1244 Kilborn Place

TIA Step 5 – Draft Final Report

Prepared for:
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TIA Draft Final Report

Parsons has been retained by the applicant Archdiocese of Ottawa-Cornwall to prepare a Transportation Impact Assessment (TIA) in support of a Zoning By-Law Amendment (ZBLA) for the development located at 1244 Kilborn Place in the Alta Vista Ward. This document follows the TIA process, as outlined in the City Transportation Impact Assessment (TIA) Guidelines, 2017.

1. Screening Form

The screening form confirmed the need for a TIA Report based on the Trip Generation trigger since the proposed development consists of more than 89 residential apartment units; the Location trigger since the development is located within 600 meters from the Billings Bridge Rapid Transit Station; and, Safety trigger since the development proposes a driveway which is located less than 150 meters from the existing Lamira/Kilborn roundabout intersection. The Screening Form and response to City comments has been provided in **Appendix A**.

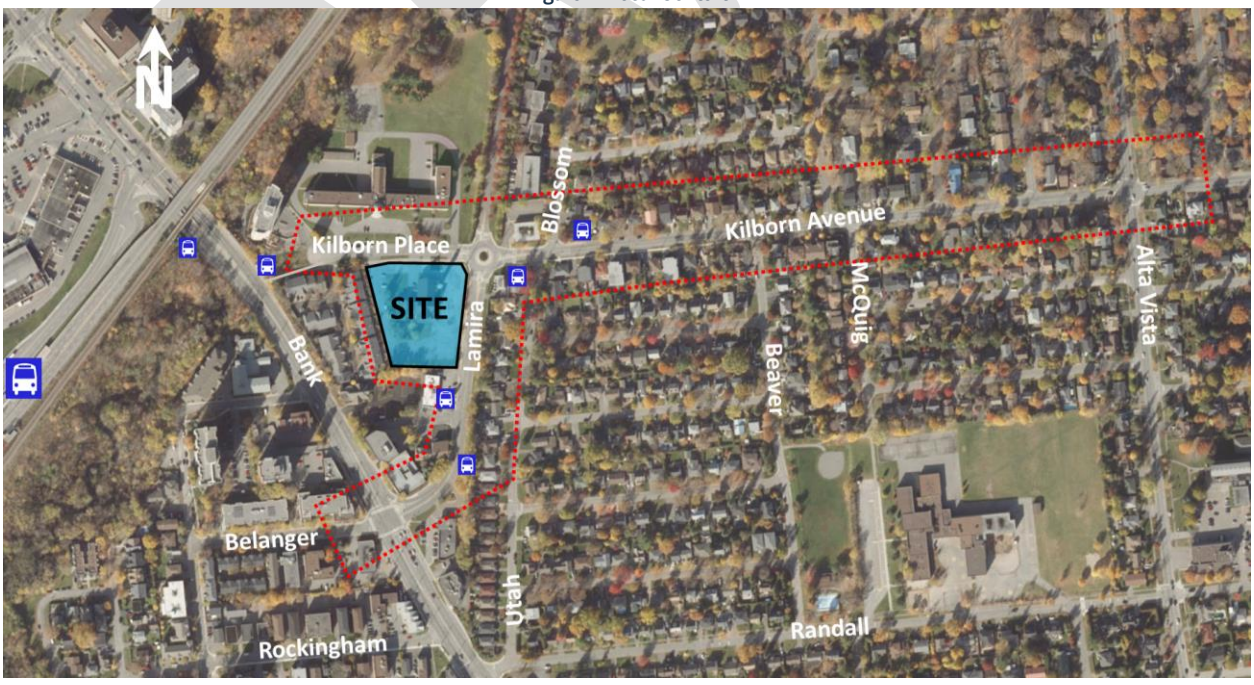
2. Scoping Report

2.1. Existing and Planned Conditions

2.1.1. PROPOSED DEVELOPMENT

Figure 1 illustrates the proposed development and surrounding study area. The proposed development is located at the municipal address of 1244 Kilborn Place, on the southwest corner of the Lamira/Kilborn roundabout intersection, east of Bank Street. The site is currently occupied by the St. Thomas d'Aquin Christian Church and related office facilities. The proponent has put forward a concept plan that would involve the re-development of the existing site with two, 4-storey mixed-use buildings resulting a total of approximately 118 residential units and 10,750 ft^2 of ground-floor retail space. This would require rezoning from the existing Minor Institutional Zone (I1A) to the General Mixed Use (GM) zoning designation. The site is anticipated to be served by underground parking spaces which are to be provided in accordance with the proposed zoning provisions and market demand.

Figure 1: Local Context



The proposed study area includes the intersections of Lamira/Kilborn, Bank/Lamira, Alta Vista/Kilborn, and roadway segments adjacent to site as shown in **Figure 1**. More details regarding the study area elements can be found in **Section 2.1.2**. The proposed site plan, as illustrated in **Figure 2,** is assumed to be built by 2024 in a single phase for the purposes of this TIA. The exact timing and phasing strategy remains to be confirmed at the time of SPA.

Figure 2: Proposed Conceptual Site Plan (Option 1)– 1244 Kilborn Place

2.1.2. EXISTING CONDITIONS

Area Road Network

Bank Street is a north-south arterial roadway that extends from Wellington Street in the north, to past the City's limits at Belmeade Road in the south. Within the study area, Bank Street has a four-lane cross-section with auxiliary turn lanes provided at major intersections. The posted speed limit is 50km/h.

Alta Vista Drive is a north-south major collector roadway that extends from Industrial Avenue in the south to Bank Street in the north. The posted speed limit is 50 km/h. Within the study area, Alta Vista Drive has a two-lane cross-section with a wide paved shoulder for cyclists. Auxiliary turn lanes provided at major intersections.

Kilborn Avenue is an east-west collector roadway east of Lamira Street, where it provides for a two-lane urban cross section, a painted center-line, painted on-street cycle lanes, and a boulevard with a concrete sidewalk arrangement along the south side of the corridor. The posted speed limit is 50 km/h.

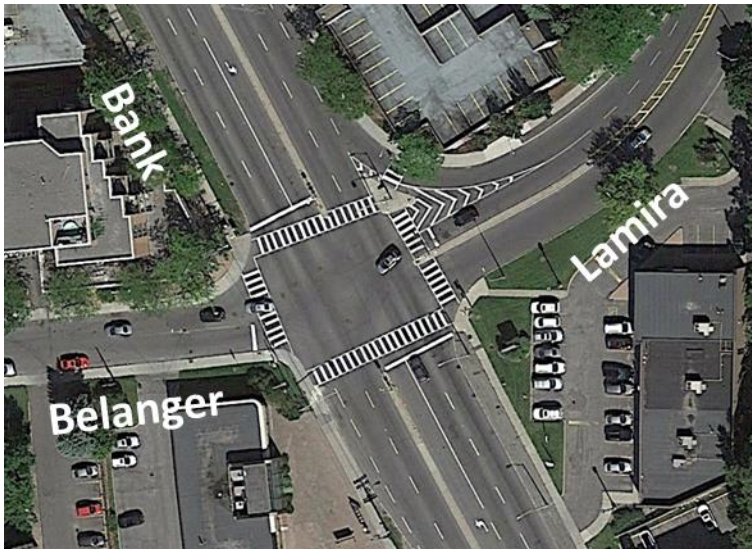
Kilborn Place is a local roadway, extending from Kilborn Avenue west of Lamira Street to the end of the road approximately 150 meters west (cul-de-sac). The two-lane local roadway provides for a boulevard with a sidewalk on the south side of the street, providing an active transportation connection to Bank Street to the west.

Lamira Street is a north-south collector roadway south of Kilborn Place and a local roadway north of Kilborn Place to the end of the road approximately 600 meters north (cul-de-sac). From Kilborn Place to the south, it extends to Bank Street where it then continues as Belanger Avenue. Within the study area, it has a two-lane cross-section with auxiliary turn lanes at Bank/Lamira intersection. The unposted speed limit is assumed 50 km/h. A sidewalk and boulevard are provided along the west portion of the corridor.

Existing Study Area Intersections

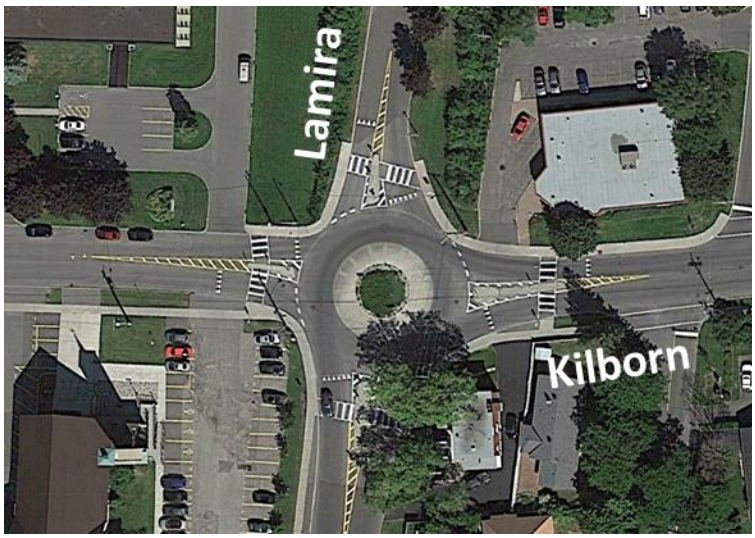
Bank/Lamira

The Bank/Lamira intersection is a four-legged signalized intersection. The eastbound approach consists of a shared all movement lane. The westbound approach consists of a through-left lane and a channelized right-turn lane with its own receiving lane. The north and southbound approaches both consist of a single left-turn lane, a through lane and a shared through-right lane. The westbound and eastbound through movements are prohibited Monday to Friday from 7:00 – 9:00 and 15:30 – 17:30 respectively. Southbound U-turns are prohibited. All approaches have high-visibility zebra stripe crosswalk treatments.



Lamira/Kilborn

The Lamira/Kilborn intersection is a four-legged roundabout intersection. All approaches consist of a single entry and single egress lane. All movements are permitted at this location. All approaches have high-visibility zebra stripe crosswalk treatments with typical roundabout refuge medians.



Alta Vista/Kilborn

The Alta Vista/Kilborn intersection is a four-legged signalized intersection. All movements consist of a single left-turn lane and a shared through-right lane. All movements are permitted at this location. While all pedestrian crossings, have standard crosswalk treatments, the intersection has been 'raised' to provide for a traffic calming effect.

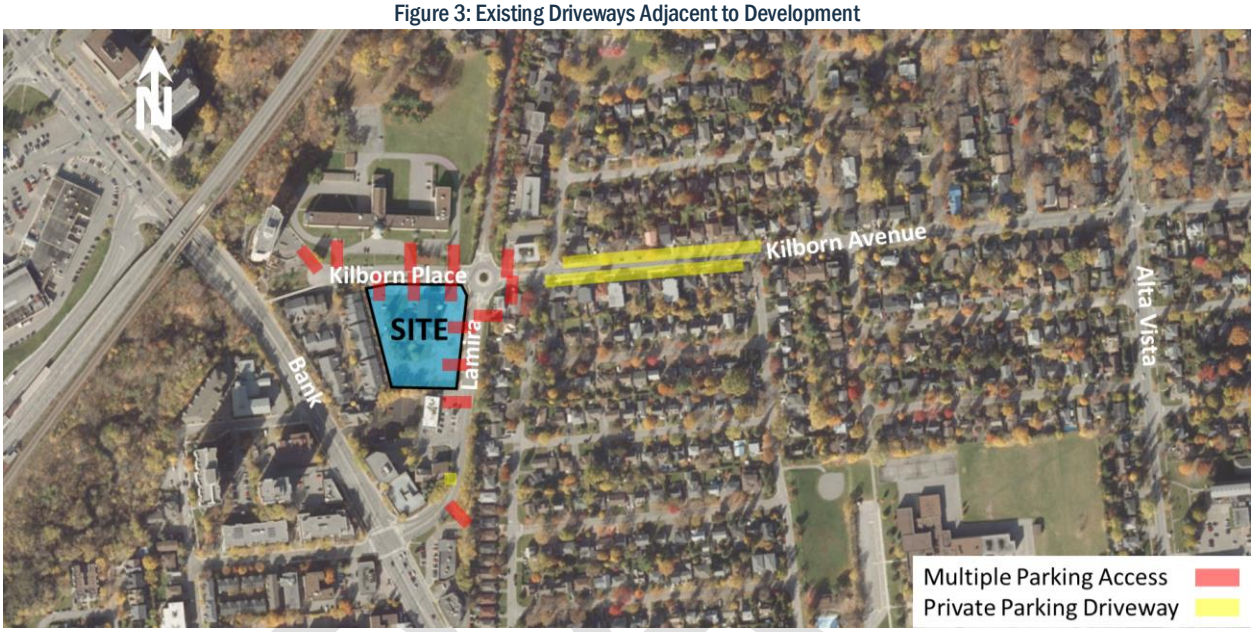
Existing Driveways to Adjacent Developments

There are multiple existing driveways within the influence of the proposed site. The existing driveways as shown in **Figure 3** include:

- Access Driveways to Kilborn Place:
  - 1244 – three accesses to the proposed site from Kilborn Place (existing church). These three accesses are proposed as a single consolidated access on the western limit of the site.
  - 1241 – a single access to surface and underground parking for Waterford Apartments (approximately 50m west of the site limits)
  - 1245 – three accesses to approximately 60 surface parking spots for the Stewardship (two of the accesses are directly across from the proposed site)
  - 1270 – access to what looks like a garbage drop-off point. Limited parking but could have relatively high activity (southeast quadrant of Lamira/Kilborn)
  - 1285 – access to a small retail block with an eye clinic. Has parking for approximately 28 vehicles (northeast quadrant of Lamira/Kilborn)
  - 1280 – 1331 – east of Lamira Street includes multiple private driveways to single detached homes
- Access Driveways to Lamira Street:
  - 1244 (Kilborn) – two accesses to the proposed site from Lamira Street (existing church). These two accesses will be removed and the only access to the site will be provided off of Kilborn Place.

- 1270 (Kilborn) – access to what looks like a garbage drop-off point. Limited parking but could have relatively high activity (southeast quadrant of Lamira/Kilborn)
- 2188 – access to a small retail block including a pizzeria, a bakery, a nut store and a barber shop. There is parking for approximately 24 vehicles (just south of the site limits)
- 1220 (Rooney's) – backdoor access to a single car parking space to the animal hospital (approximately 85m south of the site limits)
- 1395 (Bank) – access to a small medical building including dental, hearing and pharmacy uses. Approximately 30 parking spots available (approximately 120m south of the site limits)

Figure 3: Existing Driveways Adjacent to Development



Existing Area Traffic Management Measures

Below are the known existing area traffic management measures within the study area:

- Sidewalk facilities with some crosswalks including high-visibility zebra stripes at the intersection of Lamira/Kilborn, Bank/Lamira and Alta Vista/Kilborn;
- Kilborn Avenue has centerline flexible slow down signs;
- Kilborn Place and Avenue have stop for pedestrians sign at a PXO;
- Kilborn Avenue and Alta Vista Drive have share the road with cyclists sign;
- Channelized right-turns at Bank/Lamira intersection;
- On-street parking at intermittent locations on Kilborn Place/Avenue and Lamira Street;
- Elderly persons sign on Bank Street;
- Cul-de-sac treatment on Kilborn Place and Lamira Street to prevent shortcutting; and,
- Alta Vista/Kilborn intersection is considered a 'raised' intersection intended to reduce through-traffic speeds within the intersection.

Pedestrian/Cycling Network

Sidewalk facilities near the site are provided along both sides of Bank Street and Alta Vista Drive. Kilborn Place and Kilborn Avenue have sidewalk facilities on the south side of the roadway only. Lamira Street has sidewalks on the west side of the roadway south of Kilborn Place and no sidewalks north of Kilborn Place. There is a paved sidewalk connection between Bank Street and Kilborn Place, making a shorter and convenient walk to Billings Bridge Shopping Center and the BRT transitway, located approximately 550 meters from the site.

According to the City's Existing Cycling Network, Bank Street north of Ohio Street, Kilborn Avenue east of Lamira Street and Alta Vista Drive all have bike lanes. On-street bike lanes are currently provided on Kilborn Avenue, Alta Vista Drive and Bank Street as curbside facilities. Lamira Street is a suggested bike route.

Transit Network

The transit network for the study area is illustrated in **Figure 4** with nearby transit stops shown in **Figure 5**. Note that the larger bus icon represents Billings Bridge Rapid Transit Station, located approximately 550-meter walk from the site, which provides many different bus routes, including rapid, frequent, connection and local routes. The following OC Transpo routes currently operate within 600m walking distance to the site:

- **Rapid Transit Routes**: identified by OC Transpo as operating in all time periods and operates 7 days a week. Routes #97, #98 and #99 operate on the Bus Rapid Transitway (BRT) departing Hurdman LRT Station and continuing southbound with fast connection to Confederation LRT Line 1, Trillium LRT Line 2 and destinations in the south including The Ottawa McDonald Cartier Airport, Riverside South, Barrhaven and along Hunt Club Road. The nearest bus stops for these routes are available on the BRT transitway at Billings Bridge, approximately 550 meters walking from the site.
- **Frequent Transit Routes**: identified by OC Transpo as operating at a frequency of every 15 minutes or less on weekdays and operates 7 days a week. Routes #6, #10, #88, #90, and #111 operate within the transitway or on major arterial roads such as Baseline Road, Bank Street, Alta Vista Drive, Bronson Avenue, etc. Some routes provide connection to Confederation LRT Line 1 and Trillium LRT Line 2. All routes stop at Billings Bridge Rapid Transit Station located approximately 550 meters walk from the site, and route #6 has additional bus stops located on Bank Street, approximately 150-meter walk from the site via the pedestrian connection from Kilborn Place to Bank Street.
- **Local Transit Routes**: identified by OC Transpo as operating on custom routing and hours. Routes #48, #49, #92, #93, #96, #140, #190 and #199 operate on local roads with connections to larger stations. Bus route #48 operates on Kilborn Avenue and Lamira Street, with bus stops located less than 100 meters from the proposed site.
- **Connexion Transit Routes**: identified by OC Transpo as operating during peak periods only on weekdays. Routes #290, #291, #294 and #299 all provide fast connection to the Confederation LRT Line 1. The nearest bus stops for these routes are available on the BRT transitway at Billings Bridge, approximately 550 meters walking from the site.

Figure 4: Area Transit Network

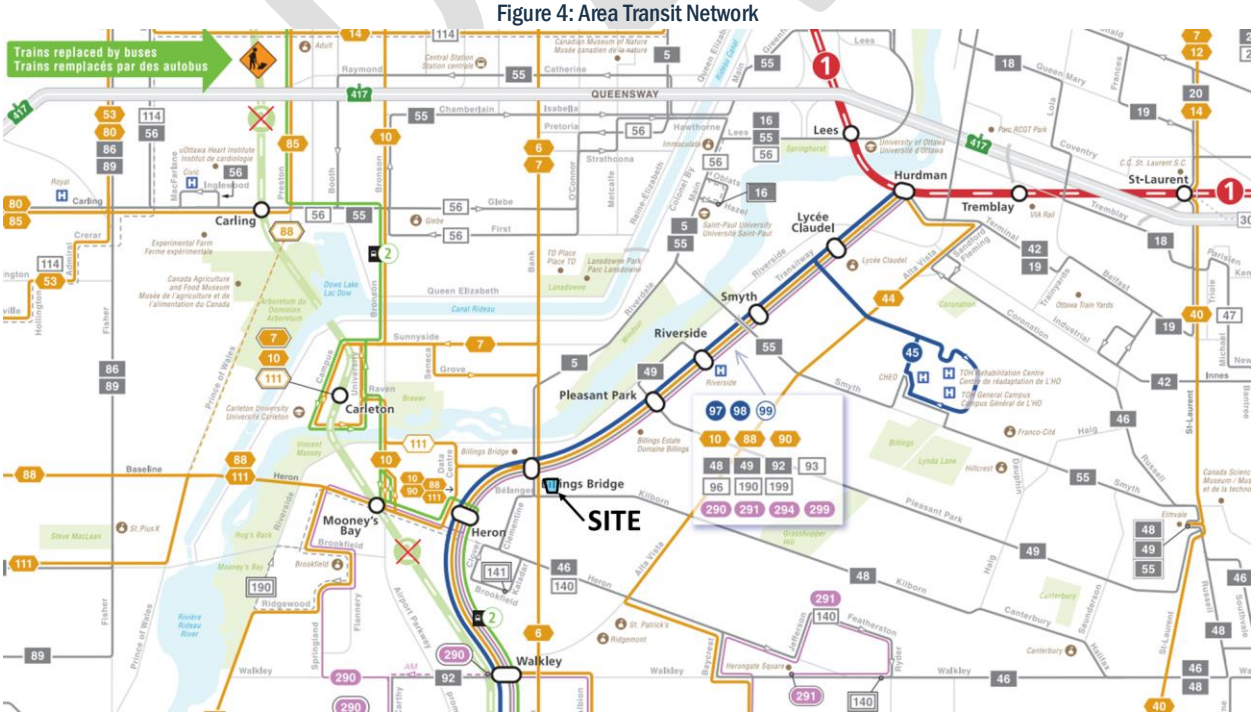
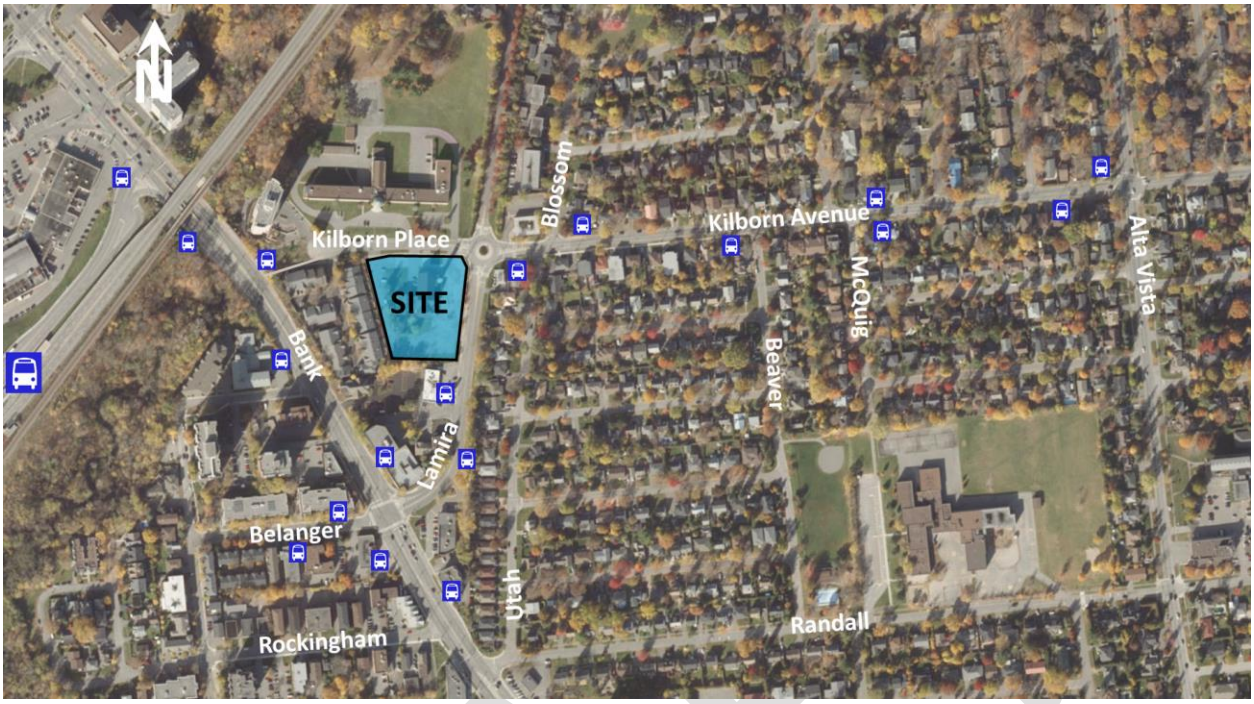


Figure 5: Nearby Transit Stops



Peak Hour Travel Demands

The existing peak hour vehicle traffic and active travel volumes within the study area are illustrated in **Figure 6** and **Figure 7** respectively. These volumes were obtained from the City of Ottawa (2015 to 2019 counts pre-COVID-19 conditions). Traffic count data has been provided in **Appendix B**.

Figure 6: Existing Peak Hour Traffic Volumes

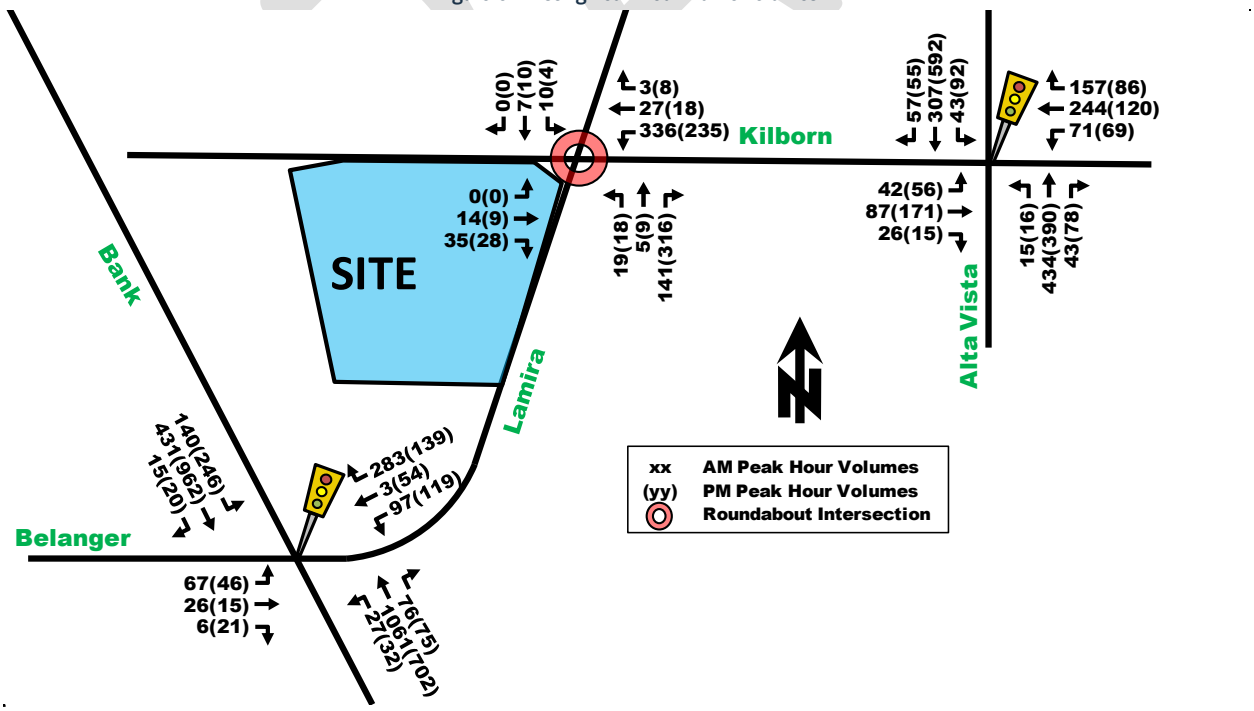
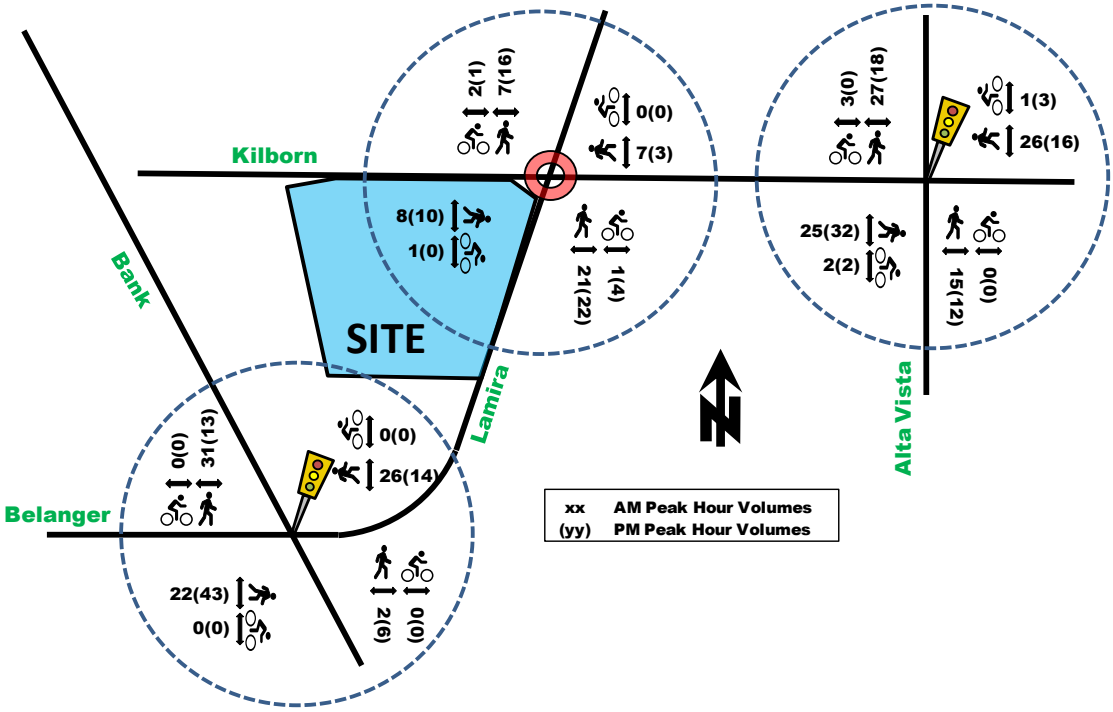


Figure 7: Existing Peak Hour Pedestrian/Cycling Volumes



Existing Road Safety Conditions

A five-year collision history data (2015-2019, inclusive) was requested and obtained from the City of Ottawa for all intersections and road segments within the study area. Upon analyzing the collision data, the total number of collisions observed within the study area was determined to be 68 collisions within the past five-years. Within the study area, the quantity of collisions at each location has occurred at a rate of:

- Alta Vista/Kilborn: 16
- Bank/Lamira: 38
- Lamira/Kilborn: 3
- Other Intersections: 4
- Mid-block on Lamira: 1
- Mid-block on Kilborn: 6

To help quantify the relative safety risk at intersections within the study area, an industry standard unit of measure for assessing collisions at an intersection was used based on the number collisions per million entering vehicles (MEV). An MEV value greater than 1.00 indicates a relatively high frequency of collisions; however, it does not explain the type or severity of collision. A secondary analysis is done to determine the severity of collision by representing the number of personal injuries rate as a percentage (%PIR) of the total number of collisions at a given intersection.

A high propensity (MEV > 1.00 or %PIR > 30%) would signal a potential intersection design deficiency or other contributing factor, such as poor intersection geometry, blind spots, poor lighting, excessive speeds, high amount of entry/exit driveways etc.

Intersections that met the MEV or PIR threshold include:

- Bank/Kilborn – 0.68 Collisions/MEV with 37% causing injury. Total of 38 collisions with 13 (34%) of all collisions involving turning movements, 12 (32%) of all collisions involving rear end, 5 (13%) involving angle, 4 (11%) involving single vehicle other, 3 (8%) other and 1 (3%) sideswipe.
  Overall, Bank/Kilborn does not have a high propensity to collisions (medium MEV of 0.68), but it was observed that of the 38 collisions, 3 involved pedestrians, all which led to non-fatal injuries. Of the collisions with pedestrians, all involved turning movements on behalf of the vehicle.

This intersection does not have a contemporary design that meets AODA standards. The City may consider pedestrian and cycling enhancements as part of the Bank Street Renewal Project (Riverside to Ledbury), such as ladder crosswalks and TWSIs, which may help reduce the risk of pedestrian collisions.

Intersections that did not meet the MEV or PIR threshold and do not warrant further analysis include:

- Alta Vista/Kilborn – 0.33 Collisions/MEV with 13% causing injury. Total of 16 collisions with 6 (38%) of all collisions involving angle and 5 (31%) involving rear end.
- Lamira/Kilborn – 0.17 Collisions/MEV with 0% causing injury.

Other collisions within the study area include:

- There was a total of 7 collisions between intersections (mid-block segments), with the majority, 6 (86%) of them occurring on Kilborn Avenue between Lamira/Kilborn and Alta Vista/Kilborn. Of these mid-block collisions, 33% resulted in non-fatal injury, however the low number of collisions makes it hard to determine a specific pattern. None involved active transportation modes.
- There was a total of 3 registered collisions with pedestrians (4% of all collisions), with all occurring at Bank/Lamira intersection.
- There were no reported collisions with cyclists.

The majority of collisions and only area of minimal concern includes the intersection of Bank/Lamira. The Bank Street Renewal Project proposes to improve this corridor into a more contemporary design with complete streets approach geared to improving safety, particularly for alternate modes of transportation.

The source collision data as provided by the City of Ottawa, and related analysis, is provided within **Appendix C**.

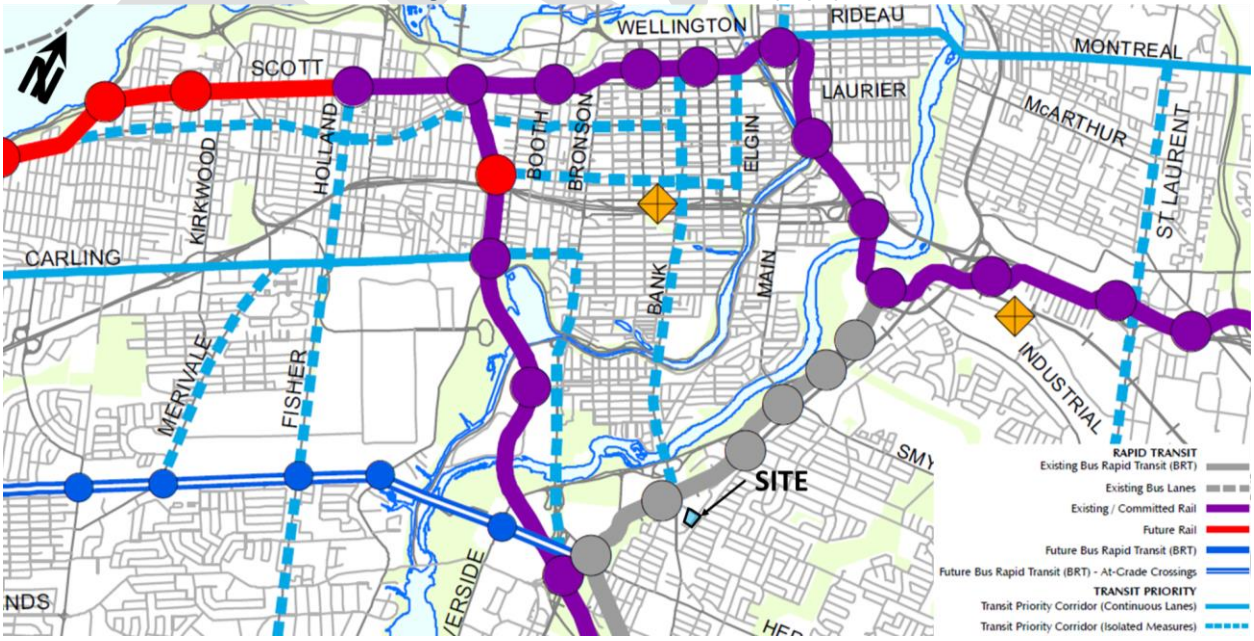
2.1.3. PLANNED CONDITIONS

Planned Study Area Transportation Network Changes

Transit Network

Within Ottawa's 2013 Transportation Master Plan (TMP) affordable network as shown in **Figure 8**, Bank Street north of the existing Bus Rapid Transit Corridor (BRT) at Billing Bridge Station is proposed a transit priority corridor with isolated measures connecting to the Confederation LRT Line. Billings Bridge Station is located approximately 500-meter walk to the site.

Figure 8: TMP Transit Affordable Network (Map 5)



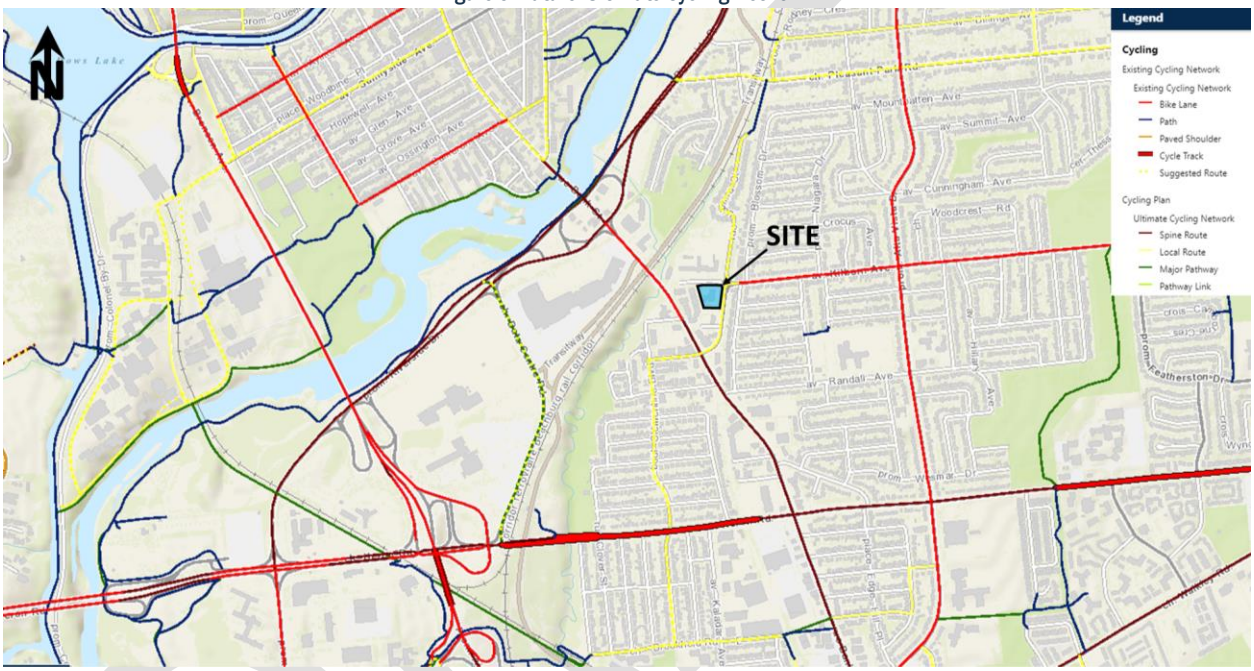
Road Network

The Bank Street Renewal Project (Riverside to Ledbury) is currently underway by the City of Ottawa, with detailed design expected by Fall 2022. The timing of construction is yet to be determined and is subject to funding availability. The Functional Design plan for Bank Street (Fall 2019), provided in **Appendix D**, which includes possible cycle tracks.

Cycling Network

Within the Ottawa Ultimate Cycling Network, Bank Street and nearby Riverside Drive are classified as 'spine bike routes'. Lamira Street, its continuation Belandger Avenue and Clementine Boulevard are classified as 'local bike routes'. Kilborn Place east of Lamira Street, parts of Bank Street and Alta Vista Drive have bike lanes. There are cycle tracks on Heron Road. **Figure 9** depicts the future cycling network.

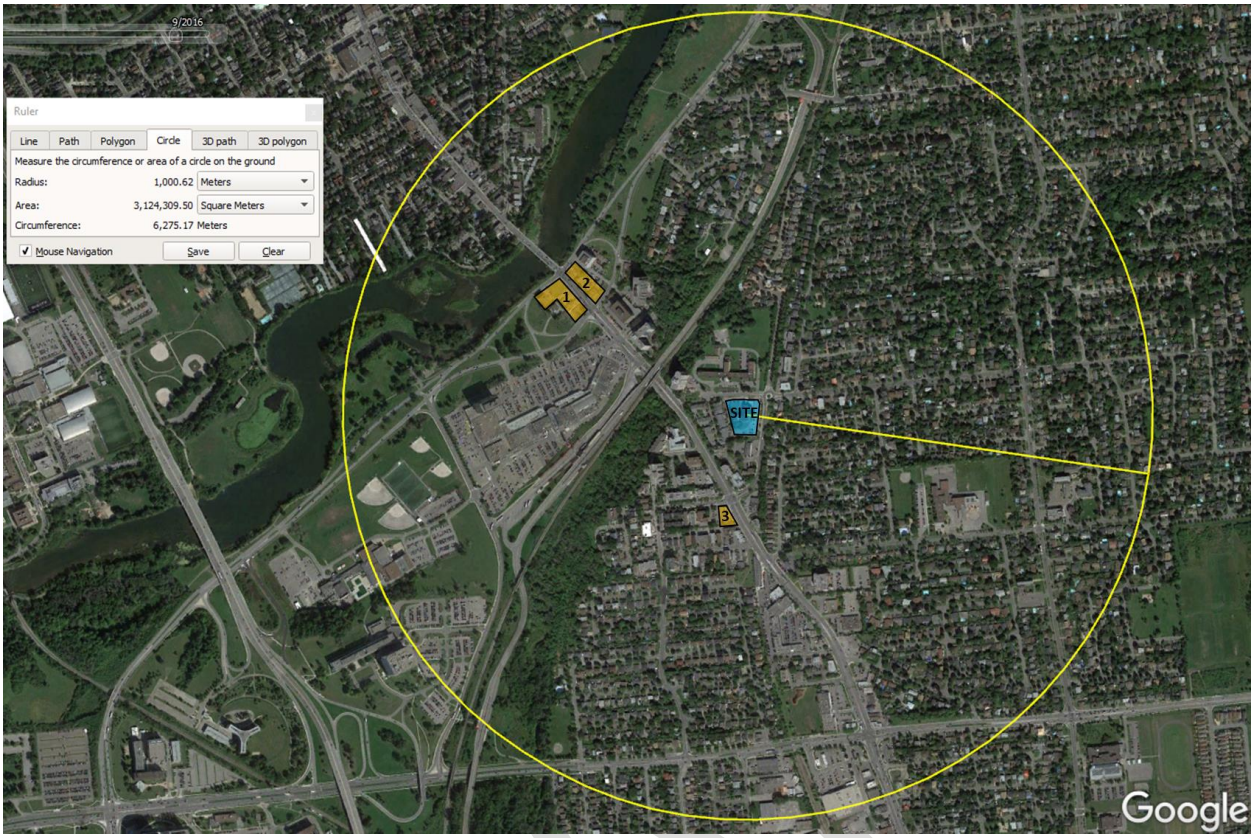
Figure 9: Future 'Ultimate Cycling Network"



Other Area Developments

The following section outlines adjacent developments in the general area that were considered in the TIA. The criteria for inclusion of other area developments are either approved developments or developments that have an active planning application that are generally within a 1-km radius of the subject site. **Figure 10** illustrates the location and relative size of relevant other area developments.

Figure 10: Other Area Developments



1 – 1346 Bank Street

Two mixed-use buildings (27 and a 29-storeys) are proposed at this location, with a combined total of 537 residential apartment units and 3,603 ft² of ground floor commercial. A TIA prepared by Parsons in May 2021, projects approximately 75 to 55 new two-way trips. These trips will be layered on to background volume trips.

2 – 1335 Bank Street

A 26-storey mixed use building is proposed at this location, with a total of 391 residential apartment units and 5,640 ft² of ground floor commercial. A TIA prepared by Parsons in December 2021, projects approximately 60 to 35 new two-way trips. These trips will be layered on to background volume trips.

3 – 1400 Bank Street

A 16-storey mixed use building is proposed at this location, with a total of 160 residential apartment units, 5,365 ft² of office space and 3,791 ft² of ground floor commercial. A TIA prepared by CGH in November 2021, projects approximately 30 to 35 new two-way trips. These trips will be layered on to background volume trips.

All other developments did not trigger the trip generation warrant and will add negligible new trips to the network.

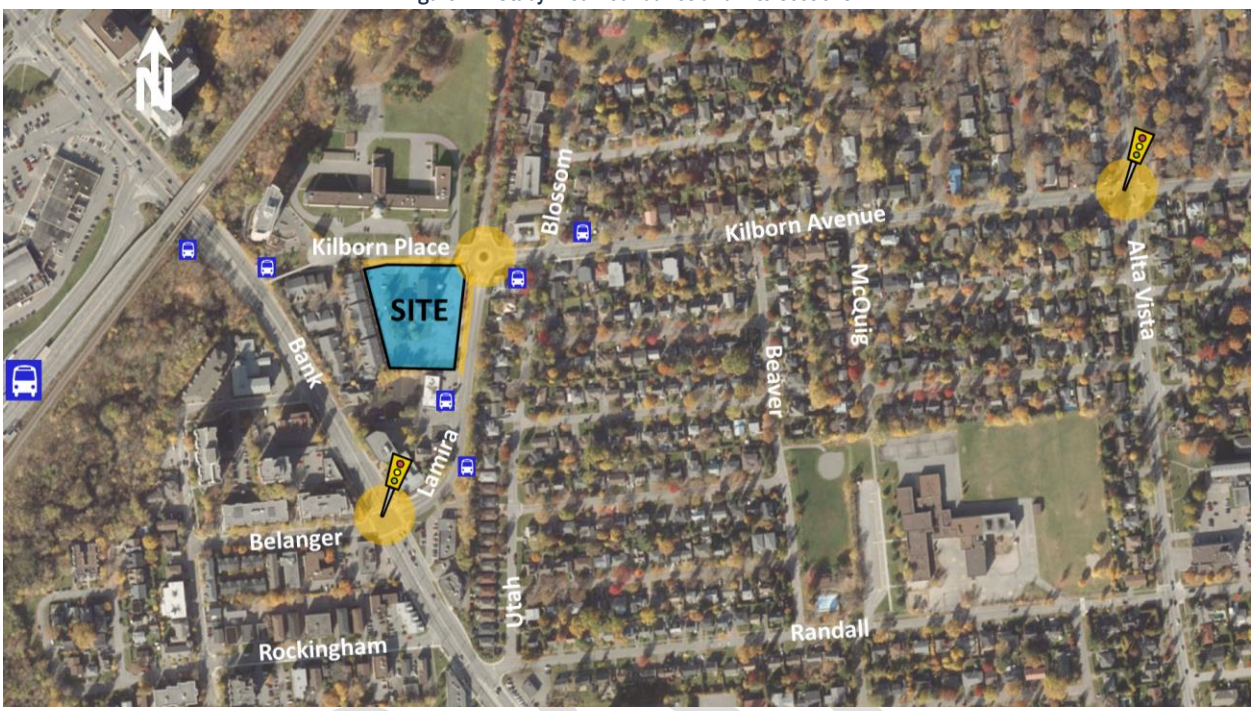
2.2. Study Area and Time Periods

The proposed mixed-use development is anticipated by 2024. Therefore, the horizon years to be analyzed within this report includes 2024 and 2029 (buildout plus five years), using the weekday morning and afternoon peak hour time periods. It is worthwhile to note that these peak periods are likely different than the current institutional use which will be accounted for in the forecasting methodology.

Proposed study area intersections and boundary roads are outlined below and highlighted in **Figure 11**.

- Lamira/Kilborn intersection;
- Bank/Lamira intersection;
- Alta Vista/Kilborn intersection;
- Site/Kilborn intersection;
- Along Kilborn Place adjacent to the site; and,
- Along Lamira Street adjacent to the site.

Figure 11: Study Area Boundaries and Intersections



2.3. Exemption Review

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

Table 1: Exemptions Review Summary

Module	Element	Exemption Consideration
Modules 4.1 – 4.4	All elements	Recommended to be exempt by City Staff until the Site Plan Application (SPA) is submitted.
Module 4.8 Review of Network Concept	All Elements	This element is only triggered when the site generates more than 200 peak-hour persons trips than the equivalent volume permitted by the established zoning Section 3.2, and related appendices, have projected person-trips based on two potential scenarios for a typical GM zoning. The first alternative considered a greater amount of residential and commercial density, resulting in approximately 100 person trips. The second, less likely alternative, would see the site developed as an office-related development resulting in less than 200 person-trips in the peak hours of travel demand. Therefore, the proposed GM zoning is not anticipated to generated more than 200 peak-hour person trips than the established I1A zoning.

3. Forecasting Report

3.1. Development Generated Travel Demand

For the purposes of remaining conservative in regard to the total projected number of peak-hour person trips, the existing site was assumed to produce a negligible number of trips during the morning and afternoon peaks. Therefore, no reductions will be applied for the removal of the existing church and related office development.

The following trip generation approach provides peak-hour person-trip projections based on two potential mode shares; those presented within the TRANS 2020 Manual (reflectively of the entire Alta Vista area, including the established communities east of the site) and mode shares based upon a reflection of TOD mode share targets.

3.1.1. RESIDENTIAL TRIP GENERATION AND MODE SHARES

Table 2 summarizes the AM and PM peak period person-trip generation rates for the development based on the newly revised 2020 TRANS Trip Generation Manual. The 'High-Rise' person-trip rate was selected based on the definition provided by the TRANS Trip Generation Manual Summary Report, as the proposed mixed-use development is anticipated to exceed two-stories in height (two-4 storey buildings are proposed).

Table 2: 2020 TRANS Residential Trip Generation Rates

Land Use	Data Source	Dwelling Units	Trip Rates	
			AM Peak	PM Peak
High Rise Condos	TRANS 2020	118 units	T = 0.80(du)	T = 0.90(du)
Note: T = Average Vehicle Trip Ends; du = dwelling units				

Using the TRANS Trip Generation rates, the total amount of person trips generated by the proposed 118 residential units was calculated. The results are summarized in **Table 3**.

Table 3: Projected Residential Peak Period Person Trip Generation – TRANS Model

Land Use	Dwelling Units	AM Peak Period Person Trips	PM Peak Period Person Trips
High Rise Condos	118	94	106

Table 5 of the TRANS 2020 Trip Generation Manual was referenced for the base mode shares applicable to a residential development within the Alta Vista ward. The projected site peak period person trips according to the Alta Vista mode shares are summarized in **Table 4**.

Table 4: Residential Peak Period Trips using TRANS 2020 Mode Shares

Travel Mode	AM Peak Period		PM Peak Period	
	Mode Share	Person Trips	Mode Share	Person Trips
Auto Driver	38%	36	45%	48
Auto Passenger	12%	11	16%	16
Transit	42%	39	28%	30
Cycling	2%	2	2%	2
Walking	7%	6	9%	10
Total Person Trips	100%	94	100%	106

Standard traffic analysis is usually conducted using the morning and afternoon peak hour trips as they represent a worst-case scenario for traffic operations. The 2020 TRANS Manual used for **Table 4** uses critical peak periods which could be longer or shorter than an hour, rather than a defined critical 60-minute block.

The 2020 TRANS Manual Table 4 was referenced to convert the peak-period person-trips to peak-hour person trips by mode. **Table 5** summarizes the conversion factors from the 2020 TRANS Manual. Note that conversion factors for passenger trips are assumed to be equivalent to the published 'Auto Driver' factors for both the morning and afternoon peak period-to-hour conversion.

Table 5: Residential Peak Period to Peak Hour Conversion Factors (2020 TRANS Manual)

Travel Mode	Peak Period to Peak Hour Conversion Factors	
	AM	PM
Auto Driver	0.48	0.44
Passenger	0.48	0.44
Transit	0.55	0.47
Bike	0.58	0.48
Walk	0.58	0.52

Table 6 summarizes the residential peak hour trips for TRANS 2020 Alta Vista mode share generated by the site by adopting the peak period to peak hour conversion rates from **Table 5**, the derived peak period trips by mode shares from **Table 4**, and the inbound and outbound splits from TRANS 2020 Manual Table 9.

Table 6: Residential Peak Hour Trips Generated using TRANS 2020 Mode Shares

Travel Mode	Mode Share	AM Peak Hour (Trips/h)			Mode Share	PM Peak Hour (Trips/h)		
		In	Out	Total		In	Out	Total
Auto Driver	38%	5	12	17	45%	12	9	21
Auto Passenger	12%	2	4	5	16%	4	3	7
Transit	42%	7	15	22	28%	8	6	14
Cycling	2%	0	1	1	2%	1	0	1
Walking	7%	1	2	4	9%	3	2	5
Total Person Trips	**100%**	**15**	**34**	**49**	**100%**	**28**	**20**	**48**
Total 'New' Residential Auto Trips		**5**	**12**	**17**	**-**	**12**	**9**	**21**

A significant transit modal share for the residential portion of the development is proposed given the site walking distance to the Billings Bridge Transit Station.

Table 7 summarizes the TRANS 2020 suggested residential modal shares for Alta Vista, the City's Transit Oriented Development (TOD) modal shares and future projected residential modal shares. The projected modal shares were based on a hybrid of the ideal TOD modal shares and the TRANS 2020 modal shares. To achieve such modal shares, a careful consideration on numbers of proposed parking will be required (to be confirmed at a later time, during the SPA submission). Transit trips will be modelled as pedestrian trips to and from Billings Bridge Station likely utilizing the pedestrian/cycling link between Kilborn Place and Bank Street, west of the site.

Table 7: Future Residential Modal Share Targets for the Development

Travel Mode	TRANS Residential Mode Shares		City's TOD Mode Shares	Future Target Mode Share (AM & PM)	Residential Modal Share Target Rationale
	AM	PM			
Auto Driver	38%	45%	15%	25%	A reduction in driver mode share from TRANS is justifiable given the close proximity to Billing Bridge Rapid Transit Station. Given that the station is BRT and not LRT, a slightly higher driver mode share is assumed over TOD mode shares.
Auto Passenger	12%	16%	5%	10%	
Transit	42%	28%	65%	50%	Development is located within 600m of a BRT Transitway Corridor, making it a Transit-Oriented Development (TOD).
Cycling	2%	2%	5%	5%	Consistent with TOD mode share targets.
Walking	7%	9%	10%	10%	

Table 8: Residential Peak Hour Trips using TOD Mode Shares

Travel Mode	Mode Share	AM Peak Hour (Trips/h)			Mode Share	PM Peak Hour (Trips/h)		
		In	Out	Total		In	Out	Total
Auto Driver	25%	4	8	12	25%	7	5	12
Auto Passenger	10%	2	3	5	10%	3	2	5
Transit	50%	8	17	24	50%	14	10	24
Cycling	5%	1	2	2	5%	1	1	2
Walking	10%	2	3	5	10%	3	2	5
Total Person Trips	**100%**	**15**	**34**	**49**	**100%**	**28**	**20**	**48**
Total 'New' Residential Auto Trips		**4**	**8**	**12**	-	**7**	**5**	**12**

3.1.2. COMMERCIAL TRIP GENERATION

The proposed concept plan of the subject development includes ground floor commercial/retail opportunities for each of the two buildings. The commercial/retail tenants have not been identified at this stage of planning and could vary between different commercial/retail land uses. For this reason, the more general 'shopping center' rate was used, which is considered to be conservative in terms of peak hour traffic while remaining consistent with the ground-floor retail market opportunities that typically exist for mixed-use buildings. **Table 9** presents the selected peak hour commercial auto trip generation rate for the ground floor commercial based on the ITE Trip Generation Manual, Version 10.

Table 9: ITE Trip Generation Rates for Shopping Center

Land Use	Data Source	Size	Trip Rates	
			AM Peak	PM Peak
Shopping Center	ITE 820	10,750 ft²	T = 0.94(x)	T = 3.81(x)
Note: T = Average Vehicle Trip Ends; x = GFA in 1,000 ft²				

To determine peak hour person trip rates, the peak hour auto trips are converted by a factor of 1.28 according to TIA guidelines. This factor is based on the typical vehicle occupancy in North America (1.15 persons/vehicle) and the inherent non-auto mode share (10%) present within the ITE Trip Generation Manual. **Table 10** summarizes the total trips per modal shares for the proposed ground floor commercial aspect of the development, using TRANS 2020 commercial modal share estimates for Alta Vista.

Table 10: Ground-Floor Commercial Trips Generated – TRANS 2020 Mode Share

Travel Mode	Mode Share AM (PM)	AM Peak Hour (Trips/hr)			PM Peak Hour (Trips/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	64% (60%)	6	4	10	15	17	32
Auto Passenger	9% (20%)	1	1	2	5	6	11
Transit	12% (9%)	0	0	0	2	2	4
Cycling	1% (0%)	0	0	0	0	0	0
Walking	14% (11%)	1	0	1	2	3	5
Total Person Trips	100% (100%)	**8**	**5**	**13**	**24**	**28**	**52**
Less Pass-by 0% (34%)		0	0	0	-5	-5	-10
Total 'New' Shopping Auto Trips		**6**	**4**	**10**	**10**	**12**	**22**

The commercial aspect of this development is to mainly cater to local trips, be it residents from this development or nearby neighborhoods. **Table 11** proposes a significant reduction in auto dependency for the ground-floor commercial uses compared to the recommended TRANS 2020 for Alta Vista given the commercial is anticipated to cater to local needs, the location of the development on a local street/collector road and given that regional shopping travel would most likely select the nearby much larger Billings Bridge Shopping Center. It would be expected that auto trips would likely be pass-by related, generated to/from the adjacent single unit neighborhoods east of the site.

Table 11: Future Modal Share Targets for Commercial/Retail

Travel Mode	TRANS Commercial Mode Shares		Commercial Target Mode Share (AM & PM)	Commercial/Retail Target Modal Share Rationale
	AM	PM		
Auto Driver	64%	60%	40%	A reduction in driver mode share from TRANS is justifiable given the close proximity to nearby BRT, nearby residential uses (promoting walking), and the pre-dominance of local commercial opportunities.
Auto Passenger	9%	20%	15%	
Transit	12%	9%	20%	Transit anticipated to be slightly higher than the ward based on proximity to rapid transit
Cycling	1%	0%	5%	The majority of trips are anticipated to be generated locally and will most likely attract nearby pedestrians, cyclists or even residents of the same development
Walking	14%	11%	20%	

Table 12: Ground-Floor Commercial Trips Generated – Target Mode Share

Travel Mode	Mode Share	AM Peak Hour (Trips/hr)			PM Peak Hour (Trips/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	40%	4	2	6	9	9	18
Auto Passenger	15%	1	1	2	4	4	8
Transit	20%	1	1	2	4	5	9
Cycling	5%	1	0	1	1	2	3
Walking	20%	1	1	2	5	5	10
Total Person Trips	100%	4	2	6	6	8	14
Less Pass-by 0% AM (34% PM)		0	0	0	-3	-3	-6
Total 'New' Shopping Auto Trips		**4**	**2**	**6**	**6**	**6**	**12**

3.1.3. TRIP GENERATION REDUCTIONS

The existing site is currently zones as I1A, for institutional uses. To our understanding, the site is currently occupied by St. Thomas D'Aquin Christian Church. As a church, the site's predominant trip generator occurs on weekends, with limited to no services on weekdays. Administrative and office uses have been identified for the site as well, however they are expected to represent a negligible number of trips generated. For the purpose of this study, it will be assumed that the existing site uses do not currently generate any peak hour trips to and from the site during the weekday peak hours, and thus, no existing site land use trips will be reduced from the network.

Given the mixed land uses, an internal reduction rate is applicable based on mixed-use parameters described in Section 6.5 of the ITE Trip Generation Manual 3rd Edition. These trips may be reduced to avoid double counting multi-purpose trips such as a local resident shopping within site. The base calculation for determining the quantity of eligible internal reductions has been provided in **Appendix E.**

Pass-by trips were also considered for commercial uses. Pass-by trips are intermediate trips along the original route between the primary origin and destination, such as a retail trip between home and another destination such as work. These are not considered 'new' trips, but existing trips already on the network making an interim stop on route. Appendix E of the ITE Trip Generation Manual 3rd edition was used to determine pass-by rates. Pass-by trips were calculated after the internal reduction factor was applied.

The trip generation rates for commercial uses from **Table 9**, the proposed retail size and respective mode share as described in **Table 11** and the internal reductions calculation from the ITE Trip Generation Manual 3rd Edition were used to estimate the new commercial trips as shown in **Table 13.**

Table 13: Commercial Peak Hour Trips – Target Mode Shares & Internal Reductions

Travel Mode	AM Peak Hour (Trips/hr)			PM Peak Hour (Trips/hr)		
	In	Out	Total	In	Out	Total
Auto Driver	4	2	6	9	9	18
Pre-Internal Reduction	*4*	*2*	*6*	*10*	*12*	*22*
Vehicles Reduced	*0*	*0*	*0*	*-1*	*-3*	*-4*
Less Pass-by 0% AM (34% PM)	0	0	0	-3	-3	-6
Total 'New' Shopping Auto Trips	**4**	**2**	**6**	**6**	**6**	**12**
Note: active transportation and total person trips remain the same as Table 12.						

Additionally, an internal reduction to residential trips is applicable for TRANS and target mode shares, as shown in **Table 14** and **Table 15** respectively.

Table 14: Residential Peak Hour Trips – TRANS 2020 Mode Shares & Internal Reductions

Travel Mode	AM Peak Hour (Trips/hr)			PM Peak Hour (Trips/hr)		
	In	Out	Total	In	Out	Total
Auto Driver	5	12	17	9	8	17
Pre-Internal Reduction	*5*	*12*	*17*	*12*	*9*	*21*
Vehicles Reduced	*0*	*0*	*0*	*-3*	*-1*	*-4*
Total 'New' Residential Auto Trips	**5**	**12**	**17**	**9**	**8**	**17**
Note: active transportation and total person trips remain the same as Table 6						

Table 15: Residential Peak Hour Trips – Target Mode Shares & Internal Reductions

Travel Mode	AM Peak Hour (Trips/hr)			PM Peak Hour (Trips/hr)		
	In	Out	Total	In	Out	Total
Auto Driver	4	8	12	4	4	8
Pre-Internal Reduction	*4*	*8*	*12*	*7*	*5*	*12*
Vehicles Reduced	*0*	*0*	*0*	*-3*	*-1*	*-4*
Total 'New' Residential Auto Trips	**4**	**8**	**12**	**4**	**4**	**8**
Note: active transportation and total person trips remain the same as Table 8						

3.1.4. SITE FORECAST TRIP GENERATION SUMMARY – TRANS MODE SHARES

Using the retail trips generated from **Table 12** and its reductions from **Table 13,** plus the residential trips generated from **Table 6** with its internal reductions from **Table 14**, the combined trips generated at full buildout using TRANS mode shares for residential and custom mode shares for commercial can be found on **Table 16**.

Table 16: Combined Residential and Commercial Trips Generated – TRANS Mode Shares

Travel Mode	AM Peak Hour (Trips/hr)			PM Peak Hour (Trips/hr)		
	In	Out	Total	In	Out	Total
Auto Driver	9	14	23	18	17	35
Pre-Internal Reduction	*9*	*14*	*23*	*22*	*21*	*43*
Vehicles Reduced	*0*	*0*	*0*	*-4*	*-4*	*-8*
Auto Passenger	3	5	7	8	7	15
Transit	8	16	24	12	11	23
Cycling	1	1	2	2	2	4
Walking	2	3	6	8	7	15
Total Person Trips	19	36	55	34	28	62
Less Pass-by	0	0	0	-3	-3	-6
Total 'New' Full Buildout Auto Trips	**9**	**14**	**23**	**15**	**14**	**29**

As shown in **Table 16**, based on the 2020 TRANS Trip Generation Manual, the proposed concept plan is projected to generate approximately 25 to 30 new auto-trips, and approximately 60 person-trips, during the

peak-hour of the weekday commuter peak hours if the proposed 118 residential units, plus retail was built. The increase in two-way transit trips is estimated to be approximately 25 persons per hour, and the increase in walk and cyclist trips is approximately 10 to 20 persons per hour during the peak hours.

3.1.5. TRIP GENERATION BASED ON TOD TARGET MODE SHARES

It is important to note that the TRANS Mode share for Alta Vista includes a large portion of single-unit homes located a fair distance from rapid transit and thus the TRANS mode shares for residential uses reflected in **Table 16** likely demonstrate a significant reliance on a personal vehicle.

Table 7 presents person-trips projected that reflect the proposed development's location and density, using the target mode shares justified within **Table 8.** Those trips were then internally reduced (**Table 15**) and summed with commercial trips to produce a combined future projected site generated trips based on target mode shares as shown in **Table 17**. Note that the slight reduction in residential vehicle trips between TRANS and target mode shares did not impact the commercial internal trip reductions.

Table 17: Combined Residential and Commercial Trips Generated – Target Mode Shares

Travel Mode	AM Peak Hour (Trips/hr)			PM Peak Hour (Trips/hr)		
	In	Out	Total	In	Out	Total
Auto Driver	8	10	18	13	13	26
Pre-Internal Reduction	*8*	*10*	*18*	*17*	*17*	*34*
Vehicles Reduced	*0*	*0*	*0*	*-4*	*-4*	*-8*
Auto Passenger	3	4	7	7	6	13
Transit	9	18	26	18	15	33
Cycling	2	2	3	2	3	5
Walking	3	4	7	8	7	15
Total Person Trips	19	36	55	34	28	62
Less Pass-by	0	0	0	-3	-3	-6
Total 'New' Full Buildout Auto Trips	**8**	**10**	**18**	**10**	**10**	**20**

Based on **Table 17**, it is anticipated that the proposed development that achieves the TOD-target mode shares will generate approximately 20 'new' vehicles trips, 25 to 35 'new' transit trips and 10 to 20 'new' bike/walk trips two-way per peak hour. This is approximately a 20% reduction in auto trips when compared to the TRANS mode shares.

3.2. Person-Trip Evaluation for Proposed Zoning

This traffic study is in support of a Zoning By-Law Amendment (ZBLA) to re-zone the existing site from Minor Institutional (I1A) to General Mixed Use (GM).

The purpose of the existing I1A zoning is to permit a range of community uses which range from a place of worship, residential care facilities, retirement homes, schools, sports arenas and community centres. Therefore, the existing zoning can vary significantly in peak-hour intensity from the existing use, which is currently occupied by the St. Thomas d'Aquin Christian Church, and related office facilities, operated by the Archidocese of Ottawa-Cornwall. The existing site likely has a limited impact on the morning and afternoon peak hours of travel demand which is exclusively related to employee travel to and from the offices.

The proposed GM – General Mixed zone provides the opportunity for a wide variety of residential and non-residential opportunities. For non-residential opportunities, this includes uses related to retail stores, offices, places of worship, medical facilities and restaurants. For residential opportunities, the GM zoning permits for low-and-midrise apartment dwellings, group homes, retirement homes and stacked units.

Based on market demands and discussions with the proposal team, two alternatives were envisioned which could represent higher density development opportunities:

- Alternative 1: A similar mixed-use development developed to the maximum FSI (2.0), with a maximum building height of 4 storeys. This would result in a retail GFA of approximately 17,000 ft^2 and 191 residential units; or
- Alternative 2: A development that is entirely constructed as a general office building with a maximum FSI of 2.0 and building height of 4 storeys. This would result in an office GFA of approximately 137,300 ft^2.

Appendix F provides details on the person-trip estimates for Alternatives 1 and 2. The results of the person-trips projection for the morning and afternoon peak hour found:

- Alternative 1 would produce approximately 100 persons trips based on the 2020 TRANS manual and local mode shares
- Alternative 2 produces less than 200 persons trips based on a review of the ITE Trip Generation manual and application of local mode shares.

Therefore, the proposed GM – General Mixed zoning is not anticipated to produce more than 200 person-trips in the peak hours of travel demand in a worst-case high intensity development scenario. Based on current market demands and the local context, a mixed-use residential/retail development is anticipated to be the dominant outcome.

Given the sites proximity to major transit facilities, the potential for TDM opportunities, local shopping amenities, access to the adjacent arterial Bank Street corridor by walking and cycling, and the local context surrounding the site, there is a low risk of significant traffic impacts from a high-density development at the subject site due to rezoning to a GM – General Mixed-use designation. The transportation function of Kilborn Avenue, Kilborn Place and Alta Vista Drive are not anticipated to change as a result of the proposal.

3.3. Projected Travel Demands of Proposed Development

3.3.1. TRIP DISTRIBUTION

Based on the OD Mode Share Survey, existing traffic volume counts and the location of adjacent arterial roadways and neighborhoods, the distribution of site-generated traffic volumes is as follows:

- (From/To) the North: 35%;
- (From/To) the South: 30%;
- (From/To) the West: 20%; and,
- (From/To) the East: 15%.

3.3.2. TRIP ASSIGNMENT

The latest site plan proposes to consolidate all site accesses into a single, full movement driveway on to Kilborn Place with a STOP-control on the site egress. The exact location of the driveways will be confirmed once a Site Plan Application is filed. The 'new' site-generated vehicle trips assuming TRANS modal shares from **Table 16** and with target modal shares from **Table 17** for the residential and commercial uses were assigned to the study area network and are illustrated as **Figure 12** and **Figure 13**.

Figure 12: 'New' Site-Generated Trips – TRANS Mode Share

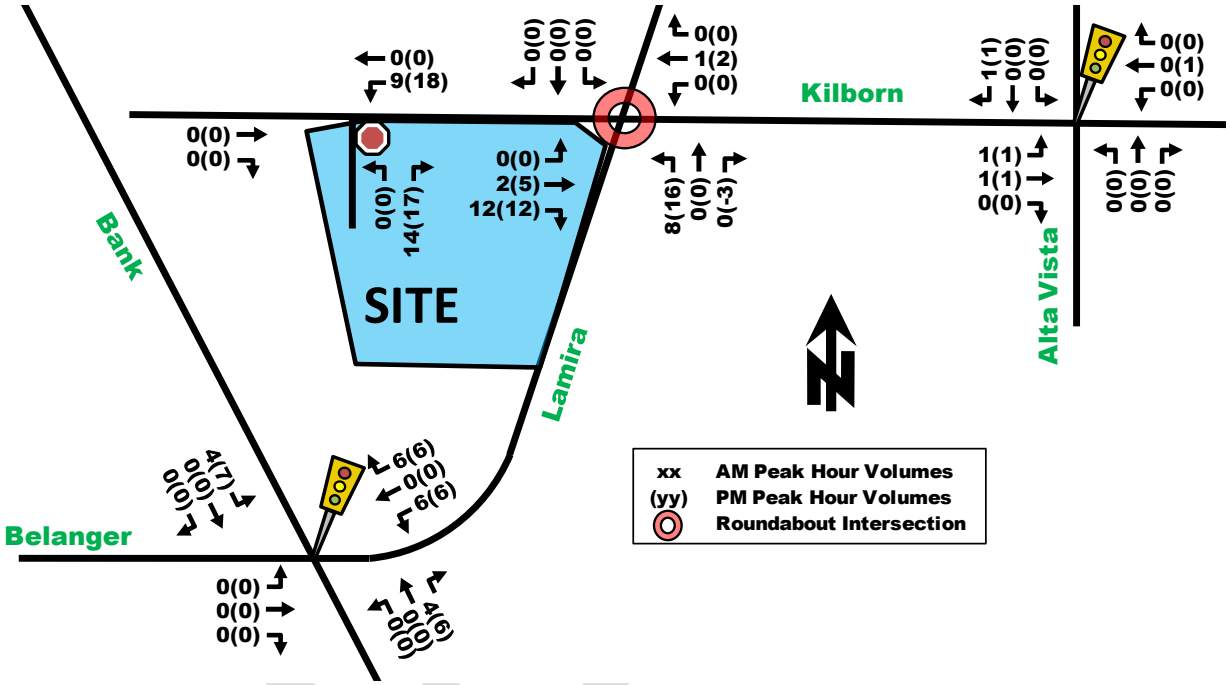
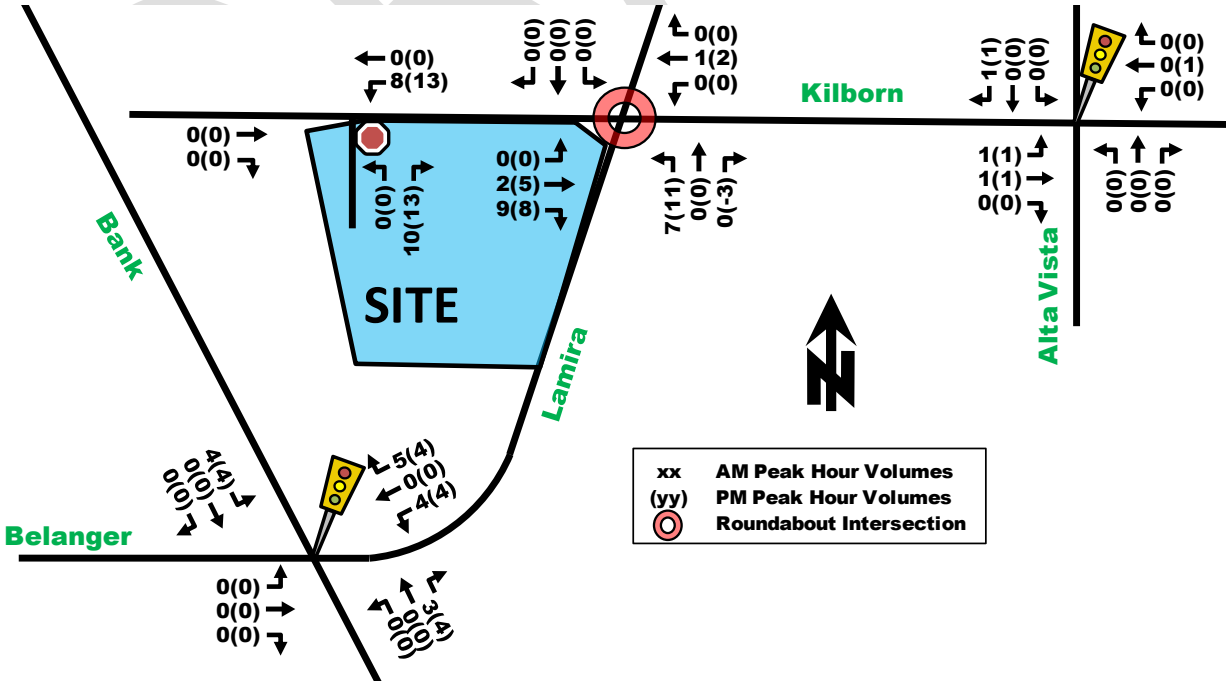


Figure 13: 'New' Site-Generated Trips – Target Mode Share



3.4. Background Network Travel Demands

3.4.1. TRANSPORTATION NETWORK PLANS

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

3.4.2. BACKGROUND GROWTH

The 'Bank Street Renewal Functional Design Study' public open house on December 6, 2016, quoted that City TRANS regional model shows a traffic decrease of approximately 5% through the Riverside Drive to Ledbury Avenue corridor on Bank Street by the year 2031. The lands surrounding the study area are well developed, with few major other area developments planned near the subject site and limited new development opportunity available. Traffic within the study area is not anticipated to increase significantly by the build-out of the conceptual development.

For the subsequent analysis of future conditions, a very conservative 1% annual growth rate along north-south movements on Bank Street only will be applied, in addition to other area development generated traffic. No growth is proposed for Kilborn Place/Avenue, Alta Vista Drive and Lamira Street given the surrounding built-up communities.

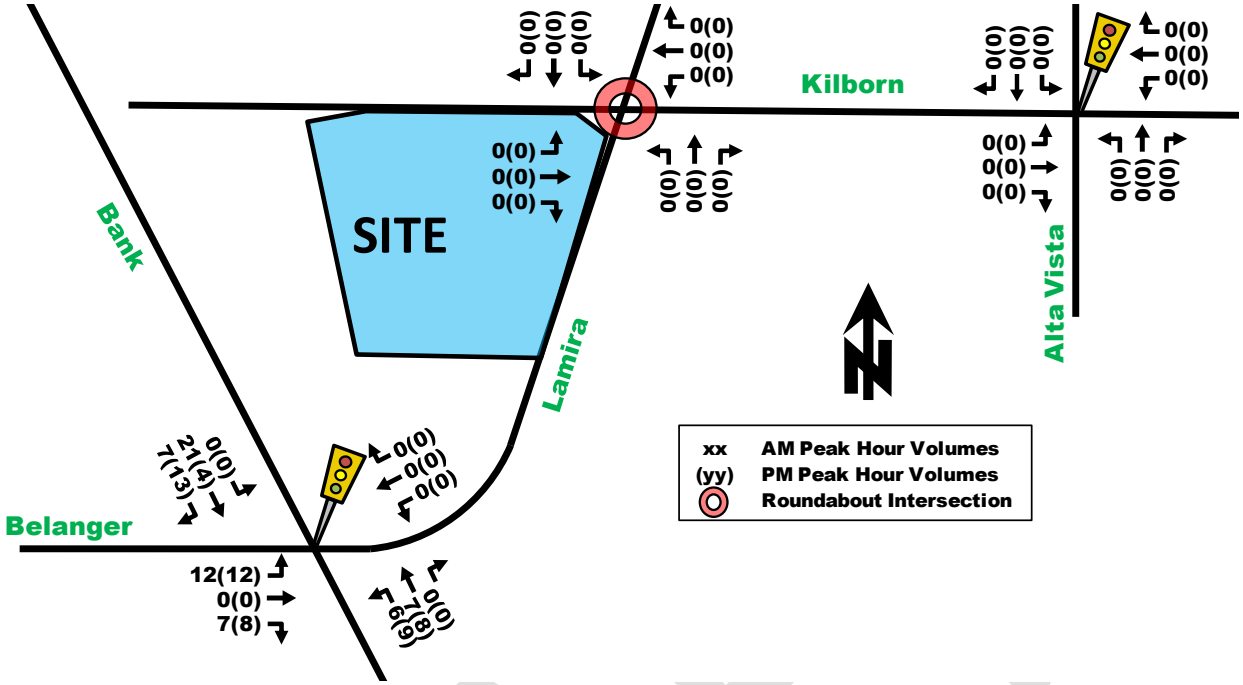
3.4.3. OTHER AREA DEVELOPMENTS

Other area developments were identified and described in **Section 2.1.3**. Peak hour trips generated by these developments, based on the supporting TIA studies, have been summarized in **Table 18** and forecasted volume additions to study area intersections illustrated in **Figure 14**. It is noteworthy that studies for 1346 and 1335 Bank Street were performed using the 2011 TRANS Trip Generation manual which is now outdated and projects a higher trip generation rate compared to the new industry standard, TRANS 2020 Trip Generation manual.

Table 18: Other Area Developments Vehicle Trip Generation

Developments	AM Peak (persons/h)			PM Peak (persons/h)		
	In	Out	Total	In	Out	Total
1346 Bank Street	18	44	62	23	11	34
1335 Bank Street	8	65	73	37	17	54
1400 Bank Street	12	18	30	18	16	34
Total	**38**	**127**	**165**	**78**	**44**	**122**

Figure 14: Other Area Developments Vehicle Trip Generation within Study Intersections



3.5. Demand Rationalization

Figure 15 and Figure 16 illustrate the future projected background volumes for year 2024 and 2029 assuming 1% annual growth rate on Bank Street north and south through movement, plus the addition of other area developments.

Figure 15: Future Projected 2024 Background Volumes

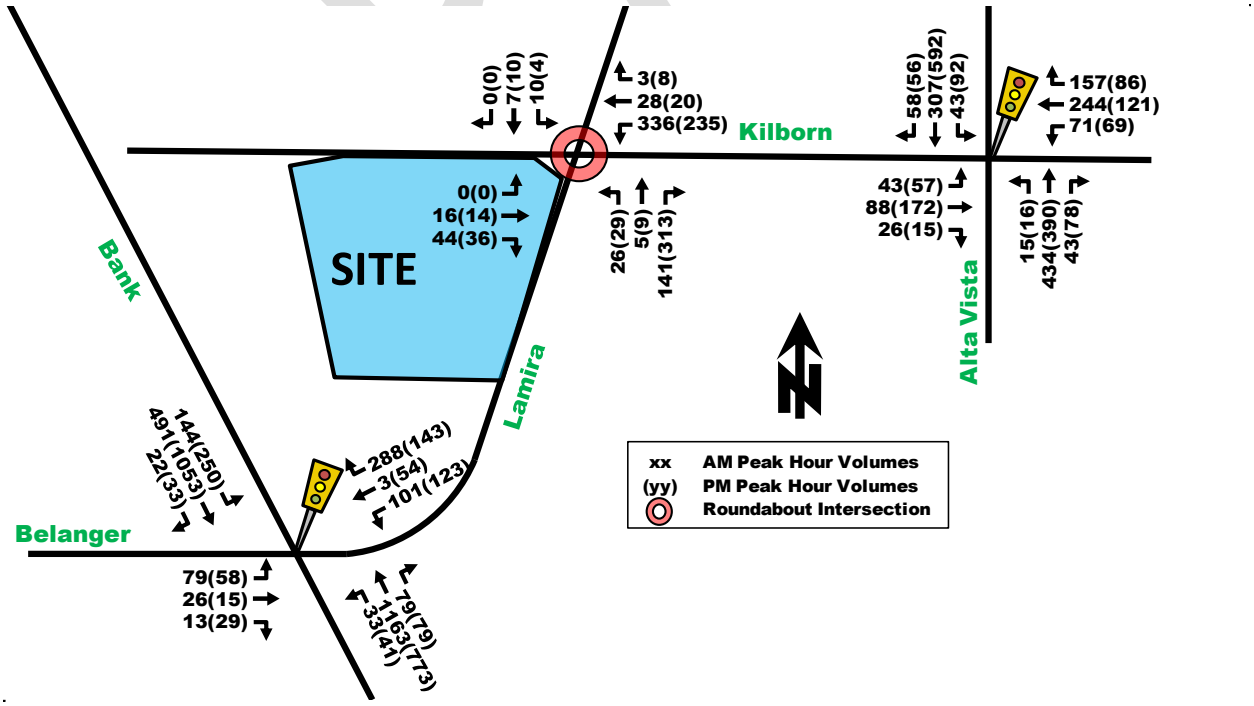
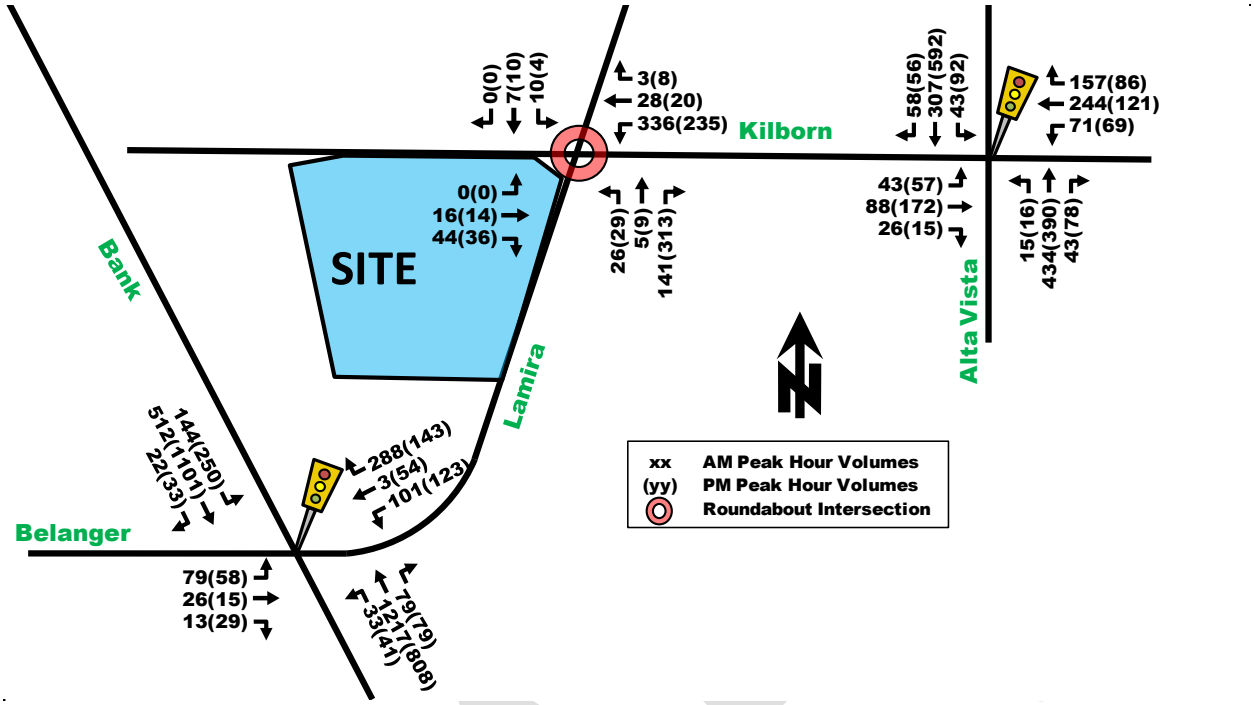


Figure 16: Future Projected 2029 Background Volumes



According to the City of Ottawa, Bank Street is an arterial road, Alta Vista Drive a major collector road and the route from Alta Vista Drive to Bank Street via Kilborn Avenue and Lamira Street is classified a collector road.

The segments of Kilborn Avenue/Place, Lamira Street and Alta Vista Drive are anticipated to have negligible growth throughout the study area from this development and other area developments. Bank Street on the other hand is anticipated to have traffic volume growth given the highly conservative 1% annual growth along through movements on Bank Street.

The Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads outlines “typical” daily traffic volume (DTV) capacities of urban minor arterial road can accommodate up to 20,000 vehicles a day, while a major arterial such as Bank Street south of Riverside Drive can accommodate up to 30,000 vehicles per day.

The most critical scenario, background 2029, estimates approximate daily traffic volumes on Bank Street at Bank/Lamira of 21,600 vehicles which is well below the 30,000 threshold. Bank Street is expected to accommodate anticipated growth through year 2029, if any growth happens at all. The future intersection capacity along these road sections will be explored in more detail in the ensuing Strategy Report.

4. Strategy Report

4.1. Development Design

Exempt. See **Table 1.**

It is worthwhile to note that the walking distance from the subject development to the Bank Street transit stops is approximately 150m-to-200m, is less than 100m to transit stops along Lamira Street and approximately 600m to the Billings Bridge Transit Station.

Integrating cycling into the site and boundaries will be reviewed during SPA submission.

4.2. Parking

Exempt. See **Table 1.**

4.3. Boundary Street Design

Exempt. See **Table 1.**

4.4. Access Intersection Design

Although exempt (see **Table 1**) the preliminary vision for the site access includes consolidating the existing five accesses into a single access to Kilborn Place, a local street.

The proposed access would function as a single full movement access driveway to Kilborn Place, located as far away from the Lamira/Kilborn roundabout intersection (west of the existing intersection) as possible for the site. The access is proposed as a STOP-controlled for vehicles leaving the site and free-flow on Kilborn Place. The final proposed access will be confirmed during the SPA.

4.5. Transportation Demand Management

4.5.1. CONTEXT FOR TDM

The proposed development is located within 600m of the Billings Bridge Transitway Station and is therefore considered a Transit-Oriented Development (TOD). The aim of a TOD is to encourage a mix of moderate to high-density transit-supportive land uses located within an easy walk of a transit station.

The currently proposal is for a general mixed-use development, namely with residential and commercial uses. Based on the type of development, it is assumed that most trips generated by the proposed site will be residents leaving the site in the AM peak to go to work and returning from work to the proposed site in the PM peak. Sections 3.1.1 and 3.1.2 describe how many trips are anticipated per travel mode and anticipates the likely locations that they will travel to and from based on the OD-Survey 2011 for Ottawa.

4.5.2. NEED AND OPPORTUNITY

Developments located in a Transit-Oriented Development (TOD) zone such as the proposed site are expected to utilize measures to provide sustainable active mode shares. The proposed development is expected to utilize TDM measures to maintain sustainable transit and active mode shares, as described in more detail in Section 4.5.3. The current suggestions should be considered preliminary in nature given that this study supports a ZBLA application, where further site details are refined during the site plan application.

The site is located in a well-developed core-area of the City of Ottawa with established transit, walking and cycling facilities. Local active transportation connections between Kilborn Place and Bank Street encourage connectivity to the site.

4.5.3. TDM PROGRAM

Given that this is a ZBLA only, the exact details of the proposed development are unknown. A draft TDM infrastructure checklist is attached as **Appendix G** with some of the proposed attributes that are known. Below are some suggested measures which could be considered for the future development proposal; however, they should be considered fully conceptual at this time:

- The development could provide parking equal to or only slight exceeding the minimum required vehicle parking for the proposed GM zoning;
- Provisions for a number of bicycle parking stalls that exceed the minimum recommended by City of Ottawa By-Law, located ideally in an underground and secure facility; and
- Locate buildings as close to sidewalks as possible and provide vehicle parking away from the roads.

4.6. Neighborhood Traffic Management

4.6.1. ADJACENT NEIGHBORHOODS

This module compares the maximum one-way traffic of a local or collection during morning and afternoon peak hours, to respective thresholds provided by the City of Ottawa TIA Guidelines. The TIA Guidelines provided maximum one-way thresholds for maximum number of vehicles per day and per peak hours. The thresholds per roadway classifications are as followed:

- Local roads: 120 vehicles per hour (one-way) during peak hours or a combined total of 1,000 vehicles per day
- Collector roads: 300 vehicles per hour (one-way) during peak hours or a combined total of 2,500 vehicles per day
- Major collector roads: 600 vehicles per hour (one-way) during peak hours or a combined total of 5,000 vehicles per day

Table 19 summarizes a comparison of each roadway segment by classification and traffic volume threshold. The table also indicates the existing and the forecasted volumes (rounded) for the most critical scenario (2029 assuming TRANS mode share).

Inspection of the table indicates that all the collector/major collector facilities surrounding the proposed development exceeds the designated thresholds.

Site generated traffic is anticipated to utilize Kilborn Place (west of Lamira) to access either Lamira Street or Kilbon Avenue (east of Lamira). Lamira Street is anticipated to be the primary collector that would connect the proposed development to Bank Street, the nearest major arterial. Assuming TRANS mode shares, the proposed development is forecast to have the following impacts to the surrounding local network:

- Less than 15 vehicles-per-direction along Lamira Street (1 vehicle every 4 minutes); and
- Less than 5 vehicles-per-direction along Alta Vista (1 vehicle every 15 minutes).

Therefore, given the proximity of the site to Bank Street, auto trips will have a negligible impact on the surrounding transportation network.

Table 19: Comparison of Roadway Classification Threshold and Forecasted Volumes

Road Segment	Classification	Peak Hour Volumes (one way)[1]			Daily Volumes (combined)[2]		
		Threshold	Existing	Forecasted	Threshold	Existing	Forecasted
Alta Vista (nearest Kilborn)	Major Collector	600	750	750	5,000	5,750	5,750
Lamira (Bank – Kilborn)	Collector	300	400	400	2,500	3,500	3,600
Kilborn (E. of Lamira)	Collector	300	350	350	2,500	3,150	3,150
Kilborn (W. of Lamira)	Local	120	50	60	1,000	450	600

1. Only peak direction of the critical AM or PM hour volumes shown. 2.) calculated by summing (AM + PM) and multiplying by 5
Volumes rounded to nearest 50 vehicles

4.7. Transit

4.7.1. ROUTE CAPACITY

It is projected that 25 to 35 'new' two-way transit passenger trips per hour will be generated for the AM and PM peak hours. Considering that Billings Bridge Rapid Transit Station is within a 600-meter walk and additional routes, such as #48 and #6, operate even closer to the site, it is anticipated that the future transit network will have sufficient capacity to accommodate the subject development transit demand.

Billings Bridge BRT Station is accessible via a paved pathway which connects the dead-end of Kilborn Place via a park to the east sidewalk on Bank Street. A bus stop for route #6 is located at this junction, or transit users may continue north on Bank Street to the Bank/Transitway intersection, where they can cross to the west side of Bank Street and follow the sidewalks to the Billings Bridge BRT Station. Bus stops are also located adjacent to the site on Lamira Street, with local bus route #48 providing connectivity to Billings Bridge BRT Station.

4.7.2. TRANSIT PRIORITY

Since the BRT Corridor is grade separated, the development's site generated traffic will not impact travel times for those routes. Routes operating with mixed traffic are not anticipated to see delays due to the very minimal vehicular traffic forecasted from this development.

4.8. Review of Network Concept

Exempt. See **Table 1.**

4.9. Intersection Design

4.9.1. INTERSECTION CONTROL

The site access is envisioned as a STOP-controlled minor access to Kilborn Place, in a similar location to the existing westerly access. The remaining four site accesses to the site are anticipated to be close.

4.9.2. INTERSECTION DESIGN

Multi-Modal Level of Service

As stated in the MMLOS Guidelines, only signalized intersections are considered for the intersection MMLOS analysis, which include the intersections of Bank/Lamira and Alta Vista/Kilborn. **Appendix D** illustrates the proposed changes to the Bank/Lamira intersection according to the Bank Street Renewal Project, which remains to be finalized and implemented. The intersection is assumed to have fully protected left-turn phases for the north-south movements, and restrict RTOR movements in the east-west directions.

The MMLOS analysis is summarized in **Table 20**, with detailed analyses provided in **Appendix H**.

Table 20: MMLOS – Existing and Future Intersections

Intersection	Level of Service							
	Pedestrian		Bicycle (BLoS)		Transit (TLoS)		Truck (TkLoS)	
	PLoS	Target	BLoS	Target	TLoS	Target	TkLoS	Target
Alta Vista/Kilborn (Existing)	C	C	D	C	C	D	N/A	N/A
Bank/Lamira (Existing)	F	A	F	C	D	D	E	D
Bank/Lamira (Future)[1]	D	A	A	C	D	D	E	D

1) Future Bank/Lamira is based on preliminary Bank Street Renewal Designs, however, the design and its implementation are subject to refinements

Pedestrian

- ***Alta Vista/Kilborn*** The existing intersection was found to meet the PLoS target goals, given that the intersection is considered "raised" for the purpose of this analysis. Prohibiting right-turns on red could serve to benefit the intersection, but would not alter the current PLOS.
- ***Bank/Lamira*** Given the high PLOS target of "A", and the prevalence of multi-lane crossings of BankS Street, both the existing and future intersection configurations were found to not meet the PLOS target. Rhe reduction of lanes is likely not palatable along Bank Street, therefore there is little that can be done to achieve the target PLoS 'A'. However, considering the inclusion of protected left turn phasing, leading pedestrian intervals and restricting right-turns on red serve to improve pedestrian safety when crossing Bank Street

Bicycle

- Bicycle BLoS targets are not met at either intersection based on a review of existing conditions.
- ***Alta Vista/Kilborn*** fails to meet the BLOS due to the estimated operating speed of 50 km/h, which could be overly conservative given the residential nature of the area and the presence of a raised intersection
- ***Bank/Lamira*** The future Bank Street Renewal Project proposes unidirectional cycle facilities on Bank Street, with the approaches to the intersection on Lamira Street and Belanger Avenue having cycle facilities. These facilities would be physically separated from the roadways and would meet the cycle BLoS targets.

Transit

- Transit TLoS targets were found to be met at all study area intersections.

Truck

- Only Bank Street is classified as a truck route, and therefore is assigned a TrLOS "D". The analysis found that the intersection fails to meet the TrLOS target, which is considered acceptable given that it is not a major arterial-arterial connection nor a direct connection to truck-oriented developments;
- Lamira Street, Kilborn and Alta Vista are not designated truck routes and are considered collector roadways. They do not have a TrLOS target.

Existing Intersection Performance

Table 21 summarizes the existing traffic operations at the study area intersections based on an analysis utilizing Synchro Trafficware (V10) (for STOP-controlled and traffic signal-controlled intersections) and SIDRA analysis software. The subject intersections were assessed in terms of the volume-to-capacity (v/c) ratio and the corresponding Level of Service (LoS) for the critical movement(s) according to City of Ottawa guidelines. The Synchro and SIDRA model outputs of existing conditions are provided within **Appendix I** and the volumes used were obtained from **Figure 6**.

Table 21: Existing Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Bank/Lamira (S)	C(B)	0.77(0.69)	NBT(NBT)	20.5(20.1)	C(B)	0.71(0.63)
Alta Vista/Kilborn (S)	D(C)	0.84(0.73)	WBT(WBT)	23.2(20.4)	B(A)	0.63(0.59)
Lamira/Kilborn (R)	B(A)	10(9)	SB(SB)	6(5)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 0.90 and a saturation flow rate of 1800 veh/h/lane. (S) = Signalized; (R) = Roundabout						

As seen in **Table 21,** all intersections operate overall at acceptable LoS 'C' or better with critical movements operating at LoS 'D' or better during the existing conditions.

Background Conditions 2029

Given that this is a ZBLA only, only the most critical horizon year background scenario will be analyzed. The future 2029 background volumes were projected by increasing existing volumes by 1% annually and superimposing other area development trip generations as illustrated in **Figure 16** with projected operation outputs in **Table 22**. The detailed Synchro and SIDRA results can be found in **Appendix J**.

Table 22: 2029 Background Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Bank/Lamira (S)	C(B)	0.77(0.66)	NBT(NBT)	20.2(19.1)	C(B)	0.71(0.61)
Alta Vista/Kilborn (S)	D(B)	0.82(0.68)	WBT(WBT)	21.9(18.8)	A(A)	0.58(0.54)
Lamira/Kilborn (R)	B(A)	10(9)	SB(SB)	6(5)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane. (S) = Signalized; (R) = Roundabout						

A review of **Table 22** indicates that, assuming background 2029 forecast conditions, the study area intersections were found to operate with overall acceptable LoS 'C' or better, with critical movements operating at LoS 'D'. In comparison to existing conditions, traffic operations have slightly improved due to the use of 1.0 peak hour factor instead of 0.9 for future analysis. This increase in peak hour factor is consistent with the TIA Guidelines.

Future Conditions 2029

Given that this is a ZBLA only, only the most critical horizon year full buildout scenario will be analyzed. The future full build-out 2029 volumes were derived by superimposing background 2029 volumes which include other area developments and background growth, with future site-generated volumes. The future projected 2029 volumes are illustrated in **Figure 17** with projected operation outputs in **Table 23.** The detailed Synchro and SIDRA results can be found in **Appendix K**.

Figure 17: 2029 Total Projected Volumes

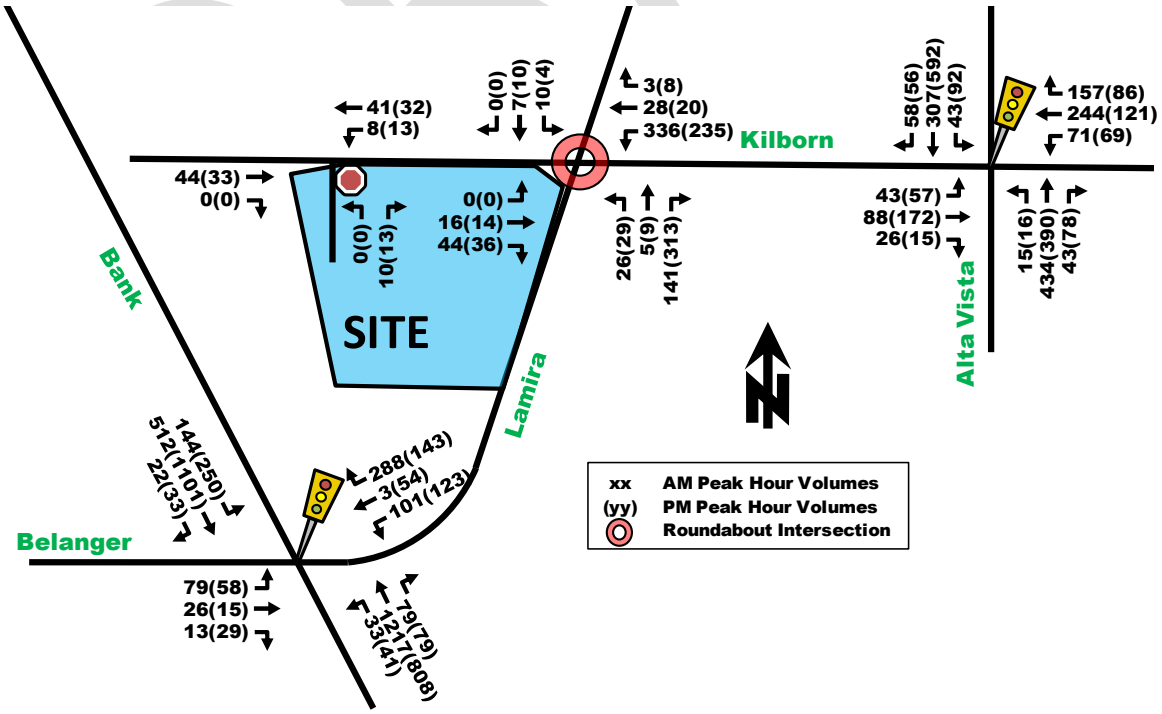


Table 23: 2029 Full Build-out Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Bank/Lamira (S)	C(B)	0.78(0.67)	NBT(NBT)	20.4(19.5)	C(B)	0.72(0.61)
Alta Vista/Kilborn (S)	D(B)	0.82(0.69)	WBT(WBT)	22.0(19.0)	A(A)	0.58(0.54)
Lamira/Kilborn (R)	B(A)	10(9)	SB(SB)	6(5)	A(A)	-
Site Access/Kilborn (U)	A(A)	9(9)	NB(NB)	1(2)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane. (S) = Signalized; (R) = Roundabout; (U) = Unsignalized STOP controlled						

As seen in **Table 23**, all study area intersections are expected to continue to operate with acceptable conditions similar to background 2029 conditions.

The Bank Street Renewal Project has not been finalized yet, and the final design of Bank/Lamira intersection has not been approved. In the event that a similar intersection to the one shown in **Appendix D** was built, then Bank/Lamira intersection is anticipated to operate almost identical to what has been shown in **Table 23**. Note that the only major difference between the existing intersection and the future intersection (aside from major improvements to active transportation facilities proposing physically separated from vehicular traffic facilities) includes the east approach being converted from a left-through plus channelized right-turn lane to a left-through plus an un-channelized right-turn. The addition of 5 second active transportation advances on all legs does not significantly impact intersection operations.

There is ample capacity to incorporate this development and nearby area developments within the study area intersections. The onset of the proposed development is anticipated to have a negligible impact on the surround study area intersections.

Future Conditions if Target Mode Share not Met

The trips generated based on TRANS 2020 mode share for Alta Vista are shown in **Figure 18** in the event that the target mode shares are not met. The projected intersection performance for the critical scenario 2029 with Alta Vista mode shares from TRANS 2020 are shown in **Table 24** with detailed output in **Appendix L**.

Figure 18: 2029 Total if Target Mode Share not Met Projected Volumes

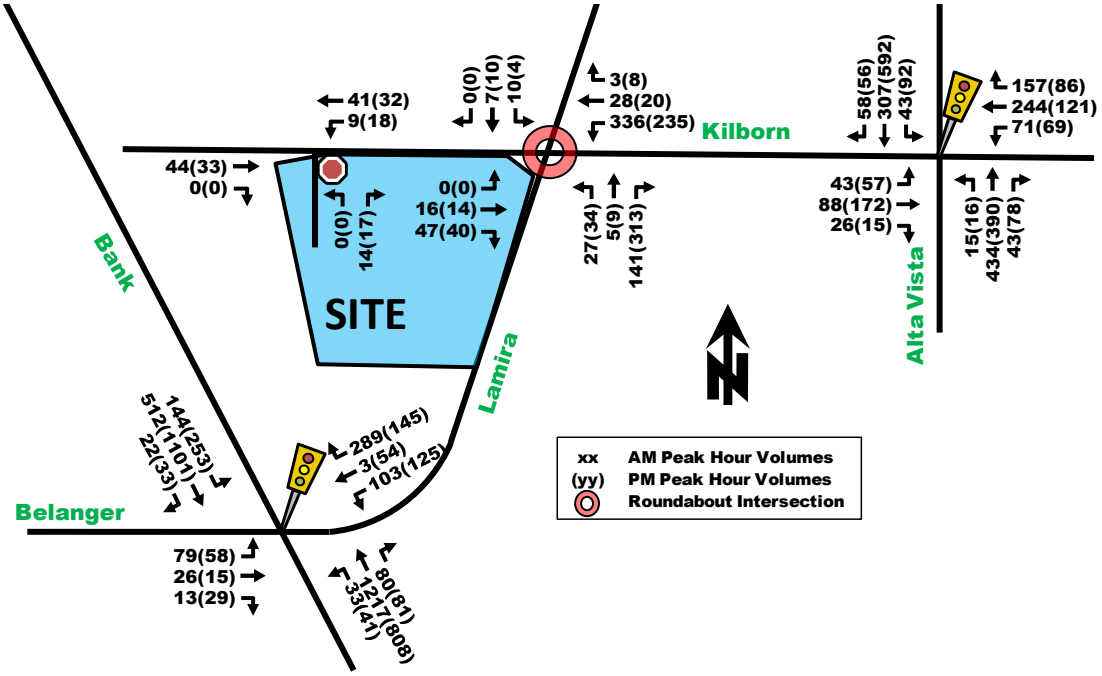


Table 24: Intersection Performance if Custom Mode Shares Not Met

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Bank/Lamira (S)	C(B)	0.78(0.68)	NBT(NBT)	20.5(19.7)	C(B)	0.72(0.62)
Alta Vista/Kilborn (S)	D(B)	0.82(0.69)	WBT(WBT)	22.0(19.0)	A(A)	0.58(0.54)
Lamira/Kilborn (R)	B(A)	10(9)	SB(SB)	6(5)	A(A)	-
Site Access/Kilborn (U)	A(A)	9(9)	NB(NB)	2(3)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane. (S) = Signalized; (R) = Roundabout; (U) = Unsignalized STOP controlled						

As seen in **Table 24**, all study area intersections are expected to operate very similarly to projected 2029 conditions with custom mode shares.

Queueing Analysis

According to Synchro V10 analysis, the anticipated 95th percentile queue lengths on all approaches of study area intersections are anticipated to change by less than 10-meter difference between existing and 2029 projected future scenario. The site will not contribute to any adverse queueing issues, as it is anticipated to generate up to 30 new vehicles two-way during the most critical peak hour scenario (TRANS mode share 2029). Thirty new vehicles two-way per hour equate to approximately 1 new vehicle every 2 minutes, considered negligible.

5. Findings and Recommendations

Based on the results summarized herein the following findings and recommendations are provided:

Existing Conditions

- The site is currently located in the southwest quadrant of the Lamira/Kilborn roundabout intersection. It is currently occupied by the St. Thomas d'Aquin Christian Church, and related office facilities, with a designated zoning of Minor Institutional - I1A.
- In review of existing transportation conditions, there are no existing safety concerns along the proposed development frontage. Therefore, no mitigation measures were considered.
- Existing intersections were found to operate at an acceptable overall LoS 'C' or better, with critical movements exhibiting LoS 'D' or better during the weekday morning and afternoon peak hours.

Proposed Development

- The current conceptual development proposal indicates approximately 118 residential units and 10,750 ft^2 of ancillary ground floor retail/commercial space. At this time, the tenants of the ground floor retail and the break down of residential units (2 bedroom, 1 bedroom, etc) are unknown.
- The site proposes to consolidate the existing 5 site accesses into a single full movement driveway to Kilborn Place, a local road. The proposed site access maximizes the distance from the Lamira/Kilborn roundabout intersection.
- At this time, parking for the site is to be determined. It is anticipated that parking will be accommodated underground. The applicant intends to provide at least the minimum number of bicycle parking spaces required by the City's Parking By-law, and a suitable number of vehicle parking based on its location. These amounts are to be confirmed during the Site Plan Application.
- The proposed development is projected to generate approximately 20 'new' vehicles per hour (two-way) during the weekday morning and afternoon peak hours.
- The proposed development is projected to generate approximately 25 to 35 'new' transit trips during the morning and afternoon peak hour periods, which can be accommodated by multiple nearby bus routes including the transit stops along Bank Street and Lamira, as well as the BRT Station at Billings Bridge (less than 600-meter walk). Additional capacity is also available on local bus routes on Lamira Street and Bank Street.
- TDM measures should be reviewed during the Site Plan Application to identify ways to leverage the site's proximity to rapid transit. It is recommended that the site be transit-supportive according to Transit Oriented Development (TOD) guidelines.
- A trip generation comparison between the existing use and two high density alternatives for the proposed General Mixed - GM zoning found that the worst-case high-density (i.e. maximum) would result in an increase of less than 200 person-trips during the peak hours of travel demand. This finding assumes that the existing use produces near-zero person trips in the peak hours. While either of these alternatives are unlikely to occur, the surrounding transportation network is likely capable of accommodating a high-density development.

Future Conditions

- The Bank Street Renewal Project is encouraged as it would provide substantial improvements to active transportation facilities along Bank Street, improving overall mobility for the proposed development.
- Other nearby developments and a 1% growth rate were applied to existing volumes on Bank Street to estimate 2029 background conditions. Even with this conservative approach, the 2029 background intersection performance operated with similarly acceptable conditions that were overall comparable to the existing intersection performance.
- An analysis of future conditions with the proposed development, the site generated vehicle, pedestrian, and transit trips were layered onto the future road network. The study area intersections performed similarly to background 2029 conditions, with overall intersections operating at an acceptable LoS 'C' or

better during the peak hours of travel demand. Overall, study area intersections are expected to continue to operate within City standards with the build-out of the proposed development, regardless if the TOD-mode shares proposed within this study are met.

- A sensitivity capacity analysis of the Bank/Lamira intersection assuming the Bank Street Renewal Project's Functional Design would be in place demonstrated that Bank/Lamira is anticipated to perform similarly to the existing intersection, even with the addition of 5 second active transportation advances on all approaches.
- The MMLOS intersection analysis found that:
  - Transit and truck target goals were met or were non-applicable at each of the study area intersections.
  - Pedestrian targets were not met at the Bank/Lamira intersection, assuming both the existing and future intersection configurations, due to the number of lanes along Bank Street which are unlikely to change to meet the current PLoS target. The Alta Vista/Kilborn met PLoS targets as it is considered a 'raised' intersection.
  - Cyclist targets were only met on future Bank/Lamira due to designated cycling facilities and two-stage crossings. The Alta Vista/Kilborn intersection did not meet the BLoS targets due to the existing operating speed exceeding 50 km/h. A review of existing speed profiles would be required to justify any changes, as the local residential environment combined with the various traffic calming measures that are currently in place would likely minimize overall operating speeds.

Based on the foregoing findings, the proposed development located at 1244 Kilborn Place is recommended from a transportation perspective.

Prepared By:	Reviewed By:
Juan Lavin, E.I.T.	Jake Berube, P.Eng. Transportation Engineer

APPENDIX A

Screening Form and City Comment Responses

PARSONS

1223 Michael Street, Suite 100, Ottawa, Ontario, K1J 7T2
P: +1 613.738.4160 l F: +1 613.739.7105 l www.parsons.com

City of Ottawa 2017 TIA Guidelines

TIA Screening Form

Date	11-Jan-22
Project	1244 Kilborn Place
Project Number	478193 - 01000

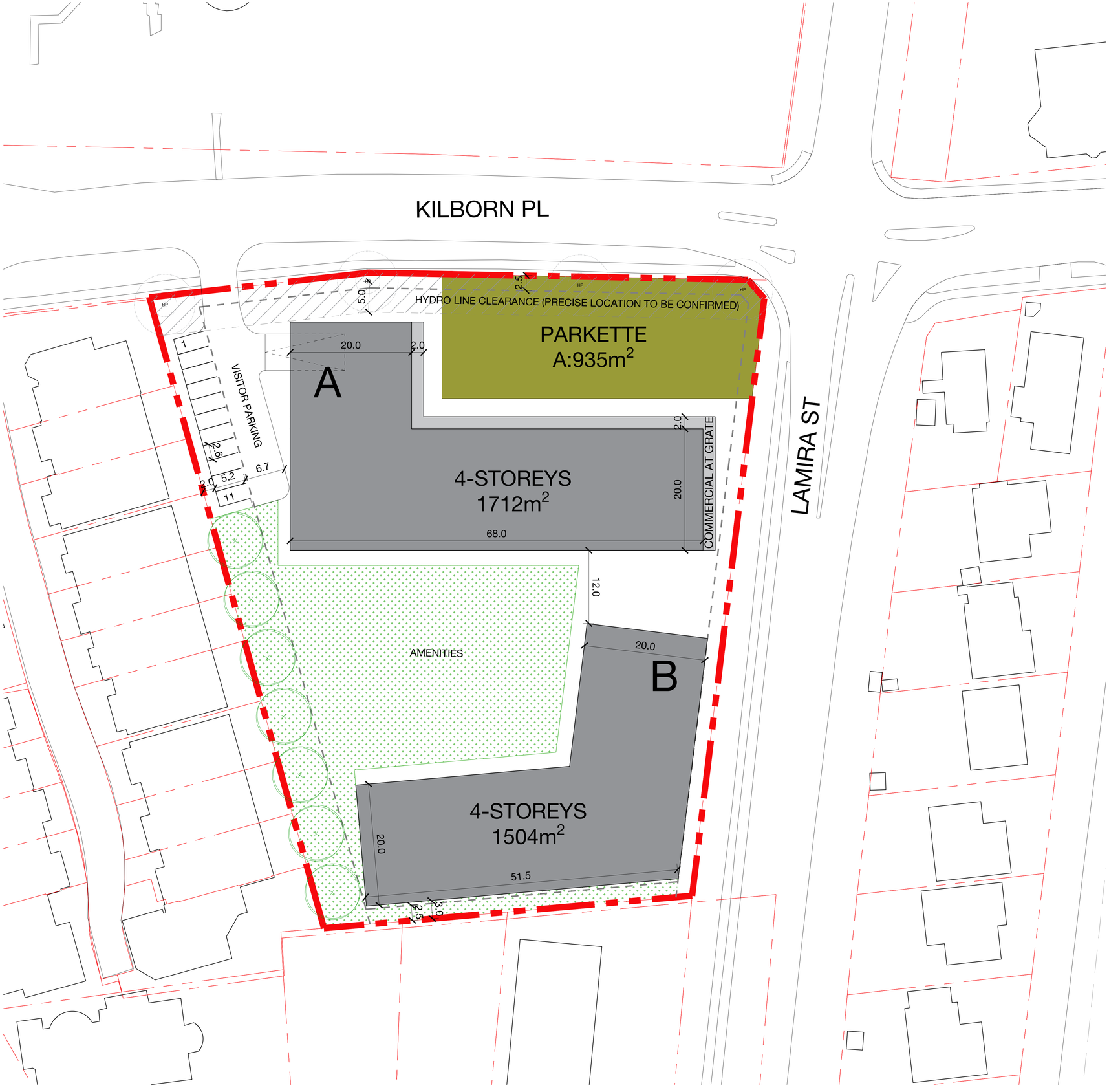
Results of Screening	Yes/No
Development Satisfies the Trip Generation Trigger	Yes
Development Satisfies the Location Trigger	Yes
Development Satisfies the Safety Trigger	Yes

Module 1.1 - Description of Proposed Development	
Municipal Address	1244 Kilborn Place
Description of location	Southwest quadrant of Kilborn Place and Lamira Street, currently occupied by a church
Land Use	Mixed-Use
Development Size	118 residential units and approximately 1,000 m2 of retail
Number of Accesses and Locations	Single access to Kilborn Place
Development Phasing	Single phase
Buildout Year	2024
Sketch Plan / Site Plan	See attached

Module 1.2 - Trip Generation Trigger		
Land Use Type	Townhomes or Apartments	
Development Size	118	Units
Trip Generation Trigger Met?	Yes	

Module 1.3 - Location Triggers		
Development Proposes a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit, or Spine Bicycle Networks (See Sheet 3)	No	No, however adjacent Lamira Street is proposed as future 'local route' and Kilborn Place east of Lamira has bike lanes
Development is in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone. (See Sheet 3)	Yes	Development within 600m of Billings Bridge Rapid Transit Station
Location Trigger Met?	Yes	

Module 1.4 - Safety Triggers		
Posted Speed Limit on any boundary road	<80	km/h
Horizontal / Vertical Curvature on a boundary street limits sight lines at a proposed driveway	No	
A proposed driveway is within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions) or within auxiliary lanes of an intersection;	Yes	Proposed site access is within 150 m or less from existing Kilborn/Lamira roundabout intersection
A proposed driveway makes use of an existing median break that serves an existing site	No	
There is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development	No	
The development includes a drive-thru facility	No	
Safety Trigger Met?	Yes	



SITE INFORMATION

ZONING	I1A

SITE AREA

Total Site Area:	8,503m²

HEIGHT	Permitted
	4 Storeys (12m)

PARKING RATES	REQUIRED
Residential:	0.5 p/unit
Visitor:	0.1p/unit
Retail:	2.5p/100m²

AMENITIES RATE	
Required	6m² / unit

SETBACKS	F.Y.	S.Y.	R.Y.
	2.5m	2.5m	7.5m

DEVELOPMENT STATISTICS

RESIDENTIAL UNITS	
Apartment (Assumes an 85% efficiency):	125

HEIGHT	
	4 Storeys (12m)

GFA	Retail	Residential
	1,000m²	10,029m²

TOTAL AREA	Retail	Residential
	1,176m²	11,799m²

PARKING	Required	Provided
Residential:	63	TBD (underground)
Visitor:	11	11 (surface)
Retail:	25	TBD
Total:	99	TBD

PARKLAND DEDICATION (10%)	
Provided	935m²

AMENITIES	
Required	6m² x 125 = 750m²

NOTES

1. Assumes typical Residential floor height of 3m. Assumes Retail Ground floor height of 4.5m.

2. For the purpose of this concept, an average of 80m² (860sf) unit size is used to calculate approximate total number of units.

3. *GFA: as defined in City of Ottawa Zoning Bylaw means the total area of each floor whether located above, at or below grade, measured from the interiors of outside walls, but excluding areas dedicated for uses such as mechanical and electrical rooms, common hallways, corridors, staircases and elevators, interior amenities, bicycle storage and parking. Assume 85% efficiency for Retail, Office and Apartment buildings. Areas are approximate. Building includes interior amenity areas for the residents.

4. The base plan (lot lines, existing roads and surrounding areas) is based on the City's Open Data and aerial images. The site area is approximate and all dimensions need to be confirmed by a legal survey.

5. This concept is part of a development concept report and should be interpreted as per findings and descriptions of such report. This concept may require minor variances for setback reduction, parking, heights, etc.

1244 KILBORN STREET OTTAWA

Concept Plan 1

LEGEND

- PROPOSED BUILDING
- AMENITY SPACE
- PROPERTY BOUNDARY
- SETBACKS
- HYDRO POLE

0 5m 10m 15m 30m

No.	REVISION	DATE	BY
3	CONCEPT PLAN	2022.01.07	TS
2	CONCEPT PLAN	2021.12.23	LC
1	BASE PLAN	2021.12.07	LC

CLIENT
ARCHDIOCESE OF OTTAWA

FOTENN
Planning + Design
396 Cooper Street, Suite 300, Ottawa ON K2P 2H7
613.730.5709 www.fotenn.com

DESIGNED	RP
REVIEWED	RP
DATE	2021.12.XX

P1

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27 January 2022

City of Ottawa
Development Review Services
110 Laurier Avenue West
Ottawa, ON K1P 1J1

Attention: Patrick McMahon, Project Manager

Dear Patrick:

Re: 1244 Kilborn Place
Step 2 – Response to City Comments

The following response form has been prepared to address City of Ottawa comments received on January 21, 2022. City comments are noted in black with the corresponding responses from Parsons in Green.

Transportation Engineering Services

Section 2.1.2 Existing Conditions

Provide descriptions of the crosswalk/PXO types, as necessary for study area intersections. Description added

Correct the spelling of PXO (written as POX on page 5). Text corrected

On-street bike lanes are provided on Kilborn (there is curbing therefore they should not be considered shoulders). Noted

Section 2.3 Exemption Review

Since this TIA is in support of a ZBLA, the entirety of modules 4.1-4.4 may be exempt until the site plan submission. Noted, these sections have been described as exempted.

In the exemption table, confirm the statement to exempt Module 4.8 by comparing the maximum trip generation that the GM zone with higher FSI would produce vs the existing I1A. Through a review of a GM development with higher FSI, both a mixed residential/commercial and office-related development alternatives were found to generate less than 200 persons trips in the peak hours. Therefore, Module 4.8 is recommended to be exempt from the Strategy Report.

1223 Michael Street North, Suite 100 | Ottawa, ON K1J 7T2
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17 February 2022

City of Ottawa
Development Review Services
110 Laurier Avenue West
Ottawa, ON K1P 1J1

Attention: Patrick McMahon, Project Manager

Dear Patrick:

Re: 1244 Kilborn Place
Step 3 – Response to City Comments

The following response form has been prepared to address City of Ottawa comments received on February 16, 2022. City comments are noted in black with the corresponding responses from Parsons in Green.

Transportation Engineering Services

The review of the largest trip generation for the proposed zoning is appreciated. Thank you

Transportation Engineering Services also supports the access being located on Kilborn Place. With access on Kilborn Place rather than Lamira, the reduce auto mode share for the commercial component is supported. Agreed

Ensure that the access meets all private approach bylaws when submitting the site plan application. Noted

Integrating cycling into the site and boundaries will be expected. Noted, will be discussed further once a SPA is submitted

In the future, it is recommended to obtain a local snapshot of the Long-Rane Transportation Model from Tim Wei (tim.wei@ottawa.ca) in order to inform background growth rates. Noted

Thank you and proceed to the strategy report

APPENDIX B

Traffic Count Data

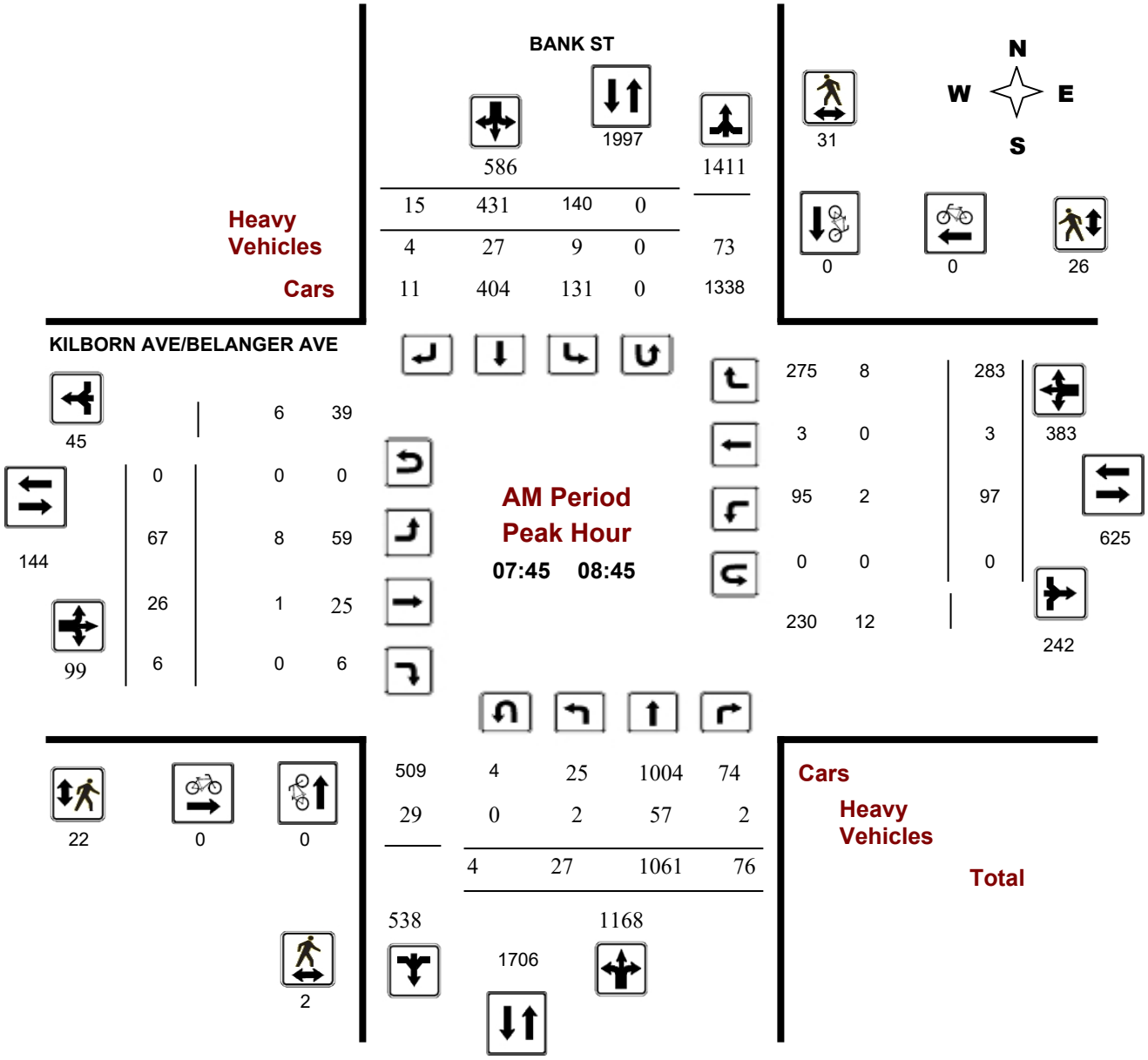
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BANK ST @ KILBORN AVE/BELANGER AVE

Survey Date: Wednesday, January 28, 2015 **WO No:** 34332

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



Comments

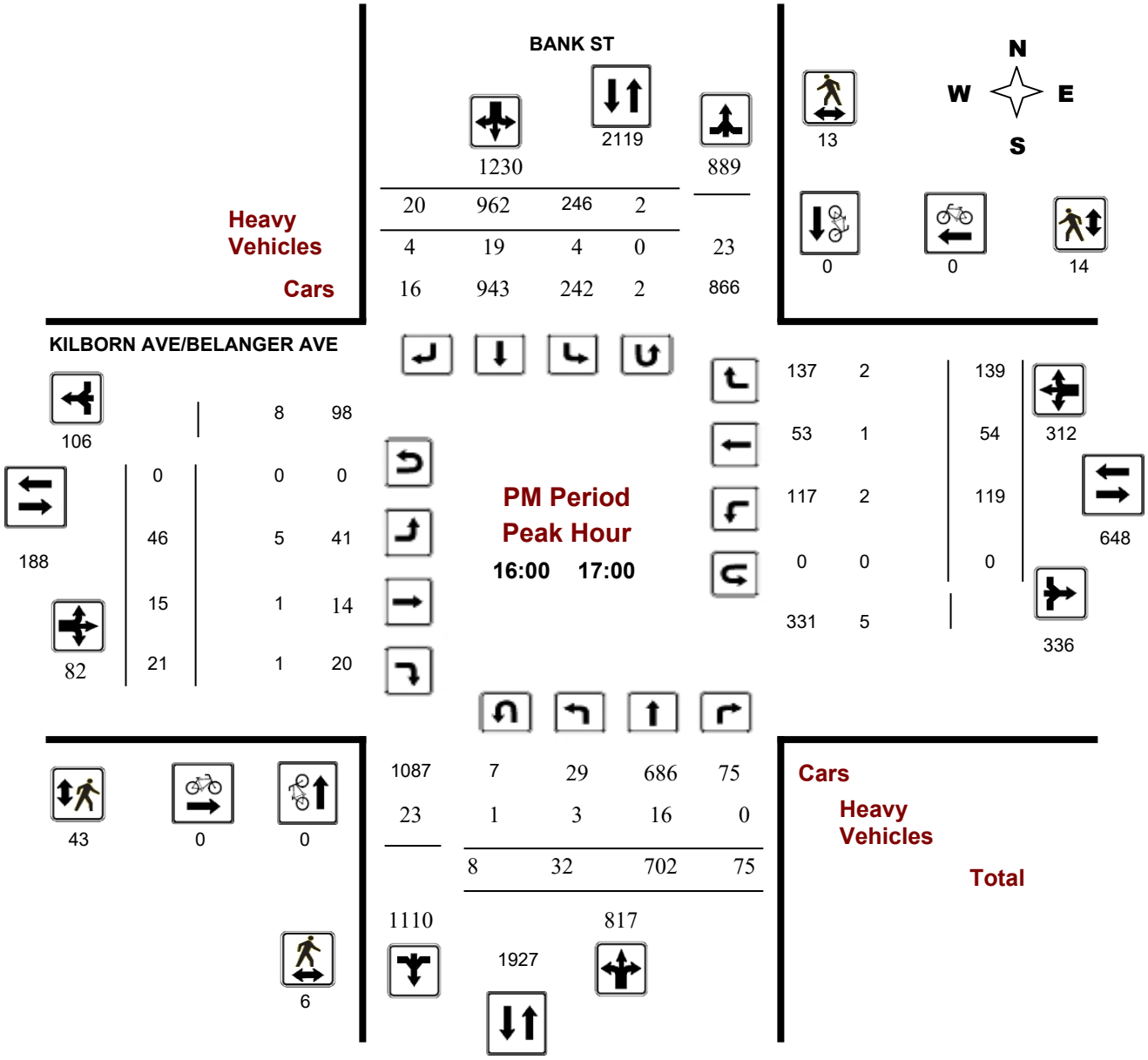
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BANK ST @ KILBORN AVE/BELANGER AVE

Survey Date: Wednesday, January 28, 2015 **WO No:** 34332

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



Comments

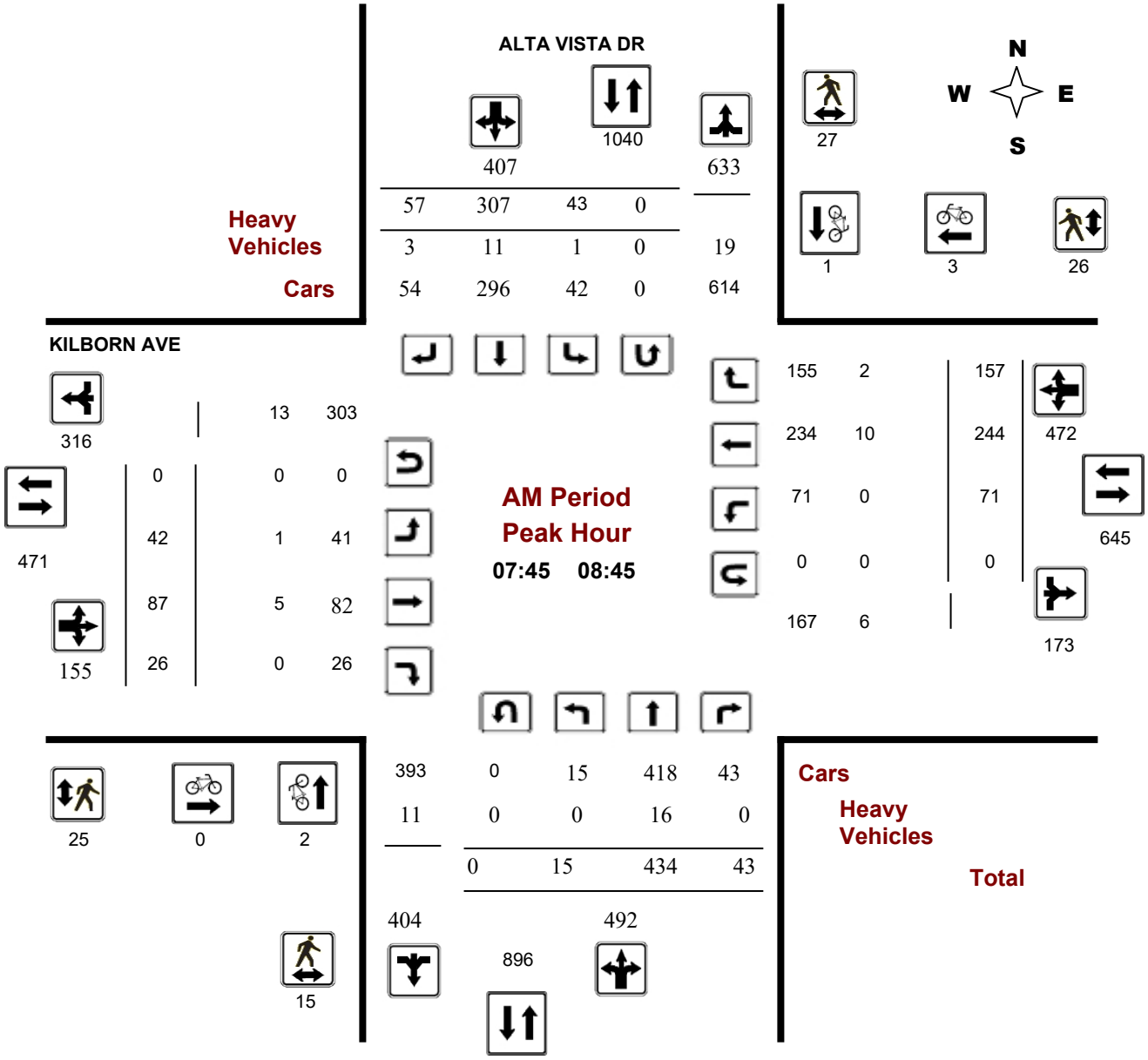
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ALTA VISTA DR @ KILBORN AVE

Survey Date: Tuesday, December 04, 2018 **WO No:** 38189

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



Comments

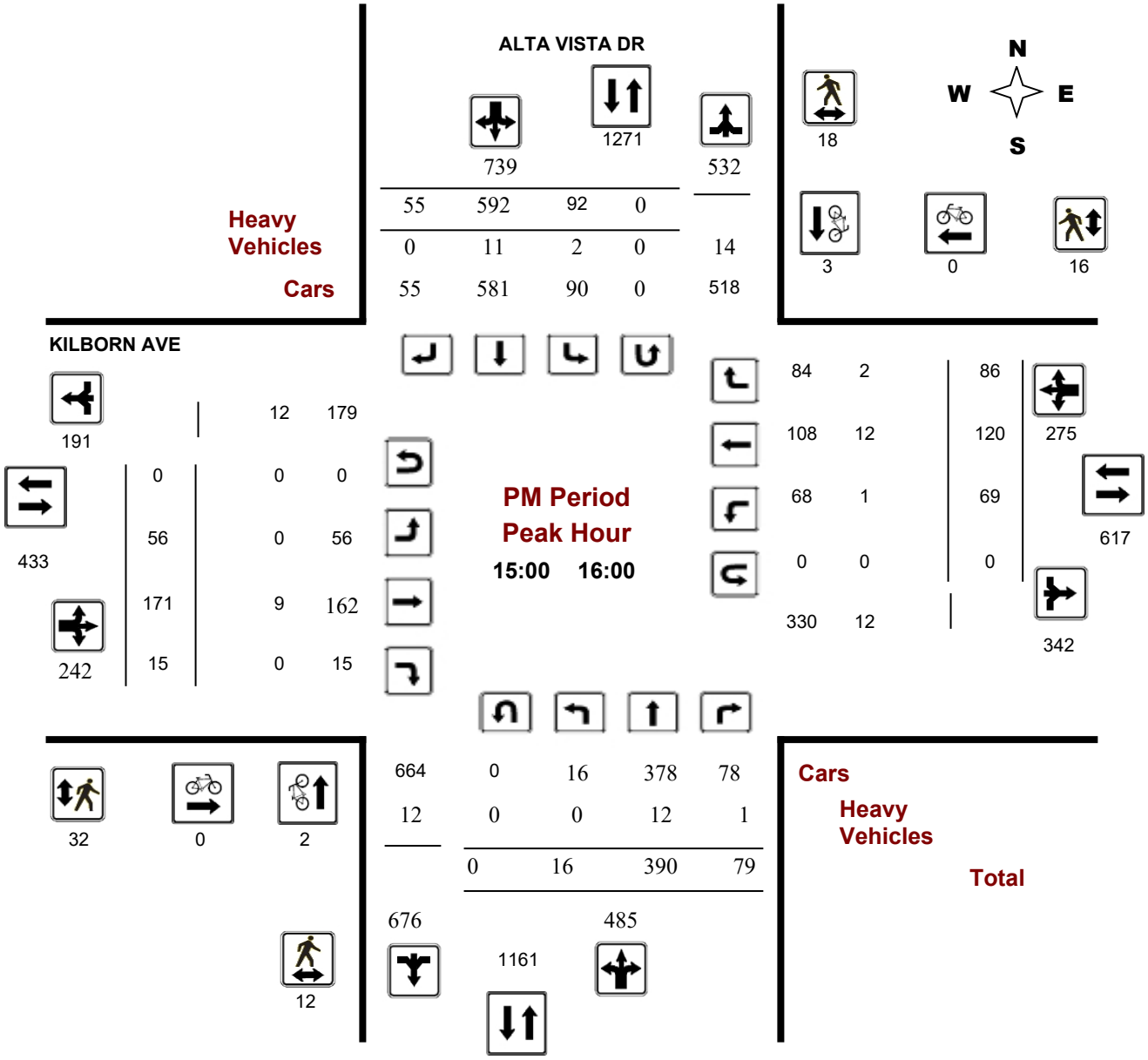
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ALTA VISTA DR @ KILBORN AVE

Survey Date: Tuesday, December 04, 2018 **WO No:** 38189

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



Comments

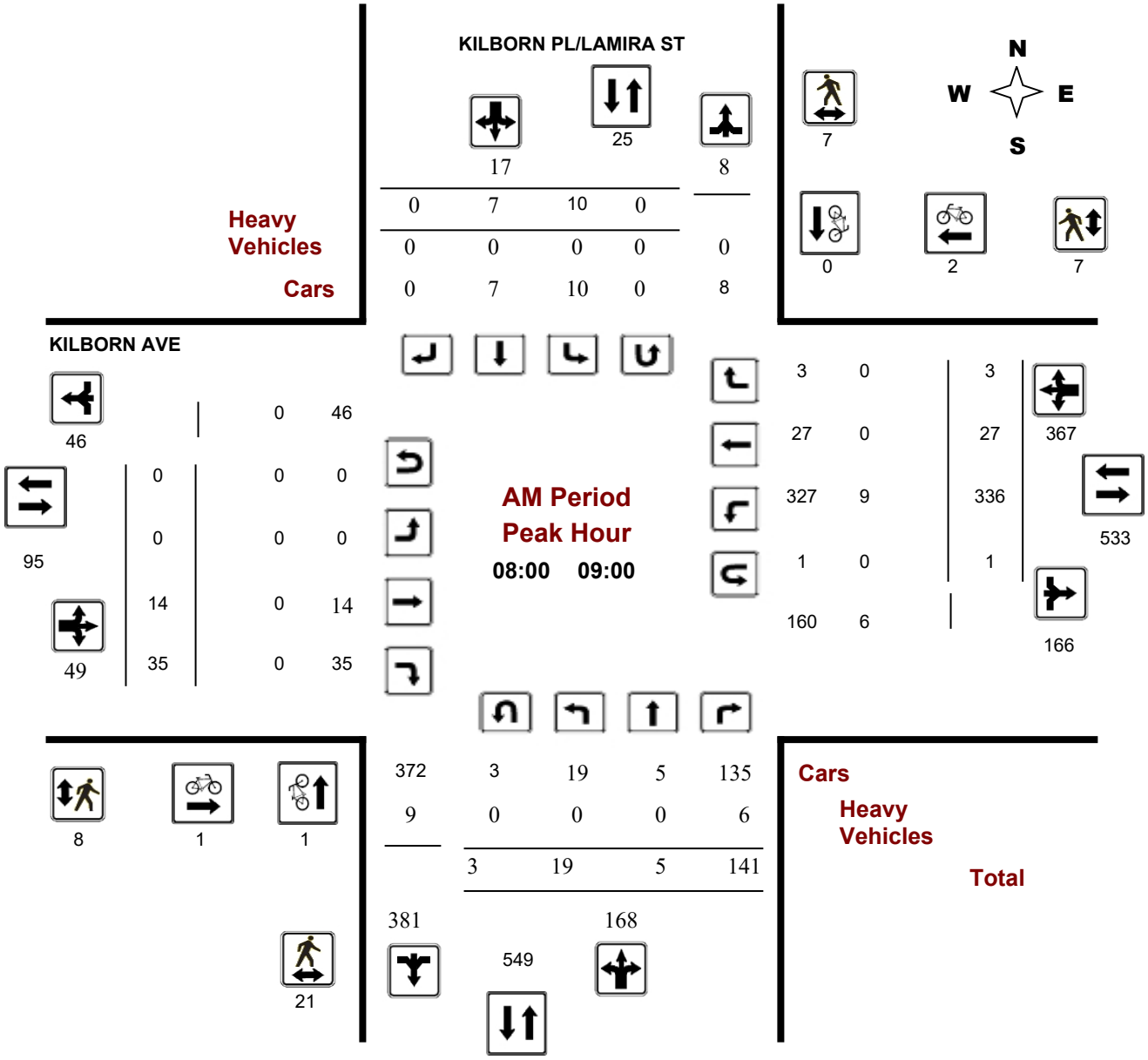
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

KILBORN AVE @ KILBORN PL/LAMIRA ST

Survey Date: Tuesday, December 10, 2019 **WO No:** 39215

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



Comments

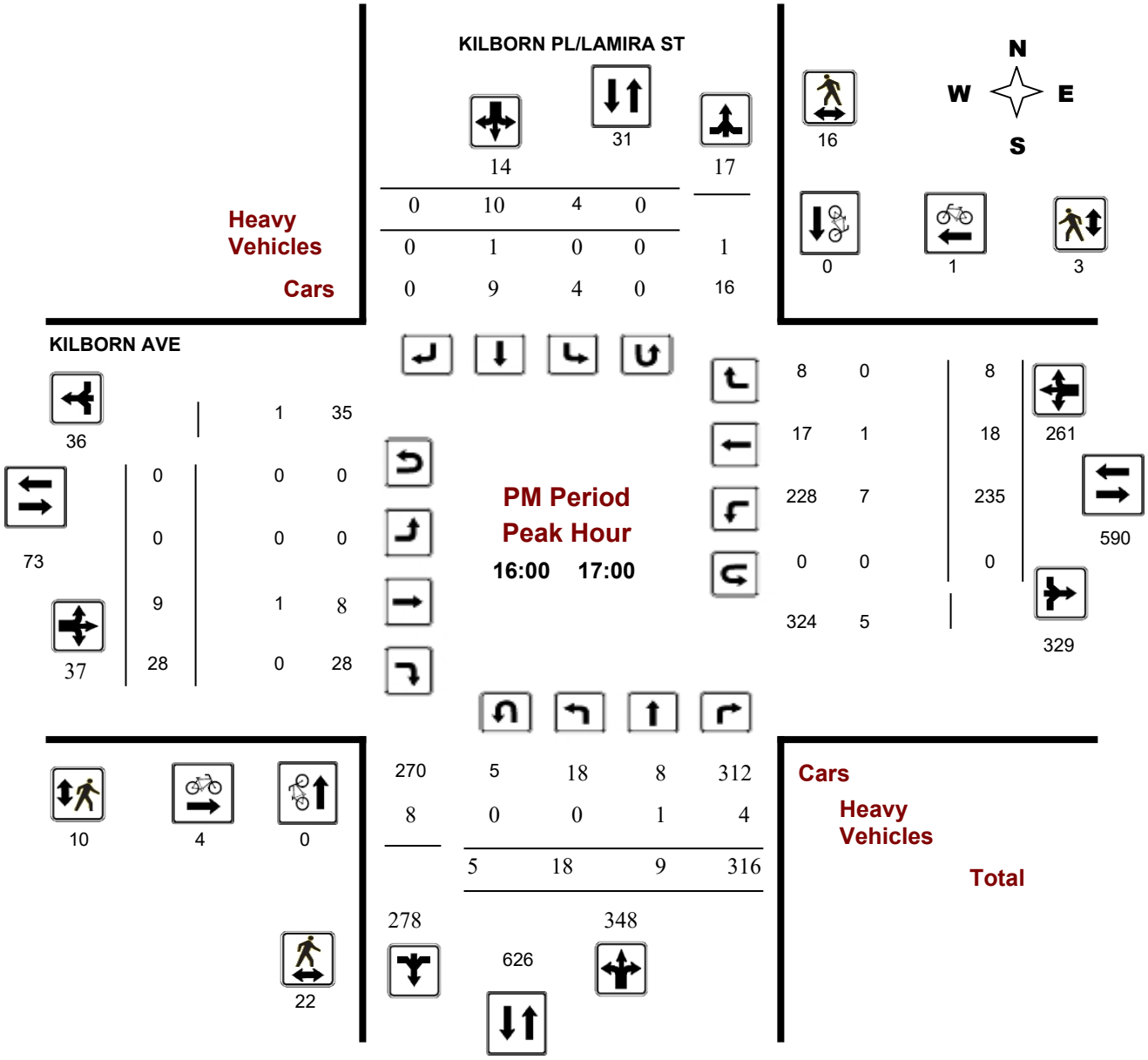
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

KILBORN AVE @ KILBORN PL/LAMIRA ST

Survey Date: Tuesday, December 10, 2019 **WO No:** 39215

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



Comments

APPENDIX C

Collision Data

Total Area

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	14	9	3	11	1	3	4	4	49	72%
Non-fatal injury	5	6	0	3	0	5	0	0	19	28%
Non-reportable	0	0	0	0	0	0	0	0	0	0%
Total	**19**	**15**	**3**	**14**	**1**	**8**	**4**	**4**	**68**	100%
	#1 or 28%	#2 or 22%	#7 or 4%	#3 or 21%	#8 or 1%	#4 or 12%	#5 or 6%	#5 or 6%		

ALTA VISTA DR/KILBORN AVE

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2015-2019	16	26,806	1825	**0.33**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	4	0	2	6	0	2	0	0	14	88%
Non-fatal injury	1	1	0	0	0	0	0	0	2	13%
Non-reportable	0	0	0	0	0	0	0	0	0	0%
Total	**5**	**1**	**2**	**6**	**0**	**2**	**0**	**0**	**16**	100%
	31%	6%	13%	38%	0%	13%	0%	0%		

BANK ST/KILBORN AVE/BELANGER AVE

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2015-2019	38	30,449	1825	**0.68**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	9	9	1	2	0	0	0	3	24	63%
Non-fatal injury	3	4	0	3	0	4	0	0	14	37%
Non-reportable	0	0	0	0	0	0	0	0	0	0%
Total	**12**	**13**	**1**	**5**	**0**	**4**	**0**	**3**	**38**	100%
	32%	34%	3%	13%	0%	11%	0%	8%		

KILBORN AVE/KILBORN PL/LAMIRA ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2015-2019	3	9,565	1825	**0.17**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	0	0	0	2	1	0	0	0	3	100%
Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
Non-reportable	0	0	0	0	0	0	0	0	0	0%
Total	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**0**	**3**	100%
	0%	0%	0%	67%	33%	0%	0%	0%		

KILBORN AVE/NIAGARA DR

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2015-2019	1	n/a	1825	**n/a**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	0	0	0	0	0	1	0	0	1	100%
Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
Non-reportable	0	0	0	0	0	0	0	0	0	0%
Total	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	100%
	0%	0%	0%	0%	0%	100%	0%	0%		

KILBORN AVE/ROONEY'S LANE

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2015-2019	2	n/a	1825	**n/a**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	1	0	0	0	0	0	0	0	1	50%
Non-fatal injury	1	0	0	0	0	0	0	0	1	50%
Non-reportable	0	0	0	0	0	0	0	0	0	0%
Total	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	100%
	100%	0%	0%	0%	0%	0%	0%	0%		

KILBORN AVE/UTAH ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2015-2019	1	n/a	1825	**n/a**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	0	0	0	1	0	0	0	0	1	100%
Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
Non-reportable	0	0	0	0	0	0	0	0	0	0%
Total	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	100%
	0%	0%	0%	100%	0%	0%	0%	0%		

ROAD SEGMENTS

KILBORN AVE, BANK ST to ROONEY'S LANE

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2015-2019	1	n/a	1825	**n/a**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	0	0	0	0	0	0	0	1	1	100%
Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
Non-reportable	0	0	0	0	0	0	0	0	0	0%
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	100%
	0%	0%	0%	0%	0%	0%	0%	100%		

KILBORN AVE, Blossom DR to Crocus AVE

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2015-2019	6	n/a	1825	**n/a**

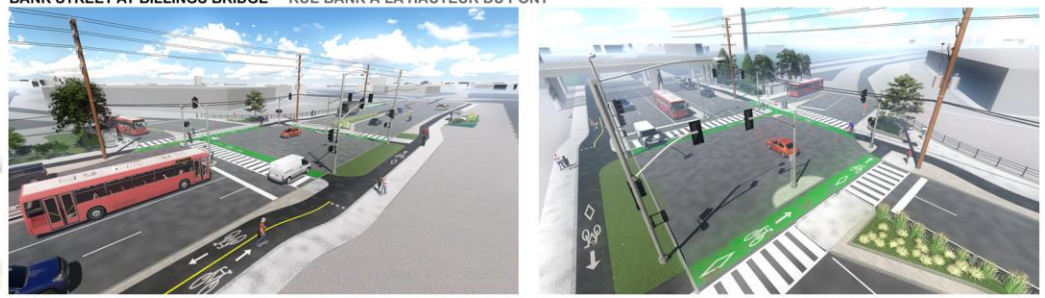
Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	0	0	0	0	0	0	4	0	4	67%
Non-fatal injury	0	1	0	0	0	1	0	0	2	33%
Non-reportable	0	0	0	0	0	0	0	0	0	0%
Total	**0**	**1**	**0**	**0**	**0**	**1**	**4**	**0**	**6**	100%
	0%	17%	0%	0%	0%	17%	67%	0%		

APPENDIX D

Bank Street Renewal Project – Functional Design

BANK STREET RENEWAL FUNCTIONAL DESIGN STUDY - Between Riverside Drive North and Ledbury Avenue
L'ÉTUDE DE CONCEPTION FONCTIONELLE EN VUE DE LA RÉFECTION DE LA RUE BANK - de la Promenade Riverside Nord à l'avenue Ledbury

BANK STREET AT BILLINGS BRIDGE RUE BANK À LA HAUTEUR DU PONT



PROPOSED STREETSCAPE DESIGN - Bird's eye view

AMÉNAGEMENT PAYSAGER DE RUE PROPOSÉ - Vue à vol d'oiseau

PROPOSED STREETSCAPE DESIGN - Ground level view

AMÉNAGEMENT PAYSAGER DE RUE PROPOSÉ - Vue au niveau de la rue

APPENDIX E

Internal Reduction Calculations

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	1244 Kilborn Place TRANS	**Organization:**	Parsons
Project Location:		**Performed By:**	Juan L
Scenario Description:		**Date:**	12-Jan-22
Analysis Year:		**Checked By:**	
Analysis Period:	**AM Street Peak Hour**	**Date:**	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail				6	4	2
Restaurant				0		
Cinema/Entertainment				0		
Residential				17	5	12
Hotel				0		
All Other Land Uses[2]				0		
				23	9	14

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	23	9	14
Internal Capture Percentage	0%	0%	0%
External Vehicle-Trips[5]	23	9	14
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	0%	0%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	0%	0%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	1244 Kilborn Place TRANS
Analysis Period:	**AM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	4	4	1.00	2	2
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	5	5	1.00	12	12
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	1		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	2	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1	0	0	0	0
Retail	0		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	1	0	0		0
Hotel	0	0	0	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	0	4	4	4	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	5	5	5	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	0	2	2	2	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	12	12	12	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	1244 Kilborn Place TRANS	**Organization:**	Parsons
Project Location:		**Performed By:**	Juan L
Scenario Description:		**Date:**	12-Jan-22
Analysis Year:		**Checked By:**	
Analysis Period:	**PM Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail				22	10	12
Restaurant				0		
Cinema/Entertainment				0		
Residential				21	12	9
Hotel				0		
All Other Land Uses[2]				0		
				43	22	21

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail					50	
Restaurant						
Cinema/Entertainment						
Residential		50				
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	3	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	1	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	43	22	21
Internal Capture Percentage	19%	18%	19%
External Vehicle-Trips[5]	35	18	17
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	10%	25%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	25%	11%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	1244 Kilborn Place TRANS
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	10	10	1.00	12	12
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	12	12	1.00	9	9
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		3	0	3	1
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	4	2	0		0
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1	0	0	0	0
Retail	0		0	0	6	0
Restaurant	0	5		0	2	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	1	0	0		0
Hotel	0	0	0	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	1	9	10	9	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	3	9	12	9	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	3	9	12	9	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	8	9	8	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	1244 Kilborn Place Target	**Organization:**	Parsons
Project Location:		**Performed By:**	Juan L
Scenario Description:		**Date:**	12-Jan-22
Analysis Year:		**Checked By:**	
Analysis Period:	**AM Street Peak Hour**	**Date:**	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail				6	4	2
Restaurant				0		
Cinema/Entertainment				0		
Residential				12	4	8
Hotel				0		
All Other Land Uses[2]				0		
				18	8	10

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	18	8	10
Internal Capture Percentage	0%	0%	0%
External Vehicle-Trips[5]	18	8	10
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	0%	0%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	0%	0%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	1244 Kilborn Place Target
Analysis Period:	**AM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	4	4	1.00	2	2
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	4	4	1.00	8	8
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	1		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	2	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1	0	0	0	0
Retail	0		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	1	0	0		0
Hotel	0	0	0	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	0	4	4	4	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	4	4	4	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	0	2	2	2	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	8	8	8	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	1244 Kilborn Place Target	**Organization:**	Parsons
Project Location:		**Performed By:**	Juan L
Scenario Description:		**Date:**	12-Jan-22
Analysis Year:		**Checked By:**	
Analysis Period:	**PM Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail				22	10	12
Restaurant				0		
Cinema/Entertainment				0		
Residential				12	7	5
Hotel				0		
All Other Land Uses[2]				0		
				34	17	17

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail					50	
Restaurant						
Cinema/Entertainment						
Residential		50				
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	3	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	1	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	34	17	17
Internal Capture Percentage	24%	24%	24%
External Vehicle-Trips[5]	26	13	13
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	10%	25%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	43%	20%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	1244 Kilborn Place Target
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	10	10	1.00	12	12
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	7	7	1.00	5	5
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		3	0	3	1
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	2	1	0		0
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1	0	0	0	0
Retail	0		0	0	3	0
Restaurant	0	5		0	1	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	1	0	0		0
Hotel	0	0	0	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	1	9	10	9	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	3	4	7	4	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	3	9	12	9	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	4	5	4	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

APPENDIX F

GM Zoning Alternate Land Uses & Highest Densities Allowed

The GM zone being applied for in this ZBLA has identified a maximum potential of 195 residential units and 1,600 m² (approximately 17,250 ft² of commercial/retail uses. The following tables show a summary of trips generated if this theoretical maximum was built.

1.1.1. RESIDENTIAL TRIP GENERATION AND MODE SHARES

Table 1 summarizes the selected peak period person-trip generation rates for the development based on the newly revised 2020 TRANS Trip Generation Manual. The 'High-Rise' person-trip rate was selected based on the definition provided by the TRANS Trip Generation Manual Summary Report, as the proposed mixed-use development is anticipated to exceed two-stories in height.

Table 1: 2020 TRANS Residential Trip Generation Rates

Land Use	Data Source	Dwelling Units	Trip Rates	
			AM Peak	PM Peak
High Rise Condos	TRANS 2020	195 units	T = 0.80(du)	T = 0.90(du)
Note: T = Average Vehicle Trip Ends; du = dwelling units				

Using the TRANS Trip Generation rates, the total amount of person trips generated by the maximum 195 residential units was calculated. The results are summarized in **Table 2**.

Table 2: Projected Residential Peak Period Person Trip Generation – TRANS Model

Land Use	Dwelling Units	AM Peak Period Person Trips	PM Peak Period Person Trips
High Rise Condos	195	156	176

Table 5 of the TRANS 2020 Trip Generation Manual was referenced for the base mode shares applicable to a residential development within the Alta Vista ward. The projected site peak period person trips according to the Alta Vista mode shares are summarized in **Table 3**.

Table 3: Residential Peak Period Trips using TRANS 2020 Mode Shares

Travel Mode	AM Peak Period		PM Peak Period	
	Mode Share	Person Trips	Mode Share	Person Trips
Auto Driver	38%	59	45%	79
Auto Passenger	12%	19	16%	27
Transit	42%	65	28%	49
Cycling	2%	3	2%	3
Walking	7%	10	9%	16
Total Person Trips	100%	156	100%	176

Standard traffic analysis is usually conducted using the morning and afternoon peak hour trips as they represent a worst-case scenario for traffic operations. The 2020 TRANS Manual used for **Table 3** uses critical peak periods which could be longer or shorter than an hour, rather than a defined critical 60-minute block.

The 2020 TRANS Manual Table 4 was referenced to convert the peak-period person-trips to peak-hour person trips by mode. **Table 4** summarizes the conversion factors from the 2020 TRANS Manual. Note that conversion factors for passenger trips are assumed to be equivalent to the published 'Auto Driver' factors for both the morning and afternoon peak period-to-hour conversion.

Table 4: Residential Trips – Peak Period to Peak Hour Conversion Factors (2020 TRANS Manual)

Travel Mode	Peak Period to Peak Hour Conversion Factors	
	AM	PM
Auto Driver	0.48	0.44
Passenger	0.48	0.44
Transit	0.55	0.47
Bike	0.58	0.48
Walk	0.58	0.52

Table 5 summarizes the residential peak hour trips for TRANS 2020 Alta Vista mode share generated by the site by adopting the peak period to peak hour conversion rates from **Table 4**, the derived peak period trips by mode shares from **Table 3**, and the inbound and outbound splits from TRANS 2020 Manual Table 9.

Table 5: Residential Peak Hour Trips Generated using TRANS 2020 Mode Shares

Travel Mode	Mode Share	AM Peak Hour (Trips/h)			Mode Share	PM Peak Hour (Trips/h)		
		In	Out	Total		In	Out	Total
Auto Driver	38%	9	20	28	45%	20	15	35
Auto Passenger	12%	3	6	9	16%	7	5	12
Transit	42%	11	25	36	28%	13	10	23
Cycling	2%	1	1	2	2%	1	1	2
Walking	7%	2	4	6	9%	5	4	9
Total Person Trips	**100%**	**25**	**56**	**81**	**100%**	**46**	**34**	**80**
Total 'New' Residential Auto Trips		**9**	**20**	**28**	-	**20**	**15**	**35**

Given the location of the site, within close proximity to the Billings Bridge Transit Station, a higher transit modal share for residential uses is appropriate. **Table 6** illustrates the TRANS 2020 suggested residential modal shares for Alta Vista, the City's Transit Oriented Development (TOD) modal shares and future projected residential modal shares. The projected modal shares were based on a hybrid of the ideal TOD modal shares and the TRANS 2020 modal shares. To achieve such modal shares, a careful consideration on numbers of proposed parking will be required (to be confirmed during SPA submission). Transit trips will be modelled as pedestrian trips to and from Billings Bridge Station.

Table 6: Future Residential Modal Share Targets for the Development

Travel Mode	TRANS Residential Mode Shares		City's TOD Mode Shares	Future Target Mode Share (AM & PM)	Residential Modal Share Target Rationale
	AM	PM			
Auto Driver	38%	45%	15%	25%	A reduction in driver mode share from TRANS is justifiable given the close proximity to Billing Bridge Rapid Transit Station. Given that the station is BRT and not LRT, a slightly higher driver mode share is assumed over TOD mode shares.
Auto Passenger	12%	16%	5%	10%	
Transit	42%	28%	65%	50%	Development is located within 600m of a BRT Transitway Corridor, making it a Transit-Oriented Development (TOD).
Cycling	2%	2%	5%	5%	Consistent with TOD mode share targets.
Walking	7%	9%	10%	10%	

Table 7: Residential Peak Hour Trips using TOD Mode Shares

Travel Mode	Mode Share	AM Peak Hour (Trips/h)			Mode Share	PM Peak Hour (Trips/h)		
		In	Out	Total		In	Out	Total
Auto Driver	25%	6	14	20	25%	12	8	20
Auto Passenger	10%	3	6	8	10%	5	3	8
Transit	50%	13	28	40	50%	23	17	40
Cycling	5%	1	3	4	5%	2	2	4
Walking	10%	3	6	8	10%	5	3	8
Total Person Trips	**100%**	**25**	**56**	**81**	**100%**	**46**	**34**	**80**
Total 'New' Residential Auto Trips		**6**	**14**	**20**	-	**12**	**8**	**20**

1.1.2. COMMERCIAL TRIP GENERATION

The commercial/retail tenants have not been identified at this stage of planning and could vary between different commercial/retail land uses. For this reason, the more general 'shopping center' rate was used, which is considered to be conservative in terms of peak hour traffic while remaining consistent with the ground-floor retail market opportunities that typically exist for mixed-use buildings. **Table 8** presents the

selected peak hour commercial auto trip generation rate for the ground floor commercial based on the ITE Trip Generation Manual, Version 10. The highest commercial/retail density of 17,250 ft² was used.

Table 8: ITE Trip Generation Rates for Shopping Center

Land Use	Data Source	Size	Trip Rates	
			AM Peak	PM Peak
Shopping Center	ITE 820	17,250 ft²	T = 0.94(x)	T = 3.81(x)
Note: T = Average Vehicle Trip Ends; x = GFA in 1,000 ft²				

To determine peak hour person trip rates, the peak hour auto trips are converted by a factor of 1.28 according to TIA guidelines. This factor is based on the typical vehicle occupancy in North America (1.15 persons/vehicle) and the inherent non-auto mode share (10%) present within the ITE Trip Generation Manual. **Table 9** summarizes the total trips per modal shares for the proposed ground floor commercial aspect of the development, using TRANS 2020 commercial modal share estimates for Alta Vista.

Table 9: Ground-Floor Commercial Trips Generated – TRANS 2020 Mode Share

Travel Mode	Mode Share AM (PM)	AM Peak Hour (Trips/hr)			PM Peak Hour (Trips/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	64% (60%)	8	5	13	24	27	51
Auto Passenger	9% (20%)	3	2	5	8	9	17
Transit	12% (9%)	1	1	2	4	4	8
Cycling	1% (0%)	0	0	0	0	0	0
Walking	14% (11%)	1	0	1	4	4	8
Total Person Trips	100% (100%)	**13**	**8**	**21**	**40**	**44**	**84**
Less Pass-by 0% (34%)		0	0	0	-9	-9	-18
Total 'New' Shopping Auto Trips		**8**	**5**	**13**	**15**	**18**	**33**

The commercial aspect of this development is to mainly cater to local trips, be it residents from this development or nearby neighborhoods. Consideration for labelling the commercial aspect as mainly locally catered include the small scale of commercial uses, the location of the development on a local street/collector road and given that most commercial attractors in the area will likely choose the nearby much larger Billings Bridge Shopping Center. For those reasons, a reduction in auto dependency for commercial uses compared to the recommended TRANS 2020 for Alta Vista is proposed, as shown in **Table 10**.

Table 10: Future Modal Share Targets for the Commercial/Retail Aspect of the Development

Travel Mode	TRANS Commercial Mode Shares		Commercial Target Mode Share (AM & PM)	Commercial/Retail Target Modal Share Rationale
	AM	PM		
Auto Driver	64%	60%	40%	A reduction in driver mode share from TRANS is justifiable given the close proximity to nearby BRT, nearby residential uses (promoting walking), and the pre-dominance of local commercial opportunities.
Auto Passenger	9%	20%	15%	
Transit	12%	9%	20%	Transit anticipated to be slightly higher than the ward based on proximity to rapid transit
Cycling	1%	0%	5%	The majority of trips are anticipated to be generated locally and will most likely attract nearby pedestrians, cyclists or even residents of the same development
Walking	14%	11%	20%	

Table 11: Ground-Floor Commercial Trips Generated – Target Mode Share

Travel Mode	Mode Share	AM Peak Hour (Trips/hr)			PM Peak Hour (Trips/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	40%	6	4	10	16	18	34
Auto Passenger	15%	2	1	3	6	7	13
Transit	20%	2	1	3	8	8	16
Cycling	5%	1	0	1	2	3	4
Walking	20%	2	2	4	8	8	17
Total Person Trips	100%	6	4	10	10	12	22
Less Pass-by 0% AM (34% PM)		0	0	0	-6	-6	-12
Total 'New' Shopping Auto Trips		**6**	**4**	**10**	**10**	**12**	**22**

1.1.3. TRIP GENERATION REDUCTIONS

Given the mixed land uses, an internal reduction rate is applicable based on mixed-use parameters described in Section 6.5 of the ITE Trip Generation Manual 3rd Edition. These trips may be reduced to avoid double counting multi-purpose trips such as a local resident shopping within site.

Pass-by trips were also considered for commercial uses. Pass-by trips are intermediate trips along the original route between the primary origin and destination, such as a retail trip between home and another destination such as work. These are not considered 'new' trips, but existing trips already on the network making an interim stop on route. Appendix E of the ITE Trip Generation Manual 3rd edition was used to determine pass-by rates. Pass-by trips were calculated after the internal reduction factor was applied.

The trip generation rates for commercial uses from **Table 8**, the proposed retail size and respective mode share as described in **Table 10** and the internal reductions calculation from the ITE Trip Generation Manual 3rd Edition were used to estimate the new commercial trips as shown in **Table 12.**

Table 12: Ground-Floor Commercial Trips Generated Assuming Future Mode Shares and Reductions

Travel Mode	AM Peak Hour (Trips/hr)			PM Peak Hour (Trips/hr)		
	In	Out	Total	In	Out	Total
Auto Driver	6	4	10	14	13	27
Pre-Internal Reduction	*6*	*4*	*10*	*16*	*18*	*34*
Vehicles Reduced	*0*	*0*	*0*	*-2*	*-5*	*-7*
Less Pass-by 0% AM (34% PM)	0	0	0	-5	-5	-10
Total 'New' Shopping Auto Trips	**6**	**4**	**10**	**9**	**8**	**17**
Note: active transportation and total person trips remain the same as Table 11						

Additionally, an internal reduction to residential trips is applicable for TRANS and target mode shares, as shown in **Table 13** and **Table 14** respectively.

Table 13: Residential Peak Hour Trips using TRANS 2020 Mode Shares with Internal Reduction

Travel Mode	AM Peak Hour (Trips/hr)			PM Peak Hour (Trips/hr)		
	In	Out	Total	In	Out	Total
Auto Driver	9	20	28	15	13	28
Pre-Internal Reduction	*9*	*20*	*28*	*20*	*15*	*35*
Vehicles Reduced	*0*	*0*	*0*	*-5*	*-2*	*-7*
Total 'New' Residential Auto Trips	**9**	**20**	**28**	**15**	**13**	**28**
Note: active transportation and total person trips remain the same as Table 5						

Table 14: Residential Peak Hour Trips Using Target Mode Shares with Internal Reduction

Travel Mode	AM Peak Hour (Trips/hr)			PM Peak Hour (Trips/hr)		
	In	Out	Total	In	Out	Total
Auto Driver	6	14	20	7	6	13
Pre-Internal Reduction	*6*	*14*	*20*	*12*	*8*	*20*
Vehicles Reduced	*0*	*0*	*0*	*-5*	*-2*	*-7*
Total 'New' Residential Auto Trips	**6**	**14**	**20**	**7**	**6**	**13**
Note: active transportation and total person trips remain the same as Table 7						

1.1.4. SITE FORECAST TRIP GENERATION SUMMARY

Using the retail trips generated from **Table 11** and its reductions from **Table 12,** plus the residential trips generated from **Table 5** with its internal reductions from **Table 13**, the combined trips generated at full buildout using TRANS mode shares for residential and custom mode shares for commercial can be found on **Table 15**.

Table 15: Combined Residential and Commercial Trips Generated – TRANS Mode Shares

Travel Mode	AM Peak Hour (Trips/hr)			PM Peak Hour (Trips/hr)		
	In	Out	Total	In	Out	Total
Auto Driver	15	24	38	29	26	55
Pre-Internal Reduction	*15*	*24*	*38*	*36*	*33*	*69*
Vehicles Reduced	*0*	*0*	*0*	*-7*	*-7*	*-14*
Auto Passenger	5	7	12	13	12	25
Transit	13	26	39	21	18	39
Cycling	2	1	3	3	4	6
Walking	4	6	10	13	12	26
Total Person Trips	31	60	91	56	46	102
Less Pass-by	0	0	0	-5	-5	-10
Total 'New' Full Buildout Auto Trips	**15**	**24**	**38**	**24**	**21**	**45**

As shown in **Table 15**, based on the 2020 TRANS Trip Generation Manual, the highest density that the site could produce is projected to generate approximately 40 to 45 new auto-trips per hour during the weekday commuter peak hours. The increase in two-way transit trips is estimated to be approximately 40 persons per hour, and the increase in walk and cyclist trips is approximately 15 to 30 persons per hour during the peak hours.

It is important to note that the TRANS Mode share for Alta Vista includes a large portion of homes located far from rapid transit and thus, the mode shares for residential uses reflected in **Table 15** show a large percentage of drivers and low percentage of transit/active users. To account for this, a custom target mode share was derived in **Table 6** which was used to generate the new residential trips using the target mode shares as seen in **Table 7.** Those trips were then internally reduced (**Table 14**) and summed with commercial trips to produce a combined future projected site generated trips based on target mode shares as shown in **Table 16**. Note that the slight reduction in residential vehicle trips between TRANS and target mode shares did not impact the commercial internal trip reductions.

Table 16: Combined Residential and Commercial Trips Generated – Target Mode Shares

Travel Mode	AM Peak Hour (Trips/hr)			PM Peak Hour (Trips/hr)		
	In	Out	Total	In	Out	Total
Auto Driver	12	18	30	21	19	40
Pre-Internal Reduction	*12*	*18*	*30*	*28*	*26*	*54*
Vehicles Reduced	*0*	*0*	*0*	*-7*	*-7*	*-14*
Auto Passenger	5	7	11	11	10	21
Transit	15	29	43	31	25	56
Cycling	2	3	5	4	5	8
Walking	5	8	12	13	11	25
Total Person Trips	31	60	91	56	46	102
Less Pass-by	0	0	0	-5	-5	-10
Total 'New' Full Buildout Auto Trips	**12**	**18**	**30**	**16**	**14**	**30**

Based on **Table 16**, it is anticipated that the highest mixed-use development using target mode shares will generate approximately 30 'new' vehicles trips, 45 to 55 'new' transit trips and 10 to 30 'new' bike/walk trips two-way per peak hour.

Alternative 2: Office Leasable Space Only

An alternative GM zone land use could include leasable office space. The highest square footage for office space at this site was identified as approximately 137,300 ft². The following analysis determines the number of trips that could be generated out of solely office space use.

1.1.5. OFFICE TRIP GENERATION

Rates from the ITE Trip Generation Manual Tenth Edition were used to determine trips ends as illustrated in **Table 17**.

Table 17: ITE Trip Generation Rates for General Office

Land Use	Data Source	Size	Trip Rates	
			AM Peak	PM Peak
General Office	ITE 710	137,300 ft²	T = 0.94(x) + 26.49	T = 0.95Ln(x) + 0.36
Note: T = Average Vehicle Trip Ends; x = GFA in 1,000 ft²				

To determine peak hour person trip rates, the peak hour auto trips are converted by a factor of 1.28 according to TIA guidelines. This factor is based on the typical vehicle occupancy in North America (1.15 persons/vehicle) and the inherent non-auto mode share (10%) present within the ITE Trip Generation Manual. **Table 18** summarizes the total trips per modal shares for the maximum office space allowable to be developed for this site, using TRANS 2020 employment mode share estimates for Alta Vista. Since this alternative only has a single land use, an internal reduction is not applicable. Office space does not generate pass-by trip reductions either.

Table 18: Office Only Trips Generated – TRANS 2020 Mode Share

Travel Mode	Mode Share AM (PM)	AM Peak Hour (Trips/hr)			PM Peak Hour (Trips/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	69% (69%)	118	20	138	22	115	137
Auto Passenger	7% (7%)	12	2	14	3	12	15
Transit	18% (18%)	31	5	36	5	30	35
Cycling	3% (3%)	5	0	1	0	4	4
Walking	3% (3%)	5	1	6	1	5	6
Total Person Trips	100% (100%)	171	28	199	31	166	197
Total 'New' Office Auto Trips		**118**	**20**	**138**	**22**	**115**	**137**

Given that the development is within 600 meters from Billings Bridge Rapid Transit Station and there is some higher density located nearby, a reduction in auto dependency for office uses as shown in **Table 19** is recommended.

Table 19: Future Mode Share Targets for Office Uses

Travel Mode	TRANS Commercial Mode Shares		City's TOD Mode Shares	Office Target Mode Share (AM & PM)	Office Target Modal Share Rationale
	AM	PM			
Auto Driver	69%	69%	15%	35%	A reduction in driver mode share from TRANS is justifiable given the close proximity to nearby BRT and nearby high-density residential (promoting walking).
Auto Passenger	7%	7%	5%	10%	
Transit	18%	18%	65%	40%	Transit anticipated to be higher than the ward based on proximity to rapid transit but lower than TOD given that it is near BRT and not LRT.
Cycling	3%	3%	5%	5%	Active transportation anticipated to be similar to TOD targets.
Walking	3%	3%	10%	10%	

Table 20: Office Only Trips Generated – Target Mode Share

Travel Mode	Mode Share	AM Peak Hour (Trips/hr)			PM Peak Hour (Trips/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	35%	60	10	70	11	59	70
Auto Passenger	10%	18	3	21	4	17	21
Transit	40%	68	11	79	12	66	78
Cycling	5%	8	1	9	1	8	9
Walking	10%	17	3	20	3	16	19
Total Person Trips	100%	171	28	199	31	166	197
Total 'New' Office Auto Trips		**60**	**10**	**70**	**11**	**59**	**70**

APPENDIX G

TDM Checklist

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

Legend

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

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	1.	**WALKING & CYCLING: ROUTES**	
	1.1	**Building location & access points**	
BASIC	1.1.1	Locate building close to the street, and do not locate parking areas between the street and building entrances	☑ parking on backside/underground
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☑ Buildings front sidewalks
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☑ anticipated modern design
	1.2	**Facilities for walking & cycling**	
REQUIRED	1.2.1	Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations *(see Official Plan policy 4.3.3)*	☑ existing pathway connects Kilborn Place to Bank Street, which then continues through paved sidewalks to Billings Bridge Station
REQUIRED	1.2.2	Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible *(see Official Plan policy 4.3.12)*	☑ Refer to comment above. Entire route via paved sidewalks

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3	Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks *(see Official Plan policy 4.3.10)*	☑ Sidewalks built to City Standards
REQUIRED	1.2.4	Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps *(see Official Plan policy 4.3.10)*	☑ Anticipated to meet OADA standards
REQUIRED	1.2.5	Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on-road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians *(see Official Plan policy 4.3.11)*	☑ crossing improvements for active transportation proposed on Bank Street as part of the Bank Street Renewal Project
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☑ Refer to comment 1.2.1
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☑ City lighting exists on pathways and roads nearby
BASIC	1.2.8	Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	☐
	1.3	**Amenities for walking & cycling**	
BASIC	1.3.1	Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	☑ Lighting provided on Kilborn Place to Billings Bridge
BASIC	1.3.2	Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	☐

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

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

APPENDIX H

MMLOS: Intersection Analysis

Multi-Modal Level of Service - Intersections Form

Consultant	**Parsons**	**Project**	**478193 - 01000**
Scenario	**1244 Kilborn Place**	**Date**	**2-Feb-22**
Comments			

Unlocked Rows for Replicating

INTERSECTIONS		Alta Vista/Kilborn (existing/future)				Bank/Lamira (existing)				Bank/Lamira (future Bank Renewal)			
	Crossing Side	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	4	4	4	4	8	8	7	5	5	5	4	5
	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	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Protected/ Permissive	Permissive	Permissive	Permissive	Protected	Protected
	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	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	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel	No Channel	No Channel	Conventional with Receiving Lane	No Channel	No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	5-10m	5-10m	5-10m	10-15m	10-15m	15-25m	3-5m	10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Zebra stripe hi-vis markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	**55**	**56**	**56**	**56**	**-9**	**-9**	**8**	**44**	**39**	**39**	**63**	**47**
	Ped. Exposure to Traffic LoS	**D**	**D**	**D**	**D**	**F**	**F**	**F**	**E**	**E**	**E**	**C**	**D**
	Cycle Length	100	100	100	100	95	95	95	95	95	95	95	95
	Effective Walk Time	25	25	24	24	29	29	32	32	29	29	32	32
	Average Pedestrian Delay	**28**	**28**	**29**	**29**	**23**	**23**	**21**	**21**	**23**	**23**	**21**	**21**
	Pedestrian Delay LoS	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**
	Level of Service	**D**	**D**	**D**	**D**	**F**	**F**	**F**	**E**	**E**	**E**	**C**	**D**
		D				**F**				**E**			
	Approach From	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP					Mixed Traffic		Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP
	Right Turn Lane Configuration	Not Applicable	Not Applicable					> 50 m		Not Applicable	Not Applicable	Not Applicable	Not Applicable
	Right Turning Speed	Not Applicable	Not Applicable					>25 km/h		Not Applicable	Not Applicable	Not Applicable	Not Applicable
	Cyclist relative to RT motorists	**Not Applicable**	**Not Applicable**	**-**	**-**	**-**	**-**	**F**	**-**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**
	Separated or Mixed Traffic	**Separated**	**Separated**	**-**	**-**	**-**	**-**	**Mixed Traffic**	**-**	**Separated**	**Separated**	**Separated**	**Separated**
	Left Turn Approach	1 lane crossed	1 lane crossed	1 lane crossed	1 lane crossed	≥ 2 lanes crossed	≥ 2 lanes crossed	No lane crossed	No lane crossed	2-stage, LT box	2-stage, LT box	2-stage, LT box	2-stage, LT box
	Operating Speed	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h
	Left Turning Cyclist	**D**	**D**	**D**	**D**	**F**	**F**	**C**	**C**	**A**	**A**	**A**	**A**
	Level of Service	**D**	**D**	**-**	**-**	**-**	**-**	**F**	**-**	**A**	**A**	**A**	**A**
		D				**F**				**A**			
Transit	Average Signal Delay	≤ 20 sec	≤ 20 sec			≤ 30 sec	≤ 20 sec			≤ 30 sec	≤ 20 sec		
	Level of Service	**C**	**C**	**-**	**-**	**D**	**C**	**-**	**-**	**D**	**C**	**-**	**-**
		C				**D**				**D**			
Truck	Effective Corner Radius	10-15m	5-10m	5-10m	5-10m	10-15m	10-15m	15-25m	3-5m	10-15m	10-15m	10-15m	10-15m
	Number of Receiving Lanes on Departure from Intersection	1	1	≥ 2	≥ 2	1	1	1	1	1	1	≥ 2	≥ 2
	Level of Service	**#N/A**	**#N/A**	**#N/A**	**#N/A**	**#N/A**	**#N/A**	**#N/A**	**#N/A**	**#N/A**	**#N/A**	**#N/A**	**#N/A**
		#N/A				**#N/A**				**#N/A**			
Auto	Volume to Capacity Ratio												
	Level of Service	**-**				**-**				**-**			

APPENDIX I

Intersection Performance: Existing Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	26	6	97	3	283	27	1061	76	140	431	15
Future Volume (vph)	67	26	6	97	3	283	27	1061	76	140	431	15
Satd. Flow (prot)	0	1708	0	0	1702	1517	1695	3343	0	1695	3367	0
Flt Permitted		0.731			0.684		0.470			0.101		
Satd. Flow (perm)	0	1267	0	0	1218	1450	823	3343	0	180	3367	0
Satd. Flow (RTOR)		4				314		8			5	
Lane Group Flow (vph)	0	110	0	0	111	314	30	1263	0	156	496	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		5.0	10.0	
Minimum Split (s)	33.3	33.3		33.3	33.3	33.3	35.0	35.0		11.0	35.0	
Total Split (s)	39.0	39.0		39.0	39.0	39.0	36.0	36.0		15.0	51.0	
Total Split (%)	41.1%	41.1%		41.1%	41.1%	41.1%	37.9%	37.9%		15.8%	53.7%	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.6	2.6		2.6	2.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.3			6.3	6.3	5.9	5.9		5.9	5.9	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	None	None		None	None	None	C-Min	C-Min		None	C-Min	
Act Effct Green (s)		20.5			20.5	20.5	46.7	46.7		62.3	62.3	
Actuated g/C Ratio		0.22			0.22	0.22	0.49	0.49		0.66	0.66	
v/c Ratio		0.40			0.42	0.56	0.07	0.77		0.57	0.22	
Control Delay		32.9			35.0	7.5	18.1	26.5		19.8	8.0	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		32.9			35.0	7.5	18.1	26.5		19.8	8.0	
LOS		C			D	A	B	C		B	A	
Approach Delay		32.9			14.7			26.3			10.8	
Approach LOS		C			B			C			B	
Queue Length 50th (m)		15.2			16.0	0.0	3.2	109.3		12.0	21.2	
Queue Length 95th (m)		29.3			30.6	18.8	9.6	#168.0		28.6	29.5	
Internal Link Dist (m)		152.2			261.5			165.0			510.5	
Turn Bay Length (m)						35.0	60.0			60.0		
Base Capacity (vph)		438			419	705	404	1646		287	2210	
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		0.25			0.26	0.45	0.07	0.77		0.54	0.22	

Intersection Summary

Cycle Length: 95
Actuated Cycle Length: 95
Offset: 4 (4%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated

Lane Group	Ø10	Ø11
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Satd. Flow (RTOR)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	10	11
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	5%	5%
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

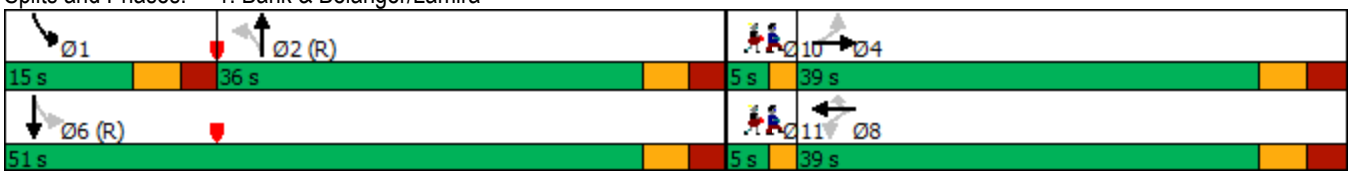
Intersection Summary

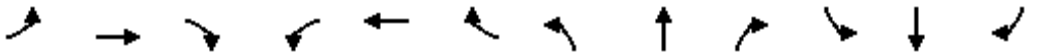
Maximum v/c Ratio: 0.77

Intersection Signal Delay: 20.5	Intersection LOS: C
Intersection Capacity Utilization 80.4%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Bank & Belanger/Lamira





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	87	26	71	244	157	15	434	43	43	307	57
Future Volume (vph)	42	87	26	71	244	157	15	434	43	43	307	57
Satd. Flow (prot)	1695	1699	0	1695	1621	0	1695	1746	0	1695	1722	0
Flt Permitted	0.232			0.676			0.463			0.368		
Satd. Flow (perm)	404	1699	0	1168	1621	0	806	1746	0	646	1722	0
Satd. Flow (RTOR)		18			39			6			12	
Lane Group Flow (vph)	47	126	0	79	445	0	17	530	0	48	404	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.5	24.5		24.5	24.5		26.2	26.2		26.2	26.2	
Total Split (s)	41.0	41.0		41.0	41.0		44.0	44.0		44.0	44.0	
Total Split (%)	43.2%	43.2%		43.2%	43.2%		46.3%	46.3%		46.3%	46.3%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.2	2.2		2.2	2.2		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	
Act Effct Green (s)	29.6	29.6		29.6	29.6		54.7	54.7		54.7	54.7	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.58	0.58		0.58	0.58	
v/c Ratio	0.38	0.23		0.22	0.84		0.04	0.53		0.13	0.41	
Control Delay	32.2	19.9		23.4	41.5		11.9	16.1		12.9	13.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	32.2	19.9		23.4	41.5		11.9	16.1		12.9	13.8	
LOS	C	B		C	D		B	B		B	B	
Approach Delay		23.2			38.8			16.0			13.7	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	6.7	14.4		10.6	69.3		1.3	54.7		3.8	37.1	
Queue Length 95th (m)	14.9	23.8		18.6	92.0		5.2	102.9		11.6	71.6	
Internal Link Dist (m)		612.9			195.3			240.5			249.8	
Turn Bay Length (m)	45.0			40.0			40.0			35.0		
Base Capacity (vph)	153	657		444	641		464	1008		372	997	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.31	0.19		0.18	0.69		0.04	0.53		0.13	0.41	

Intersection Summary
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 11 (12%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

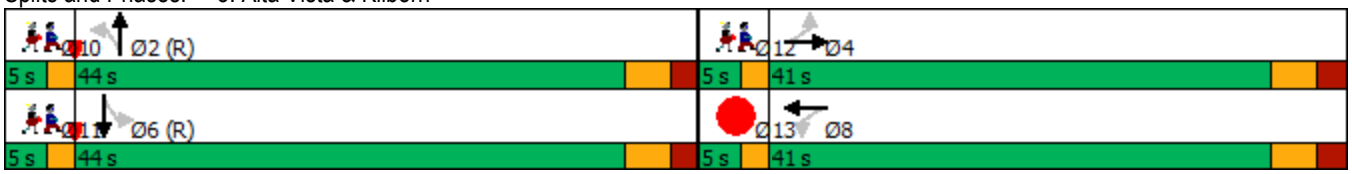
Lane Group	Ø10	Ø11	Ø12	Ø13
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Satd. Flow (RTOR)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	10	11	12	13
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	1.0	1.0	1.0	1.0
Minimum Split (s)	5.0	5.0	5.0	5.0
Total Split (s)	5.0	5.0	5.0	5.0
Total Split (%)	5%	5%	5%	5%
Yellow Time (s)	2.0	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	None	None
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (m)				
Queue Length 95th (m)				
Internal Link Dist (m)				
Turn Bay Length (m)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				

Intersection Summary

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 23.2	Intersection LOS: C
Intersection Capacity Utilization 83.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Alta Vista & Kilborn



MOVEMENT SUMMARY

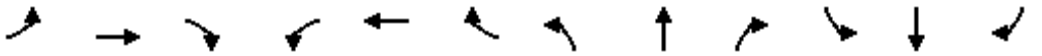
Site: 101 [Lamira/Kilborn Existing AM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Lamira												
1	L2	20	2.0	0.124	7.0	LOS A	0.7	4.8	0.13	0.49	0.13	47.1
2	T1	5	2.0	0.124	3.8	LOS A	0.7	4.8	0.13	0.49	0.13	47.3
3	R2	148	2.0	0.124	3.8	LOS A	0.7	4.8	0.13	0.49	0.13	46.5
Approach		174	2.0	0.124	4.2	LOS A	0.7	4.8	0.13	0.49	0.13	46.6
East: Kilborn Ave												
4	L2	354	2.0	0.269	7.0	LOS A	1.6	11.4	0.14	0.59	0.14	45.7
5	T1	28	2.0	0.269	3.8	LOS A	1.6	11.4	0.14	0.59	0.14	45.9
6	R2	3	2.0	0.269	3.8	LOS A	1.6	11.4	0.14	0.59	0.14	45.1
Approach		385	2.0	0.269	6.7	LOS A	1.6	11.4	0.14	0.59	0.14	45.7
North: Lamira												
7	L2	11	2.0	0.025	9.5	LOS A	0.1	0.8	0.51	0.62	0.51	45.1
8	T1	7	2.0	0.025	6.3	LOS A	0.1	0.8	0.51	0.62	0.51	45.3
9	R2	1	2.0	0.025	6.4	LOS A	0.1	0.8	0.51	0.62	0.51	44.5
Approach		19	2.0	0.025	8.1	LOS A	0.1	0.8	0.51	0.62	0.51	45.1
West: Kilborn Pl												
10	L2	1	2.0	0.059	9.0	LOS A	0.3	2.1	0.49	0.58	0.49	46.2
11	T1	15	2.0	0.059	5.8	LOS A	0.3	2.1	0.49	0.58	0.49	46.4
12	R2	37	2.0	0.059	5.8	LOS A	0.3	2.1	0.49	0.58	0.49	45.6
Approach		53	2.0	0.059	5.9	LOS A	0.3	2.1	0.49	0.58	0.49	45.9
All Vehicles		631	2.0	0.269	6.0	LOS A	1.6	11.4	0.17	0.56	0.17	45.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	15	21	119	54	139	32	702	75	246	962	20
Future Volume (vph)	46	15	21	119	54	139	32	702	75	246	962	20
Satd. Flow (prot)	0	1671	0	0	1725	1517	1695	3329	0	1695	3374	0
Flt Permitted		0.705			0.768		0.262			0.167		
Satd. Flow (perm)	0	1204	0	0	1369	1478	461	3329	0	297	3374	0
Satd. Flow (RTOR)		20				154		12			3	
Lane Group Flow (vph)	0	91	0	0	192	154	36	863	0	273	1091	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		5.0	10.0	
Minimum Split (s)	33.3	33.3		33.3	33.3	33.3	35.0	35.0		11.0	35.0	
Total Split (s)	39.0	39.0		39.0	39.0	39.0	36.0	36.0		15.0	51.0	
Total Split (%)	41.1%	41.1%		41.1%	41.1%	41.1%	37.9%	37.9%		15.8%	53.7%	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.6	2.6		2.6	2.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.3			6.3	6.3	5.9	5.9		5.9	5.9	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	None	None		None	None	None	C-Min	C-Min		None	C-Min	
Act Effct Green (s)		21.7			21.7	21.7	35.3	35.3		61.1	61.1	
Actuated g/C Ratio		0.23			0.23	0.23	0.37	0.37		0.64	0.64	
v/c Ratio		0.31			0.62	0.34	0.21	0.69		0.56	0.50	
Control Delay		24.7			40.5	6.7	27.6	30.0		15.9	10.9	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		24.7			40.5	6.7	27.6	30.0		15.9	10.9	
LOS		C			D	A	C	C		B	B	
Approach Delay		24.7			25.5			29.9			11.9	
Approach LOS		C			C			C			B	
Queue Length 50th (m)		9.9			29.2	0.0	4.8	74.4		22.9	59.3	
Queue Length 95th (m)		22.4			50.1	13.8	13.3	98.3		46.0	76.2	
Internal Link Dist (m)		152.2			261.5			165.0			510.5	
Turn Bay Length (m)						35.0	60.0			60.0		
Base Capacity (vph)		427			471	609	171	1243		485	2172	
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		0.21			0.41	0.25	0.21	0.69		0.56	0.50	

Intersection Summary
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 19 (20%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated

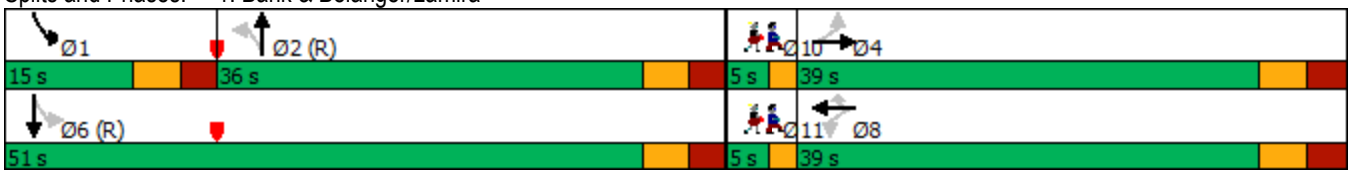
Lane Group	Ø10	Ø11
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Satd. Flow (RTOR)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	10	11
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	5%	5%
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

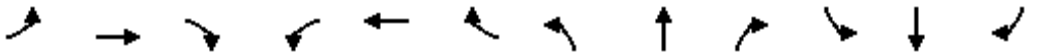
Intersection Summary

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 20.1	Intersection LOS: C
Intersection Capacity Utilization 70.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: Bank & Belanger/Lamira





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	171	15	69	120	86	16	390	78	92	592	55
Future Volume (vph)	56	171	15	69	120	86	16	390	78	92	592	55
Satd. Flow (prot)	1695	1756	0	1695	1625	0	1695	1722	0	1695	1746	0
Flt Permitted	0.391			0.445			0.317			0.429		
Satd. Flow (perm)	677	1756	0	777	1625	0	566	1722	0	755	1746	0
Satd. Flow (RTOR)		4			34			16			8	
Lane Group Flow (vph)	62	207	0	77	229	0	18	520	0	102	719	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.5	24.5		24.5	24.5		26.2	26.2		26.2	26.2	
Total Split (s)	29.0	29.0		29.0	29.0		61.0	61.0		61.0	61.0	
Total Split (%)	29.0%	29.0%		29.0%	29.0%		61.0%	61.0%		61.0%	61.0%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.2	2.2		2.2	2.2		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	
Act Effct Green (s)	17.8	17.8		17.8	17.8		71.5	71.5		71.5	71.5	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.72	0.72		0.72	0.72	
v/c Ratio	0.52	0.66		0.56	0.72		0.04	0.42		0.19	0.58	
Control Delay	51.0	46.8		51.8	45.5		5.9	7.6		6.8	10.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	51.0	46.8		51.8	45.5		5.9	7.6		6.8	10.0	
LOS	D	D		D	D		A	A		A	B	
Approach Delay		47.8			47.1			7.6			9.6	
Approach LOS		D			D			A			A	
Queue Length 50th (m)	10.8	36.4		13.5	35.4		0.9	35.9		5.9	60.5	
Queue Length 95th (m)	22.7	55.4		26.9	56.4		3.7	65.6		14.8	109.5	
Internal Link Dist (m)		612.9			195.3			240.5			249.8	
Turn Bay Length (m)	45.0			40.0			40.0			35.0		
Base Capacity (vph)	160	418		183	410		404	1236		539	1250	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.39	0.50		0.42	0.56		0.04	0.42		0.19	0.58	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 3 (3%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated

Lane Group	Ø10	Ø11	Ø12	Ø13
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Satd. Flow (RTOR)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	10	11	12	13
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	1.0	1.0	1.0	1.0
Minimum Split (s)	5.0	5.0	5.0	5.0
Total Split (s)	5.0	5.0	5.0	5.0
Total Split (%)	5%	5%	5%	5%
Yellow Time (s)	2.0	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	None	None
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (m)				
Queue Length 95th (m)				
Internal Link Dist (m)				
Turn Bay Length (m)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				

Intersection Summary

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 20.3	Intersection LOS: C
Intersection Capacity Utilization 85.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Alta Vista & Kilborn

MOVEMENT SUMMARY

Site: 101 [Lamira/Kilborn Existing PM]

New Site
Site Category: (None)
Roundabout

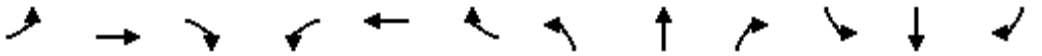
Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Lamira												
1	L2	19	2.0	0.236	6.9	LOS A	1.4	10.3	0.10	0.48	0.10	47.3
2	T1	9	2.0	0.236	3.7	LOS A	1.4	10.3	0.10	0.48	0.10	47.5
3	R2	333	2.0	0.236	3.8	LOS A	1.4	10.3	0.10	0.48	0.10	46.7
Approach		361	2.0	0.236	3.9	LOS A	1.4	10.3	0.10	0.48	0.10	46.7
East: Kilborn Ave												
4	L2	247	2.0	0.199	7.0	LOS A	1.1	7.7	0.14	0.59	0.14	45.7
5	T1	19	2.0	0.199	3.8	LOS A	1.1	7.7	0.14	0.59	0.14	45.9
6	R2	8	2.0	0.199	3.8	LOS A	1.1	7.7	0.14	0.59	0.14	45.1
Approach		275	2.0	0.199	6.7	LOS A	1.1	7.7	0.14	0.59	0.14	45.7
North: Lamira												
7	L2	4	2.0	0.019	8.7	LOS A	0.1	0.6	0.44	0.54	0.44	45.9
8	T1	11	2.0	0.019	5.5	LOS A	0.1	0.6	0.44	0.54	0.44	46.1
9	R2	1	2.0	0.019	5.5	LOS A	0.1	0.6	0.44	0.54	0.44	45.3
Approach		16	2.0	0.019	6.3	LOS A	0.1	0.6	0.44	0.54	0.44	46.0
West: Kilborn Pl												
10	L2	1	2.0	0.041	8.3	LOS A	0.2	1.4	0.41	0.53	0.41	46.6
11	T1	9	2.0	0.041	5.1	LOS A	0.2	1.4	0.41	0.53	0.41	46.8
12	R2	29	2.0	0.041	5.1	LOS A	0.2	1.4	0.41	0.53	0.41	46.0
Approach		40	2.0	0.041	5.2	LOS A	0.2	1.4	0.41	0.53	0.41	46.2
All Vehicles		692	2.0	0.236	5.2	LOS A	1.4	10.3	0.14	0.53	0.14	46.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX J

Intersection Performance: Background Conditions



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	26	13	97	3	283	33	1217	76	140	512	22
Future Volume (vph)	79	26	13	97	3	283	33	1217	76	140	512	22
Satd. Flow (prot)	0	1699	0	0	1702	1517	1695	3347	0	1695	3362	0
Flt Permitted		0.738			0.677		0.453			0.098		
Satd. Flow (perm)	0	1270	0	0	1206	1450	793	3347	0	175	3362	0
Satd. Flow (RTOR)		7				283		7			6	
Lane Group Flow (vph)	0	118	0	0	100	283	33	1293	0	140	534	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		5.0	10.0	
Minimum Split (s)	33.3	33.3		33.3	33.3	33.3	35.0	35.0		11.0	35.0	
Total Split (s)	39.0	39.0		39.0	39.0	39.0	36.0	36.0		15.0	51.0	
Total Split (%)	41.1%	41.1%		41.1%	41.1%	41.1%	37.9%	37.9%		15.8%	53.7%	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.6	2.6		2.6	2.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.3			6.3	6.3	5.9	5.9		5.9	5.9	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	None	None		None	None	None	C-Min	C-Min		None	C-Min	
Act Effct Green (s)		20.4			20.4	20.4	47.6	47.6		62.4	62.4	
Actuated g/C Ratio		0.21			0.21	0.21	0.50	0.50		0.66	0.66	
v/c Ratio		0.43			0.39	0.53	0.08	0.77		0.54	0.24	
Control Delay		32.9			34.1	7.3	17.6	26.0		18.5	8.0	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		32.9			34.1	7.3	17.6	26.0		18.5	8.0	
LOS		C			C	A	B	C		B	A	
Approach Delay		32.9			14.3			25.8			10.2	
Approach LOS		C			B			C			B	
Queue Length 50th (m)		15.9			14.3	0.0	3.5	111.8		10.7	23.1	
Queue Length 95th (m)		30.8			27.9	17.9	10.0	#169.3		25.3	31.7	
Internal Link Dist (m)		152.2			261.5			165.0			510.5	
Turn Bay Length (m)						35.0	60.0			60.0		
Base Capacity (vph)		441			415	684	397	1678		275	2211	
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		0.27			0.24	0.41	0.08	0.77		0.51	0.24	

Intersection Summary
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 4 (4%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated

Lane Group	Ø10	Ø11
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Satd. Flow (RTOR)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	10	11
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	5%	5%
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

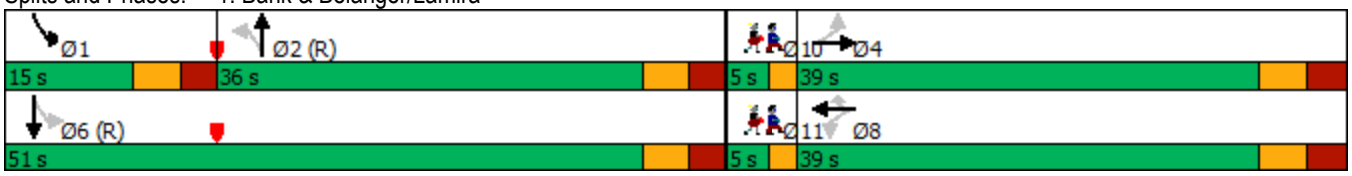
Intersection Summary

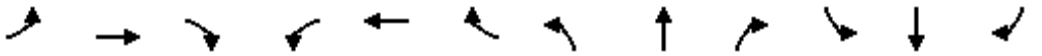
Maximum v/c Ratio: 0.77

Intersection Signal Delay: 20.2	Intersection LOS: C
Intersection Capacity Utilization 84.9%	ICU Level of Service E
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Bank & Belanger/Lamira





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	87	26	71	244	157	15	434	43	43	307	57
Future Volume (vph)	42	87	26	71	244	157	15	434	43	43	307	57
Satd. Flow (prot)	1695	1699	0	1695	1621	0	1695	1746	0	1695	1721	0
Flt Permitted	0.255			0.684			0.502			0.418		
Satd. Flow (perm)	443	1699	0	1181	1621	0	871	1746	0	731	1721	0
Satd. Flow (RTOR)		18			39			6			12	
Lane Group Flow (vph)	42	113	0	71	401	0	15	477	0	43	364	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.5	24.5		24.5	24.5		26.2	26.2		26.2	26.2	
Total Split (s)	41.0	41.0		41.0	41.0		44.0	44.0		44.0	44.0	
Total Split (%)	43.2%	43.2%		43.2%	43.2%		46.3%	46.3%		46.3%	46.3%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.2	2.2		2.2	2.2		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	
Act Effct Green (s)	27.1	27.1		27.1	27.1		57.2	57.2		57.2	57.2	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.60	0.60		0.60	0.60	
v/c Ratio	0.33	0.23		0.21	0.82		0.03	0.45		0.10	0.35	
Control Delay	31.8	20.8		24.9	41.7		10.6	13.4		11.1	11.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	31.8	20.8		24.9	41.7		10.6	13.4		11.1	11.8	
LOS	C	C		C	D		B	B		B	B	
Approach Delay		23.8			39.1			13.3			11.7	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	6.1	13.1		9.8	62.0		1.0	43.8		3.1	30.0	
Queue Length 95th (m)	13.8	22.6		17.7	84.0		4.5	83.8		9.8	59.4	
Internal Link Dist (m)		612.9			195.3			240.5			249.8	
Turn Bay Length (m)	45.0			40.0			40.0			35.0		
Base Capacity (vph)	166	648		443	632		524	1053		440	1040	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.25	0.17		0.16	0.63		0.03	0.45		0.10	0.35	

Intersection Summary
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 11 (12%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

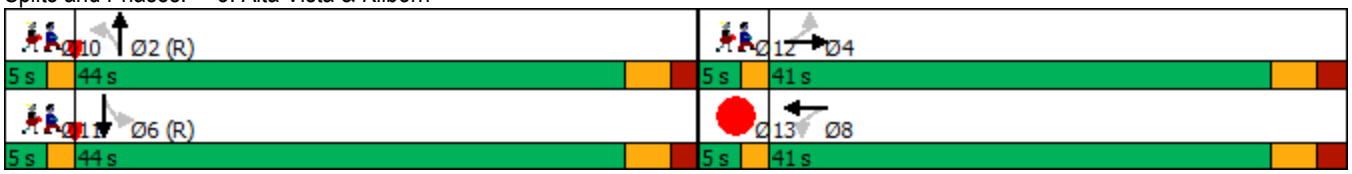
Lane Group	Ø10	Ø11	Ø12	Ø13
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Satd. Flow (RTOR)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	10	11	12	13
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	1.0	1.0	1.0	1.0
Minimum Split (s)	5.0	5.0	5.0	5.0
Total Split (s)	5.0	5.0	5.0	5.0
Total Split (%)	5%	5%	5%	5%
Yellow Time (s)	2.0	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	None	None
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (m)				
Queue Length 95th (m)				
Internal Link Dist (m)				
Turn Bay Length (m)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				

Intersection Summary

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 21.9	Intersection LOS: C
Intersection Capacity Utilization 83.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Alta Vista & Kilborn



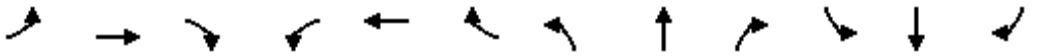
MOVEMENT SUMMARY

Site: 101 [Lamira/Kilborn 2029 Background AM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Lamira												
1	L2	20	2.0	0.124	7.0	LOS A	0.7	4.8	0.13	0.49	0.13	47.1
2	T1	5	2.0	0.124	3.8	LOS A	0.7	4.8	0.13	0.49	0.13	47.3
3	R2	148	2.0	0.124	3.8	LOS A	0.7	4.8	0.13	0.49	0.13	46.5
Approach		174	2.0	0.124	4.2	LOS A	0.7	4.8	0.13	0.49	0.13	46.6
East: Kilborn Ave												
4	L2	354	2.0	0.269	7.0	LOS A	1.6	11.4	0.14	0.59	0.14	45.7
5	T1	28	2.0	0.269	3.8	LOS A	1.6	11.4	0.14	0.59	0.14	45.9
6	R2	3	2.0	0.269	3.8	LOS A	1.6	11.4	0.14	0.59	0.14	45.1
Approach		385	2.0	0.269	6.7	LOS A	1.6	11.4	0.14	0.59	0.14	45.7
North: Lamira												
7	L2	11	2.0	0.025	9.5	LOS A	0.1	0.8	0.51	0.62	0.51	45.1
8	T1	7	2.0	0.025	6.3	LOS A	0.1	0.8	0.51	0.62	0.51	45.3
9	R2	1	2.0	0.025	6.4	LOS A	0.1	0.8	0.51	0.62	0.51	44.5
Approach		19	2.0	0.025	8.1	LOS A	0.1	0.8	0.51	0.62	0.51	45.1
West: Kilborn Pl												
10	L2	1	2.0	0.059	9.0	LOS A	0.3	2.1	0.49	0.58	0.49	46.2
11	T1	15	2.0	0.059	5.8	LOS A	0.3	2.1	0.49	0.58	0.49	46.4
12	R2	37	2.0	0.059	5.8	LOS A	0.3	2.1	0.49	0.58	0.49	45.6
Approach		53	2.0	0.059	5.9	LOS A	0.3	2.1	0.49	0.58	0.49	45.9
All Vehicles		631	2.0	0.269	6.0	LOS A	1.6	11.4	0.17	0.56	0.17	45.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	15	29	119	54	139	41	808	75	246	1101	33
Future Volume (vph)	58	15	29	119	54	139	41	808	75	246	1101	33
Satd. Flow (prot)	0	1662	0	0	1725	1517	1695	3334	0	1695	3368	0
Flt Permitted		0.704			0.759		0.251			0.178		
Satd. Flow (perm)	0	1196	0	0	1353	1478	440	3334	0	316	3368	0
Satd. Flow (RTOR)		23				139		11			4	
Lane Group Flow (vph)	0	102	0	0	173	139	41	883	0	246	1134	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		5.0	10.0	
Minimum Split (s)	33.3	33.3		33.3	33.3	33.3	35.0	35.0		11.0	35.0	
Total Split (s)	39.0	39.0		39.0	39.0	39.0	36.0	36.0		15.0	51.0	
Total Split (%)	41.1%	41.1%		41.1%	41.1%	41.1%	37.9%	37.9%		15.8%	53.7%	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.6	2.6		2.6	2.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.3			6.3	6.3	5.9	5.9		5.9	5.9	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	None	None		None	None	None	C-Min	C-Min		None	C-Min	
Act Effct Green (s)		21.2			21.2	21.2	38.2	38.2		61.6	61.6	
Actuated g/C Ratio		0.22			0.22	0.22	0.40	0.40		0.65	0.65	
v/c Ratio		0.36			0.57	0.32	0.23	0.66		0.54	0.52	
Control Delay		25.4			39.2	6.8	27.6	27.7		13.9	11.0	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		25.4			39.2	6.8	27.6	27.7		13.9	11.0	
LOS		C			D	A	C	C		B	B	
Approach Delay		25.4			24.8			27.7			11.5	
Approach LOS		C			C			C			B	
Queue Length 50th (m)		11.1			26.0	0.0	5.4	73.8		20.2	62.8	
Queue Length 95th (m)		24.6			45.2	13.0	15.1	#101.8		37.4	80.6	
Internal Link Dist (m)		152.2			261.5			165.0			510.5	
Turn Bay Length (m)						35.0	60.0			60.0		
Base Capacity (vph)		426			465	599	177	1348		459	2186	
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		0.24			0.37	0.23	0.23	0.66		0.54	0.52	

Intersection Summary
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 19 (20%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated

Lane Group	Ø10	Ø11
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Satd. Flow (RTOR)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	10	11
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	5%	5%
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

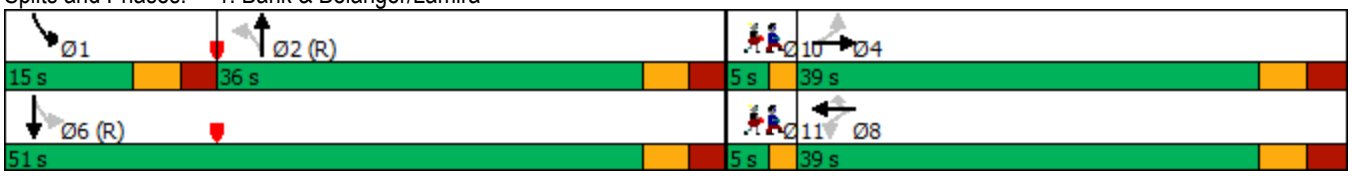
Intersection Summary

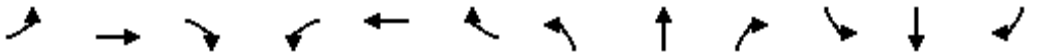
Maximum v/c Ratio: 0.66

Intersection Signal Delay: 19.1	Intersection LOS: B
Intersection Capacity Utilization 73.1%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Bank & Belanger/Lamira





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	171	15	69	120	86	16	390	78	92	592	55
Future Volume (vph)	56	171	15	69	120	86	16	390	78	92	592	55
Satd. Flow (prot)	1695	1756	0	1695	1626	0	1695	1722	0	1695	1746	0
Flt Permitted	0.432			0.484			0.360			0.464		
Satd. Flow (perm)	747	1756	0	844	1626	0	632	1722	0	815	1746	0
Satd. Flow (RTOR)		4			34			16			8	
Lane Group Flow (vph)	56	186	0	69	206	0	16	468	0	92	647	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.5	24.5		24.5	24.5		26.2	26.2		26.2	26.2	
Total Split (s)	29.0	29.0		29.0	29.0		61.0	61.0		61.0	61.0	
Total Split (%)	29.0%	29.0%		29.0%	29.0%		61.0%	61.0%		61.0%	61.0%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.2	2.2		2.2	2.2		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	
Act Effct Green (s)	16.8	16.8		16.8	16.8		72.5	72.5		72.5	72.5	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.72	0.72		0.72	0.72	
v/c Ratio	0.45	0.62		0.49	0.68		0.03	0.37		0.16	0.51	
Control Delay	47.4	46.4		48.1	43.6		5.4	6.7		6.0	8.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	47.4	46.4		48.1	43.6		5.4	6.7		6.0	8.4	
LOS	D	D		D	D		A	A		A	A	
Approach Delay		46.6			44.7			6.6			8.1	
Approach LOS		D			D			A			A	
Queue Length 50th (m)	9.6	32.2		11.9	30.7		0.8	30.9		5.2	50.7	
Queue Length 95th (m)	20.9	51.3		24.4	51.5		3.1	53.5		12.3	86.0	
Internal Link Dist (m)		612.9			195.3			240.5			249.8	
Turn Bay Length (m)	45.0			40.0			40.0			35.0		
Base Capacity (vph)	175	415		198	408		458	1252		590	1267	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.32	0.45		0.35	0.50		0.03	0.37		0.16	0.51	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 3 (3%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Lane Group	Ø10	Ø11	Ø12	Ø13
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Satd. Flow (RTOR)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	10	11	12	13
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	1.0	1.0	1.0	1.0
Minimum Split (s)	5.0	5.0	5.0	5.0
Total Split (s)	5.0	5.0	5.0	5.0
Total Split (%)	5%	5%	5%	5%
Yellow Time (s)	2.0	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	None	None
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (m)				
Queue Length 95th (m)				
Internal Link Dist (m)				
Turn Bay Length (m)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				

Intersection Summary

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 18.8	Intersection LOS: B
Intersection Capacity Utilization 85.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Alta Vista & Kilborn

MOVEMENT SUMMARY

Site: 101 [Lamira/Kilborn 2029 Background PM]

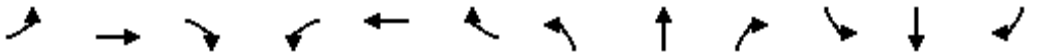
New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Lamira												
1	L2	19	2.0	0.236	6.9	LOS A	1.4	10.3	0.10	0.48	0.10	47.3
2	T1	9	2.0	0.236	3.7	LOS A	1.4	10.3	0.10	0.48	0.10	47.5
3	R2	333	2.0	0.236	3.8	LOS A	1.4	10.3	0.10	0.48	0.10	46.7
Approach		361	2.0	0.236	3.9	LOS A	1.4	10.3	0.10	0.48	0.10	46.7
East: Kilborn Ave												
4	L2	247	2.0	0.199	7.0	LOS A	1.1	7.7	0.14	0.59	0.14	45.7
5	T1	19	2.0	0.199	3.8	LOS A	1.1	7.7	0.14	0.59	0.14	45.9
6	R2	8	2.0	0.199	3.8	LOS A	1.1	7.7	0.14	0.59	0.14	45.1
Approach		275	2.0	0.199	6.7	LOS A	1.1	7.7	0.14	0.59	0.14	45.7
North: Lamira												
7	L2	4	2.0	0.019	8.7	LOS A	0.1	0.6	0.44	0.54	0.44	45.9
8	T1	11	2.0	0.019	5.5	LOS A	0.1	0.6	0.44	0.54	0.44	46.1
9	R2	1	2.0	0.019	5.5	LOS A	0.1	0.6	0.44	0.54	0.44	45.3
Approach		16	2.0	0.019	6.3	LOS A	0.1	0.6	0.44	0.54	0.44	46.0
West: Kilborn Pl												
10	L2	1	2.0	0.041	8.3	LOS A	0.2	1.4	0.41	0.53	0.41	46.6
11	T1	9	2.0	0.041	5.1	LOS A	0.2	1.4	0.41	0.53	0.41	46.8
12	R2	29	2.0	0.041	5.1	LOS A	0.2	1.4	0.41	0.53	0.41	46.0
Approach		40	2.0	0.041	5.2	LOS A	0.2	1.4	0.41	0.53	0.41	46.2
All Vehicles		692	2.0	0.236	5.2	LOS A	1.4	10.3	0.14	0.53	0.14	46.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX K

Intersection Performance: Future Projected Conditions



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	26	13	101	3	288	33	1217	79	144	512	22
Future Volume (vph)	79	26	13	101	3	288	33	1217	79	144	512	22
Satd. Flow (prot)	0	1697	0	0	1702	1517	1695	3344	0	1695	3362	0
Flt Permitted		0.736			0.676		0.453			0.097		
Satd. Flow (perm)	0	1266	0	0	1196	1450	794	3344	0	173	3362	0
Satd. Flow (RTOR)		7				288		7			6	
Lane Group Flow (vph)	0	118	0	0	104	288	33	1296	0	144	534	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		5.0	10.0	
Minimum Split (s)	33.3	33.3		33.3	33.3	33.3	35.0	35.0		11.0	35.0	
Total Split (s)	39.0	39.0		39.0	39.0	39.0	36.0	36.0		15.0	51.0	
Total Split (%)	41.1%	41.1%		41.1%	41.1%	41.1%	37.9%	37.9%		15.8%	53.7%	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.6	2.6		2.6	2.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.3			6.3	6.3	5.9	5.9		5.9	5.9	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	None	None		None	None	None	C-Min	C-Min		None	C-Min	
Act Effct Green (s)		20.4			20.4	20.4	47.4	47.4		62.4	62.4	
Actuated g/C Ratio		0.21			0.21	0.21	0.50	0.50		0.66	0.66	
v/c Ratio		0.43			0.41	0.54	0.08	0.78		0.56	0.24	
Control Delay		33.0			34.7	7.3	17.7	26.3		19.4	8.0	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		33.0			34.7	7.3	17.7	26.3		19.4	8.0	
LOS		C			C	A	B	C		B	A	
Approach Delay		33.0			14.6			26.1			10.4	
Approach LOS		C			B			C			B	
Queue Length 50th (m)		15.9			14.9	0.0	3.5	112.6		11.1	23.1	
Queue Length 95th (m)		30.8			28.8	18.1	10.1	#171.4		26.4	31.7	
Internal Link Dist (m)		152.2			261.5			165.0			510.5	
Turn Bay Length (m)						35.0	60.0			60.0		
Base Capacity (vph)		440			411	687	396	1672		275	2211	
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		0.27			0.25	0.42	0.08	0.78		0.52	0.24	

Intersection Summary
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 4 (4%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated

Lane Group	Ø10	Ø11
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Satd. Flow (RTOR)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	10	11
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	5%	5%
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

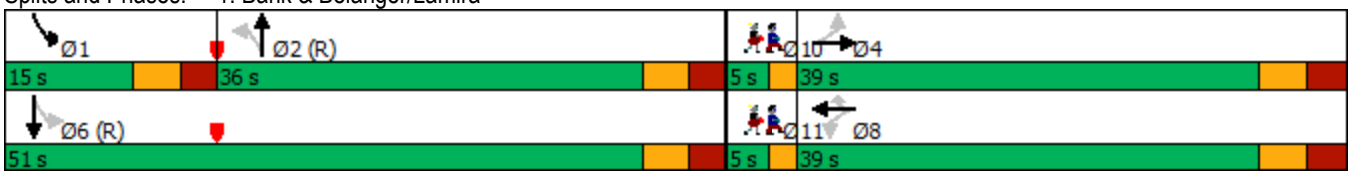
Intersection Summary

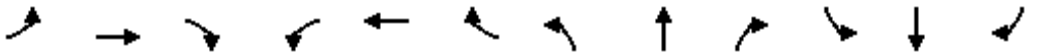
Maximum v/c Ratio: 0.78

Intersection Signal Delay: 20.4	Intersection LOS: C
Intersection Capacity Utilization 88.3%	ICU Level of Service E
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Bank & Belanger/Lamira





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	88	26	71	244	157	15	434	43	43	307	58
Future Volume (vph)	43	88	26	71	244	157	15	434	43	43	307	58
Satd. Flow (prot)	1695	1699	0	1695	1619	0	1695	1746	0	1695	1719	0
Flt Permitted	0.255			0.684			0.502			0.418		
Satd. Flow (perm)	443	1699	0	1181	1619	0	871	1746	0	731	1719	0
Satd. Flow (RTOR)		18			39			6			12	
Lane Group Flow (vph)	43	114	0	71	401	0	15	477	0	43	365	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.5	24.5		24.5	24.5		26.2	26.2		26.2	26.2	
Total Split (s)	41.0	41.0		41.0	41.0		44.0	44.0		44.0	44.0	
Total Split (%)	43.2%	43.2%		43.2%	43.2%		46.3%	46.3%		46.3%	46.3%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.2	2.2		2.2	2.2		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	
Act Effct Green (s)	27.1	27.1		27.1	27.1		57.2	57.2		57.2	57.2	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.60	0.60		0.60	0.60	
v/c Ratio	0.34	0.23		0.21	0.82		0.03	0.45		0.10	0.35	
Control Delay	32.2	20.8		24.9	41.7		10.6	13.4		11.1	11.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	32.2	20.8		24.9	41.7		10.6	13.4		11.1	11.8	
LOS	C	C		C	D		B	B		B	B	
Approach Delay		23.9			39.2			13.3			11.7	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	6.2	13.3		9.8	62.1		1.0	43.8		3.1	30.1	
Queue Length 95th (m)	14.1	22.7		17.7	84.1		4.5	83.8		9.8	59.6	
Internal Link Dist (m)		612.9			195.3			240.5			249.8	
Turn Bay Length (m)	45.0			40.0			40.0			35.0		
Base Capacity (vph)	166	648		443	631		524	1053		440	1039	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.26	0.18		0.16	0.64		0.03	0.45		0.10	0.35	

Intersection Summary
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 11 (12%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

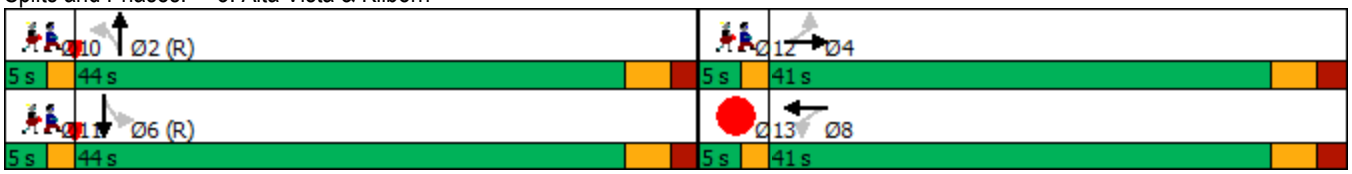
Lane Group	Ø10	Ø11	Ø12	Ø13
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Satd. Flow (RTOR)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	10	11	12	13
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	1.0	1.0	1.0	1.0
Minimum Split (s)	5.0	5.0	5.0	5.0
Total Split (s)	5.0	5.0	5.0	5.0
Total Split (%)	5%	5%	5%	5%
Yellow Time (s)	2.0	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	None	None
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (m)				
Queue Length 95th (m)				
Internal Link Dist (m)				
Turn Bay Length (m)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				

Intersection Summary

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 22.0	Intersection LOS: C
Intersection Capacity Utilization 84.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Alta Vista & Kilborn



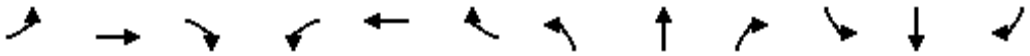
Intersection	
Int Delay, s/veh	1.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	44	0	8	41	0	10
Future Vol, veh/h	44	0	8	41	0	10
Conflicting Peds, #/hr	0	60	60	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	44	0	8	41	0	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	104	0	161	104
Stage 1	-	-	-	-	104	-
Stage 2	-	-	-	-	57	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1488	-	830	951
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	966	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1412	-	783	903
Mov Cap-2 Maneuver	-	-	-	-	783	-
Stage 1	-	-	-	-	873	-
Stage 2	-	-	-	-	960	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	903	-	-	1412	-
HCM Lane V/C Ratio	0.011	-	-	0.006	-
HCM Control Delay (s)	9	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	26	13	101	3	288	33	1217	79	144	512	22
Future Volume (vph)	79	26	13	101	3	288	33	1217	79	144	512	22
Satd. Flow (prot)	0	1696	0	0	1702	1517	1695	3341	0	1695	3361	0
Flt Permitted		0.736			0.673		0.453			0.105		
Satd. Flow (perm)	0	1264	0	0	1190	1442	794	3341	0	187	3361	0
Satd. Flow (RTOR)		7				288		7			6	
Lane Group Flow (vph)	0	118	0	0	104	288	33	1296	0	144	534	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		5.0	10.0	
Minimum Split (s)	33.3	33.3		33.3	33.3	33.3	35.0	35.0		11.0	35.0	
Total Split (s)	39.0	39.0		39.0	39.0	39.0	36.0	36.0		15.0	51.0	
Total Split (%)	39.0%	39.0%		39.0%	39.0%	39.0%	36.0%	36.0%		15.0%	51.0%	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.6	2.6		2.6	2.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.3			6.3	6.3	5.9	5.9		5.9	5.9	
Lead/Lag										Lag		
Lead-Lag Optimize?										Yes		
Recall Mode	None	None		None	None	None	C-Min	C-Min		None	C-Min	
Act Effct Green (s)		20.5			20.5	20.5	52.0	52.0		67.3	67.3	
Actuated g/C Ratio		0.20			0.20	0.20	0.52	0.52		0.67	0.67	
v/c Ratio		0.45			0.43	0.55	0.08	0.74		0.54	0.24	
Control Delay		36.1			38.0	7.9	17.0	24.7		17.2	7.6	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		36.1			38.0	7.9	17.0	24.7		17.2	7.6	
LOS		D			D	A	B	C		B	A	
Approach Delay		36.1			15.9			24.5			9.7	
Approach LOS		D			B			C			A	
Queue Length 50th (m)		17.2			16.1	0.0	3.5	113.1		11.1	23.1	
Queue Length 95th (m)		32.9			31.0	19.0	10.0	#169.4		24.9	31.4	
Internal Link Dist (m)		152.2			261.5			165.0			510.5	
Turn Bay Length (m)						35.0	60.0			60.0		
Base Capacity (vph)		418			389	665	412	1740		282	2264	
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		0.28			0.27	0.43	0.08	0.74		0.51	0.24	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 84 (84%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated

Lane Group	Ø10	Ø11	Ø12	Ø13
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Satd. Flow (RTOR)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	10	11	12	13
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	1.0	1.0	1.0	1.0
Minimum Split (s)	5.0	5.0	5.0	5.0
Total Split (s)	5.0	5.0	5.0	5.0
Total Split (%)	5%	5%	5%	5%
Yellow Time (s)	2.0	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag			Lead	
Lead-Lag Optimize?			Yes	
Recall Mode	None	None	None	None
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (m)				
Queue Length 95th (m)				
Internal Link Dist (m)				
Turn Bay Length (m)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				

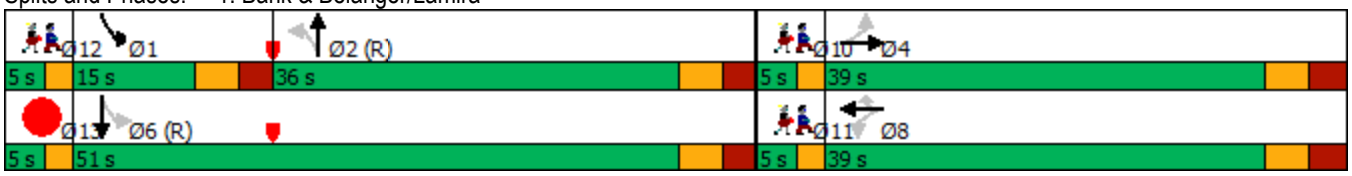
Intersection Summary

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 19.7	Intersection LOS: B
Intersection Capacity Utilization 88.3%	ICU Level of Service E
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Bank & Belanger/Lamira



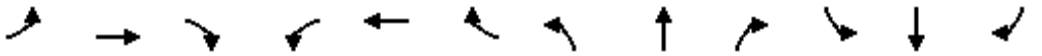
MOVEMENT SUMMARY

Site: 101 [Lamira/Kilborn 2029 Projected AM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Lamira												
1	L2	27	2.0	0.130	7.0	LOS A	0.7	5.0	0.13	0.49	0.13	47.0
2	T1	5	2.0	0.130	3.8	LOS A	0.7	5.0	0.13	0.49	0.13	47.3
3	R2	148	2.0	0.130	3.8	LOS A	0.7	5.0	0.13	0.49	0.13	46.4
Approach		181	2.0	0.130	4.3	LOS A	0.7	5.0	0.13	0.49	0.13	46.5
East: Kilborn Ave												
4	L2	354	2.0	0.277	7.0	LOS A	1.7	11.8	0.16	0.58	0.16	45.6
5	T1	29	2.0	0.277	3.9	LOS A	1.7	11.8	0.16	0.58	0.16	45.8
6	R2	3	2.0	0.277	3.9	LOS A	1.7	11.8	0.16	0.58	0.16	45.0
Approach		386	2.0	0.277	6.8	LOS A	1.7	11.8	0.16	0.58	0.16	45.6
North: Lamira												
7	L2	11	2.0	0.025	9.6	LOS A	0.1	0.8	0.52	0.62	0.52	45.1
8	T1	7	2.0	0.025	6.4	LOS A	0.1	0.8	0.52	0.62	0.52	45.3
9	R2	1	2.0	0.025	6.4	LOS A	0.1	0.8	0.52	0.62	0.52	44.5
Approach		19	2.0	0.025	8.2	LOS A	0.1	0.8	0.52	0.62	0.52	45.1
West: Kilborn Pl												
10	L2	1	2.0	0.072	9.0	LOS A	0.4	2.6	0.50	0.59	0.50	46.2
11	T1	17	2.0	0.072	5.9	LOS A	0.4	2.6	0.50	0.59	0.50	46.4
12	R2	46	2.0	0.072	5.9	LOS A	0.4	2.6	0.50	0.59	0.50	45.6
Approach		64	2.0	0.072	5.9	LOS A	0.4	2.6	0.50	0.59	0.50	45.8
All Vehicles		651	2.0	0.277	6.0	LOS A	1.7	11.8	0.20	0.56	0.20	45.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	15	29	123	54	143	41	808	79	250	1101	33
Future Volume (vph)	58	15	29	123	54	143	41	808	79	250	1101	33
Satd. Flow (prot)	0	1658	0	0	1724	1517	1695	3328	0	1695	3368	0
Flt Permitted		0.697			0.757		0.251			0.171		
Satd. Flow (perm)	0	1182	0	0	1342	1478	442	3328	0	303	3368	0
Satd. Flow (RTOR)		23				143		11			4	
Lane Group Flow (vph)	0	102	0	0	177	143	41	887	0	250	1134	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		5.0	10.0	
Minimum Split (s)	33.3	33.3		33.3	33.3	33.3	35.0	35.0		11.0	35.0	
Total Split (s)	39.0	39.0		39.0	39.0	39.0	36.0	36.0		15.0	51.0	
Total Split (%)	41.1%	41.1%		41.1%	41.1%	41.1%	37.9%	37.9%		15.8%	53.7%	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.6	2.6		2.6	2.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.3			6.3	6.3	5.9	5.9		5.9	5.9	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	None	None		None	None	None	C-Min	C-Min		None	C-Min	
Act Effct Green (s)		21.3			21.3	21.3	37.4	37.4		61.5	61.5	
Actuated g/C Ratio		0.22			0.22	0.22	0.39	0.39		0.65	0.65	
v/c Ratio		0.36			0.59	0.32	0.24	0.67		0.54	0.52	
Control Delay		25.5			39.8	6.7	28.0	28.5		14.4	11.1	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		25.5			39.8	6.7	28.0	28.5		14.4	11.1	
LOS		C			D	A	C	C		B	B	
Approach Delay		25.5			25.0			28.5			11.7	
Approach LOS		C			C			C			B	
Queue Length 50th (m)		11.1			26.7	0.0	5.4	75.1		20.6	62.8	
Queue Length 95th (m)		24.6			46.5	13.3	15.1	#103.4		39.5	80.6	
Internal Link Dist (m)		152.2			261.5			165.0			510.5	
Turn Bay Length (m)						35.0	60.0			60.0		
Base Capacity (vph)		421			461	602	174	1318		462	2181	
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		0.24			0.38	0.24	0.24	0.67		0.54	0.52	

Intersection Summary
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 19 (20%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated

Lane Group	Ø10	Ø11
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Satd. Flow (RTOR)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	10	11
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	5%	5%
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

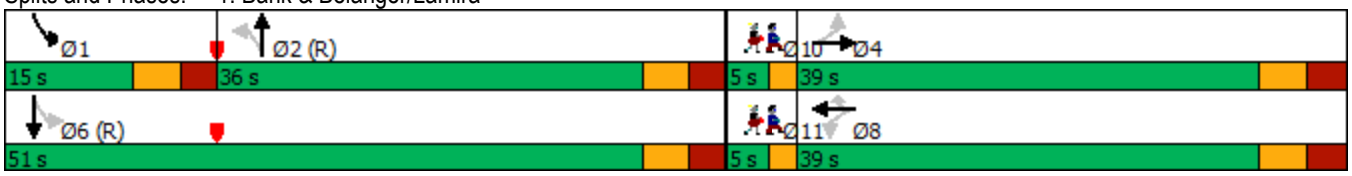
Intersection Summary

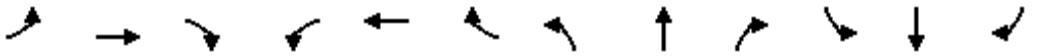
Maximum v/c Ratio: 0.67

Intersection Signal Delay: 19.5	Intersection LOS: B
Intersection Capacity Utilization 73.4%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Bank & Belanger/Lamira





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	172	15	69	121	86	16	390	78	92	592	56
Future Volume (vph)	57	172	15	69	121	86	16	390	78	92	592	56
Satd. Flow (prot)	1695	1755	0	1695	1622	0	1695	1722	0	1695	1746	0
Flt Permitted	0.431			0.483			0.359			0.464		
Satd. Flow (perm)	745	1755	0	843	1622	0	630	1722	0	815	1746	0
Satd. Flow (RTOR)		4			33			16			8	
Lane Group Flow (vph)	57	187	0	69	207	0	16	468	0	92	648	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.5	24.5		24.5	24.5		26.2	26.2		26.2	26.2	
Total Split (s)	29.0	29.0		29.0	29.0		61.0	61.0		61.0	61.0	
Total Split (%)	29.0%	29.0%		29.0%	29.0%		61.0%	61.0%		61.0%	61.0%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.2	2.2		2.2	2.2		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	
Act Effct Green (s)	16.9	16.9		16.9	16.9		72.4	72.4		72.4	72.4	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.72	0.72		0.72	0.72	
v/c Ratio	0.46	0.63		0.49	0.69		0.04	0.37		0.16	0.51	
Control Delay	47.7	46.4		47.9	44.1		5.4	6.7		6.0	8.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	47.7	46.4		47.9	44.1		5.4	6.7		6.0	8.5	
LOS	D	D		D	D		A	A		A	A	
Approach Delay		46.7			45.1			6.6			8.2	
Approach LOS		D			D			A			A	
Queue Length 50th (m)	9.8	32.4		11.9	31.1		0.8	30.9		5.2	50.9	
Queue Length 95th (m)	21.3	51.4		24.4	51.8		3.2	53.9		12.4	86.8	
Internal Link Dist (m)		612.9			195.3			240.5			249.8	
Turn Bay Length (m)	45.0			40.0			40.0			35.0		
Base Capacity (vph)	175	415		198	406		456	1251		590	1267	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.33	0.45		0.35	0.51		0.04	0.37		0.16	0.51	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 3 (3%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Lane Group	Ø10	Ø11	Ø12	Ø13
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Satd. Flow (RTOR)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	10	11	12	13
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	1.0	1.0	1.0	1.0
Minimum Split (s)	5.0	5.0	5.0	5.0
Total Split (s)	5.0	5.0	5.0	5.0
Total Split (%)	5%	5%	5%	5%
Yellow Time (s)	2.0	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	None	None
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (m)				
Queue Length 95th (m)				
Internal Link Dist (m)				
Turn Bay Length (m)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				

Intersection Summary

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 19.0	Intersection LOS: B
Intersection Capacity Utilization 85.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Alta Vista & Kilborn

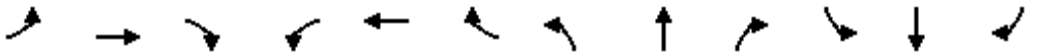
Intersection	
Int Delay, s/veh	2.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	33	0	13	32	0	13
Future Vol, veh/h	33	0	13	32	0	13
Conflicting Peds, #/hr	0	60	60	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	33	0	13	32	0	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	93	0	151	93
Stage 1	-	-	-	-	93	-
Stage 2	-	-	-	-	58	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1501	-	841	964
Stage 1	-	-	-	-	931	-
Stage 2	-	-	-	-	965	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1425	-	791	915
Mov Cap-2 Maneuver	-	-	-	-	791	-
Stage 1	-	-	-	-	884	-
Stage 2	-	-	-	-	956	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.2	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	915	-	-	1425	-
HCM Lane V/C Ratio	0.014	-	-	0.009	-
HCM Control Delay (s)	9	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	15	29	123	54	143	41	808	79	250	1101	33
Future Volume (vph)	58	15	29	123	54	143	41	808	79	250	1101	33
Satd. Flow (prot)	0	1656	0	0	1724	1517	1695	3324	0	1695	3367	0
Flt Permitted		0.671			0.754		0.251			0.174		
Satd. Flow (perm)	0	1136	0	0	1337	1472	442	3324	0	308	3367	0
Satd. Flow (RTOR)		21				143		10			4	
Lane Group Flow (vph)	0	102	0	0	177	143	41	887	0	250	1134	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		5.0	10.0	
Minimum Split (s)	33.3	33.3		33.3	33.3	33.3	35.0	35.0		11.0	35.0	
Total Split (s)	39.0	39.0		39.0	39.0	39.0	36.0	36.0		15.0	51.0	
Total Split (%)	39.0%	39.0%		39.0%	39.0%	39.0%	36.0%	36.0%		15.0%	51.0%	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.6	2.6		2.6	2.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.3			6.3	6.3	5.9	5.9		5.9	5.9	
Lead/Lag										Lag		
Lead-Lag Optimize?										Yes		
Recall Mode	None	None		None	None	None	C-Min	C-Min		None	C-Min	
Act Effct Green (s)		21.5			21.5	21.5	40.1	40.1		66.3	66.3	
Actuated g/C Ratio		0.22			0.22	0.22	0.40	0.40		0.66	0.66	
v/c Ratio		0.39			0.62	0.33	0.23	0.66		0.52	0.51	
Control Delay		29.0			43.8	7.2	27.6	28.5		13.2	10.5	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		29.0			43.8	7.2	27.6	28.5		13.2	10.5	
LOS		C			D	A	C	C		B	B	
Approach Delay		29.0			27.5			28.5			11.0	
Approach LOS		C			C			C			B	
Queue Length 50th (m)		12.4			28.9	0.0	5.6	77.0		20.6	62.8	
Queue Length 95th (m)		26.8			49.5	13.9	15.3	104.3		38.7	79.7	
Internal Link Dist (m)		152.2			261.5			165.0			510.5	
Turn Bay Length (m)						35.0	60.0			60.0		
Base Capacity (vph)		385			437	577	177	1338		485	2233	
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		0.26			0.41	0.25	0.23	0.66		0.52	0.51	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 16 (16%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

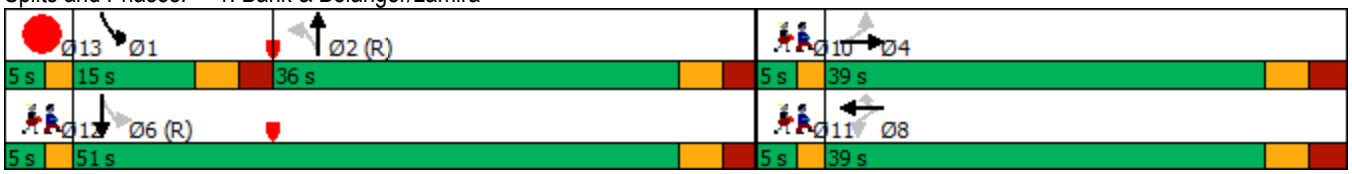
Lane Group	Ø10	Ø11	Ø12	Ø13
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Satd. Flow (RTOR)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	10	11	12	13
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	1.0	1.0	1.0	1.0
Minimum Split (s)	5.0	5.0	5.0	5.0
Total Split (s)	5.0	5.0	5.0	5.0
Total Split (%)	5%	5%	5%	5%
Yellow Time (s)	2.0	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				Lead
Lead-Lag Optimize?				Yes
Recall Mode	None	None	None	None
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (m)				
Queue Length 95th (m)				
Internal Link Dist (m)				
Turn Bay Length (m)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				

Intersection Summary

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 19.5	Intersection LOS: B
Intersection Capacity Utilization 73.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: Bank & Belanger/Lamira



MOVEMENT SUMMARY

Site: 101 [Lamira/Kilborn 2029 Projected PM]

New Site
Site Category: (None)
Roundabout

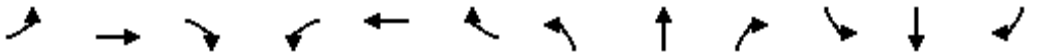
Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Lamira												
1	L2	31	2.0	0.249	7.0	LOS A	1.6	11.0	0.12	0.48	0.12	47.2
2	T1	9	2.0	0.249	3.8	LOS A	1.6	11.0	0.12	0.48	0.12	47.4
3	R2	333	2.0	0.249	3.8	LOS A	1.6	11.0	0.12	0.48	0.12	46.6
Approach		373	2.0	0.249	4.0	LOS A	1.6	11.0	0.12	0.48	0.12	46.6
East: Kilborn Ave												
4	L2	247	2.0	0.207	7.1	LOS A	1.1	8.1	0.17	0.58	0.17	45.6
5	T1	21	2.0	0.207	3.9	LOS A	1.1	8.1	0.17	0.58	0.17	45.8
6	R2	8	2.0	0.207	3.9	LOS A	1.1	8.1	0.17	0.58	0.17	45.1
Approach		277	2.0	0.207	6.7	LOS A	1.1	8.1	0.17	0.58	0.17	45.6
North: Lamira												
7	L2	4	2.0	0.019	8.8	LOS A	0.1	0.6	0.45	0.55	0.45	45.9
8	T1	11	2.0	0.019	5.6	LOS A	0.1	0.6	0.45	0.55	0.45	46.1
9	R2	1	2.0	0.019	5.6	LOS A	0.1	0.6	0.45	0.55	0.45	45.3
Approach		16	2.0	0.019	6.4	LOS A	0.1	0.6	0.45	0.55	0.45	46.0
West: Kilborn Pl												
10	L2	1	2.0	0.055	8.3	LOS A	0.3	1.9	0.42	0.54	0.42	46.6
11	T1	15	2.0	0.055	5.1	LOS A	0.3	1.9	0.42	0.54	0.42	46.8
12	R2	38	2.0	0.055	5.2	LOS A	0.3	1.9	0.42	0.54	0.42	46.0
Approach		54	2.0	0.055	5.2	LOS A	0.3	1.9	0.42	0.54	0.42	46.2
All Vehicles		719	2.0	0.249	5.2	LOS A	1.6	11.0	0.17	0.53	0.17	46.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX L

Intersection Performance: TRANS Projected Conditions



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	15	29	125	54	145	41	808	81	253	1101	33
Future Volume (vph)	58	15	29	125	54	145	41	808	81	253	1101	33
Satd. Flow (prot)	0	1658	0	0	1724	1517	1695	3324	0	1695	3368	0
Flt Permitted		0.695			0.756		0.251			0.167		
Satd. Flow (perm)	0	1178	0	0	1340	1478	442	3324	0	296	3368	0
Satd. Flow (RTOR)		23				145		12			4	
Lane Group Flow (vph)	0	102	0	0	179	145	41	889	0	253	1134	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		5.0	10.0	
Minimum Split (s)	33.3	33.3		33.3	33.3	33.3	35.0	35.0		11.0	35.0	
Total Split (s)	39.0	39.0		39.0	39.0	39.0	36.0	36.0		15.0	51.0	
Total Split (%)	41.1%	41.1%		41.1%	41.1%	41.1%	37.9%	37.9%		15.8%	53.7%	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.6	2.6		2.6	2.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.3			6.3	6.3	5.9	5.9		5.9	5.9	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	None	None		None	None	None	C-Min	C-Min		None	C-Min	
Act Effct Green (s)		21.4			21.4	21.4	36.9	36.9		61.4	61.4	
Actuated g/C Ratio		0.23			0.23	0.23	0.39	0.39		0.65	0.65	
v/c Ratio		0.36			0.59	0.33	0.24	0.68		0.54	0.52	
Control Delay		25.5			40.0	6.7	28.2	29.0		14.8	11.1	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		25.5			40.0	6.7	28.2	29.0		14.8	11.1	
LOS		C			D	A	C	C		B	B	
Approach Delay		25.5			25.1			29.0			11.8	
Approach LOS		C			C			C			B	
Queue Length 50th (m)		11.1			27.0	0.0	5.5	75.8		20.9	62.8	
Queue Length 95th (m)		24.7			47.0	13.3	15.1	#104.0		41.0	80.6	
Internal Link Dist (m)		152.2			261.5			165.0			510.5	
Turn Bay Length (m)						35.0	60.0			60.0		
Base Capacity (vph)		420			461	603	171	1299		465	2179	
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		0.24			0.39	0.24	0.24	0.68		0.54	0.52	

Intersection Summary
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 19 (20%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated

Lane Group	Ø10	Ø11
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Satd. Flow (RTOR)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	10	11
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	5%	5%
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

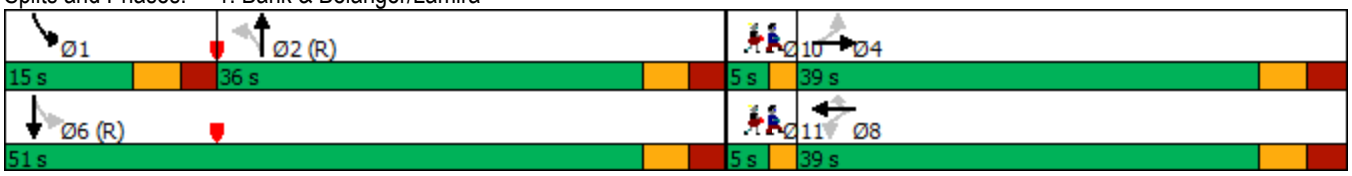
Intersection Summary

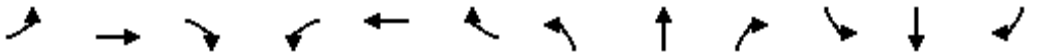
Maximum v/c Ratio: 0.68

Intersection Signal Delay: 19.7	Intersection LOS: B
Intersection Capacity Utilization 73.5%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Bank & Belanger/Lamira





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	172	15	69	121	86	16	390	78	92	592	56
Future Volume (vph)	57	172	15	69	121	86	16	390	78	92	592	56
Satd. Flow (prot)	1695	1755	0	1695	1622	0	1695	1722	0	1695	1746	0
Flt Permitted	0.431			0.483			0.359			0.464		
Satd. Flow (perm)	745	1755	0	843	1622	0	630	1722	0	815	1746	0
Satd. Flow (RTOR)		4			33			16			8	
Lane Group Flow (vph)	57	187	0	69	207	0	16	468	0	92	648	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.5	24.5		24.5	24.5		26.2	26.2		26.2	26.2	
Total Split (s)	29.0	29.0		29.0	29.0		61.0	61.0		61.0	61.0	
Total Split (%)	29.0%	29.0%		29.0%	29.0%		61.0%	61.0%		61.0%	61.0%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.2	2.2		2.2	2.2		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	
Act Effct Green (s)	16.9	16.9		16.9	16.9		72.4	72.4		72.4	72.4	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.72	0.72		0.72	0.72	
v/c Ratio	0.46	0.63		0.49	0.69		0.04	0.37		0.16	0.51	
Control Delay	47.7	46.4		47.9	44.1		5.4	6.7		6.0	8.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	47.7	46.4		47.9	44.1		5.4	6.7		6.0	8.5	
LOS	D	D		D	D		A	A		A	A	
Approach Delay		46.7			45.1			6.6			8.2	
Approach LOS		D			D			A			A	
Queue Length 50th (m)	9.8	32.4		11.9	31.1		0.8	30.9		5.2	50.9	
Queue Length 95th (m)	21.3	51.4		24.4	51.8		3.2	53.9		12.4	86.8	
Internal Link Dist (m)		612.9			195.3			240.5			249.8	
Turn Bay Length (m)	45.0			40.0			40.0			35.0		
Base Capacity (vph)	175	415		198	406		456	1251		590	1267	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.33	0.45		0.35	0.51		0.04	0.37		0.16	0.51	

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 3 (3%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Lane Group	Ø10	Ø11	Ø12	Ø13
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Satd. Flow (RTOR)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	10	11	12	13
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	1.0	1.0	1.0	1.0
Minimum Split (s)	5.0	5.0	5.0	5.0
Total Split (s)	5.0	5.0	5.0	5.0
Total Split (%)	5%	5%	5%	5%
Yellow Time (s)	2.0	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	None	None
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (m)				
Queue Length 95th (m)				
Internal Link Dist (m)				
Turn Bay Length (m)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				

Intersection Summary

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 19.0	Intersection LOS: B
Intersection Capacity Utilization 85.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Alta Vista & Kilborn

Intersection	
Int Delay, s/veh	2.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	33	0	18	32	0	17
Future Vol, veh/h	33	0	18	32	0	17
Conflicting Peds, #/hr	0	60	60	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	33	0	18	32	0	17

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	93	0	161	93
Stage 1	-	-	-	-	93	-
Stage 2	-	-	-	-	68	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1501	-	830	964
Stage 1	-	-	-	-	931	-
Stage 2	-	-	-	-	955	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1425	-	778	915
Mov Cap-2 Maneuver	-	-	-	-	778	-
Stage 1	-	-	-	-	884	-
Stage 2	-	-	-	-	943	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.7	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	915	-	-	1425	-
HCM Lane V/C Ratio	0.019	-	-	0.013	-
HCM Control Delay (s)	9	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

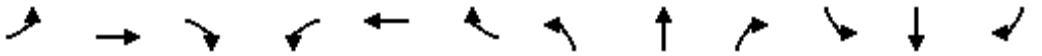
MOVEMENT SUMMARY

Site: 101 [Lamira/Kilborn 2029 TRANS AM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Lamira												
1	L2	28	2.0	0.131	7.0	LOS A	0.7	5.1	0.13	0.49	0.13	47.0
2	T1	5	2.0	0.131	3.8	LOS A	0.7	5.1	0.13	0.49	0.13	47.2
3	R2	148	2.0	0.131	3.8	LOS A	0.7	5.1	0.13	0.49	0.13	46.4
Approach		182	2.0	0.131	4.3	LOS A	0.7	5.1	0.13	0.49	0.13	46.5
East: Kilborn Ave												
4	L2	354	2.0	0.277	7.1	LOS A	1.7	11.8	0.16	0.58	0.16	45.6
5	T1	29	2.0	0.277	3.9	LOS A	1.7	11.8	0.16	0.58	0.16	45.8
6	R2	3	2.0	0.277	3.9	LOS A	1.7	11.8	0.16	0.58	0.16	45.0
Approach		386	2.0	0.277	6.8	LOS A	1.7	11.8	0.16	0.58	0.16	45.6
North: Lamira												
7	L2	11	2.0	0.025	9.6	LOS A	0.1	0.8	0.52	0.62	0.52	45.1
8	T1	7	2.0	0.025	6.4	LOS A	0.1	0.8	0.52	0.62	0.52	45.2
9	R2	1	2.0	0.025	6.4	LOS A	0.1	0.8	0.52	0.62	0.52	44.5
Approach		19	2.0	0.025	8.2	LOS A	0.1	0.8	0.52	0.62	0.52	45.1
West: Kilborn Pl												
10	L2	1	2.0	0.076	9.1	LOS A	0.4	2.7	0.50	0.59	0.50	46.2
11	T1	17	2.0	0.076	5.9	LOS A	0.4	2.7	0.50	0.59	0.50	46.4
12	R2	49	2.0	0.076	5.9	LOS A	0.4	2.7	0.50	0.59	0.50	45.6
Approach		67	2.0	0.076	5.9	LOS A	0.4	2.7	0.50	0.59	0.50	45.8
All Vehicles		655	2.0	0.277	6.0	LOS A	1.7	11.8	0.20	0.56	0.20	45.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	26	13	103	3	289	33	1217	80	144	512	22
Future Volume (vph)	79	26	13	103	3	289	33	1217	80	144	512	22
Satd. Flow (prot)	0	1697	0	0	1702	1517	1695	3344	0	1695	3362	0
Flt Permitted		0.735			0.676		0.453			0.097		
Satd. Flow (perm)	0	1264	0	0	1196	1450	794	3344	0	173	3362	0
Satd. Flow (RTOR)		7				289		7			6	
Lane Group Flow (vph)	0	118	0	0	106	289	33	1297	0	144	534	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		5.0	10.0	
Minimum Split (s)	33.3	33.3		33.3	33.3	33.3	35.0	35.0		11.0	35.0	
Total Split (s)	39.0	39.0		39.0	39.0	39.0	36.0	36.0		15.0	51.0	
Total Split (%)	41.1%	41.1%		41.1%	41.1%	41.1%	37.9%	37.9%		15.8%	53.7%	
Yellow Time (s)	3.3	3.3		3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	2.6	2.6		2.6	2.6	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.3			6.3	6.3	5.9	5.9		5.9	5.9	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	None	None		None	None	None	C-Min	C-Min		None	C-Min	
Act Effct Green (s)		20.4			20.4	20.4	47.4	47.4		62.4	62.4	
Actuated g/C Ratio		0.21			0.21	0.21	0.50	0.50		0.66	0.66	
v/c Ratio		0.43			0.41	0.54	0.08	0.78		0.56	0.24	
Control Delay		32.9			34.9	7.3	17.7	26.4		19.4	8.0	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		32.9			34.9	7.3	17.7	26.4		19.4	8.0	
LOS		C			C	A	B	C		B	A	
Approach Delay		32.9			14.7			26.1			10.5	
Approach LOS		C			B			C			B	
Queue Length 50th (m)		15.9			15.2	0.0	3.5	112.7		11.1	23.1	
Queue Length 95th (m)		30.9			29.4	18.1	10.1	#171.6		26.4	31.7	
Internal Link Dist (m)		152.2			261.5			165.0			510.5	
Turn Bay Length (m)						35.0	60.0			60.0		
Base Capacity (vph)		439			411	688	396	1671		275	2209	
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		0.27			0.26	0.42	0.08	0.78		0.52	0.24	

Intersection Summary
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 4 (4%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated

Lane Group	Ø10	Ø11
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Satd. Flow (RTOR)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	10	11
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	5%	5%
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

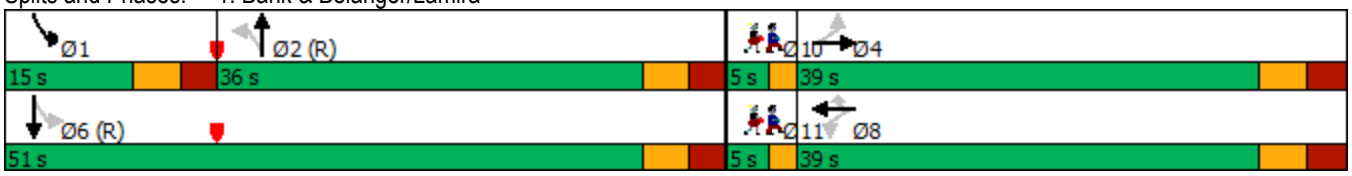
Intersection Summary

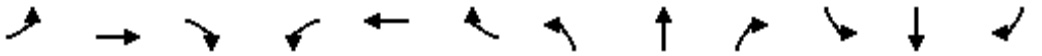
Maximum v/c Ratio: 0.78

Intersection Signal Delay: 20.5	Intersection LOS: C
Intersection Capacity Utilization 88.4%	ICU Level of Service E
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Bank & Belanger/Lamira





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	88	26	71	244	157	15	434	43	43	307	58
Future Volume (vph)	43	88	26	71	244	157	15	434	43	43	307	58
Satd. Flow (prot)	1695	1699	0	1695	1619	0	1695	1746	0	1695	1719	0
Flt Permitted	0.255			0.684			0.502			0.418		
Satd. Flow (perm)	443	1699	0	1181	1619	0	871	1746	0	731	1719	0
Satd. Flow (RTOR)		18			39			6			12	
Lane Group Flow (vph)	43	114	0	71	401	0	15	477	0	43	365	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.5	24.5		24.5	24.5		26.2	26.2		26.2	26.2	
Total Split (s)	41.0	41.0		41.0	41.0		44.0	44.0		44.0	44.0	
Total Split (%)	43.2%	43.2%		43.2%	43.2%		46.3%	46.3%		46.3%	46.3%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.2	2.2		2.2	2.2		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min	C-Min	
Act Effct Green (s)	27.1	27.1		27.1	27.1		57.2	57.2		57.2	57.2	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.60	0.60		0.60	0.60	
v/c Ratio	0.34	0.23		0.21	0.82		0.03	0.45		0.10	0.35	
Control Delay	32.2	20.8		24.9	41.7		10.6	13.4		11.1	11.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	32.2	20.8		24.9	41.7		10.6	13.4		11.1	11.8	
LOS	C	C		C	D		B	B		B	B	
Approach Delay		23.9			39.2			13.3			11.7	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	6.2	13.3		9.8	62.1		1.0	43.8		3.1	30.1	
Queue Length 95th (m)	14.1	22.7		17.7	84.1		4.5	83.8		9.8	59.6	
Internal Link Dist (m)		612.9			195.3			240.5			249.8	
Turn Bay Length (m)	45.0			40.0			40.0			35.0		
Base Capacity (vph)	166	648		443	631		524	1053		440	1039	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.26	0.18		0.16	0.64		0.03	0.45		0.10	0.35	

Intersection Summary
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 11 (12%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

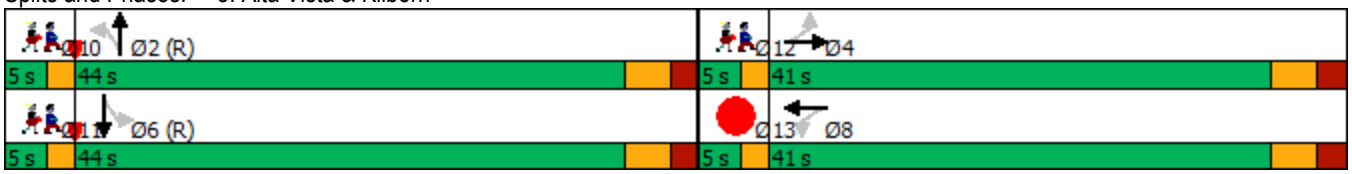
Lane Group	Ø10	Ø11	Ø12	Ø13
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Satd. Flow (RTOR)				
Lane Group Flow (vph)				
Turn Type				
Protected Phases	10	11	12	13
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	1.0	1.0	1.0	1.0
Minimum Split (s)	5.0	5.0	5.0	5.0
Total Split (s)	5.0	5.0	5.0	5.0
Total Split (%)	5%	5%	5%	5%
Yellow Time (s)	2.0	2.0	2.0	2.0
All-Red Time (s)	0.0	0.0	0.0	0.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	None	None
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (m)				
Queue Length 95th (m)				
Internal Link Dist (m)				
Turn Bay Length (m)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				

Intersection Summary

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 22.0	Intersection LOS: C
Intersection Capacity Utilization 84.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Alta Vista & Kilborn



Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	44	0	9	41	0	14
Future Vol, veh/h	44	0	9	41	0	14
Conflicting Peds, #/hr	0	60	60	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	44	0	9	41	0	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	104	0	163	104
Stage 1	-	-	-	-	104	-
Stage 2	-	-	-	-	59	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1488	-	828	951
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	964	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1412	-	780	903
Mov Cap-2 Maneuver	-	-	-	-	780	-
Stage 1	-	-	-	-	873	-
Stage 2	-	-	-	-	957	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.4	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	903	-	-	1412	-
HCM Lane V/C Ratio	0.016	-	-	0.006	-
HCM Control Delay (s)	9	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

MOVEMENT SUMMARY

Site: 101 [Lamira/Kilborn 2029 TRANS PM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Lamira												
1	L2	36	2.0	0.253	7.0	LOS A	1.6	11.2	0.12	0.48	0.12	47.2
2	T1	9	2.0	0.253	3.8	LOS A	1.6	11.2	0.12	0.48	0.12	47.4
3	R2	333	2.0	0.253	3.8	LOS A	1.6	11.2	0.12	0.48	0.12	46.5
Approach		378	2.0	0.253	4.1	LOS A	1.6	11.2	0.12	0.48	0.12	46.6
East: Kilborn Ave												
4	L2	247	2.0	0.210	7.1	LOS A	1.2	8.2	0.18	0.58	0.18	45.6
5	T1	21	2.0	0.210	3.9	LOS A	1.2	8.2	0.18	0.58	0.18	45.8
6	R2	8	2.0	0.210	3.9	LOS A	1.2	8.2	0.18	0.58	0.18	45.0
Approach		277	2.0	0.210	6.8	LOS A	1.2	8.2	0.18	0.58	0.18	45.6
North: Lamira												
7	L2	4	2.0	0.019	8.8	LOS A	0.1	0.6	0.45	0.55	0.45	45.9
8	T1	11	2.0	0.019	5.6	LOS A	0.1	0.6	0.45	0.55	0.45	46.1
9	R2	1	2.0	0.019	5.6	LOS A	0.1	0.6	0.45	0.55	0.45	45.3
Approach		16	2.0	0.019	6.5	LOS A	0.1	0.6	0.45	0.55	0.45	46.0
West: Kilborn Pl												
10	L2	1	2.0	0.060	8.3	LOS A	0.3	2.1	0.42	0.54	0.42	46.6
11	T1	15	2.0	0.060	5.1	LOS A	0.3	2.1	0.42	0.54	0.42	46.8
12	R2	42	2.0	0.060	5.2	LOS A	0.3	2.1	0.42	0.54	0.42	46.0
Approach		58	2.0	0.060	5.2	LOS A	0.3	2.1	0.42	0.54	0.42	46.2
All Vehicles		728	2.0	0.253	5.3	LOS A	1.6	11.2	0.17	0.53	0.17	46.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.