would need to be protected. Making these modifications to the intersections would have a negative impact on the vehicular level of service. The PM peak experiences the majority of the pedestrian activity at this intersection, and it was found that there are roughly 14 pedestrians who use this intersection during the PM peak hour. Thus, it is not recommended to make the geometric modifications to this intersection to meet the PLOS target of C.



The Carling Avenue at Moodie Drive intersection also does not currently meet the BLOS target of D due to the lack of cycling facilities. The majority of the intersection approaches require cyclists to operate in mixed traffic. This, coupled with the high speeds of the roads leads to the BLOS of F. To meet the BLOS target, cycling facilities would need to be implemented in the form of either separated facilities or curbside bicycle lanes with appropriate cross-rides at the intersection.

The Carling Avenue at Moodie Drive intersection also does not currently meet the TLOS target of D due to the delays experienced on the south leg of the intersection. This leg of the intersection would need to see the delays reduced to under 30 seconds to meet the TLOS target of D. To reduce the delay to this leg of the intersection, the total cycle length of the intersection could be reduced, however, it is noted that as this intersection is coordinated, changing the cycle length may have an impact on the surrounding signalized intersections.

The Carling Avenue at Moodie Drive intersection currently meets both the TkLOS and VLOS targets.

Carling Avenue at Bedale Drive

The Carling Avenue at Bedale Drive intersection currently does not meet the PLOS target due to the number of lanes pedestrians have to cross on the west and east legs of the intersection. To meet the PLOS target of C, the number of lanes would need to be reduced in the east and west directions to four lanes total and the northbound and southbound left turns would need to be protected. Making these modifications to the intersections would have a negative impact on the vehicular level of service. The PM peak experiences the majority of the pedestrian activity at this intersection, and it was found that there are roughly 38 pedestrians who use this intersection during the PM peak hour. This is likely due to the Nepean Sailing Club / Andrew Hayden Park, which are two significant destinations within the community. As this is an existing condition, the City may wish to monitor this intersection and make the appropriate adjustments to improve the PLOS at this location.

The Carling Avenue at Bedale intersection also does not currently meet the BLOS target of D due to the lack of cycling facilities. The majority of the intersection approaches require cyclists to operate in mixed traffic. This, coupled with the high speeds of the roads leads to the BLOS of F. To meet the BLOS target, cycling facilities would need to be implemented in the form of either separated facilities or curbside bicycle lanes with appropriate cross-rides at the intersection.

The Carling Avenue at Bedale Drive intersection currently meets both the TLOS and VLOS under existing conditions.

As trucks are not permitted on the north or south legs of this intersection, there is no need for them to make turning movements at this intersection, and thus, the TkLOS is not applicable.

Appendix C contains the detailed MMLOS analysis.



TABLE 17 2022 EXISTING INTERSECTION MMLOS

Intersection		PLOS	BLOS	TLOS	TkLOS	VLOS
Carling Avenue & Moodie Drive	Existing	F	F	F	A	A
	Target	C	D	D	D	D
Carling Avenue & Bedale Drive	Existing	F	F	B	N/A	A
	Target	C	D	D		D

4.9.2.2 2024 Future Background Conditions

Figure 7 illustrates 2024 Future Background AM and PM peak hour volumes at the study area intersections. It should be noted that the traffic volumes were rounded up to the nearest five vehicles.

Intersection Capacity Analysis

Table 18 summarizes the results of the Synchro analysis under 2024 future background conditions. Both intersections are projected to continue to operate within the acceptable thresholds with residual capacity remaining. Due to the negligible background growth rate that was applied, and the lack of background developments occurring in the vicinity of the subject site, the results of the 2024 future background analysis are similar to those of the 2022 existing conditions analysis.

Appendix E contains details intersection performance worksheets.



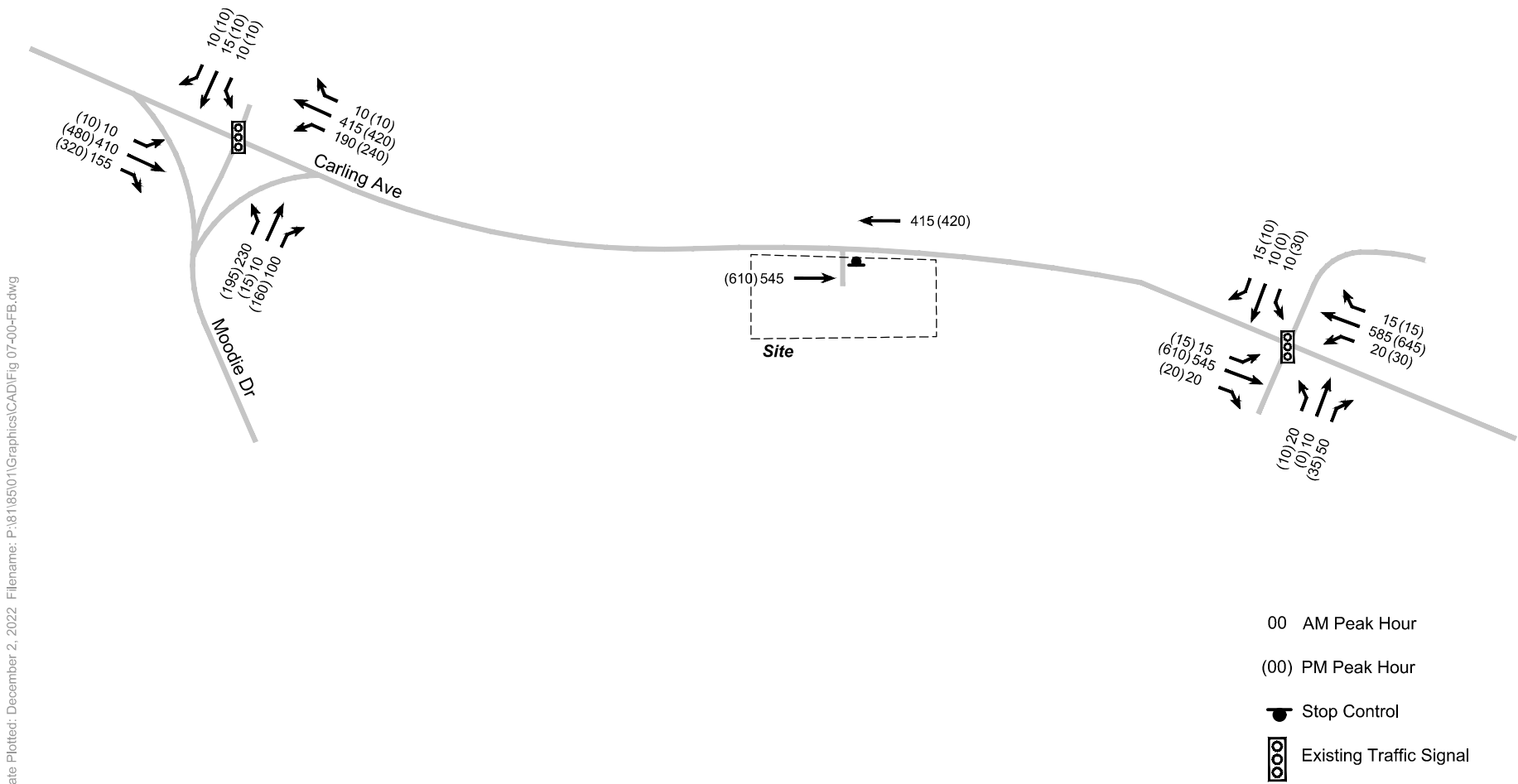
TABLE 18 2024 FUTURE BACKGROUND INTERSECTION OPERATIONS

Intersection	Intersection Control		LOS	v/c	Delay	Queue 95 th (m)
Carling Avenue at Moodie Drive <i>(Signalized)</i>	EB	Left	A (A)	0.25 (0.30)	16.8 (15.5)	51 (52)
		Right	A (A)	0.10 (0.22)	15.3 (15.0)	13 (17)
	WB	Left	A (A)	0.31 (0.41)	9.0 (7.5)	35 (34)
		Through/Right	A (A)	0.19 (0.19)	8.7 (6.6)	35 (27)
	NB	Through	C (C)	0.81 (0.76)	60.7 (47.9)	79 (57)
		Right	A (A)	0.07 (0.11)	37.4 (31.5)	12 (14)
	SB	Left/Through/Right	A (A)	0.08 (0.07)	37.6 (31.1)	12 (9)
	Overall			A (A)	0.46 (0.52)	22.0 (17.6)
Carling Avenue at Bedale Drive <i>(Signalized)</i>	EB	Left	A (A)	0.03 (0.03)	3.5 (2.9)	4 (4)
		Through	A (A)	0.23 (0.24)	4.2 (3.6)	30 (33)
		Right	A (A)	0.01 (0.01)	3.4 (2.8)	1 (1)
	WB	Left	A (A)	0.04 (0.05)	3.5 (3.0)	4 (6)
		Right	A (A)	0.25 (0.26)	4.3 (3.7)	32 (36)
	NB	Left/Through/Right	A (A)	0.19 (0.04)	28.9 (29.7)	12 (7)
	SB	Left/Through/Right	A (A)	0.14 (0.03)	28.6 (29.6)	8 (6)
	Overall			A (A)	0.24 (0.23)	6.3 (5.0)

Multi-Modal Level of Service Analysis – Intersections

No changes to the multi-modal level of service analysis as compared to the 2022 existing conditions.





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FIGURE 7 2024 FUTURE BACKGROUND TRAFFIC VOLUMES

4.9.2.3 2024 Total Future Conditions

Figure 8 illustrates 2024 Total Future AM and PM peak hour volumes at the study area intersections. It should be noted that the traffic volumes were rounded up to the nearest five vehicles.

Intersection Capacity Analysis

Table 19 summarizes the results of the Synchro analysis under 2024 total future conditions. All study area intersections are projected to operate within the acceptable thresholds with residual capacity remaining. The addition of the proposed development is anticipated to have a negligible impact on the operations of the two existing intersections. The future site access intersection is anticipated to operate with minimal delays under 2024 total future conditions.

Appendix E contains details intersection performance worksheets.

TABLE 19 2024 TOTAL FUTURE INTERSECTION OPERATIONS

Intersection	Intersection Control		LOS	v/c	Delay	Queue 95 th (m)
Carling Avenue at Moodie Drive (Signalized)	EB	Left	A (A)	0.25 (0.30)	16.9 (15.7)	52 (52)
		Right	A (A)	0.10 (0.22)	15.4 (15.2)	13 (17)
	WB	Left	A (A)	0.32 (0.43)	9.0 (7.6)	37 (37)
		Through/Right	A (A)	0.19 (0.19)	8.6 (6.6)	37 (27)
	NB	Through	C (C)	0.81 (0.76)	61.4 (47.9)	79 (57)
		Right	A (A)	0.08 (0.12)	37.6 (31.6)	13 (15)
	SB	Left/Through/Right	A (A)	0.08 (0.07)	37.6 (31.1)	12 (9)
Overall			A (A)	0.47 (0.53)	22.1 (17.8)	-- (--)
Carling Avenue at Bedale Drive (Signalized)	EB	Left	A (A)	0.03 (0.03)	3.5 (2.9)	4 (4)
		Through	A (A)	0.23 (0.24)	4.2 (3.6)	30 (34)
		Right	A (A)	0.01 (0.01)	3.4 (2.8)	1 (1)
	WB	Left	A (A)	0.04 (0.05)	3.5 (3.0)	4 (6)
		Right	A (A)	0.25 (0.26)	4.3 (3.7)	33 (37)
	NB	Left/Through/Right	A (A)	0.19 (0.07)	28.9 (29.8)	12 (7)
	SB	Left/Through/Right	A (A)	0.14 (0.04)	28.6 (29.7)	8 (7)
Overall			A (A)	0.24 (0.24)	6.3 (5.1)	-- (--)
	EB	Through	A (A)	0.21 (0.24)	0.0 (0.0)	0 (0)



Carling Avenue at Site Access (Unsignalized)		Right	A (A)	0.11 (0.13)	0.0 (0.0)	0 (0)
	WB	Through/Left	A (A)	0.00 (0.01)	0.0 (0.4)	0 (0)
		Through	A (A)	0.16 (0.16)	0.0 (0.0)	0 (0)
	NB	Left /Right	A (A)	0.05 (0.04)	14.5 (15.0)	1 (1)
	Overall		A (A)	-- (--)	0.4 (0.4)	-- (--)

Multi-Modal Level of Service Analysis – Intersections

No changes to the multi-modal level of service analysis as compared to the 2022 existing conditions.



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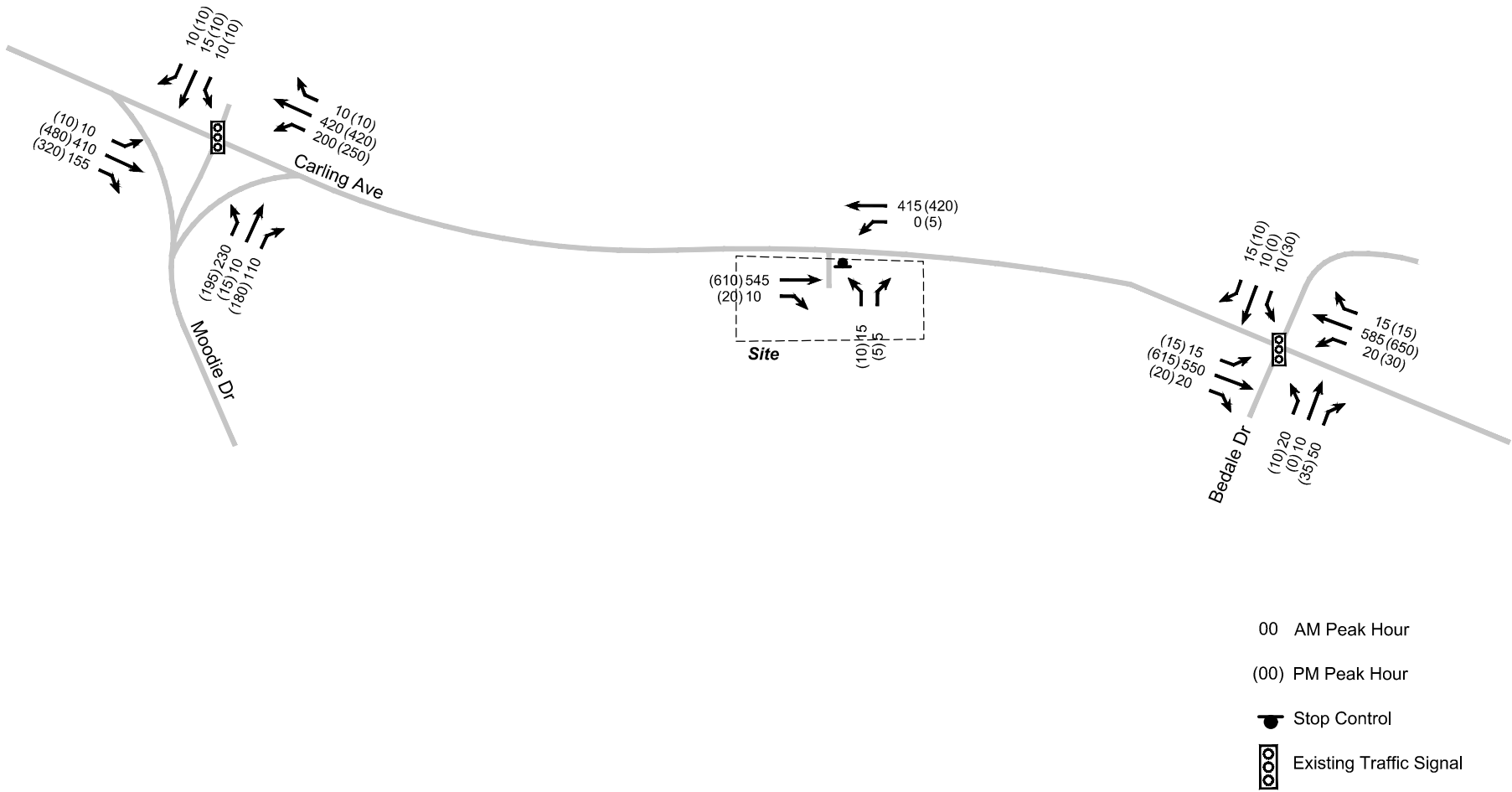


FIGURE 8 2024 TOTAL FUTURE TRAFFIC VOLUMES

4.9.2.4 2029 Ultimate Conditions

Figure 9 illustrates 2029 Ultimate AM and PM peak hour volumes at the study area intersections. It should be noted that the traffic volumes were rounded up to the nearest five vehicles.

Intersection Capacity Analysis

Table 20 summarizes the results of the Synchro analysis under 2024 ultimate conditions. All study area intersections are projected to operate within the acceptable thresholds with residual capacity remaining.

Appendix E contains details intersection performance worksheets.

TABLE 20 2029 ULTIMATE INTERSECTION OPERATIONS

Intersection	Intersection Control		LOS	v/c	Delay	Queue 95 th (m)
Carling Avenue at Moodie Drive	EB	Left	A (A)	0.27 (0.33)	18.4 (16.7)	57 (57)
		Right	A (A)	0.11 (0.23)	16.7 (16.0)	14 (18)
	WB	Left	A (A)	0.35 (0.47)	9.9 (8.1)	40 (39)
		Through/Right	A (A)	0.20 (0.20)	9.4 (6.9)	39 (29)
	NB	Through	C (C)	0.82 (0.77)	60.2 (48.5)	83 (58)
		Right	A (A)	0.08 (0.13)	36.3 (31.1)	13 (15)
	SB	Left/Through/Right	A (A)	0.08 (0.06)	36.3 (30.6)	12 (9)
	Overall			A (A)	0.50 (0.57)	22.7 (18.3)
Carling Avenue at Bedale Drive	EB	Left	A (A)	0.03 (0.03)	3.5 (2.9)	4 (4)
		Through	A (A)	0.24 (0.26)	4.2 (3.6)	31 (35)
		Right	A (A)	0.01 (0.01)	3.4 (2.8)	1 (1)
	WB	Left	A (A)	0.04 (0.06)	3.5 (3.1)	4 (6)
		Right	A (A)	0.26 (0.28)	4.3 (3.7)	35 (39)
	NB	Left/Through/Right	A (A)	0.18 (0.07)	28.8 (29.8)	12 (7)
	SB	Left/Through/Right	A (A)	0.10 (0.04)	28.3 (29.7)	8 (7)
	Overall			A (A)	0.25 (0.25)	6.3 (5.1)
Carling Avenue at Site Access	EB	Through	A (A)	0.22 (0.25)	0.0 (0.0)	0 (0)
		Right	A (A)	0.12 (0.14)	0.0 (0.0)	0 (0)
	WB	Through/Left	A (A)	0.01 (0.01)	0.3 (0.7)	0 (0)



		Through	A (A)	0.17 (0.17)	0.0 (0.0)	0 (0)
	NB	Left /Right	A (A)	0.07 (0.06)	15.0 (15.5)	1 (1)
	Overall		A (A)	-- (--)	0.4 (0.4)	-- (--)

Multi-Modal Level of Service Analysis – Intersections

No changes to the multi-modal level of service analysis as compared to the 2022 existing conditions.





Date Plotted: December 13, 2022. Filename: P:\81185\01\Graphics\CAD\Fig 09-00-UT.dwg

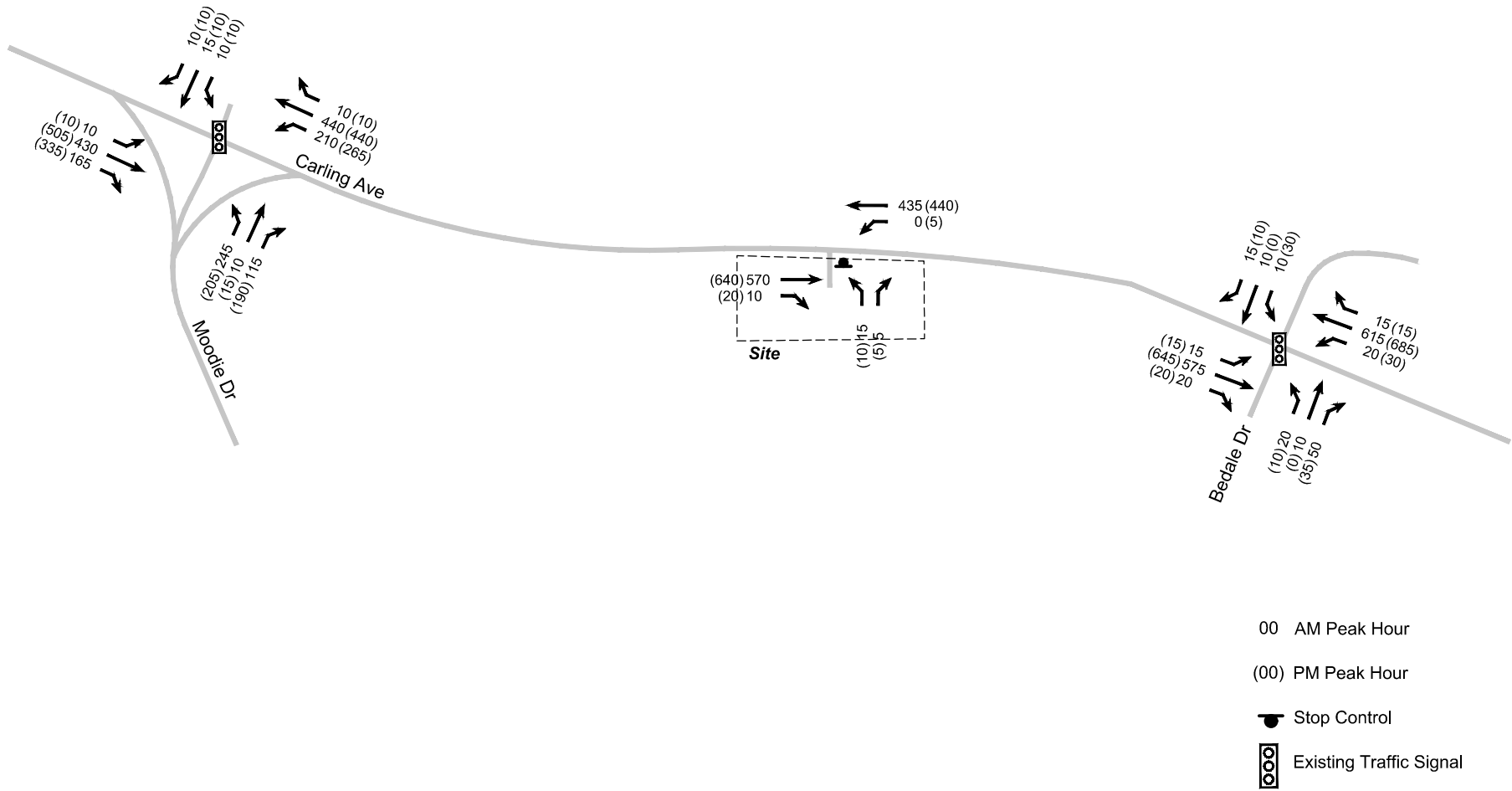


FIGURE 9 2029 ULTIMATE TRAFFIC VOLUMES

5.0 SUMMARY AND CONCLUSION

The proposed development is located at 3430 Carling Avenue in the City of Ottawa's west end. The development consists of two six-storey residential towers, with a combined total of 186 units. The two buildings will share one access off Carling Avenue, which will lead to an internal driveway located between the two buildings. This driveway will access the underground parking garage, which will be shared between the two buildings.

The development includes 247 residential vehicle parking spaces which will all be located within the parking garage. The development will also include 21 visitor parking spaces within the garage and 16 visitor parking spaces at grade. In total, the development will include 4 accessible parking spaces, two in the underground garage for residents and 2 in the surface parking lot for visitors. It is noted that the development is anticipated to meet the Zoning By-Law requirements for both resident and visitor vehicle parking.

The development includes 194 bicycle parking spaces spread out across the site. There are two bicycle storage rooms located on the ground floor of each building. There are also two bicycle storage rooms in the underground parking garage, one on P1 and one on P2. In addition, there are 8 outdoor bicycle racks located on the southern facades of the buildings, next to the visitor parking spaces. It is noted that the development is anticipated to meet the Zoning By-Law requirements for bicycle parking.

The MMLOS analysis found that the segment of Carling Avenue across the frontage of the subject site does not currently meet the Pedestrian nor Bicycle level of service targets due to the existing cross-section of the road. To meet the Pedestrian level of service target, there would need to be a 2.0m boulevard constructed and the sidewalk would need to be widened to 2.0m. To meet the Bicycle level of service target, curbside bike lanes with a width between 1.2m – 1.5m would need to be implemented. Note that the segment MMLOS is not anticipated to change in the future with the addition of the subject development.

Currently, the study area intersections operate within acceptable thresholds and no improvements are recommended to supplement the existing conditions.

The Carling Avenue at Moodie Drive intersection currently does not meet the Pedestrian, Bicycle, nor Transit level of service targets due to size of the intersection, the lack of bicycle facilities, and the delays experienced at this location. The improvements required to meet the MMLOS targets include reducing the number of lanes along Moodie, protecting the left turns, adding bicycle facilities in the form of separated cycle tracks or curbside bike lanes with cross-rides, and reducing the cycle length to reduce the delays. However, it is recognized that implementing these measures may be detrimental to the vehicular level of service at this location.

The Carling Avenue at Bedale Drive intersection currently does not meet the Pedestrian nor Bicycle level of service targets due to the number of lanes along Carling Avenue as well as the lack of cycling facilities. To meet the targets, the number of lanes on Carling Avenue would need to be reduced, the northbound and southbound left turn phases would need to be protected, and cycling facilities would need to be implemented. However, it is recognized that implementing these measures may result in a detriment to the vehicular level of service at this location.

The subject development is anticipated to generate 27 and 35 two-way auto trips during the AM and PM peak hours, respectively. The impact of the proposed subject development on the surrounding transportation



environment is anticipated to be negligible. The study area intersections are projected to continue to operate within acceptable thresholds under all study horizons.

The development is also anticipated to generate 60 and 58 two-way peak period transit trips. As the current transit ridership on the surrounding transit routes is very low (i.e., 1-2% of available capacity), the transit trips that the subject development is projected to generate will be able to be accommodated on the existing transit network.

Overall, the subject development will have a negligible impact on the surrounding transportation environment, and thus, the development is recommended to proceed from a transportation perspective.



APPENDIX A: TRAFFIC DATA



Turning Movement Count - Study Results

CARLING AVE @ MOODIE DR/JAMES CUMMINGS AVE W

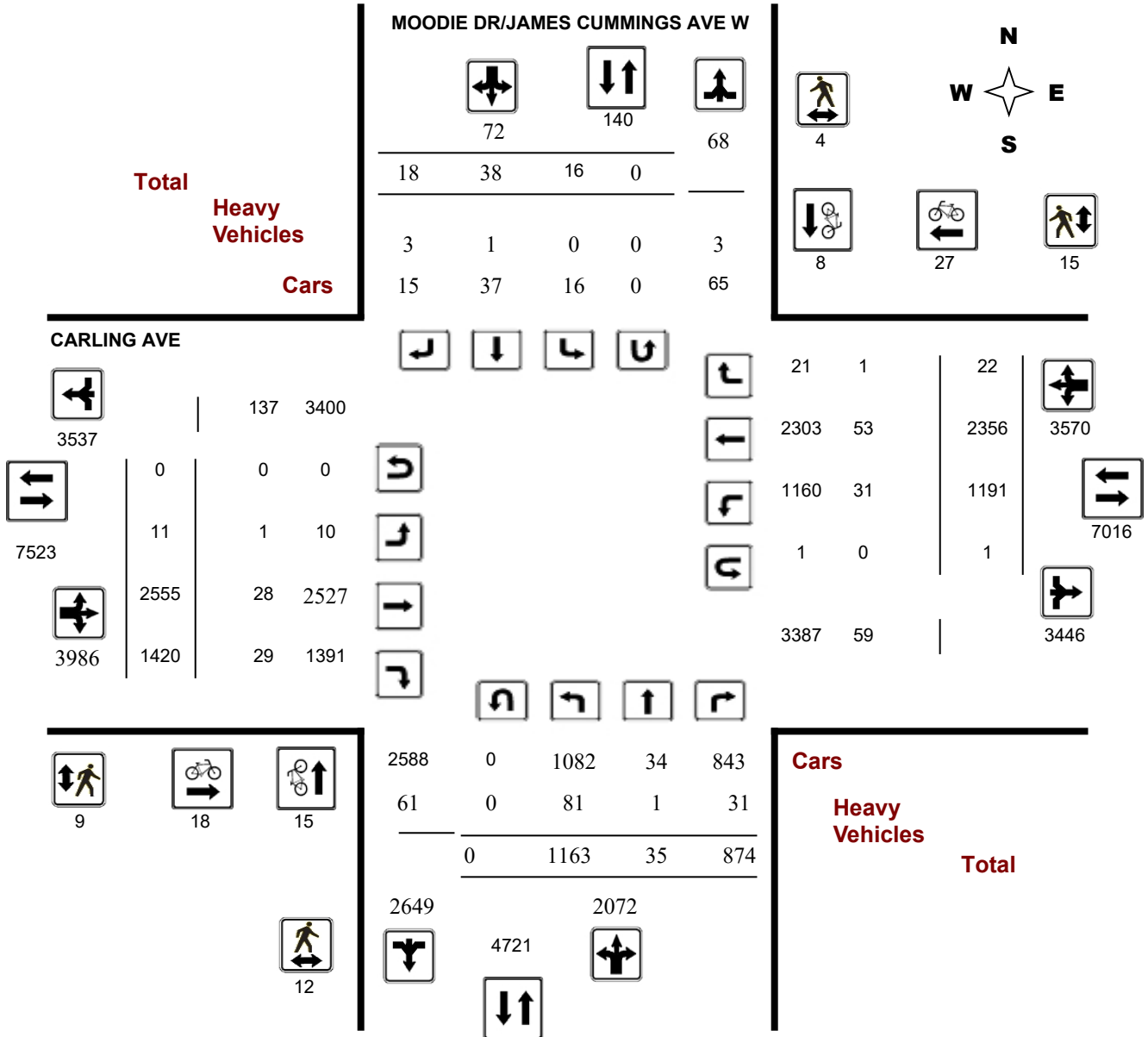
Survey Date: Wednesday, November 09, 2022

WO No: 40684

Start Time: 07:00

Device: Miovision

Full Study Diagram



Turning Movement Count - Study Results

CARLING AVE @ MOODIE DR/JAMES CUMMINGS AVE W

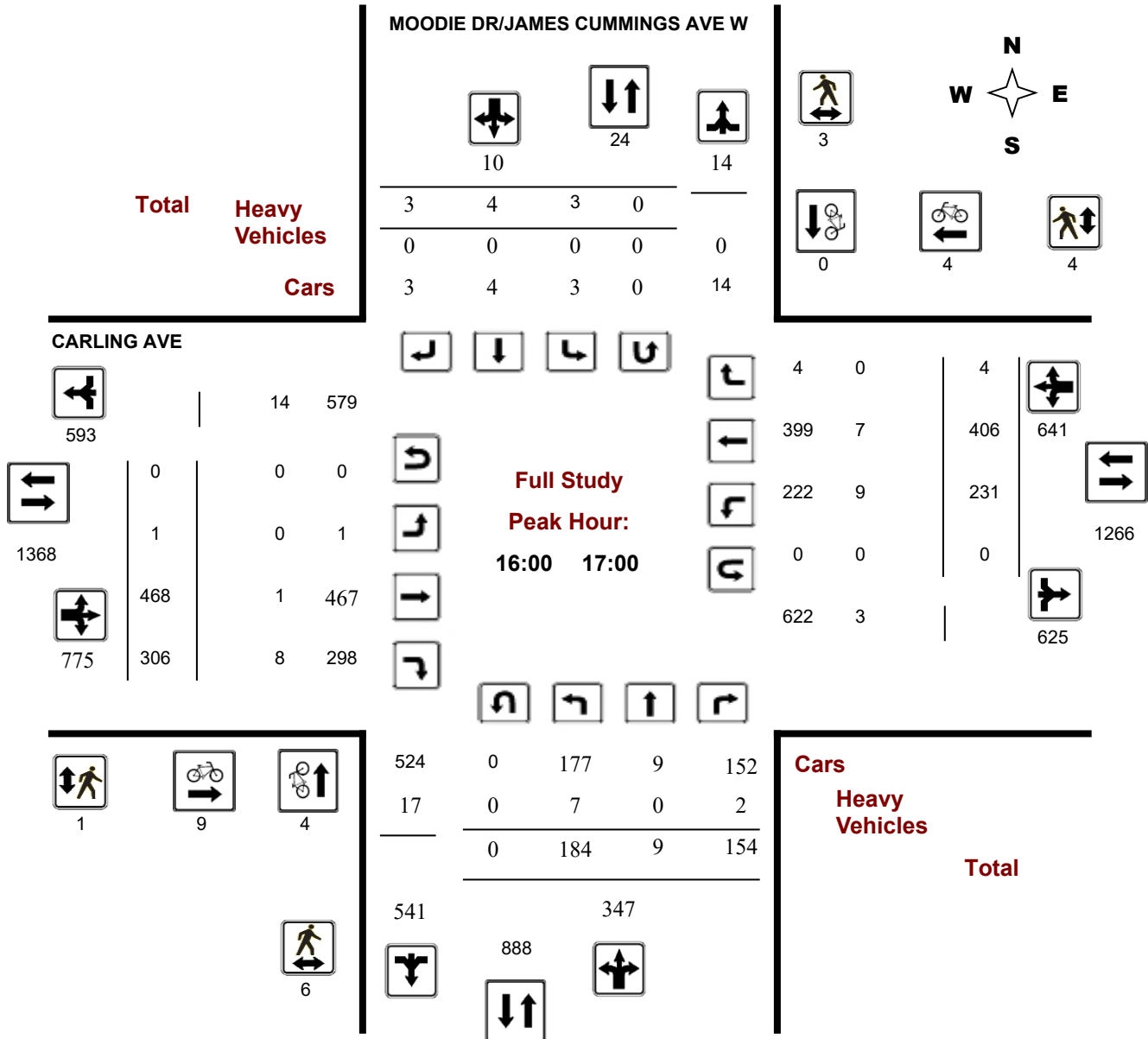
Survey Date: Wednesday, November 09, 2022

WO No: 40684

Start Time: 07:00

Device: Miovision

Full Study Peak Hour Diagram



Turning Movement Count - Peak Hour Diagram

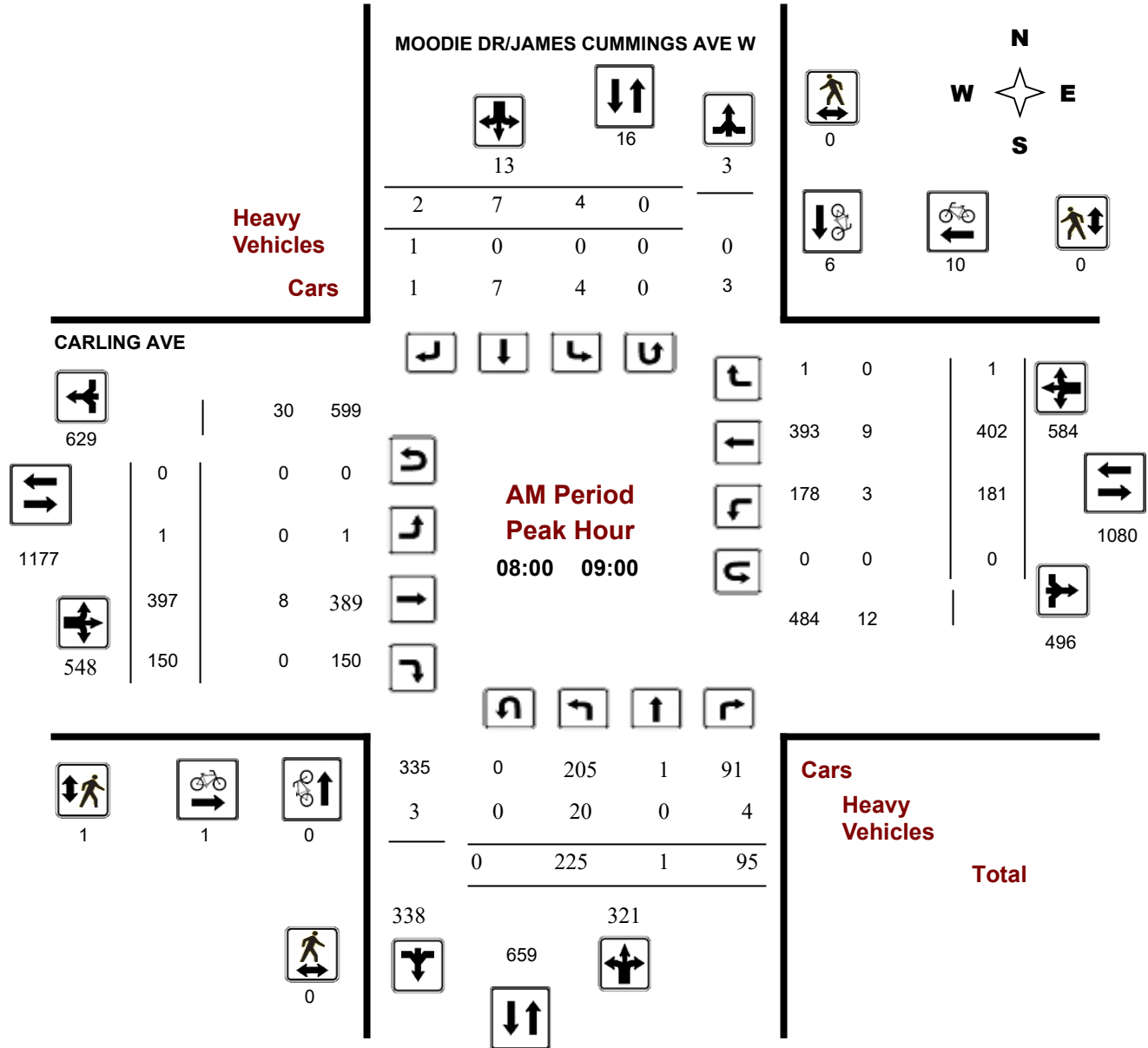
CARLING AVE @ MOODIE DR/JAMES CUMMINGS AVE W

Survey Date: Wednesday, November 09, 2022

WO No: 40684

Start Time: 07:00

Device: Miovision



Turning Movement Count - Peak Hour Diagram

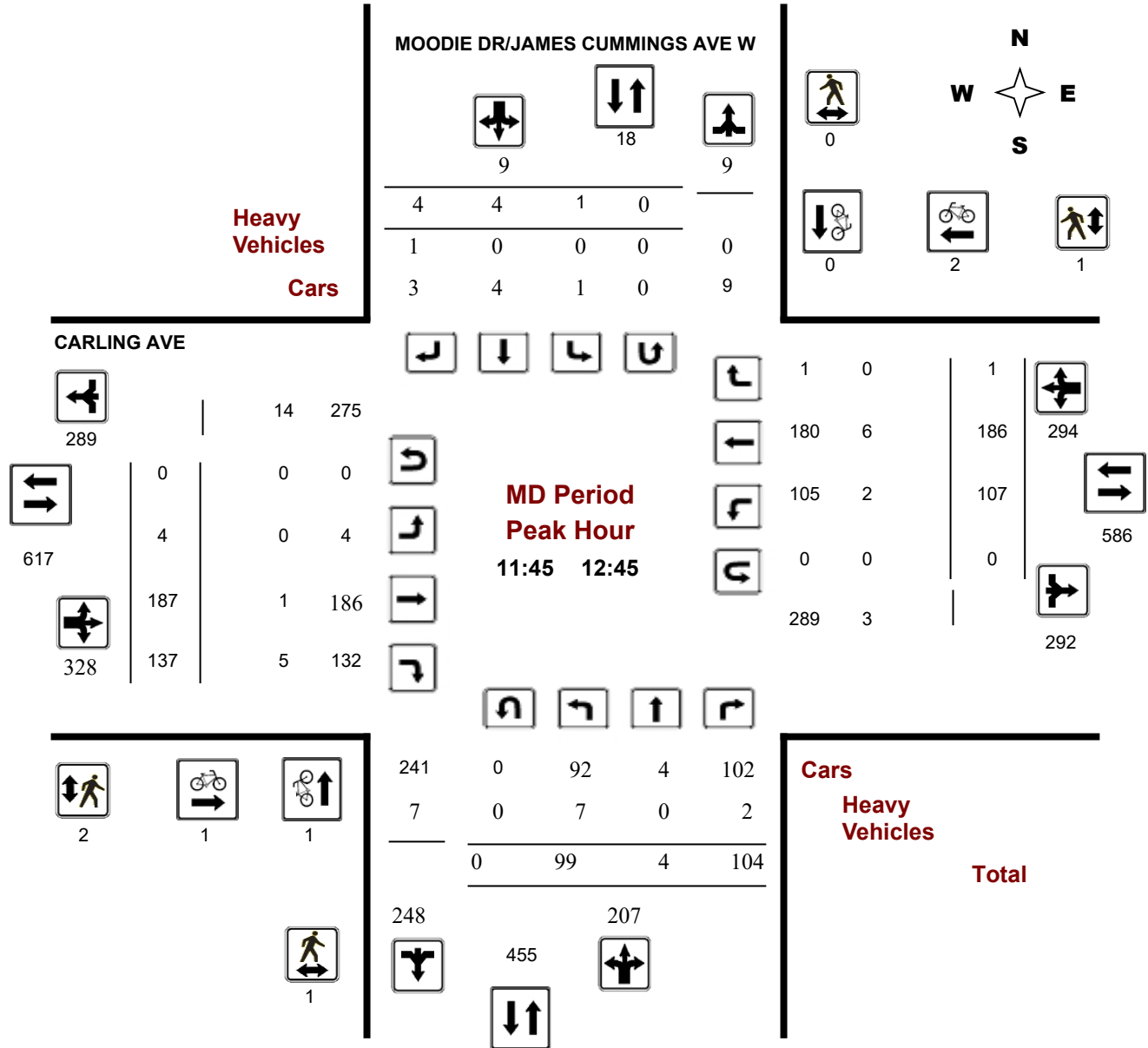
CARLING AVE @ MOODIE DR/JAMES CUMMINGS AVE W

Survey Date: Wednesday, November 09, 2022

Start Time: 07:00

WO No: 40684

Device: Miovision



Turning Movement Count - Peak Hour Diagram

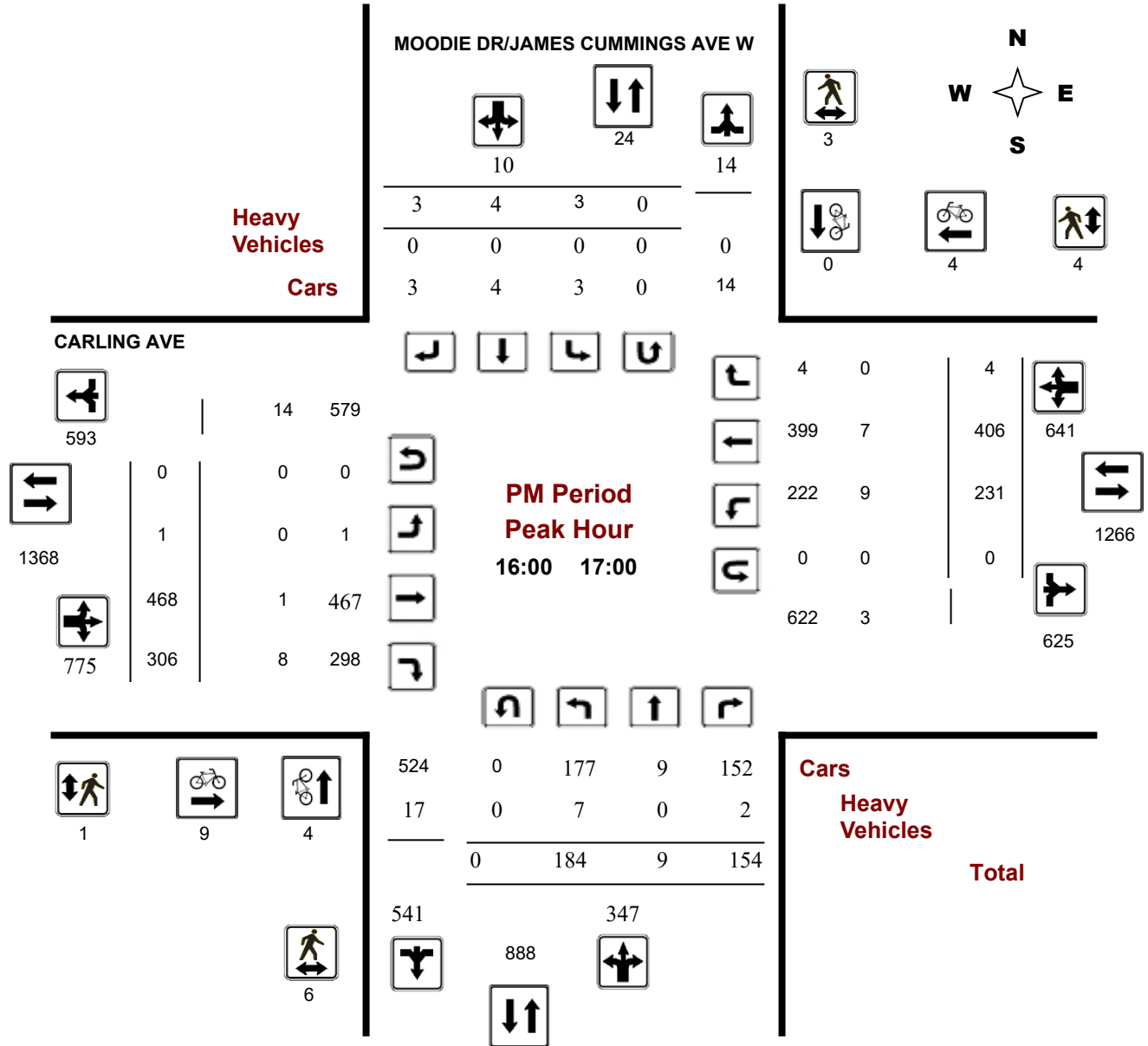
CARLING AVE @ MOODIE DR/JAMES CUMMINGS AVE W

Survey Date: Wednesday, November 09, 2022

Start Time: 07:00

WO No: 40684

Device: Miovision





Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARLING AVE @ MOODIE DR/JAMES CUMMINGS AVE W

Survey Date: Wednesday, November 09, 2022

WO No: 40684

Start Time: 07:00

Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, November 09, 2022

Total Observed U-Turns
 Northbound: 0 Southbound: 0
 Eastbound: 0 Westbound: 1

AADT Factor

.90

MOODIE DR/JAMES CUMMINGS AVE W

CARLING AVE

Period	Northbound					Southbound					Eastbound					Westbound					Grand Total
	LT	ST	RT	NB TOT	STR TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	STR TOT	LT	ST	RT	WB TOT	STR TOT	
07:00 08:00	178	2	74	254	259	2	3	0	5	259	2	367	108	477	908	156	274	1	431	908	1167
08:00 09:00	225	1	95	321	334	4	7	2	13	334	1	397	150	548	1132	181	402	1	584	1132	1466
09:00 10:00	170	4	67	241	248	0	7	0	7	248	1	215	108	324	700	114	259	3	376	700	948
11:30 12:30	106	5	105	216	225	1	3	5	9	225	3	188	132	323	590	98	168	1	267	590	815
12:30 13:30	92	6	96	194	201	1	5	1	7	201	1	193	117	311	629	120	195	3	318	629	830
15:00 16:00	120	4	151	275	290	3	6	6	15	290	2	326	242	570	1048	153	319	6	478	1048	1338
16:00 17:00	184	9	154	347	357	3	4	3	10	357	1	468	306	775	1416	231	406	4	641	1416	1773
17:00 18:00	88	4	132	224	230	2	3	1	6	230	0	401	257	658	1132	138	333	3	474	1132	1362
Sub Total	1163	35	874	2072	2144	16	38	18	72	2144	11	2555	1420	3986	7555	1191	2356	22	3569	7555	9699
U Turns				0	0				0	0				0	1				1	1	1
Total	1163	35	874	2072	2144	16	38	18	72	2144	11	2555	1420	3986	7556	1191	2356	22	3570	7556	9700

EQ 12Hr 1617 49 1215 2880 2980 22 53 25 100 2980 15 3551 1974 5541 10503 1655 3275 31 4962 10503 13483

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

AVG 12Hr 1455 44 1094 2592 2682 20 62 29 90 2682 14 3196 1777 4987 12135 1490 2948 28 4466 9453 12135

Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor. **.90**

AVG 24Hr 1906 58 1433 3396 3513 26 81 38 118 3513 18 4187 2328 6533 15897 1952 3862 37 5850 12383 15897

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

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



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARLING AVE @ MOODIE DR/JAMES CUMMINGS AVE W

Survey Date: Wednesday, November 09, 2022

WO No: 40684

Start Time: 07:00

Device: Miovision

Full Study 15 Minute Increments

MOODIE DR/JAMES CUMMINGS AVE W

CARLING AVE

Northbound

Southbound

Eastbound

Westbound

Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00 07:15	37	1	14	52	0	0	0	0	52	1	57	19	77	30	69	0	99	176	228
07:15 07:30	30	1	22	53	1	2	0	3	56	0	70	33	103	40	68	1	109	212	268
07:30 07:45	48	0	25	73	0	1	0	1	74	0	122	20	142	40	68	0	108	250	324
07:45 08:00	63	0	13	76	1	0	0	1	77	1	118	36	155	46	69	0	115	270	347
08:00 08:15	45	0	32	77	0	3	1	4	81	0	130	36	166	48	86	0	134	300	381
08:15 08:30	54	1	14	69	0	1	0	1	70	0	94	39	133	38	97	0	135	268	338
08:30 08:45	61	0	25	86	2	0	0	2	88	0	108	32	140	47	100	1	148	288	376
08:45 09:00	65	0	24	89	2	3	1	6	95	1	65	43	109	48	119	0	167	276	371
09:00 09:15	61	0	15	76	0	2	0	2	78	0	71	28	99	30	68	1	100	199	277
09:15 09:30	48	1	20	69	0	2	0	2	71	1	57	36	94	43	90	2	135	229	300
09:30 09:45	27	1	13	41	0	2	0	2	43	0	44	21	65	15	61	0	76	141	184
09:45 10:00	34	2	19	55	0	1	0	1	56	0	43	23	66	26	40	0	66	132	188
11:30 11:45	26	1	26	53	0	0	1	1	54	0	46	35	81	21	38	0	59	140	194
11:45 12:00	27	0	29	56	1	1	3	5	61	1	47	31	79	24	49	0	73	152	213
12:00 12:15	29	2	21	52	0	1	0	1	53	1	58	35	94	23	34	1	58	152	205
12:15 12:30	24	2	29	55	0	1	1	2	57	1	37	31	69	30	47	0	77	146	203
12:30 12:45	19	0	25	44	0	1	0	1	45	1	45	40	86	30	56	0	86	172	217
12:45 13:00	26	2	24	52	0	1	0	1	53	0	50	23	73	25	48	0	73	146	199
13:00 13:15	17	2	21	40	0	2	0	2	42	0	52	34	86	35	47	1	83	169	211
13:15 13:30	30	2	26	58	1	1	1	3	61	0	46	20	66	30	44	2	76	142	203
15:00 15:15	30	2	38	70	2	2	1	5	75	1	82	82	165	34	50	2	86	251	326
15:15 15:30	30	0	38	68	0	1	0	1	69	1	100	45	146	41	64	0	105	251	320
15:30 15:45	34	0	40	74	1	3	2	6	80	0	76	58	134	46	100	4	150	284	364
15:45 16:00	26	2	35	63	0	0	3	3	66	0	68	57	125	32	105	0	137	262	328
16:00 16:15	28	1	42	71	0	1	1	2	73	0	122	84	206	42	105	0	147	353	426
16:15 16:30	43	3	45	91	1	0	0	1	92	0	108	87	195	69	96	2	167	362	454
16:30 16:45	61	3	34	98	1	1	1	3	101	1	128	64	193	58	116	0	174	367	468
16:45 17:00	52	2	33	87	1	2	1	4	91	0	110	71	181	62	89	2	153	334	425
17:00 17:15	24	1	36	61	0	1	1	2	63	0	124	85	209	48	94	1	143	352	415
17:15 17:30	27	1	32	60	1	0	0	1	61	0	120	77	197	39	78	1	118	315	376
17:30 17:45	19	0	36	55	1	1	0	2	57	0	80	64	144	31	74	1	106	250	307
17:45 18:00	18	2	28	48	0	1	0	1	49	0	77	31	108	20	87	0	107	215	264
Total:	1163	35	874	2072	16	38	18	72	2144	11	2555	1420	3986	1191	2356	22	3570	7556	9,700

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARLING AVE @ MOODIE DR/JAMES CUMMINGS AVE W

Survey Date: Wednesday, November 09, 2022

WO No: 40684

Start Time: 07:00

Device: Miovision

Full Study Cyclist Volume

MOODIE DR/JAMES CUMMINGS AVE W

CARLING AVE

Time Period	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00 07:15	0	0	0	0	1	1	1
07:15 07:30	0	1	1	1	2	3	4
07:30 07:45	0	0	0	0	0	0	0
07:45 08:00	0	0	0	1	1	2	2
08:00 08:15	0	4	4	1	5	6	10
08:15 08:30	0	0	0	0	3	3	3
08:30 08:45	0	0	0	0	0	0	0
08:45 09:00	0	2	2	0	2	2	4
09:00 09:15	0	0	0	0	1	1	1
09:15 09:30	0	0	0	0	0	0	0
09:30 09:45	0	0	0	0	0	0	0
09:45 10:00	0	0	0	0	0	0	0
11:30 11:45	0	0	0	0	0	0	0
11:45 12:00	0	0	0	0	2	2	2
12:00 12:15	0	0	0	0	0	0	0
12:15 12:30	1	0	1	0	0	0	1
12:30 12:45	0	0	0	1	0	1	1
12:45 13:00	2	0	2	1	0	1	3
13:00 13:15	4	0	4	0	1	1	5
13:15 13:30	0	0	0	0	0	0	0
15:00 15:15	4	1	5	0	2	2	7
15:15 15:30	0	0	0	1	0	1	1
15:30 15:45	0	0	0	0	1	1	1
15:45 16:00	0	0	0	1	0	1	1
16:00 16:15	2	0	2	5	0	5	7
16:15 16:30	1	0	1	1	3	4	5
16:30 16:45	0	0	0	0	1	1	1
16:45 17:00	1	0	1	3	0	3	4
17:00 17:15	0	0	0	1	0	1	1
17:15 17:30	0	0	0	1	0	1	1
17:30 17:45	0	0	0	0	0	0	0
17:45 18:00	0	0	0	0	2	2	2
Total	15	8	23	18	27	45	68



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARLING AVE @ MOODIE DR/JAMES CUMMINGS AVE W

Survey Date: Wednesday, November 09, 2022

WO No: 40684

Start Time: 07:00

Device: Miovision

Full Study Pedestrian Volume

MOODIE DR/JAMES CUMMINGS AVE W

CARLING AVE

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	0	0	0	0	0	0	0
07:15 07:30	0	0	0	0	0	0	0
07:30 07:45	0	0	0	0	0	0	0
07:45 08:00	0	0	0	0	1	1	1
08:00 08:15	0	0	0	0	0	0	0
08:15 08:30	0	0	0	1	0	1	1
08:30 08:45	0	0	0	0	0	0	0
08:45 09:00	0	0	0	0	0	0	0
09:00 09:15	0	1	1	1	0	1	2
09:15 09:30	3	0	3	0	3	3	6
09:30 09:45	1	0	1	0	1	1	2
09:45 10:00	0	0	0	0	0	0	0
11:30 11:45	0	0	0	0	0	0	0
11:45 12:00	0	0	0	0	0	0	0
12:00 12:15	1	0	1	2	1	3	4
12:15 12:30	0	0	0	0	0	0	0
12:30 12:45	0	0	0	0	0	0	0
12:45 13:00	0	0	0	2	0	2	2
13:00 13:15	0	0	0	0	0	0	0
13:15 13:30	0	0	0	0	0	0	0
15:00 15:15	0	0	0	0	0	0	0
15:15 15:30	1	0	1	1	1	2	3
15:30 15:45	0	0	0	0	0	0	0
15:45 16:00	0	0	0	0	0	0	0
16:00 16:15	0	2	2	0	0	0	2
16:15 16:30	2	0	2	1	2	3	5
16:30 16:45	0	1	1	0	0	0	1
16:45 17:00	4	0	4	0	2	2	6
17:00 17:15	0	0	0	0	2	2	2
17:15 17:30	0	0	0	0	2	2	2
17:30 17:45	0	0	0	0	0	0	0
17:45 18:00	0	0	0	1	0	1	1
Total	12	4	16	9	15	24	40



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARLING AVE @ MOODIE DR/JAMES CUMMINGS AVE W

Survey Date: Wednesday, November 09, 2022

WO No: 40684

Start Time: 07:00

Device: Miovision

Full Study Heavy Vehicles

MOODIE DR/JAMES CUMMINGS AVE W

CARLING AVE

Northbound

Southbound

Eastbound

Westbound

Time Period	Northbound			N TOT	Southbound			S TOT	STR TOT	Eastbound			E TOT	Westbound			W TOT	STR TOT	Grand Total
	LT	ST	RT		LT	ST	RT			LT	ST	RT		LT	ST	RT			
07:00 07:15	4	0	0	4	0	0	0	1	5	1	1	0	7	0	1	0	2	9	7
07:15 07:30	4	0	1	5	0	0	0	1	6	0	1	0	5	0	0	1	3	8	7
07:30 07:45	4	0	2	7	0	0	0	0	7	0	1	0	6	1	1	0	5	11	9
07:45 08:00	3	0	1	4	0	0	0	0	4	0	1	0	4	0	0	0	2	6	5
08:00 08:15	7	0	2	10	0	0	1	1	11	0	1	0	12	1	3	0	7	19	15
08:15 08:30	4	0	1	5	0	0	0	0	5	0	2	0	7	0	1	0	4	11	8
08:30 08:45	2	0	0	2	0	0	0	0	2	0	3	0	8	0	3	0	6	14	8
08:45 09:00	7	0	1	10	0	0	0	0	10	0	2	0	11	2	2	0	7	18	14
09:00 09:15	4	0	2	9	0	1	0	1	10	0	3	0	9	2	2	0	9	18	14
09:15 09:30	6	0	2	9	0	0	0	0	9	0	0	0	7	1	1	0	4	11	10
09:30 09:45	2	0	1	3	0	0	0	0	3	0	0	0	6	0	4	0	5	11	7
09:45 10:00	5	1	2	11	0	0	0	1	12	0	0	2	7	1	0	0	3	10	11
11:30 11:45	1	0	0	5	0	0	0	0	5	0	3	3	9	1	2	0	6	15	10
11:45 12:00	2	0	1	4	0	0	1	1	5	0	0	1	6	0	2	0	3	9	7
12:00 12:15	3	0	0	6	0	0	0	0	6	0	0	2	7	1	2	0	3	10	8
12:15 12:30	1	0	1	4	0	0	0	0	4	0	0	1	2	1	0	0	2	4	4
12:30 12:45	1	0	0	2	0	0	0	0	2	0	1	1	5	0	2	0	3	8	5
12:45 13:00	2	0	1	3	0	0	0	0	3	0	1	0	3	0	0	0	2	5	4
13:00 13:15	4	0	1	9	0	0	0	0	9	0	0	2	8	2	2	0	5	13	11
13:15 13:30	1	0	2	5	0	0	0	0	5	0	1	0	4	2	2	0	7	11	8
15:00 15:15	0	0	1	3	0	0	1	1	4	0	2	0	4	2	1	0	6	10	7
15:15 15:30	2	0	1	8	0	0	0	0	8	0	2	2	9	3	3	0	9	18	13
15:30 15:45	0	0	2	2	0	0	0	0	2	0	0	0	5	0	5	0	7	12	7
15:45 16:00	1	0	2	6	0	0	0	0	6	0	1	3	7	0	2	0	5	12	9
16:00 16:15	1	0	0	4	0	0	0	0	4	0	0	3	6	0	2	0	2	8	6
16:15 16:30	1	0	1	9	0	0	0	0	9	0	0	3	5	4	1	0	6	11	10
16:30 16:45	4	0	0	7	0	0	0	0	7	0	0	2	9	1	3	0	4	13	10
16:45 17:00	1	0	1	6	0	0	0	0	6	0	1	0	3	4	1	0	7	10	8
17:00 17:15	2	0	1	6	0	0	0	0	6	0	0	1	6	2	3	0	6	12	9
17:15 17:30	1	0	0	3	0	0	0	0	3	0	1	2	4	0	0	0	1	5	4
17:30 17:45	1	0	1	2	0	0	0	0	2	0	0	0	2	0	1	0	2	4	3
17:45 18:00	0	0	0	1	0	0	0	0	1	0	0	1	2	0	1	0	1	3	2
Total: None	81	1	31	174	0	1	3	7	181	1	28	29	195	31	53	1	144	339	260



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARLING AVE @ MOODIE DR/JAMES CUMMINGS AVE W

Survey Date: Wednesday, November 09, 2022

WO No: 40684

Start Time: 07:00

Device: Miovision

Full Study 15 Minute U-Turn Total

Time Period		MOODIE DR/JAMES CUMMINGS AVE W		CARLING AVE		Total
		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	1	1
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	0	0	1	1

Turning Movement Count - Study Results

CARLING AVE @ BEDALE DR

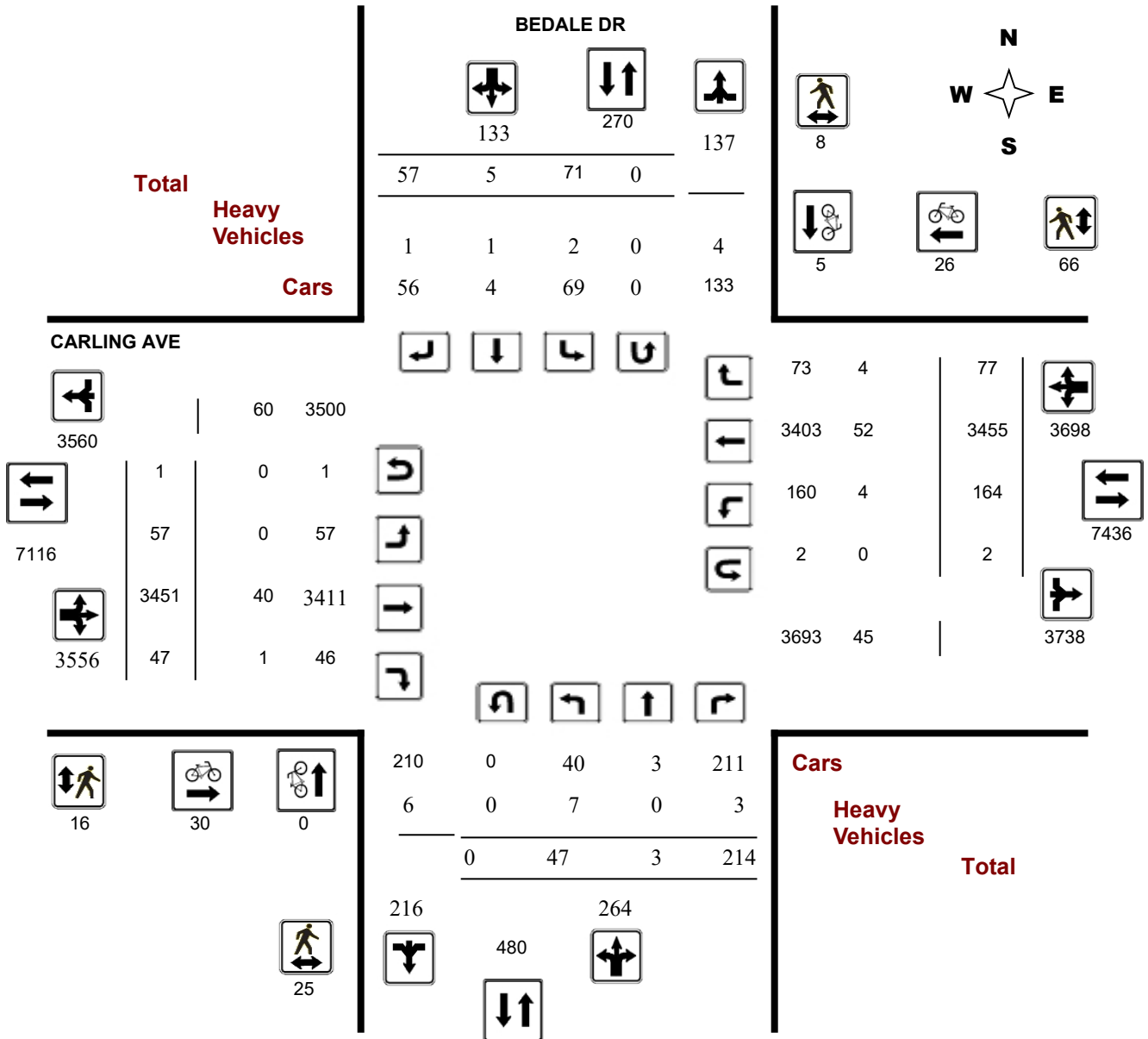
Survey Date: Wednesday, November 09, 2022

WO No: 40685

Start Time: 07:00

Device: Miovision

Full Study Diagram



Turning Movement Count - Study Results

CARLING AVE @ BEDALE DR

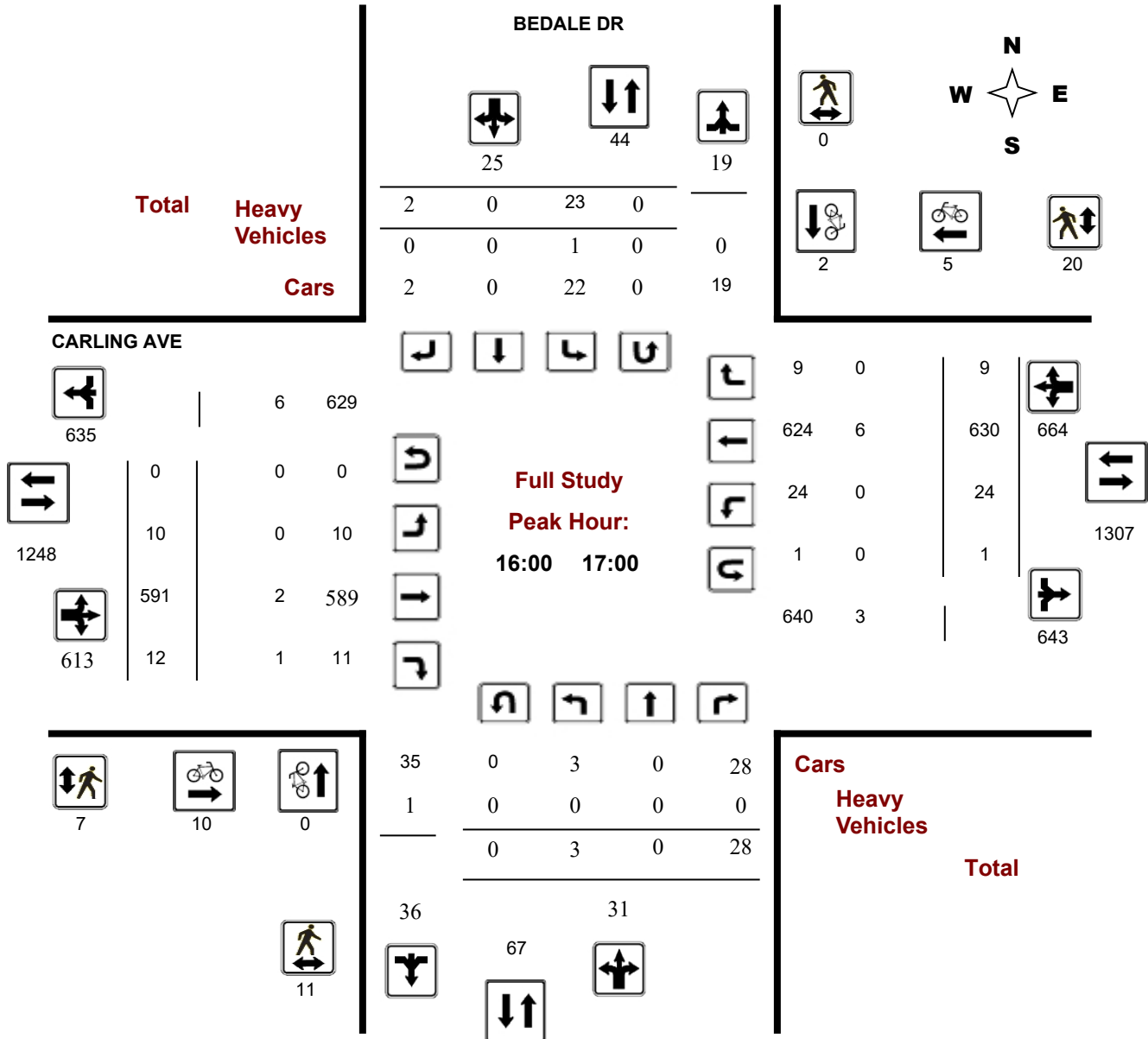
Survey Date: Wednesday, November 09, 2022

WO No: 40685

Start Time: 07:00

Device: Miovision

Full Study Peak Hour Diagram



Turning Movement Count - Peak Hour Diagram

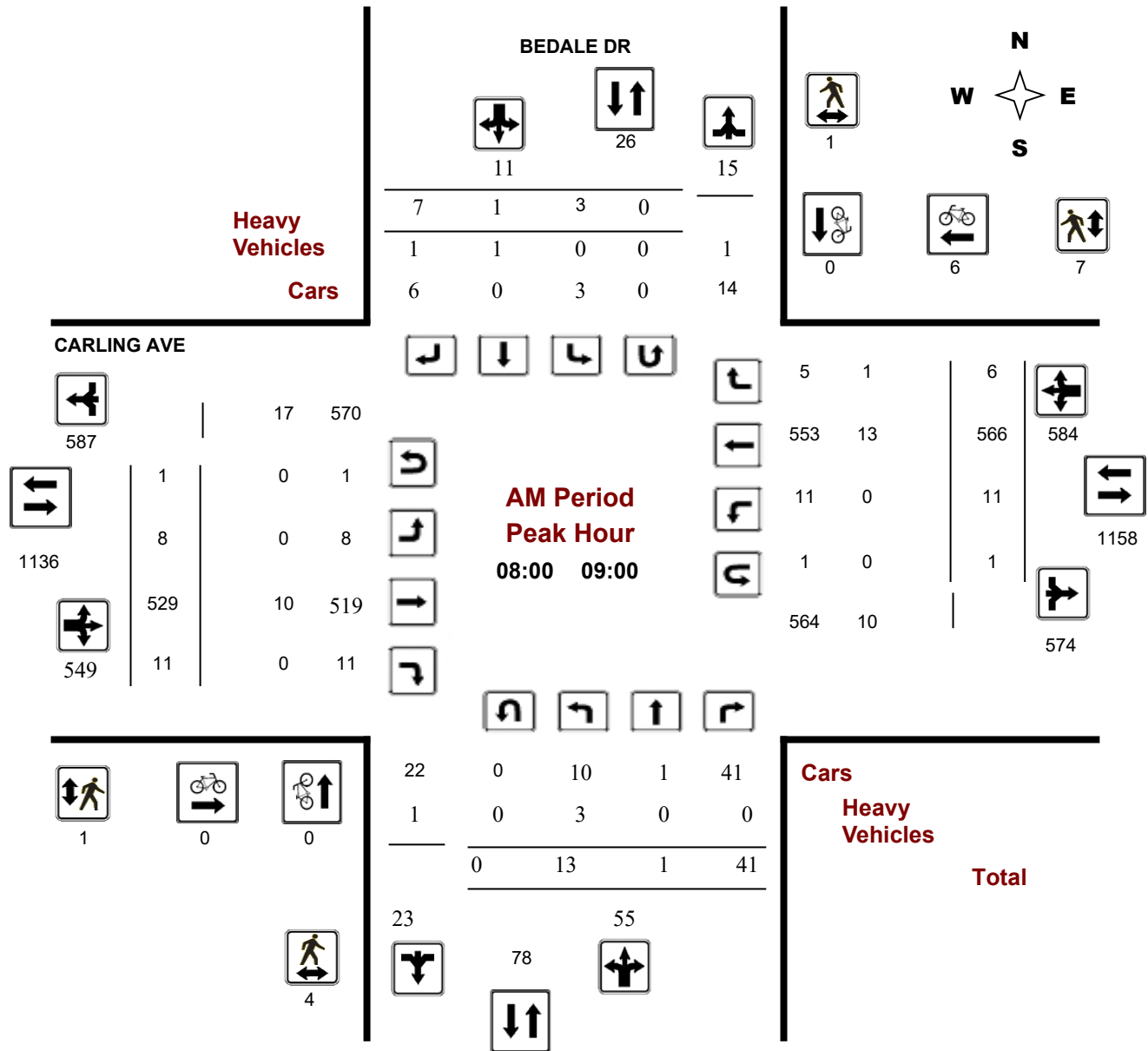
CARLING AVE @ BEDALE DR

Survey Date: Wednesday, November 09, 2022

Start Time: 07:00

WO No: 40685

Device: Miovision



Turning Movement Count - Peak Hour Diagram

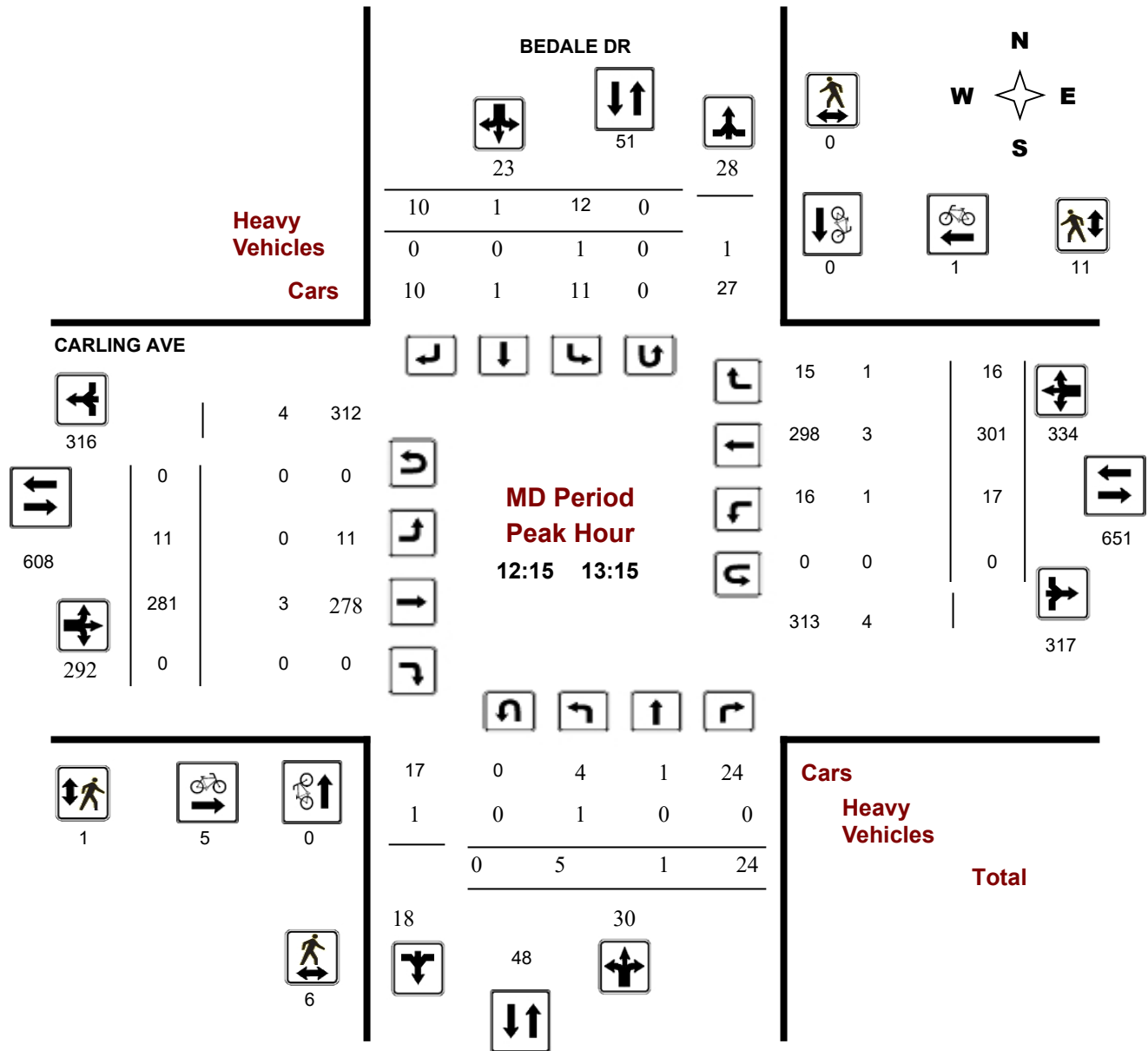
CARLING AVE @ BEDALE DR

Survey Date: Wednesday, November 09, 2022

Start Time: 07:00

WO No: 40685

Device: Miovision



Turning Movement Count - Peak Hour Diagram

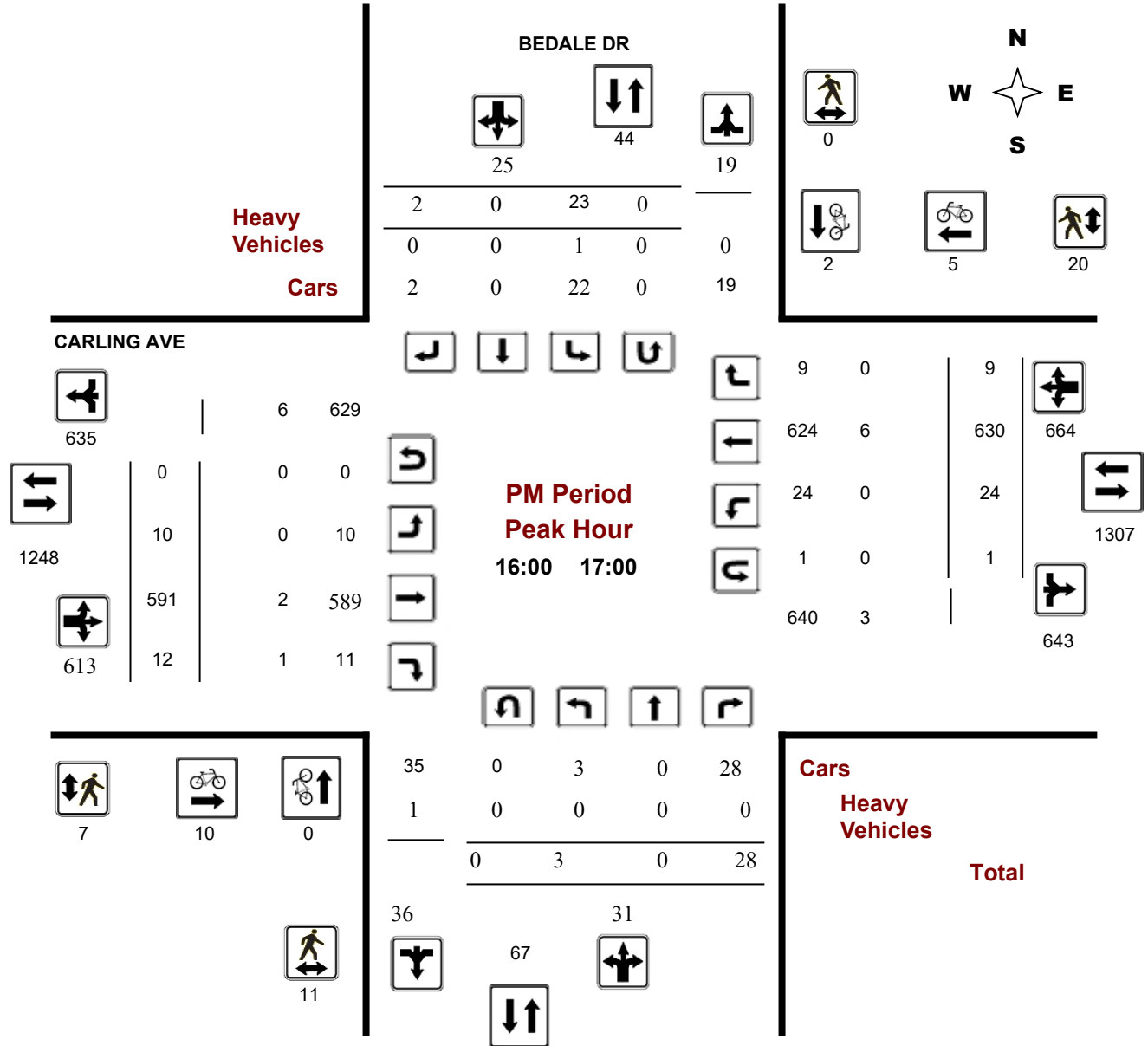
CARLING AVE @ BEDALE DR

Survey Date: Wednesday, November 09, 2022

Start Time: 07:00

WO No: 40685

Device: Miovision





Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARLING AVE @ BEDALE DR

Survey Date: Wednesday, November 09, 2022

WO No: 40685

Start Time: 07:00

Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, November 09, 2022

Total Observed U-Turns
 Northbound: 0 Southbound: 0
 Eastbound: 1 Westbound: 2

AADT Factor

.90

Period	BEDALE DR										CARLING AVE										Grand Total
	Northbound					Southbound					Eastbound					Westbound					
	LT	ST	RT	NB TOT	STR TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	STR TOT	LT	ST	RT	WB TOT	STR TOT	
07:00 08:00	7	0	37	44	48	1	0	3	4	48	1	446	4	451	8	388	7	403	854	902	
08:00 09:00	13	1	41	55	66	3	1	7	11	66	8	529	11	548	11	566	6	583	1131	1197	
09:00 10:00	5	0	22	27	36	6	0	3	9	36	1	299	1	301	13	367	7	387	688	724	
11:30 12:30	4	1	22	27	45	10	1	7	18	45	13	298	4	315	17	258	7	282	597	642	
12:30 13:30	4	0	23	27	49	10	1	11	22	49	8	279	1	288	15	305	21	341	629	678	
15:00 16:00	6	1	23	30	56	9	1	16	26	56	7	500	8	515	38	491	16	545	1060	1116	
16:00 17:00	3	0	28	31	56	23	0	2	25	56	10	591	12	613	24	630	9	663	1276	1332	
17:00 18:00	5	0	18	23	41	9	1	8	18	41	9	509	6	524	38	450	4	492	1016	1057	
Sub Total	47	3	214	264	397	71	5	57	133	397	57	3451	47	3555	164	3455	77	3696	7251	7648	
U Turns				0	0				0	0			1				2	3	3		
Total	47	3	214	264	397	71	5	57	133	397	57	3451	47	3556	164	3455	77	3698	7254	7651	
EQ 12Hr	65	4	297	367	552	99	7	79	185	552	79	4797	65	4943	228	4802	107	5140	10083	10635	
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														1.39							
AVG 12Hr	58	4	267	330	497	89	8	93	166	497	71	4317	58	4449	205	4322	96	4626	9075	9572	
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														.90							
AVG 24Hr	76	5	350	432	651	117	10	122	217	651	93	5655	76	5828	269	5662	126	6060	11888	12539	
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														1.31							
Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.																					



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARLING AVE @ BEDALE DR

Survey Date: Wednesday, November 09, 2022

WO No: 40685

Start Time: 07:00

Device: Miovision

Full Study 15 Minute Increments

BEDALE DR

CARLING AVE

Northbound

Southbound

Eastbound

Westbound

Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00 07:15	0	0	8	8	1	0	0	1	9	1	71	0	72	0	91	0	91	163	172
07:15 07:30	3	0	10	13	0	0	1	1	14	0	99	1	100	2	99	2	103	203	217
07:30 07:45	1	0	11	12	0	0	0	0	12	0	144	2	146	2	101	2	105	251	263
07:45 08:00	3	0	8	11	0	0	2	2	13	0	132	1	133	4	97	3	104	237	250
08:00 08:15	2	0	9	11	0	1	0	1	12	3	161	3	168	3	121	2	126	294	306
08:15 08:30	2	0	4	6	2	0	6	8	14	2	143	0	145	2	137	1	140	285	299
08:30 08:45	3	0	11	14	1	0	1	2	16	0	123	3	126	2	137	2	141	267	283
08:45 09:00	6	1	17	24	0	0	0	0	24	3	102	5	110	4	171	1	177	287	311
09:00 09:15	0	0	9	9	1	0	0	1	10	0	86	0	86	3	103	3	109	195	205
09:15 09:30	0	0	4	4	1	0	0	1	5	0	80	1	81	5	126	1	132	213	218
09:30 09:45	1	0	6	7	3	0	2	5	12	0	67	0	67	0	77	3	80	147	159
09:45 10:00	4	0	3	7	1	0	1	2	9	1	66	0	67	5	61	0	66	133	142
11:30 11:45	1	0	11	12	6	0	1	7	19	2	77	0	79	3	53	2	58	137	156
11:45 12:00	2	0	3	5	2	1	0	3	8	4	80	2	86	5	75	1	81	167	175
12:00 12:15	0	0	3	3	0	0	3	3	6	3	82	2	87	3	59	2	64	151	157
12:15 12:30	1	1	5	7	2	0	3	5	12	4	59	0	63	6	71	2	79	142	154
12:30 12:45	1	0	7	8	2	0	1	3	11	4	74	0	78	3	92	6	101	179	190
12:45 13:00	1	0	5	6	3	1	3	7	13	0	74	0	74	5	66	7	78	152	165
13:00 13:15	2	0	7	9	5	0	3	8	17	3	74	0	77	3	72	1	76	153	170
13:15 13:30	0	0	4	4	0	0	4	4	8	1	57	1	59	4	75	7	86	145	153
15:00 15:15	3	0	10	13	4	1	4	9	22	0	134	2	136	7	89	3	99	235	257
15:15 15:30	0	0	4	4	2	0	3	5	9	2	149	2	153	13	108	6	127	280	289
15:30 15:45	0	0	2	2	2	0	5	7	9	1	115	1	117	11	153	5	169	286	295
15:45 16:00	3	1	7	11	1	0	4	5	16	4	102	3	109	7	141	2	150	259	275
16:00 16:15	1	0	8	9	3	0	1	4	13	3	152	2	157	5	148	4	157	314	327
16:15 16:30	2	0	5	7	9	0	0	9	16	1	157	1	159	5	149	2	156	315	331
16:30 16:45	0	0	10	10	4	0	0	4	14	2	144	4	150	2	179	0	181	331	345
16:45 17:00	0	0	5	5	7	0	1	8	13	4	138	5	147	12	154	3	170	317	330
17:00 17:15	1	0	5	6	4	0	1	5	11	1	133	3	137	11	132	0	143	280	291
17:15 17:30	1	0	7	8	2	0	5	7	15	1	159	2	162	8	107	1	116	278	293
17:30 17:45	1	0	4	5	2	1	1	4	9	3	117	1	121	11	106	2	119	240	249
17:45 18:00	2	0	2	4	1	0	1	2	6	4	100	0	104	8	105	1	114	218	224
Total:	47	3	214	264	71	5	57	133	397	57	3451	47	3556	164	3455	77	3698	7254	7,651

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARLING AVE @ BEDALE DR

Survey Date: Wednesday, November 09, 2022

WO No: 40685

Start Time: 07:00

Device: Miovision

Full Study Cyclist Volume

Time Period	BEDALE DR			CARLING AVE			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00-07:15	0	0	0	0	1	1	1
07:15-07:30	0	0	0	0	1	1	1
07:30-07:45	0	0	0	0	0	0	0
07:45-08:00	0	0	0	1	2	3	3
08:00-08:15	0	0	0	0	3	3	3
08:15-08:30	0	0	0	0	1	1	1
08:30-08:45	0	0	0	0	0	0	0
08:45-09:00	0	0	0	0	2	2	2
09:00-09:15	0	0	0	2	1	3	3
09:15-09:30	0	0	0	2	0	2	2
09:30-09:45	0	0	0	0	0	0	0
09:45-10:00	0	0	0	0	0	0	0
11:30-11:45	0	0	0	0	0	0	0
11:45-12:00	0	0	0	0	1	1	1
12:00-12:15	0	0	0	0	0	0	0
12:15-12:30	0	0	0	0	0	0	0
12:30-12:45	0	0	0	0	0	0	0
12:45-13:00	0	0	0	3	0	3	3
13:00-13:15	0	0	0	2	1	3	3
13:15-13:30	0	0	0	1	1	2	2
15:00-15:15	0	0	0	2	2	4	4
15:15-15:30	0	0	0	1	0	1	1
15:30-15:45	0	0	0	1	1	2	2
15:45-16:00	0	0	0	0	0	0	0
16:00-16:15	0	0	0	1	0	1	1
16:15-16:30	0	1	1	4	1	5	6
16:30-16:45	0	0	0	2	3	5	5
16:45-17:00	0	1	1	3	1	4	5
17:00-17:15	0	2	2	2	2	4	6
17:15-17:30	0	1	1	0	0	0	1
17:30-17:45	0	0	0	2	0	2	2
17:45-18:00	0	0	0	1	2	3	3
Total	0	5	5	30	26	56	61



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARLING AVE @ BEDALE DR

Survey Date: Wednesday, November 09, 2022

WO No: 40685

Start Time: 07:00

Device: Miovision

Full Study Pedestrian Volume

BEDALE DR

CARLING AVE

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	0	0	0	0	1	1	1
07:15 07:30	0	0	0	0	0	0	0
07:30 07:45	0	1	1	0	1	1	2
07:45 08:00	0	1	1	0	2	2	3
08:00 08:15	1	0	1	0	3	3	4
08:15 08:30	3	0	3	0	2	2	5
08:30 08:45	0	0	0	0	2	2	2
08:45 09:00	0	1	1	1	0	1	2
09:00 09:15	0	0	0	0	2	2	2
09:15 09:30	0	0	0	0	0	0	0
09:30 09:45	0	1	1	0	0	0	1
09:45 10:00	1	1	2	1	1	2	4
11:30 11:45	0	0	0	0	0	0	0
11:45 12:00	0	0	0	0	0	0	0
12:00 12:15	0	1	1	0	5	5	6
12:15 12:30	3	0	3	0	7	7	10
12:30 12:45	2	0	2	0	3	3	5
12:45 13:00	1	0	1	1	0	1	2
13:00 13:15	0	0	0	0	1	1	1
13:15 13:30	0	0	0	1	2	3	3
15:00 15:15	0	0	0	0	3	3	3
15:15 15:30	0	0	0	0	0	0	0
15:30 15:45	2	0	2	3	0	3	5
15:45 16:00	0	0	0	0	3	3	3
16:00 16:15	0	0	0	0	0	0	0
16:15 16:30	3	0	3	4	7	11	14
16:30 16:45	1	0	1	3	4	7	8
16:45 17:00	7	0	7	0	9	9	16
17:00 17:15	1	0	1	0	5	5	6
17:15 17:30	0	1	1	1	3	4	5
17:30 17:45	0	1	1	0	0	0	1
17:45 18:00	0	0	0	1	0	1	1
Total	25	8	33	16	66	82	115



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARLING AVE @ BEDALE DR

Survey Date: Wednesday, November 09, 2022

WO No: 40685

Start Time: 07:00

Device: Miovision

Full Study Heavy Vehicles

BEDALE DR

CARLING AVE

Northbound

Southbound

Eastbound

Westbound

Time Period	Northbound			N TOT	Southbound			S TOT	STR TOT	Eastbound			E TOT	Westbound			W TOT	STR TOT	Grand Total
	LT	ST	RT		LT	ST	RT			LT	ST	RT		LT	ST	RT			
07:00 07:15	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	2	4	2
07:15 07:30	1	0	1	2	0	0	0	0	2	0	1	0	2	0	0	0	2	4	3
07:30 07:45	0	0	0	0	0	0	0	0	0	0	2	0	3	0	1	0	3	6	3
07:45 08:00	0	0	0	0	0	0	0	1	1	0	1	0	2	0	1	1	3	5	3
08:00 08:15	1	0	0	2	0	1	0	2	4	0	3	0	6	0	2	1	6	12	8
08:15 08:30	0	0	0	0	0	0	1	1	1	0	3	0	8	0	4	0	7	15	8
08:30 08:45	0	0	0	0	0	0	0	0	0	0	2	0	5	0	3	0	5	10	5
08:45 09:00	2	0	0	2	0	0	0	0	2	0	2	0	8	0	4	0	6	14	8
09:00 09:15	0	0	0	1	0	0	0	0	1	0	4	0	5	1	1	0	6	11	6
09:15 09:30	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	2	1
09:30 09:45	0	0	0	0	0	0	0	0	0	0	1	0	4	0	3	0	4	8	4
09:45 10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 11:45	0	0	0	0	0	0	0	0	0	0	3	0	4	0	1	0	4	8	4
11:45 12:00	0	0	1	2	0	0	0	0	2	0	0	0	3	1	3	0	5	8	5
12:00 12:15	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	2	4	2
12:15 12:30	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	2	1
12:30 12:45	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	2	1
12:45 13:00	0	0	0	1	0	0	0	0	1	0	2	0	2	1	0	0	3	5	3
13:00 13:15	1	0	0	1	1	0	0	2	3	0	1	0	3	0	1	1	4	7	5
13:15 13:30	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0	4	8	4
15:00 15:15	2	0	1	3	0	0	0	0	3	0	2	0	6	0	2	0	5	11	7
15:15 15:30	0	0	0	1	0	0	0	1	2	0	4	0	8	1	4	1	10	18	10
15:30 15:45	0	0	0	0	0	0	0	0	0	0	3	0	7	0	4	0	7	14	7
15:45 16:00	0	0	0	0	0	0	0	0	0	0	1	0	2	0	1	0	2	4	2
16:00 16:15	0	0	0	1	0	0	0	0	1	0	1	1	3	0	1	0	2	5	3
16:15 16:30	0	0	0	0	1	0	0	1	1	0	1	0	2	0	1	0	3	5	3
16:30 16:45	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	0	3	6	3
16:45 17:00	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	2	1
17:00 17:15	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	2	4	2
17:15 17:30	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	2	1
17:30 17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45 18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total: None	7	0	3	16	2	1	1	8	24	0	40	1	101	4	52	4	105	206	115



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CARLING AVE @ BEDALE DR

Survey Date: Wednesday, November 09, 2022

WO No: 40685

Start Time: 07:00

Device: Miovision

Full Study 15 Minute U-Turn Total

BEDALE DR

CARLING AVE

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	1	0	1
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	1	1
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	1	1
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	0	1	2	3

Traffic Signal Timing

City of Ottawa, Public Works Department

Traffic Signal Operations Unit

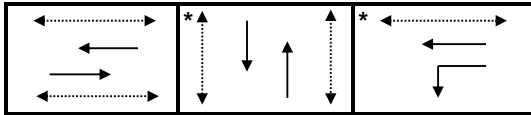
Intersection:	<i>Main:</i> Carling	<i>Side:</i> Moodie
Controller:	3200 A	TSD: 5646
Author:	Matthew Anderson	Date: 10-Nov-22

Existing Timing Plans†

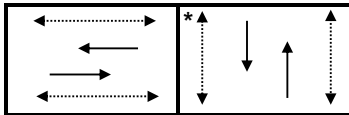
	Plan						Ped Minimum Time		
	AM Peak 1	Off Peak 2	PM Peak 3	Night 4	AM Rush 21	AM Heavy 23	Walk	DW	A+R
Cycle	100	90	100	70	120	130			
Offset	100	X	100	X	0	0			
EB Thru	37	45	40	35	40	40	7	16	3.7+1.9
WB Thru	52	45	65	35	55	55	7	16	3.7+1.9
NB Thru	48	45	35	35	65	75	7	18	3.7+2.3
SB Thru	48	45	35	35	65	75	7	18	3.7+2.3
WB Left	15	-	25	-	15	15	-	-	3.7+1.9

Phasing Sequence‡

Plan: 1, 3, 21 & 23



Plan: 2 & 4



Schedule

Weekday

Time	Plan
0:15	4
6:30	1
7:30	21
7:50	23
9:20	1
9:30	2
15:00	3
19:00	2
21:30	4

Weekend

Time	Plan
0:15	4

Notes

†: Time for each direction includes amber and all red intervals

‡: Start of first phase should be used as reference point for offset

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◄.....► Pedestrian signal

Cost is \$64.16 (\$54.12 + HST)

Traffic Signal Timing

City of Ottawa, Public Works Department

Traffic Signal Operations Unit

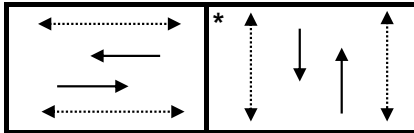
Intersection:	<i>Main:</i> Carling	<i>Side:</i> Bedale
Controller:	ATC 3	TSD: 6070
Author:	Matthew Anderson	Date: 10-Nov-2022

Existing Timing Plans[†]

	Plan						Ped Minimum Time		
	AM Peak 1	Off Peak 2	PM Peak 3	Evening 4	Weekend 5	Nite 9	Walk	DW	A+R
Cycle	75	60	75	60	60	Free			
Offset	7	6	7	6	6	-			
EB Thru	43	28	43	28	28	max=55.6	7	13	3.7+1.9
WB Thru	43	28	43	28	28	max=55.6	7	13	3.7+1.9
NB Thru	32	32	32	32	32	max=41.1	9	16	3.3+2.8
SB Thru	32	32	32	32	32	max=41.1	9	16	3.3+2.8

Phasing Sequence[‡]

Plan:



Schedule

Weekday

Time	Plan
0:15	9
6:30	1
9:30	2
15:00	3
18:00	2
22:00	4
22:30	9

Weekend

Time	Plan
0:15	9
8:00	2
9:00	5
17:00	2
22:00	4
22:30	9

Notes

†: Time for each direction includes amber and all red intervals

‡: Start of first phase should be used as reference point for offset

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◄.....► Pedestrian signal

Cost is \$61.16 (\$54.12 + HST)

APPENDIX B: COLLISION DATA





Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2016 To: December 31, 2020

Location: CARLING AVE @ BEDALE DR

Traffic Control: Traffic signal

Total Collisions: 5

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2017-Feb-16, Thu,08:54	Clear	Rear end	P.D. only	Dry	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Jan-02, Tue,12:45	Clear	Angle	Non-fatal injury	Packed snow	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Turning left	Snow plow	Other motor vehicle	
2019-Aug-14, Wed,16:14	Clear	Angle	Non-fatal injury	Dry	East	Going ahead	Bicycle	Other motor vehicle	0
					South	Turning right	Automobile, station wagon	Cyclist	
2019-Dec-02, Mon,00:10	Clear	SMV other	P.D. only	Wet	West	Going ahead	Automobile, station wagon	Pole (utility, power)	0
2019-Dec-09, Mon,19:00	Rain	SMV other	Non-fatal injury	Wet	South	Turning left	Automobile, station wagon	Pedestrian	1

Location: CARLING AVE @ MOODIE DR/JAMES CUMMINGS AVE W

Traffic Control: Traffic signal

Total Collisions: 29

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2016-Jan-20, Wed,13:21	Clear	Turning movement	Non-fatal injury	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Apr-19, Tue,17:35	Clear	Turning movement	Non-fatal injury	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Turning left	Automobile, station wagon	Other motor vehicle	
2016-Nov-24, Thu,20:03	Clear	SMV other	P.D. only	Slush	East	Going ahead	Automobile, station wagon	Animal - wild	0
2017-Jan-13, Fri,17:03	Clear	Turning movement	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-Feb-17, Fri,16:43	Clear	Angle	P.D. only	Dry	West	Turning left	Pick-up truck	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-Feb-22, Wed,05:15	Clear	SMV other	P.D. only	Wet	West	Turning left	Pick-up truck	Animal - wild	0
2017-May-02, Tue,12:47	Clear	Turning movement	Non-fatal injury	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2016 To: December 31, 2020

Location: CARLING AVE @ MOODIE DR/JAMES CUMMINGS AVE W

Traffic Control: Traffic signal

Total Collisions: 29

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2017-Aug-24, Thu,20:30	Clear	SMV other	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Animal - wild	0
2017-Sep-09, Sat,14:15	Clear	Turning movement	Non-fatal injury	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-Nov-24, Fri,16:57	Clear	Turning movement	Non-fatal injury	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-Nov-27, Mon,09:02	Clear	Rear end	P.D. only	Dry	North	Going ahead	Construction equipment	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Dec-12, Tue,09:15	Snow	Rear end	P.D. only	Slush	West	Going ahead	Passenger van	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Feb-14, Wed,18:01	Clear	Turning movement	P.D. only	Wet	West	Turning left	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-May-31, Thu,09:00	Clear	Rear end	P.D. only	Dry	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Sep-30, Sun,01:05	Clear	SMV other	P.D. only	Wet	North	Turning right	Automobile, station wagon	Pole (utility, power)	0
2018-Nov-23, Fri,12:08	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Pick-up truck	Other motor vehicle	
2019-Jan-18, Fri,07:23	Snow	Turning movement	Non-fatal injury	Loose snow	West	Turning left	Pick-up truck	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Feb-08, Fri,11:38	Clear	Turning movement	P.D. only	Wet	West	Turning left	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-May-21, Tue,08:34	Clear	Sideswipe	Non-fatal injury	Dry	West	Pulling away from shoulder or curb	Bicycle	Other motor vehicle	0
					West	Overtaking	Automobile, station wagon	Cyclist	



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2016 To: December 31, 2020

Location: CARLING AVE @ MOODIE DR/JAMES CUMMINGS AVE W

Traffic Control: Traffic signal

Total Collisions: 29

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2019-Jul-15, Mon,20:52	Clear	Turning movement	Fatal injury	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Motorcycle	Other motor vehicle	
2019-Jul-19, Fri,18:19	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Pick-up truck	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Aug-24, Sat,13:35	Clear	Turning movement	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Oct-18, Fri,12:00	Clear	SMV other	P.D. only	Dry	North	Turning right	Automobile, station wagon	Ran off road	0
2020-Jan-27, Mon,17:57	Clear	Turning movement	Non-fatal injury	Wet	West	Turning left	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2020-Jan-28, Tue,06:35	Clear	Rear end	P.D. only	Ice	South	Turning left	Pick-up truck	Other motor vehicle	0
					South	Turning left	Passenger van	Other motor vehicle	
2020-Feb-20, Thu,23:07	Clear	Other	P.D. only	Dry	South	Reversing	Snow plow	Other motor vehicle	0
					North	Turning right	Automobile, station wagon	Other motor vehicle	
2020-Jul-02, Thu,23:30	Clear	Rear end	P.D. only	Wet	East	Going ahead	Pick-up truck	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2020-Jul-28, Tue,12:41	Clear	Turning movement	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2020-Sep-30, Wed,15:49	Clear	Turning movement	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	

Location: CARLING AVE @ ROCKY POINT RD

Traffic Control: Stop sign

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
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Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2016 To: December 31, 2020

Location: CARLING AVE @ ROCKY POINT RD

Traffic Control: Stop sign

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2017-Jan-05, Thu,07:56	Snow	Angle	P.D. only	Slush	South	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Snow plow	Other motor vehicle	

Location: CARLING AVE btwn BEDALE DR & HARBOUR LANDING PRIV

Traffic Control: No control

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2019-Aug-15, Thu,09:08	Clear	Angle	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Pick-up truck	Other motor vehicle	

Location: CARLING AVE btwn CRYSTAL BEACH DR & SUNNY BRAE AVE

Traffic Control: No control

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2019-Jan-21, Mon,12:13	Drifting Snow	Turning movement	P.D. only	Packed snow	East	Turning right	Pick-up truck	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	

Location: CARLING AVE btwn JAMES CUMMINGS AVE & MOODIE DR

Traffic Control: No control

Total Collisions: 5

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2016-Jul-30, Sat,05:29	Clear	SMV other	P.D. only	Dry	West	Going ahead	Pick-up truck	Ran off road	0
2016-Aug-15, Mon,16:55	Clear	Other	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Debris falling off vehicle	0
					East	Going ahead	Car and trailer	Other	
2016-Sep-26, Mon,08:44	Clear	Sideswipe	Non-fatal injury	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-Feb-28, Tue,16:05	Clear	SMV other	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Animal - wild	0
2017-Dec-05, Tue,17:24	Clear	SMV other	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Animal - wild	0



Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2016 To: December 31, 2020

Location: CARLING AVE btwn JAMES CUMMINGS AVE & ULLSWATER DR

Traffic Control: No control

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2020-May-05, Tue,00:30	Clear	SMV other	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Animal - wild	0

Location: CARLING AVE btwn MOODIE DR & TURN LANE

Traffic Control: No control

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2020-Aug-31, Mon,06:23	Clear	SMV other	P.D. only	Dry	West	Going ahead	Pick-up truck	Animal - wild	0

Location: CARLING AVE btwn SUNNY BRAE AVE & ULLSWATER DR

Traffic Control: No control

Total Collisions: 4

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2016-Feb-16, Tue,07:38	Snow	Rear end	P.D. only	Slush	West	Slowing or stopping	Pick-up truck	Other motor vehicle	0
					West	Turning left	Pick-up truck	Other motor vehicle	
2016-May-12, Thu,10:30	Clear	Angle	P.D. only	Dry	North	Turning right	Unknown	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Sep-12, Mon,07:40	Clear	Rear end	Non-fatal injury	Dry	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					East	Slowing or stopping	Truck - tractor	Other motor vehicle	
2017-Jun-14, Wed,13:35	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Turning left	Automobile, station wagon	Other motor vehicle	

Location: ULLSWATER DR @ CARLING AVE

Traffic Control: Stop sign

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuvre	Vehicle type	First Event	No. Ped
2016-Oct-07, Fri,14:50	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Delivery van	Other motor vehicle	

APPENDIX C: MULTI-MODAL LEVEL OF SERVICE



Multi-Modal Level of Service - Segments Form

Consultant	BA Group
Scenario	2022 Existing Conditions
Comments	

Project	3430 Carling
Date	01-Dec-22

3430 Carling
01-Dec-22

SEGMENTS		LOS	Carling Avenue Across Frontage	Section 2	Section 3
Pedestrian	Sidewalk Width	F	1.8 m		
	Boulevard Width		< 0.5 m		
	Avg Daily Curb Lane Traffic Volume		> 3000		
	Operating Speed		> 50 to 60 km/h		
	On-Street Parking		no		
	Exposure to Traffic PLoS		F	-	-
Level of Service		F	-	-	
Bicycle	Type of Cycling Facility	F	Mixed Traffic		
	Number of Travel Lanes		4-5 lanes total		
	Operating Speed		≥ 60 km/h		
	# of Lanes & Operating Speed LoS		F	-	-
	Bike Lane (+ Parking Lane) Width		≥ 1.2 to <1.5 m		
	Bike Lane Width LoS		C	-	-
	Bike Lane Blockages		Rare		
	Blockage LoS		A	-	-
Level of Service		F	-	-	
Transit	Facility Type	D	Mixed Traffic		
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8		
	Level of Service		D	-	-
Truck	Truck Lane Width	D	≤ 3.2 m		
	Travel Lanes per Direction		> 1		
	Level of Service		D	-	-
Auto	Level of Service		Not Applicable		

Multi-Modal Level of Service - Intersections Form

Consultant	BA Group
Scenario	2022 Existing Conditions
Comments	

Project	3430 Carling Avenue
Date	01-Dec-22

INTERSECTIONS		Carling & Moodie				Carling & Bedale					
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST		
Pedestrian	Lanes	0 - 2	4	6	6	0 - 2	0 - 2	5	6		
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		
	Conflicting Left Turns	Permissive	Protected/ Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive		
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control		
	Right Turns on Red (RTOR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed		
	Ped Signal Leading Interval?	No	No	No	No	No	No	No	No		
	Right Turn Channel	No Channel	Conventional with Receiving Lane	No Channel	Conventional with Receiving Lane	No Channel	No Channel	No Channel	No Channel		
	Corner Radius	10-15m	>25m	10-15m	>25m	5-10m	10-15m	5-10m	5-10m		
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings		
	PETSI Score	85	51	20	18	86	85	38	21		
	Ped. Exposure to Traffic LoS	B	D	F	F	B	B	E	F		
	Cycle Length	130	130	130	130	75	75	75	75		
	Effective Walk Time	18	18	12	12	24	24	10	10		
	Average Pedestrian Delay	48	48	54	54	17	17	28	28		
Pedestrian Delay LoS	E	E	E	E	B	B	C	C			
Level of Service	E	E	F	F	B	B	E	F			
		F				F					
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST		
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic		
	IF Dedicated Right Turn Lane, THEN Right Turn Configuration, ELSE <blank>		> 50 m		> 50 m				≤ 50 m		
	Dedicated Right Turning Speed	≤ 25 km/h	≤ 25 km/h	Not Applicable	≤ 25 km/h				≤ 25 km/h		
	Cyclist Through Movement		F	Not Applicable	F			Not Applicable	D		
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Separated	Mixed Traffic	Mixed Traffic	Mixed Traffic	Separated	Mixed Traffic		
	Left Turn Approach	No lane crossed	No lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	No lane crossed	No lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed		
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	≥ 60 km/h	≥ 60 km/h		
Left Turning Cyclist	C	C	F	F	B	B	F	F			
Level of Service	C	F	F	F	B	B	F	F			
		F				F					
Transit	Average Signal Delay		> 40 sec	≤ 10 sec	≤ 20 sec			≤ 10 sec	≤ 10 sec		
	Level of Service	-	F	B	C	-	-	B	B		
		F				B					
Truck	Effective Corner Radius		> 15 m		> 15 m						
	Number of Receiving Lanes on Departure from Intersection		≥ 2		≥ 2						
Level of Service	-	A	-	A	-	-	-	-			
		A				-					
Auto	Volume to Capacity Ratio		0.0 - 0.60					0.0 - 0.60			
	Level of Service		A					A			

APPENDIX D: TRANSPORTATION DEMAND MANAGEMENT CHECKLISTS



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

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

TDM-supportive design & infrastructure measures: <i>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 checked="" type="checkbox"/>
BASIC	1.1.2 Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	<input checked="" type="checkbox"/>
BASIC	1.1.3 Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	<input 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"/> N/A
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>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 checked="" type="checkbox"/>
BASIC	1.2.7 Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	<input 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>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 checked="" type="checkbox"/>
REQUIRED	2.1.2 Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas (see <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
REQUIRED	2.1.3 Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored (see <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
BASIC	2.1.4 Provide bicycle parking spaces equivalent to the expected number of resident-owned bicycles, plus the expected peak number of visitor cyclists	<input type="checkbox"/>
2.2 Secure bicycle parking		
REQUIRED	2.2.1 Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers (see <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
BETTER	2.2.2 Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi-family residential developments	<input type="checkbox"/>
2.3 Bicycle repair station		
BETTER	2.3.1 Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	<input checked="" type="checkbox"/>
3. TRANSIT		
3.1 Customer amenities		
BASIC	3.1.1 Provide shelters, lighting and benches at any on-site transit stops	<input type="checkbox"/>
BASIC	3.1.2 Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	<input type="checkbox"/>
BETTER	3.1.3 Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	<input type="checkbox"/>

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

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

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

TDM measures: <i>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 (<i>multi-family, condominium</i>) <input type="checkbox"/>
2.2 Bicycle skills training		
BETTER	2.2.1	Offer on-site cycling courses for residents, or subsidize off-site courses <input type="checkbox"/>

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

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

APPENDIX E: INTERSECTION PERFORMANCE WORKSHEETS



Queues

1: Moodie Drive & Carling Avenue

12-01-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	400	150	185	405	5	225	5	95	5	10	5
Future Volume (vph)	5	400	150	185	405	5	225	5	95	5	10	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	125.0	75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	0	1	1	0	0	0	1	0	1	0	0	0
Taper Length (m)	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor					1.00		1.00	0.99		1.00		
Fit		0.850		0.998			0.850		0.966			
Fit Protected		0.999		0.950			0.953		0.988			
Satd. Flow (prot)	0	3388	1547	1712	3383	0	1608	1488	0	1537	0	0
Fit Permitted		0.951		0.450			0.716		0.933			
Satd. Flow (perm)	0	3225	1547	811	3383	0	1207	1469	0	1451	0	0
Right Turn on Red		Yes			Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)			156		1			99		5		
Link Speed (k/h)		60		60			80		50			
Link Distance (m)		253.2		674.7			209.4		72.7			
Travel Time (s)		15.2		40.5			9.4		5.2			
Confl. Peds. (#/hr)						6	1		1			1
Confl. Bikes (#/hr)						6	1		1			10
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	2%	0%	1%	2%	0%	8%	0%	4%	0%	0%	50%
Adj. Flow (vph)	5	417	156	193	422	5	234	5	99	5	10	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	422	156	193	427	0	239	99	0	20	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	Perm	NA	NA	NA
Protected Phases	2	2	1	6		8	8	8	4	4		
Permitted Phases	2	2	6	6		8	8	8	4	4		
Detector Phase	2	2	2	1	6	8	8	8	4	4		
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	28.6	28.6	28.6	10.6	28.6	31.0	31.0	31.0	31.0	31.0	31.0	31.0
Total Split (s)	44.0	44.0	44.0	25.0	69.0	61.0	61.0	61.0	61.0	61.0	61.0	61.0
Total Split (%)	33.8%	33.8%	33.8%	19.2%	53.1%	46.3%	46.9%	46.9%	46.9%	46.9%	46.9%	46.9%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.9	1.9	1.9	1.9	1.9	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	-1.6	-1.6	-1.6	-1.6	-1.6	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	C-Min	C-Min	C-Min	None	C-Min	None	None	None	None	None	None	None
Act Effect Green (s)	71.1	71.1	88.0	88.0	88.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
Actuated g/C Ratio	0.55	0.55	0.68	0.68	0.68	0.26	0.26	0.26	0.26	0.26	0.26	0.26
v/c Ratio	0.24	0.17	0.30	0.19	0.19	0.76	0.22	0.05	0.05	0.05	0.05	0.05
Control Delay	17.9	3.7	10.4	9.0	9.0	58.4	6.7	25.7	25.7	25.7	25.7	25.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.9	3.7	10.4	9.0	9.0	58.4	6.7	25.7	25.7	25.7	25.7	25.7
LOS	B	A	B	A	A	E	A	A	C	C	C	C

3430 Carling Avenue 2022 Existing AM Peak 3:27 pm 12-01-2022 CS

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Queues

1: Moodie Drive & Carling Avenue

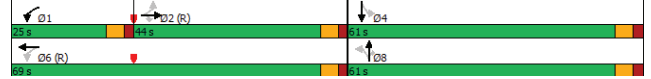
12-01-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay	14.1									9.5		25.7
Approach LOS	B									A		D
Queue Length 50th (m)	28.3	0.0	16.6	19.5	56.5	0.0	77.0	11.8	8.2	185.4	0.0	48.7
Queue Length 95th (m)	50.2	12.7	34.0	34.3	77.0	11.8	77.0	11.8	8.2	185.4	0.0	48.7
Internal Link Dist (m)	229.2									650.7		185.4
Turn Bay Length (m)				125.0	75.0							
Base Capacity (vph)	1763	916	694	2289	529	699	639					
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.17	0.28	0.19	0.45	0.14	0.03					

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 18.7
 Intersection LOS: B
 Intersection Capacity Utilization 53.9%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 1: Moodie Drive & Carling Avenue



3430 Carling Avenue 2022 Existing AM Peak 3:27 pm 12-01-2022 CS

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HCM Signalized Intersection Capacity Analysis

1: Moodie Drive & Carling Avenue

12-01-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	400	150	185	405	5	225	5	95	5	10	5
Future Volume (veh/h)	5	400	150	185	405	5	225	5	95	5	10	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	1.00	0.85	1.00	1.00	1.00	1.00	0.85	0.97	0.97	1.00	1.00	1.00
Fit Protected	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.99	0.99	1.00	1.00	1.00
Satd. Flow (prot)	3389	1547	1712	3384	1607	1468	1535					
Fit Permitted	0.95	1.00	0.45	1.00	1.00	0.72	1.00	0.93	0.93	1.00	1.00	1.00
Satd. Flow (perm)	3224	1547	810	3384	1207	1468	1451					
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	5	417	156	193	422	5	234	5	99	5	10	5
RTOR Reduction (vph)	0	0	71	0	0	0	0	73	0	4	0	0
Lane Group Flow (vph)	0	422	85	193	427	0	239	26	0	16	0	0
Confl. Peds. (#/hr)						6	1		1			10
Confl. Bikes (#/hr)						6	1		1			10
Heavy Vehicles (%)	0%	2%	0%	1%	2%	0%	8%	0%	4%	0%	0%	50%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	Perm	NA	NA	NA
Protected Phases	2	2	1	6		8	8	8	4	4		
Permitted Phases	2	2	6	6		8	8	8	4	4		
Actuated Green, G (s)	69.5	69.5	86.4	86.4	86.4	32.0	32.0	32.0	32.0	32.0	32.0	32.0
Effective Green, g (s)	71.1	71.1	88.0	88.0	88.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
Actuated g/C Ratio	0.55	0.55	0.68	0.68	0.68	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.6	5.6	5.6	5.6	5.6	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1763	846	637	2290	513	315	383	379				
v/s Ratio Prot			c0.03	0.13								
v/s Ratio Perm	0.13	0.06	c0.17			c0.20	0.02	0.01				
v/c Ratio	0.24	0.10	0.30	0.19	0.19	0.76	0.07	0.04				
Uniform Delay, d1	15.4	14.1	8.0	7.8	7.8	44.2	36.1	35.8				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Incremental Delay, d2	0.3	0.2	0.3	0.2	0.2	10.0	0.1	0.0				
Delay (s)	15.7	14.4	8.3	7.9	7.9	54.3	36.2	35.9				
Level of Service	B	B	A	A	A	D	D	D				
Approach Delay (s)	15.3				8.0</							

HCM Unsignalized Intersection Capacity Analysis
3: Site East & Carling Avenue

12-01-2022

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↑↑	↑↑	↑↑	↑↑
Traffic Volume (veh/h)	530	0	0	405	0	0
Future Volume (veh/h)	530	0	0	405	0	0
Sign Control	Free		Free	Stop		
Grade	0%		0%	0%		
Peak Hour Factor	0.25	0.25	0.25	0.25	0.25	0.25
Hourly flow rate (vph)	2120	0	0	1620	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			2120	2930	1060	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCU, unblocked vol			2120	2930	1060	
tC, single (s)			4.1	6.8	6.9	
tC, 2 stage (s)						
tF (s)			2.2	3.5	3.3	
p0 queue free %			100	100	100	
cM capacity (veh/h)			261	12	224	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	1413	707	540	1080	0	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	0	0	
ESH	1700	1700	261	1700	1700	
Volume to Capacity	0.83	0.42	0.00	0.64	0.00	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS					A	
Approach Delay (s)	0.0		0.0		0.0	
Approach LOS					A	
Intersection Summary						
Average Delay	0.0					
Intersection Capacity Utilization	18.8%			ICU Level of Service A		
Analysis Period (min)	15					

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CS

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Queues
4: Bedale Drive & Carling Avenue/Carling

12-01-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (vph)	10	530	15	15	570	10	15	5	45	5	5	10
Future Volume (vph)	10	530	15	15	570	10	15	5	45	5	5	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0	15.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1	1	1	0	0	0	0	0	0	0	0	0
Taper Length (m)	7.5		7.5		7.5		7.5		7.5		7.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.97	1.00	1.00		0.99		0.99		0.99	
Frt			0.850		0.998		0.907		0.932		0.932	
Fit Protected	0.950			0.950			0.988		0.988		0.988	
Satd. Flow (prot)	1729	3424	1547	1729	3375	0	0	1527	0	0	1259	0
Fit Permitted	0.420			0.446			0.933		0.932		0.932	
Satd. Flow (perm)	764	3424	1505	809	3375	0	0	1442	0	0	1186	0
Right Turn on Red			Yes			Yes		Yes		Yes		Yes
Satd. Flow (RTOR)			45		3		47		10		10	
Link Speed (k/h)		60			60		40		40		40	
Link Distance (m)		456.6			117.8		75.2		83.5		83.5	
Travel Time (s)		27.4		4	7.1		6.8		7.5		7.5	
Confl. Peds. (#/hr)	1		4	4		1	1		7	7	7	1
Confl. Bikes (#/hr)												6
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	1%	0%	0%	2%	16%	23%	0%	0%	0%	100%	14%
Adj. Flow (vph)	10	552	16	16	594	10	16	5	47	5	5	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	552	16	16	604	0	0	68	0	0	20	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases	2			6			8		4		4	
Permitted Phases	2		2	6			8		4		4	
Detector Phase	2	2	2	6	6		8	8	4	4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	25.6	25.6	25.6	25.6	25.6		29.1	29.1	29.1	29.1	29.1	
Total Split (s)	43.0	43.0	43.0	43.0	43.0		32.0	32.0	32.0	32.0	32.0	
Total Split (%)	57.3%	57.3%	57.3%	57.3%	57.3%		42.7%	42.7%	42.7%	42.7%	42.7%	
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		3.3	3.3	3.3	3.3	3.3	
All-Red Time (s)	1.9	1.9	1.9	1.9	1.9		2.8	2.8	2.8	2.8	2.8	
Lost Time Adjust (s)	-1.6	-1.6	-1.6	-1.6	-1.6		-2.1	-2.1	-2.1	-2.1	-2.1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min		None	None	None	None	None	
Act Effect Green (s)	56.3	56.3	56.3	56.3	56.3		14.7	14.7	14.7	14.7	14.7	
Actuated g/C Ratio	0.75	0.75	0.75	0.75	0.75		0.20	0.20	0.20	0.20	0.20	
v/c Ratio	0.02	0.21	0.01	0.03	0.24		0.21	0.08	0.08	0.08	0.08	
Control Delay	5.5	4.7	0.5	5.5	4.8		12.0	15.9	15.9	15.9	15.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	5.5	4.7	0.5	5.5	4.8		12.0	15.9	15.9	15.9	15.9	
LOS	A	A	A	A	A		B	B	B	B	B	

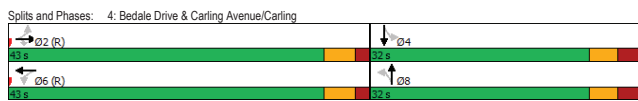
3430 Carling Avenue 2022 Existing AM Peak 3:27 pm 12-01-2022
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Synchro 11 Report
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Queues
4: Bedale Drive & Carling Avenue/Carling

12-01-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay	4.6			4.8			12.0		15.9			
Approach LOS	A			A			B		B			
Queue Length 50th (m)	0.3	10.3	0.0	0.5	11.4		2.6		1.2			
Queue Length 95th (m)	2.5	28.3	0.6	3.5	31.2		9.9		5.3			
Internal Link Dist (m)	432.6			93.8			51.2		59.5			
Turn Bay Length (m)	30.0		15.0	30.0								
Base Capacity (vph)	573	2571	1141	607	2535		567		449			
Starvation Cap Reductn	0	0	0	0	0		0		0			
Spillback Cap Reductn	0	0	0	0	0		0		0			
Storage Cap Reductn	0	0	0	0	0		0		0			
Reduced v/c Ratio	0.02	0.21	0.01	0.03	0.24		0.12		0.04			
Intersection Summary												
Area Type:	Other											
Cycle Length:	75											
Actuated Cycle Length:	75											
Offset: 7 (9%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green												
Natural Cycle:	55											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.24											
Intersection Signal Delay:	5.3			Intersection LOS: A								
Intersection Capacity Utilization:	43.7%			ICU Level of Service A								
Analysis Period (min):	15											



3430 Carling Avenue 2022 Existing AM Peak 3:27 pm 12-01-2022
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Synchro 11 Report
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HCM Signalized Intersection Capacity Analysis
4: Bedale Drive & Carling Avenue/Carling

12-01-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Traffic Volume (vph)	10	530	15	15	570	10	15	5	45	5	5	10
Future Volume (vph)	10	530	15	15	570	10	15	5	45	5	5	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	4.0	4.0	4.0	4.0	4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00		1.00		1.00	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00		0.99		0.99		0.99	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00		1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		0.91		0.91		0.91	
Fit Protected	0.95	1.00	1.00	0.95	1.00		0.99		0.99		0.99	
Satd. Flow (prot)	1728	3424	1505	1723	3373		1527		1255		1255	
Fit Permitted	0.42	1.00	1.00	0.45	1.00		0.93		0.93		0.93	
Satd. Flow (perm)	764	3424	1505	808	3373		1441		1184		1184	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96		0.96		0.96		0.96	
Adj. Flow (vph)	10	552	16	16	594	10	16	5	47	5	5	10
RTOR Reduction (vph)	0	0	4	0	1	0	0	39	0			

Queues

1: Moodie Drive & Carling Avenue

12-01-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	4	3	4	4	5	5	4	3	4	4	5
Traffic Volume (vph)	5	470	310	235	410	5	190	10	155	5	5	5
Future Volume (vph)	5	470	310	235	410	5	190	10	155	5	5	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	0.0	125.0	75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	0	1	1	1	0	0	0	0	1	0	0	0
Taper Length (m)	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.96	1.00	1.00	1.00	0.98	1.00	0.98	0.99	0.99	0.99	0.99
Frt	0.850	0.998	0.950	0.950	0.955	0.955	0.955	0.955	0.984	0.984	0.984	0.984
Fit Protected	0	3458	1517	1679	3416	0	0	1690	1532	0	1701	0
Fit Permitted	0	0.951	0.398	0.398	0.728	0	0	0.728	0.912	0	0.912	0
Satd. Flow (perm)	0	3288	1461	700	3416	0	0	1283	1496	0	1575	0
Right Turn on Red	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Satd. Flow (RTOR)	0	326	2	2	163	0	0	163	5	0	5	0
Link Speed (km/h)	60	60	60	60	80	80	80	80	50	50	50	50
Link Distance (m)	253.2	674.7	674.7	209.4	65.8	65.8	65.8	65.8	65.8	65.8	65.8	65.8
Travel Time (s)	15.2	40.5	40.5	9.4	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
Confl. Peds. (#/hr)	3	6	6	3	1	4	4	4	4	4	4	4
Confl. Bikes (#/hr)	4	4	4	9	9	9	9	9	9	9	9	9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	2%	3%	1%	0%	3%	0%	1%	0%	0%	0%
Adj. Flow (vph)	5	495	326	247	432	5	200	11	163	5	5	5
Shared Lane Traffic (%)	0	500	326	247	437	0	0	211	163	0	15	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Left
Median Width (m)	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Link Offset (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crosswalk Width (m)	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
Two way Left Turn Lane	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Headway Factor	24	14	24	14	24	14	24	14	24	14	24	14
Turning Speed (km/h)	1	2	1	1	2	1	2	1	1	1	2	1
Number of Detectors	1	2	1	1	2	1	2	1	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	0.0	30.5	6.1	6.1	30.5	6.1	30.5
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size (m)	6.1	1.8	6.1	6.1	1.8	0.0	1.8	6.1	6.1	1.8	6.1	1.8
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position (m)	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7
Detector 2 Size (m)	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 2 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	Perm	Perm	NA	NA
Protected Phases	2	2	6	6	8	8	8	8	4	4	4	4
Permitted Phases	2	2	6	6	8	8	8	8	4	4	4	4

3430 Carling Avenue 2022 Existing PM Peak 3:25 pm 12-01-2022
CS

Synchro 11 Report
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HCM Signalized Intersection Capacity Analysis

1: Moodie Drive & Carling Avenue

12-01-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	4	3	4	4	5	5	4	3	4	4	5
Traffic Volume (vph)	5	470	310	235	410	5	190	10	155	5	5	5
Future Volume (vph)	5	470	310	235	410	5	190	10	155	5	5	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.96	1.00	1.00	1.00	0.97	1.00	0.97	0.99	0.99	0.99	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85	1.00	0.85	0.95	0.95	0.95	0.95
Fit Protected	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.98	0.98	0.98	0.98
Satd. Flow (prot)	3456	1463	1675	3417	1688	1493	1698	1493	1698	1698	1698	1698
Fit Permitted	0.95	1.00	0.40	1.00	0.73	1.00	0.91	1.00	0.91	0.91	0.91	0.91
Satd. Flow (perm)	3290	1463	702	3417	1284	1493	1575	1493	1575	1575	1575	1575
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	495	326	247	432	5	200	11	163	5	5	5
RTOR Reduction (vph)	0	0	159	0	1	0	0	0	124	0	4	0
Lane Group Flow (vph)	0	500	167	247	436	0	0	211	39	0	11	0
Confl. Peds. (#/hr)	3	6	6	3	1	4	4	4	4	4	4	4
Confl. Bikes (#/hr)	4	4	4	9	9	9	9	9	9	9	9	9
Heavy Vehicles (%)	0%	0%	2%	3%	1%	0%	3%	0%	1%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	Perm	Perm	NA	NA
Protected Phases	2	2	6	6	8	8	8	8	4	4	4	4
Permitted Phases	2	2	6	6	8	8	8	8	4	4	4	4
Actuated Green, G (s)	49.7	49.7	66.7	41.0	66.7	21.7	21.7	21.7	23.7	23.7	21.7	21.7
Effective Green, g (s)	51.3	51.3	68.3	43.6	68.3	23.7	23.7	23.7	25.3	25.3	23.7	23.7
Actuated g/C Ratio	0.51	0.51	0.68	0.68	0.68	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Clearance Time (s)	5.6	5.6	5.6	5.6	5.6	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1687	750	605	2333	304	353	373	373	373	373	373	373
v/s Ratio Prot	c0.05	c0.05	c0.05	c0.05	c0.05	c0.05	c0.05	c0.05	c0.05	c0.05	c0.05	c0.05
v/s Ratio Perm	0.15	0.11	c0.23	0.19	0.19	c0.16	0.03	0.03	0.03	0.03	0.03	0.03
v/c Ratio	0.30	0.22	0.41	0.19	0.19	0.69	0.11	0.11	0.11	0.11	0.11	0.11
Uniform Delay, d1	14.0	13.4	6.4	5.8	5.8	34.8	29.9	29.9	29.3	29.3	29.3	29.3
Progression 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
Incremental Delay, d2	0.4	0.7	0.5	0.2	0.2	6.7	0.1	0.1	0.0	0.0	0.0	0.0
Delay (s)	14.4	14.1	6.8	5.9	5.9	41.6	30.0	29.3	29.3	29.3	29.3	29.3
Level of Service	B	B	A	A	A	D	C	C	C	C	C	C
Approach Delay (s)	14.3	6.3	6.3	36.5	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3
Approach LOS	B	A	A	D	C	C	C	C	C	C	C	C
Intersection Summary												
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service										B
HCM 2000 Volume to Capacity ratio	0.50											
Actuated Cycle Length (s)	100.0	Sum of lost time (s)										12.0
Intersection Capacity Utilization	67.0%	ICU Level of Service										C
Analysis Period (min)	15											
c Critical Lane Group												

3430 Carling Avenue 2022 Existing PM Peak 3:25 pm 12-01-2022
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Synchro 11 Report
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Queues

1: Moodie Drive & Carling Avenue

12-01-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
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HCM Unsignalized Intersection Capacity Analysis
3: Site East & Carling Avenue

12-01-2022

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	595	0	0	410	0	0
Future Volume (veh/h)	595	0	0	410	0	0
Sign Control	Free		Free	Stop		
Grade	0%		0%	0%		
Peak Hour Factor	0.25	0.25	0.25	0.25	0.25	0.25
Hourly flow rate (vph)	2380	0	0	1640	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)						
pK, platoon unblocked						
vC, conflicting volume		2380		3200	1190	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		2380		3200	1190	
IC, single (s)		4.1		6.8	6.9	
IC, 2 stage (s)						
IF (s)		2.2		3.5	3.3	
p0 queue free %		100		100	100	
cM capacity (veh/h)		206		8	183	
Direction, Lane #						
Volume Total	1587	793	547	1093	0	0
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0
vSH	1700	1700	206	1700	1700	
Volume to Capacity	0.93	0.47	0.00	0.64	0.00	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS					A	
Approach Delay (s)	0.0	0.0	0.0	0.0		
Approach LOS					A	
Intersection Summary						
Average Delay	0.0					
Intersection Capacity Utilization	20.7%					
ICU Level of Service	A					
Analysis Period (min)	15					

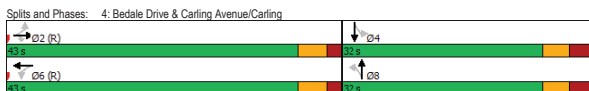
3430 Carling Avenue 2022 Existing PM Peak 3:25 pm 12-01-2022
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Queues
4: Bedale Drive & Carling Avenue/Carling

12-01-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2	2	6	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.6	25.6	25.6	25.6	25.6	25.6	29.1	29.1	29.1	29.1	29.1	29.1
Total Split (s)	43.0	43.0	43.0	43.0	43.0	43.0	32.0	32.0	32.0	32.0	32.0	32.0
Total Split (%)	57.3%	57.3%	57.3%	57.3%	57.3%	57.3%	42.7%	42.7%	42.7%	42.7%	42.7%	42.7%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.9	1.9	1.9	1.9	1.9	1.9	2.8	2.8	2.8	2.8	2.8	2.8
Last Time Adjust (s)	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	-2.1	-2.1	-2.1	-2.1	-2.1	-2.1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min	C-Min	None	None	None	None	None	None
Act Effect Green (s)	60.3	60.3	60.3	60.3	60.3	60.3	None	None	None	None	None	None
Actuated g/C Ratio	0.80	0.80	0.80	0.80	0.80	0.80	0.20	0.20	0.20	0.20	0.20	0.20
v/c Ratio	0.02	0.22	0.01	0.04	0.24	0.24	0.11	0.11	0.11	0.11	0.11	0.11
Control Delay	5.5	4.2	0.3	5.3	4.3	4.3	7.9	7.9	7.9	7.9	7.9	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.5	4.2	0.3	5.3	4.3	4.3	7.9	7.9	7.9	7.9	7.9	7.9
LOS	A	A	A	A	A	A	A	A	A	A	A	A
Approach Delay	4.2						4.3			7.9		
Approach LOS	A						A			A		
Queue Length 50th (m)	0.3	11.6	0.0	0.8	12.7	12.7	0.0	0.0	0.0	0.0	0.0	0.0
Queue Length 95th (m)	2.5	31.6	0.5	4.9	34.2	34.2	5.4	5.4	5.4	5.4	5.4	5.4
Internal Link Dist (m)	432.6						93.8			51.2		
Turn Bay Length (m)	30.0						15.0			30.0		
Base Capacity (vph)	582	2782	1115	609	2776	2776	581	581	581	499	499	499
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.22	0.01	0.04	0.24	0.24	0.06	0.06	0.06	0.06	0.06	0.06
Intersection Summary												
Area Type:	Other											
Cycle Length: 75												
Actuated Cycle Length: 75												
Offset: 7 (9%), Referenced to phase 2:EBLT and 6:WBTL, Start of Green												
Natural Cycle: 55												
Control Type: Actuated-Coordinated												
Maximum v/c Ratio: 0.24												
Intersection Signal Delay: 4.4												
Intersection Capacity Utilization 45.6%												
ICU Level of Service A												
Analysis Period (min) 15												



3430 Carling Avenue 2022 Existing PM Peak 3:25 pm 12-01-2022
CS

Synchro 11 Report
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Queues
4: Bedale Drive & Carling Avenue/Carling

12-01-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	10	595	15	25	630	10	5	0	30	25	0	5
Future Volume (vph)	10	595	15	25	630	10	5	0	30	25	0	5
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0	15.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1	1	1	0	0	0	0	0	0	0	0	0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.96	0.99	1.00			0.97			0.97		0.98
Frt		0.850		0.998			0.884			0.884		0.978
Fit Protected	0.950			0.950			0.993			0.960		0.960
Satd. Flow (prot)	1729	3458	1432	1729	3450	0	0	1647	0	1648	0	1648
Fit Permitted	0.398			0.419			0.960			0.755		0.755
Satd. Flow (perm)	724	3458	1375	757	3450	0	0	1494	0	1275	0	1275
Right Turn on Red		Yes		Yes		Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		45		3			38			38		38
Link Speed (kh)		60		60			40			40		40
Link Distance (m)		456.6		117.8			75.2			83.5		83.5
Travel Time (s)		27.4		7.1			6.8			7.5		7.5
Confl. Peds. (#/hr)		11	11				7			20	20	7
Confl. Bikes (#/hr)							2			10	10	5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	0%	8%	0%	0%	0%	0%	0%	0%	4%	0%	0%
Adj. Flow (vph)	10	613	15	26	649	10	5	0	31	26	0	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	613	15	26	659	0	0	36	0	0	31	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.7	0.0	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Link Offset(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crosswalk Width(m)	4.8			4.8			4.8			4.8		4.8
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (kh)	24	14	24	14	24	14	24	14	24	14	24	14
Number of Detectors	1	2	1	1	2	1	2	1	2	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Left
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	30.5	6.1	30.5	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	1.8	6.1	1.8	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7			28.7			28.7		28.7
Detector 2 Size(m)	1.8			1.8			1.8			1.8		1.8
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		0.0
Turn Type	Perm</											

Queues
1: Moodie & Carling

12-01-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	10	410	155	190	415	10	230	10	100	10	15	10
Traffic Volume (vph)	10	410	155	190	415	10	230	10	100	10	15	10
Future Volume (vph)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Ideal Flow (vphpl)	0.0	125.0	75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Length (m)	0.0	1	1	0	0	0	0	1	0	0	0	0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor				1.00			1.00	0.99		0.99		
Frt		0.850		0.996			0.850		0.961			
Fit Protected		0.999		0.950			0.954		0.986			
Satd. Flow (prot)	0	3368	1547	1712	3376	0	1613	1488	0	1501	0	0
Fit Permitted		0.943		0.449			0.709		0.301			
Satd. Flow (perm)	0	3198	1547	809	3376	0	0	1197	1469	0	1371	0
Right Turn on Red		Yes		Yes		Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		155		3			100		10			
Link Speed (kh)		60		60			80		50			
Link Distance (m)		253.2		802.9			206.2		72.7			
Travel Time (s)		15.2		48.2			9.3		5.2			
Confl. Peds. (#/hr)						6		1				1
Confl. Bikes (#/hr)									1			10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	0%	1%	2%	0%	8%	0%	4%	0%	0%	50%
Adj. Flow (vph)	10	410	155	190	415	10	230	10	100	10	15	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	420	155	190	425	0	240	100	0	35	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Right
Median Width(m)		3.7		3.7			0.0		0.0		0.0	
Link Offset(m)		0.0		0.0			0.0		0.0		0.0	
Crosswalk Width(m)		4.8		4.8			4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (kh)	24	14	24	14	24	14	24	14	24	14	24	14
Number of Detectors	1	2	1	1	2	1	2	1	1	2	1	2
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	0.0	30.5	6.1	6.1	30.5	0.0	30.5
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	0.0	1.8	6.1	6.1	1.8	0.0	1.8
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7		28.7			28.7		28.7		28.7	
Detector 2 Size(m)		1.8		1.8			1.8		1.8		1.8	
Detector 2 Type		Cl+Ex		Cl+Ex			Cl+Ex		Cl+Ex		Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0		0.0			0.0		0.0		0.0	
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2		6		8		8		4		4
Permitted Phases	2	2	6	6	8	8	8	4	4	4	4	4

3430 Carling Avenue 2024 Future Background AM Peak 3:29 pm 12-01-2022
CS Synchro 11 Report Page 1

HCM Signalized Intersection Capacity Analysis
1: Moodie & Carling

12-01-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	10	410	155	190	415	10	230	10	100	10	15	10
Traffic Volume (vph)	10	410	155	190	415	10	230	10	100	10	15	10
Future Volume (vph)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Ideal Flow (vphpl)	0.0	125.0	75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.6	5.6	5.6	5.6	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.95	1.00	1.00	0.95			1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00			1.00	0.99	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00			1.00	0.85	0.96	1.00	0.85	0.96
Fit Protected	1.00	1.00	0.95	1.00			0.95	1.00	0.99	1.00	0.95	1.00
Satd. Flow (prot)	3368	1547	1712	3376			1611	1488	1500	1501	1488	1500
Fit Permitted	0.94	1.00	0.45	1.00			0.71	1.00	0.30	1.00	0.30	1.00
Satd. Flow (perm)	3197	1547	809	3376			1197	1468	1370	1370	1468	1370
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	410	155	190	415	10	230	10	100	10	15	10
RTOR Reduction (vph)	0	0	73	0	1	0	0	0	75	0	8	0
Lane Group Flow (vph)	0	420	82	190	424	0	240	25	0	27	0	0
Confl. Peds. (#/hr)						6		1				10
Confl. Bikes (#/hr)									1			10
Heavy Vehicles (%)	0%	2%	0%	1%	2%	0%	8%	0%	4%	0%	0%	50%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2		6		8		8		4		4
Permitted Phases	2	2	6	6	8	8	8	4	4	4	4	4
Actuated Green, G (s)	69.1	68.1	86.1	86.1	86.1	32.3	32.3	32.3	32.3	32.3	32.3	32.3
Effective Green, g (s)	69.1	68.1	86.1	86.1	86.1	32.3	32.3	32.3	32.3	32.3	32.3	32.3
Actuated g/C Ratio	0.53	0.53	0.66	0.66	0.66	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Clearance Time (s)	5.6	5.6	5.6	5.6	5.6	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1699	822	614	2237			297	364		340		340
v/s Ratio Prot		c0.03		0.13								
v/s Ratio Perm	0.13	0.05	c0.18				c0.20	0.02		0.02		0.08
v/C Ratio	0.25	0.10	0.31	0.19			0.81	0.07		0.08		0.08
Uniform Delay, d1	16.4	15.1	8.7	8.5			45.9	37.3		37.5		37.5
Progression Factor	1.00	1.00	1.00	1.00			1.00	1.00		1.00		1.00
Incremental Delay, d2	0.3	0.2	0.3	0.2			14.8	0.1		0.1		0.1
Delay (s)	16.8	15.3	9.0	8.7			60.7	37.4		37.6		37.6
Level of Service	B	B	A	A			E	D		D		D
Approach Delay (s)	16.4		8.8				53.9			37.6		
Approach LOS	B		A				D			D		D

Intersection Summary			
HCM 2000 Control Delay	22.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.2
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

3430 Carling Avenue 2024 Future Background AM Peak 3:29 pm 12-01-2022
CS Synchro 11 Report Page 3

Queues
1: Moodie & Carling

12-01-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2	2	1	6		8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	28.6	28.6	28.6	10.6	28.6		31.0	31.0	31.0	31.0	31.0	31.0
Total Split (s)	44.0	44.0	44.0	26.0	70.0		60.0	60.0	60.0	60.0	60.0	60.0
Total Split (%)	33.8%	33.8%	33.8%	20.0%	53.8%		46.2%	46.2%	46.2%	46.2%	46.2%	46.2%
Maximum Green (s)	38.4	38.4	38.4	20.4	64.4		54.0	54.0	54.0	54.0	54.0	54.0
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.9	1.9	1.9	1.9	1.9		2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0</										

Queues
4: Bedale & Carling

12-01-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	15	545	20	20	585	15	20	10	50	10	10	15
Future Volume (vph)	15	545	20	20	585	15	20	10	50	10	10	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0	15.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1	1	1	0	0	0	0	0	0	0	0	0
Taper Length (m)	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.97	1.00	1.00	1.00	1.00	0.99	0.99	0.99	0.99	0.99	0.99
Frt	0.850	0.936	0.936	0.916	0.916	0.916	0.986	0.986	0.986	0.986	0.986	0.986
Fit Protected	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Satd. Flow (prot)	1729	3424	1547	1729	3363	0	0	1539	0	0	1247	0
Fit Permitted	0.425	0.449	0.449	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307
Satd. Flow (perm)	773	3424	1505	814	3363	0	0	1413	0	0	1129	0
Right Turn on Red	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Satd. Flow (RTOR)	45	5	5	5	5	5	5	5	5	5	5	5
Link Speed (kh)	60	60	60	60	60	60	60	60	60	60	60	60
Link Distance (m)	456.6	117.8	75.2	83.5	83.5	83.5	83.5	83.5	83.5	83.5	83.5	83.5
Travel Time (s)	27.4	7.1	6.8	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Confl. Peds. (#/hr)	1	4	4	1	1	1	7	7	7	7	7	7
Confl. Bikes (#/hr)	1	4	4	1	1	1	7	7	7	7	7	7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	0%	0%	2%	16%	23%	0%	0%	0%	100%	14%
Adj. Flow (vph)	15	545	20	20	585	15	20	10	50	10	10	15
Shared Lane Traffic (%)	15	545	20	20	600	0	0	80	0	0	35	0
Lane Group Flow (vph)	15	545	20	20	600	0	0	80	0	0	35	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.7	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Link Offset(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crosswalk Width(m)	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
Two way Left Turn Lane	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Headway Factor	24	14	24	14	24	14	24	14	24	14	24	14
Turning Speed (kh)	1	2	1	1	2	1	2	1	2	1	2	1
Number of Detectors	1	2	1	1	2	1	2	1	2	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Left	Thru	Left	Thru	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	30.5	6.1	30.5	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	1.8	6.1	1.8	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7
Detector 2 Size(m)	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 2 Channel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	2	2	6	6	8	8	8	8	8	4	4	4
Permitted Phases	2	2	6	6	8	8	8	8	8	4	4	4

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HCM Signalized Intersection Capacity Analysis
4: Bedale & Carling

12-01-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	15	545	20	20	585	15	20	10	50	10	10	15
Future Volume (vph)	15	545	20	20	585	15	20	10	50	10	10	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost Time (s)	5.6	5.6	5.6	5.6	5.6	5.6	6.1	6.1	6.1	6.1	6.1	6.1
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frb, ped/bikes	1.00	1.00	0.97	1.00	1.00	1.00	0.99	0.99	0.99	0.99	0.99	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	1.00	0.92	0.92	0.92	0.92	0.92	0.92
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	1728	3424	1505	1723	3364	0	1538	1242	0	0	1247	0
Fit Permitted	0.43	1.00	1.00	0.45	1.00	0.307	0.91	0.886	0.307	0.307	0.886	0.307
Satd. Flow (perm)	773	3424	1505	813	3364	0	1412	1126	0	0	1126	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	545	20	20	585	15	20	10	50	10	10	15
RTOR Reduction (vph)	0	0	6	0	1	0	43	0	0	13	0	0
Lane Group Flow (vph)	15	545	14	20	599	0	0	37	0	0	22	0
Confl. Peds. (#/hr)	1	4	4	1	1	1	7	7	7	7	7	7
Confl. Bikes (#/hr)	1	4	4	1	1	1	7	7	7	7	7	7
Heavy Vehicles (%)	0%	1%	0%	0%	2%	16%	23%	0%	0%	0%	100%	14%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	2	2	6	6	8	8	8	8	8	4	4	4
Permitted Phases	2	2	6	6	8	8	8	8	8	4	4	4
Actuated Green, G (s)	52.7	52.7	52.7	52.7	52.7	52.7	10.6	10.6	10.6	10.6	10.6	10.6
Effective Green, G (s)	52.7	52.7	52.7	52.7	52.7	52.7	10.6	10.6	10.6	10.6	10.6	10.6
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.70	0.70	0.14	0.14	0.14	0.14	0.14	0.14
Clearance Time (s)	5.6	5.6	5.6	5.6	5.6	5.6	6.1	6.1	6.1	6.1	6.1	6.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	543	2405	1057	571	2363	199	159	159	159	159	159	159
v/s Ratio Prot	0.16	0.16	0.16	0.16	0.16	0.16	0.18	0.18	0.18	0.18	0.18	0.18
v/s Ratio Perm	0.02	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03
v/c Ratio	0.03	0.23	0.01	0.04	0.25	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Uniform Delay, d1	3.4	3.9	3.3	3.4	4.0	28.4	28.2	28.2	28.2	28.2	28.2	28.2
Progression 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
Incremental Delay, d2	0.1	0.2	0.0	0.1	0.3	0.5	0.4	0.4	0.4	0.4	0.4	0.4
Delay (s)	3.5	4.2	3.4	3.5	4.3	28.9	28.6	28.6	28.6	28.6	28.6	28.6
Level of Service	A	A	A	A	A	C	C	C	C	C	C	C
Approach Delay (s)	4.1	4.1	4.1	4.1	4.1	28.9	28.6	28.6	28.6	28.6	28.6	28.6
Approach LOS	A	A	A	A	A	C	C	C	C	C	C	C
Intersection Summary												
HCM 2000 Control Delay	6.3	HCM 2000 Level of Service										
HCM 2000 Volume to Capacity ratio	0.24											
Actuated Cycle Length (s)	75.0	Sum of lost time (s)										
Intersection Capacity Utilization	48.1%	ICU Level of Service										
Analysis Period (min)	15											
c Critical Lane Group												

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Queues
4: Bedale & Carling

12-01-2022

Lane Group	EBL	EBT	EBR	WBL
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HCM Signalized Intersection Capacity Analysis
4: Bedale & Carling

12-12-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	15	550	20	20	585	15	20	10	50	10	10	15
Future Volume (vph)	15	550	20	20	585	15	20	10	50	10	10	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost Time (s)	5.6	5.6	5.6	5.6	5.6				6.1			6.1
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95				1.00			1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00				0.99			0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00				1.00			1.00
Frt	1.00	1.00	0.85	1.00	1.00				0.92			0.94
Flt Protected	0.95	1.00	1.00	0.95	1.00				0.99			0.99
Satd. Flow (prot)	1728	3424	1505	1723	3364				1538			1242
Flt Permitted	0.43	1.00	1.00	0.45	1.00				0.91			0.89
Satd. Flow (perm)	773	3424	1505	810	3364				1412			1126
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	550	20	20	585	15	20	10	50	10	10	15
RTOR Reduction (vph)	0	0	6	0	1	0	0	43	0	0	13	0
Lane Group Flow (vph)	15	550	14	20	599	0	0	37	0	0	22	0
Confl. Peds. (#/hr)	1		4	4		1	1		7	7		1
Confl. Bikes (#/hr)												6
Heavy Vehicles (%)	0%	1%	0%	0%	2%	16%	23%	0%	0%	0%	100%	14%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2	2	2	6	6	8	8	8	4	4	4	4
Permitted Phases	2	2	6	6	6	8	8	8	4	4	4	4
Actuated Green, G (s)	52.7	52.7	52.7	52.7	52.7	52.7	52.7	52.7	10.6	10.6	10.6	10.6
Effective Green, g (s)	52.7	52.7	52.7	52.7	52.7	52.7	52.7	52.7	10.6	10.6	10.6	10.6
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.14	0.14	0.14	0.14
Clearance Time (s)	5.6	5.6	5.6	5.6	5.6				6.1			6.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0				3.0			3.0
Lane Grp Cap (vph)	543	2405	1057	569	2363				199			159
v/s Ratio Prot		0.16			c0.18							
v/s Ratio Perm	0.02	0.01	0.02				c0.03				0.02	
v/c Ratio	0.03	0.23	0.01	0.04	0.25				0.19			0.14
Uniform Delay, d1	3.4	4.0	3.3	3.4	4.0				28.4			28.2
Progression Factor	1.00	1.00	1.00	1.00	1.00				1.00			1.00
Incremental Delay, d2	0.1	0.2	0.0	0.1	0.3				0.5			0.4
Delay (s)	3.5	4.2	3.4	3.5	4.3				28.9			28.6
Level of Service	A	A	A	A	A				C			C
Approach Delay (s)	4.1			4.3		28.9			28.6			
Approach LOS	A			A		C			C			

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Queues
1: Moodie & Carling

12-12-2022

Detector Phase	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	28.6	28.6	28.6	10.6	28.6		31.0	31.0	31.0	31.0	31.0	31.0
Total Split (s)	40.0	40.0	40.0	25.0	65.0		35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	40.0%	40.0%	40.0%	25.0%	65.0%		35.0%	35.0%	35.0%	35.0%	35.0%	35.0%
Maximum Green (s)	34.4	34.4	34.4	19.4	59.4		29.0	29.0	29.0	29.0	29.0	29.0
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.9	1.9	1.9	1.9	1.9		2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.6	5.6	5.6	5.6		6.0	6.0	6.0	6.0	6.0	6.0
Lag												
Lead/Lag	Lag	Lag	Lag	Lead								
Lead/Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	C-Min	C-Min	None	C-Min		None	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	16.0	16.0	16.0	16.0	16.0		18.0	18.0	18.0	18.0	18.0	18.0
Pedestrian Calls (#/hr)	5	5	5	5	5		5	5	5	5	5	5
Act Effect Green (s)	49.2	49.2	49.2	66.6	66.6		21.8	21.8	21.8	21.8	21.8	21.8
Actuated g/C Ratio	0.49	0.49	0.49	0.67	0.67		0.22	0.22	0.22	0.22	0.22	0.22
v/c Ratio	0.30	0.36	0.43	0.19			0.76	0.39	0.09			0.07
Control Delay	17.9	3.8	10.1	7.4			53.3	6.8	21.1			21.1
Queue Delay	0.0	0.0	0.0	0.0			0.0	0.0	0.0			0.0
Total Delay	17.9	3.8	10.1	7.4			53.3	6.8	21.1			21.1
LOS	B	A	B	A			D	A	C			C
Approach Delay	12.4			8.4		31.8			21.1			
Approach LOS	B			A		C			C			
Queue Length 50th (m)	28.4	0.0	17.0	14.8			38.3	0.0	3.1			
Queue Length 95th (m)	52.0	17.4	35.6	27.3			56.8	14.5	9.3			
Internal Link Dist (m)	229.2			691.7			185.4		41.8			
Turn Bay Length (m)		125.0	75.0									
Base Capacity (vph)	1607	880	657	2285			372	565	455			
Staircase Cap Reductn	0	0	0	0			0	0	0			0
Spillback Cap Reductn	0	0	0	0			0	0	0			0
Storage Cap Reductn	0	0	0	0			0	0	0			0
Reduced v/c Ratio	0.30	0.36	0.38	0.19			0.56	0.32	0.07			0.07

Splits and Phases: 1: Moodie & Carling



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Queues
1: Moodie & Carling

12-12-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	10	480	320	250	420	10	195	15	180	10	10	10
Future Volume (vph)	10	480	320	250	420	10	195	15	180	10	10	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost Time (s)	5.6	5.6	5.6	5.6	5.6				6.0			6.0
Lane Util. Factor	0.95	1.00	1.00	0.95					1.00			1.00
Frpb, ped/bikes	1.00	0.96	1.00	1.00					1.00			0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00					1.00			1.00
Frt	1.00	0.85	1.00	1.00					1.00			0.95
Flt Protected	1.00	1.00	0.95	1.00					0.96			0.98
Satd. Flow (prot)	3454	1462	1675	3411					1690			1698
Flt Permitted	0.94	1.00	0.40	1.00					0.72			0.88
Satd. Flow (perm)	3267	1462	705	3411					1272			1529
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	480	320	250	420	10	195	15	180	10	10	10
RTOR Reduction (vph)	0	0	163	0	1	0	0	0	141	0	8	0
Lane Group Flow (vph)	0	490	157	250	429	0	0	0	210	39	0	22
Confl. Peds. (#/hr)	3	6	6	6	429	3	1	4	4	4	1	4
Confl. Bikes (#/hr)												9
Heavy Vehicles (%)	0%	0%	2%	3%	1%	0%	3%	0%	1%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	2	2	6	6	8	8	8	4	4	4	4	4
Permitted Phases	2	2	6	6	6	8	8	8	4	4	4	4
Actuated Green, G (s)	49.2	49.2	66.6	66.6	66.6		21.8	21.8	21.8	21.8	21.8	21.8
Effective Green, g (s)	49.2	49.2	66.6	66.6	66.6		21.8	21.8	21.8	21.8	21.8	21.8
Actuated g/C Ratio	0.49	0.49	0.67	0.67	0.67		0.22	0.22	0.22	0.22	0.22	0.22
Clearance Time (s)	5.6	5.6	5.6	5.6			6					

Queues
1: Moodie & Carling

12-12-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	10	430	165	210	440	10	245	10	115	10	15	10
Traffic Volume (vph)	10	430	165	210	440	10	245	10	115	10	15	10
Future Volume (vph)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Ideal Flow (vphpl)	0.0	125.0	75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Length (m)	0.0	1	1	0	0	0	0	0	1	0	0	0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor				1.00			1.00	0.99		0.99		
Frt		0.850		0.997			0.850		0.961			
Fit Protected		0.999		0.950			0.954		0.986			
Satd. Flow (prot)	0	3388	1547	1712	3380	0	1612	1488	0	1501	0	0
Fit Permitted		0.942		0.432			0.709		0.300			
Satd. Flow (perm)	0	3195	1547	778	3380	0	1197	1469	0	1370	0	0
Right Turn on Red		Yes		Yes		Yes	Yes		Yes		Yes	
Satd. Flow (RTOR)		165		2			115		10			
Link Speed (kh)		60		60			80		50			
Link Distance (m)		253.2		711.9			206.2		72.7			
Travel Time (s)		15.2		42.7			9.3		5.2			
Confl. Peds. (#/hr)						6	1		1			10
Confl. Bikes (#/hr)												
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	0%	1%	2%	0%	8%	0%	4%	0%	0%	50%
Adj. Flow (vph)	10	430	165	210	440	10	245	10	115	10	15	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	440	165	210	450	0	255	115	0	35	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left
Median Width(m)		3.7		3.7			0.0		0.0		0.0	
Link Offset(m)		0.0		0.0			0.0		0.0		0.0	
Crosswalk Width(m)		4.8		4.8			4.8		4.8		4.8	
Two Way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (kh)	24	14	24	14	24	14	24	14	24	14	24	14
Number of Detectors	1	2	1	1	2	1	2	1	1	2	1	2
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	0.0	30.5	6.1	6.1	30.5	0.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	0.0	1.8	6.1	6.1	1.8	0.0	0.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7			28.7		28.7		28.7	
Detector 2 Size(m)	1.8			1.8			1.8		1.8		1.8	
Detector 2 Type	Cl+Ex			Cl+Ex			Cl+Ex		Cl+Ex		Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0		0.0		0.0	
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	Perm	Perm	NA	NA
Protected Phases		2		6			8		8		4	
Permitted Phases	2	2	6	6	8	8	8	8	4	4	4	4

3430 Carling Avenue 2029 Ultimate AM Peak 3:35 pm 12-01-2022
CS Synchro 11 Report Page 1

HCM Signalized Intersection Capacity Analysis
1: Moodie & Carling

12-12-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	10	430	165	210	440	10	245	10	115	10	15	10
Traffic Volume (vph)	10	430	165	210	440	10	245	10	115	10	15	10
Future Volume (vph)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Ideal Flow (vphpl)	0.0	125.0	75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	5.6	5.6	5.6	5.6	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.95	1.00	1.00	0.95			1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00			1.00	0.99	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00			1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	1.00	1.00			1.00	0.85	0.96		1.00	0.96
Fit Protected	1.00	1.00	0.95	1.00			0.95	1.00	0.99		1.00	0.99
Satd. Flow (prot)	3388	1547	1712	3379			1610	1468	1500		1501	1468
Fit Permitted	0.94	1.00	0.43	1.00			0.71	1.00	0.90		0.71	1.00
Satd. Flow (perm)	3195	1547	779	3379			1196	1468	1369		1370	1468
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	430	165	210	440	10	245	10	115	10	15	10
RTOR Reduction (vph)	0	0	81	0	1	0	0	0	85	0	7	0
Lane Group Flow (vph)	0	440	84	210	449	0	255	30	0	28	0	0
Confl. Peds. (#/hr)						6	1		1			10
Confl. Bikes (#/hr)												
Heavy Vehicles (%)	0%	2%	0%	1%	2%	0%	8%	0%	4%	0%	0%	50%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	Perm	Perm	NA	NA
Protected Phases		2		6			8		8		4	
Permitted Phases	2	2	6	6	8	8	8	8	4	4	4	4
Actuated Green, G (s)	66.5	66.5	84.4	84.4	84.4	34.0	34.0	34.0	34.0	34.0	34.0	34.0
Effective Green, g (s)	66.5	66.5	84.4	84.4	84.4	34.0	34.0	34.0	34.0	34.0	34.0	34.0
Actuated g/C Ratio	0.51	0.51	0.65	0.65	0.65	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.6	5.6	5.6	5.6	5.6	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1634	791	594	2193			312	383		358		
v/s Ratio Prot		c0.03		0.13								
v/s Ratio Perm	0.14	0.05	c0.20				c0.21	0.02		0.02		0.02
v/c Ratio	0.27	0.11	0.35	0.20			0.82	0.08		0.08		0.08
Uniform Delay, d1	18.0	16.4	9.6	9.2			45.1	36.2		36.2		36.2
Progression Factor	1.00	1.00	1.00	1.00			1.00	1.00		1.00		1.00
Incremental Delay, d2	0.4	0.3	0.4	0.2			15.2	0.1		0.1		0.1
Delay (s)	18.4	16.7	9.9	9.4			60.2	36.3		36.3		36.3
Level of Service	B	B	A	A			E	D		D		D
Approach Delay (s)	17.9			9.6			52.8			36.3		
Approach LOS	B			A			D			D		D
Intersection Summary												
HCM 2000 Control Delay				22.7			HCM 2000 Level of Service		C			
HCM 2000 Volume to Capacity ratio				0.50								
Actuated Cycle Length (s)				130.0			Sum of lost time (s)		17.2			
Intersection Capacity Utilization				61.9%			ICU Level of Service		B			
Analysis Period (min)				15								
c Critical Lane Group												

3430 Carling Avenue 2029 Ultimate AM Peak 3:35 pm 12-01-2022
CS Synchro 11 Report Page 3

Queues
1: Moodie & Carling

12-12-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2	2	1	6		8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	28.6	28.6	28.6	10.6	28.6		31.0	31.0	31.0	31.0	31.0	31.0
Total Split (s)	44.0	44.0	44.0	26.0	70.0		60.0	60.0	60.0	60.0	60.0	60.0
Total Split (%)	33.8%	33.8%	33.8%	20.0%	53.8%		46.2%	46.2%	46.2%	46.2%	46.2%	46.2%
Maximum Green (s)	38.4	38.4	38.4	20.4	64.4		54.0	54.0	54.0	54.0	54.0	54.0
Yellow Time (s)	3.7	3.7	3.7									

Queues
4: Bedale & Carling

12-12-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Volume (vph)	15	575	20	20	615	15	20	10	50	10	10	15
Future Volume (vph)	15	575	20	20	615	15	20	10	50	10	10	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0	15.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Lanes	1	1	1	0	0	0	0	0	0	0	0	0
Taper Length (m)	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.996			0.916		0.942		0.986	
Flt Protected	0.950		0.950				0.988		0.986			
Satd. Flow (prot)	1695	3390	1517	1695	3377	0	0	1615	0	0	1657	0
Flt Permitted	0.413			0.436			0.907		0	0	0.894	0
Satd. Flow (perm)	737	3390	1517	778	3377	0	0	1482	0	0	1503	0
Right Turn on Red		Yes		Yes		Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		45				50		15		15		
Link Speed (km/h)	60		60		40		40		40		40	
Link Distance (m)	542.9		117.8		75.2		83.5		83.5		7.5	
Travel Time (s)	32.6		7.1		6.8		7.5		7.5		1.00	
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
Adj. Flow (vph)	15	575	20	20	615	15	20	10	50	10	10	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	15	575	20	20	630	0	0	80	0	0	35	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width (m)	3.7		3.7		0.0		0.0		0.0		0.0	
Link Offset (m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width (m)	4.8		4.8		4.8		4.8		4.8		4.8	
Two way Left Turn Lane												
Headway Factor	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Turning Speed (km/h)	24		14		24		14		24		14	
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size (m)	6.1	1.8	6.1	6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex	Ch+Ex		Ch+Ex	Ch+Ex		Ch+Ex	Ch+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position (m)	28.7		28.7		28.7		28.7			28.7		
Detector 2 Size (m)	1.8		1.8		1.8		1.8			1.8		
Detector 2 Type	Ch+Ex		Ch+Ex		Ch+Ex		Ch+Ex			Ch+Ex		
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0			0.0		
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases	2		2		6		8			4		4
Permitted Phases	2		2		6		8			4		4
Detector Phase	2	2	2	6	6		8	8		4	4	4
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	25.6	25.6	25.6	25.6	25.6		29.1	29.1		29.1	29.1	

3430 Carling Avenue 2029 Ultimate AM Peak 3:35 pm 12-01-2022
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HCM Signalized Intersection Capacity Analysis
4: Bedale & Carling

12-12-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Volume (vph)	15	575	20	20	615	15	20	10	50	10	10	15
Future Volume (vph)	15	575	20	20	615	15	20	10	50	10	10	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost Time (s)	5.6	5.6	5.6	5.6	5.6		6.1		6.1		6.1	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00		1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		0.92		0.94		0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.99		0.99		0.99	
Satd. Flow (prot)	1695	3390	1517	1695	3378		1614		1657		1657	
Flt Permitted	0.41	1.00	1.00	0.44	1.00		0.91		0.89		0.89	
Satd. Flow (perm)	737	3390	1517	777	3378		1481		1503		1503	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00		1.00		1.00		1.00	
Adj. Flow (vph)	15	575	20	20	615		15		20		10	
RTOR Reduction (vph)	0	0	6	0	1		0		43		0	
Lane Group Flow (vph)	15	575	14	20	629		0		37		0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases	2		2		6		8			4		4
Permitted Phases	2		2		6		8			4		4
Actuated Green, G (s)	52.7	52.7	52.7	52.7	52.7		10.6		10.6		10.6	
Effective Green, g (s)	52.7	52.7	52.7	52.7	52.7		10.6		10.6		10.6	
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.70		0.14		0.14		0.14	
Clearance Time (s)	5.6	5.6	5.6	5.6	5.6		6.1		6.1		6.1	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	517	2382	1065	545	2373		209		212		212	
v/s Ratio Prot	0.17		0.01	0.03			c0.19		0.01		0.01	
v/s Ratio Perm	0.03	0.24	0.01	0.04	0.26		0.18		0.10		0.10	
Uniform Delay, d1	3.4	4.0	3.3	3.4	4.1		28.4		28.1		28.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.1	0.2	0.0	0.1	0.3		0.4		0.2		0.2	
Delay (s)	3.5	4.2	3.4	3.5	4.3		28.8		28.3		28.3	
Level of Service	A	A	A	A	A		C		C		C	
Approach Delay (s)	4.2		4.3		28.8		28.3		28.3		28.3	
Approach LOS	A		A		C		C		C		C	
Intersection Summary												
HCM 2000 Control Delay	6.3		HCM 2000 Level of Service		A							
HCM 2000 Volume to Capacity ratio	0.25											
Actuated Cycle Length (s)	75.0		Sum of lost time (s)		11.7							
Intersection Capacity Utilization	39.4%		ICU Level of Service		A							
Analysis Period (min)	15											
c Critical Lane Group												

3430 Carling Avenue 2029 Ultimate AM Peak 3:35 pm 12-01-2022
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Queues
4: Bedale & Carling

12-12-2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	43.0	43.0	43.0	43.0	43.0		32.0		32.0		32.0	
Total Split (%)	57.3%	57.3%	57.3%	57.3%	57.3%		42.7%		42.7%		42.7%	
Maximum Green (s)	37.4	37.4	37.4	37.4	37.4		25.9		25.9		25.9	
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		3.3		3.3		3.3	
All-Red Time (s)	1.9	1.9	1.9	1.9	1.9		2.8		2.8		2.8	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0		0.0		0.0	
Total Lost Time (s)	5.6	5.6	5.6	5.6	5.6		6.1		6.1		6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0		3.0		3.0	
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min		None		None		None	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0		7.0		7.0	
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	13.0		16.0		16.0		16.0	
Pedestrian Calls (#/hr)	5	5	5	5	5		5		5		5	
Adj Effct Green (s)	55.0	55.0	55.0	55.0	55.0		12.6		12.6		12.6	
Actuated g/C Ratio	0.73	0.73	0.73	0.73	0.73		0.17		0.17		0.17	
v/c Ratio	0.03	0.23	0.02	0.04								

HCM Signalized Intersection Capacity Analysis

4: Bedale Drive /Bedale Drive & Carling Avenue/Carling

12-12-2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	15	645	20	30	685	15	10	0	35	30	0	10	
Future Volume (vph)	15	645	20	30	685	15	10	0	35	30	0	10	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	
Total Lost time (s)	5.6	5.6	5.6	5.6	5.6			6.1			6.1		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00			1.00		
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00			0.96			0.99		
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00			1.00			0.99		
Frt	1.00	1.00	0.85	1.00	1.00			0.90			0.97		
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.99			0.96		
Satd. Flow (prot)	1729	3458	1375	1714	3445			1546			1611		
Flt Permitted	0.39	1.00	1.00	0.41	1.00			0.91			0.75		
Satd. Flow (perm)	702	3458	1375	734	3445			1428			1255		
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	15	645	20	30	685	15	10	0	35	30	0	10	
RTOR Reduction (vph)	0	0	5	0	1	0	0	34	0	0	34	0	
Lane Group Flow (vph)	15	645	15	30	699	0	0	11	0	0	6	0	
Confl. Peds. (#/hr)			11	11			7		20	20		7	
Confl. Bikes (#/hr)						2			10			5	
Heavy Vehicles (%)	0%	0%	8%	0%	0%	0%	0%	0%	0%	4%	0%	0%	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA	Perm	NA	Perm	NA	
Protected Phases		2			6			8			4		
Permitted Phases	2		2	6			8			4			
Actuated Green, G (s)	54.7	54.7	54.7	54.7	54.7			8.6			8.6		
Effective Green, g (s)	54.7	54.7	54.7	54.7	54.7			8.6			8.6		
Actuated g/C Ratio	0.73	0.73	0.73	0.73	0.73			0.11			0.11		
Clearance Time (s)	5.6	5.6	5.6	5.6	5.6			6.1			6.1		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0		
Lane Grp Cap (vph)	511	2522	1002	535	2512			163			143		
v/s Ratio Prot		0.19			c0.20								
v/s Ratio Perm	0.02		0.01	0.04				c0.01			0.01		
v/c Ratio	0.03	0.26	0.01	0.06	0.28			0.07			0.04		
Uniform Delay, d1	2.8	3.4	2.8	2.9	3.4			29.6			29.5		
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00		
Incremental Delay, d2	0.1	0.2	0.0	0.2	0.3			0.2			0.1		
Delay (s)	2.9	3.6	2.8	3.1	3.7			29.8			29.7		
Level of Service	A	A	A	A	A			C			C		
Approach Delay (s)		3.6			3.7			29.8			29.7		
Approach LOS		A			A			C			C		
Intersection Summary													
HCM 2000 Control Delay	5.1		HCM 2000 Level of Service					A					
HCM 2000 Volume to Capacity ratio	0.25												
Actuated Cycle Length (s)	75.0						Sum of lost time (s)						11.7
Intersection Capacity Utilization	50.0%		ICU Level of Service					A					
Analysis Period (min)	15												
c Critical Lane Group													