Regional Group

S-4 Leitrim West of Bank Lands

Community Transportation Study

September 25, 2026

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Community Transportation Study

September 25, 2026

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Table of Contents

Executive Summary **ES1**
1 Introduction **1**
2 Study Area **3**
PART 1: EXISTING CONDITIONS, OPPORTUNITIES & CONSTRAINTS **5**
3 Existing Transportation Network **5**
3.1 Neighbourhood Amenities **5**
3.2 Existing Road Network **7**
3.2.1 Existing Traffic Volumes **9**
3.2.2 Intersection Capacity Analysis Criteria **11**
3.2.3 Intersection Capacity Analysis Results **12**
3.3 Existing Pedestrian and Cycling Facilities **13**
3.4 Existing Transit Facilities and Service **13**
3.5 Existing Multi-Modal Level of Service **16**
3.5.1 Segment-Based Multi-Modal Level of Service **17**
3.5.2 Intersection-Based Multi-Modal Level of Service **17**
3.6 Collision History **18**
4 Future Transportation Network **19**
4.1 Future Road Network **19**
4.2 Future Cycling and Pedestrian Facilities **22**
4.3 Future Transit Facilities and Service **23**
4.4 Future Adjacent Developments **25**
5 Vision, Objective and Targets **27**
5.1 Community Vision **27**
5.2 Development Objectives **27**
5.3 Transportation Targets **28**
5.3.1 Mode Share Targets **28**
6 Opportunities and Constraints **30**
6.1 Opportunities **30**
6.2 Constraints **31**
PART 2: CONCEPT PLAN DEVELOPMENT **33**
7 Community Design **33**

7.1 Transportation Network Layout 33
7.1.1 Road Network Layout 33
7.1.2 Transit Network 35
7.1.3 Active Transportation Network 35
7.2 Street Cross-Sections 35
7.3 Land Use Projections 36
7.4 Analysis Years and Time Periods 36
7.5 Community Generated Traffic 37
7.5.1 Peak Period Person-Trip Generation 37
7.5.2 Trip Generation by Mode 37
7.5.3 Trip Distribution and Assignment 38
8 TIA Exceptions Review 40
PART 3: NETWORK ANALYSIS 41
9 Transportation Network Review 41
9.1 Future Traffic Volumes 41
9.1.1 General Background Growth Rates 41
9.1.2 Future Background Traffic 41
9.1.3 Future Total Traffic 41
9.2 Review of Network Concept 46
9.3 Intersection Operational Review 47
9.3.1 Intersection Capacity Analysis Results 47
9.3.1.1 Future (2031) Background Traffic 48
9.3.1.2 Future (2036) Background Traffic 49
9.3.1.3 Future (2031) Total Traffic 50
9.3.1.4 Future (2036) Total Traffic 51
9.3.2 Intersection Control 51
9.4 Auxiliary Lane Requirements 52
9.4.1 Left-Turn Lanes at Signalized Intersections 52
9.4.2 Left-Turn Lanes at Unsignalized Intersections 53
9.4.3 Right-Turn Lanes at Signalized Intersections 53
9.4.4 Right-Turn Lanes at Unsignalized Intersections 54
9.5 Multi-Modal Level of Service 54
9.5.1 Segment-Based MMLOS 54

9.5.2 Intersection-Based MMLOS 55
9.6 Traffic Calming Plan 56
9.7 Transit Network Requirements 56
9.8 Pedestrian Crossing Requirements 57
10 Earl Armstrong Road Extension (Sensitivity Analysis) 58
10.1 Traffic Diversion 58
10.2 Sensitivity Scenarios - Intersection Capacity Analysis Results 62
10.2.1 Future (2036) Background Traffic with Earl Armstrong Extension 62
10.2.2 Future (2036) Total Traffic with Earl Armstrong Extension 63
10.3 Multi-Modal Level of Service (Earl Armstrong Road Extension) 64
10.3.1 Segment-Based MMLOS 64
10.3.2 Intersection-Based MMLOS 65
PART 4: IMPLEMENTATION 67
11 Mobility Plan 67
11.1 Transportation Demand Management 67
11.2 Zoning and Policy Amendments 67
11.3 City Policies and Objectives 68
12 Implementation Plan 68
13 Conclusion 69

Tables

Table 1-1 Terms of Reference and TIA Requirement Review 1
Table 3-1 Existing Road Characteristics within Context Area 7
Table 3-2 Level of Service Thresholds 11
Table 3-3 Intersection Capacity Analysis: Existing Traffic 12
Table 3-4 Existing Transit Routes 13
Table 3-5 Segment-Based MMLOS Analysis Results: Existing Conditions 17
Table 3-6 Intersection-Based MMLOS Analysis Results: Existing Conditions 18
Table 3-7 Historical Collisions 18
Table 4-1 Future Adjacent Developments 25
Table 5-1 Existing and Target Mode Share Distributions 29
Table 7-1 Land Use Statistics 36

Table 7-2 Peak Period Person-Trip Generation **37**
Table 7-3 Development-Generated Peak Hour Person Trips by Mode **37**
Table 8-1 Exemptions Review **40**
Table 9-1 2046 Screenline Analysis **47**
Table 9-2 Intersection Capacity Analysis: Future (2031) Background Traffic **48**
Table 9-3 Intersection Capacity Analysis: Future (2036) Background Traffic **49**
Table 9-4 Intersection Capacity Analysis: Future (2031) Total Traffic **50**
Table 9-5 Intersection Capacity Analysis: Future (2036) Total Traffic **51**
Table 9-6 Auxiliary Left-Turn Storage Analysis at Signalized Intersections **52**
Table 9-7 Auxiliary Right-Turn Storage Analysis at Signalized Intersections **54**
Table 9-8 Segment-Based MMLOS Analysis Results: Future Conditions **55**
Table 10-1 Intersection Capacity Analysis: Future (2036) Background Traffic with Earl Armstrong Extension **62**
Table 10-2 Intersection Capacity Analysis: Future (2036) Total Traffic with Earl Armstrong Extension **63**
Table 10-3 Segment-based MMLOS **64**
Table 10-4 Intersection-based MMLOS **66**

Figures

Figure 3-1 Existing Streets Within 1,200m Walking Distance **6**
Figure 3-2 Existing Pedestrian Network **13**
Figure 3-3 Existing Cycling Network **13**
Figure 3-4 Local Transit Network **14**
Figure 3-5 Bus Stop Locations **15**
Figure 4-1 Future Road Network Projects **20**
Figure 4-2 Future Earl Armstrong Road Extension Alignment **20**
Figure 4-3 Future Bank Street & Miikana Road/Blais Road Intersection **21**
Figure 4-4 Future Bank Street & Earl Armstrong Road Roundabout **21**
Figure 4-5 Future Earl Armstrong Road & Kelly Farm Drive Intersection **22**
Figure 4-6 Future Rural Active Transportation Network **23**
Figure 4-7 Future Priority Transit Network **24**
Figure 7-1 Proposed Kelly Farm Drive Cross-Section **36**
Figure 9-1 Screenlines **46**

Exhibits

Exhibit 2-1 Context Area 4
Exhibit 3-1 Existing Traffic Control and Lane Configurations 8
Exhibit 3-2 Existing Traffic 10
Exhibit 4-1 Adjacent Development 26
Exhibit 7-1 Concept Plan & Active Transportation Network 34
Exhibit 7-2 Site-Generated Traffic 39
Exhibit 9-1 Future (2031) Background Traffic 42
Exhibit 9-2 Future (2036) Background Traffic 43
Exhibit 9-3 Future (2031) Total Traffic 44
Exhibit 9-4 Future (2036) Total Traffic 45
Exhibit 10-1 Future (2036) Background Traffic with Earl Armstrong Extension 59
Exhibit 10-2 Site-Generated Traffic with Earl Armstrong Extension 60
Exhibit 10-3 Future (2036) Total Traffic with Earl Armstrong Extension 61

Appendices

Appendix A Terms of Reference
Appendix B TIA Screening Form
Appendix C Neighbourhood Amenities
Appendix D Traffic Data
Appendix E Intersection Capacity Analysis Reports
Appendix F Transit Service Maps
Appendix G Multi-Modal Level of Service Analyses
Appendix H Left-Turn Warrant Analysis
Appendix I Transportation Demand Management
Appendix J Swept Path Analysis

Acronyms and Abbreviations

ALOS	Auto Level of Service
AM	Morning
BLOS	Bicycle Level of Service
CTS	Community Transportation Study
DC	Development Charges
EA	Environmental Assessment
EBL	Eastbound Left
EBR	Eastbound Right
EBT	Eastbound Through
HCM	Highway Capacity Manual
LOS	Level of Service
LRT	Light Rail Transit
LTS	Level of Traffic Stress
MMLOS	Multi-Modal Level of Service
MTS	Master Transportation Study
MUP	Multi-Use Path
NBL	Northbound Left
NBR	Northbound Right
NBT	Northbound Through
OTM	Ontario Traffic Manual
PHF	Peak Hour Factor
PLOS	Pedestrian Level of Service
PM	Afternoon
PRLOS	Public Realm Level of Service
RTTP	Rapid Transit and Transit Priority
SBL	Southbound Left
SBR	Southbound Right
SBT	Southbound Through
TIA	Transportation Impact Assessment

TLOS	Transit Level of Service
TMP	Transportation Master Plan
WBL	Westbound Left
WBR	Westbound Right
WBT	Westbound Through

Executive Summary

Introduction

Arcadis was retained by Regional Group to undertake a Community Transportation Study (CTS) in support of the Concept Plan process for the S-4 Leitrim West of Bank Lands. The CTS will also be used in support of a subsequent and concurrent Draft Plan of Subdivision and Zoning By-law Amendment applications, thereby fulfilling the requirements of a Transportation Impact Assessment (TIA) as well. The subject site is located at the southern edge of the urban boundary in the Leitrim community, and is bound by residential development to the north, Bank Street to the east, undeveloped land to the west and the future Earl Armstrong Road extension to the south.

Transportation Network

Walking: Within a 15-minute walk of the site are a number of amenities including a school, several parks, some existing and future retail, and one place of worship. At a slightly greater walking distance (20- to 25-minute walking distance) is an additional school, park and two shopping centres.

Cycling: Currently there are few cycling facilities within the study area and no sidewalks on Bank Street. As part of the Bank Street widening, it is expected that sidewalks and cycle tracks will be provided on both sides of the road from Leitrim Road to Miikana Road/Blais Road. Cycle tracks and sidewalks will also be provided on both sides of the Earl Armstrong Road extension when it is constructed. Furthermore, the TMP identifies plans to provide bike lanes on Findlay Creek Drive as well as a major pathway connection to the future cross-town bikeway adjacent to the Trillium Line extension.

Transit: There are three transit routes that currently serve the Leitrim community, although only one provides weekday peak period transit service within walking distance of the site. In the future, it is anticipated that transit priority measures will be implemented on Bank Street. The Earl Armstrong Road extension will also be a transit priority corridor providing connectivity to Bowesville LRT Station.

Roads: Bank Street is currently being widened to four lanes between Leitrim Road and Miikana Road/Blais Road with completion anticipated for the end of 2026. Further widening south of Miikana Road/Blais Road is not expected to occur within the timeframe of this study but may be implemented by 2046. The Transportation Master Plan also identifies the eventual extension of Earl Armstrong Road east to Hawthorne Road within approximately 10 years, although given the uncertainty of the timing for this extension this study has evaluated traffic conditions both with and without the road extension.

Development Impact

Based on the size of the subject site, it is estimated that a mix of single-family homes and townhomes could be provided, with a total of approximately 300 dwelling units. The overall trip generation associated with the site would therefore range from 131 to 143 two-way vehicle-trips during the weekday peak hours.

Transportation Network Review

The development of the subject lands could result in major changes to the area's transportation network. An intersection capacity analysis was completed, and no road network modifications are recommended as a result of site-generated traffic. Growth in background traffic, however, is expected to result in capacity issues at the future Bank & Earl Armstrong roundabout and therefore it is recommended that the City revisit the proposed design for this intersection and consider a signalized intersection design instead. Multi-Modal Level of Service (MMLOS) analysis results indicate that the portion of Bank Street adjacent to the site does not currently meet the prescribed

Pedestrian or Bicycle Level of Service targets due to the lack of facilities for both road user groups. It is expected that these issues will be addressed in the future once Bank Street is widened and urbanized south of Miikana Road/Blais Road (by others). The intersection of Bank & Miikana/Blais is also not meeting its Pedestrian Level of Service target due to long crossing distances. The portion of Kelly Farm Drive through the subject site is anticipated to meet and exceed its MMLOS targets.

Traffic generated by the subject site is not likely to trigger the need for traffic-calming measures on existing streets. Within the site, however, it is recommended that local roads be designed for a 30km/h posted speed limit through the implementation of the City's *Local Residential Streets 30km/h Streets Toolbox (2021)*, while the collector road network be designed for a 40km/h posted speed limit in accordance with the *Designing Neighbourhood Collector Streets* (2019).

Community Design Recommendations

To guide the development of these urban expansion lands, a number of objectives and targets have been developed in accordance with the City of Ottawa 2022 Official Plan. Opportunities and constraints relating to the development of these lands have been identified in this report and a conceptual development plan has been established. It is recommended that vehicular access to the site be provided via an extension of Kelly Farm Drive, in accordance with the approved Environment Assessment study completed by the City of Ottawa for the Earl Armstrong Road extension. The connection of this collector road to the future arterial road network provides an opportunity to establish continuity in the pedestrian, cycling and transit facilities within the community while providing an additional routing alternative for the community that will reduce congestion on the primary transportation spine (i.e., Bank Street).

Although the site has 20m of frontage on Bank Street, this study has found that there would be operational challenges with providing a road connection to Bank Street and it is therefore recommended that this space be used to provide a mid-block active transportation connection to Bank Street instead which could also serve as a direct vehicular connection to the arterial road network in the event of an emergency. Appropriate traffic control measures such as regulatory signage and bollards will need to be installed to prevent its usage outside of emergency situations.

A future road block connection, identified as Block 80 on the Draft Plan of Subdivision, has been provided as part of the proposed development connecting the subject site to the westerly lands, should the roadway network be extended. This is consistent with other neighbourhoods at the edge of urban areas in the City of Ottawa.

A mid-block active transportation connection to Paakanaak Road is proposed at the northwest corner of the site via an existing servicing block.

Given the uncertainty regarding the timing of the Earl Armstrong Road extension and the near-term need for transit service within the site, it is recommended that existing transit service will be extended on Kelly Farm Drive to service a proposed bus stop pair within the subject lands and facilitate turn-around of transit vehicles using a temporary cul-de-sac. Once the extension is completed, it is expected that transit service will be provided along Kelly Farm Drive and Earl Armstrong Road. Kelly Farm Drive extension is proposed to adhere to cross-section 26C of the City of Ottawa's *Designing Neighbourhood Collector Streets* guidelines. This cross-section has sidewalks on both sides and does not include any on-street parking to allow for more green space and a narrower roadway. For pedestrian network connectivity, future traffic volume projections indicate a Level 2, Type 'D' pedestrian cross-over could be considered on Kelly Farm Drive.

With consideration of site-generated multi-modal travel demands, sensitivity analysis and mitigation measures recommended through this study, the proposed development is not dependent on the Earl Armstrong Road

extension from a transportation perspective at the time of full build-out in 2031. However, these modifications remain relevant to ultimate transit and network operation. By the 2036 CTS study horizon year, the Earl Armstrong Road extension may be required to alleviate some capacity constraints experienced on Bank Street due to the continued growth of background traffic; however, it is reasonable to expected that the key east-west arterial road may be built by this time, given that it is identified as a Phase 1 project in the 2025 Transportation Master Plan (TMP).

In accordance with the City of Ottawa's local street standard cross-sections approved in 2022, all double-loaded local roads within the subject lands are recommended to have an 18.0m right-of-way which will provide space for on-street parking, 1.8m wide sidewalks and treed boulevards, while single-loaded local streets (i.e. 'window streets') within the site are recommended to have a 14.75m right-of-way, with similar cross-section characteristics.

Mobility Plan

To encourage the use of non-auto travel modes, consideration will be given to the following Transportation Demand Management (TDM) measures:

- Provide a multimodal travel information package to new residents highlighting routes to/from local amenities, the location of bus stops within walking distance of the site, and the location of potential future amenities. Of particular importance will be highlighting safe routes to/from local schools as it is anticipated that this represents the greatest opportunity to reduce auto usage.

In addition, the design of the community to avoid private approaches on Kelly Farm Drive to maximize tree coverage and limit conflict points with cyclists and pedestrians.

Combined with the proposed layout of the transportation network, it is expected that these measures will ensure that the City of Ottawa policies and objectives are achieved.

Based on the findings of this study, it is the overall opinion of Arcadis that the subject site will integrate well with and can be safely accommodated by the adjacent transportation network with consideration of the recommendations outlined above.

1 Introduction

Arcadis was retained by Regional Group to undertake a Community Transportation Study (CTS) in support of the Concept Plan application for the S-4 Leitrim West of Bank Lands located at the southern edge of the Leitrim community west of Bank Street.

The Terms of Reference for this study were established in consultation with City of Ottawa staff and finalized on July 22, 2024. Additional clarification on elements relating to transit were finalized by email on September 11, 2024. These Terms of Reference have been used to guide the contents of this study and are provided in **Appendix A**.

This CTS report is also intended to support concurrent Draft Plan of Subdivision and Zoning By-law Amendment applications which will follow the approval of the Concept Plan by the City of Ottawa. As such, supplemental elements are provided to conform with the requirements outlined in the City of Ottawa's Transportation Impact Assessment Guidelines (June 2017) and the guideline revisions enacted in June 2023. A screening form has been prepared for the subject site and is provided in **Appendix B**.

To assist City staff with their review, **Table 1-1** has been prepared and summarizes which sections of the report address the requirements of the Terms of Reference and the requirements of the Transportation Impact Assessment (TIA) Guidelines.

Table 1-1 Terms of Reference and TIA Requirement Review

Terms of Reference Requirement	Report Section/Figure/ Exhibit/Table	TIA Module/Element	Report Section/Figure/ Exhibit/Table
Plan Context		**Step 1: Screening**	
Requirement #1	See **Exhibit 2-1**	Module 1.1 to 1.4	See **Appendix B**
Requirement #2	See Section 2	**Step 2: Scoping & Forecasting**	
Requirement #3	See Section 4	Element 2.1.1	See Sections 2, 7.1, 7.3 and 7.4
Existing Conditions		Element 2.1.2	See Sections 3 and 7.1.1
Requirement #4	See Section 6	Element 2.1.3	See Section 4
Requirement #5	See Sections 3.2 and 3.6 and **Exhibit 2-1**	Element 2.2.1	See Section 2
Requirement #6	See Sections 3.1, 3.3, 4.2 and 6	Element 2.2.2	See Section 7.4
Requirement #7	See Section 3.4	Element 2.2.3	See Section 7.4
Requirement #8	See Section 3.1	Module 2.3	See Section 8
Vision, Objectives and Targets		Element 3.1.1	See Sections 5.3.1, 7.5.1 and 7.5.2
Requirement #9	See Sections 5.1 and 5.2	Element 3.1.2	See Section 7.5.3
Requirement #10	See Section 5.3	Element 3.1.3	See Section 7.5.3
Key Plan Components		**Step 3: Analysis**	
Requirement #11	See Section 7.1	Element 3.2.1	See Section 4

Terms of Reference Requirement	Report Section/Figure/ Exhibit/Table	TIA Module/Element	Report Section/Figure/ Exhibit/Table
Requirement #12	See Sections 7.1, 7.2, 7.3 and 7.4	Element 3.2.2	See Section 9.1.1
Requirement #13	See Sections 7.1, 7.2 and 7.3	Element 3.2.3	See Section 4.4
Forecasting & Analysis		Module 3.3	See Section 3.2.3
Requirement #14	See Sections 7.5 and 9.1	Element 4.1.1	See Section 11.1
Requirement #15	See Sections 9.3, 9.7 and 9.8	Element 4.1.2	Not Applicable
Requirement #16	See Section 7.1	Element 4.1.3	See Section 7.1.1
Requirement #17	See Sections 9.3 and 9.4	Element 4.2.1	Not Applicable
Mobility Plan		Module 4.3	See Sections 3.6 and 9.5
Requirement #18	See Section 11.1	Element 4.4.1	See Section 7.1.1
Requirement #19	See Section 11.2	Element 4.4.2	See Section 9.3.2
Requirement #20	See Section 11.3	Element 4.4.3	See Section 9.3.1
Requirement #21	Not Applicable	Element 4.5.1	See Section 11.1
Implementation Strategy		Element 4.5.2	See Section 11.1
Requirement #22	See Section 12	Element 4.5.3	See Section 11.1
Requirement #23	See Section 12	Module 4.6	See Section 9.6
Requirement #24	See Section 12	Element 4.7.1	See Section 9.7
Requirement #25	See Section 12	Element 4.7.2	See Section 9.7
		Module 4.8	See Section 9.2
		Element 4.9.1	See Section 9.3.2
		Element 4.9.2	See Section 9.3.1

2 Study Area

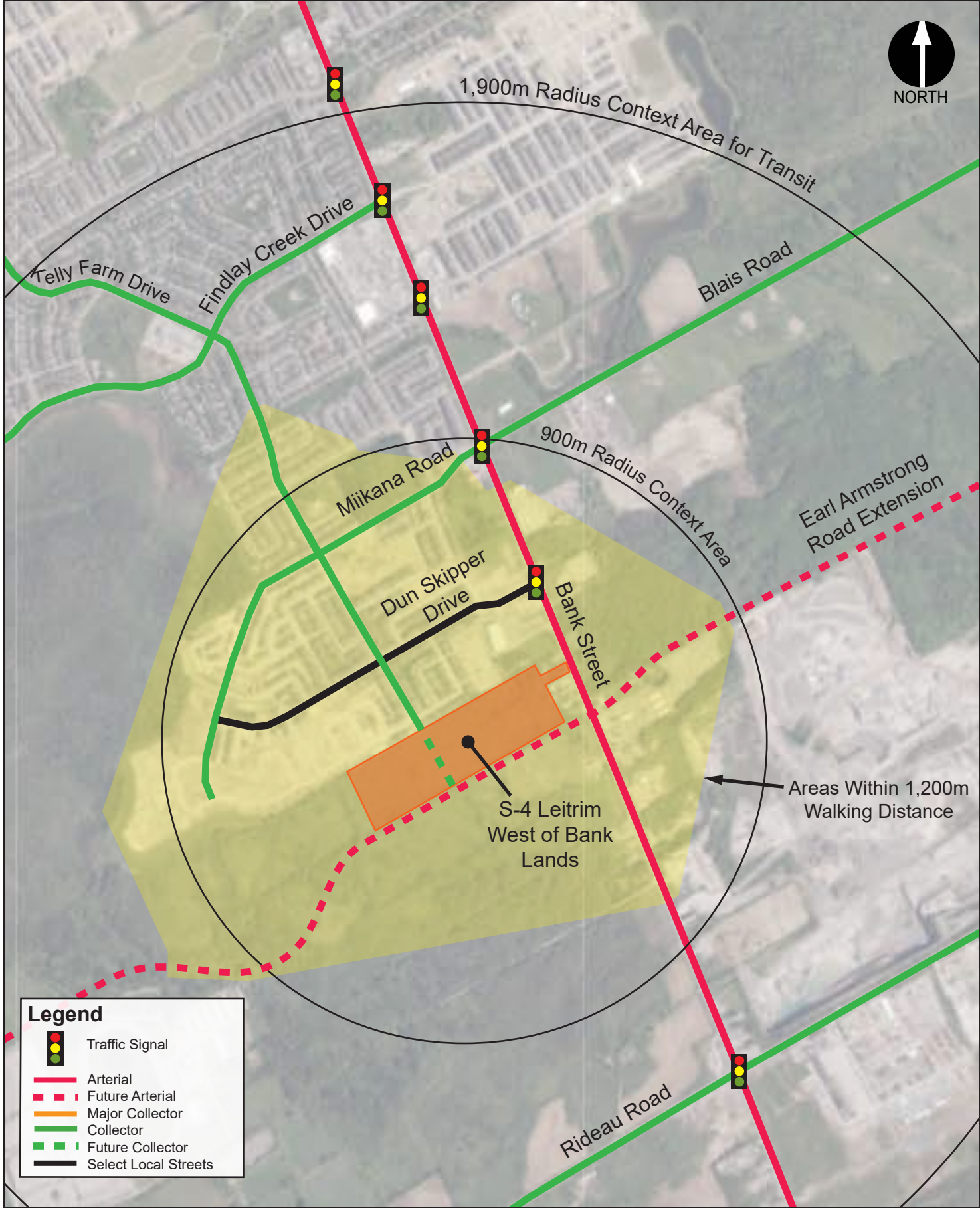
The subject site is located at the southern boundary of the Leitrim community west of Bank Street. The site is bound by Bank Street to the east, the Pathways South subdivision to the north, and undeveloped land to the south and west. The future extension of Earl Armstrong Road will eventually form the southern limits of the site.

According to the Official Plan (Schedule B9), the site is currently located within the Rural Transect and is within an area designated as Rural Countryside. The lands immediately to the north of the site are located within the Suburban Transect (as per Schedule B7) and are designated as a Neighbourhood. Bank Street is designated a Mainstreet Corridor between Leitrim Road and the northern boundary of the site. The lands adjacent to Bank Street are within the *Evolving Neighbourhood* overlay.

The context area for this study is illustrated in **Exhibit 2-1** and includes all lands located within a 900m radius or 1,200m walking distance of the site, whichever is greater, consistent with the Official Plan policy relating to *15-Minute Neighbourhoods*. In addition, the Official Plan also requires that safe and convenient cycling routes and facilities are provided within 1.9 kilometre radius or 2.5 kilometre cycling distance, whichever is greatest, to existing or planned rapid transit stations, frequent street transit stops and street transit stops on the Transit Priority network. A supplemental 1.9km radius around the proposed development site will be reviewed to assess this requirement.

As agreed by City staff, the following intersections will be evaluated as part of this study:

- Bank & Miikana/Blais
- Bank & Dun Skipper
- Kelly Farm & Findlay Creek
- Kelly Farm & Miikana
- Kelly Farm & Dun Skipper
- Bank & Earl Armstrong (future)
- Kelly Farm & Earl Armstrong (future)



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S-4 Leitrim West of Bank Street Lands
Community Transportation Study

Exhibit 2-1
Context Area

PROJECT No. 145172

SCALE: 0m 125m 250m

PART 1: EXISTING CONDITIONS, OPPORTUNITIES & CONSTRAINTS

3 Existing Transportation Network

3.1 Neighbourhood Amenities

A key theme of the Official Plan is the establishment of walkable *15-Minute Neighbourhoods*. There are a number of existing neighbourhood amenities located within at 15-minute walking distance of the site.

Schools:

- Future Findlay Creek Elementary School

Parks:

- Anisha Park
- Salamander Park
- Dun Skipper Park
- Miikana Park

Retail/Services:

- Hardware Store
- Future Mix-Use Development along Bank Street

Places of Worship:

- Hindu Temple of Ottawa-Carleton

Figure 3-1 below illustrates the existing streets that are located within a 15-minute (1,200m) walking distance of the site.

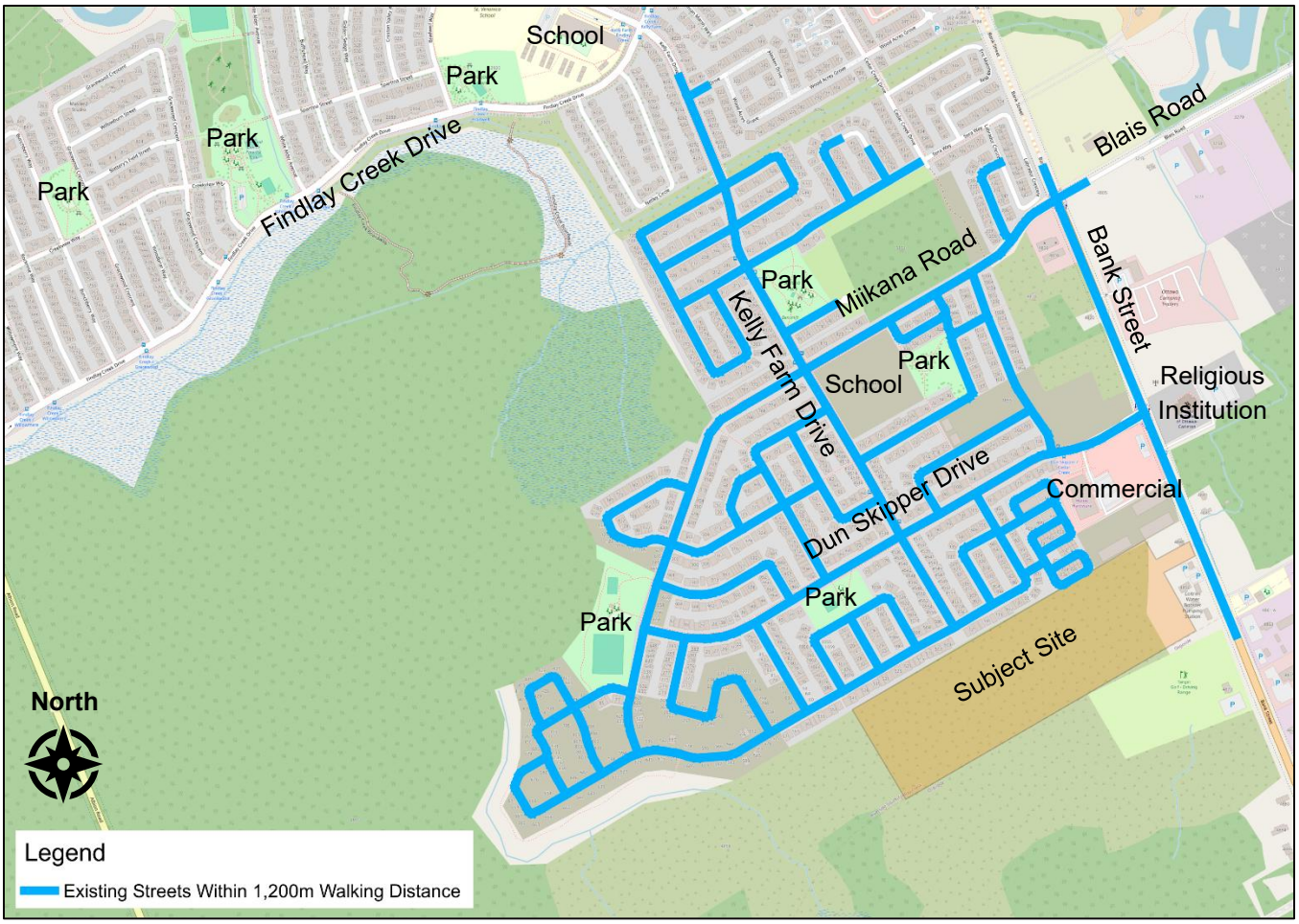


Figure 3-1 Existing Streets Within 1,200m Walking Distance

Within a 20-minute walking distance (~1,600m) additional greenspace such as the Findlay Creek Boardwalk and the Vimy Ridge Public School are reachable.

Within a 25-minute walking distance (~1,900m), additional neighbourhood amenities are provided at the Findlay Creek Shopping Centre and Cowan's Grove Plaza. These two shopping centres include a variety of key daily amenities such as banks, grocery stores and restaurants.

The locations of the above amenities are shown in **Appendix C**.

3.2 Existing Road Network

Table 3-1 summarizes the details of the existing street network within the context area.

Table 3-1 Existing Road Characteristics within Context Area

Name	Class	Orientation And Extents	Cross-Section within Context Area	Right-Of-Way Protection within Context Area (m)	Speed Limit within Context Area (km/h)
Bank Street	Arterial	North-South, Wellington to Ottawa City limits	2-Lane, Rural, Undivided	44.5	80
Kelly Farm Drive	Collector	North-South, Leitrim to Paakanaak	2-Lane, Urban, Undivided	~24/26[1]	50
Findlay Creek Drive	Collector	East-West, Albion to Highgarden	2-Lane, Urban, Undivided	~30[1]	50
Miikana Drive	Collector	East-West, Paakanaak to Bank	2-Lane, Urban, Undivided	~24[1]	50
Blais Road	Collector	East-West, Bank to Hawthorne	2-Lane, Rural, Undivided	31	50
Dun Skipper Drive	Collector/ Local	East-West, Miikana to Bank	2-Lane, Urban, Undivided	~24[1]	50

[1] *Approximate right-of-way (existing).*

Bank Street represents a key north-south connection to both local and city-wide destinations. The majority of commercial amenities in the community are located on Bank Street and the street also represents the most direct connection to the city-wide arterial road network.

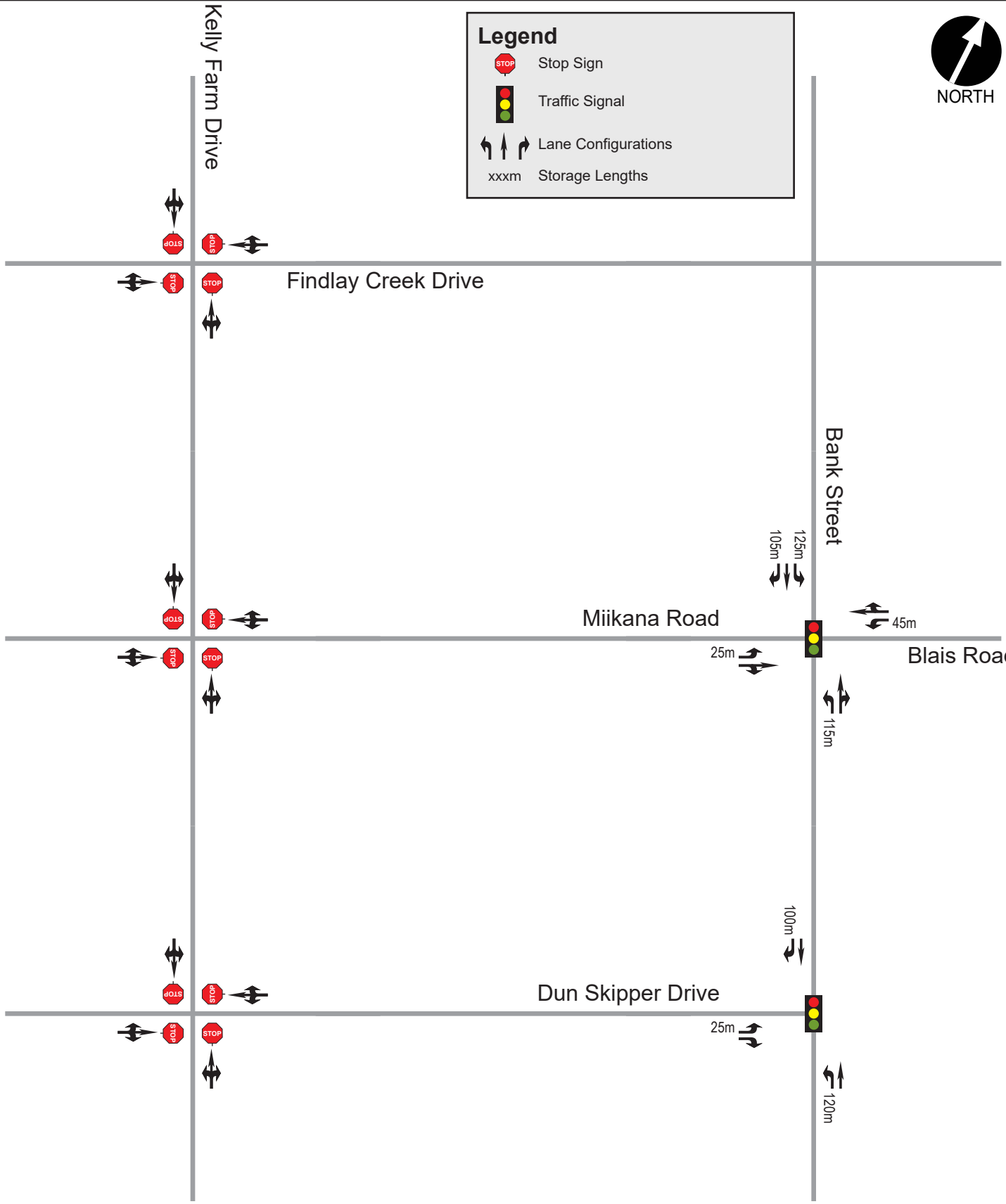
Within the context area, the truck network is limited to Bank Street and Blais Road. Bank Street is designated as a full-load truck route while Blais Road is a restricted load truck route.

It should be noted that arterial roads generally have a theoretical capacity of 1,000 vehicles per hour per lane, while the capacity of collector and local roads is lower as a result of increased ‘friction’.

Within the study area, the following traffic management measures have been implemented:

- On-street speed limit pavement markings and flexible bollards on Findlay Creek Drive and Kelly Farm Drive.
- Flexible bollards on Miikana Road

Exhibit 3-1 below illustrates the existing traffic control and lane configurations of the study area intersections.



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S-4 Leitrim West of Bank Street Lands
Community Transportation Study

Exhibit 3-1:
Existing Traffic
Control and
Lane Configurations

PROJECT No. 145172

SCALE: N.T.S.

3.2.1 Existing Traffic Volumes

The following weekday morning and afternoon peak hour turning movement counts were obtained from the City of Ottawa:

- Bank & Miikana/Blais: July 6, 2023
- Bank & Dun Skipper: September 14, 2023
- Bank & Rideau: December 6, 2023
- Findlay Creek & Kelly Farm: February 9, 2023
- Kelly Farm & Miikana: February 23, 2023
- Kelly Farm & Dun Skipper: June 29, 2023

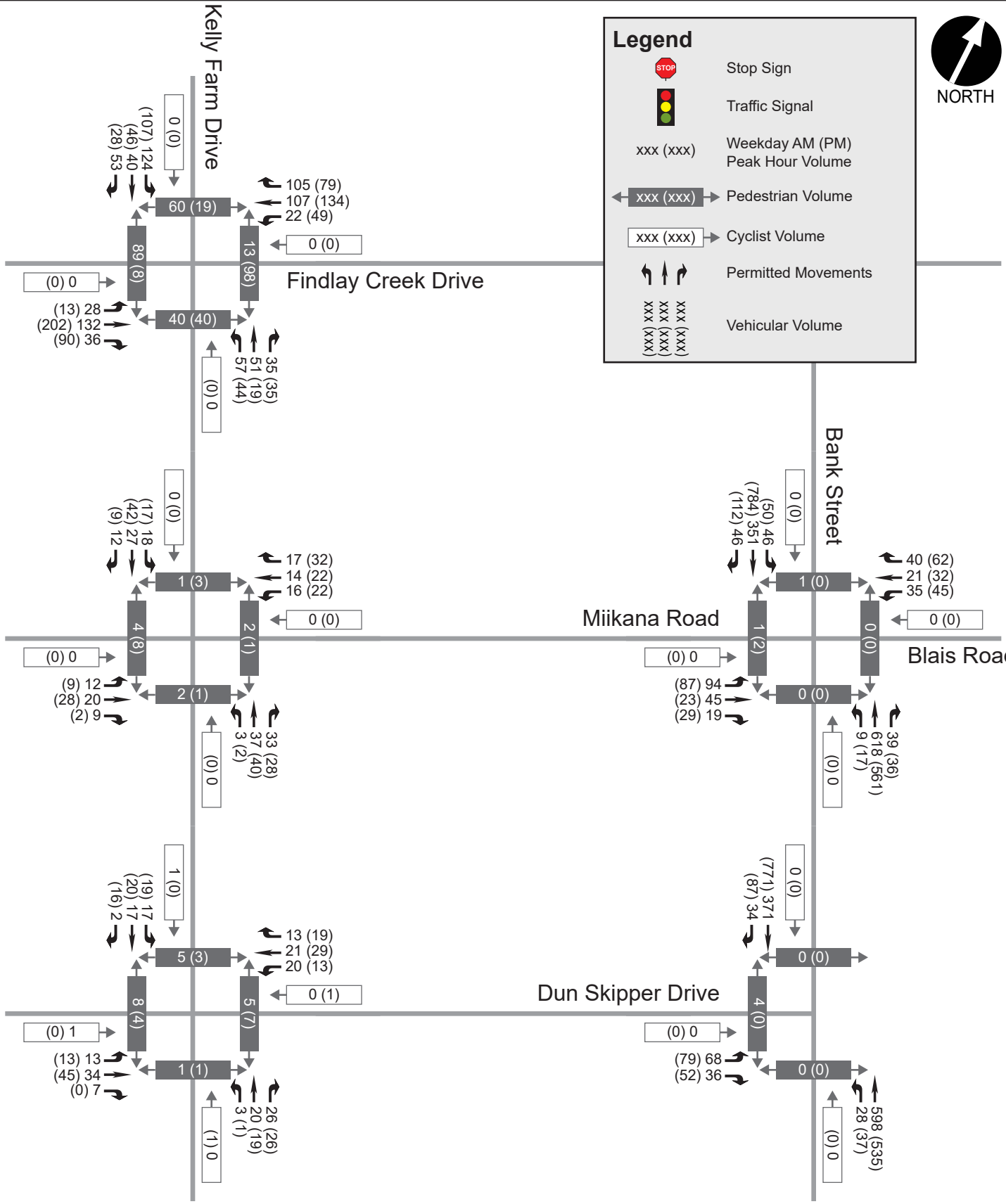
Several of the above traffic counts were collected during the winter months and therefore the volume of cyclists at some intersections may be lower than the volumes during the peak cycling season.

The traffic count at the Bank & Rideau intersection was obtained to provide information on potential future volumes on the Earl Armstrong Road extension. The intersection is not included in the study area otherwise.

Growth rates were applied to northbound and southbound through volumes on Bank Street to account for growth in regional traffic between 2023 and 2024. Justification of the background growth rates is discussed later in this report.

Peak hour traffic volumes representative of existing conditions are shown in **Exhibit 3-2**[1]. Weekday morning and afternoon peak hour turning movement counts have been provided in **Appendix D**.

[1] It is acknowledged that Bank Street was under construction at the time of this study and therefore traffic volumes may be lower than usual. For the purposes of this study, “existing traffic” shall be interpreted as the level of traffic that would be expected under normal operating conditions.



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Community Transportation Study

Exhibit 3-2:
Existing Traffic

PROJECT No. 145172

SCALE: N.T.S.

3.2.2 Intersection Capacity Analysis Criteria

In qualitative terms, Level of Service (LOS) describes a user's perception of the operational conditions of a transportation facility. For vehicular LOS, these conditions are generally defined in terms of delay, speed and travel time, freedom to maneuver, traffic interruptions, safety, comfort and convenience. The two key metrics used to evaluate vehicular LOS are as follows:

- **Volume to Capacity (v/c) Ratio:** The ratio of traffic volume (either measured or forecast) to the capacity of the intersection or roadway.
- **Average Delay:** The average elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line, including the time required for a vehicle to travel from the last-in-queue position to the first-in-queue position.

LOS is given a letter designation from 'A' to 'F'. LOS 'A' represents the best operating conditions and LOS 'E' represents the level at which the intersection, or an approach to the intersection, is carrying the maximum traffic volume that can, practicably, be accommodated. LOS 'F' indicates that the facility is operating beyond its theoretical capacity.

For signalized intersections, the City of Ottawa has developed criteria for signalized intersections as part of the TIA Guidelines which directly relate the v/c ratio to a LOS designation. In contrast, the LOS for unsignalized intersections is based on average delay using the criteria outlined in the Highway Capacity Manual (HCM) 2010. These criteria are presented in **Table 3-2** below.

Table 3-2 Level of Service Thresholds

Level Of Service	Signalized	Unsignalized
	v/c Ratio	Delay (Seconds per Vehicle)
A	0 to 0.60	<10
B	0.61 to 0.70	>10 and <15
C	0.71 to 0.80	>15 and <25
D	0.81 to 0.90	>25 and <35
E	0.91 to 1.00	>35 and <50
F	> 1.00	>50

In accordance with the Multi-Modal Level of Service (MMLOS) Guidelines Update(May 2025), a Level of Service target of 'E' is applicable to the study area roads.

3.2.3 Intersection Capacity Analysis Results

Table 3-3 below summarizes the existing traffic operational performance at the study area intersections based on weekday peak hour traffic volumes representative of existing conditions. The intersection capacity analysis is based on locally-specific parameters as described in the TIA Guidelines and incorporates existing signal timing plans obtained from the City of Ottawa. As prescribed in the TIA Guidelines, a peak hour factor (PHF) of 0.90 has been considered in the analysis of existing conditions. The Synchro output files have been provided in **Appendix E**.

Table 3-3 Intersection Capacity Analysis: Existing Traffic

Intersection	Traffic Control	Weekday Peak Hour	Overall LOS (v/c or Delay)	Critical Movement (v/c or Delay)
Bank & Miikana/Blais	Signalized	AM	A (0.57)	EBL (0.65)
		PM	B (0.65)	SBT (0.65)
Bank & Dun Skipper	Signalized	AM	A (0.48)	EBL (0.50)
		PM	B (0.62)	SBT (0.63)
Findlay Creek & Kelly Farm	Unsignalized	AM	B (11.6s)	SBTRL (11.6s)
		PM	B (12.8s)	EBTRL (12.8s)
Kelly Farm & Miikana	Unsignalized	AM	A (8.0s)	NBTRL (8.0s)
		PM	A (8.5s)	NBTRL (8.5s)
Kelly Farm & Dun Skipper	Unsignalized	AM	A (7.8s)	WBTRL (7.8s)
		PM	A (7.6s)	EBTRL (7.6s)

Based on the above results, all intersections are currently operating at an acceptable Level of Service. There is no evidence of existing capacity issues at any of the study area intersections.

3.3 Existing Pedestrian and Cycling Facilities

Figure 3-2 and **Figure 3-3** illustrate the existing pedestrian and cycling facilities within the context area.

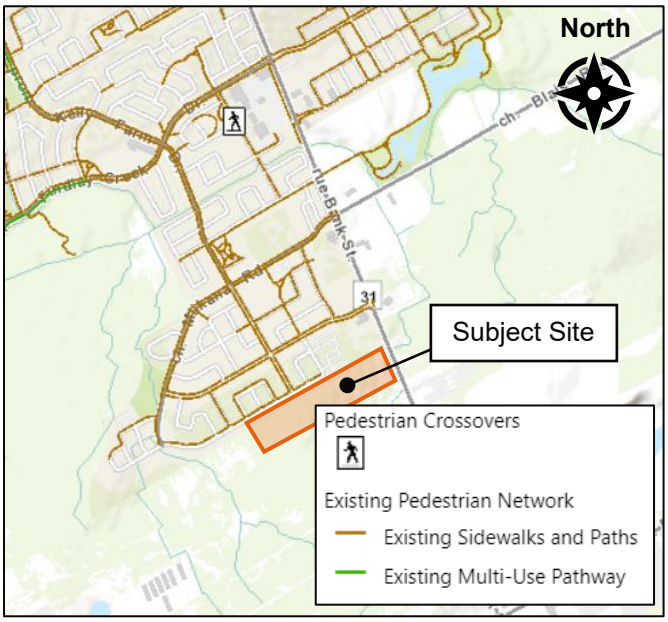


Figure 3-2 Existing Pedestrian Network

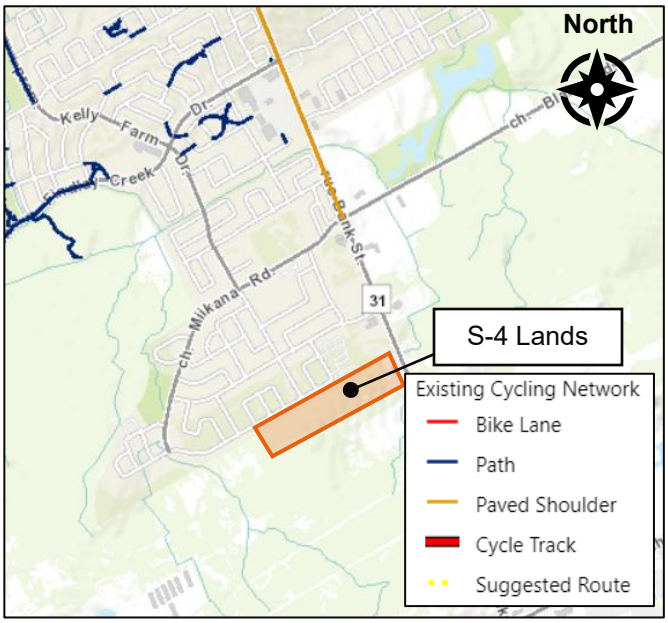


Figure 3-3 Existing Cycling Network

Concrete sidewalks are provided on both sides of Kelly Farm Drive, Dun Skipper Drive, Miikana Road, and Findlay Creek Drive, and on one side of several local roads in the area including Paakanaak Avenue.

Cycling facilities in the context area are limited to paved shoulders on Bank Street north of Miikana Road/Blais Road, a shared pathway on Findlay Creek Drive west of Bradwell Way and protected intersections at the intersections of Bank & Miikana and Bank & Dun Skipper.

Missing links, connectivity and desire lines are discussed in Section 6 of this report.

3.4 Existing Transit Facilities and Service

Table 3-4 summarizes the transit routes OC Transpo operates within the context area.

Table 3-4 Existing Transit Routes

Route	Route Type	Terminuses	Peak Period Frequency
#93[1]	Sunday Only	Rotary to Leitrim	One trip in the morning and one trip in the afternoon
#94	Weekday, peak period only	Dun Skipper to Leitrim	30 minutes
#304	Thursday Only	Billings Bridge/South Keys to Metcalfe/Greely/Osgoode	One trip in the morning and one trip in the afternoon

[1] *On Sundays Route #93 follows an alternate route twice per day to provide transit service to the Hindu Temple of Ottawa-Carleton.*

Figure 3-4 below illustrates the path the above transit routes follow within the context area and the Leitrim community.

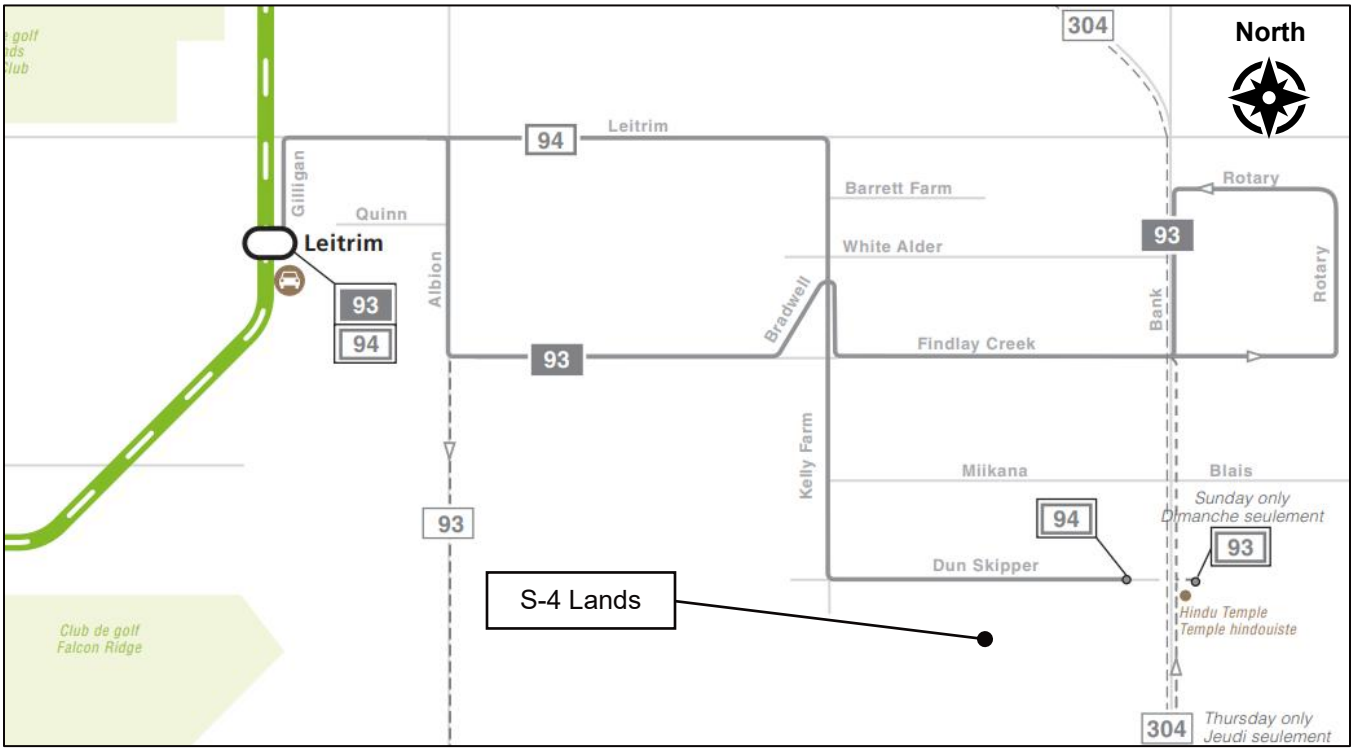


Figure 3-4 *Local Transit Network*
(Source: OC Transpo)

The transit service maps for the above routes are provided in **Appendix F**.

Based on comments from City staff, it is understood that for planning purposes it should be assumed that a peak period bus has capacity for 45 passengers. Based on existing service frequency, Route #94 therefore has a capacity of approximately 90 passengers per hour (per direction) during the weekday morning and afternoon peak hours. Although there are two other transit routes operating within the study area, these other routes only operate on a single day of the week or are a long walking distance from the site and are therefore unlikely to be used regularly by future residents of the subject site.

The nearest bus stops to the subject lands are located on Kelly Farm Drive near Dun Skipper Drive, approximately 400m north of the subject lands, as illustrated in **Figure 3-5** below. There are no transit priority measures (e.g., queue jump lanes, transit-only lanes) within the context area.

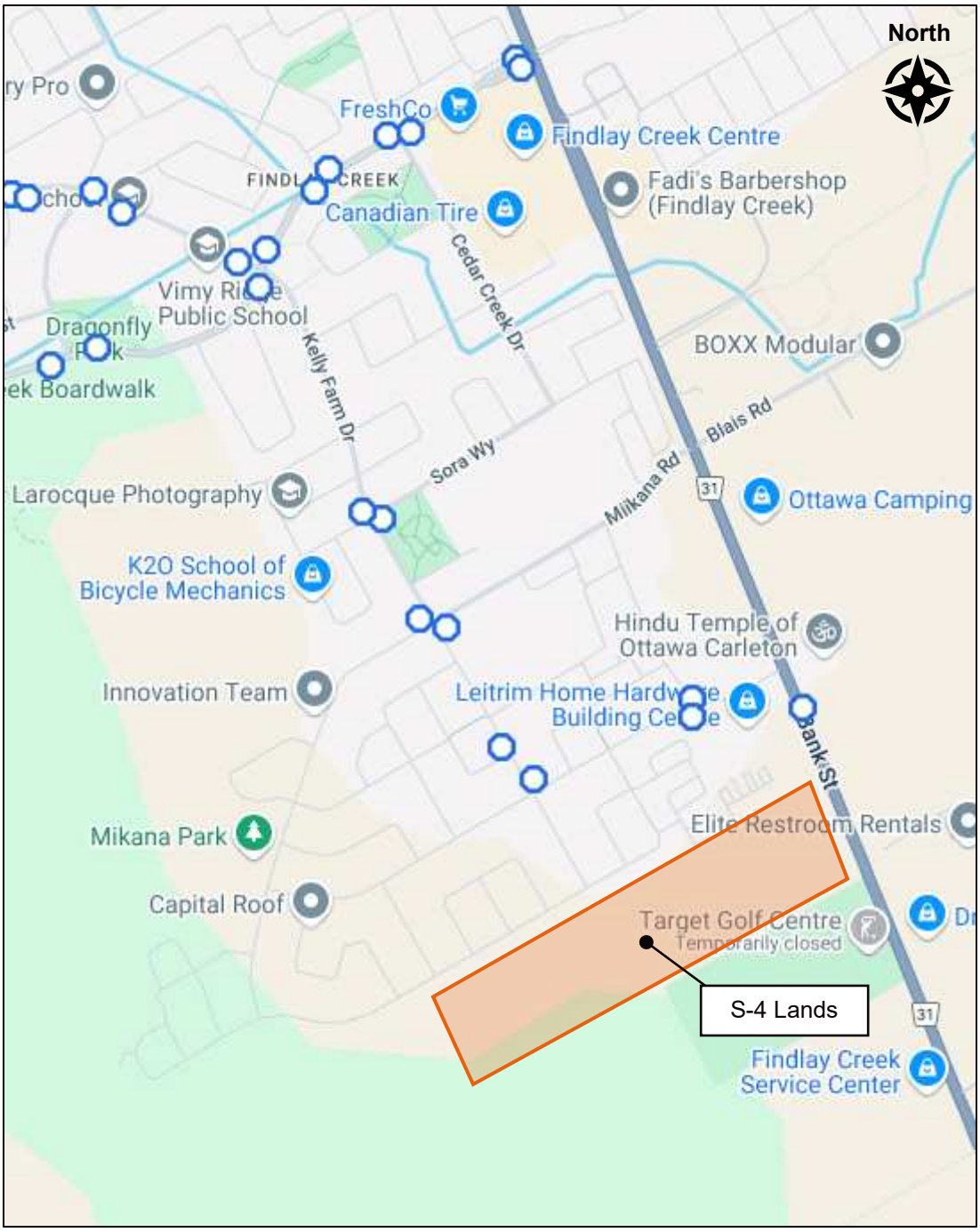


Figure 3-5 *Bus Stop Locations*
(Source: OC Transpo)

3.5 Existing Multi-Modal Level of Service

When evaluating roads and intersections, the comfort and safety of all users need to be assessed and weighed against performance targets. The City of Ottawa has developed the Multi-Modal Level of Service (MMLOS) analysis methodology to allow for the quantitative evaluation of Level of Service for pedestrians, cyclists, transit, and passenger vehicles. The elements considered in the MMLOS analysis for each user group are described below:

- **Pedestrian Level of Service (PLOS)** evaluates pedestrian comfort, safety, and convenience at intersections and along roadway segments. Segment-based PLOS considers the quality of pedestrian facilities, the distance between controlled crossings and the impact of adjacent traffic on pedestrian comfort and safety, while intersection-based PLOS considers delays experienced by pedestrians and the level of exposure to traffic.
- **Bicycle Level of Service (BLOS)** evaluates the level of traffic stress (LTS) experienced by cyclists travelling through intersections or along roadway segments. BLOS takes into consideration both the degree of physical separation between cyclists and motorized traffic as well as the operating speed of motorized traffic.
- **Transit Level of Service (TLOS)** evaluates the reliability of transit based on delays experienced by transit at intersections and travel times along roadway segments.
- **Auto Level of Service (ALOS)** evaluates the ease of travel for motorized traffic in terms of delays and intersection capacity.

For each travel mode, the City of Ottawa has established a set of MMLOS targets which vary based on Official Plan land use designation or policy area, as well as cycling, transit and roadway network classification. Segment-based MMLOS analysis is completed for boundary roadway segments only, while intersection-based MMLOS analysis is reserved for signalized intersections. For each intersection and roadway segment, an MMLOS score is calculated for the facility, as well as for the worst (critical) portion of the facility. Only the overall MMLOS score is evaluated against the targets.

The following sections summarize the results of the Multi-Modal Level of Service (MMLOS) analysis conducted within the study area for pedestrians, bicycles, transit and auto. Details on the Multi-Modal Level of Service (MMLOS) analysis are provided in **Appendix G**.

It should be noted that the traffic operations analysis presented previously was based on the weekday peak hours, while Automobile Level of Service (ALOS) is evaluated on a peak period basis (i.e. 2.5 hours) through the MMLOS methodology. To convert the peak hour results to peak period results, a 0.84 and 0.92 conversion factor has been applied to the weekday morning and afternoon peak hour v/c results, respectively, in accordance with the guidelines.

The MMLOS analysis results are based on the draft MMLOS Guidelines from the 2025 MMLOS Transportation Guidelines and spreadsheet tool.

3.5.1 Segment-Based Multi-Modal Level of Service

For this site, the only existing boundary streets are Bank Street and Kelly Farm Drive. Segment-based MMLOS analysis results are provided in **Table 3-5**.

Table 3-5 Segment-Based MMLOS Analysis Results: Existing Conditions

Segment	Travel Mode	Side	Overall LOS	Critical LOS	Target	Deviation[1]
Bank Street (Dun Skipper to Rideau Road)	Pedestrian	West	F	F	D	-2
		East	F	F		-2
	Bicycle	West	E	E	D	-1
		East	E	E		-1
	Transit	West	C	-	E	+2
		East	C			+2
	Public Realm[2]	Both Sides	E	-	-	-
Kelly Farm Drive (Dun Skipper to Paakanaak/ Rallidale)	Pedestrian	West	A	A	C	+2
		East	A	A		+2
	Bicycle	West	D	D	C	-1
		East	D	D		-1
	Transit	West	-	-	E	-
		East	-			-
	Public Realm[2]	Both Sides	B	-	-	-

Notes:
[1] A comparison between the 'Overall LOS' and 'Target LOS'. 'Critical LOS' is shown for information purposes only.
[2]Projects involving geometric changes that affect the public realm should target a Public Realm Level of Service (PRLOS) (Proposed)/PRLOS (Existing) ratio greater than 1.0.

On Bank Street, the lack of pedestrian or cycling facilities along the site frontage, combined with the high traffic volumes and high operating speeds creates a dangerous and uncomfortable environment for vulnerable road users. Providing dedicated facilities for these road users would be required in order to improve the Level of Service for active transportation modes.

On Kelly Farm Drive, the Bicycle Level of Service is 'D' whereas the City target is 'C'. Lowering the posted speed limit to 40 km/h would be sufficient to achieve the target Level of Service. PRLOS scores are based on whether there is available right-of-way to potentially introduce improvements to the pedestrian environment. PRLOS score in the range of B to E.

3.5.2 Intersection-Based Multi-Modal Level of Service

Intersection-based MMLOS analysis results for the two signalized study area intersections are provided in **Table 3-6**.

Table 3-6 Intersection-Based MMLOS Analysis Results: Existing Conditions

Intersection	Travel Mode	Overall LOS	Critical LOS	Target	Deviation[1]
Bank & Blais/Miikana[2]	Pedestrian	C	C	B	-1
	Bicycle	A	B	C	+2
	Transit	A	B	E	+4
	Auto	A	-	E	+4
Bank & Dun Skipper	Pedestrian	A	B	B	+1
	Bicycle	B	D	C	+2
	Transit	A	A	E	+4
	Auto	A	-	E	+4

Notes:
[1] A comparison between the 'Overall LOS' and 'Target LOS'. 'Critical LOS' is shown for information purposes only.
[2] Based on the future intersection configuration currently under construction. Refer to Section 4.1 for details on this configuration.

Overall, the existing signalized intersections within the study area generally meet the MMLOS targets for all modes. The exception is the Bank & Miikana/Blais intersection which will not meet the Pedestrian Level of Service target even under its future configuration. The intersection is currently undergoing reconstruction to widen Bank Street which will increase crossing distances and therefore negatively impact Pedestrian Level of Service.

3.6 Collision History

A review of historical collision data has been conducted for the road network surrounding the proposed development. The TIA Guidelines require a safety review if at least six collisions for any one movement or of a discernible pattern, over a five-year period have occurred. **Table 3-7** summarizes all reported collisions between January 1, 2017, and December 31, 2022. It should be noted that the last two years of collision data occurred during the COVID-19 pandemic and may have therefore been influenced by the pandemic.

Table 3-7 Historical Collisions

Location	# Of Reported Collisions						
	Approa-ching	Angle	Rear End	Side-swipe	Turning Move-ment	Single Motor Vehicle	Total
Intersections							
Findlay Creek & Kelly Farm	-	-	1	-	1	-	2
Bank & Blais/Miikana	-	3	9	1	2	-	15
Bank & Dun Skipper	-	-	2	-	1	1	4
Kelly Farm & Miikana	-	-	-	-	-	-	0
Kelly Farm & Dun Skipper	-	-	-	-	-	-	0
Segments							
Bank, Blais/Miikana to Dun Skipper	-	-	2	-	-	-	2
Kelly Farm, Findlay Creek to Miikana	2	-	-	-	-	1	3

Location	# Of Reported Collisions						
	Approa-ching	Angle	Rear End	Side-swipe	Turning Move-ment	Single Motor Vehicle	Total
Kelly Farm, Miikana to Dun Skipper	-	-	-	-	-	-	0
Miikana, Kelly Farm to Bank	-	1	-	-	-	-	1
Dun Skipper, Kelly Farm to Bank	-	-	-	-	-	3	3

Within the study area, only rear end collisions at the Bank & Blais/Miikana intersection require further review. Of the nine rear end collisions, one occurred when it was dark and road conditions were wet, one occurred while it was raining, another occurred when it was not actively raining but road conditions were wet, and one collision resulted in non-fatal injuries but occurred under ideal driving conditions (i.e., during the daytime with no adverse weather conditions. The remaining four rear end collisions occurred under ideal driving conditions and resulted in property damage only. Four of the nine collisions occurred at midday (i.e., around noon) and three occurred during the afternoon peak period (i.e., 3:30-6:00pm). Overall, there are no obvious patterns associated with these collisions.

Between 2017 and 2022, no fatal collisions were recorded, nor were there any pedestrian or bicycle collisions reported.

4 Future Transportation Network

4.1 Future Road Network

The Transportation Master Plan (TMP) Capital Infrastructure Plan outlines future road network modifications required in the 2046 Priority Road Network and has been referenced to identify future road network modifications within the study area. The City's Bank Street Widening project website and the Earl Armstrong Road Extension Environmental Assessment Study (Parsons, November 2019) were also referenced as they provide specific details associated with the planned modifications to these two streets.

The following projects were noted that may have an impact on area traffic within the vicinity of the site:

- **Bank Street:** Widening from two to four lanes between Leitrim Road and Miikana Road/Blais Road is currently ongoing and completion anticipated to be completed by the end of 2026[2]. Further widening between Miikana Road/Blais Road and the future Earl Armstrong Road extension is expected to be completed by 2046.
- **Earl Armstrong Road:** Planned extension of Earl Armstrong Road east from its current terminus at High Road to Hawthorne Road. The Earl Armstrong Road extension would define the southern boundary of the site and would form a three-legged signalized intersection with the Kelly Farm Drive extension as well as form a two-lane roundabout where it intersects with Bank Street, according to the Earl Armstrong Road Extension

[2] https://ottawa.ca/en/city-hall/public-engagement/projects/bank-street-widening-and-reconstruction-south-leitrim-road-south-blais-road#

Environmental Assessment (2019). The TMP identifies this as a Phase 1 project and it is therefore expected that this may be completed within approximately 10 years.

Figure 4-1 below illustrates the planned changes to the arterial road network projects in the broader area, as per the TMP Priority Road Network.

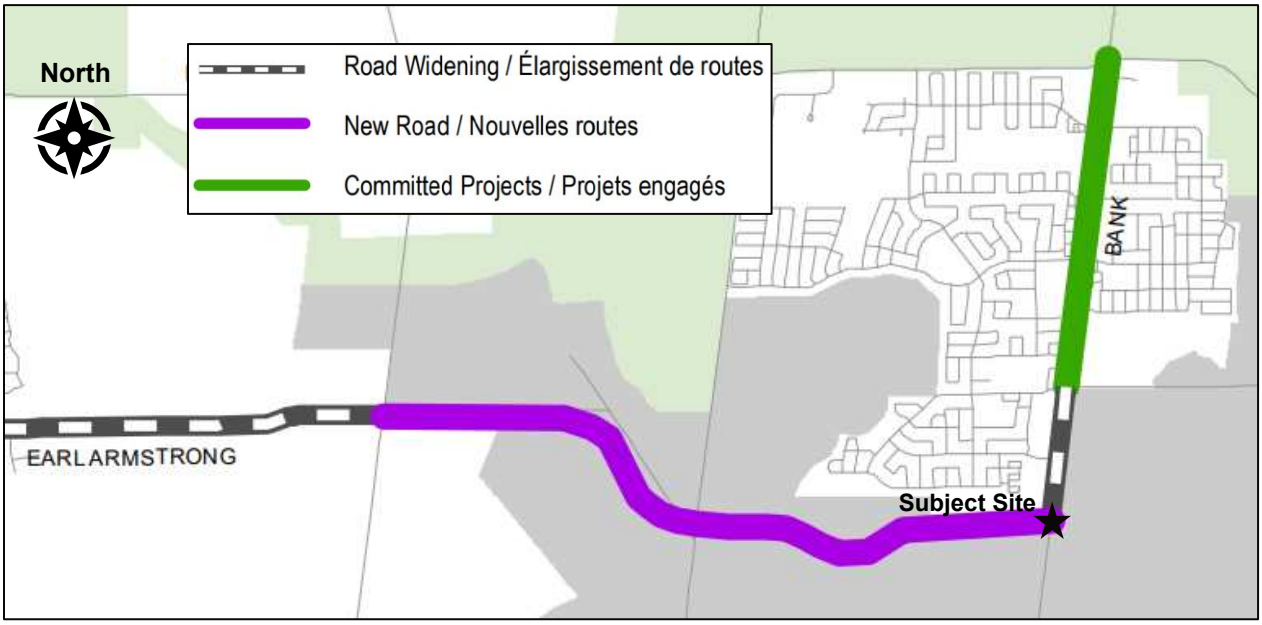


Figure 4-1 Future Road Network Projects

Figure 4-2 illustrates the location of the subject site relative to the future alignment of the Earl Armstrong Road extension.

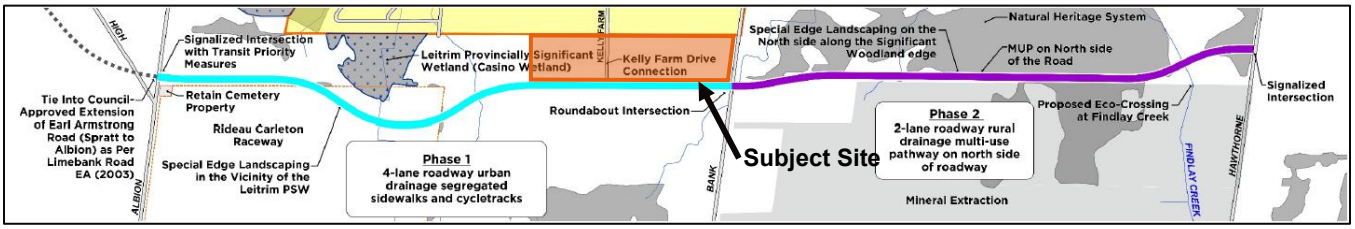


Figure 4-2 Future Earl Armstrong Road Extension Alignment

Figure 4-3 illustrates the future configuration of the Bank & Miikana/Blais intersection.

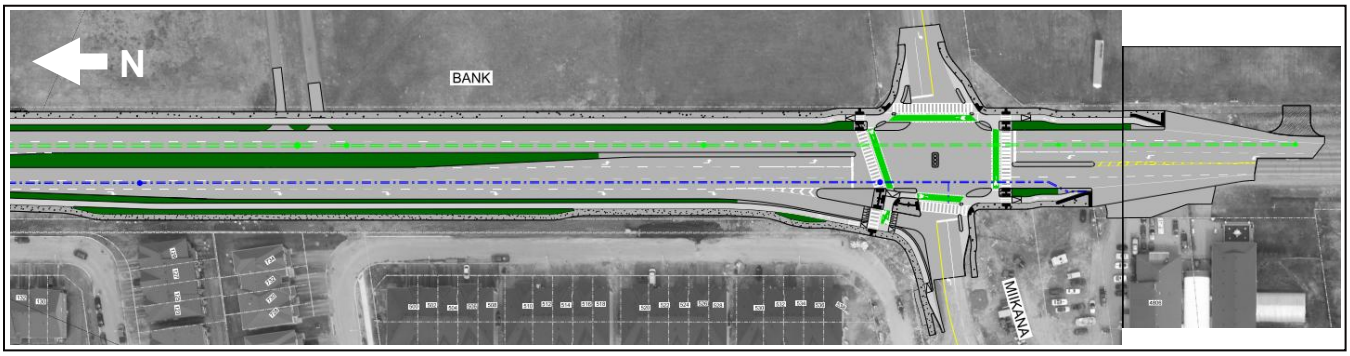


Figure 4-3 Future Bank Street & Miikana Road/Blais Road Intersection

Figure 4-4 and **Figure 4-5** illustrate the planned configurations for the intersections of Earl Armstrong Road with Bank Street and Kelly Farm Drive, respectively, as extracted from the Earl Armstrong Road EA Recommended Plan.

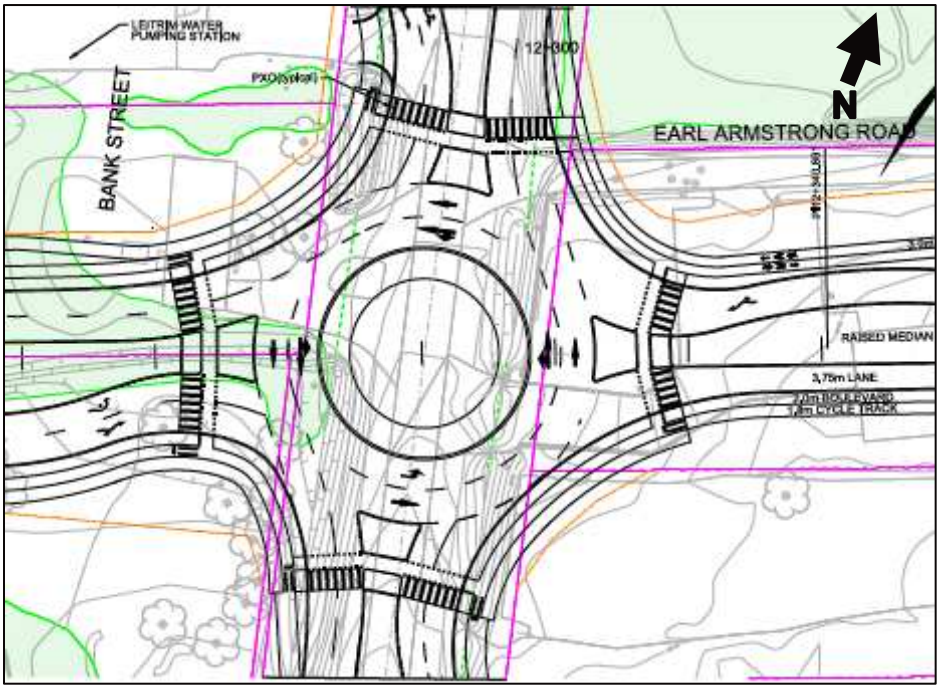


Figure 4-4 Future Bank Street & Earl Armstrong Road Roundabout

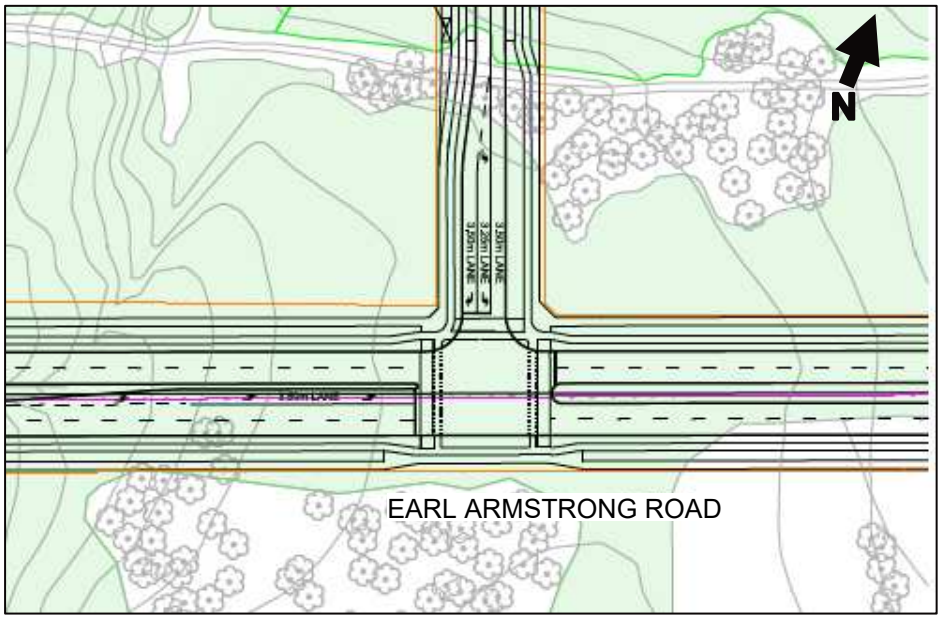


Figure 4-5 Future Earl Armstrong Road & Kelly Farm Drive Intersection

4.2 Future Cycling and Pedestrian Facilities

The Official Plan indicates that all urban arterials, major collectors and collectors are cycling routes, regardless of whether they are identified as Cross-Town Bikeways. As such, Bank Street, Findlay Creek Drive, Kelly Farm Drive, Miikana Road and Blais Road are all designated as cycling routes.

The TMP Rural Active Transportation Network indicates that a major pathway will be provided, connecting the Leitrim community to an existing pathway adjacent to the Trillium Line Extension, as illustrated in **Figure 4-6**. This pathway will ultimately connect to a cross-town bikeway which follows the alignment of the Trillium Line Extension.



Figure 4-6 Future Rural Active Transportation Network

The TMP also indicates that bike lanes are envisioned on Findlay Creek Drive between Albion Road and Bank Street (where feasible). Sidewalks and cycle tracks will be provided on both sides of Bank Street between Leitrim Road and Miikana Road/Blais Road when it is widened to four lanes, and it is anticipated that this configuration will be extended south if subsequent segments of Bank Street are widened to four lanes as well.

Sidewalks and cycle tracks are also envisioned on both sides of the Earl Armstrong Road extension, transitioning to a multi-use path (MUP) east of Bank Street.

4.3 Future Transit Facilities and Service

The TMP Priority Transit Network outlines the transit network modifications which are expected to be implemented by 2046. The following projects were identified that may have an impact on future travel demand in the vicinity of the proposed development:

- **Conroy Road Continuous Bus Lanes and Transit Priority Corridor** – The TMP recommends that continuous bus lanes be provided along the northern half of Conroy Road, with transit priority measures along the southern half.
- **Bank Street Continuous Bus Lanes and Transit Priority Corridor** – The TMP recommends that continuous bus lanes be provided on Bank Street between Leitrim Road and Conroy Road. Between Leitrim Road and the future Earl Armstrong Road extension, the report recommends that transit priority measures (e.g., queue jump lanes, transit priority signals, etc.) be provided.
- **Earl Armstrong Road Extension** – The TMP indicates that the Earl Armstrong Road extension will be a transit priority corridor between Bowesville Road and Bank Street and will provide connectivity to the planned Park & Ride at Bowesville Station.

Figure 4-7 illustrates the future transit network envisioned in the vicinity of the subject site based on the TMP.

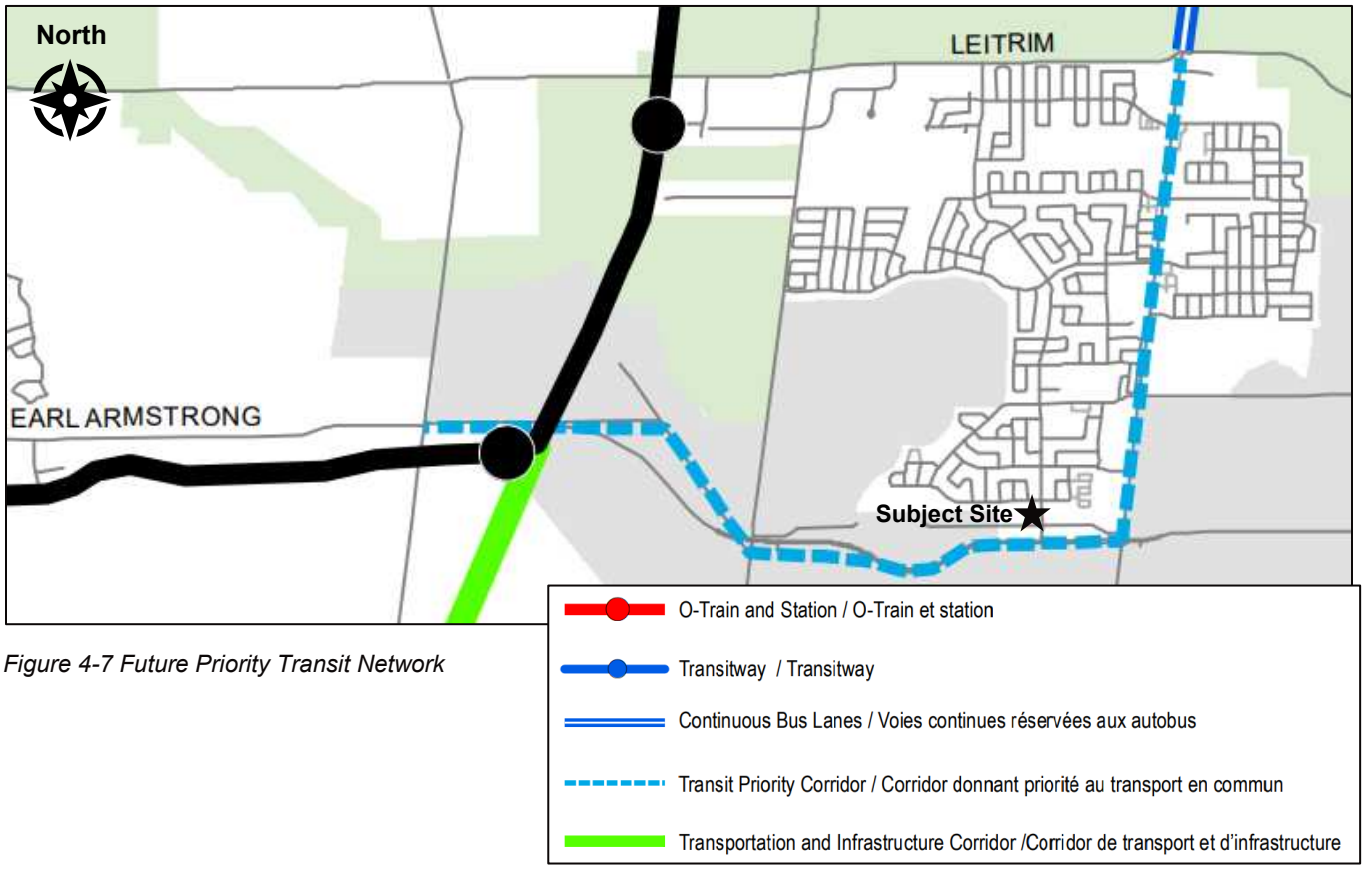


Figure 4-7 Future Priority Transit Network

4.4 Future Adjacent Developments

In 2017, a Master Transportation Study (MTS) was undertaken by IBI Group (now Arcadis) for the Leitrim community, which considered the cumulative impact of all development lands within the Bank Street corridor. Since this CTS was completed, additional development applications have been submitted for some of the blocks within the subdivisions that were included in the CTS. **Table 4-1** below summarizes the land use details and status of these developments. The location of these developments is shown in **Exhibit 4-1** below.

Table 4-1 Future Adjacent Developments

Development Name	Land Use	Size	Anticipated Buildout	Status[3]
Barrett Lands	Residential	797 units	2029	Under construction, partially occupied
Barrett Lands Extension	Residential	150 units	2022	Fully built-out and occupied
Findlay Creek Stage 2 Phase 4C	Residential	240 units	-	Fully built-out and occupied
Transport Canada Lands	Residential	231 units	2029	No construction started
Cowan's Grove & Lilythorne (OPA 76 Areas 9a & 9b)	Residential	1,319 units	2029	Under construction, partially occupied
	Commercial	13.6 acres[1]		3.5 acres built-out and occupied
Pathways (Remer & Idone Lands)[2]	Residential	1,155 units	2029	Under construction, partially occupied
4791 Bank Street	Residential	102 units	2022	Under construction
4816 Bank	Residential	188 units	TBD	No construction started
4836 Bank Street	Hardware Store	2,997 m^2	2022	Fully built-out and occupied
	Senior Apartments	141 units	2023	No construction started
	Restaurant	502 m^2		
	Commercial	1,865 m^2		
4840 Bank Street	Residential	180 units	2025	Fully built-out, however, it was still under construction at the time that the traffic counts were undertaken
150 Dun Skipper Drive	Commercial (including a supermarket)	5,416 m^2	2026	No construction started

Notes:
[1] Formerly 17 acres, however, 3.4 acres have been subtracted as they are now part of the 4791 Bank Street development.
[2] Formerly there was 26 acres of commercial lands, however, these lands have been subtracted as they are now part of the 4816 Bank Street, 4836 Bank Street, 4840 Bank Street and 155 Dun Skipper Drive developments.
[3]It is important to understand the current status of the adjacent developments in order to properly account for the traffic generated by any units that have already been constructed and occupied. The status of the adjacent developments was established based on the Google Earth aerial imagery from September 2024.



ARCADIS

S-4 Leitrim West of Bank Street Lands
Community Transportation Study

Exhibit 4-1
Adjacent Developments

PROJECT No. 145172

SCALE: 0m 125m 250m

5 Vision, Objective and Targets

5.1 Community Vision

The vision for the subject urban expansion land is to provide housing for people of all ages, income levels and backgrounds, to support active transportation and healthy living, and to be well connected to existing amenities in the surrounding area. Central to this vision is the creation of 15-Minute Neighbourhoods, in which most daily needs of residents can be fulfilled within a 15-minute walk, which is generally equivalent to a 1,200m walking distance.

The following describes how the subject expansion lands will adhere to the Official Plan's "Big Policy Moves"

1. **More Growth by Intensification than by Greenfield Development:** The Official Plan seeks to accommodate 60% of future growth within the existing urban areas, with the remainder to be accommodated in undeveloped areas within the urban boundary and through expanding the urban boundary. The subject site has been identified by the Official Plan as an urban boundary expansion area and therefore will accommodate part of the 40% of growth which is to be accommodated outside the existing urban areas.
2. **By 2046, the Majority of Trips Will be Made by Sustainable Transportation:** The Official Plan targets an average city-wide auto driver mode share of less than 50%. As described later in Section 5.3.1, the auto driver mode share target for this community is 50%. It is expected that more central portions of the city will have a lower auto driver mode share which will balance out the higher auto driver mode share of the subject site such that the average city-wide auto driver mode share meets the target.
3. **Improve Sophistication in Urban and Community Design:** The subject site will adhere to good urban and community design principles by providing a variety of housing types and providing connections to nearby elements of 15-minute neighbourhoods.
4. **Embed Environmental, Climate and Health Resiliency and Energy into Planning Policies:** To support the future livability of Ottawa, the community will be designed as a 15-minute neighbourhood by providing convenient connections to nearby amenities. This will minimize the number of trips by personal vehicle future residents will need to make, thereby reducing emissions.
5. **Embed Economic Development into Planning Policies:** The subject site will help support economic development by providing residents a place to live and supporting nearby businesses.

5.2 Development Objectives

In order to achieve the above Vision, the following objectives have been established for the development of the subject lands:

- The community shall include a diversity of residential building typologies at different price ranges and sizes to suit people of different ages, incomes and life stages.
- The design of the transportation network shall take a more deliberate approach to the allocation of space for automobiles and prioritize the role of public transit and active transportation.
- The use of transit shall be encouraged by providing safe and convenient infrastructure and connections.

5.3 Transportation Targets

The Vision and Objectives define the overall strategic direction for the community as well as the goals in which the City hopes to achieve through the development of these urban expansion lands. The targets establish the specific means by which these goals will be achieved. The following targets identify how the transportation objectives shall be achieved:

- All pedestrian facilities shall be designed to be universally accessible.
- An active transportation connection (i.e., “shortcut”) shall be provided in the northwest corner of the site to provide connectivity to Paakanaak Avenue. A pedestrian and cycling connection shall also be provided along the eastern boundary of the site connecting to Bank Street.
- Streets shall be designed for lower vehicle speeds, with space for trees and greenery, and a vibrant public realm.
- Opportunities for controlled or uncontrolled pedestrian crossings shall be considered along higher order streets to ensure there are frequent crossing opportunities for pedestrians.
- The road network shall be designed in such a way to minimize cut-through traffic and encourage low vehicle operating speeds.
- All streets within the community shall be designed as access streets.
- A future road block connection, identified as Block 80 on the Draft Plan of Subdivision, has been provided as part of the proposed development connecting the subject site to the westerly lands, should the roadway network be extended. This is consistent with other neighbourhoods at the edge of urban areas in the City of Ottawa.
- The right-of-way width allocated to all new streets shall be in accordance with Schedule C16 of the City of Ottawa Official Plan: 14.75m for single-loaded local streets, 18m for double-loaded local streets and 26m for collector streets.
- Measures shall be implemented to ensure transit service can be provided within 400m walking distance of 95% of residents. Of critical importance will be ensuring transit service can be provided within an acceptable walking distance prior to the extension of Earl Armstrong Road.

5.3.1 Mode Share Targets

Although light rail transit (LRT) service will be provided at the Leitrim Park & Ride as well as an additional station at Bowesville Road, the site’s distance of over 4 kilometres from either of these rapid transit stations may limit the transit mode share of this future community as it would only be reasonably accessible through local transit ‘feeder bus’ service, or through the use of Park and Ride facilities.

Although amenities such as grocery stores and restaurants are currently located more than a 15-minute walk from the site, there are two proposed developments at the intersection of Bank & Dun Skipper which will greatly improve access to these types of amenities. Combined with other existing amenities that are within a 15-minute walk, such as two schools, several parks and a place of worship, it is expected that a relatively large number of daily necessities could be accessed by non-auto travel modes.

Based on data from the 2011 TRANS Origin-Destination Survey Report, approximately 35% and 28% of weekday morning and afternoon peak period trips, respectively, are school, shopping or leisure trips.

Only a portion of school trips[3] are expected to be accommodated by the two English elementary public schools that are within walking distance of the site. Considering the typical number of years of education students undertake (16[4]), as well as the proportion of elementary students that go to English public schools (51%), only 32% of those categorized in the O-D Survey as "school trips" are likely to attend the local schools. The remainder are expected to attend school elsewhere. Once this has been accounted for, only 13% and 28% of weekday morning and afternoon peak period trips, respectively, are expected to be accommodated by local amenities (i.e., the nearby schools, parks, retail, etc.).

For trips less than one kilometre in distance, the Transportation Trends Report (Arcadis, May 2024) indicates that approximately 60% are expected to be active transportation trips (i.e., walking or cycling) and the remainder will be auto driver or passenger trips.

With consideration of the factors outlined above, mode share targets have been developed for the subject lands and are illustrated in **Table 5-1**.

To remain conservative, the trip generation exercise undertaken for this study applied the more conservative existing 'blended' mode share distribution.

Table 5-1 Existing and Target Mode Share Distributions

Mode	Existing Mode Share (Single-Detached)[1]	Existing Mode Share (Multi-Unit (Low-Rise))[1]	Existing Blended Mode Share[2]	Mode Share Targets
Auto Driver	55%	61%	59%	50%
Auto Passenger	24%	19%	20%	17%
Transit	11%	16%	15%	20%
Bike	1%	1%	1%	2%
Walk	9%	3%	5%	11%
Total	**100%**	**100%**	**100%**	**100%**

Notes:
[1] Average of AM and PM peak period mode shares from the 2020 TRANS Trip Generation Summary Report.
[2] Weighted average mode shares based on the projected blend of single-detached and multi-unit (low-rise) units.

The mode share targets consider an active transportation target of 13% to reflect number of peak period trips that existing and future amenities nearby can likely support. This target also considers the fact that even when amenities are located within a short walking distance, 40% people continue to choose to drive. New direct transit routes to the Leitrim LRT station are assumed to result in an increase in ridership. In addition, the presence of LRT service to the Leitrim community is likely to see a further shift in mode from automobile to transit through the use of the Park-and-Ride lot adjacent to the station. As these trips will continue to leave the study area as auto trips, no changes to the localized mode shares have been made with respect to new park-and-ride users.

[3] School trips include trips to pre-school, elementary, high school, and post-secondary institutions.
[4] It is assumed that a typical student will attend two years of pre-school, eight years of elementary, four years of high school, and two or more years of post-secondary education.

6 Opportunities and Constraints

The size of the subject lands and the minimal frontage along an existing public roadway presents a challenge as to how the lands can be configured for development. At present, the site has only one roadway connection via Kelly Farm Drive to the north, while to the east there is only 20 metres of available frontage on Bank Street. The site is bounded by an existing residential community to the north, various properties along Bank Street to the east, undevelopable terrain to the west, and a future arterial roadway alignment to the south.

The greatest uncertainty with respect to the development of these lands is the potential extension of Earl Armstrong Road along the site's southern boundary. Although the establishment of this major roadway will provide solutions to many mobility constraints for these lands, the design of the subject lands must take into consideration the uncertain timing of this roadway and thus be able to be developed independently, while provisioning for its potential implementation.

6.1 Opportunities

Roads – In accordance with the Earl Armstrong Extension functional design, Kelly Farm Drive will eventually be extended south from Paakanaak Avenue/Rallidale Street thereby connecting this collector road to the future arterial road network.

At the eastern boundary of the site, there is 20m of frontage on Bank Street which could permit a direct local road connection to the arterial road network. This frontage on Bank Street is located 150m (centreline to centreline) north of the future Bank & Earl Armstrong roundabout. Given the short distance between the roundabout and this potential intersection, the maximum speed within the roundabout could be used as a design speed for a northbound left-turn into this hypothetical road connection. For a 50 km/h design speed (typical maximum speed within a multi-lane roundabout) the minimum length required for a northbound left-turn lane is 75m, including 15m of storage, deceleration length and taper. As such, there is potentially sufficient space for a left-turn lane to be provided at this location, though there are a number of other considerations that negatively influence the feasibility of this access, as discussed in Section 6.2 below.

Pedestrian Facilities – Pedestrian facilities along the future Kelly Farm Drive extension would provide connectivity to the existing pedestrian network to the north, as well as connectivity to future pedestrian facilities along the Earl Armstrong Road extension. The 20m of frontage on Bank Street at the eastern boundary of the site could provide connectivity to future active transportation facilities on Bank Street. Additionally, a mid-block active transportation connection to Paakanaak Avenue in the form of a multi-use path could be provided via an existing servicing block at the northwestern corner of the site.

Cycling Facilities – A future Kelly Farm Drive extension will allow cyclists to connect to the future pathway linking Miikana Road to the city-wide cycling network as well as future cycling facilities along the Earl Armstrong Road extension. A cycling connection to Bank Street along the 20m of frontage on that street could also provide connectivity to future cycling facilities on Bank Street

Transit Facilities – Direct local transit connections to Leitrim Station could be provided via Kelly Farm Drive to the core of the subject lands on an interim basis, while a direct local transit connection to Bowesville Station could be provided in the future once Earl Armstrong Road is extended to Hawthorne Road.

15-Minute Neighbourhoods – A number of essential services will be located at the Bank & Dun Skipper intersection, within a short walking distance of the site. Additional development land may be available around the Bank & Blais/Miikana intersection for essential services in close proximity to the subject site through the future development of the S-5 Leitrim East of Bank Street lands.

6.2 Constraints

Roads – Although there is an opportunity to provide a road connection to Bank Street, there are a number of constraints associated with such a road connection:

- Any connection to Bank Street along the 20m of frontage would likely need to be classified as a local road. Collector roads generally require a minimum of 24m-26m of right-of-way width, though can be as narrow as 22m.
- Local-to-arterial connections are generally discouraged as it does not respect the typical hierarchy of road classifications. Best practice is for local roads to connect to collector roads, and for collector roads to connect to arterial roads.
- Signalization of the intersection may not be feasible due to the narrow right-of-way available and lack of sufficient 'corner triangles'. Without signalization, delays on the side street approaches are likely to be high (i.e., LOS 'F').
- The location of the intersection does not meet the minimum 200m intersection spacing recommended for intersections on arterial roads.
- Providing a southbound right-turn lane would be prohibitively expensive due to the need for a box culvert extension under Bank Street.
- To discourage cut-through traffic along such a road connection or avoid it from becoming a primary access, it would be necessary for the internal street network to be highly circuitous with a high level of traffic calming to discourage the use of this road by non-local traffic and maintain 30 km/h operating speeds.
- Local roads cannot accommodate transit service.
- There is the potential that the intersection will be restricted to right-in/right-out only if Bank Street is ever widened to four lanes.

Along the future Earl Armstrong Road extension, the location of the Earl Armstrong & Kelly Farm intersection has been pre-determined through the Environmental Assessment process for that road which will limit the feasibility of providing additional vehicular connections along the southern boundary of the site. The TAC Geometric Design Guide for Canadian Roads indicates that the minimum distance between intersections required along arterial roads is 200m, though 400m spacing is desirable. Two additional local road connections to the future Earl Armstrong Road extension could therefore be provided, however, these connections would be relatively redundant given that Earl Armstrong & Kelly Farm intersection will provide a superior level of access as a signalized intersection.

Pedestrian Facilities – Currently, there are no pedestrian facilities on Bank Street which limits the site's connectivity to nearby amenities and would require future residents to use a more circuitous path within the community to access those amenities. This limits the viability of walking as a means of meeting daily needs.

Cycling Facilities – Currently, there are no cycling facilities on Bank Street adjacent to the site, nor the existing portions of Kelly Farm Drive. Although cycle tracks are now required on all new collector roads, providing cycle tracks along a future 180m segment of Kelly Farm Drive within the subject site would serve no purpose on an interim

basis without the presence of the Earl Armstrong extension or cycle tracks along the remainder of Kelly Farm Drive. These cycle tracks would be isolated and minimally used in the interim.

In addition to the above constraints, until the Earl Armstrong Road extension is complete there will be no protected crossings on Bank Street along the site's frontage that would allow cyclists to access the future northbound cycle tracks on Bank Street, thereby forcing northbound cyclists to travel north on Kelly Farm Drive to reach the Bank/Dun Skipper signalized intersection.

Transit Facilities – A temporary cul-de-sac could be provided at the south end of Kelly Farm Drive on an interim basis to facilitate the extension of existing transit service through the subject site and until such time the Earl Armstrong Road extension is in place. This cul-de-sac, however, will temporarily use some of the developable land as there is insufficient space to accommodate a turning basin within the 26 m right-of-way of Kelly Farm Drive. As such, it is anticipated that the construction of one block of townhouse units will need to be postponed until after the Earl Armstrong extension is built, as the temporary turn-around area will need to remain fully operational during the construction of this arterial road.

Once the extension of Earl Armstrong Road is completed, transit service is expected to be routed along Kelly Farm Drive and Earl Armstrong Road.

15-Minute Neighbourhoods – Small-scale neighbourhood retail is not feasible due the lack of a customer base as a result of the site's location at the periphery of the city and the uncertainty regarding the timing of the Earl Armstrong Road extension. As discussed in Section 6.1, essential services will be available within a 15-minute walking distance of the site.

PART 2: CONCEPT PLAN DEVELOPMENT

7 Community Design

This section of the report provides an overview of the high-level evaluation completed to develop the configuration of the community transportation network. The concept plan that has been developed for the subject site is shown in **Exhibit 7-1** below illustrates the conceptual plan and active transportation network.

7.1 Transportation Network Layout

The following subsections describe the configuration of the road, transit, pedestrian and cycling networks within the subject site.

7.1.1 Road Network Layout

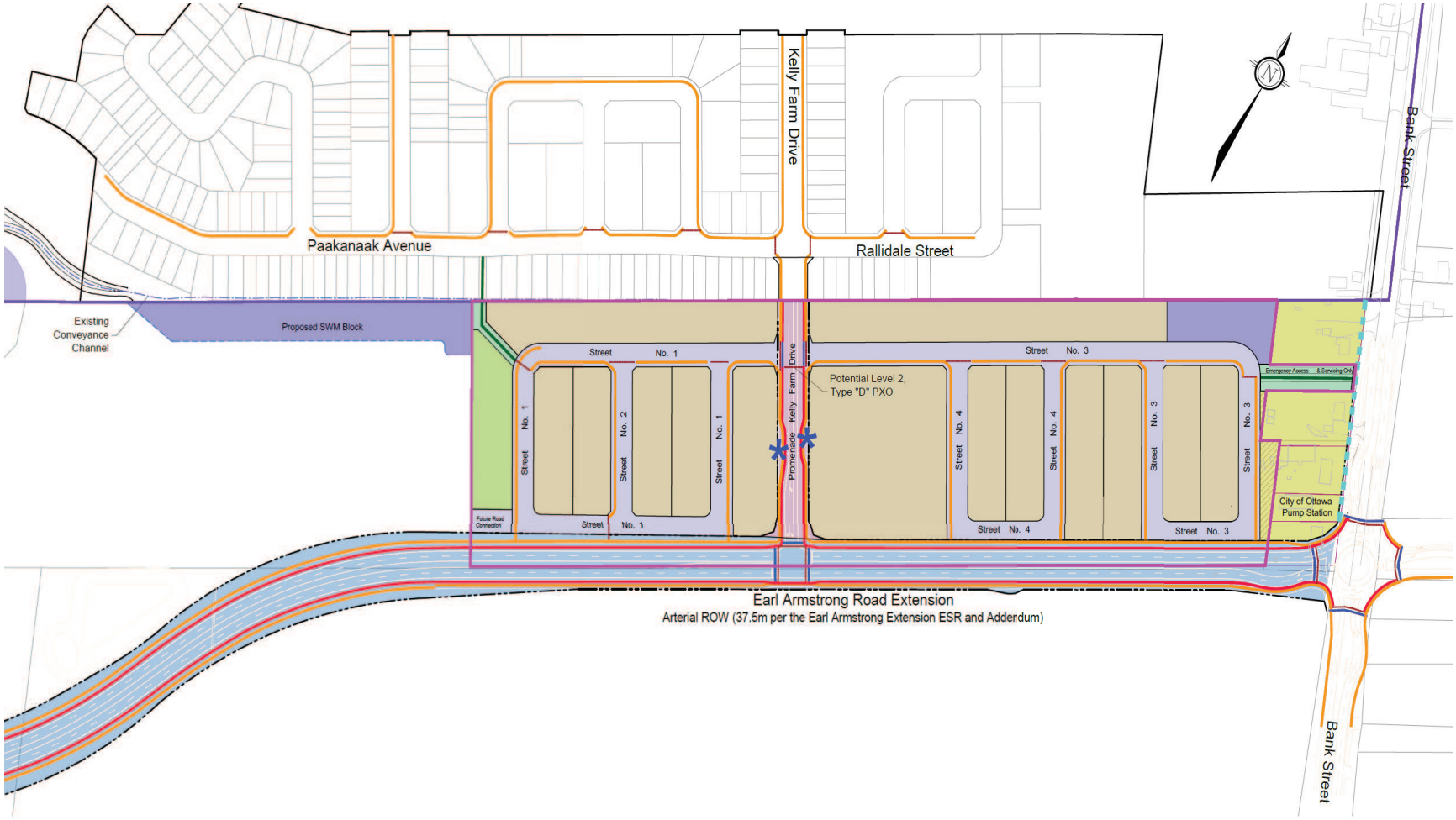
As noted in Section 6, extending Kelly Farm Drive south to the future Earl Armstrong Road extension presents a key opportunity to provide connectivity to the existing and future road, pedestrian and cycling networks to the north. Once Earl Armstrong Road is extended, Kelly Farm Drive would also provide direct connectivity to the arterial road network and the pedestrian and cycling facilities proposed along this corridor.

The review of opportunities and constraints also identified the possibility of a road connection to Bank Street. Preliminary analysis has identified a number of challenges associated with providing such a connection (see Section 6.2) which would make such a road connection undesirable. The analysis also suggests that this road connection is not a technical requirement for the development of the lands as the existing intersections to the north have sufficient capacity to accommodate the traffic demand that would be generated by the community. As such, a vehicular connection to Bank Street is not recommended.

A future road block connection, identified as Block 80 on the Draft Plan of Subdivision, has been provided as part of the proposed development connecting the subject site to the westerly lands, should the roadway be extended. This is consistent with other neighbourhoods at the edge of urban areas in the City of Ottawa.

As vehicular access to the subject site will be provided via an extension of Kelly Farm Drive rather than a new road connection to an existing street, it is not possible to comment on existing driveways within 200m of the proposed driveways, as no driveways are proposed.

Due the constraints of the site, there are limited alternative configurations for the primary road network.



LEGEND

- 4850 Bank Street
- Residential (*Minimum Density of 36 units per net hectare*)
- Mixed Use
- Park
- Open Space
- Stormwater Management Block
- Arterial ROW
- Collector ROW
- Local ROW
- Existing Conveyance Channel
- Pedestrian Facility (Arcadis, 2025)
- Cycling Facility (Arcadis, 2025)
- Multi-Use Pathway (Arcadis, 2025)
- Pedestrian Crossing (Marked or Unmarked) (Arcadis, 2025)
- Cycling Crossing (Marked) (Arcadis, 2025)
- Remnant Lands
- Right-in / Right-out (To Be Confirmed Through Subsequent Planning Applications)
- Future Bus Stops (Earl Armstrong Extension ESR and Addendum)

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Community Transportation Study

Exhibit 7-1
Conceptual Plan &
Active Transportation Network
(Dwg No: AT Plan-1)

PROJECT No: 145172
DATE: 2026-09-25
SCALE: 0m 50m 100m

7.1.2 Transit Network

Based on discussions with City technical staff, the following interim and ultimate transit service routes are recommended:

- **Interim Conditions (prior to Earl Armstrong Road extension):** Extend existing transit service on Kelly Farm Drive to service a proposed bus stop pair within the subject lands and facilitate turn-around of transit vehicles using a temporary cul-de-sac. It is anticipated that the construction of one block of townhouse units will need to be postponed until after the Earl Armstrong extension is built, as the temporary turn-around area will need to remain fully operational during the construction of this arterial road.
- **Future Conditions (after the extension of Earl Armstrong Road):** Provide transit service along Kelly Farm Drive and Earl Armstrong Road.

Under interim conditions, the recommended transit routing will provide transit service within 400 m for approximately 95% of residents within the subject site, thereby meeting the transit coverage target for the subject site.

Once this new transit routing is in place, it is anticipated that all residents within the subject site will be within 400 m of transit. The Earl Armstrong Road extension will also provide an opportunity for more direct service to O-Train Line 2 via transit routes to Bowesville Station.

7.1.3 Active Transportation Network

Active transportation is proposed to be accommodated via sidewalks on at least one side of all local roads and on both sides of Kelly Farm Drive, consistent with Official Plan requirements. Cycle tracks will also be provided on both sides of the portion of Kelly Farm Drive within the subject site.

Two active transportation connections to the adjacent community are recommended:

- A multi-use path is recommended in the northwest corner of the site to provide connectivity to Paakanaak Avenue. This will improve connectivity with the neighbourhood to the north and provide a shorter, more direct route to/from Dun Skipper Park.
- A multi-use path is recommended at the eastern boundary of the site to connect the community to Bank Street. Once pedestrian and cycling facilities are extended south on Bank Street to this point as part of a future urbanization project this will provide the most direct route for residents to/from key amenities such as the Findlay Creek Shopping Centre and the Cowan's Grove Plaza.

Exhibit 7-1 above also illustrates the proposed active transportation network.

7.2 Street Cross-Sections

It is anticipated that none of the residential properties will front onto Kelly Farm Drive and instead they will all have driveways located on local roads. As such, there is no benefit in providing additional street width on Kelly Farm Drive for on-street parking and the space usually used for parking will instead be allocated towards additional green space.

Figure 7-1 illustrates the proposed street cross-section for Kelly Farm Drive.

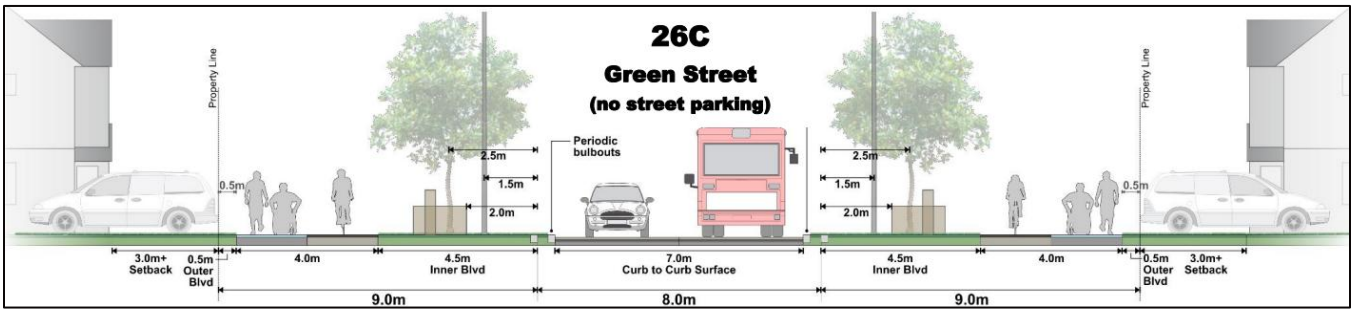

Figure 7-1 Proposed Kelly Farm Drive Cross-Section
(Source: Designing Neighbourhood Collector Streets, City of Ottawa and Parsons, December 2019)

In accordance with the City of Ottawa's local street standard cross-sections approved in 2022, all double-loaded local roads within the subject lands are recommended to have an 18.0m right-of-way which will provide space for on-street parking, 1.8m wide sidewalks and treed boulevards, while single-loaded local streets (i.e. 'window streets') within the site are recommended to have a 14.75m right-of-way, with similar cross-section characteristics.

7.3 Land Use Projections

Based on initial land use projections for the site, the following number of residential units are expected.

Table 7-1 Land Use Statistics

Land Use	Size
Single-Family Home	77
Regular Townhome	131
Back-to-Back Townhome	96

7.4 Analysis Years and Time Periods

It is anticipated that the subject site will be fully built out in a single phase and occupied by 2031. The following analysis years will therefore be considered in this study:

- Year 2031 – Year of development buildout
- Year 2036 – Five years after development buildout

Given residential nature of the subject site, intersection capacity analysis will be limited to the peak hours of weekday morning and afternoon.

7.5 Community Generated Traffic

7.5.1 Peak Period Person-Trip Generation

Peak period person-trips associated with the subject site were estimated using the trip generation rates from the 2020 TRANS Trip Generation Summary Report. The peak period person-trip generation results for the subject site are summarized in **Table 7-2**.

Table 7-2 Peak Period Person-Trip Generation

Land Use	Size	Period	Peak Period Person-Trips		
			In	Out	Total
Single-Family Homes	77 units	AM	47	111	158
		PM	118	73	191
Townhouses	227 units	AM	92	214	306
		PM	201	158	359
Total		**AM**	**139**	**325**	**464**
		PM	**319**	**231**	**550**

7.5.2 Trip Generation by Mode

The mode share targets from Section 5.3.1 were applied to the peak period person-trips to determine the number of person-trips per travel mode. Peak period to peak hour adjustment factors from Table 4 of the 2020 TRANS Trip Generation Summary Report were subsequently applied to convert to peak hour trips.

The resulting number of person-trips by mode is summarized in **Table 7-3**.

Table 7-3 Development-Generated Peak Hour Person Trips by Mode

Land Use	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Auto Driver	39	92	131	83	60	143
Auto Passenger	13	31	44	28	20	48
Transit	11	27	38	22	16	38
Bike	1	2	3	2	1	3
Walk	4	9	13	8	6	14
Total	**68**	**161**	**229**	**143**	**103**	**246**

7.5.3 Trip Distribution and Assignment

The City of Ottawa provided EMME model results for future 2031 conditions which provide an indication of how traffic is expected to distribute in the future. Based on these projections, it is expected that site-generated traffic will be distributed as follows:

- 75% to/from the North via Bank Street
- 5% to/from the North via Kelly Farm Drive
- 15% to/from the South via Bank Street
- 5% to/from the West via Findlay Creek Drive

Utilizing the estimated number of new auto trips and applying the above distribution, future site-generated traffic volumes at each of the study area intersections was calculated and is illustrated in **Exhibit 7-2** below.

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Exhibit 7-2:
Site Generated
Traffic

PROJECT No. 145172

SCALE: N.T.S.

8 TIA Exceptions Review

The TIA Guidelines provide exemption considerations for elements of the Design Review and Network Impact components. **Table 8-1** summarizes the TIA modules that are not applicable to this study.

Table 8-1 Exemptions Review

TIA Module	Element	Exemption Considerations	Required
Design Review Component			
4.1 Development Design	4.1.2 Circulation and Access	• Only required for site plans	✗
	4.1.3 New Street Networks	• Only required for plans of subdivision	✓
4.2 Parking	4.2.1 Parking Supply	• Only required for site plans	✗
	4.2.2 Spillover Parking	• No longer required based on the June 2023 revisions to the TIA guidelines.	✗
Network Impact Component			
4.5 Transportation Demand Management	All Elements	• Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	✓
4.6 Neighbourhood Traffic Calming	All Elements	• Only required when the following conditions are met: 1. Access via a collector or local road 2. Adjacent to two significant sensitive land uses 3. Zoning By-Law Amendment or Draft Plan of Subdivision application 4. At least 75 vehicle-trips 5. Site-generated traffic will increase peak hour volumes by 50% or more	✗
4.7 Transit	4.7.1 Transit Route Capacity	• Only required when the proposed development generates 75 transit trips or more	✗
	4.7.2 Transit Priority Requirements	• Only required when the proposed development generates 75 vehicle trips or more	✓
4.8 Network Concept	All Elements	• Only required when proposed development generates more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by established zoning	✓
4.9 Intersection Design	All Elements	• Only required when the proposed development generates 75 vehicle trips or more	✓

PART 3: NETWORK ANALYSIS

9 Transportation Network Review

This section of the report summarizes the results of the transportation analyses undertaken as part of this study to evaluate the impact of the subject site on the surrounding transportation network and identify mitigation measures to address any issues identified.

As noted in Section 4.1, the implementation timing for the Earl Armstrong Road extension is uncertain and may not occur within the timeframe of this study. As such, the subsequent analyses do not consider the potential impact of this extension on the study area transportation network. For an overview of the potential impact of the Earl Armstrong Road extension on the study area transportation network, see Section 10.

9.1 Future Traffic Volumes

9.1.1 General Background Growth Rates

Based on a comparison of traffic volume projections between the 2011 and 2031 EMME model provided by City technical staff at the onset of the study, it is anticipated that traffic volumes on the arterial road network will increase by 2.5% per year due to growth in regional traffic passing through the study area. From 2031 to 2036, the linear annual background growth rate is expected to decrease to 1.5% per year, based on population projections for the City of Ottawa[5]. The collector and local road networks are only expected to experience growth as a result of adjacent development traffic.

9.1.2 Future Background Traffic

Future background traffic volumes projections have been established by combining the adjacent development traffic and background traffic derived through the application of a growth rate, as discussed previously.

Exhibit 9-1 and **Exhibit 9-2** present the future background traffic volumes anticipated for the 2031 and 2036 analysis years, respectively.

9.1.3 Future Total Traffic

Future total volumes have been derived by combining the site-generated traffic volumes with future background volumes. **Exhibit 9-3** and **Exhibit 9-4** present the future total traffic volumes anticipated for the 2031 and 2036 analysis years, respectively.

[5] Growth projections for Ottawa: 2018-2046 | City of Ottawa

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Exhibit 9-1:
Future (2031)
Background Traffic

PROJECT No. 145172

SCALE: N.T.S.

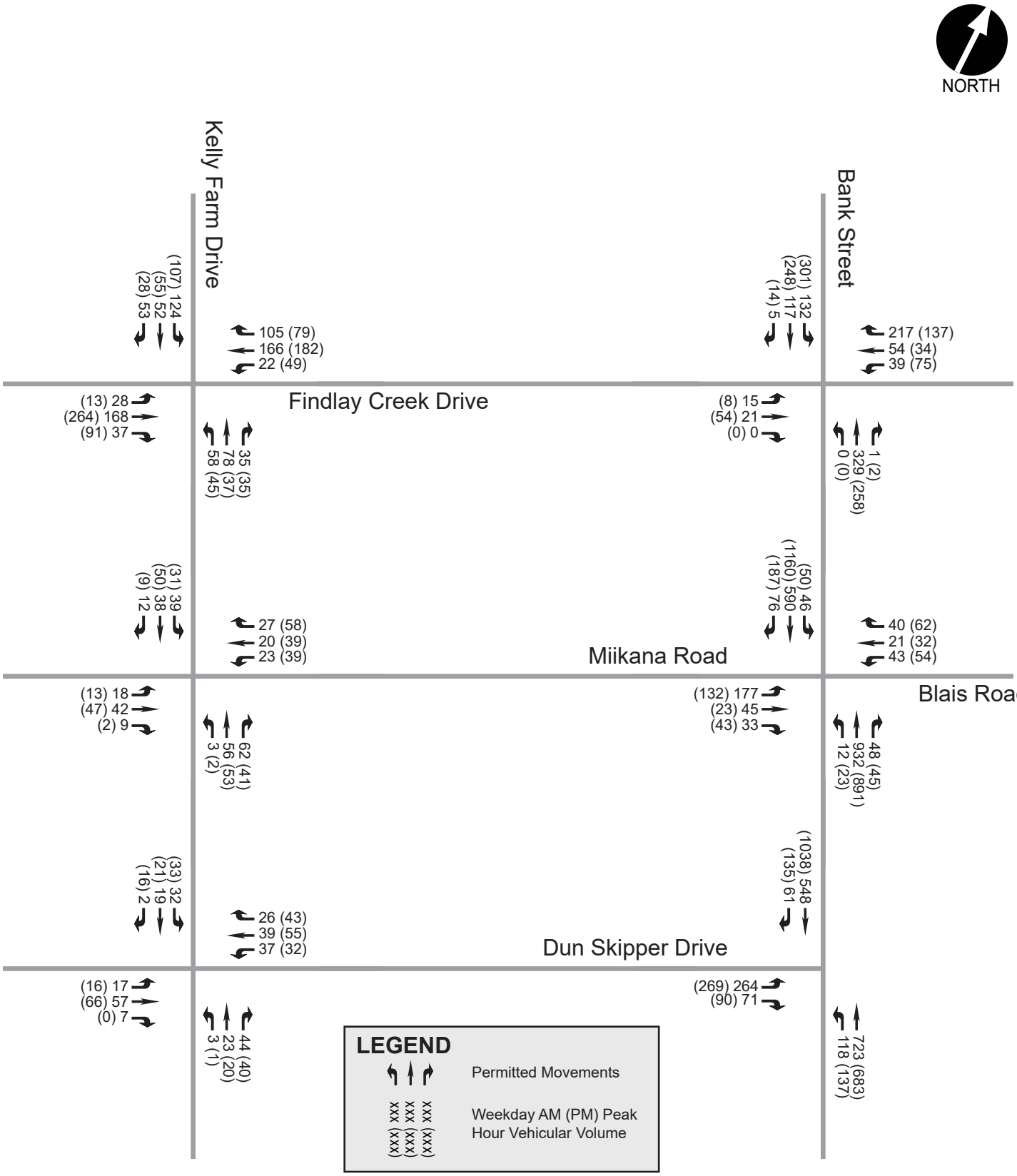

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Exhibit 9-2:
Future (2036)
Background Traffic

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SCALE: N.T.S.

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S-4 Leitrim West of Bank Street Lands
Community Transportation Study

Exhibit 9-3:
Future (2031)
Total Traffic

PROJECT No. 145172

SCALE: N.T.S.

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Community Transportation Study

Exhibit 9-4:
Future (2036)
Total Traffic

PROJECT No. 145172

SCALE: N.T.S.

9.2 Review of Network Concept

A screenline is an artificial boundary between areas of major traffic generation that captures all significant points of entry from one area to another to compare crossing demand with the available roadway capacity. Screenlines are typically located along geographical barriers such as rivers, rail lines or within the Greenbelt. To capture existing flow and model future demand, count stations are established by the City of Ottawa at each crossing point along the screenline.

The nearest strategic planning screenlines adjacent to the development have been identified as follows:

- **SL8 – Leitrim:** This is the nearest east/west screenline with respect to the subject site. This screenline has four crossing points: River Road, Albion Road, Bank Street, and Hawthorne Road.
- **SL52 – Hawthorne South:** This is the nearest north/south screenline relative to the site. This screenline has four crossing points as well: Leitrim Road, Louiseize Road, Rideau Road and Mitch Owens Road.

SL8 and SL52 are shown below in **Figure 9-1**, as determined from the City of Ottawa's Road Network Development Report (2025), a supporting document to the 2025 TMP.

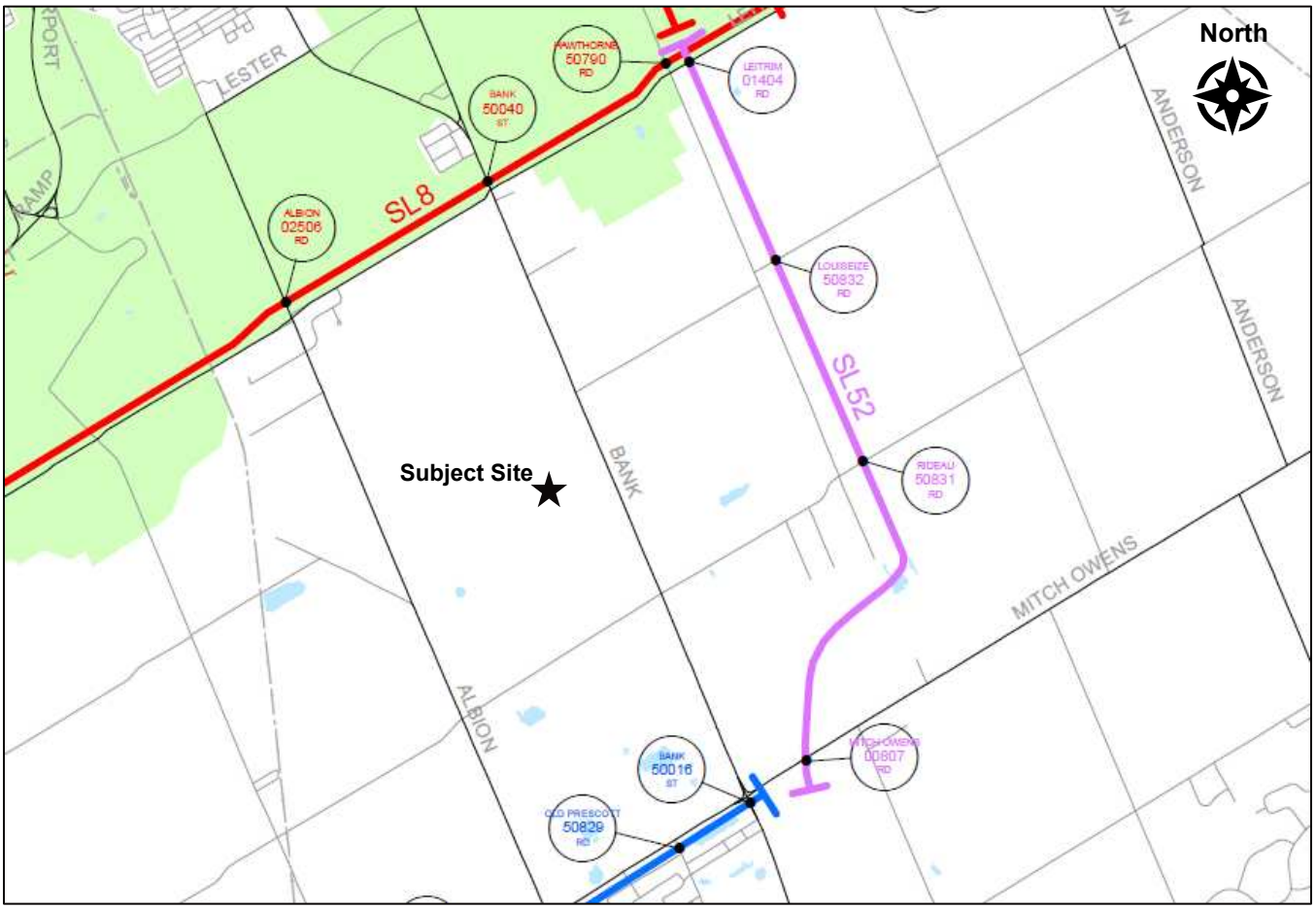


Figure 9-1 Screenlines
(Source: TRANS Screenline System (2010))

Table 9-1 below summarizes the City's 2046 'Transit First' screenline analysis demand and capacity across these two screenlines.

Table 9-1 2046 Screenline Analysis

Screenline	2046 'Transit First' Inbound		
	Demand	Capacity	v/c Ratio
SL8 – Leitrim	6,114	7,000	**0.96**
SL52 – Hawthorne South	1,269	4,000	0.32

Note - Table results from Ottawa Transportation Master Plan Update,Road Network Development Report (March 2025)

Overall, although Screenline 8 is expected to approach its theoretical capacity in the long term, it is still operating within acceptable limits and sufficient excess capacity will be available across both nearby screenlines to accommodate site-generated vehicular traffic.

Capital projects such as the Albion Road widening (Leitrim Road to Lester Road) and the Earl Armstrong Road extension to Hawthorne Road will help to alleviate congested conditions experienced on Bank Street as a result of continued background growth within the study area and broader Leitrim Community beyond the study horizon year.

9.3 Intersection Operational Review

9.3.1 Intersection Capacity Analysis Results

The Level of Service calculation is based on locally specific parameters as described in the TIA Guidelines and incorporates existing signal timing plans obtained from the City of Ottawa. The analysis of existing conditions utilized a Peak Hour Factor (PHF) of 0.90, while analysis of future conditions considers optimized signal timing plans and the use of a Peak Hour Factor (PHF) of 1.0 to recognize peak spreading beyond a 15-minute period in congested conditions.

Following the established intersection capacity analysis criteria described above, future traffic conditions were analyzed using the weekday peak hour traffic volumes derived in this study.

The subsequent sections present the results of the intersection capacity analysis. All tables summarize study area intersection LOS results during the weekday morning and weekday afternoon peak hour periods.

The intersection capacity analysis reports have been provided in **Appendix E**.

9.3.1.1 Future (2031) Background Traffic

Intersection capacity analysis has been undertaken using Future (2031) Background Traffic volumes presented previously in **Exhibit 9-1**. The results of the intersection capacity analysis are summarized in **Table 9-2**.

Table 9-2 Intersection Capacity Analysis: Future (2031) Background Traffic

Intersection	Traffic Control	Peak Hour	Overall LOS (v/c or Delay)	Critical Movement (v/c or Delay)
Bank & Miikana/Blais	Signalized	AM	A (0.44)	EBL (0.77)
		PM	A (0.47)	EBL (0.71)
Bank & Dun Skipper	Signalized	AM	B (0.64)	EBL (0.81)
		PM	D (0.83)	EBL (0.90)
Findlay Creek & Kelly Farm	Unsignalized	AM	B (12.4s)	WBTRL (12.4s)
		PM	B (13.9s)	EBTRL (13.9s)
Kelly Farm & Miikana	Unsignalized	AM	A (8.4s)	NBTRL (8.4s)
		PM	A (8.9s)	NBTRL (8.9s)
Kelly Farm & Dun Skipper	Unsignalized	AM	A (8.2s)	WBTRL (8.2s)
		PM	A (7.9s)	EBTRL (7.9s)

Relative to existing conditions, traffic operations at the two signalized intersections are expected to improve as a result of peak spreading in the future. Peak spreading will also have an impact on the unsignalized intersections but the growth in adjacent development traffic is expected to counteract this benefit resulting in a minor increase in delays at those intersections. Overall, the study area intersections are expected to operate at Level of Service 'D' or better under Future (2031) Background Traffic conditions.

9.3.1.2 Future (2036) Background Traffic

Intersection capacity analysis has been undertaken using Future (2036) Background Traffic volumes presented previously in **Exhibit 9-2**. The results of the intersection capacity analysis are summarized in **Table 9-3**.

Table 9-3 Intersection Capacity Analysis: Future (2036) Background Traffic

Intersection	Traffic Control	Peak Hour	Overall LOS (v/c or Delay)	Critical Movement (v/c or Delay)
Bank & Miikana/Blais	Signalized	AM	A (0.46)	EBL (0.77)
		PM	A (0.50)	EBL (0.71)
Bank & Dun Skipper	Signalized	AM	B (0.67)	EBL (0.81)
		PM	D (0.86)	EBL (0.90)
Findlay Creek & Kelly Farm	Unsignalized	AM	B (12.4s)	WBTRL (12.4s)
		PM	B (13.9s)	EBTRL (13.9s)
Kelly Farm & Miikana	Unsignalized	AM	A (8.4s)	NBTRL (8.4s)
		PM	A (8.9s)	NBTRL (8.9s)
Kelly Farm & Dun Skipper	Unsignalized	AM	A (8.2s)	WBTRL (8.2s)
		PM	A (7.9s)	EBTRL (7.9s)

Continued regional traffic growth is expected to utilize more of the capacity of the two signalized intersections, resulting in a minor increase in the overall v/c ratios of those two intersections. The three unsignalized intersections are not expected to experience any increase in delays relative to Future (2031) Background Traffic conditions.

9.3.1.3 Future (2031) Total Traffic

Intersection capacity analysis has been undertaken using Future (2031) Total Traffic volumes presented previously in **Exhibit 9-3**. The results of the intersection capacity analysis are summarized in **Table 9-4** below.

Table 9-4 Intersection Capacity Analysis: Future (2031) Total Traffic

Intersection	Traffic Control	Peak Hour	Overall LOS (v/c or Delay)	Critical Movement (v/c or Delay)
Bank & Miikana/Blais	Signalized	AM	A (0.47)	EBL (0.77)
		PM	A (0.50)	EBL (0.71)
Bank & Dun Skipper	Signalized	AM	B (0.69)	EBL (0.89)
		PM	D (0.86)	**EBL (0.91)**
Findlay Creek & Kelly Farm	Unsignalized	AM	B (12.5s)	WBTRL (12.5s)
		PM	B (14.2s)	EBTRL (14.2s)
Kelly Farm & Miikana	Unsignalized	AM	A (8.6s)	NBTRL (8.6s)
		PM	A (9.0)	NBTRL (9.0s)
Kelly Farm & Dun Skipper	Unsignalized	AM	A (8.9s)	WBTRL (8.9s)
		PM	A (8.9s)	WBTRL (8.9s)

The addition of site-generated traffic is expected to have a minor impact on the study area intersections. The overall v/c ratios and delays at the study area intersections will increase by a small amount, but all intersections will continue operating at an overall Level of Service of ‘D’ or better.

9.3.1.4 Future (2036) Total Traffic

Intersection capacity analysis has been undertaken using Future (2036) Total Traffic volumes presented previously in **Exhibit 9-4**. The results of the intersection capacity analysis are summarized in **Table 9-5**.

Table 9-5 Intersection Capacity Analysis: Future (2036) Total Traffic

Intersection	Traffic Control	Peak Hour	Overall LOS (v/c or Delay)	Critical Movement (v/c or Delay)
Bank & Miikana/Blais	Signalized	AM	A (0.49)	EBL (0.77)
		PM	A (0.51)	EBL (0.71)
Bank & Dun Skipper	Signalized	AM	C (0.72)	EBL (0.89)
		PM	**E (0.96)**	**EBL (1.01)**
Findlay Creek & Kelly Farm	Unsignalized	AM	B (12.5s)	WBTRL (12.5s)
		PM	B (14.2s)	EBTRL (14.2s)
Kelly Farm & Miikana	Unsignalized	AM	A (8.6s)	NBTRL (8.6s)
		PM	A (9.0s)	NBTRL (9.0s)
Kelly Farm & Dun Skipper	Unsignalized	AM	A (8.9s)	WBTRL (8.9s)
		PM	A (8.9s)	WBTRL (8.9s)

The addition of site-generated traffic, combined with continued growth in background traffic, is expected to result in some capacity issues at the Bank & Dun Skipper intersection which cannot be addressed through signal timing modifications (e.g., providing protected-permitted left-turn phases). As indicated later in Section 10, the extension of Earl Armstrong Road to Bank Street is anticipated to divert traffic within the study area and reduce overall traffic demand at the Bank & Dun Skipper intersection. As such, any potential capacity issues at this intersection are expected to be addressed through planned road network modifications.

Sensitivity analysis suggests that a decrease of just one eastbound left vehicle would be sufficient for the v/c ratio of the eastbound left-turn movement to decrease to 1.0. Given the inherent uncertainty associated with projecting traffic volumes 10 or more years into the future and the fact that the overall v/c ratio is less than 1.0, no mitigation measures are recommended to address this potential capacity issue.

Overall, the Earl Armstrong Road extension east to Bank Street is not required to support vehicular capacity upon full build-out of the proposed development, but remains relevant to the ultimate transportation network operations due to the continued growth in background travel demand.

9.3.2 Intersection Control

None of the unsignalized study area intersections are expected to experience any capacity issues within the timeframe of this study. As such, there is no need to consider alternative forms of intersection control.

9.4 Auxiliary Lane Requirements

The following section reviewed the need for auxiliary left- and right-turn lanes at signalized and unsignalized study area intersections.

It should be noted that careful consideration was given to any recommendations regarding new auxiliary lanes or lengthening of existing dedicated turning lanes to ensure alignment with the City's MMLOS and Healthy Streets objectives. It is recognized that there is significant potential for this additional right-of-way space to be reallocated for streetscape features which would enhance the overall public realm space for pedestrians and cyclists. This narrower roadway platform would allow for a more compact roadway design, thereby reducing crossing distances for active users and creating more inclusive, comfortable and safe environment for these vulnerable users. As such, any transportation operational considerations were balanced with the desire to provide optimal intersection configurations for all road users.

9.4.1 Left-Turn Lanes at Signalized Intersections

A review of auxiliary left-turn lane storage requirements was completed under Future (2036) Total Traffic conditions, comparing the highest queue lengths on each intersection approach under weekday morning and afternoon peak hours. The review compared the projected 95th percentile queue lengths from Synchro operational results, and the standard queue length calculation based on the following equation:

$$Storage\ Length = \frac{NL}{C} \times 1.5^{*}$$

Where:
N = number of vehicles per hour
L = Length occupied by a vehicle in the queue = 7 m
C = number of traffic signal cycles per hour

** For roadways with design speeds of 60 km/h or higher, the average queue length should be multiplied by a factor of 2.0 instead of 1.5.*

The results of the auxiliary left-turn lane analysis are summarized below in **Table 9-6**.

Table 9-6 Auxiliary Left-Turn Storage Analysis at Signalized Intersections

Intersection	Movement	Maximum 95th Percentile Queue Length (m)	Maximum Calculated Queue Length (m)	Existing/ Future Planned Parallel Lane Length[1] (m)	Storage Deficiency
Bank & Miikana/ Blais	EBL	60	20	100	-
	WBL	25	10	40	-
	NBL	5	5	100	-
	SBL	10	10	75	-
	EBL	125	40	25	100

Intersection	Movement	Maximum 95th Percentile Queue Length (m)	Maximum Calculated Queue Length (m)	Existing/ Future Planned Parallel Lane Length[1] (m)	Storage Deficiency
Bank & Dun Skipper	NBL	40	20	120	-

[1] Future parallel lane lengths at the Bank & Miikana/Blais intersection are based on the design for the four-lane widening of Bank Street.

The results of the analysis indicate that eastbound left-turn queue at the Bank & Dun Skipper intersection will exceed the available storage capacity. As this is a minor street approach, there are no significant concerns associated with this queue spillback.

With a 50th percentile and 95th percentile queue length of 70m and 125m, respectively, the eastbound left-turn queue may block the entrance to the Home Hardware approximately 12% of the time. Given that Dun Skipper Drive is a local road, and this access blockage will occur infrequently, this can be considered a minor issue which does not warrant any mitigation measures.

9.4.2 Left-Turn Lanes at Unsignalized Intersections

Auxiliary left-turn lane warrant analysis has been completed for the Kelly Farm & Dun Skipper intersection under Future (2036) Total Traffic conditions. The results of the analysis are provided in **Appendix H** and indicate that left-turn auxiliary lanes are not warranted at this intersection.

The other stop-controlled study area intersections, including Kelly Farm & Miikana and Kelly Farm & Findlay Creek are anticipated to experience nominal site-generated traffic impacts and operate well within acceptable thresholds. As such, auxiliary left-turn lanes are not warranted at any of the stop-controlled study area intersections either.

Furthermore, all of the above noted intersections are configured as all-way stop-controlled junctions and, as such, the presence of more than one lane on each approach is not desirable from a transportation operations perspective.

9.4.3 Right-Turn Lanes at Signalized Intersections

Section 9.14 of TAC suggests that auxiliary right-turn lanes shall be considered when more than 10% of vehicles on an approach are turning right and when the peak hour demand exceeds 60 vehicles. The purpose of this guideline is to mitigate operational impacts to through-traffic, particularly on high-speed arterial roadways, and may not be applicable in all circumstances.

Table 9-7 summarizes the results of the right-turn warrant analysis for locations with no planned right-turn lanes as well as the projected 95th percentile queues at locations with planned right-turn lanes.

Table 9-7 Auxiliary Right-Turn Storage Analysis at Signalized Intersections

Intersection	Movement	Existing/ Future Planned Parallel Lane Length[1] (m)	Right-Turn Warrant Met?	Maximum 95th Percentile Queue Length (m)	Storage Deficiency
Bank & Miikana/ Blais	EBR	-	N	-	-
	WBR	-	Y	-	-
	NBR	-	N	-	-
	SBR	175	-	10	-
Bank & Dun Skipper	EBR	*	-	15	-
	SBR	100	-	5	-

[1] Future parallel lane lengths at the Bank & Miikana/Blais intersection are based on the design for the four-lane widening of Bank Street.
** Through lane transitions to a right-turn lane at the intersection.*

A right-turn lane is technically warranted on the westbound approach to the Bank & Miikana/Blais intersection. Through volumes on the approach range from 20-30 vehicles per hour, while right-turn volumes range from 40 to 62 vehicles per hour, therefore, the shared through-right lane operates primarily as a de-facto right-turn lane. Given the low volume of through traffic on the approach as well as the fact that a right-turn lane is not operationally required it is not recommended that a right-turn lane be provided on this approach.

9.4.4 Right-Turn Lanes at Unsignalized Intersections

Section 9.14 of TAC also provides guidance on the use of auxiliary right-turn lanes at unsignalized intersections and suggests that auxiliary right-turn lanes should be considered “when the volume of decelerating or accelerating vehicles compared with the through traffic volume causes undue hazard”. Given that Dun Skipper Drive is a low-volume residential road it is not expected that right-turning traffic will represent a hazard to through or left-turning traffic. As such, right-turn lanes are not recommended at the Kelly Farm & Dun Skipper intersection.

9.5 Multi-Modal Level of Service

The following sections summarize the results of the MMLOS analysis of future conditions. Details on the MMLOS analysis are provided in **Appendix G**.

9.5.1 Segment-Based MMLOS

Under future conditions, the segment of Bank Street adjacent to the site is expected to maintain its existing configuration. As such, refer to Section 3.5.1 for the results of the segment-based MMLOS analysis for this roadway segment.

Segment-based MMLOS analysis has been completed for the future portion of Kelly Farm Drive between Paakanaak Road and the future Earl Armstrong Road extension. The results of the segment-based MMLOS analysis are summarized in **Table 9-8**.

Table 9-8 Segment-Based MMLOS Analysis Results: Future Conditions

Segment	Travel Mode	Side	Overall LOS	Critical LOS	Target	Deviation[1]
Kelly Farm, Paakanaak to Earl Armstrong Extension	Pedestrian	West	A	A	C	+2
		East	A	A		+2
	Bicycle	West	A	A	C	+2
		East	A	A		+2
	Transit	West	C	-	E	+2
		East	C			+2

Notes:
[1] A comparison of 'Overall LOS' and 'Target LOS'. 'Critical LOS' is shown for information purpose only.

The results of the segment-based MMLOS analysis suggest that all MMLOS results exceed their targets by two letter grades. As such, no mitigation measures were recommended for this segment-based MMLOS analysis.

9.5.2 Intersection-Based MMLOS

None of the signalized study area intersections are expected to be modified within the timeframe of this study. As such, the intersection-based MMLOS analysis results from Section 3.5.2 also apply to future conditions. It should be noted that this previous MMLOS analysis evaluated the Bank & Miikana/Blais intersection based on the intersection configuration that is currently under construction, while the Bank & Dun Skipper intersection was recently constructed as a 'protected intersection' with no further geometric changes planned within the timeframe of this study.

Specific mitigation strategies such as signal plan timing optimization measures such as the implementation of longer effective pedestrian walk times, shortened cycle lengths or Leading Pedestrian Intervals (LPIs) will help to improve the overall PLOS score. The upgrades to the signalized study area intersections on Bank Street at Miikana/Blais and Dun Skipper are already included in the existing MMLOS analysis and therefore no additional analysis was required under Future Total Traffic conditions.

9.6 Traffic Calming Plan

The May 2023 revision to the City of Ottawa Transportation Impact Assessment Guidelines outlined five criteria which must be met in order for neighbourhood traffic calming to be considered on existing streets. The five criteria are summarized below:

1. Site-generated traffic uses local or collector roads to reach the arterial road network.
2. There are significant sensitive land uses[6] adjacent to the subject streets.
3. Application is for Zoning By-law Amendment or Draft Plan of Subdivision.
4. At least 75 site-generated auto trips.
5. Site-generated traffic will increase peak hour volumes along the route(s) by 50% or more.

The only route along which site-generated traffic will increase peak hour volumes by more than 50% is Kelly Farm Drive south of Dun Skipper Drive and Dun Skipper Drive east of Kelly Farm Drive. This route, however, does not meet the criteria for significant sensitive land uses as there are only residential land uses along this route, there is no school, park, retirement facility, childcare centre or community centre along this route. As such there is no need to consider supplementary traffic calming measures along any of the existing collector and local streets within the study area.

Within the proposed development, it is proposed that the following traffic calming measures be implemented to ensure that vehicular operating speeds adhere to the target operating speed:

- As Kelly Farm Drive will be a collector road with planned transit service, no vertical traffic calming measures can be implemented. As such, it is recommended that the proposed design of the road utilizes minimum lane widths and treed boulevards which will create a sense of confinement for motorists and should encourage lower operating speeds. However, the most appropriate measures will be determined through detailed design in consultation with the City.
- To achieve the target 30 km/h operating speeds along the local roads, it is recommended that all crosswalks crossing local roads be designed with speed humps be implemented at 50-60m intervals. There is no raised crossing proposed the local transportation network, given the short bock lengths and frequent driveways.

9.7 Transit Network Requirements

As noted in Section 7.1.2, it is anticipated that transit service to the subject site will be provided as follows:

- **Interim Conditions (prior to Earl Armstrong Road extension):** Extend existing transit service on Kelly Farm Drive to service a proposed bus stop pair within the subject lands and facilitate turn-around of transit vehicles using a temporary cul-de-sac. It is anticipated that the construction of one block of townhouse units will need to be postponed until after the Earl Armstrong extension is built, as the temporary turn-around area will need to remain fully operational during the construction of this arterial road.
- **Future Conditions (after the extension of Earl Armstrong Road):** Provide transit service along Kelly Farm Drive and Earl Armstrong Road.

[6] Two or more of the following land uses must be present for this criterion to be met: a school within 250m walking distance, a park, a retirement/older adult facility, a licenced child care centre, a community centre, or 50% or more of adjacent properties along the route(s) are occupied by residential lane uses (minimum of 10 occupied residential units).

Under interim conditions, approximately 85% of residents of the subject site will be within 400m walking distance from transit, only slightly below the 95% target. Following the extension of Earl Armstrong Road, it is expected that bus stops will be provided on Kelly Farm near the Earl Armstrong Road extension which will reduce walking distances to transit to less than 400m for all residents of the subject site. The exact location of these bus stops will be identified on the Geometric Roadway Design Drawing (GRDD) plan.

Existing bus transit service within the community has an estimated capacity of 90 passengers per hour per direction. The subject site is anticipated to generate up to 38 transit trips per hour per direction which represents more than a third of the capacity of the existing transit service. It is recommended that OC Transpo review the projected transit demand generated by the subject site as well as other developments within the wider Leitrim community to ensure that sufficient capacity is provided. However, since the transit trip generation is well below the 75 transit trips per hour threshold specified in the 2023 update to the TIA Guidelines which requires more detailed transit analysis. As such, a review of transit route capacity was not required per the 2023 Update to the TIA Guidelines.

A Swept path analysis was conducted to verify that a standard A-Bus, B-12 Bus, HSU and Wayne Titan can navigate within the proposed temporary turn-around on Kelly Farm Drive. The results indicate that the arrangement is acceptable, and the bus can complete the required turning movements without any issue. It is understood that a portion of the proposed development may need to be postponed until after the Earl Armstrong Road extension immediately south of the subject site is developed so that Kelly Farm Drive and the temporary turning circle can continue to remain operational through the construction of the Earl Armstrong Road extension. Details on the Swept Path Analysis are provided in **Appendix J**.

9.8 Pedestrian Crossing Requirements

Ontario Traffic Manual (OMT) Book 15: Pedestrian Crossing Treatments provides a pedestrian cross-over (PXO) warrant based vehicle and pedestrian volumes, proximity to other controlled crossings, and system connectivity requirements. Based on these criteria, a PXO should be installed on the future portion of Kelly Farm Drive within the subject site to provide system connectivity across this collector road. Based on the traffic volumes projected on Kelly Farm Drive, a Level 2, Type ‘D’ PXO would be appropriate, provided crossing distances are 7.5m or less.

Implementing a PXO on Kelly Farm Drive would provide a predictable and controlled crossing at the desired spacing of about 200 metres to the nearest east-west crossing of Kelly Farm & Dun Skipper, thereby satisfying this natural desire line for active users accessing future bus stops on either side of Kelly Farm Drive within the subject site, for instance.

10 Earl Armstrong Road Extension (Sensitivity Analysis)

As discussed in Section 4.1, the implementation timing for the Earl Armstrong Road extension is uncertain and may not occur within the timeframe of this study. It has therefore not been considered in the preceding analyses. For the purposes of evaluating the impacts of the Earl Armstrong Road extension to Bank Street on the future traffic volume projections developed for this CTS, a sensitivity analysis has been completed, and the results are summarized in the following sub-sections.

10.1 Traffic Diversion

The extension of Earl Armstrong Road is expected to have a significant impact on travel patterns within the study area. Based on EMME model results provided by the City of Ottawa, it is anticipated that this extension will draw regional traffic from other east-west arterials in the area as it provides a new route to/from the west as well as a new connection to Hawthorne Road, a minor north-south route. It is also expected that the extension of Kelly Farm Drive to the Earl Armstrong Road extension will divert local traffic from Bank Street and redirect it onto Kelly Farm Drive.

The following summarizes the anticipated impacts of the Earl Armstrong Road extension on the study area roads:

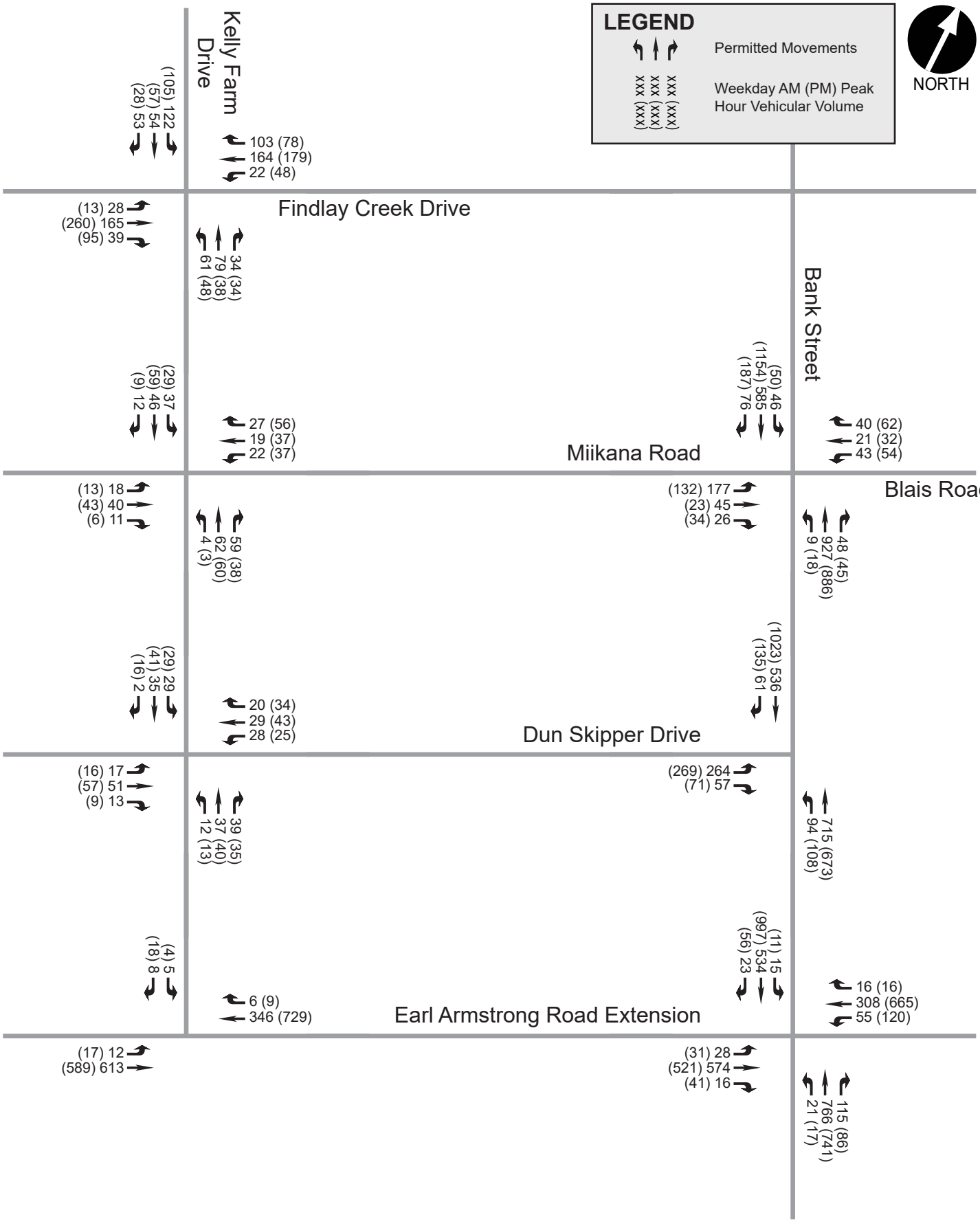
- Traffic on Bank Street south of Earl Armstrong Road will increase by approximately 5% as traffic from east-west arterials south of Rideau Road is instead redirected up Bank Street to Earl Armstrong Road.
- 30% of traffic on Rideau Road will divert and use Earl Armstrong Road instead.
- Traffic from other east-west arterials (e.g., Leitrim Road) will also divert to Earl Armstrong Road. The traffic from these other east-west arterials will be equivalent to approximately 90% of existing traffic on Rideau Road.
- Approximately 20% of local traffic from the Leitrim community going to/from the south along Bank Street will divert to Kelly Farm Drive instead.

Exhibit 10-1 illustrates the adjusted Future (2036) Background Traffic volumes which account for the impacts of the Earl Armstrong Road extension.

In addition to impacts to background traffic patterns, the Earl Armstrong Road extension will also impact the distribution of site-generated traffic as it provides alternate routes to/from the west as well as a connection to Hawthorne Road, a north-south road. Based on the EMME model projections, it is expected that site-generated traffic will distribute as follows once Earl Armstrong Road is extended:

- 45% to/from the North via Bank Street
- 5% to/from the North via Kelly Farm Drive
- 15% to/from the South via Bank Street
- 20% to/from the East via Earl Armstrong Road
- 10% to/from the West via Earl Armstrong Road
- 5% to/from the West via Findlay Creek Drive

Exhibit 10-2 and **Exhibit 10-3** illustrates the adjusted site-generated traffic volumes and Future (2036) Total Traffic volumes which account for the impact of the Earl Armstrong Road extension.



ARCADIS

S4-Lands
Community Transportation Study

Exhibit 10-1:
Future (2036)
Background Traffic
with Earl Armstrong
Extension

PROJECT No. 145172

SCALE: N.T.S.

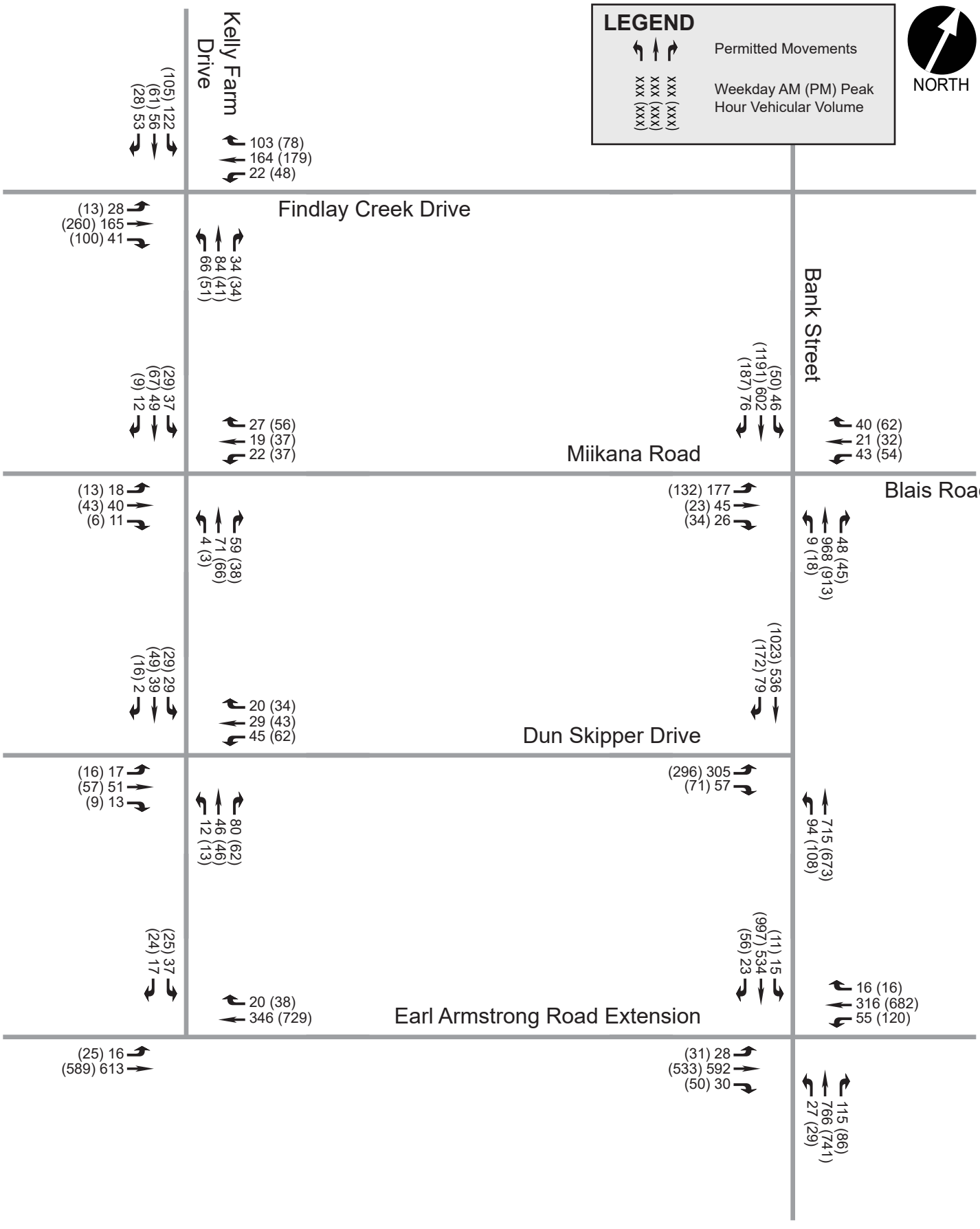
ARCADIS

S4-Lands
Community Transportation Study

Exhibit 10-2:
Site-Generated
Traffic
with Earl Armstrong
Extension

PROJECT No. 145172

SCALE: N.T.S.



ARCADIS

S4-Lands
Community Transportation Study

Exhibit 10-3:
Future (2036)
Total Traffic
with Earl Armstrong
Extension

PROJECT No. 145172

SCALE: N.T.S.

10.2 Sensitivity Scenarios - Intersection Capacity Analysis Results

The subsequent sections present the results of the intersection capacity analysis which account for the impact of the Earl Armstrong Road extension.

10.2.1 Future (2036) Background Traffic with Earl Armstrong Extension

Intersection capacity analysis has been undertaken using Future (2036) Background Traffic with Earl Armstrong Extension volumes presented previously in **Exhibit 10-1**. The results of the intersection capacity analysis are summarized in **Table 10-1**. The configuration of the two Earl Armstrong Road intersections is based on the functional design from the EA (see Section 4.1 for details).

Table 10-1 Intersection Capacity Analysis: Future (2036) Background Traffic with Earl Armstrong Extension

Intersection	Traffic Control	Peak Hour	Overall LOS (v/c or Delay)	Critical Movement (v/c or Delay)
Bank & Earl Armstrong	Roundabout[1]	AM	C (24.3s)	EBT (24.3s)
		PM	**F (155.7s)**	**EBR (155.7s)**
	Roundabout[2]	AM	C (20.2s)	NBR (20.2s)
		PM	**F (55.6s)**	**EBL (55.6s)**
	Signalized[3]	AM	C (0.76)	WBTR (0.88)
		PM	**E (0.98)**	**WBTR (0.99)**
Earl Armstrong & Kelly Farm	Signalized[1]	AM	A (0.20)	EBT (0.20)
		PM	A (0.24)	WBTR (0.25)
Bank & Miikana/Blais	Signalized	AM	A (0.46)	EBL (0.77)
		PM	A (0.49)	EBL (0.71)
Bank & Dun Skipper	Signalized	AM	B (0.66)	EBL (0.81)
		PM	D (0.85)	EBL (0.90)
Findlay Creek & Kelly Farm	Unsignalized	AM	B (12.3s)	WBTRL (12.3s)
		PM	B (13.9s)	EBTRL (13.9s)
Kelly Farm & Miikana	Unsignalized	AM	A (8.5s)	NBTRL (8.5s)
		PM	A (9.0s)	NBTRL (9.0s)
Kelly Farm & Dun Skipper	Unsignalized	AM	A (8.1s)	WBTRL (8.1s)
		PM	A (8.0s)	SBTRL (8.0s)

Notes:
[1] Recommended configuration from the EA.
[2] Recommended configuration from the EA with localized four-lane widening of the westbound approach.
[3] One through lane on the northbound and westbound approaches, two through lanes on the southbound and eastbound approach, left-turn lanes on all approaches and right-turn lane on the northbound approach.

The results of the analysis suggest that the Bank & Earl Armstrong roundabout configuration recommended by the EA would not have sufficient capacity to accommodate the projected traffic demand, with both the eastbound and westbound approaches projected to operate over capacity under 2036 background traffic conditions.

It is recommended that the City consider revising the EA design for the Bank & Earl Armstrong intersection. The results of the intersection capacity analysis suggest that a signalized intersection would provide sufficient capacity for both background traffic demand and site-generated traffic demand (see Section 10.2.2).

None of the other study area intersections are expected to experience capacity issues under this scenario.

10.2.2 Future (2036) Total Traffic with Earl Armstrong Extension

Intersection capacity analysis has been undertaken using Future (2036) Background Traffic with Earl Armstrong Extension volumes presented previously in **Exhibit 10-3**. The results of the intersection capacity analysis are summarized in **Table 10-2**.

Table 10-2 Intersection Capacity Analysis: Future (2036) Total Traffic with Earl Armstrong Extension

Intersection	Traffic Control	Peak Hour	Overall LOS (v/c or Delay)	Critical Movement (v/c or Delay)
Bank & Earl Armstrong	Roundabout[1]	AM	D (28.1s)	EBT (28.1s)
		PM	**F (172.8s)**	**EBT (172.8s)**
	Roundabout[2]	AM	C (20.9s)	NBR (20.9s)
		PM	**F (62.3s)**	**EBL (62.3s)**
	Signalized[3]	AM	C (0.74)	WBTR (0.87)
		PM	**E (0.96)**	**WBTR (0.97)**
Earl Armstrong & Kelly Farm	Signalized	AM	A (0.22)	SBL (0.28)
		PM	A (0.27)	WBTR (0.27)
Bank & Miikana/Blais	Signalized	AM	A (0.47)	EBL (0.77)
		PM	A (0.51)	EBL (0.71)
Bank & Dun Skipper	Signalized	AM	B (0.69)	EBL (0.86)
		PM	D (0.87)	**EBL (0.95)**
Findlay Creek & Kelly Farm	Unsignalized	AM	B (12.5s)	WBTRL (12.5s)
		PM	B (14.2s)	EBTRL (14.2s)
Kelly Farm & Miikana	Unsignalized	AM	A (8.6s)	NBTRL (8.6s)
		PM	A (9.1s)	NBTRL (9.1s)
Kelly Farm & Dun Skipper	Unsignalized	AM	A (8.4s)	WBTRL (8.4s)
		PM	A (8.4s)	WBTRL (8.4s)

Notes:
[1] Recommended configuration from the EA.
[2] Recommended configuration from the EA with localized four-lane widening of the westbound approach.
[3] One through lane on the northbound and westbound approaches, two through lanes on the southbound and eastbound approach, left-turn lanes on all approaches and right-turn lane on the northbound approach.

The eastbound left-turn movement at the Bank & Dun Skipper intersection is expected to approach its theoretical capacity due to the addition of site-generated traffic but will remain below the City v/c ratio threshold of 1.0. The addition of site-generated traffic is not expected to have a significant impact on any of the other study area intersections.

As observed under background traffic conditions, the Bank & Earl Armstrong intersection is expected to operate at an acceptable Level of Service (LOS 'E' or better) as a signalized intersection but not as roundabout.

It is acknowledged that the City of Ottawa 2025 TMP indicates that increasing roadway capacity may actually worsen traffic conditions over time. As such, even though the performance of the intersections on Bank Street through the study area may experience slight temporary improvements resulting from the Earl Armstrong Road extension, the long-term impact of adding additional roadway capacity may result in increased overall traffic volumes in the surrounding area. It is important to note that the proposed development is not reliant on this additional arterial roadway capacity to function from a traffic operations perspective.

10.3 Multi-Modal Level of Service (Earl Armstrong Road Extension)

The following sections summarize the results of the MMLOS analysis considered the 'ultimate' conditions with the Earl Armstrong Road extension. Details on the MMLOS analysis are provided in **Appendix G**.

10.3.1 Segment-Based MMLOS

Segment-based MMLOS results for Earl Armstrong Extension are under total traffic conditions (2036) in **Table 10-3** below and were conducted in accordance with standardized spreadsheet included with the 2025 addendum to the MMLOS Guidelines.

Table 10-3 Segment-based MMLOS

Segment	Travel Mode	Side	Overall LOS	Critical LOS	Target LOS	Deviation[1]
Earl Armstrong Road - Western Site Limits to Bank Street	Pedestrian (PLOS)	West	B	B	C	+1
		East	B	B	C	+1
	Bicycle (BLOS)	West	B	B	C	+1
		East	B	B	C	+1
	Transit (TLOS)	West	C	C	D[2]	+1
		East	C	C	D[2]	+1
	Public Realm (PRLOS)[3]	West	B	B	-	-
		East	B	B	-	-

Notes:
[1] A comparison of 'Overall LOS' and 'Target LOS'. 'Critical LOS' is shown for information purpose only.
[2] Frequent Transit Routes.
[3] Projects involving geometric changes that affect the public realm should target a PRLOS (Proposed)/PRLOS (Existing) ratio greater than 1.0.

The analysis provided in **Table 10-3** above indicates that segment will meet the PLOS, BLOS and TLOS targets.

10.3.2 Intersection-Based MMLOS

The intersection MMLOS results of the Earl Armstrong Extension under total traffic conditions (2036) are summarized in

Intersection	Travel Mode	Overall LOS	Critical LOS	Target LOS	Deviation1
Bank Street & Miikana Road/Blais Road	Pedestrian (PLOS)	C	D	B	-1
	Bicycle (BLOS)	A	B	C	+2
	Transit (TLOS)	E	E	D2	-1
	Auto (ALOS)[3]	A	A	E	+4
Bank Street & Dun Skipper Drive	Pedestrian (PLOS)	B	B	B	0
	Bicycle (BLOS)	B	C	C	+1
	Transit (TLOS)	E	E	E	0
	Auto (ALOS)[3]	D	D	E	+1
Earl Armstrong Road Extension & Bank Street	Pedestrian (PLOS)	C	C	C	0
	Bicycle (BLOS)	A	B	C	+2
	Transit (TLOS)	E	E	D2	-1
	Auto (ALOS)[3]	B	B	E	+3
Earl Armstrong Road Extension & Kelly Farm Drive	Pedestrian (PLOS)	B	C	C	+1
	Bicycle (BLOS)	A	A	C	+2
	Transit (TLOS)	E	E	E	0
	Auto (ALOS)[3]	A	A	E	+4

The analysis was focused on determining the intersection design elements required to meet the MMLOS targets.

Table 10-4 Intersection-based MMLOS

Intersection	Travel Mode	Overall LOS	Critical LOS	Target LOS	Deviation[1]
Bank Street & Miikana Road/Blais Road	Pedestrian (PLOS)	C	D	B	-1
	Bicycle (BLOS)	A	B	C	+2
	Transit (TLOS)	E	E	D[2]	-1
	Auto (ALOS)[3]	A	A	E	+4
Bank Street & Dun Skipper Drive	Pedestrian (PLOS)	B	B	B	0
	Bicycle (BLOS)	B	C	C	+1
	Transit (TLOS)	E	E	E	0
	Auto (ALOS)[3]	D	D	E	+1
Earl Armstrong Road Extension & Bank Street	Pedestrian (PLOS)	C	C	C	0
	Bicycle (BLOS)	A	B	C	+2
	Transit (TLOS)	E	E	D[2]	-1
	Auto (ALOS)[3]	B	B	E	+3
Earl Armstrong Road Extension & Kelly Farm Drive	Pedestrian (PLOS)	B	C	C	+1
	Bicycle (BLOS)	A	A	C	+2
	Transit (TLOS)	E	E	E	0
	Auto (ALOS)[3]	A	A	E	+4

Notes:
[1] A comparison of 'Overall LOS' and 'Target LOS'. 'Critical LOS' is shown for information purpose only.
[2] Frequent Transit Routes.
[3] ALOS is based on weekday peak period volumes per the MMLOS Guideline Update (May 2025).

The analysis indicates that study area intersections will meet the City's PLOS target except the Bank Street & Miikana Road/Blais Road intersection. Moreover, all intersections will meet the BLOS and ALOS target. Bank Street

& Miikana Road/Blais Road and Earl Armstrong Road Extension & Bank Street intersections will not meet the applicable TLOS targets.

PART 4: IMPLEMENTATION

11 Mobility Plan

The following section describes the measures and programs required to achieve the objective and targets of the community and how City policies and objectives will be met.

11.1 Transportation Demand Management

To encourage the targeted increase in active transportation mode share, sidewalks will be provided on at least one side of all local roads and on both sides of the Kelly Farm Drive extension. Mid-block active transportation connections will also be provided at the northern and eastern boundaries to shorten travel distances to daily amenities for these vulnerable road users. Additionally, measures have been identified for both interim and ultimate conditions that will ensure that the majority of future residents of the subject site are located within a 400m walking distance of transit.

In addition to the above measures, it is recommended that consideration be given to the following Transportation Demand Management (TDM) measures to further encourage the use of non-auto travel modes:

- Provide a multimodal travel information package to new residents highlighting routes to/from local amenities, the location of bus stops within walking distance of the site, and the location of potential future amenities. Of particular importance will be highlighting safe routes to/from local schools as it is anticipated that this represents the greatest opportunity to reduce auto usage.

The City of Ottawa's TDM Measures Checklist was completed for the subject site and is provided in **Appendix I**.

11.2 Zoning and Policy Amendments

In general, existing zoning requirements and policies are expected to be adequate to achieve the objectives and targets of the community. It is recommended, however, that the design of the community not provide private approaches on Kelly Farm Drive, the collector street bisecting the site, in order to maximize tree coverage and space for bike parking or other public realm improvements, minimize conflicts between vehicles and cyclists, as well as limit the need for on-street parking along this street within this key focal point of the site. Instead, access and on-street parking should be provided via the local street network to support the typical road hierarchy and provide natural 'friction', in accordance with the City's 30km/h Local Residential Streets Toolbox (2021).

Consistent with the City of Ottawa's development review framework, any prohibition on private approaches along Kelly Farm Drive should be confirmed with the City of Ottawa and secured through the relevant planning and legal policy. This would typically occur through the development application process, including, where applicable, conditions of draft approval, site plan approval, subdivision agreements, and access management provisions. A potential prohibition on private approaches on Kelly Farm Drive should be addressed at the Draft Plan of Subdivision approvals stage. This level of detail is not required at the Official Plan Amendment (OPA) stage.

11.3 City Policies and Objectives

The City of Ottawa Official Plan and Transportation Master Plan identify a number of policies and objectives. The following describes how the subject site is meeting these policies and objectives:

- **Vehicle Kilometres Travelled Reduction:** The mode share targets for the community target a reduction in the auto mode share relative to the surrounding area from 59% to 50%.
- **Greenhouse Gas Reduction:** Decreasing the auto mode share of the site relative to the surrounding area will decrease greenhouse gas (GHG) emissions from travel and including street trees on both sides of Kelly Farm Drive will reduce the heat island effect which drives the need for artificial cooling.
- **Equity, Inclusiveness and Accessibility:** By providing a mix of housing typologies, the subject site will cater to a variety of income groups. Additionally, all pedestrian facilities will be designed to meet AODA standards to accommodate people of all physical abilities.
- **Complete Streets:** All streets within the subject site will include sidewalks on at least one side. The design of the Kelly Farm Drive extension will also include cycle tracks which will connect to cycling facilities on the future Earl Armstrong Road extension.
- **Safety:** The design of the subject site's road network will encourage appropriate vehicle speeds for the area. This will ensure that vulnerable road users feel safe crossing or travelling next to roads.
- **15-Minute Neighbourhoods:** A number of active transportation shortcuts are recommended to minimize travel times to amenities within a short walking distance of the site.

12 Implementation Plan

Based on the findings of this study, the following infrastructure will be required:

- When the lands east of Kelly Farm Drive are developed, construct an active transportation connection along the 20m of frontage on Bank Street to provide connectivity to future pedestrian and cycling infrastructure and with 6.0 metres of pavement width so that is can serve as emergency access route. Regulatory signage and other preventative measures (e.g. bollards) to limit the use of this mid-block active transportation/ emergency access will be identified on the Geometric Roadway Design Drawing (GRDD) plan, as required.
- When the lands west of Kelly Farm Drive are developed, construct an active transportation connection to Paakanaak Road within the available service block.
- When Earl Armstrong Road is extended, extend Kelly Farm Drive to Earl Armstrong Road and construct the Earl Armstrong & Kelly Farm intersection as recommended by the EA. Additionally, a Level 2 Type 'D' PXO should be installed on Kelly Farm Drive.
- Additionally, the roundabout configuration at the future Bank & Earl Armstrong recommended by the EA is not expected to be capable of accommodating the projected background and site-generated traffic demand. As such, it is recommended that the City undertake an Addendum to the EA to review the proposed intersection configuration at this location to ensure that it will be capable of supporting the projected traffic demand.

13 Conclusion

Based on a review of the existing and future transportation network, a number of opportunities and constraints have been identified for the subject site which have guided the development of the preferred transportation network layout. Vehicular access to the site will be provided via an extension of Kelly Farm Drive which will facilitate connectivity to the existing road network to the north and the future Earl Armstrong Road extension to the south. This will also provide pedestrian and cycling connectivity to existing and future facilities to the north and south. Additionally, it is recommended that mid-block multi-use path connections be provided at the northern and eastern boundaries of the site to accommodate shorter, more direct routes to nearby amenities for active transportation users. A future road block connection, identified as Block 80 on the Draft Plan of Subdivision, has also been provided as part of the proposed development connecting the subject site to the westerly lands, should the roadway be extended. This is consistent with other neighbourhoods at the edge of urban areas in the City of Ottawa.

It is recommended that sidewalks be provided on at least one side of all local roads within the site and on both sides of the Kelly Farm Drive extension. Cycle tracks are also recommended on both sides of Kelly Farm Drive. Additionally, the analysis suggests that a Level 2, Type 'D' PXO could be considered on Kelly Farm Drive.

Preliminary land use projections for the site suggest that approximately 300 residential units could be accommodated within the space available. The overall vehicle trip generation associated with the site is estimated to range from 131 to 143 two-way vehicle-trips during the weekday peak hours and these trips were distributed and assigned to the study area road network based on EMME model projections.

As indicated by the analysis conducted for this study, no road network modifications are recommended as a result of site-generated traffic. The roundabout configuration for the future Bank & Earl Armstrong intersection from the Earl Armstrong EA, however, is not expected to be capable of accommodating the projected background traffic demand and therefore it is recommended that the City of Ottawa revisit the proposed design for this intersection and consider signalization instead. With consideration of site-generated multi-modal travel demands, sensitivity analysis and mitigation measures recommended through this study, the proposed development is not dependent on the Earl Armstrong Road extension from a transportation perspective.

The results of the Multi-Modal Level of Service (MMLOS) analysis suggests that the segment of Bank Street adjacent to the subject site is not currently meeting its Pedestrian or Bicycle Level of Service targets, although it is expected that this may be ultimately addressed in the future once Bank Street is widened to four-lanes (by others). The Bank & Miikana/Blais intersection is also not meeting its Pedestrian Level of Service due to long crossing distances. The portion of Kelly Farm Drive through the subject site is anticipated to meet and exceed its MMLOS targets.

Based on the projected traffic generation of the site, additional traffic calming measures are not required on any of the existing streets as a result of site-generated traffic. To ensure appropriate operating speeds within the subject site, however, it is recommended that consideration be given to providing the following traffic calming measures be provided:

- On Kelly Farm Drive: Provide treed boulevards and lane narrowing.
- On local roads: Provide bulb-outs or speed humps every 50-60m and make crosswalks raised.

Prior to the construction of the Earl Armstrong Road extension, it is recommended that existing transit service (Route 94) be extended on Kelly Farm Drive to service a proposed bus stop pair within the subject lands and facilitate turn-around of transit vehicles using a temporary cul-de-sac. It is anticipated that the construction of one block of townhouse units will need to be postponed until after the Earl Armstrong extension is built, as the temporary

turn-around area will need to remain fully operational during the construction of this arterial road. Once the extension is completed, it is expected that transit service will be provided along Kelly Farm Drive and Earl Armstrong Road.

The intersection capacity analysis conducted for this study focused on both v/c ratios for signalized intersections and delay-based results for unsignalized intersections, as well as any queue spillback identified for either location. Critical/constrained movements are limited to the northbound left-turn at Bank & Dun Skipper, as well as the eastbound left-turn at Bank & Dun Skipper. Overall intersection performance is an important metric in evaluating how the intersection is operating as a 'whole' and helps to put the analysis into perspective, as it is not uncommon for one movement to be operating poorly, but the most important criteria is whether it significantly degrades the performance of the entire intersection. Although not explicitly mentioned as a mitigation strategy, it is expected that the City will perform regular signal optimization as well.

No further auxiliary left- or right-turning lanes are recommended at signalized study area intersections in comparison with those already required or being implemented under Existing or Future Background Traffic conditions. The dedicated turning lanes were introduced to mitigate queue spillback which could, in turn, result in unsafe conditions for pedestrians and cyclists. To help counteract increased pedestrian crossing distances associated with the Bank & Miikana/Blais intersection, it is recommended that mitigation strategies such as Leading Pedestrian Intervals (LPIs), shortened cycle lengths or longer pedestrian intervals be considered, for instance.

Changes in multi-modal travel patterns associated with the Earl Armstrong Road extension were considered in relation to the MMLOS, PXO, traffic calming conceptual design, transit stop placement and Kelly Farm Drive conceptual design.

A mobility and implementation plan has been developed for the subject site to ensure that the objectives and targets of the community and City are met. It is recommended that multi-modal information packages be provided on resident move in and that private approaches on Kelly Farm Drive be avoided. These measures, combined with the other recommendations outlined above, are expected to be sufficient to meet the objectives and targets of the community and City. Additionally, the following infrastructure implementation timeline has been established:

- Construct the mid-block active transportation connection at the eastern boundary of the site when the lands east of Kelly Farm Drive are developed.
- Construct the mid-block active transportation connection at the northern boundary of the site when the lands west of Kelly Farm Drive are developed.
- Extend Kelly Farm Drive and construct the Earl Armstrong & Kelly Farm intersection as recommended by the EA when Earl Armstrong Road is extended.

Based on the findings of this study, it is the overall opinion of Arcadis that the subject site will integrate well with and can be safely accommodated by the adjacent transportation network with consideration of the recommendations outlined above.



Appendix A Terms of Reference

Transportation Terms of Reference – Future Neighborhoods

(as modified by Arcadis on July 22, 2024 in response to City feedback)

The City has established standard Transportation Terms of Reference for creating Local Plans in areas designated as Future Neighborhoods in Schedule C17 of the Official Plan (OP). The Terms of Reference described below build on the directions in Annex 4: Local Plan Framework and are supplemented by additional details and clarifications.

Plan Context

The Local Plans expand on existing and overarching policies for the community. This section aims to understand planned conditions and the policy framework for mobility.

1) Identify the community boundaries and the boundaries of the study area. The latter should generally include lands within a 1.5km walking distance or 900m radius, whichever is greater, of the community. See attached justification memo.
2) Describe the relationship of the study area to the adjacent community, the transect, and the broader city.
3) Summarize approved projects, planned projects, and planning policies that will be considered within the context of the Local Plan and the broader mobility network.

Existing Conditions

The Future Neighborhood must be woven into the existing built-up areas and connected to adjacent communities; understanding existing conditions will help inform future recommendations. This section will describe the following items:

4) Boundaries of the community and key access points for all modes of transportation.
5) Characteristics of the vehicular network within a 1.5km walking distance or 900m radius, whichever is greater, buffer of the community, including:
    a. Road classifications, number of lanes, and capacities;
    b. Network connectivity to key destinations;
    c. Designated truck routes and truck desire lines; and
    d. Current levels of travel demand and safety and operational performance at select intersections within the Study Area, per the attached justification memo.
6) Characteristics of the pedestrian and cycling networks within a 1.5km walking distance or 900m radius, whichever is greater, buffer of the community, including:
    a. Extent and type of facilities in the network;
    b. Critical missing links in the city's active transportation network;
    c. Network connectivity to key destinations and adjacent communities; and
    d. Desire lines to elements of 15-minute neighborhoods.
7) Characteristics of the transit network within a an expanded 1.9km buffer of the community, including:
    a. Transit routes and alignment;
    b. Capacity and frequencies;

    c. Priority treatments, including connectivity to rapid transit; and
    d. Transit service amenities.
8) Existing elements of a 15-minute neighborhood including schools, licensed childcare facilities, community centres, parks and other greenspaces, general retail, grocery stores, and other community infrastructure.

Vision, Objectives and Targets

It is essential to establish a clear vision for the Future Neighborhood and related objectives and targets to set the stage for identifying and evaluating future infrastructure requirements. This section should include the following:

9) Vision, objectives and targets for healthy and inclusive communities consistent with Subsection 2.2.4 of the OP, including a focus on creating healthy, walkable 15-minute neighborhoods and building inclusive, all-age communities.
10) Transportation objectives and targets consistent with the City's OP section 4.1 and the Transportation Master Plan (TMP), including mode share targets for walking, cycling, transit, car-pooling, and driving.

Key Plan Components

Future Neighborhoods are intended to be contemporary communities planned around active transportation and transit with reduced automobile dependence. As per Policy 5-3 of the TMP, "new neighborhood streets should form part of a highly connected multimodal network with a street design that results in low vehicle speeds, safe conditions for all users, space for trees, and a vibrant public realm. New collectors, major collectors and arterials will be spaced with sufficient proximity to support transit and minimize the need for wide streets and intersections that tend to act as barriers between neighborhoods. Fine-grained and fully-connected grid street networks with short blocks will encourage connectivity and walkability". The mobility networks for Future Neighborhoods will be identified as part of the development and evaluation of alternative land use plans. The following key tasks are required:

11) Describe and assess the interim and ultimate mobility plan for the Future Neighborhood. The qualitative assessment will identify whether the proposed mobility plan is consistent with City guidelines and policies.
12) The performance of the proposed mobility networks should be assessed against the vision, objectives, and targets for the Future Neighborhood identified above.
    a. Identify the proposed type, scale, phasing, and location of development. The layout and community design will identify connections to rapid transit services during the early stages of development and in the long term. The layout should enhance pedestrian, cycling and transit connectivity to internal and external facilities and destinations.
    b. Develop population, residential dwellings, and employment scenarios and projections to assess future travel demand.
13) Describe and illustrate the mobility network, including arterial and collector streets, transit, and active transportation facilities, focusing on travel within the community and connections to the broader region. The plan should identify the following:
    a. Community access points;

b. Street layout and cross-section design;
c. The function and classification of all internal and boundary roads to confirm their adherence to the OP's classification framework;
d. Pedestrian and cycling corridors and connections to provide a more granular active transportation network compared to the general road network;
e. Transit network improvements to facilitate transit service to the community and local servicing requirements to provide high quality service to the nearest rapid transit station for both the existing and planned transit network;
f.
g. Location of signalized intersections and pedestrian crossings; and
h. Other planning and design strategies, such as traffic calming or filtered permeability, to support the community's vision, objectives and targets.

Forecasting & Analysis

This section is intended to facilitate the seamless integration of land use and transportation planning directions by evaluating and comparing the mobility network's performance and proposed development strategy in an integrated and holistic fashion. It is expected that the forecasting and analysis will occur iteratively with the development of the Key Plan Components above.

The scope of work will largely be dictated by the development proposal's size and the anticipated development pace.

A full Transportation Impact Assessment (TIA) submission is expected for areas of approximately 75 hectares or less and where a subdivision application is anticipated to occur in lockstep with the lifting of the Future Neighborhood Overlay. The TIA should include the scope and specificity typically required to support a similarly sized subdivision application, such as traffic calming location, local street network, and pathway network, and include the items listed below.

In all cases, the time periods and horizon years for analysis will be selected per direction contained within the City of Ottawa TIA Guidelines.

The study horizon years will be as follows:

- Existing (2024) Conditions
- Future (2031) Conditions – to align with the assumed completion of all infrastructure projects in the 2013 TMP Affordable Network
- Future (2036) Conditions – 5-year study horizon

Note: The assumed 2031 and 2036 future transportation network will be based the planning documents (e.g., Transportation Master Plan, Development Charges Background Study, etc.) that are in effect at the time that the study is completed.

As the development is likely to be primarily residential in nature, only the weekday morning and weekday afternoon peak periods will be considered as these periods represent the critical periods for commuter traffic as it relates to new residential development.

Within the Study Area, the documentation of existing/forecasted conditions and evaluation of traffic impacts will be limited to select intersections, as justified in the attached memo under the heading "Study Area".

14) Forecast future travel demand generated by the development and total future demand, including background traffic growth and demand from other planned development. The forecasts should be prepared using accepted forecasting methodologies, including the TIA Guidelines and the use of the most recent TRANS Trip Generation Manual. Background traffic growth rates will be based on EMME model projections provided by the City.
15) Assess the impacts on the transportation network's performance at select intersections within the Study Area (see attached justification memo) due to the trips generated by the development. This analysis should include the following:
    a. Trips within the development and to adjacent communities;
    b. Downstream transit or road capacity deficiencies triggered or made worse by the new development, including transportation corridors providing access to the area; and
    c. Missing links between the new neighborhood's pedestrian and cycling networks and the City's broader mobility network.
16) Note any barriers that might undermine the successful realization of the goals and objectives of the plan and include steps to overcome shortfalls while harnessing opportunities.
17) Identify any network modifications or other measures required to mitigate impacts on network performance.

Mobility Plan

The section builds on the previous steps and is intended to describe a road map to support and ensure that the objectives and targets are met.

18) List and describe all necessary measures and programs to achieve the objectives and targets for the community and the evolution to a 15-minute neighborhood. Amongst these measures, the following should be considered:
    a. A Transportation Demand Management Plan to show how the mode share targets will be achieved.
    b. A strategy to establish sustainable mobility habits during early phases of development, such as the provision of transit through early servicing agreements.
19) Identify policy and zoning pain points and suggested amendments to encourage sustainable modes of transportation, such as limiting private approaches along active transportation corridors, permitting shallow setbacks, increasing bicycle parking requirements and reducing vehicle parking requirements.
20) Demonstrate how the development will achieve Council policies and objectives such as VKT reduction, GHG reduction, inclusiveness, complete streets, equity, accessibility, safety, and integration of 15-Minute Neighborhoods.
21)

Implementation Strategy

The implementation strategy will identify the phasing and timing of development and associated infrastructure needs.

22) Identify a phasing strategy for the Future Neighborhood that supports the mobility objectives, constraints, and opportunities for the community, including associated timelines for transportation infrastructure and amenities.
23) Identify critical infrastructure necessary to unlock the development potential of each phase and identify mitigation measures to maintain the mobility strategy if these infrastructure projects are delayed.
24) Establish the implementation timeframes for each proposed transportation network modification corresponding to the anticipated phasing of development, where works are required external to the Future Neighborhood to support the anticipated travel demand.
25) Identify requirements for future transportation studies, including Environmental Assessment studies needed to implement the proposed transportation measures.

Memo

SUBJECT
S-4 Leitrim West of Bank Street
Alterations to Study Terms of Reference (Transportation)

TO
Max Walker
Senior Project Manager, Transportation Planning
City of Ottawa

DATE
July 22, 2024

OUR REF
/Internal Documents/6.0_Technical/
6.23_Traffic/03_Reports/Concept Plan Process

DEPARTMENT
Transportation

PROJECT NUMBER
145172

COPIES TO
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The purpose of this memorandum is to tailor the scope of the transportation work required in support of the Concept Plan process for the S-4 Leitrim West of Bank Lands.

Following our review the Terms of Reference provided by the City of Ottawa, we have concerns with three (3) elements: Study Area, Selection and Evaluation of Alternative Road Alignments, and Road Safety Audit. A reduced scope relating to these elements has been justified as follows.

Study Area

The City's Terms of Reference describe the requirement for a 5km radial study area. Based on the initial Working Group meeting in April 2024, City staff acknowledged that they would be amendable to accepting a reduced radius, based primarily on the requirement for rapid transit within 1.9km of the expansion lands and not necessarily because of traffic as the impacts are understood would be relatively minimal. Based on the following information, a reduced study area is proposed.

a) **Availability and Distance to Rapid Transit** – 1.9km is a scoring metric established by the City for the Urban Expansion Detailed Evaluation Criteria. This radial distance was based on a 2.5km travel route, representing a 5-minute local bus ride (at 30 km/hr) and a 10-minute bicycle ride (at 15 km/hr). Presently, the nearest access points to rapid transit service are located at Bowesville Station and Leitrim Station, both over 3km from the subject lands. Schedule C-2 of the Official Plan indicates that rapid transit is not envisioned along Bank Street, however the future Earl Armstrong Extension immediately south of the site is identified as Transit Priority Corridor and will provide a direct connection to the Bowesville LRT Station in the future. Until such time Earl Armstrong Road is exteneded to Bank Street, access to rapid transit from the subject lands will only reasonably accomodated by private vehicle (park-and-ride), local bus or cycling.

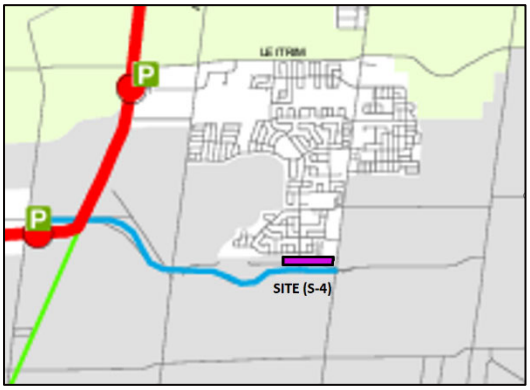


Figure 1 - Official Plan, Schedule C-2

b) **Local Transit Service** – At present, transit service within the Leitrim Community is provided as far south as Dun Skipper Drive via Route 294. This route travels south through the community along Kelly Farm Drive and terminates at the Bank/Dun Skipper intersection. This route presently provides service to the South Keys LRT/BRT station and can be accessed less than 400m from the centroid of the subject lands. The nearest bus route providing direct access to the Leitrim LRT station is Route 293 and operates along Findlay Creek Drive, approximately 1.4km north of the subject site.

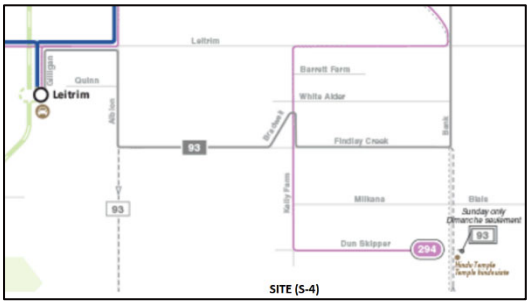


Figure 2 - OC Transpo Network Map (2024)

Local transit service on Kelly Farm Drive south of Dun Skipper is required to support the development of the subject lands.

c) **Active Transportation Facilities** – Part 1 of the Transportation Master Plan update indicates that there are no planned Crosstown Bikeways in the Leitrim Community. The Rural Active Transportation Network, however, envisions facilities along Findlay Creek Drive and west of Kelly Farm Drive as far south as Miikana/Blais Road. The first phase of the Bank Street widening, expected to start construction in 2024, will also extend as far south as Miikana Road/Blais Road providing high-quality bicycle and pedestrian facilities. Per the 2019 Development Charge By-law, subsequent widening of Bank Street to the south beyond Dun Skipper Drive is expected to occur in approximately 2030-2031 and it is assumed that it will include similar active transportation facilities. The functional design of the Earl Armstrong extension to Bank Street also includes cycle tracks, sidewalks and protected intersections, though the implementation timing is not presently known.

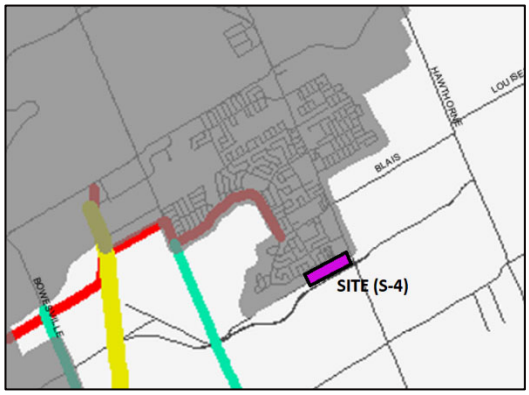


Figure 3 - TMP Part 1, Rural AT Network

Provision for active transportation facilities on Kelly Farm Drive south of Miikana Road is required to support the development of the subject lands.

d) **15-Minute Neighborhoods** – The 2005 Leitrim Community Design Plan (CDP) identified the following three commercial nodes within Leitrim: Bank/Rotary Way, Bank/Findlay Creek Drive, and Bank/Dun Skipper. The Bank/Dun Skipper node is within a 500m radius of the subject lands, while the next nearest node at Bank/Findlay Creek is 1.5km away. A school has been recently constructed adjacent the Kelly Farm Drive/Miikana intersection, within 800m of the subject site. A public park on Kelly Farm Drive exists within 900m of the subject site. The Official Plan describes a 15-minute neighborhood as a 900m radial walking distance as this is the most universally accessible mode of transportation.

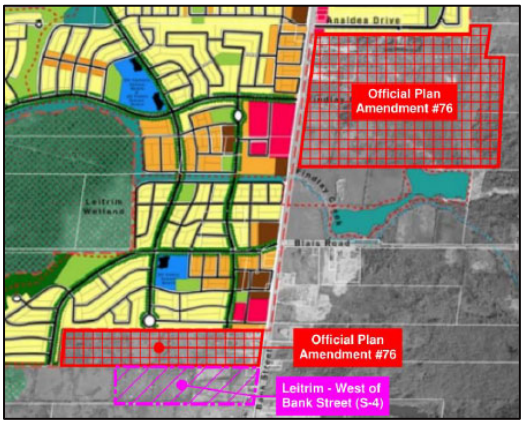


Figure 4 - Leitrim CDP, Annotated

e) **Intersection Capacity** – As mentioned previously, Bank Street will be widened to 4 lanes as far south as Dun Skipper Drive by 2030-2031. The Leitrim Master Transportation Study (IBI Group, 2018) took into consideration all future developments in this community that were within the urban boundary at that time. Other than the Bank/Leitrim intersection itself, all intersections between Leitrim Road and Dun Skipper Drive were expected to operate with plenty of spare capacity beyond the 2031 horizon year with the planned four-lane widening, with consideration of an annual 1% background growth rate from traffic originating outside of the urban boundary.
The most critical intersections for accommodating additional traffic demand are those subject to new turning movements, with the majority of the impact likely to be localized at the Bank/Dun Skipper intersection.

f) **Magnitude of Traffic Generation** – Based on the developable area within the subject lands, it is estimated that up to 375 residential units could be provided, consistent with the existing housing density of the adjacent community. This translates to approximately 250 person-trips generated during the peak hours, further broken down as 150 auto drivers, 50 transit users and the rest by active modes, per the existing modal share. **The vast majority of vehicular traffic can be accommodated by the Bank/Dun Skipper intersection, with nominal volumes expected to extend further north along Kelly Farm Drive into the existing community.** The vehicular impacts are therefore expected to be localized within a 600m radius of the subject site. The extension of Earl Armstrong Road south of the subject site will further reduce the traffic impacts of these lands on the adjacent community and may have the opposite effect where existing traffic may travel through the subject lands to access Earl Armstrong Road. In this instance, the majority of traffic expected to travel through the subject site is expected to originate south of Miikana Road. In suburban areas, the City of Ottawa's 2017 Transportation Impact Assessment Guidelines specify a 1-kilometer radius when reviewing the transportation context for new developments. The Study Area is established based on the considerations of transportation elements (both existing and planned) within the context area and focuses on key areas of concern. Beyond 1 kilometer from a development site, transportation impacts are sufficiently dispersed and the network impact becomes negligible. The Study Area is therefore typically much smaller than the 1-kilometer context area.

g) **Other Considerations** – There are two areas of planned urban expansion in the Leitrim community. The *S-5 Leitrim East of Bank* expansion lands are within close proximity to the subject lands and located immediately north of Blais Road. Those lands are nearest the community's other commercial node at Bank/Findlay Creek Drive and the southern limit of the S-5 lands coincides with the Phase 1 terminus of the planned Bank Street widening to Blais Road. As the subject lands (S-4) will focus on the 15-minute neighborhood centered with the Bank/Dun Skipper commercial node, Blais Road represents a logical division between the two expansion land study areas where the relative impacts of each will be clearly distinguished at this common point along the area's primary transportation corridor. **As the impacts of the subject site and the adjacent transportation network will be relatively minimal, ensuring connections to existing and planned transit, cycling and pedestrian infrastructure south of Blais Road**

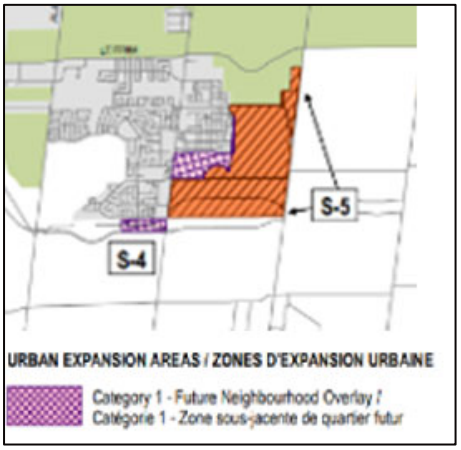


Figure 5 - Urban Expansion Areas

is essential to ensure a 15-minute neighborhood can be achieved and that localized traffic impacts can be safely accommodated at the nearest access points to the arterial road network.

Recommendation #1:

As there are Active Transportation Facilities planned west of Kelly Farm Drive and on Bank Street as far south as Miikana Road and within 600m of the site, ensuring quality connections to these will be of utmost importance, along with an extension of local bus service south of Dun Skipper Drive to service the subject lands by all modes of travel. Traffic impacts from the subject lands are projected to be minimal beyond a 1-kilometer radius, and previous assessments of the Bank Street corridor suggest no localized capacity issues at intersections south of Leitrim Road in the foreseeable future. As such, the following study area is recommended.

- Study Area: 1.5km walking distance or 900m radius, whichever is greater.
- Study Area Intersections:
    1) Kelly Farm/Miikana
    2) Kelly Farm/Dun Skipper
    3) Bank/Miikana/Blais
    4) Bank/Dun Skipper
    5) Kelly Farm/Findlay Creek
    6) Bank/Future Site Access (potential)
    7) Kelly Farm/Future Earl Armstrong
    8) Bank/Future Earl Armstrong

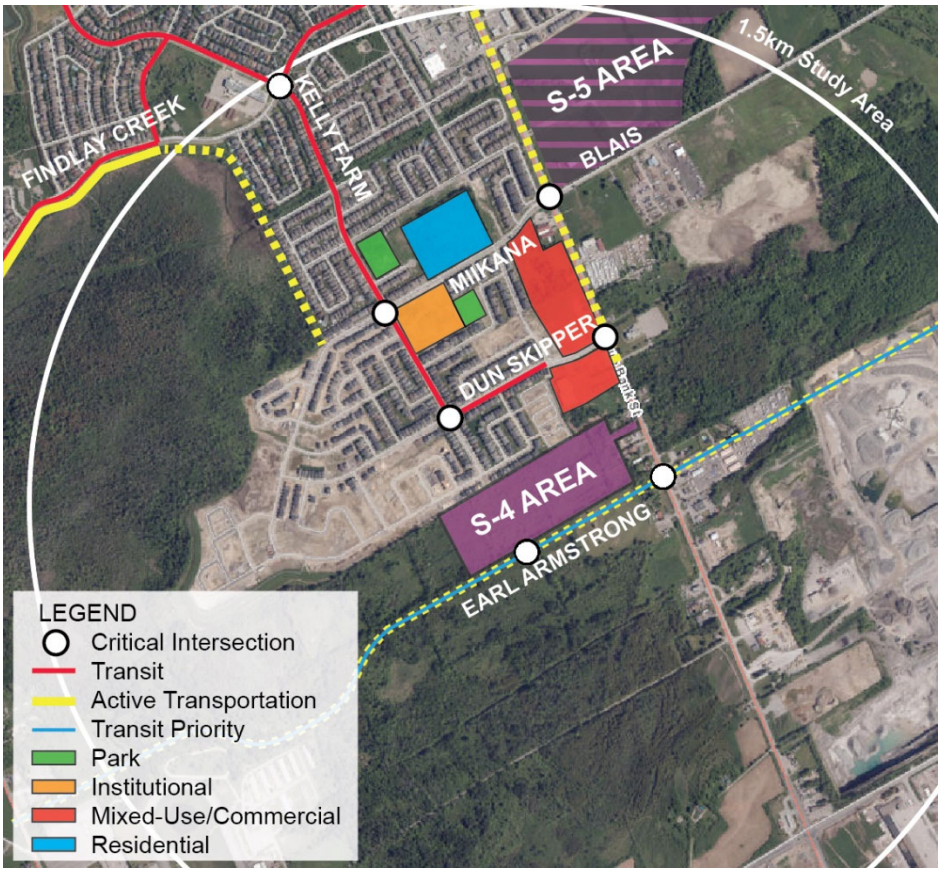


Figure 6 - Recommended Study Area for S-4 Urban Expansion Lands

Selection and Evaluation of Alternative Road Alignments

The City's Terms of Reference describe the requirement to select and analyze alternative collector road alignments. Based on the following information, no other collector road configuration is feasible and thus there are no other alternatives that could be considered.

a) **Earl Armstrong Extension Environmental Assessment (Functional Design)** – The approved functional design for the Earl Armstrong extension established a future intersection with Kelly Farm Drive. This signalized intersection will be located approximately 490m west of Bank Street. At the intersection with Bank Street, a multi-lane roundabout is proposed.

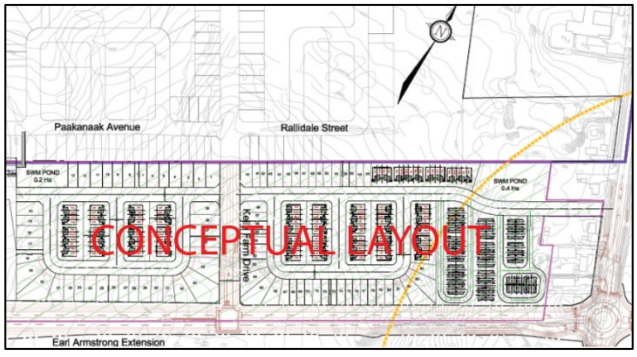


Figure 7 - Earl Armstrong Extension EA Functional Design

b) **Intersection Spacing** – According to the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads, the desired spacing of major intersections along an arterial road is 400m for efficient signal progression. The minimum intersection spacing along an arterial roadway is 200m, however this is only recommended in areas of intense existing development and should otherwise be avoided. Existing intersection spacing along the Bank Street corridor complies with this guideline. As a future major intersection is planned along Bank Street at the Earl Armstrong extension, there is insufficient spacing to accommodate another major all-movements intersection. Between major intersections, only a local road connection may be possible and would require restriction to only right-in/right-out movements, though local road connections to arterial roads are undesirable. **Based on the above, the only feasible alternative for the collector road alignment is to extend Kelly Farm Drive to the future Earl Armstrong extension.**



Figure 8 - Arterial Road Intersection Spacing

Recommendation #2:

As there are no viable alternative collector road configurations, it is recommended that any elements of the Terms of Reference associated with selection or evaluation of alternative or preferred roadway alignments be eliminated from the study scope. Associated restrictions to transit service routing will be discussed.

Road Safety Audit (RSA)

The City's Terms of Reference describe the need to "undertake a Road Safety Audit", though it does not consider that there are triggers for various types of transportation infrastructure projects.

a) **RSA Requirements** – Within the subject lands, new roads will be classified as either Local or Collector and therefore the requirement to undertake an RSA is stated as being 'optional' at the Planning stage and doesn't become a mandatory requirement until the Preliminary Design stage. It also generally only applies to projects of value greater than $1-million.

Through the Concept Plan process, transportation infrastructure requirements to support the development of the subject lands will be identified at a high level. As the lands are under single-ownership, any direct roadway modification triggers would be identified at the Plan of Subdivision Stage through a Roadway

Modification Application (RMA), though it should be noted that RSA requirements have not yet been integrated with the City's Transportation Impact Assessment process.

Under background conditions, any required modifications to existing transportation facilities based on any identified network gaps within the Study Area do not trigger the absolute need for an RSA. The scale and complexity of any gaps may determine the need for an RSA (based partially on estimated cost), though the trigger for an RSA remains 'optional' at the Planning stage, except in the case of a new arterial road (Earl Armstrong Road), full reconstruction of an arterial road (Bank Street) or major collector road (none present).

Road Safety Audit (RSA) Requirements by Project Types

Project Type	Project Description	Details	Classification	Road Safety Audit (RSA) Stage				
				Plannning/Feasibility/ Functional Design	Preliminary Design	Detail Design	Pre Opening	Existing Condition
New Schemes	New Link/Road/Transitway	Major New Road	Freeway, Arterial,Major Collector	√	√	√	√	-
		Minor New Road	Collector, Local	O	√		√	-
		Multiuse Pathways (MUPs)[1],(Cycle Tracks, Bike Lanes)[1]	Any	O	√		O	-
Existing Road Improvement (including Transitway)	Full Road Reconstruction	Major Rehabilitation/Retrofit*,Widening (estimated construction cost >$10 mil)	**Arterial,Major Collector**	√	√		O	-
			Collector, Local	O	√		O	-
	Partial Road Reconstruction	Minor Rehabilitation/Retrofit**, Widening (estimated construction cost $(1-10) mil	Any	O	√		O	-
		Minor Rehabilitation/Retrofit** or Any Small Size Projects (estimated construction cost< $1mil)	Any	O	R		-	-
	Resurfacing***	**Road Rehabilitation/Shoulder Improvement**	Any	-	-		-	R
	Intersection Modification	Full Geometric Modification # (estimated construction cost $(1-5) mil)	Any	O	√		O	-
		Partial Geometric Modification## (estimated construction cost <$1 mil)	Any	-	R		-	-
Existing Structures on Road	Culvert	Renewal	Any	-	R		-	-
	Bridge	Renewal (no change in cross-section)	Any	-	R		-	-
	Transit Structure	Renewal	Any	-	R		-	-

[1] *for MUPs or any similar projects (cycle tracks, bike lanes or sidewalks) - RSA is to be conducted only if it is adjacent to or crossing a collector or higher classifield road at potential conflict points.*

√ – Mandatory
O - Optional
R - Requirement based on 'Safety Performance' and/or 'Network Screening' review with the assistance of Road Safety Group

Figure 9 - Road Safety Audit Requirements, City of Ottawa

Recommendation #3

There are no Major Collector roads in the Leitrim community and therefore an RSA would only be considered *mandatory* for the Earl Armstrong Extension (new arterial) or Bank Street (existing arterial) – both of which have already undergone a formal design process. The safety evaluation of these roadways is therefore the responsibility of the Designer/City and not of private landowners. As it relates to the scope of work specifically for the S-4 Leitrim West of Bank expansion lands, the strict requirement to undertake a Road Safety Audit should therefore be eliminated from the Terms of Reference.

Appendix B TIA Screening Form

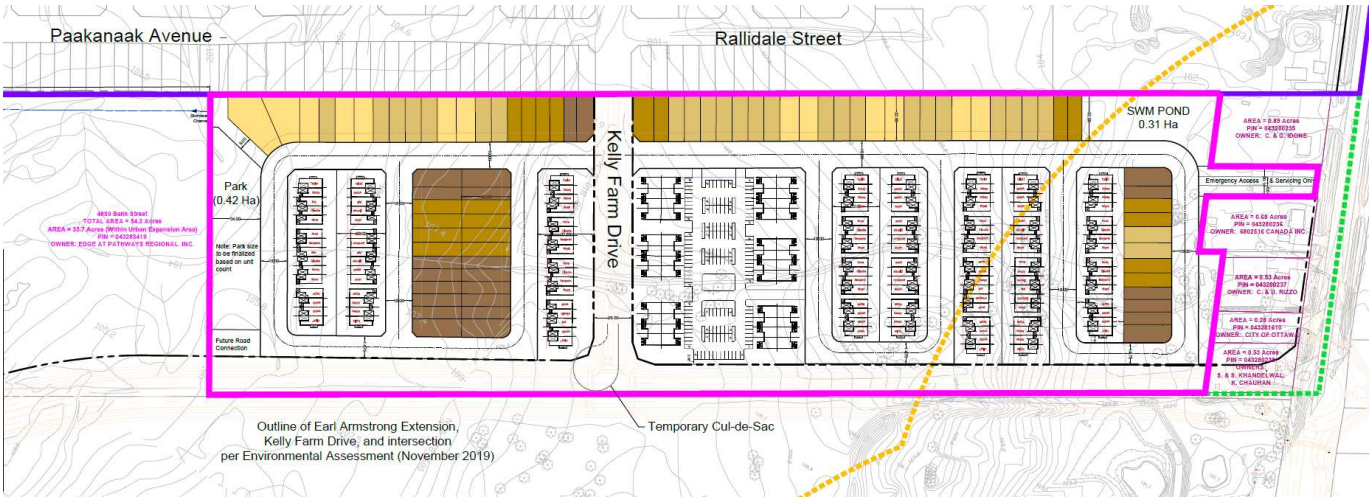
City of Ottawa 2017 TIA Guidelines Screening Form

*Revised per City of Ottawa update to the TIA Guidelines, effective June 14, 2023.

1. Description of Proposed Development

Municipal Address	4850 Bank Street, Ottawa, ON
Description of Location	Leitrim – West of Bank Street, south of Dun Skipper Drive and north of the future Earl Armstrong Road extension.
Land Use Classification	Residential
Development Size (units)	276
Development Size (m^2)	N/A
Number of Accesses and Locations	Kelly Farm Drive will be extended through the site to the future Earl Armstrong Road extension providing access to the site via the existing road network to the north and the future Earl Armstrong & Kelly Farm intersection.
Phase of Development	Single Phase
Buildout Year	TBD

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



2. Trip Generation Trigger

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

Land Use Type*	Minimum Development Size (60 person trips)
Single-Detatched[1]	60 units ✓
Multi-Use Family (Low Rise)[1]	90 units ✓
Multi-Use Family (High-Rise)[1]	150 units
Office[2]	1,400 m^2
Industrial[2]	7,000 m^2
Fast-food restaurant or coffee shop[2]	110 m^2
Destination retail[2]	1,800 m^2
Gas station or convenience market[2]	90 m^2

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

[1] Table 2 Table 3 & Table 4 TRANS Trip Generation Summary Report

[2] ITE Trip Generation manual 11.1 Ed.

Based on the results above, the Trip Generation Trigger is satisfied.

3. Location Triggers

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

**DPA and TOD are identified in the City of Ottawa Official Plan (DPA in Section 2.5.1 and Schedules A and B; TOD in Annex 6). See Chapter 4 for a list of City of Ottawa Planning and Engineering documents that support the completion of TIA). Hubs are identified as Protected Major Transit Station Areas (PTMSAs) and identified in Schedule C1-Protected Major Transit Station Areas (PMTSAs).*

Based on the results above, the Location Trigger is NOT satisfied.

4. Safety Triggers

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

Based on the results above, the Safety Trigger is satisfied.

5. Summary

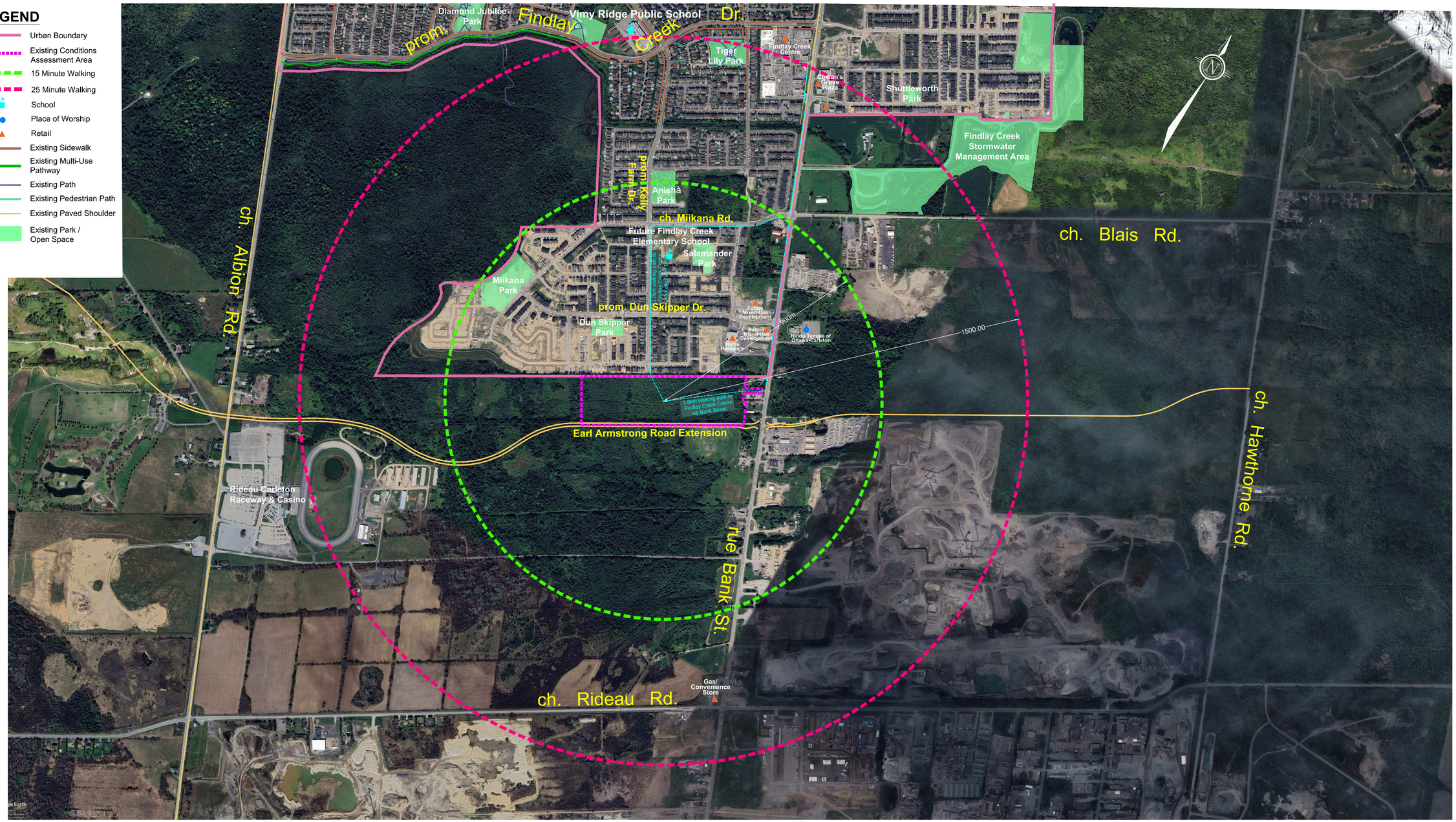
	Yes	No
Does the development satisfy the Trip Generation Trigger?	✓	
Does the development satisfy the Location Trigger?		✓
Does the development satisfy the Safety Trigger?	✓	

One or more of the triggers is satisfied. Therefore, the TIA Study must continue into the next stage (Scoping).

Appendix C Neighbourhood Amenities

LEGEND

- Urban Boundary
- Existing Conditions Assessment Area
- 15 Minute Walking
- 25 Minute Walking
- School
- Place of Worship
- Retail
- Existing Sidewalk
- Existing Multi-Use Pathway
- Existing Path
- Existing Pedestrian Path
- Existing Paved Shoulder
- Existing Park / Open Space



NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
I.	REVISED PER COMMENTS	JULY 16/24	RT

SCALE

1:7,500 (A1) / 1:15,000 (11x17)

1:7500
0 100 200 300

FOR REVIEW ONLY

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

CITY of OTTAWA

4850 BANK STREET

DRAWING NAME

15 MINUTE NEIGHBOURHOOD PLAN

PROJECT No. 123168-00

REV REV #1

DRAWING No. 123168-FIG2

M:\2023\123168\CAD\Planning\Figures\123168-FIG2.dwg, Concept Plan - Dual Scale, Jul 17, 2024 - 11:18am, wilcox

PE ANZSNI.SE (ISO) - 914.4mmx609.6mm

Appendix D Traffic Data

Traffic Signal Timing

City of Ottawa, Public Works Department

Traffic Signal Operations Unit

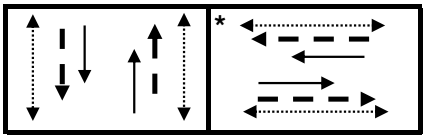
Intersection:	***Main:*** Bank	***Side:***	Blais / Miikana
Controller:	**MS 3200**	**TSD:**	**5866**
Author:	Kymen Kwan	**Date:**	30-Jul-2024

Existing Timing Plans†

	Plan						Ped Minimum Time		
	AM Peak 1	**Off Peak** 2	**PM Peak** 3	**Night** 4	**Weekend** 5	**Heavy AM** 11	***Walk***	***DW***	***A+R***
Cycle	110	75	120	70	70	130			
Offset	58	0	18	0	0	16			
NB Thru	80	45	90	40	40	90	7	6	4.6+2.0
SB Thru	80	45	90	40	40	90	7	6	4.6+2.0
EB Thru	30	30	30	30	30	40	7	9	3.3+3.3
WB Thru	30	30	30	30	30	40	7	9	3.3+3.3

Phasing Sequence‡

Plan: All



Schedule

Weekday

Time	Plan
0:15	4
6:30	1
7:00	11
8:00	1
9:30	2
15:00	3
18:30	2
22:30	4

Weekend

Time	Plan
0:15	4
6:30	2
11:00	5
19:30	2
22:00	4

Notes

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

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

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◄·····► Pedestrian signal

– – – ► Bike signal

Cost is $62.38 ($55.20 + HST)

Traffic Signal Timing

City of Ottawa, Public Works Department

Traffic Signal Operations Unit

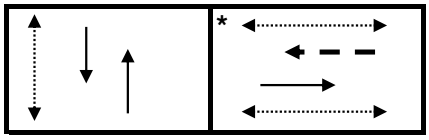
Intersection:	***Main:*** Bank	***Side:***	Dun Skipper
Controller:	**MS 3200**	**TSD:**	**5869**
Author:	Hamadoun Issabre	**Date:**	30-Jul-2024

Existing Timing Plans†

	Plan						Ped Minimum Time		
	AM Peak 1	**Off Peak** 2	**PM Peak** 3	**Night** 4	**Weekend** 5	**AM Heavy** 11	***Walk***	***DW***	***A+R***
Cycle	110	75	120	70	70	130			
Offset	58	0	18	0	0	40			
NB Thru	80	45	90	40	40	90	7	8	4.6+2.1
SB Thru	80	45	90	40	40	90	7	8	4.6+2.1
EB Thru	30	30	30	30	30	40	7	9	3.3+3.3
WB Thru	30	30	30	30	30	40	7	9	3.3+3.3

Phasing Sequence‡

Plan: All



Schedule

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0:15	4
6:30	1
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Weekend

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0:15	4
6:30	2
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19:30	2
22:00	4

Notes

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

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

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◄·····► Pedestrian signal

– – – ► Bike signal

Cost is $62.38 ($55.20 + HST)

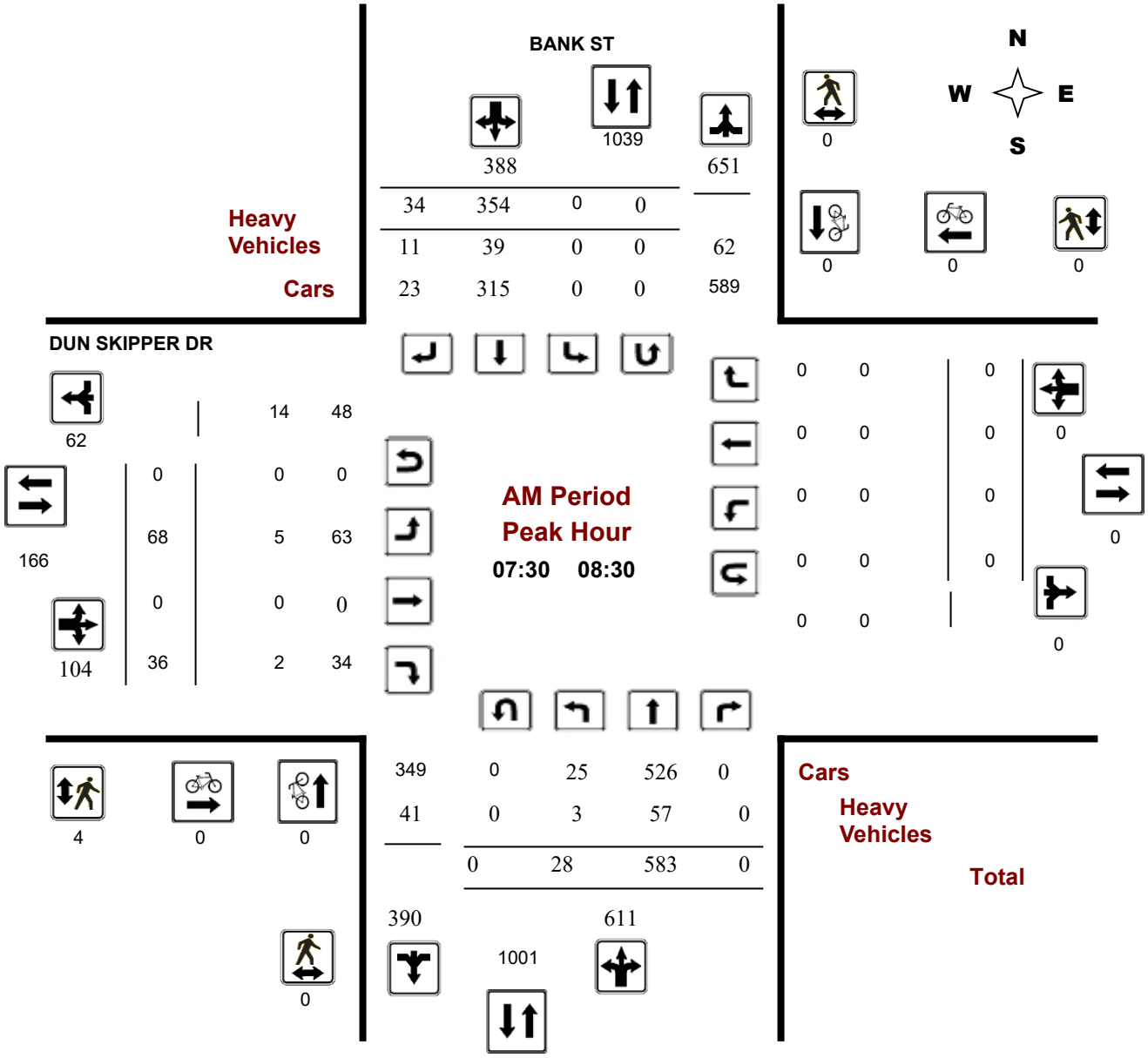
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BANK ST @ DUN SKIPPER DR

Survey Date: Thursday, September 14, 2023 **WO No:** 41167

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


BANK ST
DUN SKIPPER DR
N
W
E
S
Heavy Vehicles
Cars
AM Period
Peak Hour
07:30 08:30
Cars
Heavy Vehicles
Total
388
1039
651
34 354 0 0
11 39 0 0 62
23 315 0 0 589
62
14 48
166
0 0 0
68 5 63
104
0 0 0
36 2 34
0
0
0

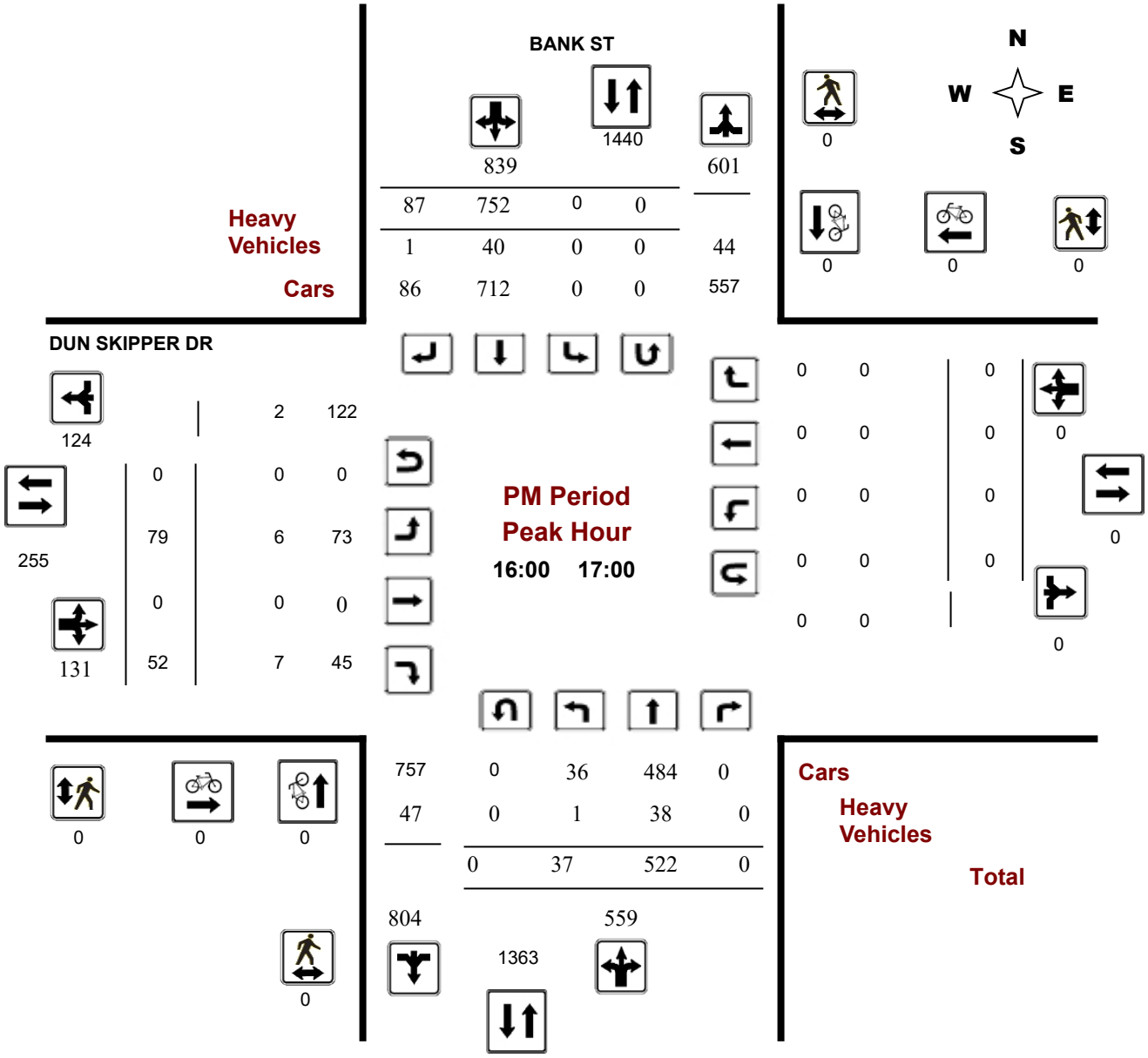
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BANK ST @ DUN SKIPPER DR

Survey Date: Thursday, September 14, 2023 **WO No:** 41167

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



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

BANK ST @ RIDEAU RD

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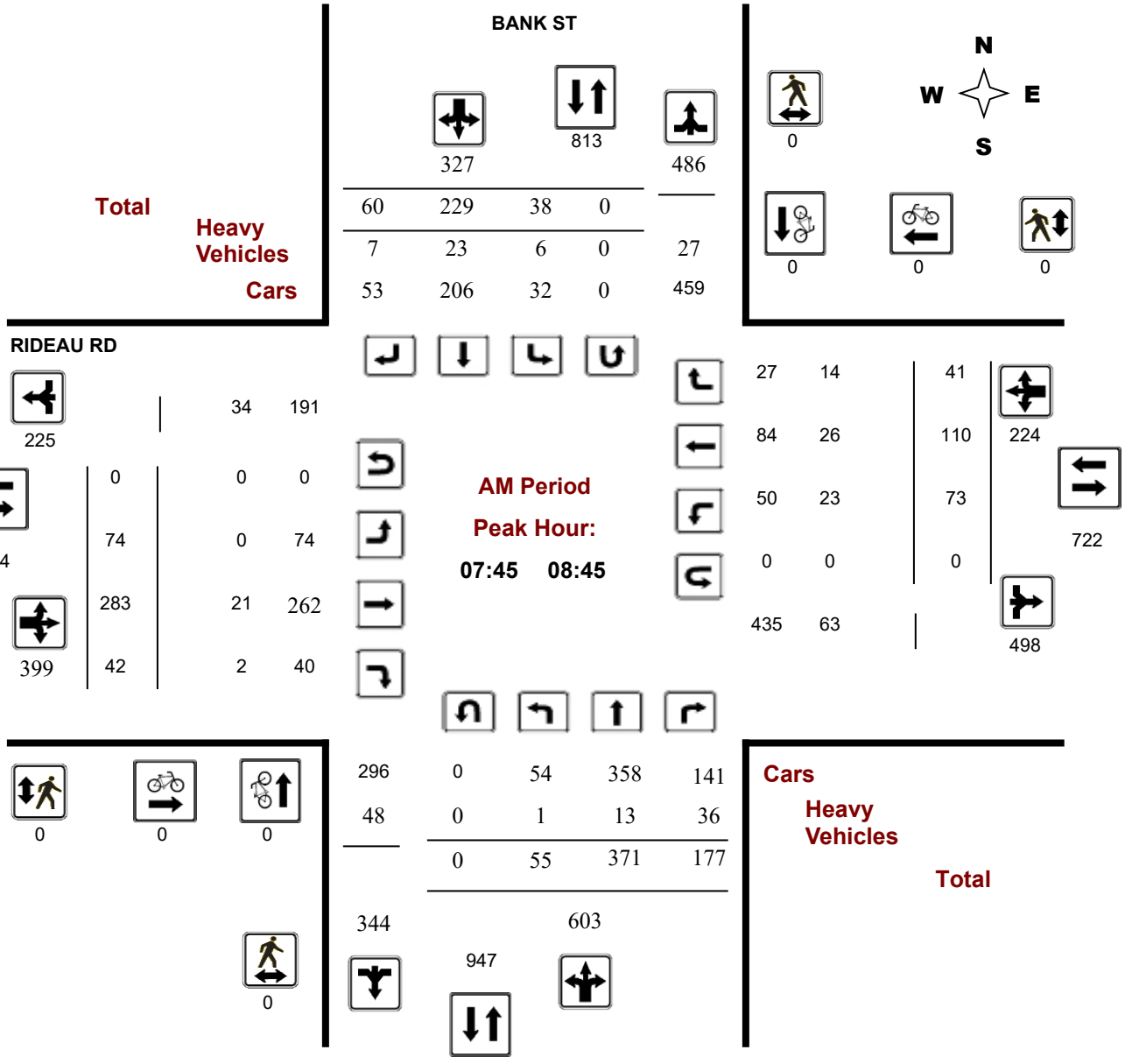
Start Time: 07:00 **Device:** Miovision

AM Period Peak Hour Diagram



Transportation Services - Traffic Services

Turning Movement Count - Study Results

BANK ST @ RIDEAU RD

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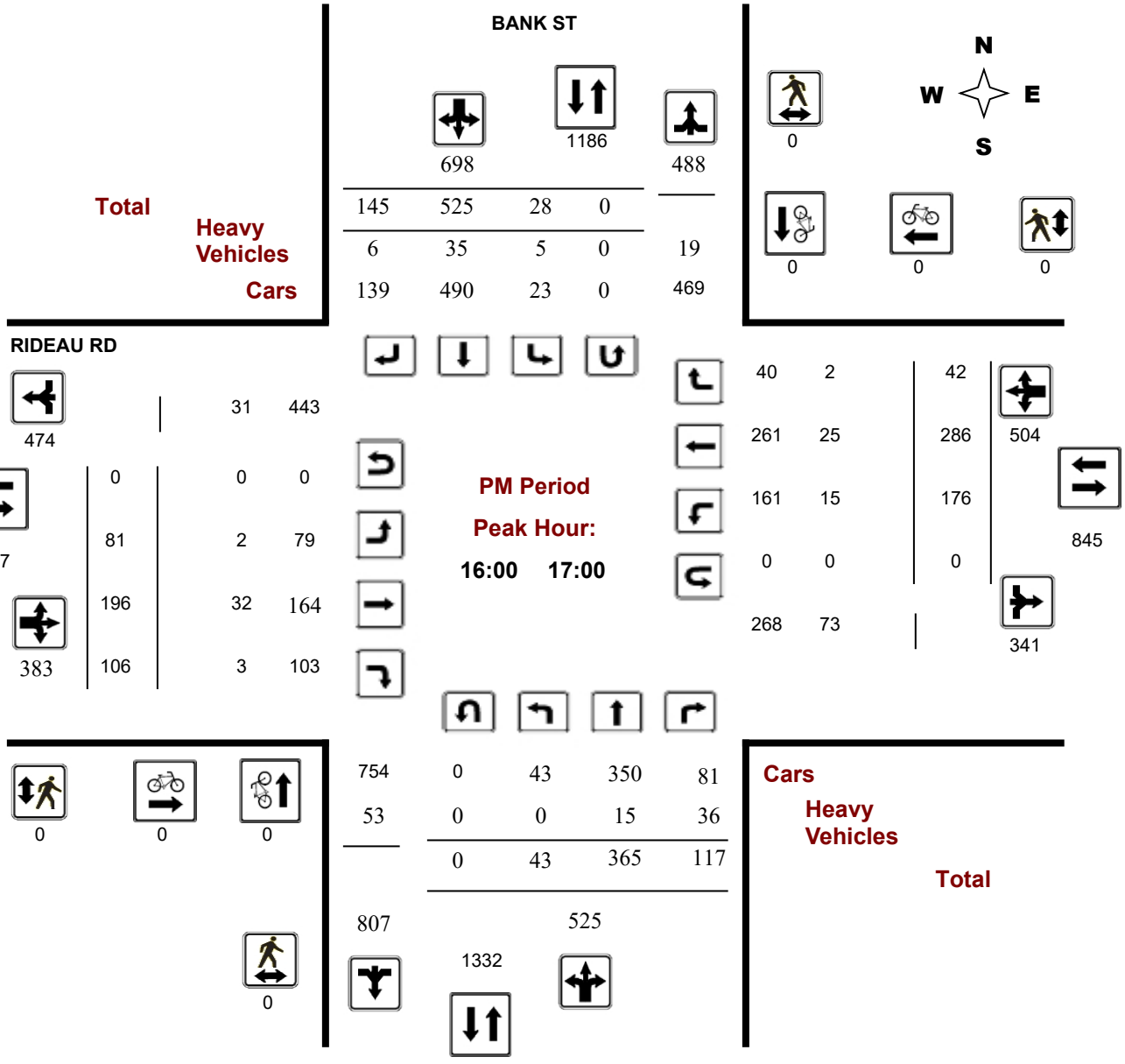
Start Time: 07:00 **Device:** Miovision

PM Period Peak Hour Diagram



Transportation Services - Traffic Services

Turning Movement Count - Study Results

BLAIS RD @ BANK ST

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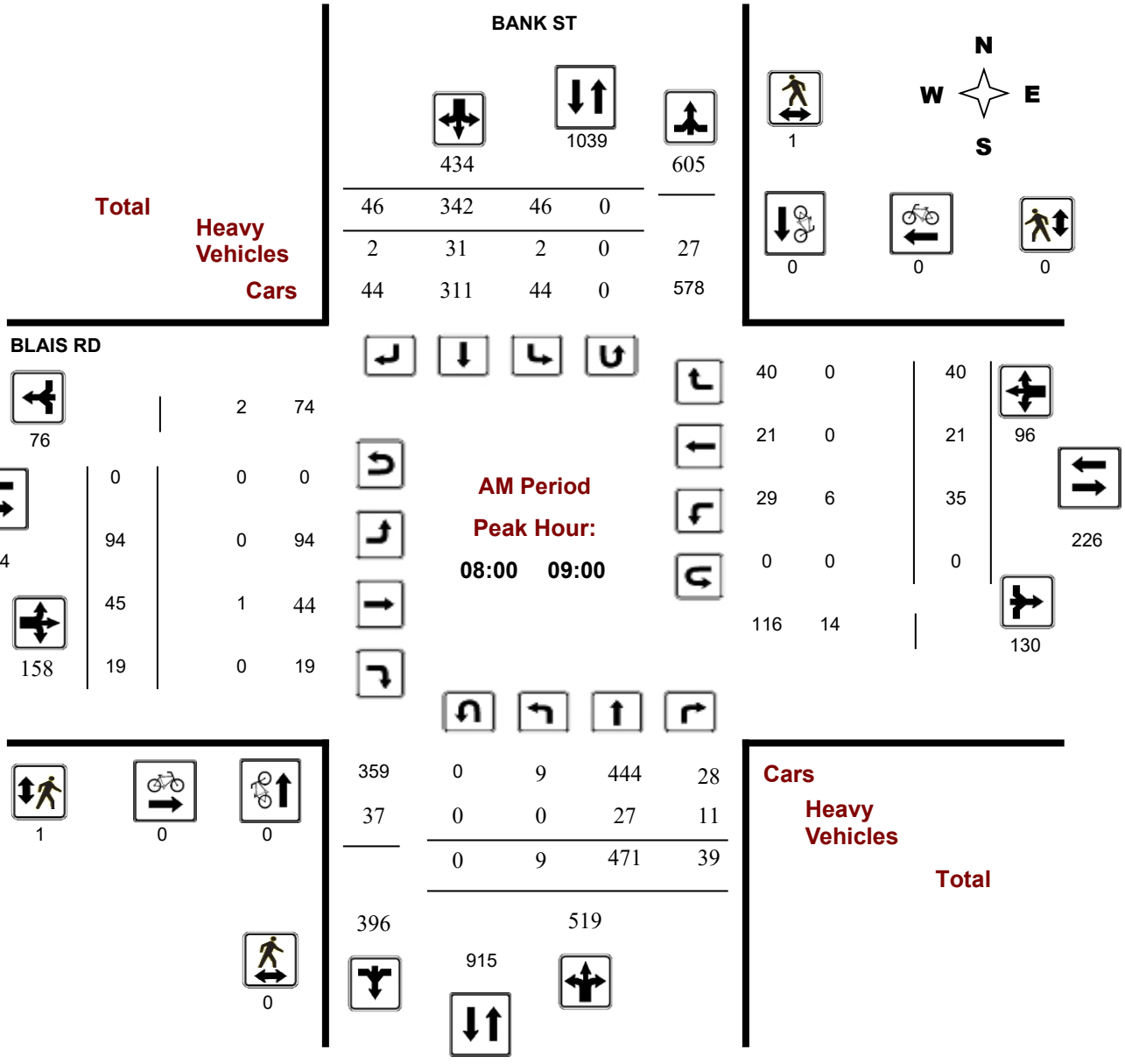
Start Time: 07:00 **Device:** Miovision

AM Period Peak Hour Diagram



Transportation Services - Traffic Services

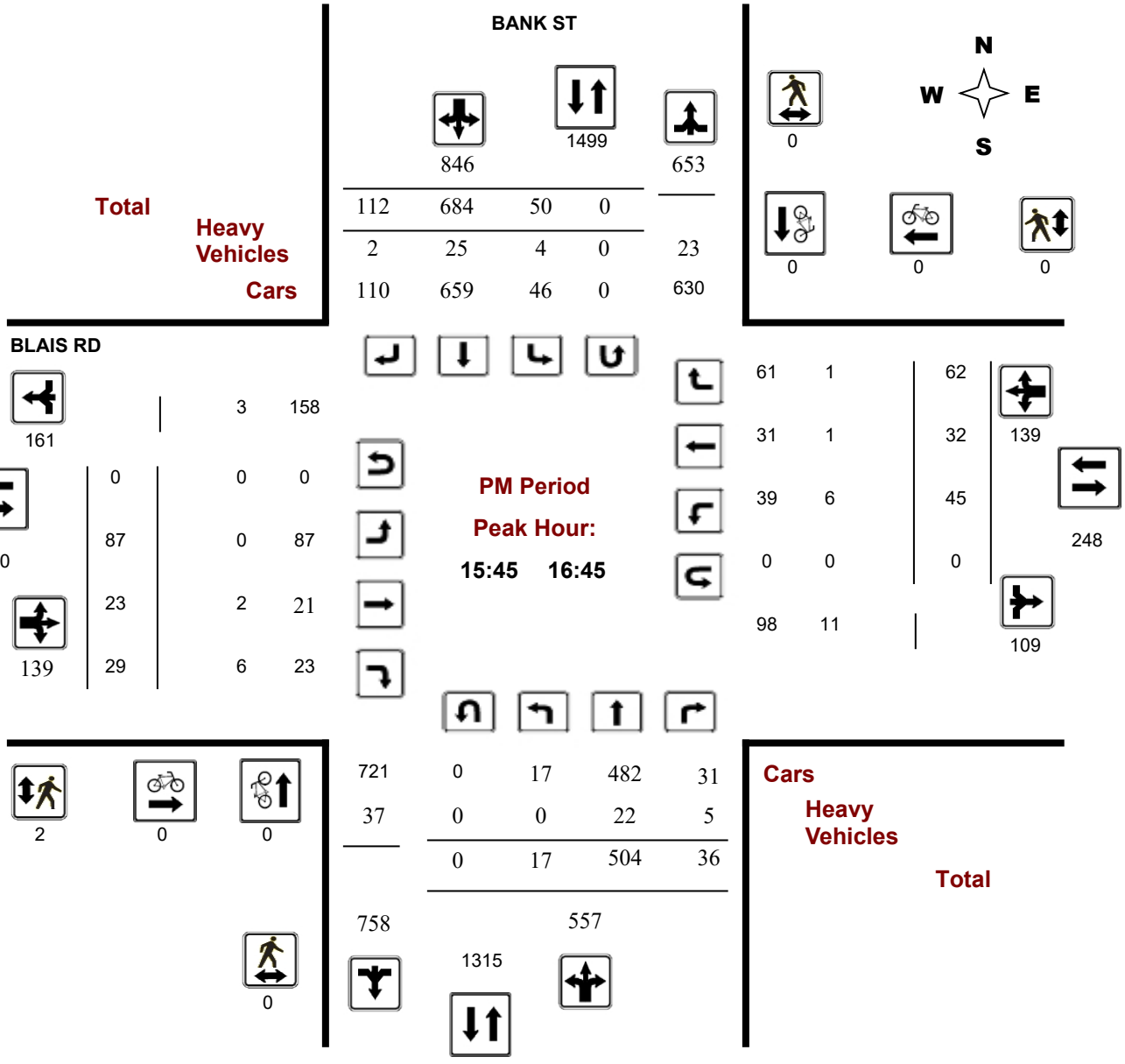
Turning Movement Count - Study Results

BLAIS RD @ BANK ST

Survey Date: Thursday, July 06, 2023 **WO No:** 41064

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

PM Period Peak Hour Diagram



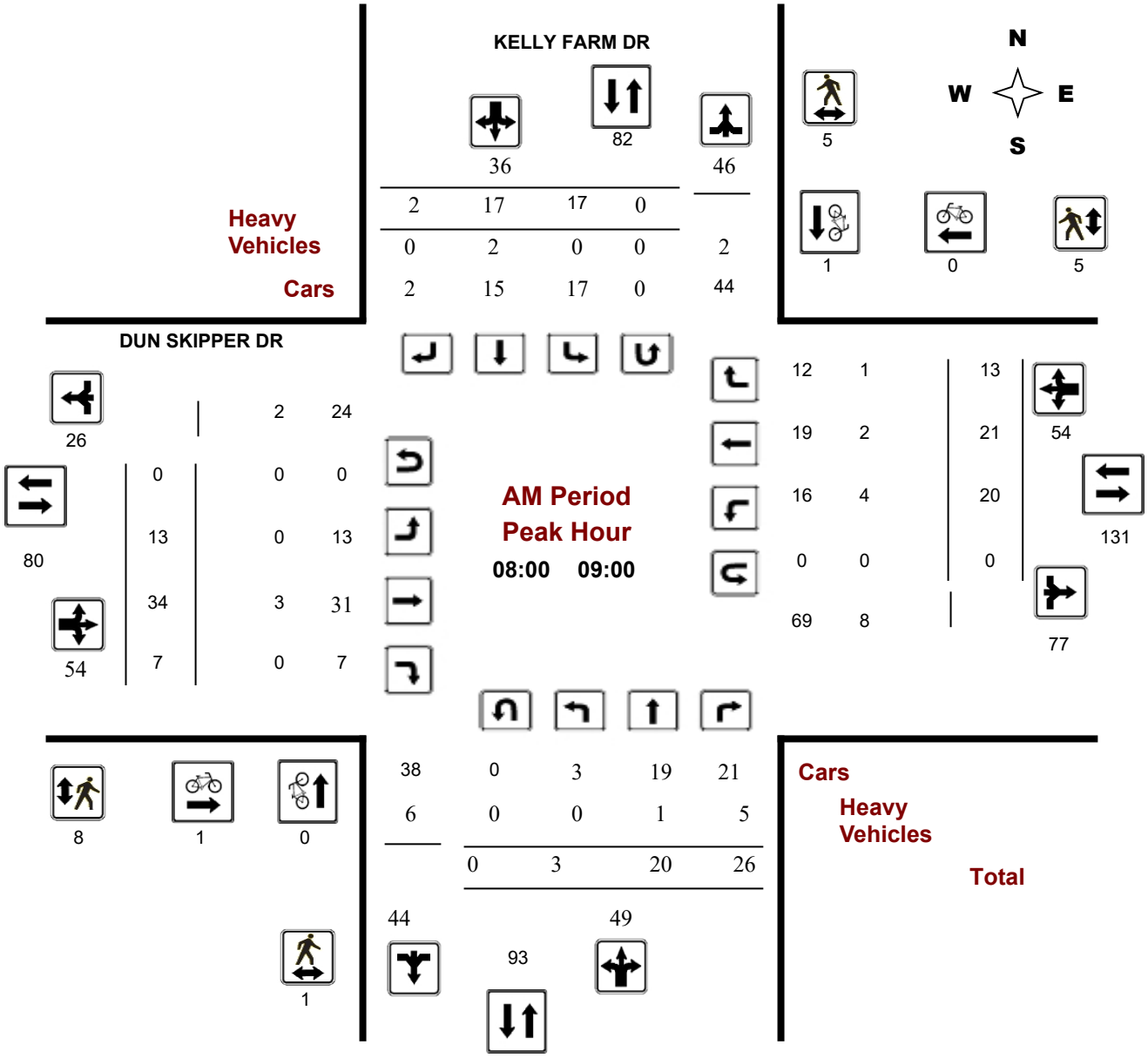
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

DUN SKIPPER DR @ KELLY FARM DR

Survey Date: Thursday, June 29, 2023 **WO No:** 41021

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



Comments

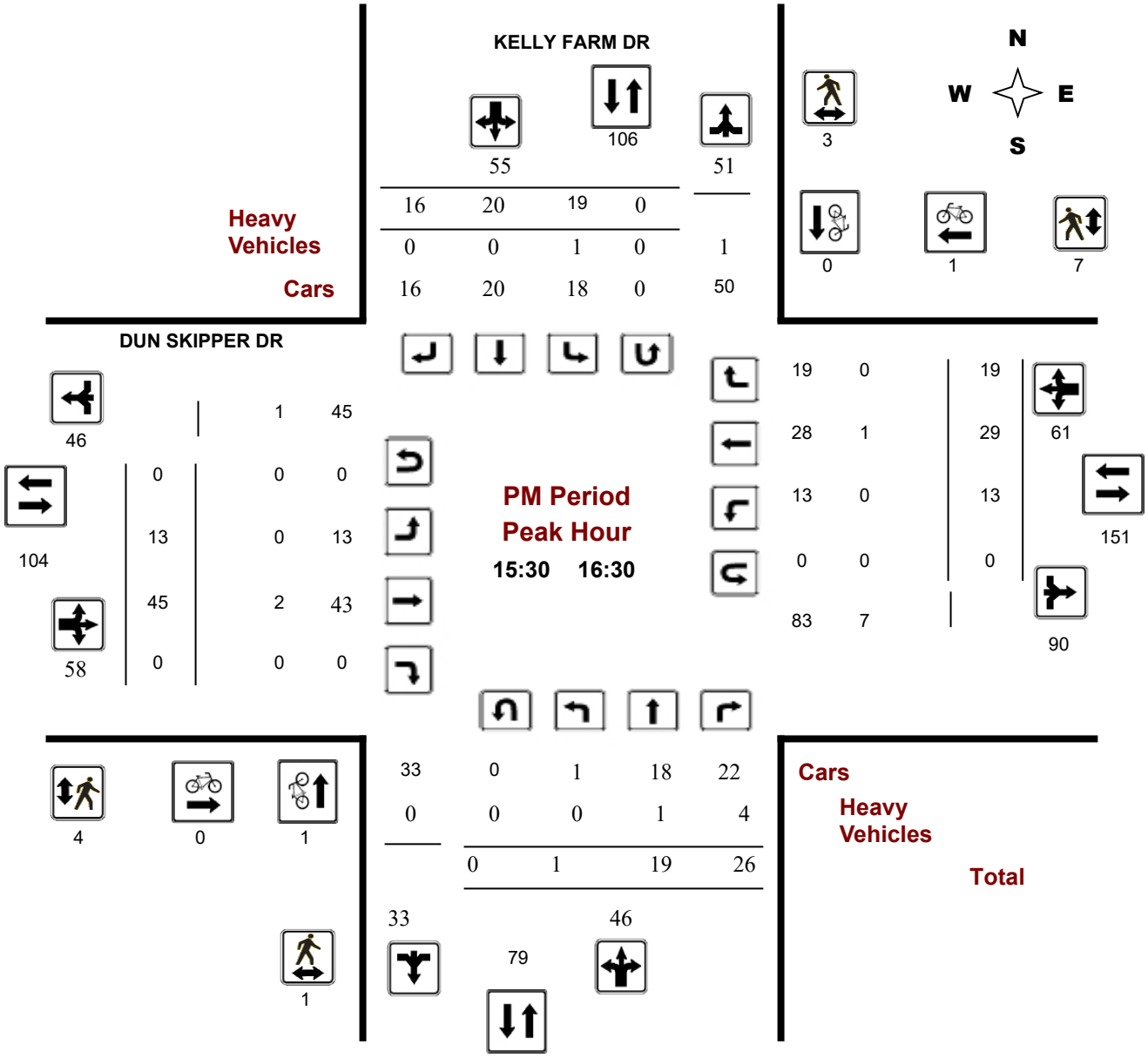
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

DUN SKIPPER DR @ KELLY FARM DR

Survey Date: Thursday, June 29, 2023 **WO No:** 41021

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



Comments

Transportation Services - Traffic Services

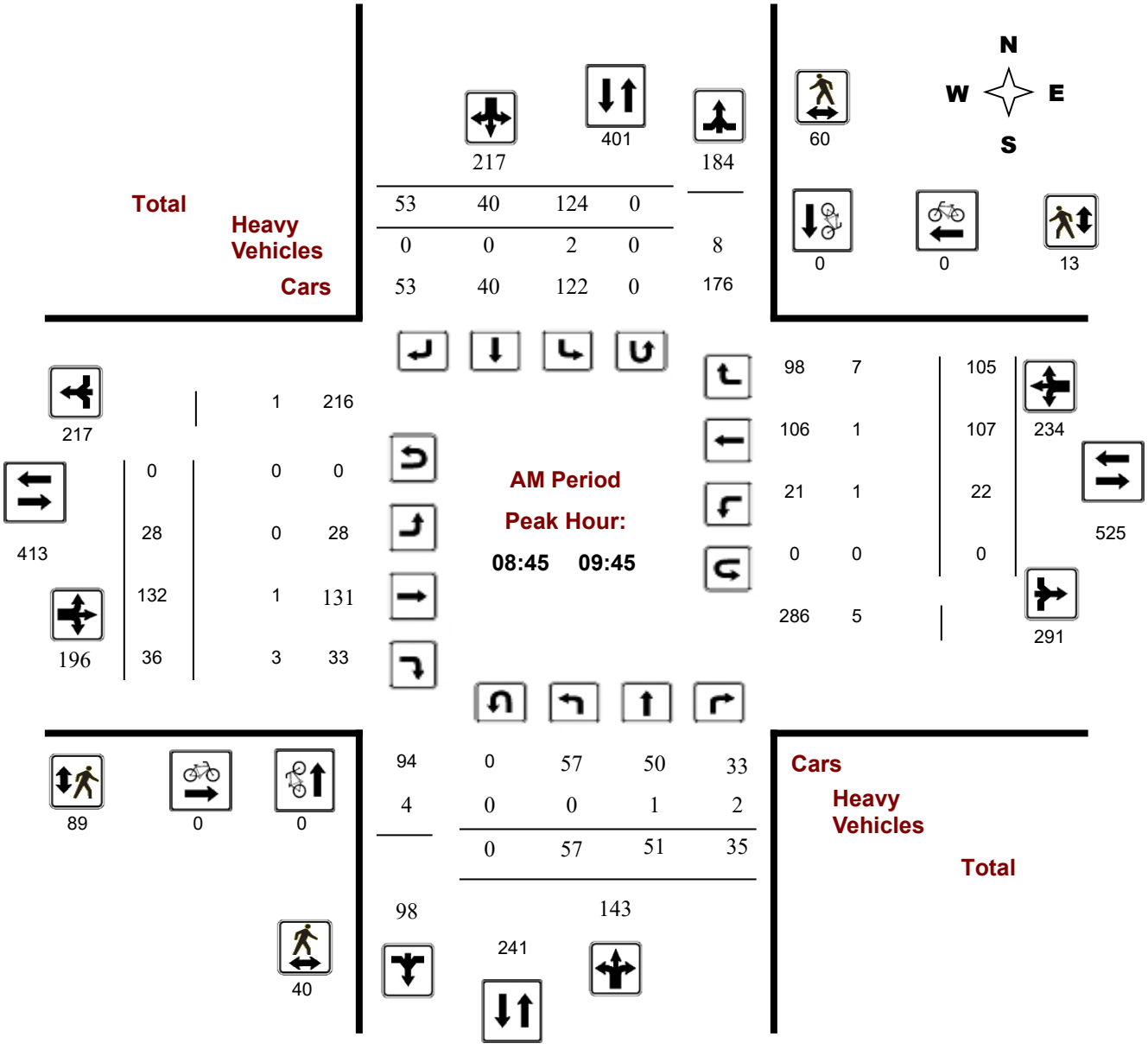
Turning Movement Count - Study Results

FINDLAY CREEK DR @ KELLY FARM DR

Survey Date: Thursday, February 09, 2023 **WO No:** 40783

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

AM Period Peak Hour Diagram



Transportation Services - Traffic Services

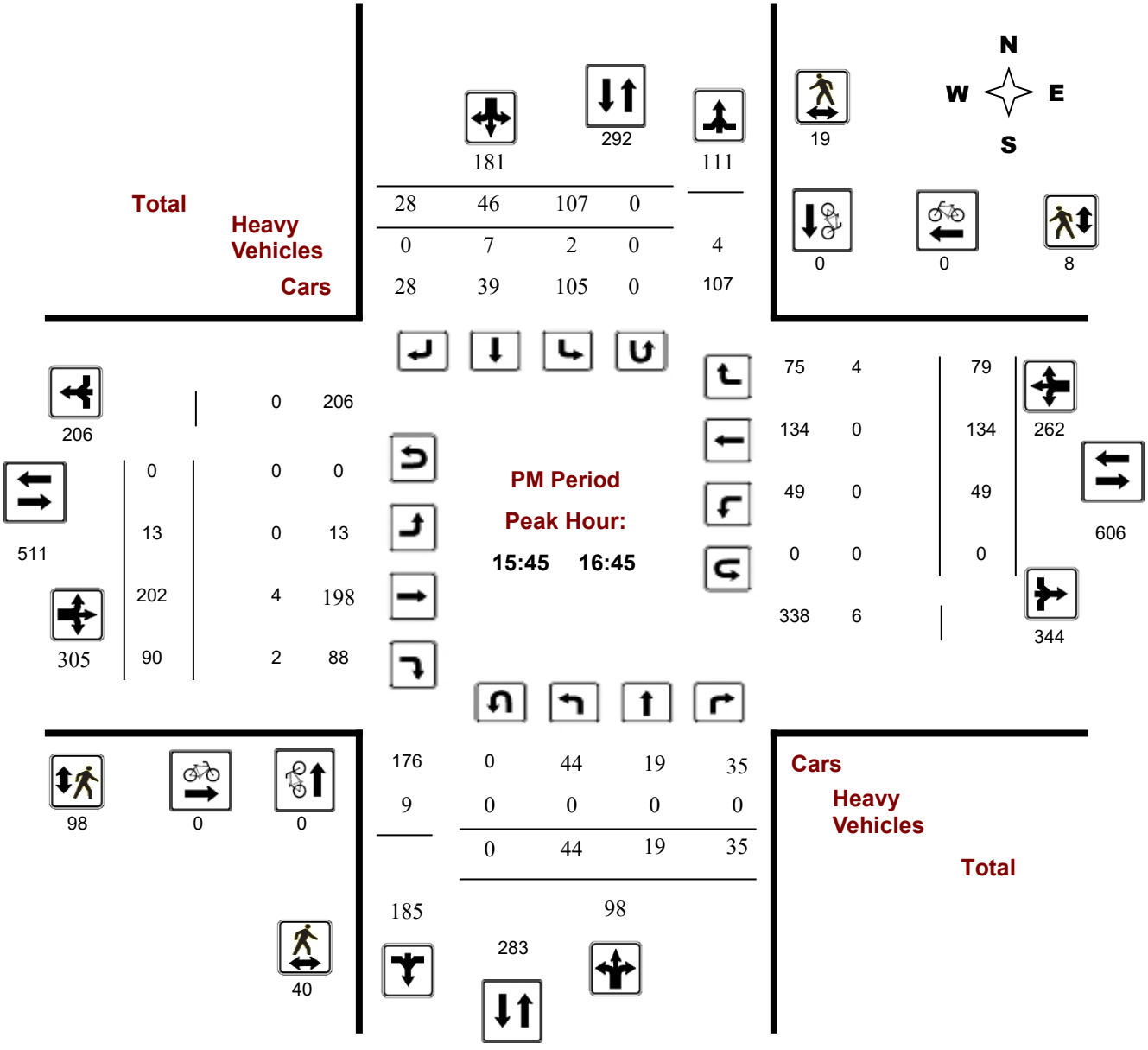
Turning Movement Count - Study Results

FINDLAY CREEK DR @ KELLY FARM DR

Survey Date: Thursday, February 09, 2023 **WO No:** 40783

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

PM Period Peak Hour Diagram



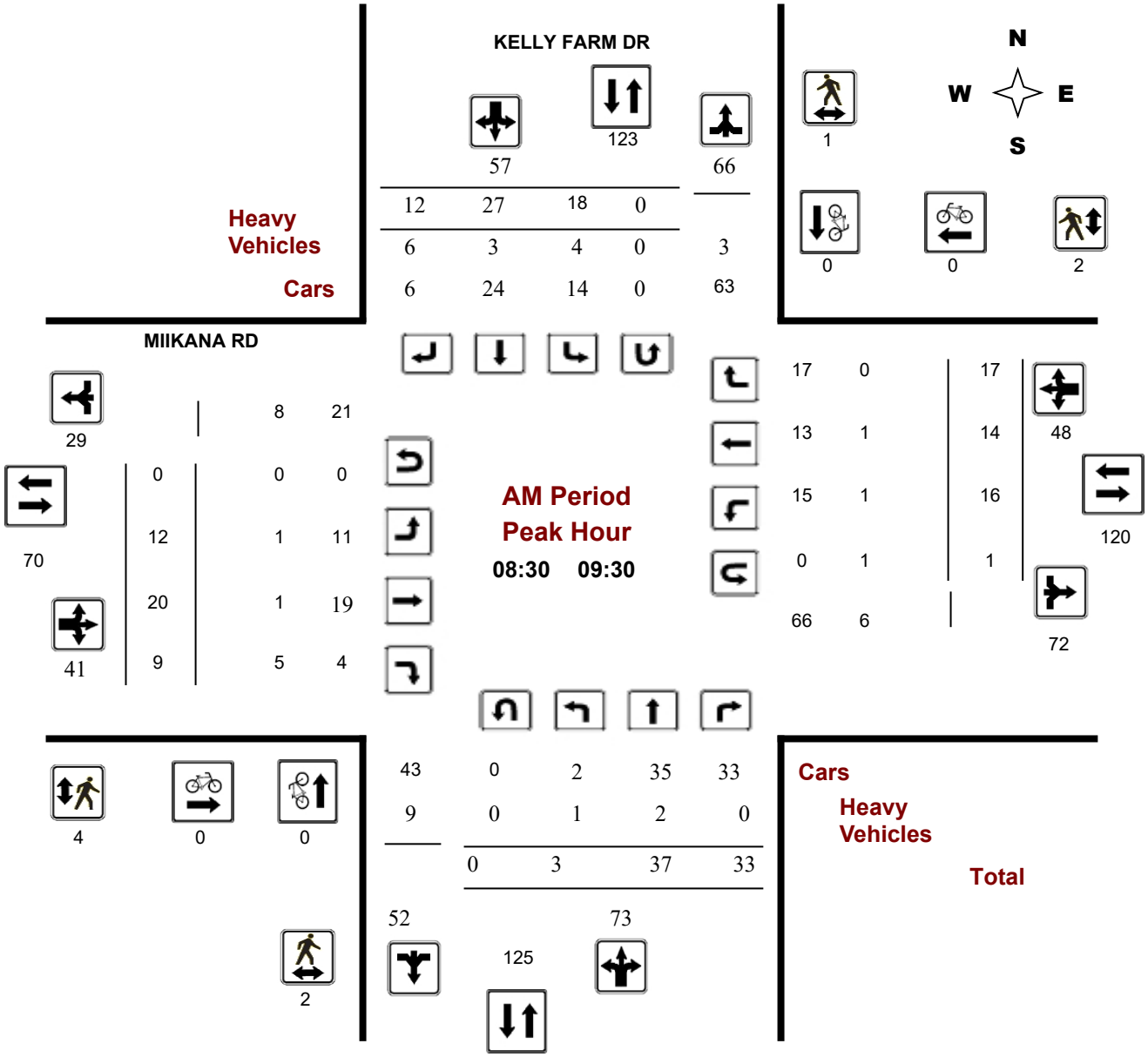
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

KELLY FARM DR @ MIIKANA RD

Survey Date: Thursday, February 23, 2023 **WO No:** 40790

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



Comments

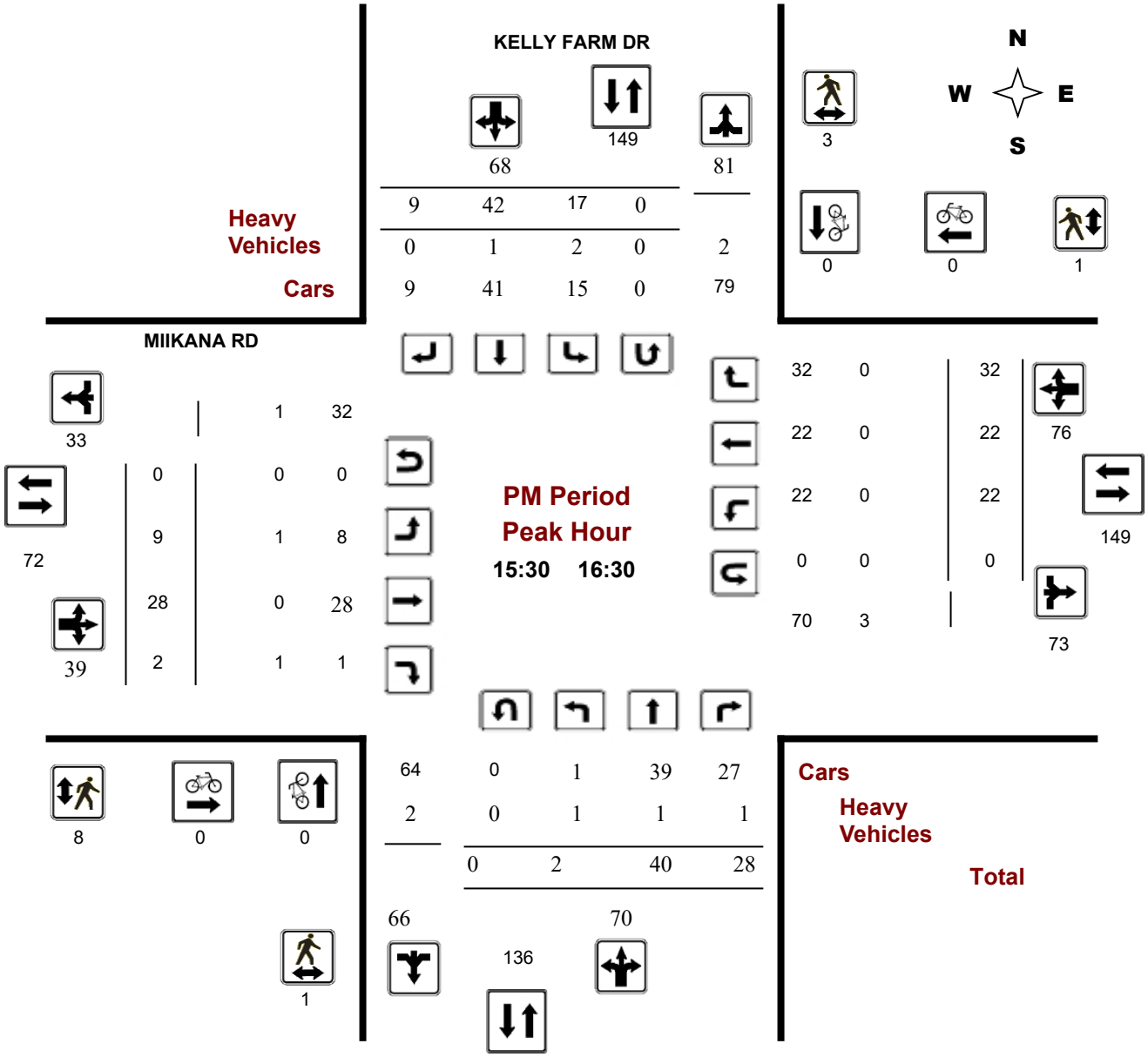
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

KELLY FARM DR @ MIIKANA RD

Survey Date: Thursday, February 23, 2023 **WO No:** 40790

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



Comments

Appendix E Intersection Capacity Analysis Reports

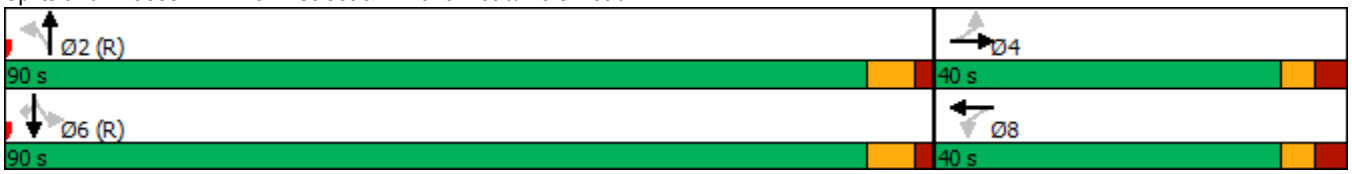
Existing

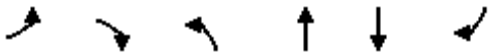
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	45	19	35	21	40	9	618	39	46	351	46
Future Volume (vph)	94	45	19	35	21	40	9	618	39	46	351	46
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0		0.0	45.0		0.0	115.0		0.0	125.0		105.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				0.98		1.00					0.98
Frt		0.956			0.901			0.991				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1729	1716	0	1478	1613	0	1729	1681	0	1662	1670	1488
Flt Permitted	0.713			0.711			0.524			0.337		
Satd. Flow (perm)	1292	1716	0	1106	1613	0	952	1681	0	590	1670	1450
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			44			5				51
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		528.6			234.2			451.0			177.6	
Travel Time (s)		38.1			16.9			20.3			8.0	
Confl. Peds. (#/hr)	1					1	1					1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	2%	0%	17%	0%	0%	0%	6%	28%	4%	9%	4%
Adj. Flow (vph)	104	50	21	39	23	44	10	687	43	51	390	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	104	71	0	39	67	0	10	730	0	51	390	51
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	19.6	19.6		19.6	19.6		19.6	19.6		19.6	19.6	19.6
Total Split (s)	40.0	40.0		40.0	40.0		90.0	90.0		90.0	90.0	90.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		69.2%	69.2%		69.2%	69.2%	69.2%
Maximum Green (s)	33.4	33.4		33.4	33.4		83.4	83.4		83.4	83.4	83.4
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6		4.6	4.6	4.6
All-Red Time (s)	3.3	3.3		3.3	3.3		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6		6.6	6.6		6.6	6.6		6.6	6.6	6.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	16.0	16.0		16.0	16.0		100.8	100.8		100.8	100.8	100.8
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.78	0.78		0.78	0.78	0.78
v/c Ratio	0.65	0.32		0.29	0.28		0.01	0.56		0.11	0.30	0.04

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	72.5	42.4		55.2	24.1		4.1	6.9		5.1	5.5	1.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	72.5	42.4		55.2	24.1		4.1	6.9		5.1	5.5	1.3
LOS	E	D		E	C		A	A		A	A	A
Approach Delay		60.3			35.5			6.8			5.0	
Approach LOS		E			D			A			A	
Queue Length 50th (m)	23.8	12.0		8.5	4.9		0.4	47.8		2.5	22.8	0.0
Queue Length 95th (m)	39.3	24.1		17.9	16.6		m1.2	66.7		7.2	42.1	3.1
Internal Link Dist (m)		504.6			210.2			427.0			153.6	
Turn Bay Length (m)	25.0			45.0			115.0			125.0		105.0
Base Capacity (vph)	331	452		284	447		738	1304		457	1294	1135
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.31	0.16		0.14	0.15		0.01	0.56		0.11	0.30	0.04

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 16 (12%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 14.4		Intersection LOS: B	
Intersection Capacity Utilization 63.5%		ICU Level of Service B	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 1: Bank Street & Miikana Road/Blais Road





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	68	36	28	598	371	34
Future Volume (vph)	68	36	28	598	371	34
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	120.0			100.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.99			0.96
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1616	1459	1558	1655	1640	1172
Flt Permitted	0.950		0.519			
Satd. Flow (perm)	1616	1459	845	1655	1640	1129
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		40				38
Link Speed (k/h)	50			80	80	
Link Distance (m)	528.6			273.1	451.0	
Travel Time (s)	38.1			12.3	20.3	
Confl. Peds. (#/hr)			4			4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	7%	6%	11%	10%	11%	32%
Adj. Flow (vph)	76	40	31	664	412	38
Shared Lane Traffic (%)						
Lane Group Flow (vph)	76	40	31	664	412	38
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	21.7	21.7	21.7	21.7
Total Split (s)	40.0	40.0	90.0	90.0	90.0	90.0
Total Split (%)	30.8%	30.8%	69.2%	69.2%	69.2%	69.2%
Maximum Green (s)	33.4	33.4	83.3	83.3	83.3	83.3
Yellow Time (s)	3.3	3.3	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	8.0	8.0	8.0	8.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	12.2	12.2	109.1	109.1	109.1	109.1
Actuated g/C Ratio	0.09	0.09	0.84	0.84	0.84	0.84
v/c Ratio	0.50	0.23	0.04	0.48	0.30	0.04

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Control Delay	67.0	18.4	3.2	5.4	3.7	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.0	18.4	3.2	5.4	3.7	1.1
LOS	E	B	A	A	A	A
Approach Delay	50.3			5.3	3.5	
Approach LOS	D			A	A	
Queue Length 50th (m)	17.5	0.0	1.2	40.6	13.2	0.0
Queue Length 95th (m)	31.2	10.0	3.6	70.4	17.3	0.6
Internal Link Dist (m)	504.6			249.1	427.0	
Turn Bay Length (m)	25.0		120.0			100.0
Base Capacity (vph)	415	404	709	1389	1377	953
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.10	0.04	0.48	0.30	0.04

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 40 (31%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.50			
Intersection Signal Delay: 8.8		Intersection LOS: A	
Intersection Capacity Utilization 52.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Bank Street & Dun Skipper Drive



Intersection	
Intersection Delay, s/veh	11.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	132	36	22	107	105	57	51	35	124	40	53
Future Vol, veh/h	28	132	36	22	107	105	57	51	35	124	40	53
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	0	1	8	5	1	7	0	2	6	2	0	0
Mvmt Flow	31	147	40	24	119	117	63	57	39	138	44	59
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11	11.4	10.4	11.6
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	40%	14%	9%	57%
Vol Thru, %	36%	67%	46%	18%
Vol Right, %	24%	18%	45%	24%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	143	196	234	217
LT Vol	57	28	22	124
Through Vol	51	132	107	40
RT Vol	35	36	105	53
Lane Flow Rate	159	218	260	241
Geometry Grp	1	1	1	1
Degree of Util (X)	0.244	0.324	0.376	0.365
Departure Headway (Hd)	5.527	5.348	5.204	5.451
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	648	671	689	658
Service Time	3.578	3.394	3.248	3.496
HCM Lane V/C Ratio	0.245	0.325	0.377	0.366
HCM Control Delay	10.4	11	11.4	11.6
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	1	1.4	1.8	1.7

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	20	9	16	14	17	3	37	33	18	27	12
Future Vol, veh/h	12	20	9	16	14	17	3	37	33	18	27	12
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	8	5	56	6	7	0	33	5	0	22	11	50
Mvmt Flow	13	22	10	18	16	19	3	41	37	20	30	13
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.6	7.5	8	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	29%	34%	32%
Vol Thru, %	51%	49%	30%	47%
Vol Right, %	45%	22%	36%	21%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	73	41	47	57
LT Vol	3	12	16	18
Through Vol	37	20	14	27
RT Vol	33	9	17	12
Lane Flow Rate	81	46	52	63
Geometry Grp	1	1	1	1
Degree of Util (X)	0.099	0.055	0.062	0.078
Departure Headway (Hd)	4.415	4.36	4.244	4.442
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	802	826	849	796
Service Time	2.495	2.361	2.245	2.526
HCM Lane V/C Ratio	0.101	0.056	0.061	0.079
HCM Control Delay	8	7.6	7.5	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.2	0.2	0.3

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	34	7	20	21	13	3	20	26	17	17	2
Future Vol, veh/h	13	34	7	20	21	13	3	20	26	17	17	2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	0	9	0	20	10	8	0	5	19	0	12	0
Mvmt Flow	14	38	8	22	23	14	3	22	29	19	19	2
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.4	7.8	7.1	7.5
HCM LOS	A	A	A	A

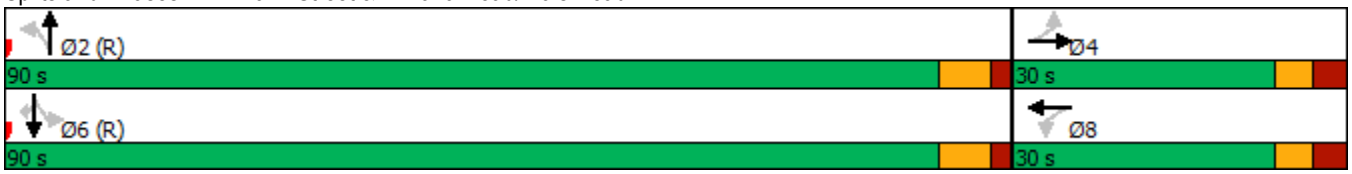
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	24%	37%	47%
Vol Thru, %	41%	63%	39%	47%
Vol Right, %	53%	13%	24%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	49	54	54	36
LT Vol	3	13	20	17
Through Vol	20	34	21	17
RT Vol	26	7	13	2
Lane Flow Rate	54	60	60	40
Geometry Grp	1	1	1	1
Degree of Util (X)	0.058	0.068	0.073	0.047
Departure Headway (Hd)	3.831	4.08	4.38	4.209
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	922	871	813	840
Service Time	1.908	2.139	2.434	2.286
HCM Lane V/C Ratio	0.059	0.069	0.074	0.048
HCM Control Delay	7.1	7.4	7.8	7.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.2	0.2	0.1

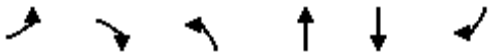
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	23	29	45	32	62	17	561	36	50	784	112
Future Volume (vph)	87	23	29	45	32	62	17	561	36	50	784	112
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0		0.0	45.0		0.0	115.0		0.0	125.0		105.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												0.97
Frt		0.917			0.901			0.991				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1729	1443	0	1530	1602	0	1729	1724	0	1601	1750	1517
Flt Permitted	0.689			0.719			0.267			0.369		
Satd. Flow (perm)	1254	1443	0	1158	1602	0	486	1724	0	622	1750	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32			69			6				124
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.6			234.2			451.0			177.6	
Travel Time (s)		38.1			16.9			32.5			12.8	
Confl. Peds. (#/hr)							2					2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	9%	21%	13%	3%	2%	0%	4%	14%	8%	4%	2%
Adj. Flow (vph)	97	26	32	50	36	69	19	623	40	56	871	124
Shared Lane Traffic (%)												
Lane Group Flow (vph)	97	58	0	50	105	0	19	663	0	56	871	124
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	19.6	19.6		19.6	19.6		19.6	19.6		19.6	19.6	19.6
Total Split (s)	30.0	30.0		30.0	30.0		90.0	90.0		90.0	90.0	90.0
Total Split (%)	25.0%	25.0%		25.0%	25.0%		75.0%	75.0%		75.0%	75.0%	75.0%
Maximum Green (s)	23.4	23.4		23.4	23.4		83.4	83.4		83.4	83.4	83.4
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6		4.6	4.6	4.6
All-Red Time (s)	3.3	3.3		3.3	3.3		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6		6.6	6.6		6.6	6.6		6.6	6.6	6.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	6.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	14.9	14.9		14.9	14.9		91.9	91.9		91.9	91.9	91.9
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.77	0.77		0.77	0.77	0.77
v/c Ratio	0.62	0.28		0.35	0.41		0.05	0.50		0.12	0.65	0.11

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	66.4	27.6		53.2	23.3		4.2	5.8		5.1	10.2	1.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	66.4	27.6		53.2	23.3		4.2	5.8		5.1	10.2	1.0
LOS	E	C		D	C		A	A		A	B	A
Approach Delay		51.9			32.9			5.8			8.8	
Approach LOS		D			C			A			A	
Queue Length 50th (m)	20.3	5.1		10.1	7.1		0.8	36.1		2.6	73.6	0.0
Queue Length 95th (m)	34.9	15.7		20.4	21.1		m2.3	46.2		7.4	135.4	4.5
Internal Link Dist (m)		504.6			210.2			427.0			153.6	
Turn Bay Length (m)	25.0			45.0			115.0			125.0		105.0
Base Capacity (vph)	244	307		225	367		372	1320		475	1339	1156
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.40	0.19		0.22	0.29		0.05	0.50		0.12	0.65	0.11

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 18 (15%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 12.9		Intersection LOS: B	
Intersection Capacity Utilization 66.6%		ICU Level of Service C	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 1: Bank Street & Miikana Road/Blais Road





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	79	52	37	535	771	87
Future Volume (vph)	79	52	37	535	771	87
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	120.0			100.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1601	1369	1679	1701	1733	1532
Flt Permitted	0.950		0.283			
Satd. Flow (perm)	1601	1369	500	1701	1733	1532
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		58				97
Link Speed (k/h)	50			80	80	
Link Distance (m)	528.6			273.1	451.0	
Travel Time (s)	38.1			12.3	20.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	8%	13%	3%	7%	5%	1%
Adj. Flow (vph)	88	58	41	594	857	97
Shared Lane Traffic (%)						
Lane Group Flow (vph)	88	58	41	594	857	97
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	21.7	21.7	21.7	21.7
Total Split (s)	30.0	30.0	90.0	90.0	90.0	90.0
Total Split (%)	25.0%	25.0%	75.0%	75.0%	75.0%	75.0%
Maximum Green (s)	23.4	23.4	83.3	83.3	83.3	83.3
Yellow Time (s)	3.3	3.3	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	8.0	8.0	8.0	8.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	12.5	12.5	94.2	94.2	94.2	94.2
Actuated g/C Ratio	0.10	0.10	0.78	0.78	0.78	0.78
v/c Ratio	0.53	0.30	0.10	0.45	0.63	0.08
Control Delay	62.0	16.0	4.2	5.8	5.7	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay	62.0	16.0	4.2	5.8	5.7	0.5
LOS	E	B	A	A	A	A
Approach Delay	43.7			5.7	5.1	
Approach LOS	D			A	A	
Queue Length 50th (m)	18.5	0.0	1.7	34.1	44.6	0.0
Queue Length 95th (m)	32.7	11.1	5.1	60.4	54.3	m1.2
Internal Link Dist (m)	504.6			249.1	427.0	
Turn Bay Length (m)	25.0		120.0			100.0
Base Capacity (vph)	312	313	392	1334	1360	1223
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.19	0.10	0.45	0.63	0.08

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 18 (15%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 8.6		Intersection LOS: A	
Intersection Capacity Utilization 62.3%		ICU Level of Service B	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 2: Bank Street & Dun Skipper Drive



Intersection	
Intersection Delay, s/veh	12
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	202	90	49	134	79	44	19	35	107	46	28
Future Vol, veh/h	13	202	90	49	134	79	44	19	35	107	46	28
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	0	2	2	0	0	5	0	0	0	2	15	0
Mvmt Flow	14	224	100	54	149	88	49	21	39	119	51	31
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	12.8	11.9	10.1	11.6
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	45%	4%	19%	59%
Vol Thru, %	19%	66%	51%	25%
Vol Right, %	36%	30%	30%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	98	305	262	181
LT Vol	44	13	49	107
Through Vol	19	202	134	46
RT Vol	35	90	79	28
Lane Flow Rate	109	339	291	201
Geometry Grp	1	1	1	1
Degree of Util (X)	0.175	0.479	0.419	0.323
Departure Headway (Hd)	5.791	5.087	5.177	5.778
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	616	708	693	621
Service Time	3.852	3.129	3.22	3.83
HCM Lane V/C Ratio	0.177	0.479	0.42	0.324
HCM Control Delay	10.1	12.8	11.9	11.6
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	0.6	2.6	2.1	1.4

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	28	2	22	22	32	2	40	28	17	42	9
Future Vol, veh/h	9	28	2	22	22	32	2	40	28	17	42	9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	11	0	50	0	0	0	50	2	4	12	2	0
Mvmt Flow	10	31	2	24	24	36	2	44	31	19	47	10
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.8	7.6	8.5	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	23%	29%	25%
Vol Thru, %	57%	72%	29%	62%
Vol Right, %	40%	5%	42%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	70	39	76	68
LT Vol	2	9	22	17
Through Vol	40	28	22	42
RT Vol	28	2	32	9
Lane Flow Rate	78	43	84	76
Geometry Grp	1	1	1	1
Degree of Util (X)	0.104	0.055	0.097	0.094
Departure Headway (Hd)	4.798	4.566	4.129	4.463
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	737	787	871	808
Service Time	2.897	2.575	2.137	2.463
HCM Lane V/C Ratio	0.106	0.055	0.096	0.094
HCM Control Delay	8.5	7.8	7.6	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.2	0.3	0.3

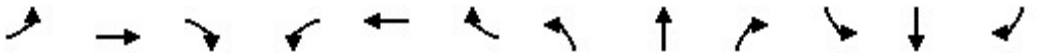
Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	45	0	13	29	19	1	19	26	19	20	16
Future Vol, veh/h	13	45	0	13	29	19	1	19	26	19	20	16
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	0	4	0	0	3	0	0	5	15	5	0	0
Mvmt Flow	14	50	0	14	32	21	1	21	29	21	22	18
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.6	7.4	7.1	7.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	22%	21%	35%
Vol Thru, %	41%	78%	48%	36%
Vol Right, %	57%	0%	31%	29%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	46	58	61	55
LT Vol	1	13	13	19
Through Vol	19	45	29	20
RT Vol	26	0	19	16
Lane Flow Rate	51	64	68	61
Geometry Grp	1	1	1	1
Degree of Util (X)	0.055	0.075	0.075	0.07
Departure Headway (Hd)	3.839	4.19	3.998	4.146
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	920	847	887	854
Service Time	1.917	2.254	2.064	2.219
HCM Lane V/C Ratio	0.055	0.076	0.077	0.071
HCM Control Delay	7.1	7.6	7.4	7.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.2	0.2	0.2

Future (2031) Background Traffic

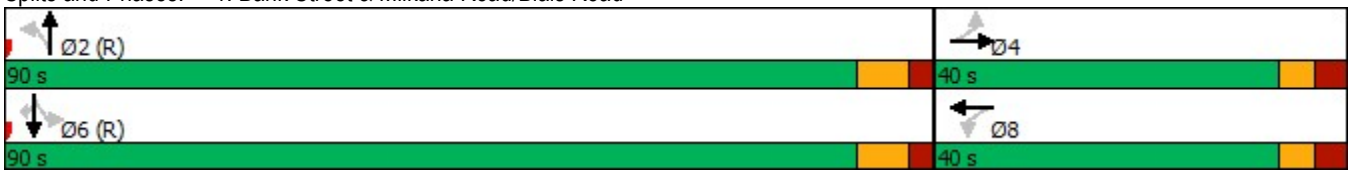


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	177	45	33	43	21	40	12	885	48	46	564	76
Future Volume (vph)	177	45	33	43	21	40	12	885	48	46	564	76
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		0.0	40.0		0.0	100.0		0.0	75.0		175.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00				0.99		1.00					0.98
Frt		0.937			0.902			0.992				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1729	1686	0	1478	1627	0	1729	3202	0	1662	3172	1488
Flt Permitted	0.717			0.706			0.440			0.285		
Satd. Flow (perm)	1303	1686	0	1098	1627	0	800	3202	0	499	3172	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			40			8				76
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		528.6			234.2			451.0			177.6	
Travel Time (s)		38.1			16.9			20.3			8.0	
Confl. Peds. (#/hr)	1					1	1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	0%	17%	0%	0%	0%	6%	28%	4%	9%	4%
Adj. Flow (vph)	177	45	33	43	21	40	12	885	48	46	564	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	177	78	0	43	61	0	12	933	0	46	564	76
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	33.8	33.8		33.8	33.8		42.6	42.6		42.6	42.6	42.6
Total Split (s)	40.0	40.0		40.0	40.0		90.0	90.0		90.0	90.0	90.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		69.2%	69.2%		69.2%	69.2%	69.2%
Maximum Green (s)	33.2	33.2		33.2	33.2		82.4	82.4		82.4	82.4	82.4
Yellow Time (s)	3.6	3.6		3.6	3.6		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	3.2	3.2		3.2	3.2		2.6	2.6		2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8		6.8	6.8		7.6	7.6		7.6	7.6	7.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		28.0	28.0		28.0	28.0	28.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	22.9	22.9		22.9	22.9		92.7	92.7		92.7	92.7	92.7
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.71	0.71		0.71	0.71	0.71
v/c Ratio	0.77	0.24		0.22	0.19		0.02	0.41		0.13	0.25	0.07

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	72.0	30.7		45.9	19.8		6.7	6.5		8.6	7.5	1.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	72.0	30.7		45.9	19.8		6.7	6.5		8.6	7.5	1.9
LOS	E	C		D	B		A	A		A	A	A
Approach Delay		59.4			30.6			6.5			6.9	
Approach LOS		E			C			A			A	
Queue Length 50th (m)	40.3	10.3		8.8	4.2		0.6	27.0		3.1	22.0	0.0
Queue Length 95th (m)	59.2	21.6		17.6	14.3		m1.4	46.0		9.2	36.3	4.9
Internal Link Dist (m)		504.6			210.2			427.0			153.6	
Turn Bay Length (m)	100.0			40.0			100.0			75.0		175.0
Base Capacity (vph)	332	450		280	445		570	2285		355	2261	1059
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.53	0.17		0.15	0.14		0.02	0.41		0.13	0.25	0.07

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 16 (12%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 14.7		Intersection LOS: B	
Intersection Capacity Utilization 69.4%		ICU Level of Service C	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 1: Bank Street & Miikana Road/Blais Road



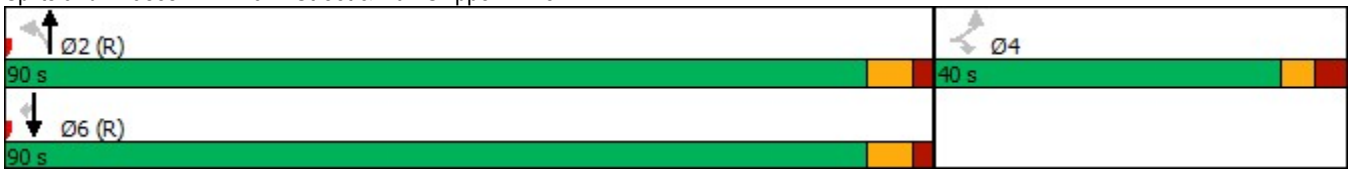


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	264	71	118	678	520	61
Future Volume (vph)	264	71	118	678	520	61
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	120.0			100.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			1.00			0.96
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1616	1459	1558	1655	1640	1172
Flt Permitted	0.950		0.423			
Satd. Flow (perm)	1616	1459	690	1655	1640	1129
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		71				61
Link Speed (k/h)	50			80	80	
Link Distance (m)	528.6			273.1	451.0	
Travel Time (s)	38.1			12.3	20.3	
Confl. Peds. (#/hr)			4			4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	6%	11%	10%	11%	32%
Adj. Flow (vph)	264	71	118	678	520	61
Shared Lane Traffic (%)						
Lane Group Flow (vph)	264	71	118	678	520	61
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	21.7	21.7	21.7	21.7
Total Split (s)	40.0	40.0	90.0	90.0	90.0	90.0
Total Split (%)	30.8%	30.8%	69.2%	69.2%	69.2%	69.2%
Maximum Green (s)	33.4	33.4	83.3	83.3	83.3	83.3
Yellow Time (s)	3.3	3.3	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	8.0	8.0	8.0	8.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	26.1	26.1	90.6	90.6	90.6	90.6
Actuated g/C Ratio	0.20	0.20	0.70	0.70	0.70	0.70
v/c Ratio	0.81	0.20	0.25	0.59	0.45	0.08

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Control Delay	68.8	9.9	9.9	13.7	10.6	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.8	9.9	9.9	13.7	10.6	1.5
LOS	E	A	A	B	B	A
Approach Delay	56.3			13.2	9.6	
Approach LOS	E			B	A	
Queue Length 50th (m)	59.8	0.0	9.4	75.6	67.4	0.6
Queue Length 95th (m)	83.1	10.8	20.9	126.5	105.3	0.6
Internal Link Dist (m)	504.6			249.1	427.0	
Turn Bay Length (m)	25.0		120.0			100.0
Base Capacity (vph)	415	427	480	1153	1143	805
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.17	0.25	0.59	0.45	0.08

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 40 (31%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 20.4		Intersection LOS: C	
Intersection Capacity Utilization 69.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: Bank Street & Dun Skipper Drive



Intersection	
Intersection Delay, s/veh	11.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	168	37	22	166	105	58	78	35	124	52	53
Future Vol, veh/h	28	168	37	22	166	105	58	78	35	124	52	53
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	1	8	5	1	7	0	2	6	2	0	0
Mvmt Flow	28	168	37	22	166	105	58	78	35	124	52	53
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.5	12.4	10.9	11.9
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	34%	12%	8%	54%
Vol Thru, %	46%	72%	57%	23%
Vol Right, %	20%	16%	36%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	171	233	293	229
LT Vol	58	28	22	124
Through Vol	78	168	166	52
RT Vol	35	37	105	53
Lane Flow Rate	171	233	293	229
Geometry Grp	1	1	1	1
Degree of Util (X)	0.27	0.353	0.433	0.359
Departure Headway (Hd)	5.692	5.459	5.322	5.639
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	628	657	674	634
Service Time	3.754	3.513	3.373	3.696
HCM Lane V/C Ratio	0.272	0.355	0.435	0.361
HCM Control Delay	10.9	11.5	12.4	11.9
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	1.1	1.6	2.2	1.6

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	42	9	23	20	27	3	56	62	39	38	12
Future Vol, veh/h	18	42	9	23	20	27	3	56	62	39	38	12
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	8	5	56	6	7	0	33	5	0	22	11	50
Mvmt Flow	18	42	9	23	20	27	3	56	62	39	38	12
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.1	7.9	8.4	8.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	26%	33%	44%
Vol Thru, %	46%	61%	29%	43%
Vol Right, %	51%	13%	39%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	121	69	70	89
LT Vol	3	18	23	39
Through Vol	56	42	20	38
RT Vol	62	9	27	12
Lane Flow Rate	121	69	70	89
Geometry Grp	1	1	1	1
Degree of Util (X)	0.154	0.088	0.086	0.117
Departure Headway (Hd)	4.588	4.596	4.424	4.744
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	784	782	812	757
Service Time	2.603	2.612	2.44	2.759
HCM Lane V/C Ratio	0.154	0.088	0.086	0.118
HCM Control Delay	8.4	8.1	7.9	8.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.3	0.3	0.4

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	57	7	37	39	26	3	23	44	32	19	2
Future Vol, veh/h	17	57	7	37	39	26	3	23	44	32	19	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	9	0	20	10	8	0	5	19	0	12	0
Mvmt Flow	17	57	7	37	39	26	3	23	44	32	19	2
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.7	8.2	7.4	7.8
HCM LOS	A	A	A	A

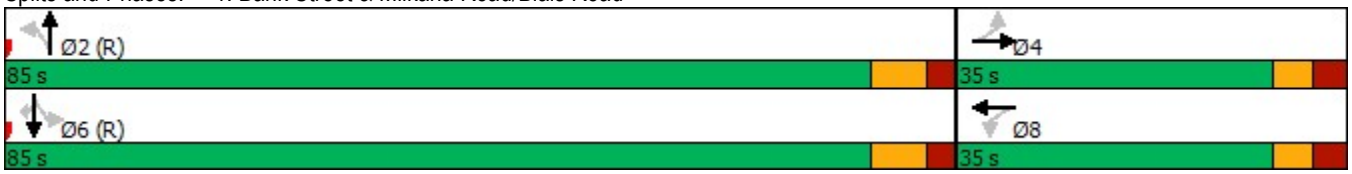
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	21%	36%	60%
Vol Thru, %	33%	70%	38%	36%
Vol Right, %	63%	9%	25%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	70	81	102	53
LT Vol	3	17	37	32
Through Vol	23	57	39	19
RT Vol	44	7	26	2
Lane Flow Rate	70	81	102	53
Geometry Grp	1	1	1	1
Degree of Util (X)	0.078	0.094	0.126	0.066
Departure Headway (Hd)	4.013	4.182	4.435	4.493
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	897	842	798	802
Service Time	2.015	2.282	2.524	2.495
HCM Lane V/C Ratio	0.078	0.096	0.128	0.066
HCM Control Delay	7.4	7.7	8.2	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.3	0.4	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	132	23	43	54	32	62	23	848	45	50	1101	187
Future Volume (vph)	132	23	43	54	32	62	23	848	45	50	1101	187
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		0.0	40.0		0.0	100.0		0.0	75.0		175.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor							1.00					0.98
Frt		0.902			0.901			0.992				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1729	1405	0	1530	1602	0	1729	3282	0	1601	3325	1517
Flt Permitted	0.696			0.714			0.236			0.305		
Satd. Flow (perm)	1267	1405	0	1150	1602	0	429	3282	0	514	3325	1481
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		43			62			9				187
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.6			234.2			451.0			177.6	
Travel Time (s)		38.1			16.9			32.5			12.8	
Confl. Peds. (#/hr)							2					2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	9%	21%	13%	3%	2%	0%	4%	14%	8%	4%	2%
Adj. Flow (vph)	132	23	43	54	32	62	23	848	45	50	1101	187
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	66	0	54	94	0	23	893	0	50	1101	187
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	33.8	33.8		33.8	33.8		42.6	42.6		42.6	42.6	42.6
Total Split (s)	35.0	35.0		35.0	35.0		85.0	85.0		85.0	85.0	85.0
Total Split (%)	29.2%	29.2%		29.2%	29.2%		70.8%	70.8%		70.8%	70.8%	70.8%
Maximum Green (s)	28.2	28.2		28.2	28.2		77.4	77.4		77.4	77.4	77.4
Yellow Time (s)	3.6	3.6		3.6	3.6		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	3.2	3.2		3.2	3.2		2.6	2.6		2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8		6.8	6.8		7.6	7.6		7.6	7.6	7.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		28.0	28.0		28.0	28.0	28.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	17.8	17.8		17.8	17.8		87.8	87.8		87.8	87.8	87.8
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.73	0.73		0.73	0.73	0.73
v/c Ratio	0.71	0.27		0.32	0.32		0.07	0.37		0.13	0.45	0.17

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	67.5	21.3		48.5	20.3		4.6	4.3		7.1	7.8	1.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	67.5	21.3		48.5	20.3		4.6	4.3		7.1	7.8	1.3
LOS	E	C		D	C		A	A		A	A	A
Approach Delay		52.1			30.6			4.3			6.8	
Approach LOS		D			C			A			A	
Queue Length 50th (m)	27.6	4.4		10.6	6.1		0.9	20.6		2.8	44.2	0.0
Queue Length 95th (m)	43.9	15.0		20.6	18.6		m1.9	m28.6		8.5	70.1	6.4
Internal Link Dist (m)		504.6			210.2			427.0			153.6	
Turn Bay Length (m)	100.0			40.0			100.0			75.0		175.0
Base Capacity (vph)	297	363		270	423		313	2404		376	2433	1133
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.44	0.18		0.20	0.22		0.07	0.37		0.13	0.45	0.17

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 18 (15%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 10.8		Intersection LOS: B	
Intersection Capacity Utilization 70.2%		ICU Level of Service C	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 1: Bank Street & Miikana Road/Blais Road



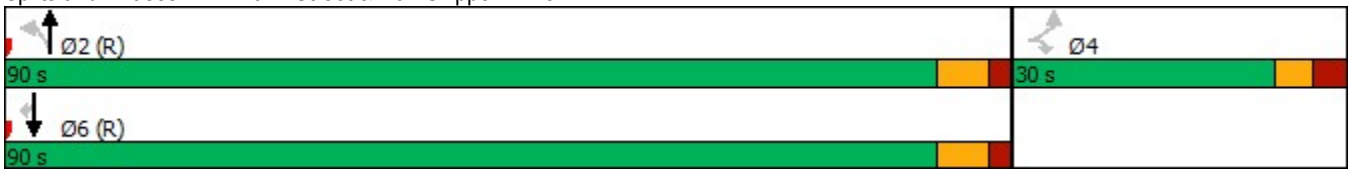


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	269	90	137	643	980	135
Future Volume (vph)	269	90	137	643	980	135
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	120.0			100.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1601	1369	1679	1701	1733	1532
Flt Permitted	0.950		0.175			
Satd. Flow (perm)	1601	1369	309	1701	1733	1532
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		90				135
Link Speed (k/h)	50			80	80	
Link Distance (m)	528.6			273.1	451.0	
Travel Time (s)	38.1			12.3	20.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	8%	13%	3%	7%	5%	1%
Adj. Flow (vph)	269	90	137	643	980	135
Shared Lane Traffic (%)						
Lane Group Flow (vph)	269	90	137	643	980	135
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	21.7	21.7	21.7	21.7
Total Split (s)	30.0	30.0	90.0	90.0	90.0	90.0
Total Split (%)	25.0%	25.0%	75.0%	75.0%	75.0%	75.0%
Maximum Green (s)	23.4	23.4	83.3	83.3	83.3	83.3
Yellow Time (s)	3.3	3.3	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	8.0	8.0	8.0	8.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	22.5	22.5	84.2	84.2	84.2	84.2
Actuated g/C Ratio	0.19	0.19	0.70	0.70	0.70	0.70
v/c Ratio	0.90	0.27	0.63	0.54	0.81	0.12
Control Delay	79.5	10.5	26.2	10.8	14.7	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay	79.5	10.5	26.2	10.8	14.7	0.4
LOS	E	B	C	B	B	A
Approach Delay	62.2			13.5	13.0	
Approach LOS	E			B	B	
Queue Length 50th (m)	57.0	0.0	14.7	61.8	146.6	0.0
Queue Length 95th (m)	#98.8	12.6	#46.8	87.0	86.2	1.2
Internal Link Dist (m)	504.6			249.1	427.0	
Turn Bay Length (m)	25.0		120.0			100.0
Base Capacity (vph)	312	339	216	1193	1216	1115
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.27	0.63	0.54	0.81	0.12

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 18 (15%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 21.0		Intersection LOS: C	
Intersection Capacity Utilization 95.2%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 2: Bank Street & Dun Skipper Drive



Intersection	
Intersection Delay, s/veh	12.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	264	91	49	182	79	45	37	35	107	55	28
Future Vol, veh/h	13	264	91	49	182	79	45	37	35	107	55	28
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	2	2	0	0	5	0	0	0	2	15	0
Mvmt Flow	13	264	91	49	182	79	45	37	35	107	55	28
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	13.9	12.6	10.5	11.7
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	38%	4%	16%	56%
Vol Thru, %	32%	72%	59%	29%
Vol Right, %	30%	25%	25%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	117	368	310	190
LT Vol	45	13	49	107
Through Vol	37	264	182	55
RT Vol	35	91	79	28
Lane Flow Rate	117	368	310	190
Geometry Grp	1	1	1	1
Degree of Util (X)	0.193	0.528	0.453	0.314
Departure Headway (Hd)	5.951	5.165	5.264	5.943
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	600	696	682	602
Service Time	4.021	3.212	3.316	4.005
HCM Lane V/C Ratio	0.195	0.529	0.455	0.316
HCM Control Delay	10.5	13.9	12.6	11.7
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	0.7	3.1	2.4	1.3

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	47	2	39	39	58	2	53	41	31	50	9
Future Vol, veh/h	13	47	2	39	39	58	2	53	41	31	50	9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	11	0	50	0	0	0	50	2	4	12	2	0
Mvmt Flow	13	47	2	39	39	58	2	53	41	31	50	9
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.2	8.1	8.9	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	21%	29%	34%
Vol Thru, %	55%	76%	29%	56%
Vol Right, %	43%	3%	43%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	96	62	136	90
LT Vol	2	13	39	31
Through Vol	53	47	39	50
RT Vol	41	2	58	9
Lane Flow Rate	96	62	136	90
Geometry Grp	1	1	1	1
Degree of Util (X)	0.135	0.081	0.16	0.117
Departure Headway (Hd)	5.054	4.726	4.243	4.684
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	710	760	847	766
Service Time	3.076	2.747	2.261	2.706
HCM Lane V/C Ratio	0.135	0.082	0.161	0.117
HCM Control Delay	8.9	8.2	8.1	8.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.3	0.6	0.4

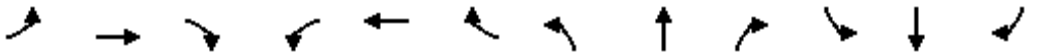
Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	16	66	0	32	55	43	1	20	40	33	21	16
Future Vol, veh/h	16	66	0	32	55	43	1	20	40	33	21	16
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	4	0	0	3	0	0	5	15	5	0	0
Mvmt Flow	16	66	0	32	55	43	1	20	40	33	21	16
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.9	7.8	7.4	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	20%	25%	47%
Vol Thru, %	33%	80%	42%	30%
Vol Right, %	66%	0%	33%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	61	82	130	70
LT Vol	1	16	32	33
Through Vol	20	66	55	21
RT Vol	40	0	43	16
Lane Flow Rate	61	82	130	70
Geometry Grp	1	1	1	1
Degree of Util (X)	0.069	0.1	0.146	0.087
Departure Headway (Hd)	4.055	4.373	4.142	4.473
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	887	824	871	804
Service Time	2.063	2.373	2.142	2.48
HCM Lane V/C Ratio	0.069	0.1	0.149	0.087
HCM Control Delay	7.4	7.9	7.8	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.3	0.5	0.3

Future (2036) Background Traffic

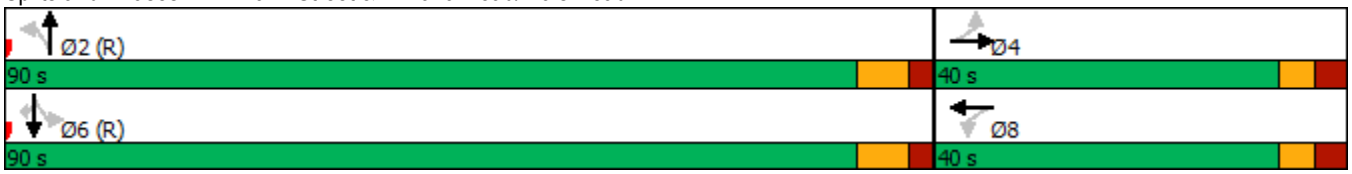


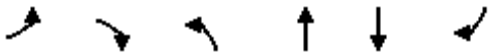
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	177	45	33	43	21	40	12	932	48	46	590	76
Future Volume (vph)	177	45	33	43	21	40	12	932	48	46	590	76
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		0.0	40.0		0.0	100.0		0.0	75.0		175.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00				0.99		1.00					0.98
Frt		0.937			0.902			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1729	1686	0	1478	1627	0	1729	3207	0	1662	3172	1488
Flt Permitted	0.717			0.706			0.428			0.269		
Satd. Flow (perm)	1303	1686	0	1098	1627	0	778	3207	0	471	3172	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			40			8				76
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		528.6			234.2			451.0			177.6	
Travel Time (s)		38.1			16.9			20.3			8.0	
Confl. Peds. (#/hr)	1					1	1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	0%	17%	0%	0%	0%	6%	28%	4%	9%	4%
Adj. Flow (vph)	177	45	33	43	21	40	12	932	48	46	590	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	177	78	0	43	61	0	12	980	0	46	590	76
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	33.8	33.8		33.8	33.8		42.6	42.6		42.6	42.6	42.6
Total Split (s)	40.0	40.0		40.0	40.0		90.0	90.0		90.0	90.0	90.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		69.2%	69.2%		69.2%	69.2%	69.2%
Maximum Green (s)	33.2	33.2		33.2	33.2		82.4	82.4		82.4	82.4	82.4
Yellow Time (s)	3.6	3.6		3.6	3.6		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	3.2	3.2		3.2	3.2		2.6	2.6		2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8		6.8	6.8		7.6	7.6		7.6	7.6	7.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		28.0	28.0		28.0	28.0	28.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	22.9	22.9		22.9	22.9		92.7	92.7		92.7	92.7	92.7
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.71	0.71		0.71	0.71	0.71
v/c Ratio	0.77	0.24		0.22	0.19		0.02	0.43		0.14	0.26	0.07

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	72.0	30.7		45.9	19.8		7.2	7.0		8.7	7.6	1.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	72.0	30.7		45.9	19.8		7.2	7.0		8.7	7.6	1.9
LOS	E	C		D	B		A	A		A	A	A
Approach Delay		59.4			30.6			7.0			7.1	
Approach LOS		E			C			A			A	
Queue Length 50th (m)	40.3	10.3		8.8	4.2		0.6	29.4		3.1	23.3	0.0
Queue Length 95th (m)	59.2	21.6		17.6	14.3		m1.5	56.8		9.3	38.2	4.9
Internal Link Dist (m)		504.6			210.2			427.0			153.6	
Turn Bay Length (m)	100.0			40.0			100.0			75.0		175.0
Base Capacity (vph)	332	450		280	445		554	2289		335	2261	1059
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.53	0.17		0.15	0.14		0.02	0.43		0.14	0.26	0.07

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 16 (12%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 14.7		Intersection LOS: B	
Intersection Capacity Utilization 69.4%		ICU Level of Service C	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 1: Bank Street & Miikana Road/Blais Road





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	264	71	118	723	548	61
Future Volume (vph)	264	71	118	723	548	61
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	120.0			100.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			1.00			0.96
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1616	1459	1558	1655	1640	1172
Flt Permitted	0.950		0.406			
Satd. Flow (perm)	1616	1459	663	1655	1640	1129
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		71				61
Link Speed (k/h)	50			80	80	
Link Distance (m)	528.6			273.1	451.0	
Travel Time (s)	38.1			12.3	20.3	
Confl. Peds. (#/hr)			4			4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	6%	11%	10%	11%	32%
Adj. Flow (vph)	264	71	118	723	548	61
Shared Lane Traffic (%)						
Lane Group Flow (vph)	264	71	118	723	548	61
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	21.7	21.7	21.7	21.7
Total Split (s)	40.0	40.0	90.0	90.0	90.0	90.0
Total Split (%)	30.8%	30.8%	69.2%	69.2%	69.2%	69.2%
Maximum Green (s)	33.4	33.4	83.3	83.3	83.3	83.3
Yellow Time (s)	3.3	3.3	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	8.0	8.0	8.0	8.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	26.1	26.1	90.6	90.6	90.6	90.6
Actuated g/C Ratio	0.20	0.20	0.70	0.70	0.70	0.70
v/c Ratio	0.81	0.20	0.26	0.63	0.48	0.08

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Control Delay	68.8	9.9	10.1	14.7	10.9	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.8	9.9	10.1	14.7	10.9	1.4
LOS	E	A	B	B	B	A
Approach Delay	56.3			14.1	9.9	
Approach LOS	E			B	A	
Queue Length 50th (m)	59.8	0.0	9.4	84.4	72.1	0.6
Queue Length 95th (m)	83.1	10.8	21.2	141.9	113.0	0.6
Internal Link Dist (m)	504.6			249.1	427.0	
Turn Bay Length (m)	25.0		120.0			100.0
Base Capacity (vph)	415	427	462	1153	1143	805
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.17	0.26	0.63	0.48	0.08

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 40 (31%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 20.6		Intersection LOS: C	
Intersection Capacity Utilization 70.9%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: Bank Street & Dun Skipper Drive



Intersection	
Intersection Delay, s/veh	11.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	168	37	22	166	105	58	78	35	124	52	53
Future Vol, veh/h	28	168	37	22	166	105	58	78	35	124	52	53
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	1	8	5	1	7	0	2	6	2	0	0
Mvmt Flow	28	168	37	22	166	105	58	78	35	124	52	53
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.5	12.4	10.9	11.9
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	34%	12%	8%	54%
Vol Thru, %	46%	72%	57%	23%
Vol Right, %	20%	16%	36%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	171	233	293	229
LT Vol	58	28	22	124
Through Vol	78	168	166	52
RT Vol	35	37	105	53
Lane Flow Rate	171	233	293	229
Geometry Grp	1	1	1	1
Degree of Util (X)	0.27	0.353	0.433	0.359
Departure Headway (Hd)	5.692	5.459	5.322	5.639
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	628	657	674	634
Service Time	3.754	3.513	3.373	3.696
HCM Lane V/C Ratio	0.272	0.355	0.435	0.361
HCM Control Delay	10.9	11.5	12.4	11.9
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	1.1	1.6	2.2	1.6

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	42	9	23	20	27	3	56	62	39	38	12
Future Vol, veh/h	18	42	9	23	20	27	3	56	62	39	38	12
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	8	5	56	6	7	0	33	5	0	22	11	50
Mvmt Flow	18	42	9	23	20	27	3	56	62	39	38	12
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.1	7.9	8.4	8.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	26%	33%	44%
Vol Thru, %	46%	61%	29%	43%
Vol Right, %	51%	13%	39%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	121	69	70	89
LT Vol	3	18	23	39
Through Vol	56	42	20	38
RT Vol	62	9	27	12
Lane Flow Rate	121	69	70	89
Geometry Grp	1	1	1	1
Degree of Util (X)	0.154	0.088	0.086	0.117
Departure Headway (Hd)	4.588	4.596	4.424	4.744
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	784	782	812	757
Service Time	2.603	2.612	2.44	2.759
HCM Lane V/C Ratio	0.154	0.088	0.086	0.118
HCM Control Delay	8.4	8.1	7.9	8.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.3	0.3	0.4

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	57	7	37	39	26	3	23	44	32	19	2
Future Vol, veh/h	17	57	7	37	39	26	3	23	44	32	19	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	9	0	20	10	8	0	5	19	0	12	0
Mvmt Flow	17	57	7	37	39	26	3	23	44	32	19	2
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.7	8.2	7.4	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	21%	36%	60%
Vol Thru, %	33%	70%	38%	36%
Vol Right, %	63%	9%	25%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	70	81	102	53
LT Vol	3	17	37	32
Through Vol	23	57	39	19
RT Vol	44	7	26	2
Lane Flow Rate	70	81	102	53
Geometry Grp	1	1	1	1
Degree of Util (X)	0.078	0.094	0.126	0.066
Departure Headway (Hd)	4.013	4.182	4.435	4.493
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	897	842	798	802
Service Time	2.015	2.282	2.524	2.495
HCM Lane V/C Ratio	0.078	0.096	0.128	0.066
HCM Control Delay	7.4	7.7	8.2	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.3	0.4	0.2

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	842	599	0
Future Vol, veh/h	0	0	0	842	599	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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, %	0	0	0	10	11	0
Mvmt Flow	0	0	0	842	599	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1441	599	599	0	-	0
Stage 1	599	-	-	-	-	-
Stage 2	842	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	148	505	988	-	-	-
Stage 1	553	-	-	-	-	-
Stage 2	426	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	148	505	988	-	-	-
Mov Cap-2 Maneuver	148	-	-	-	-	-
Stage 1	553	-	-	-	-	-
Stage 2	426	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

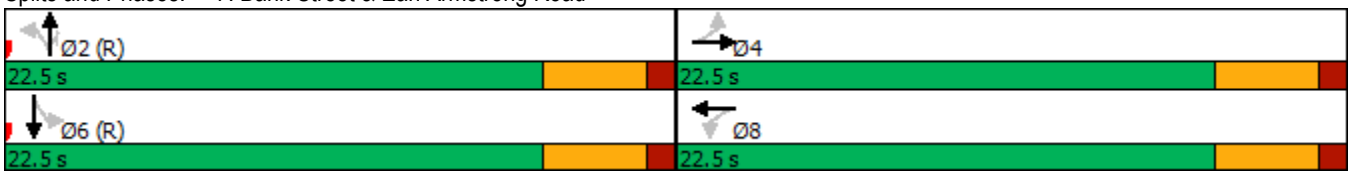
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	988	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

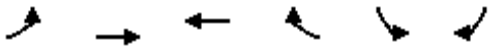
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	842	0	0	599	0
Future Volume (vph)	0	0	0	0	0	0	0	842	0	0	599	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0		0.0	50.0		0.0	20.0		15.0	15.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt												
Flt Protected												
Satd. Flow (prot)	1820	3232	0	1379	1468	0	1784	1750	1517	1569	3144	0
Flt Permitted												
Satd. Flow (perm)	1820	3232	0	1379	1468	0	1784	1750	1517	1569	3144	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		528.5			292.7			203.7			158.2	
Travel Time (s)		23.8			13.2			9.2			7.1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	7%	5%	32%	24%	34%	2%	4%	20%	16%	10%	12%
Adj. Flow (vph)	0	0	0	0	0	0	0	842	0	0	599	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	842	0	0	599	0
Turn Type	Perm			Perm			Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)								45.0			45.0	
Actuated g/C Ratio								1.00			1.00	
v/c Ratio								0.48			0.19	
Control Delay								1.0			0.1	
Queue Delay								0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay								1.0			0.1	
LOS								A			A	
Approach Delay								1.0			0.1	
Approach LOS								A			A	
Queue Length 50th (m)								0.0			0.0	
Queue Length 95th (m)								0.0			0.0	
Internal Link Dist (m)		504.5			268.7			179.7			134.2	
Turn Bay Length (m)												
Base Capacity (vph)								1750			3144	
Starvation Cap Reductn								0			0	
Spillback Cap Reductn								0			0	
Storage Cap Reductn								0			0	
Reduced v/c Ratio								0.48			0.19	

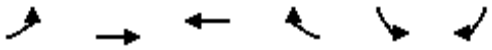
Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 0.6		Intersection LOS: A	
Intersection Capacity Utilization 50.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 7: Bank Street & Earl Armstrong Road





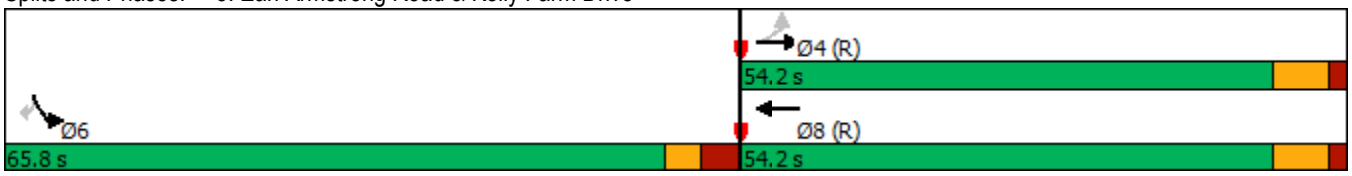
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	40.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1625	3262	3007	0	1596	1596
Flt Permitted						
Satd. Flow (perm)	1625	3262	3007	0	1596	1596
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						
Link Speed (k/h)		80	80		40	
Link Distance (m)		222.0	528.5		431.1	
Travel Time (s)		10.0	23.8		38.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	12%	6%	15%	12%	14%	14%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Turn Type	Perm				Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	24.8	24.8	24.8		33.8	33.8
Total Split (s)	54.2	54.2	54.2		65.8	65.8
Total Split (%)	45.2%	45.2%	45.2%		54.8%	54.8%
Maximum Green (s)	47.4	47.4	47.4		59.0	59.0
Yellow Time (s)	5.0	5.0	5.0		3.2	3.2
All-Red Time (s)	1.8	1.8	1.8		3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.8	6.8	6.8		6.8	6.8
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0		20.0	20.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)						
Actuated g/C Ratio						
v/c Ratio						
Control Delay						
Queue Delay						



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Total Delay						
LOS						
Approach Delay						
Approach LOS						
Queue Length 50th (m)						
Queue Length 95th (m)						
Internal Link Dist (m)		198.0	504.5		407.1	
Turn Bay Length (m)						
Base Capacity (vph)						
Starvation Cap Reductn						
Spillback Cap Reductn						
Storage Cap Reductn						
Reduced v/c Ratio						

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 59.5 (50%), Referenced to phase 4:EBTL and 8:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.00			
Intersection Signal Delay: 0.0		Intersection LOS: A	
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 8: Earl Armstrong Road & Kelly Farm Drive

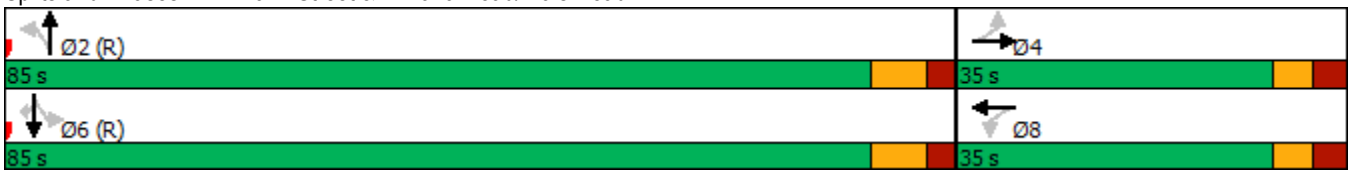


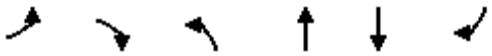
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	132	23	43	54	32	62	23	891	45	50	1160	187
Future Volume (vph)	132	23	43	54	32	62	23	891	45	50	1160	187
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		0.0	40.0		0.0	100.0		0.0	75.0		175.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor							1.00					0.98
Frt		0.902			0.901			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1729	1405	0	1530	1602	0	1729	3287	0	1601	3325	1517
Flt Permitted	0.696			0.714			0.219			0.290		
Satd. Flow (perm)	1267	1405	0	1150	1602	0	398	3287	0	489	3325	1481
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		43			62			8				187
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.6			234.2			451.0			177.6	
Travel Time (s)		38.1			16.9			32.5			12.8	
Confl. Peds. (#/hr)							2					2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	9%	21%	13%	3%	2%	0%	4%	14%	8%	4%	2%
Adj. Flow (vph)	132	23	43	54	32	62	23	891	45	50	1160	187
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	66	0	54	94	0	23	936	0	50	1160	187
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	33.8	33.8		33.8	33.8		42.6	42.6		42.6	42.6	42.6
Total Split (s)	35.0	35.0		35.0	35.0		85.0	85.0		85.0	85.0	85.0
Total Split (%)	29.2%	29.2%		29.2%	29.2%		70.8%	70.8%		70.8%	70.8%	70.8%
Maximum Green (s)	28.2	28.2		28.2	28.2		77.4	77.4		77.4	77.4	77.4
Yellow Time (s)	3.6	3.6		3.6	3.6		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	3.2	3.2		3.2	3.2		2.6	2.6		2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8		6.8	6.8		7.6	7.6		7.6	7.6	7.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		28.0	28.0		28.0	28.0	28.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	17.8	17.8		17.8	17.8		87.8	87.8		87.8	87.8	87.8
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.73	0.73		0.73	0.73	0.73
v/c Ratio	0.71	0.27		0.32	0.32		0.08	0.39		0.14	0.48	0.17

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	67.5	21.3		48.5	20.3		4.8	4.5		7.2	8.0	1.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	67.5	21.3		48.5	20.3		4.8	4.5		7.2	8.0	1.3
LOS	E	C		D	C		A	A		A	A	A
Approach Delay		52.1			30.6			4.5			7.1	
Approach LOS		D			C			A			A	
Queue Length 50th (m)	27.6	4.4		10.6	6.1		0.9	22.5		2.8	47.7	0.0
Queue Length 95th (m)	43.9	15.0		20.6	18.6		m1.8	m30.5		8.6	75.5	6.4
Internal Link Dist (m)		504.6			210.2			427.0			153.6	
Turn Bay Length (m)	100.0			40.0			100.0			75.0		175.0
Base Capacity (vph)	297	363		270	423		291	2407		357	2433	1133
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.44	0.18		0.20	0.22		0.08	0.39		0.14	0.48	0.17

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 18 (15%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 10.8		Intersection LOS: B	
Intersection Capacity Utilization 70.2%		ICU Level of Service C	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 1: Bank Street & Miikana Road/Blais Road





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	269	90	137	683	1038	135
Future Volume (vph)	269	90	137	683	1038	135
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	120.0			100.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1601	1369	1679	1701	1733	1532
Flt Permitted	0.950		0.145			
Satd. Flow (perm)	1601	1369	256	1701	1733	1532
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		90				135
Link Speed (k/h)	50			80	80	
Link Distance (m)	528.6			273.1	451.0	
Travel Time (s)	38.1			12.3	20.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	8%	13%	3%	7%	5%	1%
Adj. Flow (vph)	269	90	137	683	1038	135
Shared Lane Traffic (%)						
Lane Group Flow (vph)	269	90	137	683	1038	135
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	21.7	21.7	21.7	21.7
Total Split (s)	30.0	30.0	90.0	90.0	90.0	90.0
Total Split (%)	25.0%	25.0%	75.0%	75.0%	75.0%	75.0%
Maximum Green (s)	23.4	23.4	83.3	83.3	83.3	83.3
Yellow Time (s)	3.3	3.3	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	8.0	8.0	8.0	8.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	22.5	22.5	84.2	84.2	84.2	84.2
Actuated g/C Ratio	0.19	0.19	0.70	0.70	0.70	0.70
v/c Ratio	0.90	0.27	0.77	0.57	0.85	0.12
Control Delay	79.5	10.5	43.1	11.5	17.6	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay	79.5	10.5	43.1	11.5	17.6	0.4
LOS	E	B	D	B	B	A
Approach Delay	62.2			16.7	15.6	
Approach LOS	E			B	B	
Queue Length 50th (m)	57.0	0.0	17.6	68.2	165.8	0.0
Queue Length 95th (m)	#98.8	12.6	#58.3	96.0	106.2	1.2
Internal Link Dist (m)	504.6			249.1	427.0	
Turn Bay Length (m)	25.0		120.0			100.0
Base Capacity (vph)	312	339	179	1193	1216	1115
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.27	0.77	0.57	0.85	0.12

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 18 (15%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 23.1		Intersection LOS: C	
Intersection Capacity Utilization 98.4%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 2: Bank Street & Dun Skipper Drive



Intersection	
Intersection Delay, s/veh	12.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	264	91	49	182	79	45	37	35	107	55	28
Future Vol, veh/h	13	264	91	49	182	79	45	37	35	107	55	28
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	2	2	0	0	5	0	0	0	2	15	0
Mvmt Flow	13	264	91	49	182	79	45	37	35	107	55	28
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	13.9	12.6	10.5	11.7
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	38%	4%	16%	56%
Vol Thru, %	32%	72%	59%	29%
Vol Right, %	30%	25%	25%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	117	368	310	190
LT Vol	45	13	49	107
Through Vol	37	264	182	55
RT Vol	35	91	79	28
Lane Flow Rate	117	368	310	190
Geometry Grp	1	1	1	1
Degree of Util (X)	0.193	0.528	0.453	0.314
Departure Headway (Hd)	5.951	5.165	5.264	5.943
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	600	696	682	602
Service Time	4.021	3.212	3.316	4.005
HCM Lane V/C Ratio	0.195	0.529	0.455	0.316
HCM Control Delay	10.5	13.9	12.6	11.7
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	0.7	3.1	2.4	1.3

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	47	2	39	39	58	2	53	41	31	50	9
Future Vol, veh/h	13	47	2	39	39	58	2	53	41	31	50	9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	11	0	50	0	0	0	50	2	4	12	2	0
Mvmt Flow	13	47	2	39	39	58	2	53	41	31	50	9
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.2	8.1	8.9	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	21%	29%	34%
Vol Thru, %	55%	76%	29%	56%
Vol Right, %	43%	3%	43%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	96	62	136	90
LT Vol	2	13	39	31
Through Vol	53	47	39	50
RT Vol	41	2	58	9
Lane Flow Rate	96	62	136	90
Geometry Grp	1	1	1	1
Degree of Util (X)	0.135	0.081	0.16	0.117
Departure Headway (Hd)	5.054	4.726	4.243	4.684
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	710	760	847	766
Service Time	3.076	2.747	2.261	2.706
HCM Lane V/C Ratio	0.135	0.082	0.161	0.117
HCM Control Delay	8.9	8.2	8.1	8.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.3	0.6	0.4

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	66	0	32	55	43	1	20	40	33	21	16
Future Vol, veh/h	16	66	0	32	55	43	1	20	40	33	21	16
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	4	0	0	3	0	0	5	15	5	0	0
Mvmt Flow	16	66	0	32	55	43	1	20	40	33	21	16
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.9	7.8	7.4	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	20%	25%	47%
Vol Thru, %	33%	80%	42%	30%
Vol Right, %	66%	0%	33%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	61	82	130	70
LT Vol	1	16	32	33
Through Vol	20	66	55	21
RT Vol	40	0	43	16
Lane Flow Rate	61	82	130	70
Geometry Grp	1	1	1	1
Degree of Util (X)	0.069	0.1	0.146	0.087
Departure Headway (Hd)	4.055	4.373	4.142	4.473
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	887	824	871	804
Service Time	2.063	2.373	2.142	2.48
HCM Lane V/C Ratio	0.069	0.1	0.149	0.087
HCM Control Delay	7.4	7.9	7.8	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.3	0.5	0.3

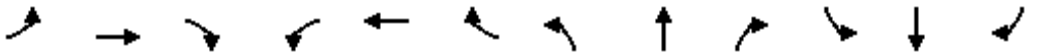
Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	827	1098	0
Future Vol, veh/h	0	0	0	827	1098	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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, %	0	0	0	7	6	0
Mvmt Flow	0	0	0	827	1098	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1925	1098	1098	0	-	0
Stage 1	1098	-	-	-	-	-
Stage 2	827	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	74	261	643	-	-	-
Stage 1	322	-	-	-	-	-
Stage 2	433	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	74	261	643	-	-	-
Mov Cap-2 Maneuver	74	-	-	-	-	-
Stage 1	322	-	-	-	-	-
Stage 2	433	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	643	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

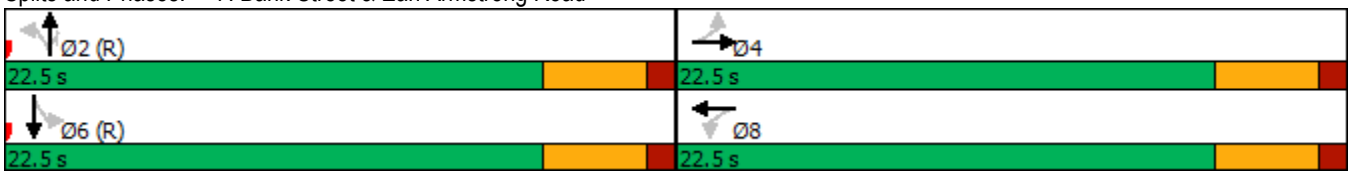


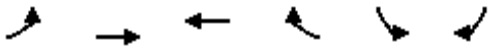
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	827	0	0	1098	0
Future Volume (vph)	0	0	0	0	0	0	0	827	0	0	1098	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0		0.0	50.0		0.0	20.0		15.0	15.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt												
Flt Protected												
Satd. Flow (prot)	1784	2981	0	1670	1670	0	1820	1750	1389	1542	3232	0
Flt Permitted												
Satd. Flow (perm)	1784	2981	0	1670	1670	0	1820	1750	1389	1542	3232	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.5			292.7			203.7			158.2	
Travel Time (s)		38.1			21.1			14.7			11.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	16%	3%	9%	9%	5%	0%	4%	31%	18%	7%	4%
Adj. Flow (vph)	0	0	0	0	0	0	0	827	0	0	1098	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	827	0	0	1098	0
Turn Type	Perm			Perm			Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)								45.0			45.0	
Actuated g/C Ratio								1.00			1.00	
v/c Ratio								0.47			0.34	
Control Delay								0.9			0.3	
Queue Delay								0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay								0.9			0.3	
LOS								A			A	
Approach Delay								0.9			0.3	
Approach LOS								A			A	
Queue Length 50th (m)								0.0			0.0	
Queue Length 95th (m)								0.0			0.0	
Internal Link Dist (m)		504.5			268.7			179.7			134.2	
Turn Bay Length (m)												
Base Capacity (vph)								1750			3232	
Starvation Cap Reductn								0			0	
Spillback Cap Reductn								0			0	
Storage Cap Reductn								0			0	
Reduced v/c Ratio								0.47			0.34	

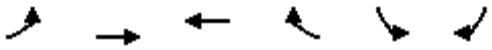
Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.47			
Intersection Signal Delay: 0.6		Intersection LOS: A	
Intersection Capacity Utilization 49.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 7: Bank Street & Earl Armstrong Road





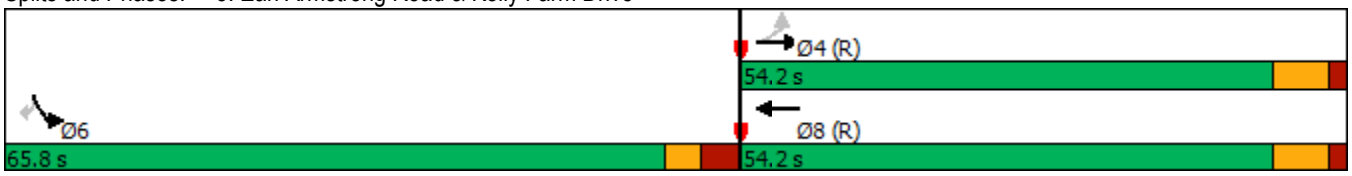
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	40.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1640	3144	3232	0	1820	1820
Flt Permitted						
Satd. Flow (perm)	1640	3144	3232	0	1820	1820
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						
Link Speed (k/h)		50	50		50	
Link Distance (m)		222.0	528.5		431.1	
Travel Time (s)		16.0	38.1		31.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	11%	10%	7%	11%	0%	0%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Turn Type	Perm				Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	24.8	24.8	24.8		33.8	33.8
Total Split (s)	54.2	54.2	54.2		65.8	65.8
Total Split (%)	45.2%	45.2%	45.2%		54.8%	54.8%
Maximum Green (s)	47.4	47.4	47.4		59.0	59.0
Yellow Time (s)	5.0	5.0	5.0		3.2	3.2
All-Red Time (s)	1.8	1.8	1.8		3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.8	6.8	6.8		6.8	6.8
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0		20.0	20.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)						
Actuated g/C Ratio						
v/c Ratio						
Control Delay						
Queue Delay						



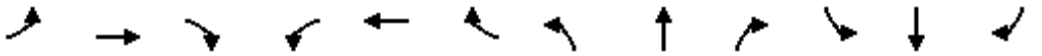
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Total Delay						
LOS						
Approach Delay						
Approach LOS						
Queue Length 50th (m)						
Queue Length 95th (m)						
Internal Link Dist (m)		198.0	504.5		407.1	
Turn Bay Length (m)						
Base Capacity (vph)						
Starvation Cap Reductn						
Spillback Cap Reductn						
Storage Cap Reductn						
Reduced v/c Ratio						

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 59.5 (50%), Referenced to phase 4:EBTL and 8:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.00			
Intersection Signal Delay: 0.0		Intersection LOS: A	
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 8: Earl Armstrong Road & Kelly Farm Drive



Future (2036) Background Traffic with Earl Armstrong Road Extension

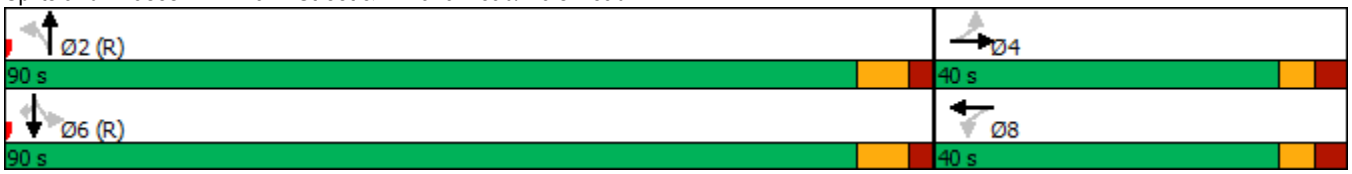


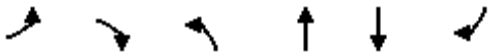
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	177	45	26	43	21	40	9	927	48	46	585	76
Future Volume (vph)	177	45	26	43	21	40	9	927	48	46	585	76
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		0.0	40.0		0.0	100.0		0.0	75.0		175.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00				0.99		1.00					0.98
Frt		0.945			0.902			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1729	1698	0	1478	1627	0	1729	3207	0	1662	3172	1488
Flt Permitted	0.717			0.711			0.431			0.271		
Satd. Flow (perm)	1303	1698	0	1106	1627	0	784	3207	0	474	3172	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			40			8				76
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		528.6			234.2			451.0			177.6	
Travel Time (s)		38.1			16.9			20.3			8.0	
Confl. Peds. (#/hr)	1					1	1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	0%	17%	0%	0%	0%	6%	28%	4%	9%	4%
Adj. Flow (vph)	177	45	26	43	21	40	9	927	48	46	585	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	177	71	0	43	61	0	9	975	0	46	585	76
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	33.8	33.8		33.8	33.8		42.6	42.6		42.6	42.6	42.6
Total Split (s)	40.0	40.0		40.0	40.0		90.0	90.0		90.0	90.0	90.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		69.2%	69.2%		69.2%	69.2%	69.2%
Maximum Green (s)	33.2	33.2		33.2	33.2		82.4	82.4		82.4	82.4	82.4
Yellow Time (s)	3.6	3.6		3.6	3.6		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	3.2	3.2		3.2	3.2		2.6	2.6		2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8		6.8	6.8		7.6	7.6		7.6	7.6	7.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		28.0	28.0		28.0	28.0	28.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	22.9	22.9		22.9	22.9		92.7	92.7		92.7	92.7	92.7
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.71	0.71		0.71	0.71	0.71
v/c Ratio	0.77	0.22		0.22	0.19		0.02	0.43		0.14	0.26	0.07

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	72.0	32.5		45.9	19.8		8.6	7.1		8.7	7.6	1.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	72.0	32.5		45.9	19.8		8.6	7.1		8.7	7.6	1.9
LOS	E	C		D	B		A	A		A	A	A
Approach Delay		60.7			30.6			7.1			7.0	
Approach LOS		E			C			A			A	
Queue Length 50th (m)	40.3	10.1		8.8	4.2		0.3	18.0		3.1	23.1	0.0
Queue Length 95th (m)	59.2	21.0		17.6	14.3		m1.3	55.3		9.3	37.7	4.9
Internal Link Dist (m)		504.6			210.2			427.0			153.6	
Turn Bay Length (m)	100.0			40.0			100.0			75.0		175.0
Base Capacity (vph)	332	449		282	445		558	2289		338	2261	1059
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.53	0.16		0.15	0.14		0.02	0.43		0.14	0.26	0.07

Intersection Summary	
Area Type:	Other
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 16 (12%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 14.8	Intersection LOS: B
Intersection Capacity Utilization 69.4%	ICU Level of Service C
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 1: Bank Street & Miikana Road/Blais Road





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	264	57	94	715	536	61
Future Volume (vph)	264	57	94	715	536	61
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	120.0			100.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			1.00			0.96
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1616	1459	1558	1655	1640	1172
Flt Permitted	0.950		0.413			
Satd. Flow (perm)	1616	1459	674	1655	1640	1129
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		57				61
Link Speed (k/h)	50			80	80	
Link Distance (m)	528.6			273.1	451.0	
Travel Time (s)	38.1			12.3	20.3	
Confl. Peds. (#/hr)			4			4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	6%	11%	10%	11%	32%
Adj. Flow (vph)	264	57	94	715	536	61
Shared Lane Traffic (%)						
Lane Group Flow (vph)	264	57	94	715	536	61
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	21.7	21.7	21.7	21.7
Total Split (s)	40.0	40.0	90.0	90.0	90.0	90.0
Total Split (%)	30.8%	30.8%	69.2%	69.2%	69.2%	69.2%
Maximum Green (s)	33.4	33.4	83.3	83.3	83.3	83.3
Yellow Time (s)	3.3	3.3	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	8.0	8.0	8.0	8.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	26.1	26.1	90.6	90.6	90.6	90.6
Actuated g/C Ratio	0.20	0.20	0.70	0.70	0.70	0.70
v/c Ratio	0.81	0.17	0.20	0.62	0.47	0.08

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Control Delay	68.8	10.6	5.8	16.6	10.5	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.8	10.6	5.8	16.6	10.5	1.3
LOS	E	B	A	B	B	A
Approach Delay	58.4			15.3	9.5	
Approach LOS	E			B	A	
Queue Length 50th (m)	59.8	0.0	7.8	140.7	69.7	0.6
Queue Length 95th (m)	83.1	9.7	m11.4	206.7	108.5	0.5
Internal Link Dist (m)	504.6			249.1	427.0	
Turn Bay Length (m)	25.0		120.0			100.0
Base Capacity (vph)	415	417	469	1153	1143	805
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.14	0.20	0.62	0.47	0.08

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 40 (31%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 21.3		Intersection LOS: C	
Intersection Capacity Utilization 70.2%		ICU Level of Service C	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 2: Bank Street & Dun Skipper Drive



Intersection	
Intersection Delay, s/veh	11.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	165	39	22	164	103	61	79	34	122	54	53
Future Vol, veh/h	28	165	39	22	164	103	61	79	34	122	54	53
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	1	8	5	1	7	0	2	6	2	0	0
Mvmt Flow	28	165	39	22	164	103	61	79	34	122	54	53
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.5	12.3	10.9	11.8
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	35%	12%	8%	53%
Vol Thru, %	45%	71%	57%	24%
Vol Right, %	20%	17%	36%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	174	232	289	229
LT Vol	61	28	22	122
Through Vol	79	165	164	54
RT Vol	34	39	103	53
Lane Flow Rate	174	232	289	229
Geometry Grp	1	1	1	1
Degree of Util (X)	0.275	0.351	0.428	0.358
Departure Headway (Hd)	5.687	5.453	5.328	5.631
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	630	657	673	637
Service Time	3.747	3.51	3.38	3.687
HCM Lane V/C Ratio	0.276	0.353	0.429	0.359
HCM Control Delay	10.9	11.5	12.3	11.8
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	1.1	1.6	2.1	1.6

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	40	11	22	19	27	4	62	59	37	46	12
Future Vol, veh/h	18	40	11	22	19	27	4	62	59	37	46	12
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	8	5	56	6	7	0	33	5	0	22	11	50
Mvmt Flow	18	40	11	22	19	27	4	62	59	37	46	12
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.1	7.9	8.5	8.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	26%	32%	39%
Vol Thru, %	50%	58%	28%	48%
Vol Right, %	47%	16%	40%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	125	69	68	95
LT Vol	4	18	22	37
Through Vol	62	40	19	46
RT Vol	59	11	27	12
Lane Flow Rate	125	69	68	95
Geometry Grp	1	1	1	1
Degree of Util (X)	0.16	0.088	0.084	0.125
Departure Headway (Hd)	4.615	4.603	4.442	4.739
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	779	780	809	758
Service Time	2.632	2.62	2.459	2.756
HCM Lane V/C Ratio	0.16	0.088	0.084	0.125
HCM Control Delay	8.5	8.1	7.9	8.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.6	0.3	0.3	0.4

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	51	13	28	29	20	12	37	39	29	35	2
Future Vol, veh/h	17	51	13	28	29	20	12	37	39	29	35	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	9	0	20	10	8	0	5	19	0	12	0
Mvmt Flow	17	51	13	28	29	20	12	37	39	29	35	2
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.7	8.1	7.6	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	14%	21%	36%	44%
Vol Thru, %	42%	63%	38%	53%
Vol Right, %	44%	16%	26%	3%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	88	81	77	66
LT Vol	12	17	28	29
Through Vol	37	51	29	35
RT Vol	39	13	20	2
Lane Flow Rate	88	81	77	66
Geometry Grp	1	1	1	1
Degree of Util (X)	0.1	0.096	0.098	0.081
Departure Headway (Hd)	4.1	4.273	4.595	4.426
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	877	842	785	812
Service Time	2.109	2.285	2.595	2.436
HCM Lane V/C Ratio	0.1	0.096	0.098	0.081
HCM Control Delay	7.6	7.7	8.1	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.3	0.3	0.3

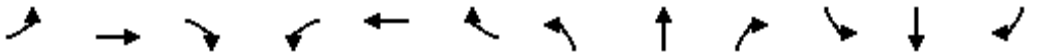
Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	810	572	0
Future Vol, veh/h	0	0	0	810	572	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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, %	0	0	0	10	11	0
Mvmt Flow	0	0	0	810	572	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1382	572	572	0	-	0
Stage 1	572	-	-	-	-	-
Stage 2	810	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	160	523	1011	-	-	-
Stage 1	569	-	-	-	-	-
Stage 2	441	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	160	523	1011	-	-	-
Mov Cap-2 Maneuver	160	-	-	-	-	-
Stage 1	569	-	-	-	-	-
Stage 2	441	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1011	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-



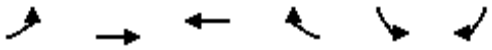
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	574	16	55	308	16	21	766	115	15	534	23
Future Volume (vph)	28	574	16	55	308	16	21	766	115	15	534	23
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0		0.0	50.0		0.0	20.0		15.0	15.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.996			0.993				0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1729	3220	0	1310	1452	0	1695	1750	1289	1491	3122	0
Flt Permitted	0.325			0.261			0.432			0.248		
Satd. Flow (perm)	592	3220	0	360	1452	0	771	1750	1289	389	3122	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			2				35		6	
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		528.5			292.7			203.7			158.2	
Travel Time (s)		23.8			13.2			9.2			7.1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	7%	5%	32%	24%	34%	2%	4%	20%	16%	10%	12%
Adj. Flow (vph)	28	574	16	55	308	16	21	766	115	15	534	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	590	0	55	324	0	21	766	115	15	557	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	36.2	36.2		36.2	36.2		36.2	36.2	36.2	36.2	36.2	
Total Split (s)	47.0	47.0		47.0	47.0		83.0	83.0	83.0	83.0	83.0	
Total Split (%)	36.2%	36.2%		36.2%	36.2%		63.8%	63.8%	63.8%	63.8%	63.8%	
Maximum Green (s)	39.8	39.8		39.8	39.8		75.8	75.8	75.8	75.8	75.8	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.2	2.2		2.2	2.2		2.2	2.2	2.2	2.2	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.2	7.2		7.2	7.2		7.2	7.2	7.2	7.2	7.2	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	22.0	22.0		22.0	22.0		22.0	22.0	22.0	22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	33.1	33.1		33.1	33.1		82.5	82.5	82.5	82.5	82.5	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.63	0.63	0.63	0.63	0.63	
v/c Ratio	0.19	0.72		0.60	0.87		0.04	0.69	0.14	0.06	0.28	
Control Delay	38.5	48.7		68.6	69.2		11.2	20.9	8.1	18.9	15.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	38.5	48.7		68.6	69.2		11.2	20.9	8.1	18.9	15.9	
LOS	D	D		E	E		B	C	A	B	B	
Approach Delay		48.3			69.1			19.1			15.9	
Approach LOS		D			E			B			B	
Queue Length 50th (m)	5.1	66.2		11.3	72.4		1.8	113.0	7.1	1.2	27.6	
Queue Length 95th (m)	12.4	79.7		24.9	100.2		5.6	175.9	16.2	m5.2	59.8	
Internal Link Dist (m)		504.5			268.7			179.7			134.2	
Turn Bay Length (m)	25.0			50.0			20.0		15.0	15.0		
Base Capacity (vph)	181	987		110	445		489	1110	830	246	1982	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.15	0.60		0.50	0.73		0.04	0.69	0.14	0.06	0.28	

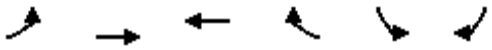
Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 33.3		Intersection LOS: C	
Intersection Capacity Utilization 87.0%		ICU Level of Service E	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 7: Bank Street & Earl Armstrong Road





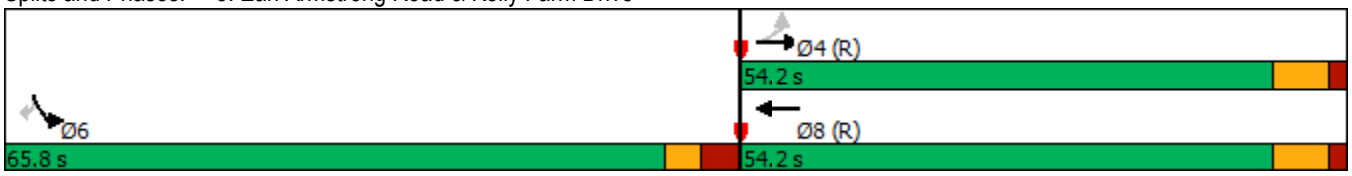
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	12	613	346	6	5	8
Future Volume (vph)	12	613	346	6	5	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	40.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.997			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1544	3262	2999	0	1517	1357
Flt Permitted	0.541				0.950	
Satd. Flow (perm)	879	3262	2999	0	1517	1357
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			2			8
Link Speed (k/h)		80	80		40	
Link Distance (m)		222.0	528.5		431.1	
Travel Time (s)		10.0	23.8		38.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	12%	6%	15%	12%	14%	14%
Adj. Flow (vph)	12	613	346	6	5	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	12	613	352	0	5	8
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	24.8	24.8	24.8		33.8	33.8
Total Split (s)	54.2	54.2	54.2		65.8	65.8
Total Split (%)	45.2%	45.2%	45.2%		54.8%	54.8%
Maximum Green (s)	47.4	47.4	47.4		59.0	59.0
Yellow Time (s)	5.0	5.0	5.0		3.2	3.2
All-Red Time (s)	1.8	1.8	1.8		3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.8	6.8	6.8		6.8	6.8
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0		20.0	20.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	110.6	110.6	110.6		10.0	10.0
Actuated g/C Ratio	0.92	0.92	0.92		0.08	0.08
v/c Ratio	0.01	0.20	0.13		0.04	0.07
Control Delay	2.0	1.6	1.5		51.6	28.5
Queue Delay	0.0	0.0	0.0		0.0	0.0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Total Delay	2.0	1.6	1.5		51.6	28.5
LOS	A	A	A		D	C
Approach Delay		1.6	1.5		37.4	
Approach LOS		A	A		D	
Queue Length 50th (m)	0.0	0.0	0.0		1.0	0.0
Queue Length 95th (m)	1.4	17.5	9.9		4.7	4.5
Internal Link Dist (m)		198.0	504.5		407.1	
Turn Bay Length (m)	60.0				40.0	
Base Capacity (vph)	810	3005	2763		745	671
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.01	0.20	0.13		0.01	0.01

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 59.5 (50%), Referenced to phase 4:EBTL and 8:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.20			
Intersection Signal Delay: 2.0		Intersection LOS: A	
Intersection Capacity Utilization 37.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 8: Earl Armstrong Road & Kelly Farm Drive

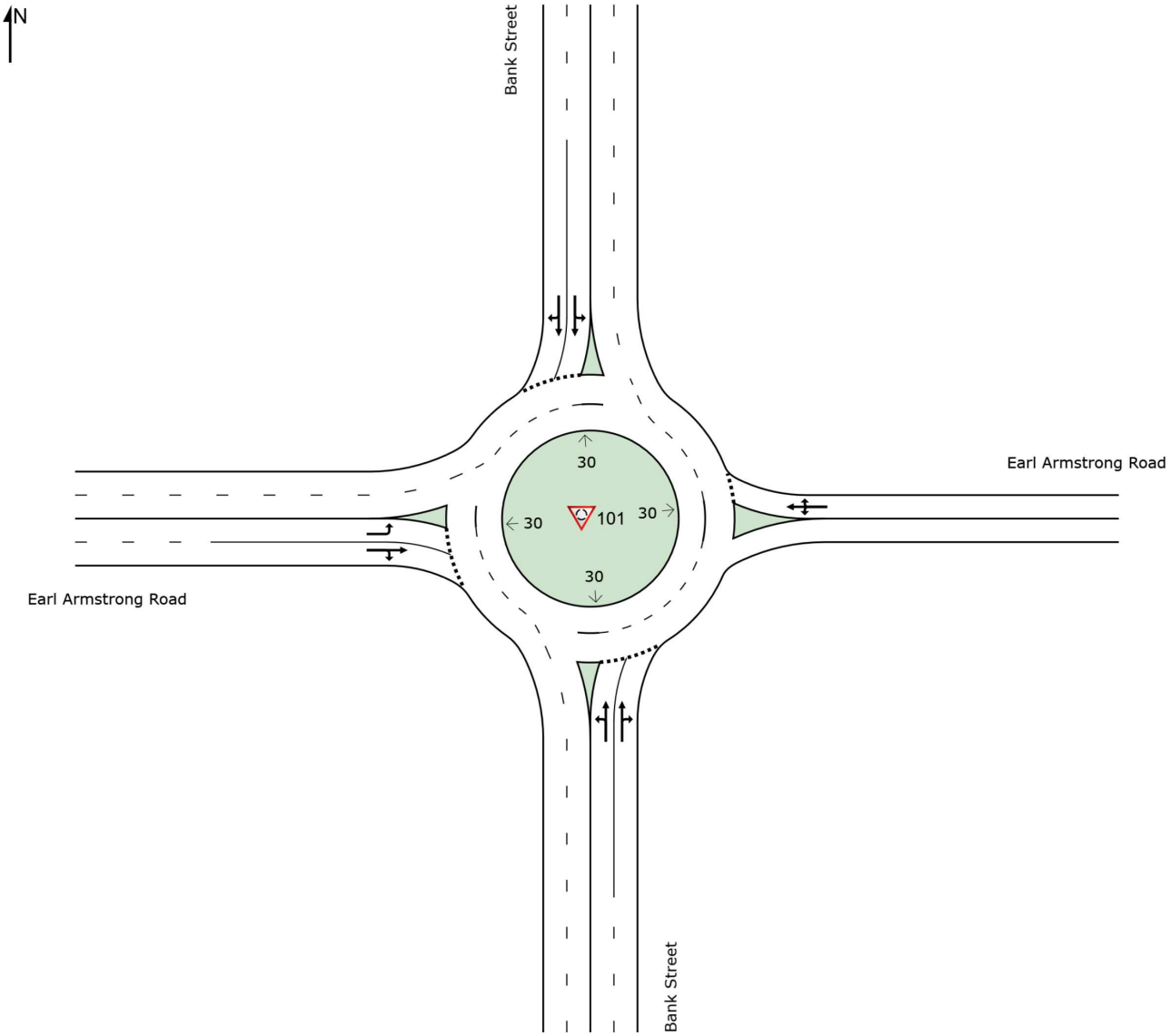


SITE LAYOUT

Site: 101 [Bank & Earl Armstrong (Site Folder: BG 2036 w Ext AM)]

Bank Street & Earl Armstrong Road
Future (2036) Background Traffic with Earl Armstrong Extension
AM Peak Hour
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [Bank & Earl Armstrong (Site Folder: BG 2036 w Ext AM)]

Bank Street & Earl Armstrong Road
Future (2036) Background Traffic with Earl Armstrong Extension
AM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bank Street														
3	L2	21	2.0	21	2.0	0.618	16.0	LOS C	4.9	38.2	0.76	0.96	1.36	49.0
8	T1	766	4.0	766	4.0	0.618	15.6	LOS C	4.9	38.2	0.75	0.96	1.35	49.1
18	R2	115	20.0	115	20.0	0.618	15.9	LOS C	4.8	38.7	0.73	0.95	1.34	47.5
Approach		902	6.0	902	6.0	0.618	15.7	LOS C	4.9	38.7	0.75	0.96	1.35	48.9
East: Earl Armstrong Road														
1	L2	55	32.0	55	32.0	0.688	23.5	LOS C	4.6	42.9	0.75	1.08	1.74	43.6
6	T1	308	24.0	308	24.0	0.688	23.1	LOS C	4.6	42.9	0.75	1.08	1.74	44.1
16	R2	16	34.0	16	34.0	0.688	23.6	LOS C	4.6	42.9	0.75	1.08	1.74	42.8
Approach		379	25.6	379	25.6	0.688	23.2	LOS C	4.6	42.9	0.75	1.08	1.74	44.0
North: Bank Street														
7	L2	15	16.0	15	16.0	0.347	8.9	LOS A	1.4	11.5	0.56	0.54	0.56	53.5
4	T1	534	10.0	534	10.0	0.347	8.4	LOS A	1.4	11.5	0.55	0.52	0.55	54.2
14	R2	23	12.0	23	12.0	0.347	8.2	LOS A	1.4	11.4	0.54	0.51	0.54	52.7
Approach		572	10.2	572	10.2	0.347	8.4	LOS A	1.4	11.5	0.55	0.52	0.55	54.1
West: Earl Armstrong Road														
5	L2	28	0.0	28	0.0	0.039	5.4	LOS A	0.1	1.0	0.53	0.46	0.53	52.9
2	T1	574	7.0	574	7.0	0.790	24.4	LOS C	9.7	77.8	0.86	1.28	2.11	44.2
12	R2	16	5.0	16	5.0	0.790	24.3	LOS C	9.7	77.8	0.86	1.28	2.11	43.1
Approach		618	6.6	618	6.6	0.790	23.5	LOS C	9.7	77.8	0.84	1.25	2.03	44.5
All Vehicles		2471	10.1	2471	10.1	0.790	17.1	LOS C	9.7	77.8	0.73	0.95	1.40	47.9

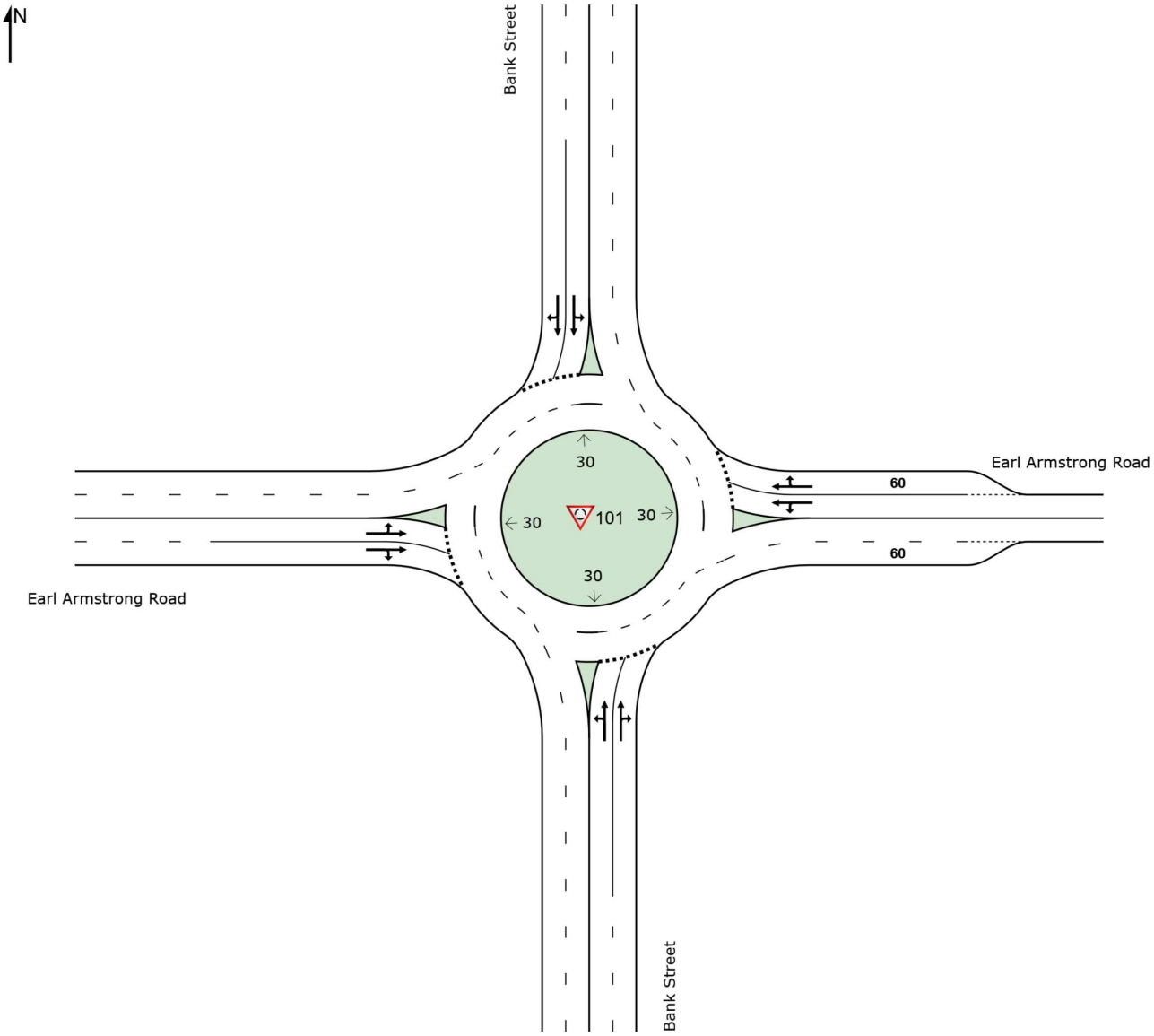
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [Bank & Earl Armstrong (w Mods) (Site Folder: BG 2036 w Ext AM)]

Bank Street & Earl Armstrong Road
Future (2036) Background Traffic with Earl Armstrong Extension
AM Peak Hour (with Modifications)
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

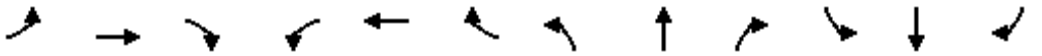
Site: 101 [Bank & Earl Armstrong (w Mods) (Site Folder: BG 2036 w Ext AM)]

Bank Street & Earl Armstrong Road
Future (2036) Background Traffic with Earl Armstrong Extension
AM Peak Hour (with Modifications)
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bank Street														
3	L2	21	2.0	21	2.0	0.618	16.0	LOS C	4.9	38.2	0.76	0.96	1.36	49.0
8	T1	766	4.0	766	4.0	0.618	15.6	LOS C	4.9	38.2	0.75	0.96	1.35	49.1
18	R2	115	20.0	115	20.0	0.618	20.2	LOS C	4.8	38.7	0.73	0.95	1.34	47.5
Approach		902	6.0	902	6.0	0.618	16.2	LOS C	4.9	38.7	0.75	0.96	1.35	48.9
East: Earl Armstrong Road														
1	L2	55	32.0	55	32.0	0.363	13.6	LOS B	1.3	11.9	0.65	0.72	0.85	48.7
6	T1	308	24.0	308	24.0	0.363	12.4	LOS B	1.3	11.8	0.64	0.71	0.83	50.5
16	R2	16	34.0	16	34.0	0.363	12.4	LOS B	1.3	11.8	0.64	0.70	0.82	49.2
Approach		379	25.6	379	25.6	0.363	12.6	LOS B	1.3	11.9	0.64	0.71	0.84	50.2
North: Bank Street														
7	L2	15	16.0	15	16.0	0.347	8.9	LOS A	1.4	11.5	0.56	0.54	0.56	53.5
4	T1	534	10.0	534	10.0	0.347	8.4	LOS A	1.4	11.5	0.55	0.52	0.55	54.2
14	R2	23	12.0	23	12.0	0.347	8.2	LOS A	1.4	11.4	0.54	0.51	0.54	52.7
Approach		572	10.2	572	10.2	0.347	8.4	LOS A	1.4	11.5	0.55	0.52	0.55	54.1
West: Earl Armstrong Road														
5	L2	28	0.0	28	0.0	0.564	13.4	LOS B	3.9	30.9	0.71	0.88	1.20	50.6
2	T1	574	7.0	574	7.0	0.564	13.5	LOS B	3.9	30.9	0.68	0.79	1.01	51.4
12	R2	16	5.0	16	5.0	0.288	8.8	LOS A	1.1	8.7	0.61	0.61	0.61	52.4
Approach		618	6.6	618	6.6	0.564	13.4	LOS B	3.9	30.9	0.68	0.79	1.01	51.3
All Vehicles		2471	10.1	2471	10.1	0.618	13.1	LOS B	4.9	38.7	0.67	0.78	1.00	50.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

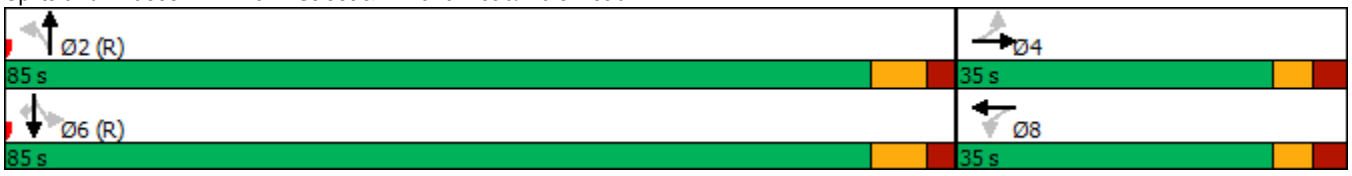


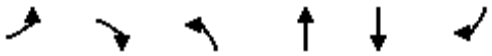
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	132	23	34	54	32	62	18	886	45	50	1154	187
Future Volume (vph)	132	23	34	54	32	62	18	886	45	50	1154	187
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		0.0	40.0		0.0	100.0		0.0	75.0		175.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor							1.00					0.98
Frt		0.911			0.901			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1729	1427	0	1530	1602	0	1729	3286	0	1601	3325	1517
Flt Permitted	0.696			0.720			0.221			0.291		
Satd. Flow (perm)	1267	1427	0	1160	1602	0	402	3286	0	490	3325	1481
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34			62			9				187
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.6			234.2			451.0			177.6	
Travel Time (s)		38.1			16.9			32.5			12.8	
Confl. Peds. (#/hr)							2					2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	9%	21%	13%	3%	2%	0%	4%	14%	8%	4%	2%
Adj. Flow (vph)	132	23	34	54	32	62	18	886	45	50	1154	187
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	57	0	54	94	0	18	931	0	50	1154	187
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	33.8	33.8		33.8	33.8		42.6	42.6		42.6	42.6	42.6
Total Split (s)	35.0	35.0		35.0	35.0		85.0	85.0		85.0	85.0	85.0
Total Split (%)	29.2%	29.2%		29.2%	29.2%		70.8%	70.8%		70.8%	70.8%	70.8%
Maximum Green (s)	28.2	28.2		28.2	28.2		77.4	77.4		77.4	77.4	77.4
Yellow Time (s)	3.6	3.6		3.6	3.6		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	3.2	3.2		3.2	3.2		2.6	2.6		2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8		6.8	6.8		7.6	7.6		7.6	7.6	7.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		28.0	28.0		28.0	28.0	28.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	17.8	17.8		17.8	17.8		87.8	87.8		87.8	87.8	87.8
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.73	0.73		0.73	0.73	0.73
v/c Ratio	0.71	0.24		0.31	0.32		0.06	0.39		0.14	0.47	0.17

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	67.5	23.3		48.3	20.3		4.9	4.0		7.2	8.0	1.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	67.5	23.3		48.3	20.3		4.9	4.0		7.2	8.0	1.3
LOS	E	C		D	C		A	A		A	A	A
Approach Delay		54.2			30.5			4.0			7.1	
Approach LOS		D			C			A			A	
Queue Length 50th (m)	27.6	4.4		10.6	6.1		0.5	13.5		2.8	47.5	0.0
Queue Length 95th (m)	43.9	14.4		20.6	18.6		m1.2	m24.0		8.6	74.9	6.4
Internal Link Dist (m)		504.6			210.2			427.0			153.6	
Turn Bay Length (m)	100.0			40.0			100.0			75.0		175.0
Base Capacity (vph)	297	361		272	423		294	2407		358	2433	1133
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.44	0.16		0.20	0.22		0.06	0.39		0.14	0.47	0.17

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 18 (15%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 10.6		Intersection LOS: B	
Intersection Capacity Utilization 70.2%		ICU Level of Service C	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 1: Bank Street & Miikana Road/Blais Road





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	269	71	108	673	1023	135
Future Volume (vph)	269	71	108	673	1023	135
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	120.0			100.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1601	1369	1679	1701	1733	1532
Flt Permitted	0.950		0.153			
Satd. Flow (perm)	1601	1369	270	1701	1733	1532
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		71				135
Link Speed (k/h)	50			80	80	
Link Distance (m)	528.6			273.1	451.0	
Travel Time (s)	38.1			12.3	20.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	8%	13%	3%	7%	5%	1%
Adj. Flow (vph)	269	71	108	673	1023	135
Shared Lane Traffic (%)						
Lane Group Flow (vph)	269	71	108	673	1023	135
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	21.7	21.7	21.7	21.7
Total Split (s)	30.0	30.0	90.0	90.0	90.0	90.0
Total Split (%)	25.0%	25.0%	75.0%	75.0%	75.0%	75.0%
Maximum Green (s)	23.4	23.4	83.3	83.3	83.3	83.3
Yellow Time (s)	3.3	3.3	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	8.0	8.0	8.0	8.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	22.5	22.5	84.2	84.2	84.2	84.2
Actuated g/C Ratio	0.19	0.19	0.70	0.70	0.70	0.70
v/c Ratio	0.90	0.23	0.57	0.56	0.84	0.12
Control Delay	79.5	11.1	9.9	1.8	16.8	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay	79.5	11.1	9.9	1.8	16.8	0.4
LOS	E	B	A	A	B	A
Approach Delay	65.2			2.9	14.9	
Approach LOS	E			A	B	
Queue Length 50th (m)	57.0	0.0	0.5	3.5	160.7	0.0
Queue Length 95th (m)	#98.8	11.3	m0.9	m5.0	102.1	1.2
Internal Link Dist (m)	504.6			249.1	427.0	
Turn Bay Length (m)	25.0		120.0			100.0
Base Capacity (vph)	312	324	189	1193	1216	1115
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.22	0.57	0.56	0.84	0.12

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 18 (15%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 18.3		Intersection LOS: B	
Intersection Capacity Utilization 97.6%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 2: Bank Street & Dun Skipper Drive



Intersection	
Intersection Delay, s/veh	12.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	260	95	48	179	78	48	38	34	105	57	28
Future Vol, veh/h	13	260	95	48	179	78	48	38	34	105	57	28
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	2	2	0	0	5	0	0	0	2	15	0
Mvmt Flow	13	260	95	48	179	78	48	38	34	105	57	28
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	13.9	12.5	10.5	11.7
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	40%	4%	16%	55%
Vol Thru, %	32%	71%	59%	30%
Vol Right, %	28%	26%	26%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	120	368	305	190
LT Vol	48	13	48	105
Through Vol	38	260	179	57
RT Vol	34	95	78	28
Lane Flow Rate	120	368	305	190
Geometry Grp	1	1	1	1
Degree of Util (X)	0.198	0.527	0.446	0.313
Departure Headway (Hd)	5.949	5.156	5.27	5.935
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	600	696	680	604
Service Time	4.017	3.206	3.323	3.996
HCM Lane V/C Ratio	0.2	0.529	0.449	0.315
HCM Control Delay	10.5	13.9	12.5	11.7
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	0.7	3.1	2.3	1.3

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	43	6	37	37	56	3	60	38	29	59	9
Future Vol, veh/h	13	43	6	37	37	56	3	60	38	29	59	9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	11	0	50	0	0	0	50	2	4	12	2	0
Mvmt Flow	13	43	6	37	37	56	3	60	38	29	59	9
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.2	8.1	9	8.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	21%	28%	30%
Vol Thru, %	59%	69%	28%	61%
Vol Right, %	38%	10%	43%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	101	62	130	97
LT Vol	3	13	37	29
Through Vol	60	43	37	59
RT Vol	38	6	56	9
Lane Flow Rate	101	62	130	97
Geometry Grp	1	1	1	1
Degree of Util (X)	0.143	0.081	0.154	0.126
Departure Headway (Hd)	5.083	4.714	4.272	4.675
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	707	761	841	768
Service Time	3.105	2.736	2.29	2.697
HCM Lane V/C Ratio	0.143	0.081	0.155	0.126
HCM Control Delay	9	8.2	8.1	8.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.3	0.5	0.4

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	57	9	25	43	34	13	40	35	29	41	16
Future Vol, veh/h	16	57	9	25	43	34	13	40	35	29	41	16
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	4	0	0	3	0	0	5	15	5	0	0
Mvmt Flow	16	57	9	25	43	34	13	40	35	29	41	16
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.9	7.8	7.7	8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	15%	20%	25%	34%
Vol Thru, %	45%	70%	42%	48%
Vol Right, %	40%	11%	33%	19%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	88	82	102	86
LT Vol	13	16	25	29
Through Vol	40	57	43	41
RT Vol	35	9	34	16
Lane Flow Rate	88	82	102	86
Geometry Grp	1	1	1	1
Degree of Util (X)	0.103	0.1	0.12	0.106
Departure Headway (Hd)	4.198	4.373	4.229	4.446
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	856	822	850	808
Service Time	2.212	2.387	2.244	2.461
HCM Lane V/C Ratio	0.103	0.1	0.12	0.106
HCM Control Delay	7.7	7.9	7.8	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.3	0.4	0.4

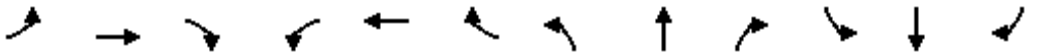
Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	789	1064	0
Future Vol, veh/h	0	0	0	789	1064	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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, %	0	0	0	7	6	0
Mvmt Flow	0	0	0	789	1064	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1853	1064	1064	0	-	0
Stage 1	1064	-	-	-	-	-
Stage 2	789	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	82	273	662	-	-	-
Stage 1	335	-	-	-	-	-
Stage 2	451	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	82	273	662	-	-	-
Mov Cap-2 Maneuver	82	-	-	-	-	-
Stage 1	335	-	-	-	-	-
Stage 2	451	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	662	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-



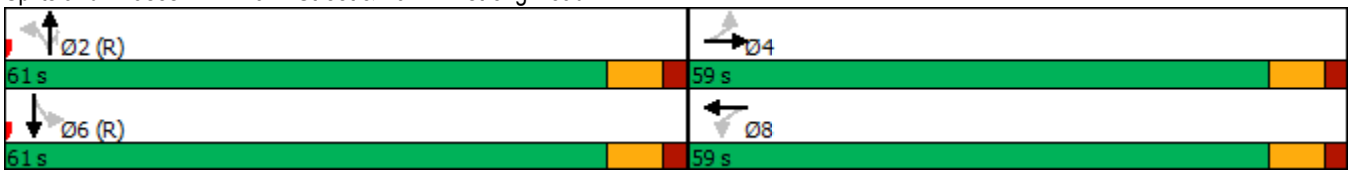
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	521	41	120	665	16	17	741	86	11	997	56
Future Volume (vph)	31	521	41	120	665	16	17	741	86	11	997	56
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0		0.0	50.0		0.0	20.0		15.0	15.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.989			0.996				0.850		0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1695	2973	0	1586	1664	0	1729	1750	1181	1465	3211	0
Flt Permitted	0.127			0.386			0.164			0.115		
Satd. Flow (perm)	227	2973	0	645	1664	0	298	1750	1181	177	3211	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			1				38		6	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.5			292.7			203.7			158.2	
Travel Time (s)		38.1			21.1			14.7			11.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	16%	3%	9%	9%	5%	0%	4%	31%	18%	7%	4%
Adj. Flow (vph)	31	521	41	120	665	16	17	741	86	11	997	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	562	0	120	681	0	17	741	86	11	1053	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	36.2	36.2		36.2	36.2		36.2	36.2	36.2	36.2	36.2	
Total Split (s)	59.0	59.0		59.0	59.0		61.0	61.0	61.0	61.0	61.0	
Total Split (%)	49.2%	49.2%		49.2%	49.2%		50.8%	50.8%	50.8%	50.8%	50.8%	
Maximum Green (s)	51.8	51.8		51.8	51.8		53.8	53.8	53.8	53.8	53.8	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.2	2.2		2.2	2.2		2.2	2.2	2.2	2.2	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.2	7.2		7.2	7.2		7.2	7.2	7.2	7.2	7.2	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	22.0	22.0		22.0	22.0		22.0	22.0	22.0	22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	50.8	50.8		50.8	50.8		54.8	54.8	54.8	54.8	54.8	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.46	0.46	0.46	0.46	0.46	
v/c Ratio	0.33	0.44		0.44	0.97		0.13	0.93	0.15	0.14	0.72	
Control Delay	32.1	23.9		30.4	60.9		22.5	50.4	12.3	34.9	41.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	

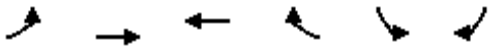
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	32.1	23.9		30.4	60.9		22.5	50.4	12.3	34.9	41.2	
LOS	C	C		C	E		C	D	B	C	D	
Approach Delay		24.4			56.3			46.0			41.1	
Approach LOS		C			E			D			D	
Queue Length 50th (m)	4.3	43.4		17.8	139.2		2.1	150.6	5.9	2.0	106.4	
Queue Length 95th (m)	13.0	57.4		34.3	#210.3		6.9	#223.3	15.0	m2.5	127.2	
Internal Link Dist (m)		504.5			268.7			179.7			134.2	
Turn Bay Length (m)	25.0			50.0			20.0		15.0	15.0		
Base Capacity (vph)	97	1287		278	718		135	798	559	80	1468	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.32	0.44		0.43	0.95		0.13	0.93	0.15	0.14	0.72	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 43.0 Intersection LOS: D
Intersection Capacity Utilization 105.5% ICU Level of Service G
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Bank Street & Earl Armstrong Road



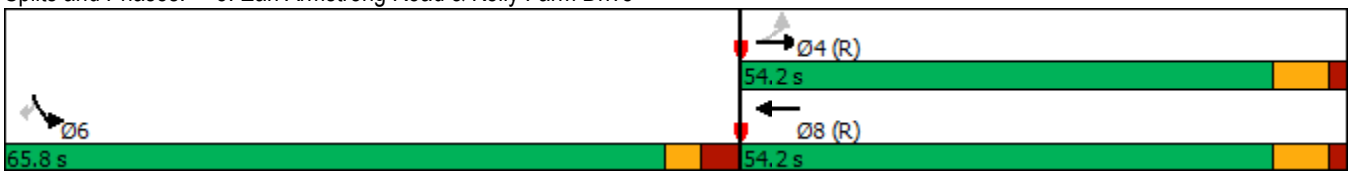


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	17	589	729	9	4	18
Future Volume (vph)	17	589	729	9	4	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	40.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.998			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1558	3144	3224	0	1729	1547
Flt Permitted	0.371				0.950	
Satd. Flow (perm)	608	3144	3224	0	1729	1547
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			1			18
Link Speed (k/h)		50	50		50	
Link Distance (m)		222.0	528.5		431.1	
Travel Time (s)		16.0	38.1		31.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	11%	10%	7%	11%	0%	0%
Adj. Flow (vph)	17	589	729	9	4	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	589	738	0	4	18
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	24.8	24.8	24.8		33.8	33.8
Total Split (s)	54.2	54.2	54.2		65.8	65.8
Total Split (%)	45.2%	45.2%	45.2%		54.8%	54.8%
Maximum Green (s)	47.4	47.4	47.4		59.0	59.0
Yellow Time (s)	5.0	5.0	5.0		3.2	3.2
All-Red Time (s)	1.8	1.8	1.8		3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.8	6.8	6.8		6.8	6.8
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0		20.0	20.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	110.6	110.6	110.6		10.0	10.0
Actuated g/C Ratio	0.92	0.92	0.92		0.08	0.08
v/c Ratio	0.03	0.20	0.25		0.03	0.12
Control Delay	2.0	1.6	5.2		51.2	22.8
Queue Delay	0.0	0.0	0.0		0.0	0.0

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Total Delay	2.0	1.6	5.2		51.2	22.8
LOS	A	A	A		D	C
Approach Delay		1.6	5.2		28.0	
Approach LOS		A	A		C	
Queue Length 50th (m)	0.0	0.0	0.0		0.8	0.0
Queue Length 95th (m)	1.8	17.0	m60.6		4.1	6.6
Internal Link Dist (m)		198.0	504.5		407.1	
Turn Bay Length (m)	60.0				40.0	
Base Capacity (vph)	560	2896	2970		850	769
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.03	0.20	0.25		0.00	0.02

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 59.5 (50%), Referenced to phase 4:EBTL and 8:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.25			
Intersection Signal Delay: 4.0		Intersection LOS: A	
Intersection Capacity Utilization 41.2%		ICU Level of Service A	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 8: Earl Armstrong Road & Kelly Farm Drive

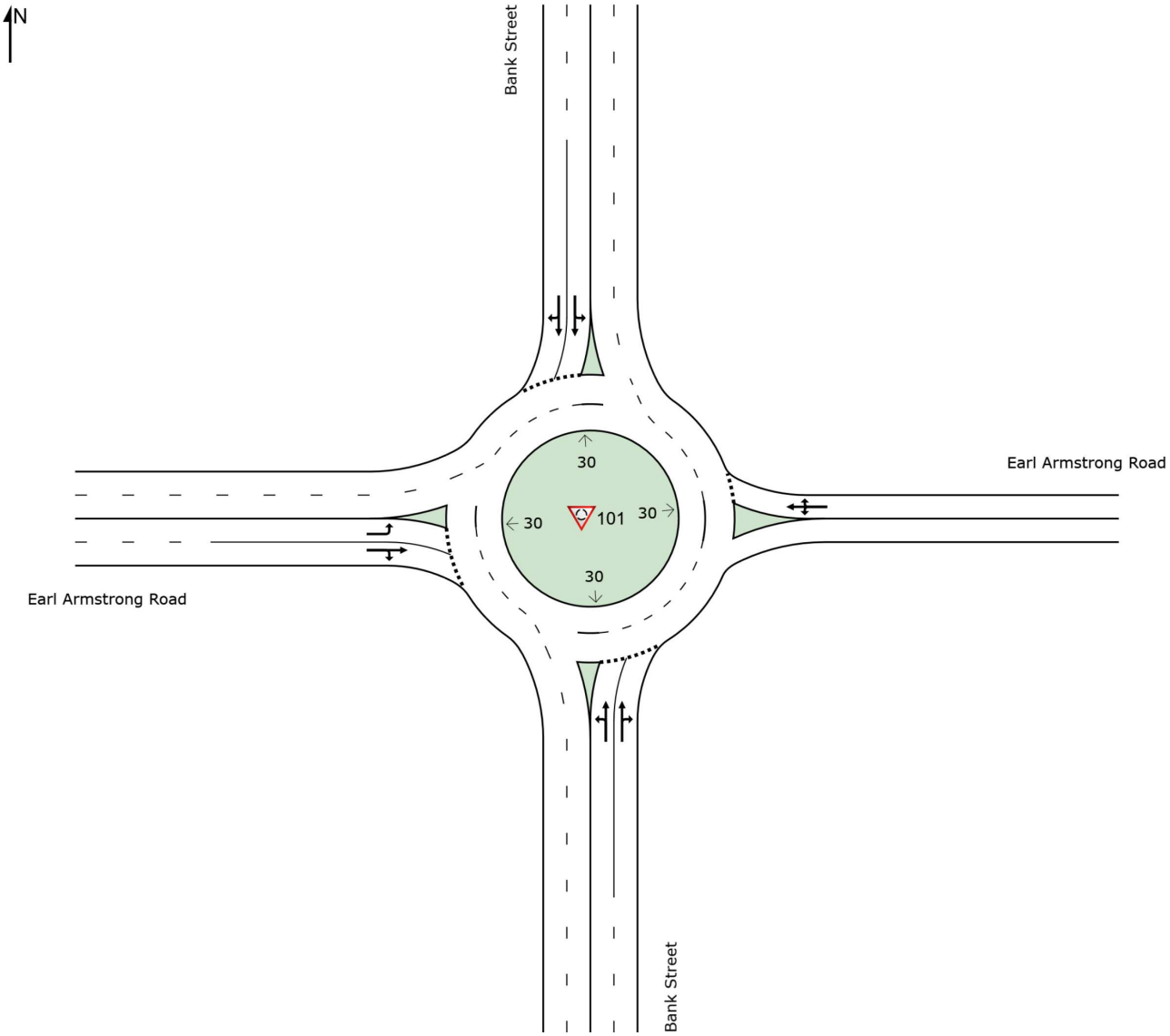


SITE LAYOUT

Site: 101 [Bank & Earl Armstrong (Site Folder: BG 2036 w Ext PM)]

Bank Street & Earl Armstrong Road
Future (2036) Background Traffic with Earl Armstrong Extension
PM Peak Hour
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [Bank & Earl Armstrong (Site Folder: BG 2036 w Ext PM)]

Bank Street & Earl Armstrong Road
Future (2036) Background Traffic with Earl Armstrong Extension
PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bank Street														
3	L2	17	0.0	17	0.0	0.521	11.7	LOS B	3.6	27.9	0.68	0.80	1.01	51.9
8	T1	741	4.0	741	4.0	0.521	11.7	LOS B	3.6	27.9	0.66	0.78	0.99	51.8
18	R2	86	31.0	86	31.0	0.521	12.4	LOS B	3.4	27.6	0.64	0.77	0.97	49.5
Approach		844	6.7	844	6.7	0.521	11.7	LOS B	3.6	27.9	0.66	0.78	0.99	51.6
East: Earl Armstrong Road														
1	L2	120	9.0	120	9.0	1.233	139.2	LOS F	62.9	513.8	1.00	3.86	9.84	18.8
6	T1	665	9.0	665	9.0	1.233	139.2	LOS F	62.9	513.8	1.00	3.86	9.84	18.8
16	R2	16	5.0	16	5.0	1.233	139.0	LOS F	62.9	513.8	1.00	3.86	9.84	18.6
Approach		801	8.9	801	8.9	1.233	139.2	LOS F	62.9	513.8	1.00	3.86	9.84	18.8
North: Bank Street														
7	L2	11	18.0	11	18.0	0.777	26.5	LOS D	8.3	66.9	0.85	1.24	2.04	43.0
4	T1	997	7.0	997	7.0	0.777	24.9	LOS C	8.7	69.7	0.85	1.24	2.04	43.9
14	R2	56	4.0	56	4.0	0.777	23.8	LOS C	8.7	69.7	0.84	1.24	2.03	43.3
Approach		1064	7.0	1064	7.0	0.777	24.9	LOS C	8.7	69.7	0.85	1.24	2.04	43.8
West: Earl Armstrong Road														
5	L2	31	2.0	31	2.0	0.070	9.1	LOS A	0.2	1.8	0.68	0.68	0.68	50.3
2	T1	521	16.0	521	16.0	1.249	156.6	LOS F	45.4	388.6	1.00	3.63	9.98	17.3
12	R2	41	3.0	41	3.0	1.249	155.7	LOS F	45.4	388.6	1.00	3.63	9.98	17.1
Approach		593	14.4	593	14.4	1.249	148.8	LOS F	45.4	388.6	0.98	3.48	9.49	17.9
All Vehicles		3302	8.7	3302	8.7	1.249	71.5	LOS F	62.9	513.8	0.86	2.16	5.00	28.3

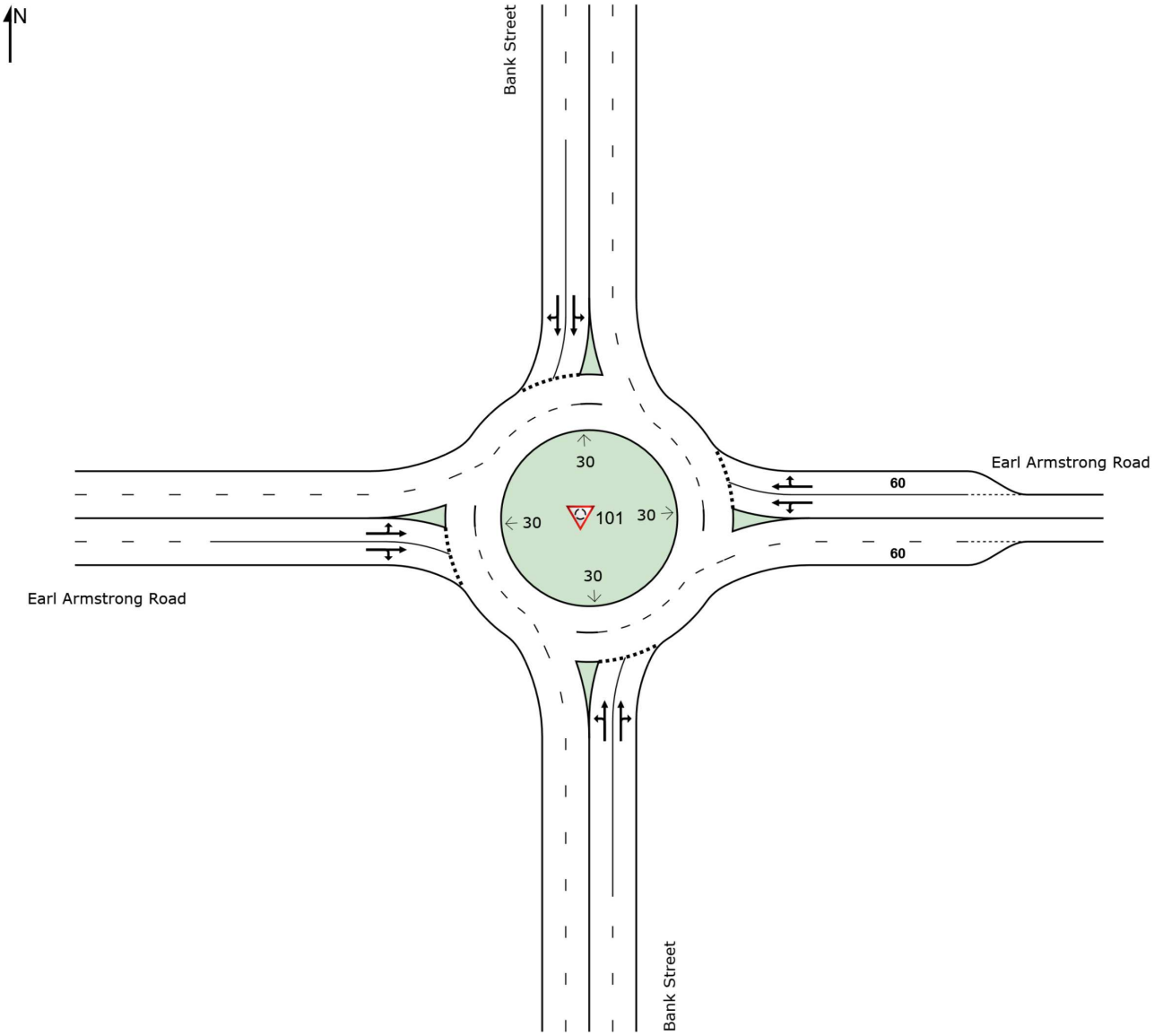
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [Bank & Earl Armstrong (w Mods) (Site Folder: BG 2036 w Ext PM)]

Bank Street & Earl Armstrong Road
Future (2036) Background Traffic with Earl Armstrong Extension
PM Peak Hour (with Modifications)
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 101 [Bank & Earl Armstrong (w Mods) (Site Folder: BG 2036 w Ext PM)]

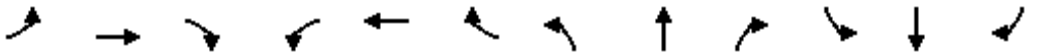
Bank Street & Earl Armstrong Road
Future (2036) Background Traffic with Earl Armstrong Extension
PM Peak Hour (with Modifications)
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bank Street														
3	L2	17	0.0	17	0.0	0.577	14.4	LOS B	4.2	32.8	0.74	0.91	1.24	50.1
8	T1	741	4.0	741	4.0	0.577	14.2	LOS B	4.2	32.8	0.72	0.90	1.23	50.0
18	R2	86	31.0	86	31.0	0.577	18.9	LOS C	4.0	32.9	0.71	0.89	1.22	48.0
Approach		844	6.7	844	6.7	0.577	14.7	LOS B	4.2	32.9	0.72	0.90	1.23	49.8
East: Earl Armstrong Road														
1	L2	120	9.0	120	9.0	0.650	20.1	LOS C	4.6	37.4	0.78	1.02	1.53	45.5
6	T1	665	9.0	665	9.0	0.650	19.1	LOS C	4.7	38.5	0.77	1.01	1.52	46.7
16	R2	16	5.0	16	5.0	0.650	18.3	LOS C	4.7	38.5	0.77	1.01	1.51	46.2
Approach		801	8.9	801	8.9	0.650	19.3	LOS C	4.7	38.5	0.77	1.01	1.52	46.5
North: Bank Street														
7	L2	11	18.0	11	18.0	0.888	42.7	LOS E	11.7	94.4	0.91	1.54	2.95	36.3
4	T1	997	7.0	997	7.0	0.888	40.4	LOS E	12.5	100.0	0.91	1.55	2.97	37.1
14	R2	56	4.0	56	4.0	0.888	38.7	LOS E	12.5	100.0	0.92	1.56	2.98	37.0
Approach		1064	7.0	1064	7.0	0.888	40.4	LOS E	12.5	100.0	0.91	1.55	2.97	37.1
West: Earl Armstrong Road														
5	L2	31	2.0	31	2.0	0.925	55.6	LOS F	10.4	88.9	0.90	1.67	3.52	32.1
2	T1	521	16.0	521	16.0	0.925	47.5	LOS E	10.4	88.9	0.87	1.46	2.89	34.9
12	R2	41	3.0	41	3.0	0.472	18.7	LOS C	1.9	16.4	0.78	0.91	1.22	45.6
Approach		593	14.4	593	14.4	0.925	45.9	LOS E	10.4	88.9	0.86	1.43	2.81	35.3
All Vehicles		3302	8.7	3302	8.7	0.925	29.7	LOS D	12.5	100.0	0.82	1.23	2.14	41.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Future (2031) Total Traffic

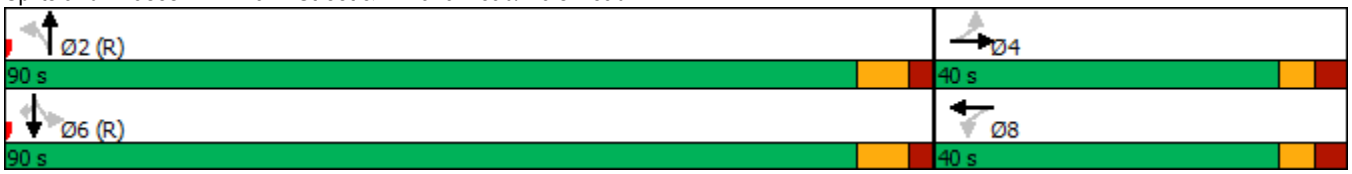


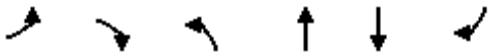
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	177	45	33	43	21	40	12	954	48	46	593	76
Future Volume (vph)	177	45	33	43	21	40	12	954	48	46	593	76
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		0.0	40.0		0.0	100.0		0.0	75.0		175.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00				0.99		1.00					0.98
Frt		0.937			0.902			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1729	1686	0	1478	1627	0	1729	3208	0	1662	3172	1488
Flt Permitted	0.717			0.706			0.427			0.262		
Satd. Flow (perm)	1303	1686	0	1098	1627	0	777	3208	0	458	3172	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			40			8				76
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		528.6			234.2			451.0			177.6	
Travel Time (s)		38.1			16.9			20.3			8.0	
Confl. Peds. (#/hr)	1					1	1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	0%	17%	0%	0%	0%	6%	28%	4%	9%	4%
Adj. Flow (vph)	177	45	33	43	21	40	12	954	48	46	593	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	177	78	0	43	61	0	12	1002	0	46	593	76
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	33.8	33.8		33.8	33.8		42.6	42.6		42.6	42.6	42.6
Total Split (s)	40.0	40.0		40.0	40.0		90.0	90.0		90.0	90.0	90.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		69.2%	69.2%		69.2%	69.2%	69.2%
Maximum Green (s)	33.2	33.2		33.2	33.2		82.4	82.4		82.4	82.4	82.4
Yellow Time (s)	3.6	3.6		3.6	3.6		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	3.2	3.2		3.2	3.2		2.6	2.6		2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8		6.8	6.8		7.6	7.6		7.6	7.6	7.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		28.0	28.0		28.0	28.0	28.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	22.9	22.9		22.9	22.9		92.7	92.7		92.7	92.7	92.7
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.71	0.71		0.71	0.71	0.71
v/c Ratio	0.77	0.24		0.22	0.19		0.02	0.44		0.14	0.26	0.07

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	72.0	30.7		45.9	19.8		6.2	6.1		8.8	7.6	1.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	72.0	30.7		45.9	19.8		6.2	6.1		8.8	7.6	1.9
LOS	E	C		D	B		A	A		A	A	A
Approach Delay		59.4			30.6			6.1			7.1	
Approach LOS		E			C			A			A	
Queue Length 50th (m)	40.3	10.3		8.8	4.2		0.5	27.0		3.1	23.4	0.0
Queue Length 95th (m)	59.2	21.6		17.6	14.3		m1.2	45.8		9.4	38.4	4.9
Internal Link Dist (m)		504.6			210.2			427.0			153.6	
Turn Bay Length (m)	100.0			40.0			100.0			75.0		175.0
Base Capacity (vph)	332	450		280	445		554	2289		326	2261	1059
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.53	0.17		0.15	0.14		0.02	0.44		0.14	0.26	0.07

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 16 (12%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 14.2		Intersection LOS: B	
Intersection Capacity Utilization 69.4%		ICU Level of Service C	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 1: Bank Street & Miikana Road/Blais Road





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	333	85	124	678	520	91
Future Volume (vph)	333	85	124	678	520	91
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	120.0			100.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			1.00			0.96
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1616	1459	1558	1655	1640	1172
Flt Permitted	0.950		0.412			
Satd. Flow (perm)	1616	1459	672	1655	1640	1129
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		85				91
Link Speed (k/h)	50			80	80	
Link Distance (m)	528.6			273.1	451.0	
Travel Time (s)	38.1			12.3	20.3	
Confl. Peds. (#/hr)			4			4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	6%	11%	10%	11%	32%
Adj. Flow (vph)	333	85	124	678	520	91
Shared Lane Traffic (%)						
Lane Group Flow (vph)	333	85	124	678	520	91
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	21.7	21.7	21.7	21.7
Total Split (s)	40.0	40.0	90.0	90.0	90.0	90.0
Total Split (%)	30.8%	30.8%	69.2%	69.2%	69.2%	69.2%
Maximum Green (s)	33.4	33.4	83.3	83.3	83.3	83.3
Yellow Time (s)	3.3	3.3	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	8.0	8.0	8.0	8.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	30.2	30.2	86.5	86.5	86.5	86.5
Actuated g/C Ratio	0.23	0.23	0.67	0.67	0.67	0.67
v/c Ratio	0.89	0.21	0.28	0.62	0.48	0.12

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Control Delay	73.4	8.8	11.7	16.1	12.5	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.4	8.8	11.7	16.1	12.5	2.2
LOS	E	A	B	B	B	A
Approach Delay	60.2			15.4	11.0	
Approach LOS	E			B	B	
Queue Length 50th (m)	74.7	0.0	11.8	88.9	74.4	2.4
Queue Length 95th (m)	#114.9	11.8	22.2	126.5	104.9	0.7
Internal Link Dist (m)	504.6			249.1	427.0	
Turn Bay Length (m)	25.0		120.0			100.0
Base Capacity (vph)	415	438	447	1101	1091	781
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.19	0.28	0.62	0.48	0.12

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 40 (31%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 24.2		Intersection LOS: C	
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: 2: Bank Street & Dun Skipper Drive



Intersection	
Intersection Delay, s/veh	11.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	168	39	22	166	105	63	82	35	124	54	53
Future Vol, veh/h	28	168	39	22	166	105	63	82	35	124	54	53
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	1	8	5	1	7	0	2	6	2	0	0
Mvmt Flow	28	168	39	22	166	105	63	82	35	124	54	53
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.6	12.5	11.1	12
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	35%	12%	8%	54%
Vol Thru, %	46%	71%	57%	23%
Vol Right, %	19%	17%	36%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	180	235	293	231
LT Vol	63	28	22	124
Through Vol	82	168	166	54
RT Vol	35	39	105	53
Lane Flow Rate	180	235	293	231
Geometry Grp	1	1	1	1
Degree of Util (X)	0.286	0.359	0.436	0.364
Departure Headway (Hd)	5.721	5.494	5.363	5.673
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	625	651	668	631
Service Time	3.787	3.555	3.422	3.734
HCM Lane V/C Ratio	0.288	0.361	0.439	0.366
HCM Control Delay	11.1	11.6	12.5	12
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	1.2	1.6	2.2	1.7

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	42	9	23	20	27	3	66	62	39	42	12
Future Vol, veh/h	18	42	9	23	20	27	3	66	62	39	42	12
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	8	5	56	6	7	0	33	5	0	22	11	50
Mvmt Flow	18	42	9	23	20	27	3	66	62	39	42	12
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.1	7.9	8.6	8.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	26%	33%	42%
Vol Thru, %	50%	61%	29%	45%
Vol Right, %	47%	13%	39%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	131	69	70	93
LT Vol	3	18	23	39
Through Vol	66	42	20	42
RT Vol	62	9	27	12
Lane Flow Rate	131	69	70	93
Geometry Grp	1	1	1	1
Degree of Util (X)	0.168	0.089	0.087	0.123
Departure Headway (Hd)	4.616	4.633	4.46	4.756
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	778	775	805	755
Service Time	2.635	2.652	2.479	2.776
HCM Lane V/C Ratio	0.168	0.089	0.087	0.123
HCM Control Delay	8.6	8.1	7.9	8.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.6	0.3	0.3	0.4

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	57	7	72	39	26	3	32	126	32	23	2
Future Vol, veh/h	17	57	7	72	39	26	3	32	126	32	23	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	9	0	20	10	8	0	5	19	0	12	0
Mvmt Flow	17	57	7	72	39	26	3	32	126	32	23	2
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.1	8.9	7.9	8.1
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	21%	53%	56%
Vol Thru, %	20%	70%	28%	40%
Vol Right, %	78%	9%	19%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	161	81	137	57
LT Vol	3	17	72	32
Through Vol	32	57	39	23
RT Vol	126	7	26	2
Lane Flow Rate	161	81	137	57
Geometry Grp	1	1	1	1
Degree of Util (X)	0.18	0.102	0.182	0.074
Departure Headway (Hd)	4.031	4.527	4.795	4.689
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	892	792	749	765
Service Time	2.047	2.553	2.819	2.711
HCM Lane V/C Ratio	0.18	0.102	0.183	0.075
HCM Control Delay	7.9	8.1	8.9	8.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0.3	0.7	0.2

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	801	583	0
Future Vol, veh/h	0	0	0	801	583	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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, %	0	0	0	10	11	0
Mvmt Flow	0	0	0	801	583	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1384	583	583	0	-	0
Stage 1	583	-	-	-	-	-
Stage 2	801	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	160	516	1001	-	-	-
Stage 1	562	-	-	-	-	-
Stage 2	445	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	160	516	1001	-	-	-
Mov Cap-2 Maneuver	160	-	-	-	-	-
Stage 1	562	-	-	-	-	-
Stage 2	445	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

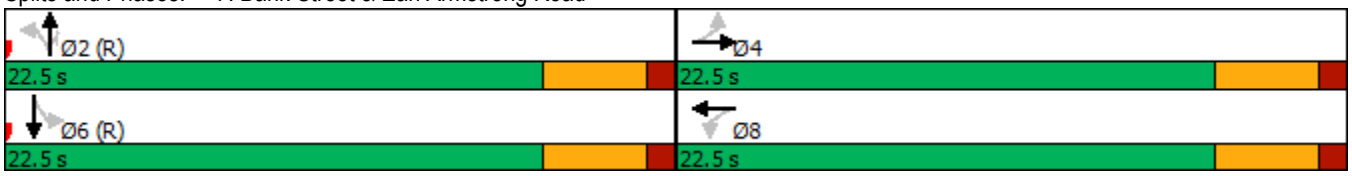
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1001	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

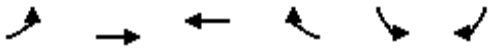
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	801	0	0	583	0
Future Volume (vph)	0	0	0	0	0	0	0	801	0	0	583	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0		0.0	50.0		0.0	20.0		15.0	15.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt												
Flt Protected												
Satd. Flow (prot)	1820	3232	0	1379	1468	0	1784	1750	1517	1569	3144	0
Flt Permitted												
Satd. Flow (perm)	1820	3232	0	1379	1468	0	1784	1750	1517	1569	3144	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		528.5			292.7			203.7			158.2	
Travel Time (s)		23.8			13.2			9.2			7.1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	7%	5%	32%	24%	34%	2%	4%	20%	16%	10%	12%
Adj. Flow (vph)	0	0	0	0	0	0	0	801	0	0	583	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	801	0	0	583	0
Turn Type	Perm			Perm			Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)								45.0			45.0	
Actuated g/C Ratio								1.00			1.00	
v/c Ratio								0.46			0.19	
Control Delay								0.9			0.1	
Queue Delay								0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay								0.9			0.1	
LOS								A			A	
Approach Delay								0.9			0.1	
Approach LOS								A			A	
Queue Length 50th (m)								0.0			0.0	
Queue Length 95th (m)								0.0			0.0	
Internal Link Dist (m)		504.5			268.7			179.7			134.2	
Turn Bay Length (m)												
Base Capacity (vph)								1750			3144	
Starvation Cap Reductn								0			0	
Spillback Cap Reductn								0			0	
Storage Cap Reductn								0			0	
Reduced v/c Ratio								0.46			0.19	

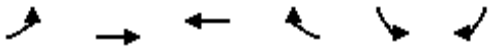
Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.46			
Intersection Signal Delay: 0.6		Intersection LOS: A	
Intersection Capacity Utilization 48.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 7: Bank Street & Earl Armstrong Road





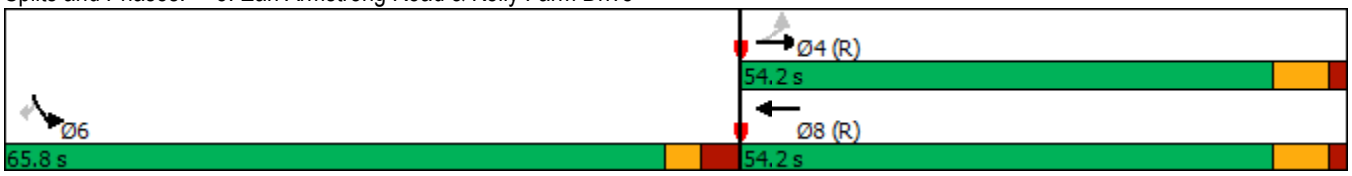
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	40.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1625	3262	3007	0	1596	1596
Flt Permitted						
Satd. Flow (perm)	1625	3262	3007	0	1596	1596
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						
Link Speed (k/h)		80	80		40	
Link Distance (m)		222.0	528.5		431.1	
Travel Time (s)		10.0	23.8		38.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	12%	6%	15%	12%	14%	14%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Turn Type	Perm				Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	24.8	24.8	24.8		33.8	33.8
Total Split (s)	54.2	54.2	54.2		65.8	65.8
Total Split (%)	45.2%	45.2%	45.2%		54.8%	54.8%
Maximum Green (s)	47.4	47.4	47.4		59.0	59.0
Yellow Time (s)	5.0	5.0	5.0		3.2	3.2
All-Red Time (s)	1.8	1.8	1.8		3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.8	6.8	6.8		6.8	6.8
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0		20.0	20.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)						
Actuated g/C Ratio						
v/c Ratio						
Control Delay						
Queue Delay						



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Total Delay						
LOS						
Approach Delay						
Approach LOS						
Queue Length 50th (m)						
Queue Length 95th (m)						
Internal Link Dist (m)		198.0	504.5		407.1	
Turn Bay Length (m)						
Base Capacity (vph)						
Starvation Cap Reductn						
Spillback Cap Reductn						
Storage Cap Reductn						
Reduced v/c Ratio						

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 59.5 (50%), Referenced to phase 4:EBTL and 8:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.00			
Intersection Signal Delay: 0.0		Intersection LOS: A	
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 8: Earl Armstrong Road & Kelly Farm Drive

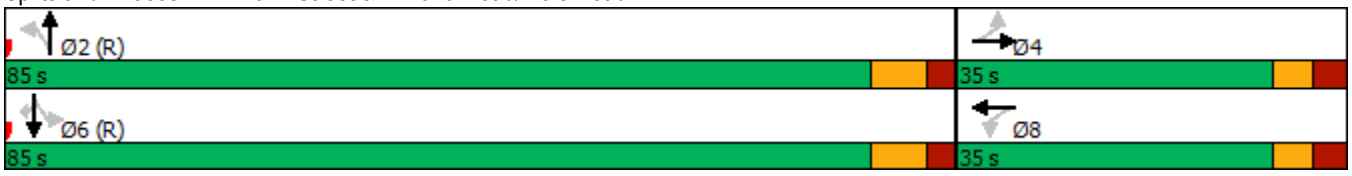


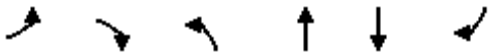
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	132	23	43	54	32	62	23	893	45	50	1164	187
Future Volume (vph)	132	23	43	54	32	62	23	893	45	50	1164	187
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		0.0	40.0		0.0	100.0		0.0	75.0		175.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor							1.00					0.98
Frt		0.902			0.901			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1729	1405	0	1530	1602	0	1729	3287	0	1601	3325	1517
Flt Permitted	0.696			0.714			0.218			0.289		
Satd. Flow (perm)	1267	1405	0	1150	1602	0	397	3287	0	487	3325	1481
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		43			62			8				187
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.6			234.2			451.0			177.6	
Travel Time (s)		38.1			16.9			32.5			12.8	
Confl. Peds. (#/hr)							2					2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	9%	21%	13%	3%	2%	0%	4%	14%	8%	4%	2%
Adj. Flow (vph)	132	23	43	54	32	62	23	893	45	50	1164	187
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	66	0	54	94	0	23	938	0	50	1164	187
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	33.8	33.8		33.8	33.8		42.6	42.6		42.6	42.6	42.6
Total Split (s)	35.0	35.0		35.0	35.0		85.0	85.0		85.0	85.0	85.0
Total Split (%)	29.2%	29.2%		29.2%	29.2%		70.8%	70.8%		70.8%	70.8%	70.8%
Maximum Green (s)	28.2	28.2		28.2	28.2		77.4	77.4		77.4	77.4	77.4
Yellow Time (s)	3.6	3.6		3.6	3.6		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	3.2	3.2		3.2	3.2		2.6	2.6		2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8		6.8	6.8		7.6	7.6		7.6	7.6	7.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		28.0	28.0		28.0	28.0	28.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	17.8	17.8		17.8	17.8		87.8	87.8		87.8	87.8	87.8
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.73	0.73		0.73	0.73	0.73
v/c Ratio	0.71	0.27		0.32	0.32		0.08	0.39		0.14	0.48	0.17

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	67.5	21.3		48.5	20.3		4.4	4.2		7.2	8.1	1.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	67.5	21.3		48.5	20.3		4.4	4.2		7.2	8.1	1.3
LOS	E	C		D	C		A	A		A	A	A
Approach Delay		52.1			30.6			4.2			7.1	
Approach LOS		D			C			A			A	
Queue Length 50th (m)	27.6	4.4		10.6	6.1		0.8	20.6		2.8	48.0	0.0
Queue Length 95th (m)	43.9	15.0		20.6	18.6		m1.6	25.6		8.6	75.9	6.4
Internal Link Dist (m)		504.6			210.2			427.0			153.6	
Turn Bay Length (m)	100.0			40.0			100.0			75.0		175.0
Base Capacity (vph)	297	363		270	423		290	2407		356	2433	1133
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.44	0.18		0.20	0.22		0.08	0.39		0.14	0.48	0.17

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 18 (15%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 10.6		Intersection LOS: B	
Intersection Capacity Utilization 70.2%		ICU Level of Service C	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 1: Bank Street & Miikana Road/Blais Road





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	314	99	149	643	980	197
Future Volume (vph)	314	99	149	643	980	197
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	120.0			100.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1601	1369	1679	1701	1733	1532
Flt Permitted	0.950		0.154			
Satd. Flow (perm)	1601	1369	272	1701	1733	1532
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		99				197
Link Speed (k/h)	50			80	80	
Link Distance (m)	528.6			273.1	451.0	
Travel Time (s)	38.1			12.3	20.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	8%	13%	3%	7%	5%	1%
Adj. Flow (vph)	314	99	149	643	980	197
Shared Lane Traffic (%)						
Lane Group Flow (vph)	314	99	149	643	980	197
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	21.7	21.7	21.7	21.7
Total Split (s)	34.0	34.0	86.0	86.0	86.0	86.0
Total Split (%)	28.3%	28.3%	71.7%	71.7%	71.7%	71.7%
Maximum Green (s)	27.4	27.4	79.3	79.3	79.3	79.3
Yellow Time (s)	3.3	3.3	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	8.0	8.0	8.0	8.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	26.0	26.0	80.7	80.7	80.7	80.7
Actuated g/C Ratio	0.22	0.22	0.67	0.67	0.67	0.67
v/c Ratio	0.91	0.27	0.82	0.56	0.84	0.18
Control Delay	75.6	9.2	51.9	13.0	18.1	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay	75.6	9.2	51.9	13.0	18.1	0.6
LOS	E	A	D	B	B	A
Approach Delay	59.7			20.3	15.2	
Approach LOS	E			C	B	
Queue Length 50th (m)	65.8	0.0	22.3	69.8	161.5	0.0
Queue Length 95th (m)	#110.2	12.6	#64.6	98.3	80.5	1.9
Internal Link Dist (m)	504.6			249.1	427.0	
Turn Bay Length (m)	25.0		120.0			100.0
Base Capacity (vph)	365	388	182	1144	1165	1095
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.26	0.82	0.56	0.84	0.18

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 18 (15%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 24.6		Intersection LOS: C	
Intersection Capacity Utilization 98.2%		ICU Level of Service F	
Analysis Period (min) 15			

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

Splits and Phases: 2: Bank Street & Dun Skipper Drive



Intersection	
Intersection Delay, s/veh	12.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	264	95	49	182	79	48	40	35	107	59	28
Future Vol, veh/h	13	264	95	49	182	79	48	40	35	107	59	28
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	2	2	0	0	5	0	0	0	2	15	0
Mvmt Flow	13	264	95	49	182	79	48	40	35	107	59	28
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	14.2	12.8	10.6	11.9
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	39%	3%	16%	55%
Vol Thru, %	33%	71%	59%	30%
Vol Right, %	28%	26%	25%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	123	372	310	194
LT Vol	48	13	49	107
Through Vol	40	264	182	59
RT Vol	35	95	79	28
Lane Flow Rate	123	372	310	194
Geometry Grp	1	1	1	1
Degree of Util (X)	0.205	0.537	0.457	0.322
Departure Headway (Hd)	5.994	5.198	5.31	5.979
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	595	692	676	598
Service Time	4.068	3.254	3.369	4.046
HCM Lane V/C Ratio	0.207	0.538	0.459	0.324
HCM Control Delay	10.6	14.2	12.8	11.9
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	0.8	3.2	2.4	1.4

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	47	2	39	39	58	2	59	41	31	58	9
Future Vol, veh/h	13	47	2	39	39	58	2	59	41	31	58	9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	11	0	50	0	0	0	50	2	4	12	2	0
Mvmt Flow	13	47	2	39	39	58	2	59	41	31	58	9
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.2	8.1	9	8.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	21%	29%	32%
Vol Thru, %	58%	76%	29%	59%
Vol Right, %	40%	3%	43%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	102	62	136	98
LT Vol	2	13	39	31
Through Vol	59	47	39	58
RT Vol	41	2	58	9
Lane Flow Rate	102	62	136	98
Geometry Grp	1	1	1	1
Degree of Util (X)	0.144	0.082	0.162	0.128
Departure Headway (Hd)	5.083	4.766	4.282	4.696
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	707	753	839	764
Service Time	3.107	2.788	2.3	2.719
HCM Lane V/C Ratio	0.144	0.082	0.162	0.128
HCM Control Delay	9	8.2	8.1	8.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.3	0.6	0.4

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	66	0	107	55	43	1	26	94	33	29	16
Future Vol, veh/h	16	66	0	107	55	43	1	26	94	33	29	16
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	4	0	0	3	0	0	5	15	5	0	0
Mvmt Flow	16	66	0	107	55	43	1	26	94	33	29	16
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.2	8.9	7.9	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	20%	52%	42%
Vol Thru, %	21%	80%	27%	37%
Vol Right, %	78%	0%	21%	21%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	121	82	205	78
LT Vol	1	16	107	33
Through Vol	26	66	55	29
RT Vol	94	0	43	16
Lane Flow Rate	121	82	205	78
Geometry Grp	1	1	1	1
Degree of Util (X)	0.141	0.105	0.252	0.103
Departure Headway (Hd)	4.19	4.616	4.42	4.741
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	855	776	812	756
Service Time	2.218	2.648	2.447	2.771
HCM Lane V/C Ratio	0.142	0.106	0.252	0.103
HCM Control Delay	7.9	8.2	8.9	8.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.4	1	0.3

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	796	1045	0
Future Vol, veh/h	0	0	0	796	1045	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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, %	0	0	0	7	6	0
Mvmt Flow	0	0	0	796	1045	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1841	1045	1045	0	-	0
Stage 1	1045	-	-	-	-	-
Stage 2	796	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	84	280	673	-	-	-
Stage 1	342	-	-	-	-	-
Stage 2	448	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	84	280	673	-	-	-
Mov Cap-2 Maneuver	84	-	-	-	-	-
Stage 1	342	-	-	-	-	-
Stage 2	448	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

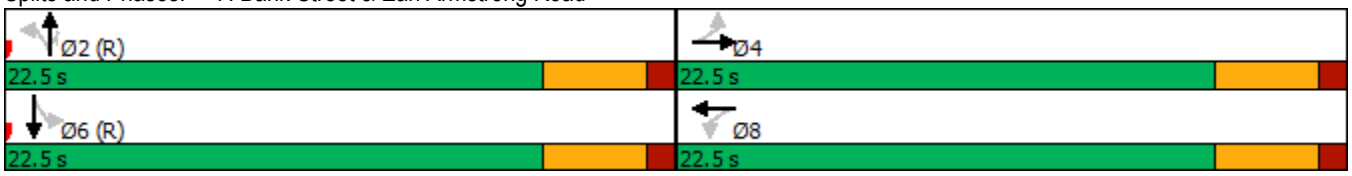
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	673	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

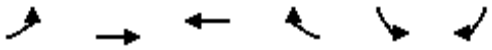
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	796	0	0	1045	0
Future Volume (vph)	0	0	0	0	0	0	0	796	0	0	1045	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0		0.0	50.0		0.0	20.0		15.0	15.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt												
Flt Protected												
Satd. Flow (prot)	1784	2981	0	1670	1670	0	1820	1750	1389	1542	3232	0
Flt Permitted												
Satd. Flow (perm)	1784	2981	0	1670	1670	0	1820	1750	1389	1542	3232	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.5			292.7			203.7			158.2	
Travel Time (s)		38.1			21.1			14.7			11.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	16%	3%	9%	9%	5%	0%	4%	31%	18%	7%	4%
Adj. Flow (vph)	0	0	0	0	0	0	0	796	0	0	1045	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	796	0	0	1045	0
Turn Type	Perm			Perm			Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)								45.0			45.0	
Actuated g/C Ratio								1.00			1.00	
v/c Ratio								0.45			0.32	
Control Delay								0.9			0.3	
Queue Delay								0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay								0.9			0.3	
LOS								A			A	
Approach Delay								0.9			0.3	
Approach LOS								A			A	
Queue Length 50th (m)								0.0			0.0	
Queue Length 95th (m)								0.0			0.0	
Internal Link Dist (m)		504.5			268.7			179.7			134.2	
Turn Bay Length (m)												
Base Capacity (vph)								1750			3232	
Starvation Cap Reductn								0			0	
Spillback Cap Reductn								0			0	
Storage Cap Reductn								0			0	
Reduced v/c Ratio								0.45			0.32	

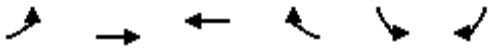
Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.45			
Intersection Signal Delay: 0.5		Intersection LOS: A	
Intersection Capacity Utilization 48.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 7: Bank Street & Earl Armstrong Road





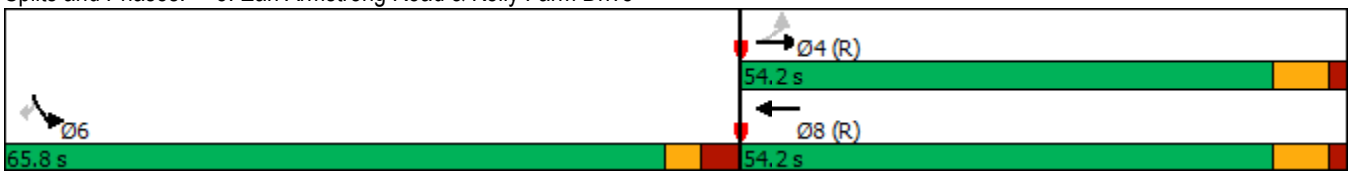
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	40.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1640	3144	3232	0	1820	1820
Flt Permitted						
Satd. Flow (perm)	1640	3144	3232	0	1820	1820
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						
Link Speed (k/h)		50	50		50	
Link Distance (m)		222.0	528.5		431.1	
Travel Time (s)		16.0	38.1		31.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	11%	10%	7%	11%	0%	0%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Turn Type	Perm				Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	24.8	24.8	24.8		33.8	33.8
Total Split (s)	54.2	54.2	54.2		65.8	65.8
Total Split (%)	45.2%	45.2%	45.2%		54.8%	54.8%
Maximum Green (s)	47.4	47.4	47.4		59.0	59.0
Yellow Time (s)	5.0	5.0	5.0		3.2	3.2
All-Red Time (s)	1.8	1.8	1.8		3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.8	6.8	6.8		6.8	6.8
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0		20.0	20.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)						
Actuated g/C Ratio						
v/c Ratio						
Control Delay						
Queue Delay						



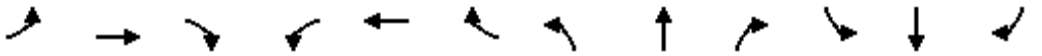
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Total Delay						
LOS						
Approach Delay						
Approach LOS						
Queue Length 50th (m)						
Queue Length 95th (m)						
Internal Link Dist (m)		198.0	504.5		407.1	
Turn Bay Length (m)						
Base Capacity (vph)						
Starvation Cap Reductn						
Spillback Cap Reductn						
Storage Cap Reductn						
Reduced v/c Ratio						

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 59.5 (50%), Referenced to phase 4:EBTL and 8:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.00			
Intersection Signal Delay: 0.0		Intersection LOS: A	
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 8: Earl Armstrong Road & Kelly Farm Drive



Future (2036) Total Traffic

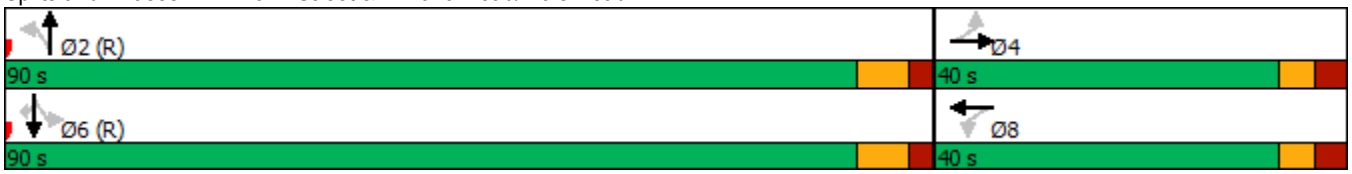


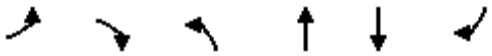
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	177	45	33	43	21	40	12	1001	48	46	620	76
Future Volume (vph)	177	45	33	43	21	40	12	1001	48	46	620	76
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		0.0	40.0		0.0	100.0		0.0	75.0		175.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00				0.99		1.00					0.98
Frt		0.937			0.902			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1729	1686	0	1478	1627	0	1729	3209	0	1662	3172	1488
Flt Permitted	0.717			0.706			0.414			0.247		
Satd. Flow (perm)	1303	1686	0	1098	1627	0	753	3209	0	432	3172	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			40			7				76
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		528.6			234.2			451.0			177.6	
Travel Time (s)		38.1			16.9			20.3			8.0	
Confl. Peds. (#/hr)	1					1	1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	0%	17%	0%	0%	0%	6%	28%	4%	9%	4%
Adj. Flow (vph)	177	45	33	43	21	40	12	1001	48	46	620	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	177	78	0	43	61	0	12	1049	0	46	620	76
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	33.8	33.8		33.8	33.8		42.6	42.6		42.6	42.6	42.6
Total Split (s)	40.0	40.0		40.0	40.0		90.0	90.0		90.0	90.0	90.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		69.2%	69.2%		69.2%	69.2%	69.2%
Maximum Green (s)	33.2	33.2		33.2	33.2		82.4	82.4		82.4	82.4	82.4
Yellow Time (s)	3.6	3.6		3.6	3.6		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	3.2	3.2		3.2	3.2		2.6	2.6		2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8		6.8	6.8		7.6	7.6		7.6	7.6	7.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		28.0	28.0		28.0	28.0	28.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	22.9	22.9		22.9	22.9		92.7	92.7		92.7	92.7	92.7
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.71	0.71		0.71	0.71	0.71
v/c Ratio	0.77	0.24		0.22	0.19		0.02	0.46		0.15	0.27	0.07

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	72.0	30.7		45.9	19.8		7.1	6.9		9.1	7.7	1.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	72.0	30.7		45.9	19.8		7.1	6.9		9.1	7.7	1.9
LOS	E	C		D	B		A	A		A	A	A
Approach Delay		59.4			30.6			6.9			7.2	
Approach LOS		E			C			A			A	
Queue Length 50th (m)	40.3	10.3		8.8	4.2		0.5	29.5		3.2	24.7	0.0
Queue Length 95th (m)	59.2	21.6		17.6	14.3		m1.3	57.7		9.5	40.3	4.9
Internal Link Dist (m)		504.6			210.2			427.0			153.6	
Turn Bay Length (m)	100.0			40.0			100.0			75.0		175.0
Base Capacity (vph)	332	450		280	445		536	2290		308	2261	1059
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.53	0.17		0.15	0.14		0.02	0.46		0.15	0.27	0.07

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 16 (12%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 14.3		Intersection LOS: B	
Intersection Capacity Utilization 69.4%		ICU Level of Service C	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 1: Bank Street & Miikana Road/Blais Road





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	333	85	124	723	548	91
Future Volume (vph)	333	85	124	723	548	91
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	120.0			100.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			1.00			0.96
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1616	1459	1558	1655	1640	1172
Flt Permitted	0.950		0.394			
Satd. Flow (perm)	1616	1459	643	1655	1640	1129
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		85				91
Link Speed (k/h)	50			80	80	
Link Distance (m)	528.6			273.1	451.0	
Travel Time (s)	38.1			12.3	20.3	
Confl. Peds. (#/hr)			4			4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	6%	11%	10%	11%	32%
Adj. Flow (vph)	333	85	124	723	548	91
Shared Lane Traffic (%)						
Lane Group Flow (vph)	333	85	124	723	548	91
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	21.7	21.7	21.7	21.7
Total Split (s)	40.0	40.0	90.0	90.0	90.0	90.0
Total Split (%)	30.8%	30.8%	69.2%	69.2%	69.2%	69.2%
Maximum Green (s)	33.4	33.4	83.3	83.3	83.3	83.3
Yellow Time (s)	3.3	3.3	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	8.0	8.0	8.0	8.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	30.2	30.2	86.5	86.5	86.5	86.5
Actuated g/C Ratio	0.23	0.23	0.67	0.67	0.67	0.67
v/c Ratio	0.89	0.21	0.29	0.66	0.50	0.12

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Control Delay	73.4	8.8	12.0	17.3	12.9	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.4	8.8	12.0	17.3	12.9	2.2
LOS	E	A	B	B	B	A
Approach Delay	60.2			16.5	11.4	
Approach LOS	E			B	B	
Queue Length 50th (m)	74.7	0.0	11.9	99.5	80.1	2.7
Queue Length 95th (m)	#114.9	11.8	22.7	141.9	112.6	0.7
Internal Link Dist (m)	504.6			249.1	427.0	
Turn Bay Length (m)	25.0		120.0			100.0
Base Capacity (vph)	415	438	428	1101	1091	781
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.19	0.29	0.66	0.50	0.12

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 40 (31%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 24.4		Intersection LOS: C	
Intersection Capacity Utilization 74.9%		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: 2: Bank Street & Dun Skipper Drive



Intersection	
Intersection Delay, s/veh	11.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	168	39	22	166	105	63	82	35	124	54	53
Future Vol, veh/h	28	168	39	22	166	105	63	82	35	124	54	53
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	1	8	5	1	7	0	2	6	2	0	0
Mvmt Flow	28	168	39	22	166	105	63	82	35	124	54	53
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.6	12.5	11.1	12
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	35%	12%	8%	54%
Vol Thru, %	46%	71%	57%	23%
Vol Right, %	19%	17%	36%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	180	235	293	231
LT Vol	63	28	22	124
Through Vol	82	168	166	54
RT Vol	35	39	105	53
Lane Flow Rate	180	235	293	231
Geometry Grp	1	1	1	1
Degree of Util (X)	0.286	0.359	0.436	0.364
Departure Headway (Hd)	5.721	5.494	5.363	5.673
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	625	651	668	631
Service Time	3.787	3.555	3.422	3.734
HCM Lane V/C Ratio	0.288	0.361	0.439	0.366
HCM Control Delay	11.1	11.6	12.5	12
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	1.2	1.6	2.2	1.7

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	42	9	23	20	27	3	66	62	39	42	12
Future Vol, veh/h	18	42	9	23	20	27	3	66	62	39	42	12
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	8	5	56	6	7	0	33	5	0	22	11	50
Mvmt Flow	18	42	9	23	20	27	3	66	62	39	42	12
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.1	7.9	8.6	8.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	26%	33%	42%
Vol Thru, %	50%	61%	29%	45%
Vol Right, %	47%	13%	39%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	131	69	70	93
LT Vol	3	18	23	39
Through Vol	66	42	20	42
RT Vol	62	9	27	12
Lane Flow Rate	131	69	70	93
Geometry Grp	1	1	1	1
Degree of Util (X)	0.168	0.089	0.087	0.123
Departure Headway (Hd)	4.616	4.633	4.46	4.756
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	778	775	805	755
Service Time	2.635	2.652	2.479	2.776
HCM Lane V/C Ratio	0.168	0.089	0.087	0.123
HCM Control Delay	8.6	8.1	7.9	8.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.6	0.3	0.3	0.4

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	57	7	72	39	26	3	32	126	32	23	2
Future Vol, veh/h	17	57	7	72	39	26	3	32	126	32	23	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	9	0	20	10	8	0	5	19	0	12	0
Mvmt Flow	17	57	7	72	39	26	3	32	126	32	23	2
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.1	8.9	7.9	8.1
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	21%	53%	56%
Vol Thru, %	20%	70%	28%	40%
Vol Right, %	78%	9%	19%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	161	81	137	57
LT Vol	3	17	72	32
Through Vol	32	57	39	23
RT Vol	126	7	26	2
Lane Flow Rate	161	81	137	57
Geometry Grp	1	1	1	1
Degree of Util (X)	0.18	0.102	0.182	0.074
Departure Headway (Hd)	4.031	4.527	4.795	4.689
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	892	792	749	765
Service Time	2.047	2.553	2.819	2.711
HCM Lane V/C Ratio	0.18	0.102	0.183	0.075
HCM Control Delay	7.9	8.1	8.9	8.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0.3	0.7	0.2

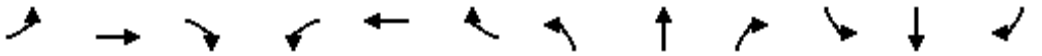
Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	848	613	0
Future Vol, veh/h	0	0	0	848	613	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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, %	0	0	0	10	11	0
Mvmt Flow	0	0	0	848	613	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1461	613	613	0	-	0
Stage 1	613	-	-	-	-	-
Stage 2	848	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	143	496	976	-	-	-
Stage 1	544	-	-	-	-	-
Stage 2	423	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	143	496	976	-	-	-
Mov Cap-2 Maneuver	143	-	-	-	-	-
Stage 1	544	-	-	-	-	-
Stage 2	423	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	976	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

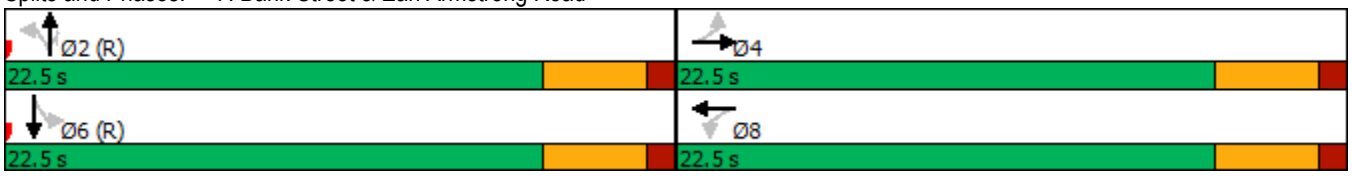


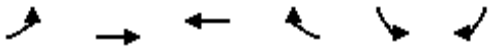
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	848	0	0	613	0
Future Volume (vph)	0	0	0	0	0	0	0	848	0	0	613	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0		0.0	50.0		0.0	20.0		15.0	15.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt												
Flt Protected												
Satd. Flow (prot)	1820	3232	0	1379	1468	0	1784	1750	1517	1569	3144	0
Flt Permitted												
Satd. Flow (perm)	1820	3232	0	1379	1468	0	1784	1750	1517	1569	3144	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		528.5			292.7			203.7			158.2	
Travel Time (s)		23.8			13.2			9.2			7.1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	7%	5%	32%	24%	34%	2%	4%	20%	16%	10%	12%
Adj. Flow (vph)	0	0	0	0	0	0	0	848	0	0	613	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	848	0	0	613	0
Turn Type	Perm			Perm			Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)								45.0			45.0	
Actuated g/C Ratio								1.00			1.00	
v/c Ratio								0.48			0.19	
Control Delay								1.0			0.1	
Queue Delay								0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay								1.0			0.1	
LOS								A			A	
Approach Delay								1.0			0.1	
Approach LOS								A			A	
Queue Length 50th (m)								0.0			0.0	
Queue Length 95th (m)								0.0			0.0	
Internal Link Dist (m)		504.5			268.7			179.7			134.2	
Turn Bay Length (m)												
Base Capacity (vph)								1750			3144	
Starvation Cap Reductn								0			0	
Spillback Cap Reductn								0			0	
Storage Cap Reductn								0			0	
Reduced v/c Ratio								0.48			0.19	

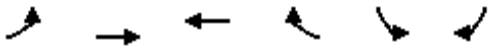
Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 0.6		Intersection LOS: A	
Intersection Capacity Utilization 50.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 7: Bank Street & Earl Armstrong Road





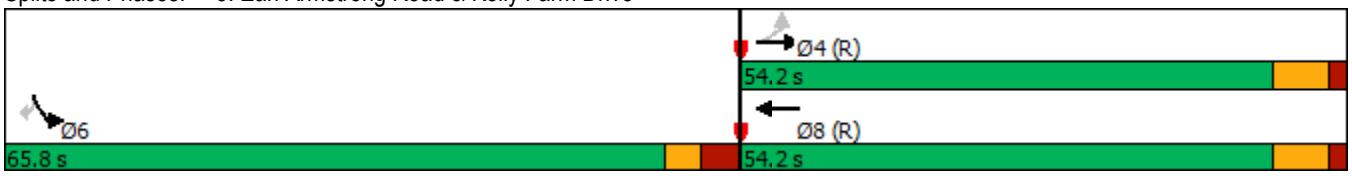
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	40.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1625	3262	3007	0	1596	1596
Flt Permitted						
Satd. Flow (perm)	1625	3262	3007	0	1596	1596
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						
Link Speed (k/h)		80	80		40	
Link Distance (m)		222.0	528.5		431.1	
Travel Time (s)		10.0	23.8		38.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	12%	6%	15%	12%	14%	14%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Turn Type	Perm				Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	24.8	24.8	24.8		33.8	33.8
Total Split (s)	54.2	54.2	54.2		65.8	65.8
Total Split (%)	45.2%	45.2%	45.2%		54.8%	54.8%
Maximum Green (s)	47.4	47.4	47.4		59.0	59.0
Yellow Time (s)	5.0	5.0	5.0		3.2	3.2
All-Red Time (s)	1.8	1.8	1.8		3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.8	6.8	6.8		6.8	6.8
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0		20.0	20.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)						
Actuated g/C Ratio						
v/c Ratio						
Control Delay						
Queue Delay						

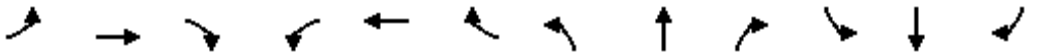


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Total Delay						
LOS						
Approach Delay						
Approach LOS						
Queue Length 50th (m)						
Queue Length 95th (m)						
Internal Link Dist (m)		198.0	504.5		407.1	
Turn Bay Length (m)						
Base Capacity (vph)						
Starvation Cap Reductn						
Spillback Cap Reductn						
Storage Cap Reductn						
Reduced v/c Ratio						

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 59.5 (50%), Referenced to phase 4:EBTL and 8:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.00			
Intersection Signal Delay: 0.0		Intersection LOS: A	
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 8: Earl Armstrong Road & Kelly Farm Drive



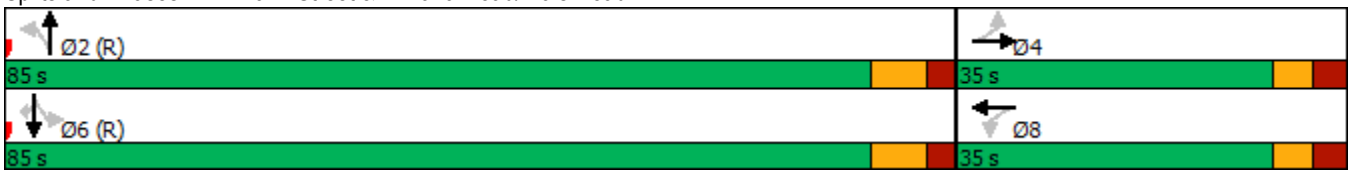


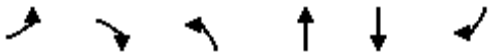
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	132	23	43	54	32	62	23	936	45	50	1223	187
Future Volume (vph)	132	23	43	54	32	62	23	936	45	50	1223	187
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		0.0	40.0		0.0	100.0		0.0	75.0		175.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor							1.00					0.98
Frt		0.902			0.901			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1729	1405	0	1530	1602	0	1729	3287	0	1601	3325	1517
Flt Permitted	0.696			0.714			0.202			0.274		
Satd. Flow (perm)	1267	1405	0	1150	1602	0	367	3287	0	462	3325	1481
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		43			62			8				187
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.6			234.2			451.0			177.6	
Travel Time (s)		38.1			16.9			32.5			12.8	
Confl. Peds. (#/hr)							2					2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	9%	21%	13%	3%	2%	0%	4%	14%	8%	4%	2%
Adj. Flow (vph)	132	23	43	54	32	62	23	936	45	50	1223	187
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	66	0	54	94	0	23	981	0	50	1223	187
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	33.8	33.8		33.8	33.8		42.6	42.6		42.6	42.6	42.6
Total Split (s)	35.0	35.0		35.0	35.0		85.0	85.0		85.0	85.0	85.0
Total Split (%)	29.2%	29.2%		29.2%	29.2%		70.8%	70.8%		70.8%	70.8%	70.8%
Maximum Green (s)	28.2	28.2		28.2	28.2		77.4	77.4		77.4	77.4	77.4
Yellow Time (s)	3.6	3.6		3.6	3.6		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	3.2	3.2		3.2	3.2		2.6	2.6		2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8		6.8	6.8		7.6	7.6		7.6	7.6	7.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		28.0	28.0		28.0	28.0	28.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	17.8	17.8		17.8	17.8		87.8	87.8		87.8	87.8	87.8
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.73	0.73		0.73	0.73	0.73
v/c Ratio	0.71	0.27		0.32	0.32		0.09	0.41		0.15	0.50	0.17

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	67.5	21.3		48.5	20.3		4.6	4.3		7.4	8.3	1.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	67.5	21.3		48.5	20.3		4.6	4.3		7.4	8.3	1.3
LOS	E	C		D	C		A	A		A	A	A
Approach Delay		52.1			30.6			4.3			7.4	
Approach LOS		D			C			A			A	
Queue Length 50th (m)	27.6	4.4		10.6	6.1		0.9	22.5		2.9	52.0	0.0
Queue Length 95th (m)	43.9	15.0		20.6	18.6		m1.6	m29.1		8.7	81.9	6.4
Internal Link Dist (m)		504.6			210.2			427.0			153.6	
Turn Bay Length (m)	100.0			40.0			100.0			75.0		175.0
Base Capacity (vph)	297	363		270	423		268	2407		338	2433	1133
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.44	0.18		0.20	0.22		0.09	0.41		0.15	0.50	0.17

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 18 (15%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 10.7		Intersection LOS: B	
Intersection Capacity Utilization 70.2%		ICU Level of Service C	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 1: Bank Street & Miikana Road/Blais Road





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	314	99	149	683	1038	197
Future Volume (vph)	314	99	149	683	1038	197
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	120.0			100.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1601	1369	1679	1701	1733	1532
Flt Permitted	0.950		0.140			
Satd. Flow (perm)	1601	1369	247	1701	1733	1532
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		99				197
Link Speed (k/h)	50			80	80	
Link Distance (m)	528.6			273.1	451.0	
Travel Time (s)	38.1			12.3	20.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	8%	13%	3%	7%	5%	1%
Adj. Flow (vph)	314	99	149	683	1038	197
Shared Lane Traffic (%)						
Lane Group Flow (vph)	314	99	149	683	1038	197
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	21.7	21.7	21.7	21.7
Total Split (s)	30.0	30.0	90.0	90.0	90.0	90.0
Total Split (%)	25.0%	25.0%	75.0%	75.0%	75.0%	75.0%
Maximum Green (s)	23.4	23.4	83.3	83.3	83.3	83.3
Yellow Time (s)	3.3	3.3	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	8.0	8.0	8.0	8.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	23.4	23.4	83.3	83.3	83.3	83.3
Actuated g/C Ratio	0.20	0.20	0.69	0.69	0.69	0.69
v/c Ratio	1.01	0.29	0.87	0.58	0.86	0.18
Control Delay	101.1	10.2	61.1	11.8	18.3	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay	101.1	10.2	61.1	11.8	18.3	0.5
LOS	F	B	E	B	B	A
Approach Delay	79.3			20.6	15.4	
Approach LOS	E			C	B	
Queue Length 50th (m)	~69.4	0.0	22.5	68.2	165.5	0.0
Queue Length 95th (m)	#122.3	13.2	#66.5	96.0	100.0	1.3
Internal Link Dist (m)	504.6			249.1	427.0	
Turn Bay Length (m)	25.0		120.0			100.0
Base Capacity (vph)	312	346	171	1180	1202	1123
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.01	0.29	0.87	0.58	0.86	0.18

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 18 (15%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.01			
Intersection Signal Delay: 27.8		Intersection LOS: C	
Intersection Capacity Utilization 101.4%		ICU Level of Service G	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 2: Bank Street & Dun Skipper Drive



Intersection	
Intersection Delay, s/veh	12.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	264	95	49	182	79	48	40	35	107	59	28
Future Vol, veh/h	13	264	95	49	182	79	48	40	35	107	59	28
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	2	2	0	0	5	0	0	0	2	15	0
Mvmt Flow	13	264	95	49	182	79	48	40	35	107	59	28
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	14.2	12.8	10.6	11.9
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	39%	3%	16%	55%
Vol Thru, %	33%	71%	59%	30%
Vol Right, %	28%	26%	25%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	123	372	310	194
LT Vol	48	13	49	107
Through Vol	40	264	182	59
RT Vol	35	95	79	28
Lane Flow Rate	123	372	310	194
Geometry Grp	1	1	1	1
Degree of Util (X)	0.205	0.537	0.457	0.322
Departure Headway (Hd)	5.994	5.198	5.31	5.979
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	595	692	676	598
Service Time	4.068	3.254	3.369	4.046
HCM Lane V/C Ratio	0.207	0.538	0.459	0.324
HCM Control Delay	10.6	14.2	12.8	11.9
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	0.8	3.2	2.4	1.4

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	47	2	39	39	58	2	59	41	31	58	9
Future Vol, veh/h	13	47	2	39	39	58	2	59	41	31	58	9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	11	0	50	0	0	0	50	2	4	12	2	0
Mvmt Flow	13	47	2	39	39	58	2	59	41	31	58	9
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.2	8.1	9	8.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	21%	29%	32%
Vol Thru, %	58%	76%	29%	59%
Vol Right, %	40%	3%	43%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	102	62	136	98
LT Vol	2	13	39	31
Through Vol	59	47	39	58
RT Vol	41	2	58	9
Lane Flow Rate	102	62	136	98
Geometry Grp	1	1	1	1
Degree of Util (X)	0.144	0.082	0.162	0.128
Departure Headway (Hd)	5.083	4.766	4.282	4.696
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	707	753	839	764
Service Time	3.107	2.788	2.3	2.719
HCM Lane V/C Ratio	0.144	0.082	0.162	0.128
HCM Control Delay	9	8.2	8.1	8.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.3	0.6	0.4

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	66	0	107	55	43	1	26	94	33	29	16
Future Vol, veh/h	16	66	0	107	55	43	1	26	94	33	29	16
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	4	0	0	3	0	0	5	15	5	0	0
Mvmt Flow	16	66	0	107	55	43	1	26	94	33	29	16
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.2	8.9	7.9	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	20%	52%	42%
Vol Thru, %	21%	80%	27%	37%
Vol Right, %	78%	0%	21%	21%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	121	82	205	78
LT Vol	1	16	107	33
Through Vol	26	66	55	29
RT Vol	94	0	43	16
Lane Flow Rate	121	82	205	78
Geometry Grp	1	1	1	1
Degree of Util (X)	0.141	0.105	0.252	0.103
Departure Headway (Hd)	4.19	4.616	4.42	4.741
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	855	776	812	756
Service Time	2.218	2.648	2.447	2.771
HCM Lane V/C Ratio	0.142	0.106	0.252	0.103
HCM Control Delay	7.9	8.2	8.9	8.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.4	1	0.3

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	839	1107	0
Future Vol, veh/h	0	0	0	839	1107	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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, %	0	0	0	7	6	0
Mvmt Flow	0	0	0	839	1107	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1946	1107	1107	0	-	0
Stage 1	1107	-	-	-	-	-
Stage 2	839	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	72	258	638	-	-	-
Stage 1	319	-	-	-	-	-
Stage 2	427	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	72	258	638	-	-	-
Mov Cap-2 Maneuver	72	-	-	-	-	-
Stage 1	319	-	-	-	-	-
Stage 2	427	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

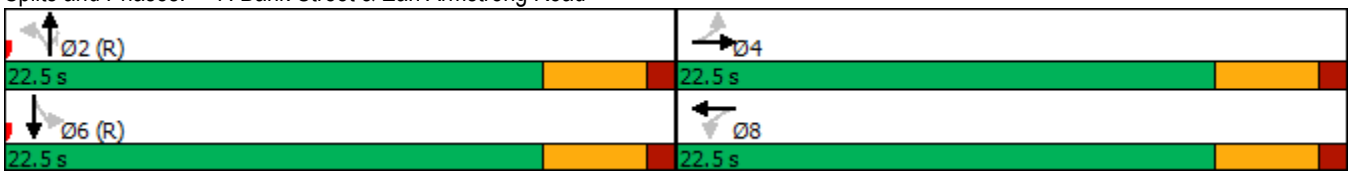
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	638	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

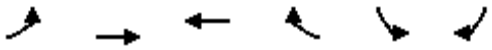
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	839	0	0	1107	0
Future Volume (vph)	0	0	0	0	0	0	0	839	0	0	1107	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0		0.0	50.0		0.0	20.0		15.0	15.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt												
Flt Protected												
Satd. Flow (prot)	1784	2981	0	1670	1670	0	1820	1750	1389	1542	3232	0
Flt Permitted												
Satd. Flow (perm)	1784	2981	0	1670	1670	0	1820	1750	1389	1542	3232	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.5			292.7			203.7			158.2	
Travel Time (s)		38.1			21.1			14.7			11.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	16%	3%	9%	9%	5%	0%	4%	31%	18%	7%	4%
Adj. Flow (vph)	0	0	0	0	0	0	0	839	0	0	1107	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	839	0	0	1107	0
Turn Type	Perm			Perm			Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)								45.0			45.0	
Actuated g/C Ratio								1.00			1.00	
v/c Ratio								0.48			0.34	
Control Delay								0.9			0.3	
Queue Delay								0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay								0.9			0.3	
LOS								A			A	
Approach Delay								0.9			0.3	
Approach LOS								A			A	
Queue Length 50th (m)								0.0			0.0	
Queue Length 95th (m)								0.0			0.0	
Internal Link Dist (m)		504.5			268.7			179.7			134.2	
Turn Bay Length (m)												
Base Capacity (vph)								1750			3232	
Starvation Cap Reductn								0			0	
Spillback Cap Reductn								0			0	
Storage Cap Reductn								0			0	
Reduced v/c Ratio								0.48			0.34	

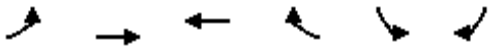
Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 0.6		Intersection LOS: A	
Intersection Capacity Utilization 50.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 7: Bank Street & Earl Armstrong Road





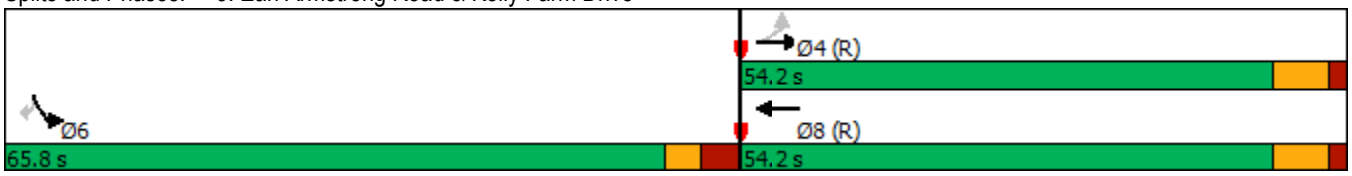
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	40.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1640	3144	3232	0	1820	1820
Flt Permitted						
Satd. Flow (perm)	1640	3144	3232	0	1820	1820
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						
Link Speed (k/h)		50	50		50	
Link Distance (m)		222.0	528.5		431.1	
Travel Time (s)		16.0	38.1		31.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	11%	10%	7%	11%	0%	0%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Turn Type	Perm				Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	24.8	24.8	24.8		33.8	33.8
Total Split (s)	54.2	54.2	54.2		65.8	65.8
Total Split (%)	45.2%	45.2%	45.2%		54.8%	54.8%
Maximum Green (s)	47.4	47.4	47.4		59.0	59.0
Yellow Time (s)	5.0	5.0	5.0		3.2	3.2
All-Red Time (s)	1.8	1.8	1.8		3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.8	6.8	6.8		6.8	6.8
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0		20.0	20.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)						
Actuated g/C Ratio						
v/c Ratio						
Control Delay						
Queue Delay						



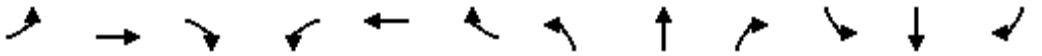
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Total Delay						
LOS						
Approach Delay						
Approach LOS						
Queue Length 50th (m)						
Queue Length 95th (m)						
Internal Link Dist (m)		198.0	504.5		407.1	
Turn Bay Length (m)						
Base Capacity (vph)						
Starvation Cap Reductn						
Spillback Cap Reductn						
Storage Cap Reductn						
Reduced v/c Ratio						

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 59.5 (50%), Referenced to phase 4:EBTL and 8:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.00			
Intersection Signal Delay: 0.0		Intersection LOS: A	
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 8: Earl Armstrong Road & Kelly Farm Drive



Future (2036) Total Traffic (w NBL pm + pt)

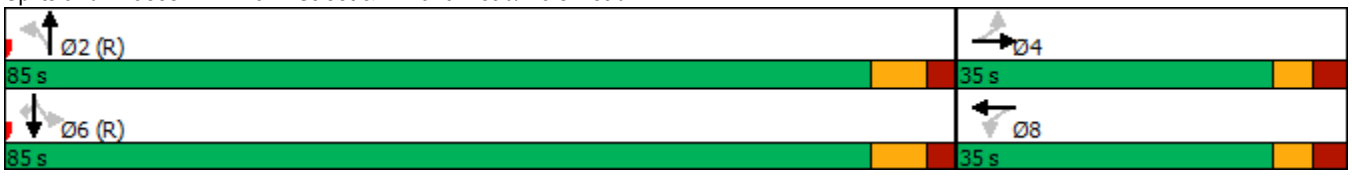


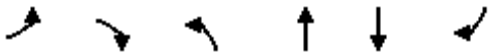
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	132	23	43	54	32	62	23	936	45	50	1223	187
Future Volume (vph)	132	23	43	54	32	62	23	936	45	50	1223	187
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		0.0	40.0		0.0	100.0		0.0	75.0		175.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor							1.00					0.98
Frt		0.902			0.901			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1729	1405	0	1530	1602	0	1729	3287	0	1601	3325	1517
Flt Permitted	0.696			0.714			0.202			0.274		
Satd. Flow (perm)	1267	1405	0	1150	1602	0	367	3287	0	462	3325	1481
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		43			62			8				187
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.6			234.2			451.0			177.6	
Travel Time (s)		38.1			16.9			32.5			12.8	
Confl. Peds. (#/hr)							2					2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	9%	21%	13%	3%	2%	0%	4%	14%	8%	4%	2%
Adj. Flow (vph)	132	23	43	54	32	62	23	936	45	50	1223	187
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	66	0	54	94	0	23	981	0	50	1223	187
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	33.8	33.8		33.8	33.8		42.6	42.6		42.6	42.6	42.6
Total Split (s)	35.0	35.0		35.0	35.0		85.0	85.0		85.0	85.0	85.0
Total Split (%)	29.2%	29.2%		29.2%	29.2%		70.8%	70.8%		70.8%	70.8%	70.8%
Maximum Green (s)	28.2	28.2		28.2	28.2		77.4	77.4		77.4	77.4	77.4
Yellow Time (s)	3.6	3.6		3.6	3.6		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	3.2	3.2		3.2	3.2		2.6	2.6		2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8		6.8	6.8		7.6	7.6		7.6	7.6	7.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		28.0	28.0		28.0	28.0	28.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	17.8	17.8		17.8	17.8		87.8	87.8		87.8	87.8	87.8
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.73	0.73		0.73	0.73	0.73
v/c Ratio	0.71	0.27		0.32	0.32		0.09	0.41		0.15	0.50	0.17

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	67.5	21.3		48.5	20.3		4.5	4.6		7.4	8.3	1.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	67.5	21.3		48.5	20.3		4.5	4.6		7.4	8.3	1.3
LOS	E	C		D	C		A	A		A	A	A
Approach Delay		52.1			30.6			4.6			7.4	
Approach LOS		D			C			A			A	
Queue Length 50th (m)	27.6	4.4		10.6	6.1		0.8	17.4		2.9	52.0	0.0
Queue Length 95th (m)	43.9	15.0		20.6	18.6		m1.5	m45.4		8.7	81.9	6.4
Internal Link Dist (m)		504.6			210.2			427.0			153.6	
Turn Bay Length (m)	100.0			40.0			100.0			75.0		175.0
Base Capacity (vph)	297	363		270	423		268	2407		338	2433	1133
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.44	0.18		0.20	0.22		0.09	0.41		0.15	0.50	0.17

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 18 (15%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 10.8		Intersection LOS: B	
Intersection Capacity Utilization 70.2%		ICU Level of Service C	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 1: Bank Street & Miikana Road/Blais Road





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	314	99	149	683	1038	197
Future Volume (vph)	314	99	149	683	1038	197
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	120.0			100.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1601	1369	1679	1701	1733	1532
Flt Permitted	0.950		0.051			
Satd. Flow (perm)	1601	1369	90	1701	1733	1532
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		99				197
Link Speed (k/h)	50			80	80	
Link Distance (m)	528.6			273.1	451.0	
Travel Time (s)	38.1			12.3	20.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	8%	13%	3%	7%	5%	1%
Adj. Flow (vph)	314	99	149	683	1038	197
Shared Lane Traffic (%)						
Lane Group Flow (vph)	314	99	149	683	1038	197
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	11.7	21.7	21.7	21.7
Total Split (s)	30.0	30.0	12.0	90.0	78.0	78.0
Total Split (%)	25.0%	25.0%	10.0%	75.0%	65.0%	65.0%
Maximum Green (s)	23.4	23.4	5.3	83.3	71.3	71.3
Yellow Time (s)	3.3	3.3	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.7	6.7	6.7	6.7
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0		8.0	8.0	8.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	23.4	23.4	83.3	83.3	71.3	71.3
Actuated g/C Ratio	0.20	0.20	0.69	0.69	0.59	0.59
v/c Ratio	1.01	0.29	1.13	0.58	1.01	0.20
Control Delay	101.1	10.2	142.7	11.8	48.5	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay	101.1	10.2	142.7	11.8	48.5	0.9
LOS	F	B	F	B	D	A
Approach Delay	79.3			35.3	40.9	
Approach LOS	E			D	D	
Queue Length 50th (m)	~69.4	0.0	~23.8	68.2	~223.4	0.0
Queue Length 95th (m)	#122.3	13.2	#62.3	96.0	#309.4	3.2
Internal Link Dist (m)	504.6			249.1	427.0	
Turn Bay Length (m)	25.0		120.0			100.0
Base Capacity (vph)	312	346	132	1180	1029	990
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.01	0.29	1.13	0.58	1.01	0.20

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 18 (15%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Natural Cycle: 130			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.13			
Intersection Signal Delay: 45.4		Intersection LOS: D	
Intersection Capacity Utilization 101.4%		ICU Level of Service G	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 2: Bank Street & Dun Skipper Drive



Intersection	
Intersection Delay, s/veh	12.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	264	95	49	182	79	48	40	35	107	59	28
Future Vol, veh/h	13	264	95	49	182	79	48	40	35	107	59	28
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	2	2	0	0	5	0	0	0	2	15	0
Mvmt Flow	13	264	95	49	182	79	48	40	35	107	59	28
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	14.2	12.8	10.6	11.9
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	39%	3%	16%	55%
Vol Thru, %	33%	71%	59%	30%
Vol Right, %	28%	26%	25%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	123	372	310	194
LT Vol	48	13	49	107
Through Vol	40	264	182	59
RT Vol	35	95	79	28
Lane Flow Rate	123	372	310	194
Geometry Grp	1	1	1	1
Degree of Util (X)	0.205	0.537	0.457	0.322
Departure Headway (Hd)	5.994	5.198	5.31	5.979
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	595	692	676	598
Service Time	4.068	3.254	3.369	4.046
HCM Lane V/C Ratio	0.207	0.538	0.459	0.324
HCM Control Delay	10.6	14.2	12.8	11.9
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	0.8	3.2	2.4	1.4

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	47	2	39	39	58	2	59	41	31	58	9
Future Vol, veh/h	13	47	2	39	39	58	2	59	41	31	58	9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	11	0	50	0	0	0	50	2	4	12	2	0
Mvmt Flow	13	47	2	39	39	58	2	59	41	31	58	9
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.2	8.1	9	8.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	21%	29%	32%
Vol Thru, %	58%	76%	29%	59%
Vol Right, %	40%	3%	43%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	102	62	136	98
LT Vol	2	13	39	31
Through Vol	59	47	39	58
RT Vol	41	2	58	9
Lane Flow Rate	102	62	136	98
Geometry Grp	1	1	1	1
Degree of Util (X)	0.144	0.082	0.162	0.128
Departure Headway (Hd)	5.083	4.766	4.282	4.696
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	707	753	839	764
Service Time	3.107	2.788	2.3	2.719
HCM Lane V/C Ratio	0.144	0.082	0.162	0.128
HCM Control Delay	9	8.2	8.1	8.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.3	0.6	0.4

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	66	0	107	55	43	1	26	94	33	29	16
Future Vol, veh/h	16	66	0	107	55	43	1	26	94	33	29	16
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	4	0	0	3	0	0	5	15	5	0	0
Mvmt Flow	16	66	0	107	55	43	1	26	94	33	29	16
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.2	8.9	7.9	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	20%	52%	42%
Vol Thru, %	21%	80%	27%	37%
Vol Right, %	78%	0%	21%	21%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	121	82	205	78
LT Vol	1	16	107	33
Through Vol	26	66	55	29
RT Vol	94	0	43	16
Lane Flow Rate	121	82	205	78
Geometry Grp	1	1	1	1
Degree of Util (X)	0.141	0.105	0.252	0.103
Departure Headway (Hd)	4.19	4.616	4.42	4.741
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	855	776	812	756
Service Time	2.218	2.648	2.447	2.771
HCM Lane V/C Ratio	0.142	0.106	0.252	0.103
HCM Control Delay	7.9	8.2	8.9	8.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.4	1	0.3

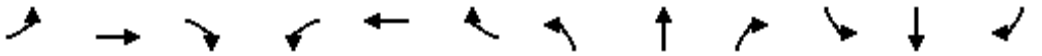
Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	839	1107	0
Future Vol, veh/h	0	0	0	839	1107	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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, %	0	0	0	7	6	0
Mvmt Flow	0	0	0	839	1107	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1946	1107	1107	0	-	0
Stage 1	1107	-	-	-	-	-
Stage 2	839	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	72	258	638	-	-	-
Stage 1	319	-	-	-	-	-
Stage 2	427	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	72	258	638	-	-	-
Mov Cap-2 Maneuver	72	-	-	-	-	-
Stage 1	319	-	-	-	-	-
Stage 2	427	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	638	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

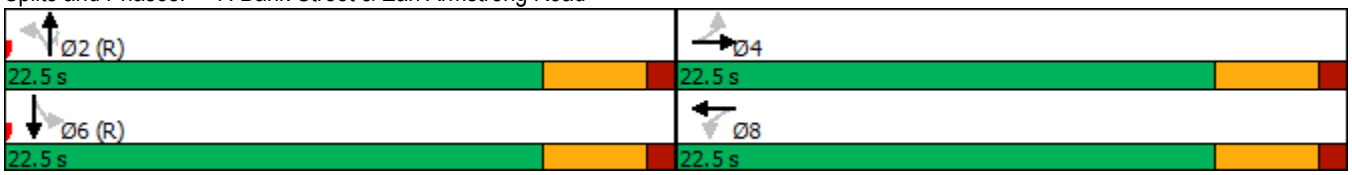


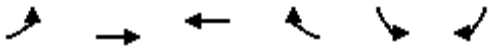
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	839	0	0	1107	0
Future Volume (vph)	0	0	0	0	0	0	0	839	0	0	1107	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0		0.0	50.0		0.0	20.0		15.0	15.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt												
Flt Protected												
Satd. Flow (prot)	1784	2981	0	1670	1670	0	1820	1750	1389	1542	3232	0
Flt Permitted												
Satd. Flow (perm)	1784	2981	0	1670	1670	0	1820	1750	1389	1542	3232	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.5			292.7			203.7			158.2	
Travel Time (s)		38.1			21.1			14.7			11.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	16%	3%	9%	9%	5%	0%	4%	31%	18%	7%	4%
Adj. Flow (vph)	0	0	0	0	0	0	0	839	0	0	1107	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	839	0	0	1107	0
Turn Type	Perm			Perm			Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5	
Total Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		18.0	18.0	18.0	18.0	18.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)								45.0			45.0	
Actuated g/C Ratio								1.00			1.00	
v/c Ratio								0.48			0.34	
Control Delay								0.9			0.3	
Queue Delay								0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay								0.9			0.3	
LOS								A			A	
Approach Delay								0.9			0.3	
Approach LOS								A			A	
Queue Length 50th (m)								0.0			0.0	
Queue Length 95th (m)								0.0			0.0	
Internal Link Dist (m)		504.5			268.7			179.7			134.2	
Turn Bay Length (m)												
Base Capacity (vph)								1750			3232	
Starvation Cap Reductn								0			0	
Spillback Cap Reductn								0			0	
Storage Cap Reductn								0			0	
Reduced v/c Ratio								0.48			0.34	

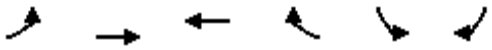
Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 45			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 0.6		Intersection LOS: A	
Intersection Capacity Utilization 50.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 7: Bank Street & Earl Armstrong Road





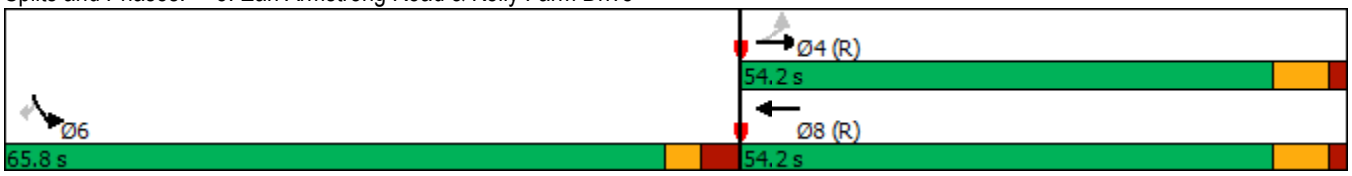
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	40.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1640	3144	3232	0	1820	1820
Flt Permitted						
Satd. Flow (perm)	1640	3144	3232	0	1820	1820
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						
Link Speed (k/h)		50	50		50	
Link Distance (m)		222.0	528.5		431.1	
Travel Time (s)		16.0	38.1		31.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	11%	10%	7%	11%	0%	0%
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Turn Type	Perm				Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	24.8	24.8	24.8		33.8	33.8
Total Split (s)	54.2	54.2	54.2		65.8	65.8
Total Split (%)	45.2%	45.2%	45.2%		54.8%	54.8%
Maximum Green (s)	47.4	47.4	47.4		59.0	59.0
Yellow Time (s)	5.0	5.0	5.0		3.2	3.2
All-Red Time (s)	1.8	1.8	1.8		3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.8	6.8	6.8		6.8	6.8
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0		20.0	20.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)						
Actuated g/C Ratio						
v/c Ratio						
Control Delay						
Queue Delay						



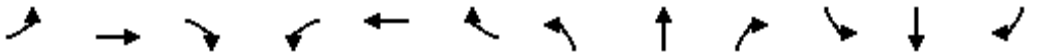
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Total Delay						
LOS						
Approach Delay						
Approach LOS						
Queue Length 50th (m)						
Queue Length 95th (m)						
Internal Link Dist (m)		198.0	504.5		407.1	
Turn Bay Length (m)						
Base Capacity (vph)						
Starvation Cap Reductn						
Spillback Cap Reductn						
Storage Cap Reductn						
Reduced v/c Ratio						

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 59.5 (50%), Referenced to phase 4:EBTL and 8:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.00			
Intersection Signal Delay: 0.0		Intersection LOS: A	
Intersection Capacity Utilization 0.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 8: Earl Armstrong Road & Kelly Farm Drive



Future (2036) Total Traffic with Earl Armstrong Road Extension

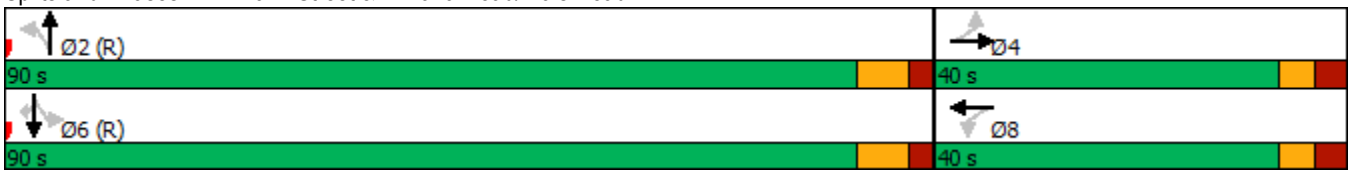


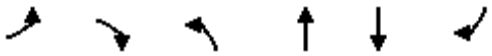
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	177	45	26	43	21	40	9	968	48	46	602	76
Future Volume (vph)	177	45	26	43	21	40	9	968	48	46	602	76
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		0.0	40.0		0.0	100.0		0.0	75.0		175.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00				0.99		1.00					0.98
Frt		0.945			0.902			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1729	1698	0	1478	1627	0	1729	3208	0	1662	3172	1488
Flt Permitted	0.717			0.711			0.423			0.257		
Satd. Flow (perm)	1303	1698	0	1106	1627	0	769	3208	0	450	3172	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			40			7				76
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		528.6			234.2			451.0			177.6	
Travel Time (s)		38.1			16.9			20.3			8.0	
Confl. Peds. (#/hr)	1					1	1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	0%	17%	0%	0%	0%	6%	28%	4%	9%	4%
Adj. Flow (vph)	177	45	26	43	21	40	9	968	48	46	602	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	177	71	0	43	61	0	9	1016	0	46	602	76
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	33.8	33.8		33.8	33.8		42.6	42.6		42.6	42.6	42.6
Total Split (s)	40.0	40.0		40.0	40.0		90.0	90.0		90.0	90.0	90.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		69.2%	69.2%		69.2%	69.2%	69.2%
Maximum Green (s)	33.2	33.2		33.2	33.2		82.4	82.4		82.4	82.4	82.4
Yellow Time (s)	3.6	3.6		3.6	3.6		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	3.2	3.2		3.2	3.2		2.6	2.6		2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8		6.8	6.8		7.6	7.6		7.6	7.6	7.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		28.0	28.0		28.0	28.0	28.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	22.9	22.9		22.9	22.9		92.7	92.7		92.7	92.7	92.7
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.71	0.71		0.71	0.71	0.71
v/c Ratio	0.77	0.22		0.22	0.19		0.02	0.44		0.14	0.27	0.07

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	72.0	32.5		45.9	19.8		8.6	7.4		8.9	7.6	1.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	72.0	32.5		45.9	19.8		8.6	7.4		8.9	7.6	1.9
LOS	E	C		D	B		A	A		A	A	A
Approach Delay		60.7			30.6			7.4			7.1	
Approach LOS		E			C			A			A	
Queue Length 50th (m)	40.3	10.1		8.8	4.2		0.4	23.7		3.1	23.8	0.0
Queue Length 95th (m)	59.2	21.0		17.6	14.3		m1.1	55.3		9.4	39.0	4.9
Internal Link Dist (m)		504.6			210.2			427.0			153.6	
Turn Bay Length (m)	100.0			40.0			100.0			75.0		175.0
Base Capacity (vph)	332	449		282	445		548	2289		320	2261	1059
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.53	0.16		0.15	0.14		0.02	0.44		0.14	0.27	0.07

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 16 (12%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 14.8		Intersection LOS: B	
Intersection Capacity Utilization 69.4%		ICU Level of Service C	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 1: Bank Street & Miikana Road/Blais Road





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	305	57	94	715	536	79
Future Volume (vph)	305	57	94	715	536	79
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	120.0			100.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			1.00			0.96
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1616	1459	1558	1655	1640	1172
Flt Permitted	0.950		0.406			
Satd. Flow (perm)	1616	1459	663	1655	1640	1129
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		57				79
Link Speed (k/h)	50			80	80	
Link Distance (m)	528.6			273.1	451.0	
Travel Time (s)	38.1			12.3	20.3	
Confl. Peds. (#/hr)			4			4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	6%	11%	10%	11%	32%
Adj. Flow (vph)	305	57	94	715	536	79
Shared Lane Traffic (%)						
Lane Group Flow (vph)	305	57	94	715	536	79
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	21.7	21.7	21.7	21.7
Total Split (s)	40.0	40.0	90.0	90.0	90.0	90.0
Total Split (%)	30.8%	30.8%	69.2%	69.2%	69.2%	69.2%
Maximum Green (s)	33.4	33.4	83.3	83.3	83.3	83.3
Yellow Time (s)	3.3	3.3	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	8.0	8.0	8.0	8.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	28.6	28.6	88.1	88.1	88.1	88.1
Actuated g/C Ratio	0.22	0.22	0.68	0.68	0.68	0.68
v/c Ratio	0.86	0.16	0.21	0.64	0.48	0.10

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Control Delay	70.9	10.3	7.1	19.1	11.8	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.9	10.3	7.1	19.1	11.8	1.9
LOS	E	B	A	B	B	A
Approach Delay	61.3			17.7	10.5	
Approach LOS	E			B	B	
Queue Length 50th (m)	68.9	0.0	9.9	150.0	74.0	2.2
Queue Length 95th (m)	96.8	9.7	m11.4	206.7	108.4	0.6
Internal Link Dist (m)	504.6			249.1	427.0	
Turn Bay Length (m)	25.0		120.0			100.0
Base Capacity (vph)	415	417	449	1121	1110	790
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.14	0.21	0.64	0.48	0.10

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 40 (31%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 24.1		Intersection LOS: C	
Intersection Capacity Utilization 72.6%		ICU Level of Service C	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 2: Bank Street & Dun Skipper Drive



Intersection	
Intersection Delay, s/veh	11.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	28	165	41	22	164	103	66	84	34	122	56	53
Future Vol, veh/h	28	165	41	22	164	103	66	84	34	122	56	53
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	1	8	5	1	7	0	2	6	2	0	0
Mvmt Flow	28	165	41	22	164	103	66	84	34	122	56	53
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.6	12.5	11.1	12
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	36%	12%	8%	53%
Vol Thru, %	46%	71%	57%	24%
Vol Right, %	18%	18%	36%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	184	234	289	231
LT Vol	66	28	22	122
Through Vol	84	165	164	56
RT Vol	34	41	103	53
Lane Flow Rate	184	234	289	231
Geometry Grp	1	1	1	1
Degree of Util (X)	0.292	0.357	0.432	0.364
Departure Headway (Hd)	5.717	5.495	5.376	5.668
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	626	651	668	633
Service Time	3.782	3.557	3.433	3.729
HCM Lane V/C Ratio	0.294	0.359	0.433	0.365
HCM Control Delay	11.1	11.6	12.5	12
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	1.2	1.6	2.2	1.7

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	40	11	22	19	27	4	71	59	37	49	12
Future Vol, veh/h	18	40	11	22	19	27	4	71	59	37	49	12
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	8	5	56	6	7	0	33	5	0	22	11	50
Mvmt Flow	18	40	11	22	19	27	4	71	59	37	49	12
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.1	7.9	8.6	8.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	26%	32%	38%
Vol Thru, %	53%	58%	28%	50%
Vol Right, %	44%	16%	40%	12%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	134	69	68	98
LT Vol	4	18	22	37
Through Vol	71	40	19	49
RT Vol	59	11	27	12
Lane Flow Rate	134	69	68	98
Geometry Grp	1	1	1	1
Degree of Util (X)	0.173	0.089	0.084	0.129
Departure Headway (Hd)	4.639	4.634	4.473	4.751
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	776	775	802	757
Service Time	2.656	2.652	2.492	2.77
HCM Lane V/C Ratio	0.173	0.089	0.085	0.129
HCM Control Delay	8.6	8.1	7.9	8.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.6	0.3	0.3	0.4

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	51	13	45	29	20	12	46	80	29	39	2
Future Vol, veh/h	17	51	13	45	29	20	12	46	80	29	39	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	9	0	20	10	8	0	5	19	0	12	0
Mvmt Flow	17	51	13	45	29	20	12	46	80	29	39	2
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.9	8.4	7.8	8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	9%	21%	48%	41%
Vol Thru, %	33%	63%	31%	56%
Vol Right, %	58%	16%	21%	3%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	138	81	94	70
LT Vol	12	17	45	29
Through Vol	46	51	29	39
RT Vol	80	13	20	2
Lane Flow Rate	138	81	94	70
Geometry Grp	1	1	1	1
Degree of Util (X)	0.156	0.099	0.124	0.088
Departure Headway (Hd)	4.065	4.412	4.752	4.524
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	885	813	756	794
Service Time	2.079	2.432	2.773	2.542
HCM Lane V/C Ratio	0.156	0.1	0.124	0.088
HCM Control Delay	7.8	7.9	8.4	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.6	0.3	0.4	0.3

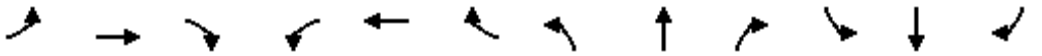
Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	810	572	0
Future Vol, veh/h	0	0	0	810	572	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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, %	0	0	0	10	11	0
Mvmt Flow	0	0	0	810	572	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1382	572	572	0	-	0
Stage 1	572	-	-	-	-	-
Stage 2	810	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	160	523	1011	-	-	-
Stage 1	569	-	-	-	-	-
Stage 2	441	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	160	523	1011	-	-	-
Mov Cap-2 Maneuver	160	-	-	-	-	-
Stage 1	569	-	-	-	-	-
Stage 2	441	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1011	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	592	30	55	316	16	27	766	115	15	534	23
Future Volume (vph)	28	592	30	55	316	16	27	766	115	15	534	23
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0		0.0	50.0		0.0	20.0		15.0	15.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.993			0.993				0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1729	3212	0	1310	1452	0	1695	1750	1289	1491	3122	0
Flt Permitted	0.320			0.242			0.431			0.244		
Satd. Flow (perm)	582	3212	0	334	1452	0	769	1750	1289	383	3122	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			2				35		6	
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		528.5			292.7			203.7			158.2	
Travel Time (s)		23.8			13.2			9.2			7.1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	7%	5%	32%	24%	34%	2%	4%	20%	16%	10%	12%
Adj. Flow (vph)	28	592	30	55	316	16	27	766	115	15	534	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	622	0	55	332	0	27	766	115	15	557	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	36.2	36.2		36.2	36.2		36.2	36.2	36.2	36.2	36.2	
Total Split (s)	48.0	48.0		48.0	48.0		82.0	82.0	82.0	82.0	82.0	
Total Split (%)	36.9%	36.9%		36.9%	36.9%		63.1%	63.1%	63.1%	63.1%	63.1%	
Maximum Green (s)	40.8	40.8		40.8	40.8		74.8	74.8	74.8	74.8	74.8	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.2	2.2		2.2	2.2		2.2	2.2	2.2	2.2	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.2	7.2		7.2	7.2		7.2	7.2	7.2	7.2	7.2	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	22.0	22.0		22.0	22.0		22.0	22.0	22.0	22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	33.9	33.9		33.9	33.9		81.7	81.7	81.7	81.7	81.7	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.63	0.63	0.63	0.63	0.63	
v/c Ratio	0.19	0.74		0.64	0.87		0.06	0.70	0.14	0.06	0.28	
Control Delay	37.9	48.9		73.5	68.6		11.6	21.6	8.3	21.3	18.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	

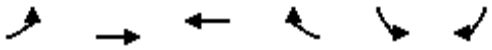
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	37.9	48.9		73.5	68.6		11.6	21.6	8.3	21.3	18.3	
LOS	D	D		E	E		B	C	A	C	B	
Approach Delay		48.4			69.3			19.7			18.4	
Approach LOS		D			E			B			B	
Queue Length 50th (m)	5.1	69.8		11.4	74.1		2.4	114.8	7.2	1.5	35.6	
Queue Length 95th (m)	12.3	83.4		#26.3	102.0		6.8	179.6	16.6	m5.1	61.4	
Internal Link Dist (m)		504.5			268.7			179.7			134.2	
Turn Bay Length (m)	25.0			50.0			20.0		15.0	15.0		
Base Capacity (vph)	182	1010		104	457		483	1100	823	240	1964	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.15	0.62		0.53	0.73		0.06	0.70	0.14	0.06	0.28	

Intersection Summary

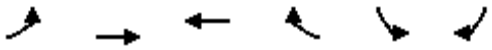
Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 34.4 Intersection LOS: C
Intersection Capacity Utilization 87.5% 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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Bank Street & Earl Armstrong Road





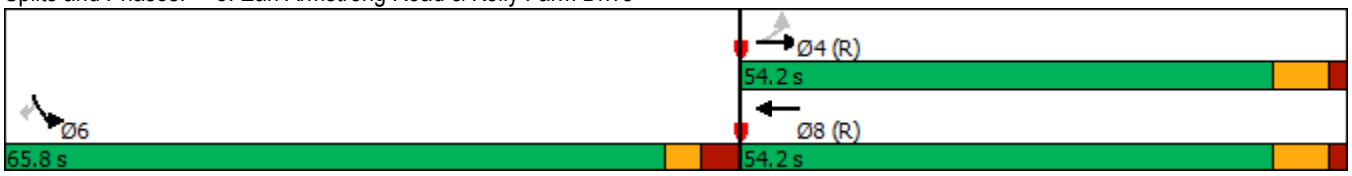
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	16	613	346	20	37	17
Future Volume (vph)	16	613	346	20	37	17
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	40.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.992			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1544	3262	2987	0	1517	1357
Flt Permitted	0.534				0.950	
Satd. Flow (perm)	868	3262	2987	0	1517	1357
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			6			17
Link Speed (k/h)		80	80		40	
Link Distance (m)		222.0	528.5		431.1	
Travel Time (s)		10.0	23.8		38.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	12%	6%	15%	12%	14%	14%
Adj. Flow (vph)	16	613	346	20	37	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	613	366	0	37	17
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	24.8	24.8	24.8		33.8	33.8
Total Split (s)	54.2	54.2	54.2		65.8	65.8
Total Split (%)	45.2%	45.2%	45.2%		54.8%	54.8%
Maximum Green (s)	47.4	47.4	47.4		59.0	59.0
Yellow Time (s)	5.0	5.0	5.0		3.2	3.2
All-Red Time (s)	1.8	1.8	1.8		3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.8	6.8	6.8		6.8	6.8
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0		20.0	20.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	100.8	100.8	100.8		10.3	10.3
Actuated g/C Ratio	0.84	0.84	0.84		0.09	0.09
v/c Ratio	0.02	0.22	0.15		0.28	0.13
Control Delay	2.6	2.8	2.5		57.1	23.2
Queue Delay	0.0	0.0	0.0		0.0	0.0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Total Delay	2.6	2.8	2.5		57.1	23.2
LOS	A	A	A		E	C
Approach Delay		2.8	2.5		46.5	
Approach LOS		A	A		D	
Queue Length 50th (m)	0.6	13.5	7.4		7.7	0.0
Queue Length 95th (m)	1.9	19.2	11.2		17.5	6.5
Internal Link Dist (m)		198.0	504.5		407.1	
Turn Bay Length (m)	60.0				40.0	
Base Capacity (vph)	729	2739	2509		745	675
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.02	0.22	0.15		0.05	0.03

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 59.5 (50%), Referenced to phase 4:EBTL and 8:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.28			
Intersection Signal Delay: 5.0		Intersection LOS: A	
Intersection Capacity Utilization 37.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 8: Earl Armstrong Road & Kelly Farm Drive

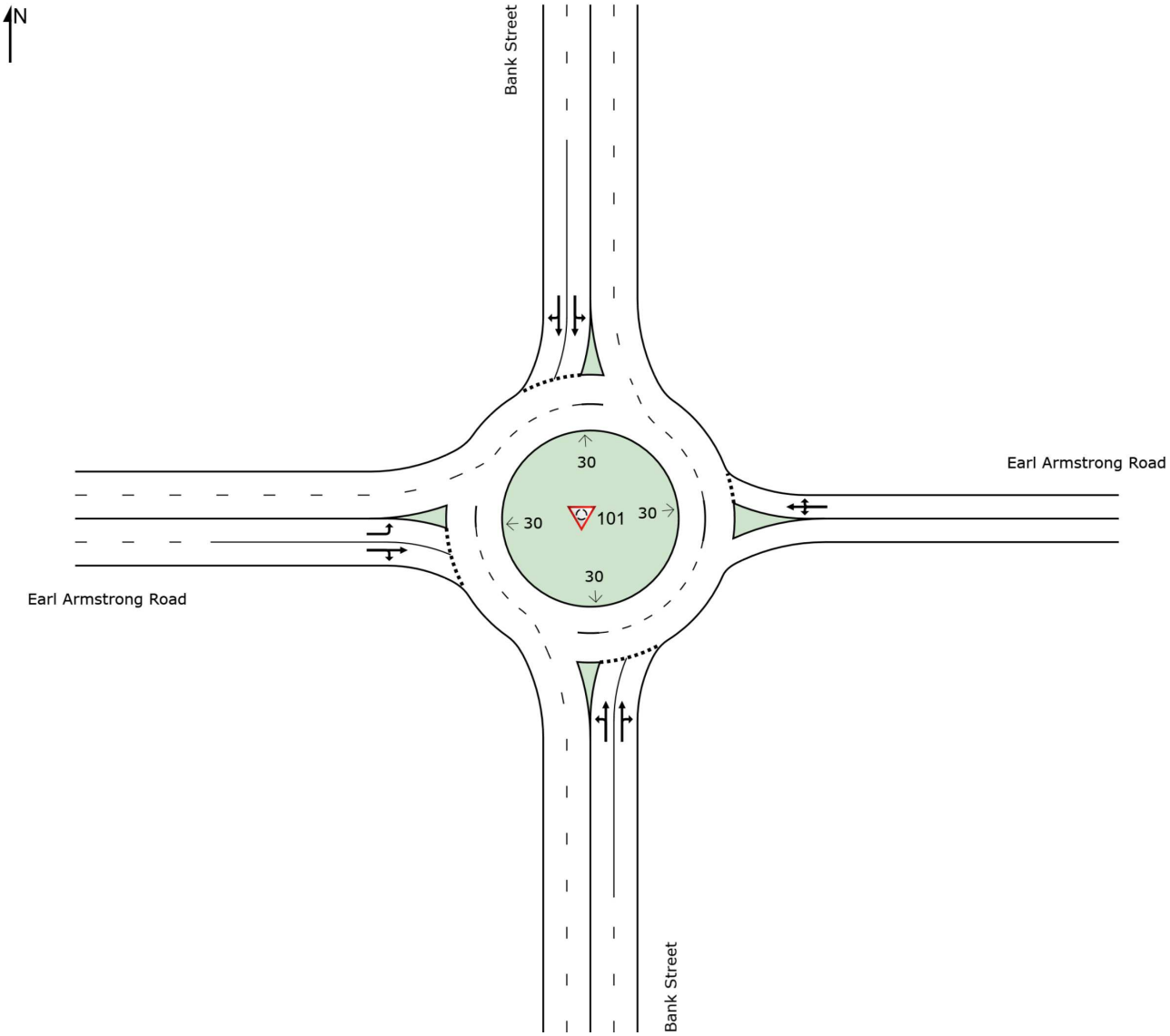


SITE LAYOUT

Site: 101 [Bank & Earl Armstrong (Site Folder: TT 2036 w Ext AM)]

Bank Street & Earl Armstrong Road
Future (2036) Total Traffic with Earl Armstrong Extension
AM Peak Hour
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [Bank & Earl Armstrong (Site Folder: TT 2036 w Ext AM)]

Bank Street & Earl Armstrong Road
Future (2036) Total Traffic with Earl Armstrong Extension
AM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bank Street														
3	L2	27	2.0	27	2.0	0.633	16.7	LOS C	5.1	39.8	0.77	0.99	1.42	48.5
8	T1	766	4.0	766	4.0	0.633	16.4	LOS C	5.1	39.8	0.76	0.98	1.41	48.6
18	R2	115	20.0	115	20.0	0.633	16.6	LOS C	5.0	40.4	0.75	0.97	1.40	47.1
Approach		908	6.0	908	6.0	0.633	16.4	LOS C	5.1	40.4	0.76	0.98	1.41	48.4
East: Earl Armstrong Road														
1	L2	55	32.0	55	32.0	0.706	24.7	LOS C	5.0	45.7	0.75	1.11	1.82	43.0
6	T1	316	24.0	316	24.0	0.706	24.3	LOS C	5.0	45.7	0.75	1.11	1.82	43.5
16	R2	16	34.0	16	34.0	0.706	24.8	LOS C	5.0	45.7	0.75	1.11	1.82	42.2
Approach		387	25.6	387	25.6	0.706	24.3	LOS C	5.0	45.7	0.75	1.11	1.82	43.4
North: Bank Street														
7	L2	15	16.0	15	16.0	0.352	9.1	LOS A	1.4	11.6	0.57	0.55	0.57	53.3
4	T1	534	10.0	534	10.0	0.352	8.6	LOS A	1.4	11.6	0.56	0.54	0.56	54.0
14	R2	23	12.0	23	12.0	0.352	8.4	LOS A	1.4	11.5	0.55	0.52	0.55	52.5
Approach		572	10.2	572	10.2	0.352	8.6	LOS A	1.4	11.6	0.56	0.54	0.56	53.9
West: Earl Armstrong Road														
5	L2	28	0.0	28	0.0	0.039	5.4	LOS A	0.1	1.0	0.53	0.46	0.53	52.9
2	T1	592	7.0	592	7.0	0.833	28.1	LOS D	11.8	94.6	0.89	1.41	2.41	42.3
12	R2	30	5.0	30	5.0	0.833	28.0	LOS D	11.8	94.6	0.89	1.41	2.41	41.3
Approach		650	6.6	650	6.6	0.833	27.1	LOS D	11.8	94.6	0.87	1.37	2.33	42.6
All Vehicles		2517	10.1	2517	10.1	0.833	18.6	LOS C	11.8	94.6	0.74	1.00	1.52	47.0

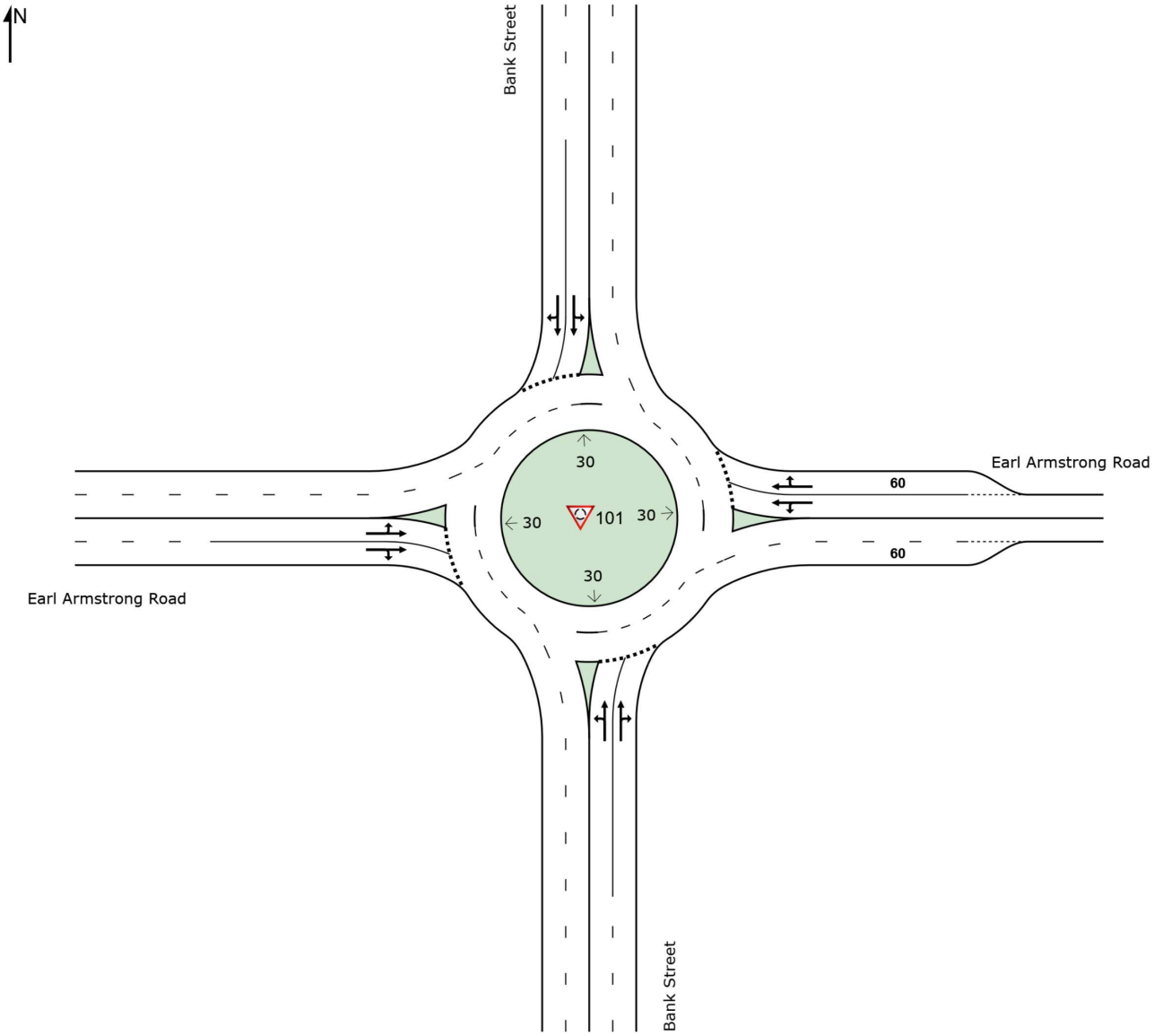
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [Bank & Earl Armstrong (w Mods) (Site Folder: TT 2036 w Ext AM)]

Bank Street & Earl Armstrong Road
Future (2036) Total Traffic with Earl Armstrong Extension
AM Peak Hour (with Modifications)
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

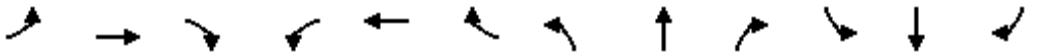
Site: 101 [Bank & Earl Armstrong (w Mods) (Site Folder: TT 2036 w Ext AM)]

Bank Street & Earl Armstrong Road
Future (2036) Total Traffic with Earl Armstrong Extension
AM Peak Hour (with Modifications)
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bank Street														
3	L2	27	2.0	27	2.0	0.633	16.7	LOS C	5.1	39.8	0.77	0.99	1.42	48.5
8	T1	766	4.0	766	4.0	0.633	16.4	LOS C	5.1	39.8	0.76	0.98	1.41	48.6
18	R2	115	20.0	115	20.0	0.633	20.9	LOS C	5.0	40.4	0.75	0.97	1.40	47.1
Approach		908	6.0	908	6.0	0.633	17.0	LOS C	5.1	40.4	0.76	0.98	1.41	48.4
East: Earl Armstrong Road														
1	L2	55	32.0	55	32.0	0.372	13.9	LOS B	1.3	12.4	0.66	0.73	0.88	48.6
6	T1	316	24.0	316	24.0	0.372	12.7	LOS B	1.3	12.4	0.65	0.72	0.86	50.3
16	R2	16	34.0	16	34.0	0.372	12.7	LOS B	1.3	12.4	0.64	0.71	0.85	49.1
Approach		387	25.6	387	25.6	0.372	12.8	LOS B	1.3	12.4	0.65	0.72	0.86	50.0
North: Bank Street														
7	L2	15	16.0	15	16.0	0.352	9.1	LOS A	1.4	11.6	0.57	0.55	0.57	53.3
4	T1	534	10.0	534	10.0	0.352	8.6	LOS A	1.4	11.6	0.56	0.54	0.56	54.0
14	R2	23	12.0	23	12.0	0.352	8.4	LOS A	1.4	11.5	0.55	0.52	0.55	52.5
Approach		572	10.2	572	10.2	0.352	8.6	LOS A	1.4	11.6	0.56	0.54	0.56	53.9
West: Earl Armstrong Road														
5	L2	28	0.0	28	0.0	0.593	14.2	LOS B	4.3	34.7	0.73	0.92	1.28	50.0
2	T1	592	7.0	592	7.0	0.593	14.2	LOS B	4.3	34.7	0.69	0.83	1.08	50.8
12	R2	30	5.0	30	5.0	0.303	9.0	LOS A	1.2	9.3	0.61	0.61	0.61	52.2
Approach		650	6.6	650	6.6	0.593	14.0	LOS B	4.3	34.7	0.69	0.82	1.07	50.9
All Vehicles		2517	10.1	2517	10.1	0.633	13.7	LOS B	5.1	40.4	0.68	0.80	1.04	50.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

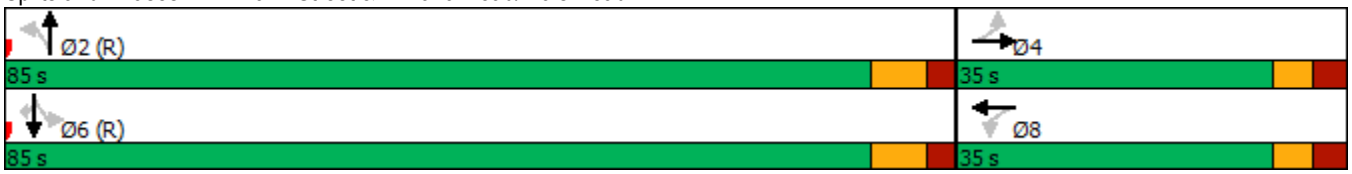


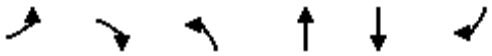
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	132	23	34	54	32	62	18	913	45	50	1191	187
Future Volume (vph)	132	23	34	54	32	62	18	913	45	50	1191	187
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	100.0		0.0	40.0		0.0	100.0		0.0	75.0		175.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor							1.00					0.98
Frt		0.911			0.901			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1729	1427	0	1530	1602	0	1729	3287	0	1601	3325	1517
Flt Permitted	0.696			0.720			0.211			0.282		
Satd. Flow (perm)	1267	1427	0	1160	1602	0	384	3287	0	475	3325	1481
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34			62			8				187
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.6			234.2			451.0			177.6	
Travel Time (s)		38.1			16.9			32.5			12.8	
Confl. Peds. (#/hr)							2					2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	9%	21%	13%	3%	2%	0%	4%	14%	8%	4%	2%
Adj. Flow (vph)	132	23	34	54	32	62	18	913	45	50	1191	187
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	57	0	54	94	0	18	958	0	50	1191	187
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	33.8	33.8		33.8	33.8		42.6	42.6		42.6	42.6	42.6
Total Split (s)	35.0	35.0		35.0	35.0		85.0	85.0		85.0	85.0	85.0
Total Split (%)	29.2%	29.2%		29.2%	29.2%		70.8%	70.8%		70.8%	70.8%	70.8%
Maximum Green (s)	28.2	28.2		28.2	28.2		77.4	77.4		77.4	77.4	77.4
Yellow Time (s)	3.6	3.6		3.6	3.6		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	3.2	3.2		3.2	3.2		2.6	2.6		2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8		6.8	6.8		7.6	7.6		7.6	7.6	7.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		28.0	28.0		28.0	28.0	28.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	17.8	17.8		17.8	17.8		87.8	87.8		87.8	87.8	87.8
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.73	0.73		0.73	0.73	0.73
v/c Ratio	0.71	0.24		0.31	0.32		0.06	0.40		0.14	0.49	0.17

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	67.5	23.3		48.3	20.3		4.8	3.8		7.3	8.2	1.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	67.5	23.3		48.3	20.3		4.8	3.8		7.3	8.2	1.3
LOS	E	C		D	C		A	A		A	A	A
Approach Delay		54.2			30.5			3.8			7.2	
Approach LOS		D			C			A			A	
Queue Length 50th (m)	27.6	4.4		10.6	6.1		0.5	13.5		2.8	49.7	0.0
Queue Length 95th (m)	43.9	14.4		20.6	18.6		m1.1	m23.4		8.6	78.6	6.4
Internal Link Dist (m)		504.6			210.2			427.0			153.6	
Turn Bay Length (m)	100.0			40.0			100.0			75.0		175.0
Base Capacity (vph)	297	361		272	423		280	2407		347	2433	1133
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.44	0.16		0.20	0.22		0.06	0.40		0.14	0.49	0.17

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 18 (15%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 10.5		Intersection LOS: B	
Intersection Capacity Utilization 70.2%		ICU Level of Service C	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 1: Bank Street & Miikana Road/Blais Road





Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	296	71	108	673	1023	172
Future Volume (vph)	296	71	108	673	1023	172
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0	0.0	120.0			100.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1601	1369	1679	1701	1733	1532
Flt Permitted	0.950		0.148			
Satd. Flow (perm)	1601	1369	262	1701	1733	1532
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		71				172
Link Speed (k/h)	50			80	80	
Link Distance (m)	528.6			273.1	451.0	
Travel Time (s)	38.1			12.3	20.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	8%	13%	3%	7%	5%	1%
Adj. Flow (vph)	296	71	108	673	1023	172
Shared Lane Traffic (%)						
Lane Group Flow (vph)	296	71	108	673	1023	172
Turn Type	Perm	Perm	Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4	4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.6	22.6	21.7	21.7	21.7	21.7
Total Split (s)	30.0	30.0	90.0	90.0	90.0	90.0
Total Split (%)	25.0%	25.0%	75.0%	75.0%	75.0%	75.0%
Maximum Green (s)	23.4	23.4	83.3	83.3	83.3	83.3
Yellow Time (s)	3.3	3.3	4.6	4.6	4.6	4.6
All-Red Time (s)	3.3	3.3	2.1	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	9.0	9.0	8.0	8.0	8.0	8.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	23.3	23.3	83.4	83.4	83.4	83.4
Actuated g/C Ratio	0.19	0.19	0.70	0.70	0.70	0.70
v/c Ratio	0.95	0.22	0.60	0.57	0.85	0.15
Control Delay	88.9	11.0	11.1	2.0	17.4	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Total Delay	88.9	11.0	11.1	2.0	17.4	0.4
LOS	F	B	B	A	B	A
Approach Delay	73.8			3.3	14.9	
Approach LOS	E			A	B	
Queue Length 50th (m)	64.0	0.0	0.5	3.4	160.2	0.0
Queue Length 95th (m)	#112.8	11.3	m0.8	m4.9	99.0	1.3
Internal Link Dist (m)	504.6			249.1	427.0	
Turn Bay Length (m)	25.0		120.0			100.0
Base Capacity (vph)	312	324	181	1182	1204	1117
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.22	0.60	0.57	0.85	0.15

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 18 (15%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.95			
Intersection Signal Delay: 20.3		Intersection LOS: C	
Intersection Capacity Utilization 99.1%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 2: Bank Street & Dun Skipper Drive



Intersection	
Intersection Delay, s/veh	12.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	260	100	48	179	78	51	41	34	105	61	28
Future Vol, veh/h	13	260	100	48	179	78	51	41	34	105	61	28
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	2	2	0	0	5	0	0	0	2	15	0
Mvmt Flow	13	260	100	48	179	78	51	41	34	105	61	28
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	14.2	12.7	10.7	11.9
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	40%	3%	16%	54%
Vol Thru, %	33%	70%	59%	31%
Vol Right, %	27%	27%	26%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	126	373	305	194
LT Vol	51	13	48	105
Through Vol	41	260	179	61
RT Vol	34	100	78	28
Lane Flow Rate	126	373	305	194
Geometry Grp	1	1	1	1
Degree of Util (X)	0.21	0.538	0.451	0.322
Departure Headway (Hd)	5.997	5.194	5.321	5.976
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	595	690	674	599
Service Time	4.07	3.249	3.38	4.042
HCM Lane V/C Ratio	0.212	0.541	0.453	0.324
HCM Control Delay	10.7	14.2	12.7	11.9
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	0.8	3.2	2.3	1.4

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	43	6	37	37	56	3	66	38	29	67	9
Future Vol, veh/h	13	43	6	37	37	56	3	66	38	29	67	9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	11	0	50	0	0	0	50	2	4	12	2	0
Mvmt Flow	13	43	6	37	37	56	3	66	38	29	67	9
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.2	8.1	9.1	8.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	21%	28%	28%
Vol Thru, %	62%	69%	28%	64%
Vol Right, %	36%	10%	43%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	107	62	130	105
LT Vol	3	13	37	29
Through Vol	66	43	37	67
RT Vol	38	6	56	9
Lane Flow Rate	107	62	130	105
Geometry Grp	1	1	1	1
Degree of Util (X)	0.152	0.082	0.156	0.137
Departure Headway (Hd)	5.105	4.749	4.307	4.682
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	703	755	833	765
Service Time	3.134	2.777	2.33	2.711
HCM Lane V/C Ratio	0.152	0.082	0.156	0.137
HCM Control Delay	9.1	8.2	8.1	8.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.3	0.6	0.5

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	57	9	62	43	34	13	46	62	29	49	16
Future Vol, veh/h	16	57	9	62	43	34	13	46	62	29	49	16
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	4	0	0	3	0	0	5	15	5	0	0
Mvmt Flow	16	57	9	62	43	34	13	46	62	29	49	16
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.1	8.4	8	8.2
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	11%	20%	45%	31%
Vol Thru, %	38%	70%	31%	52%
Vol Right, %	51%	11%	24%	17%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	121	82	139	94
LT Vol	13	16	62	29
Through Vol	46	57	43	49
RT Vol	62	9	34	16
Lane Flow Rate	121	82	139	94
Geometry Grp	1	1	1	1
Degree of Util (X)	0.142	0.103	0.171	0.12
Departure Headway (Hd)	4.23	4.516	4.422	4.583
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	848	795	812	783
Service Time	2.254	2.539	2.443	2.607
HCM Lane V/C Ratio	0.143	0.103	0.171	0.12
HCM Control Delay	8	8.1	8.4	8.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.3	0.6	0.4

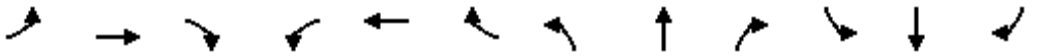
Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	789	1064	0
Future Vol, veh/h	0	0	0	789	1064	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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, %	0	0	0	7	6	0
Mvmt Flow	0	0	0	789	1064	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1853	1064	1064	0	-	0
Stage 1	1064	-	-	-	-	-
Stage 2	789	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	82	273	662	-	-	-
Stage 1	335	-	-	-	-	-
Stage 2	451	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	82	273	662	-	-	-
Mov Cap-2 Maneuver	82	-	-	-	-	-
Stage 1	335	-	-	-	-	-
Stage 2	451	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	662	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-



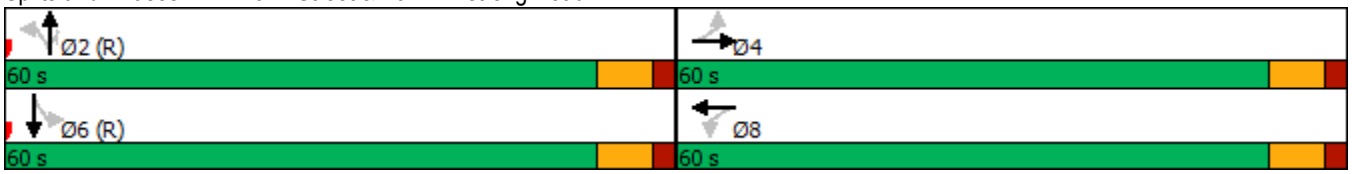
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	533	50	120	682	16	29	741	86	11	997	56
Future Volume (vph)	31	533	50	120	682	16	29	741	86	11	997	56
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	25.0		0.0	50.0		0.0	20.0		15.0	15.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.987			0.997				0.850		0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1695	2971	0	1586	1666	0	1729	1750	1181	1465	3211	0
Flt Permitted	0.123			0.376			0.159			0.104		
Satd. Flow (perm)	219	2971	0	628	1666	0	289	1750	1181	160	3211	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			1				38		6	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.5			292.7			203.7			158.2	
Travel Time (s)		38.1			21.1			14.7			11.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	16%	3%	9%	9%	5%	0%	4%	31%	18%	7%	4%
Adj. Flow (vph)	31	533	50	120	682	16	29	741	86	11	997	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	583	0	120	698	0	29	741	86	11	1053	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	36.2	36.2		36.2	36.2		36.2	36.2	36.2	36.2	36.2	
Total Split (s)	60.0	60.0		60.0	60.0		60.0	60.0	60.0	60.0	60.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	
Maximum Green (s)	52.8	52.8		52.8	52.8		52.8	52.8	52.8	52.8	52.8	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.2	2.2		2.2	2.2		2.2	2.2	2.2	2.2	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.2	7.2		7.2	7.2		7.2	7.2	7.2	7.2	7.2	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	22.0	22.0		22.0	22.0		22.0	22.0	22.0	22.0	22.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	51.9	51.9		51.9	51.9		53.7	53.7	53.7	53.7	53.7	
Actuated g/C Ratio	0.43	0.43		0.43	0.43		0.45	0.45	0.45	0.45	0.45	
v/c Ratio	0.33	0.45		0.44	0.97		0.22	0.95	0.16	0.15	0.73	
Control Delay	32.2	23.4		29.9	60.5		26.7	54.2	12.7	37.4	43.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	

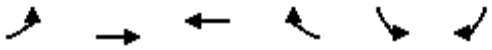
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	32.2	23.4		29.9	60.5		26.7	54.2	12.7	37.4	43.4	
LOS	C	C		C	E		C	D	B	D	D	
Approach Delay		23.8			56.0			49.1			43.3	
Approach LOS		C			E			D			D	
Queue Length 50th (m)	4.5	46.0		17.7	142.7		3.8	153.1	6.0	2.1	108.2	
Queue Length 95th (m)	13.3	60.3		34.2	#215.2		11.0	#226.6	15.2	m2.6	129.0	
Internal Link Dist (m)		504.5			268.7			179.7			134.2	
Turn Bay Length (m)	25.0			50.0			20.0		15.0	15.0		
Base Capacity (vph)	96	1312		276	733		129	783	549	71	1441	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.32	0.44		0.43	0.95		0.22	0.95	0.16	0.15	0.73	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 44.3 Intersection LOS: D
Intersection Capacity Utilization 106.4% ICU Level of Service G
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Bank Street & Earl Armstrong Road



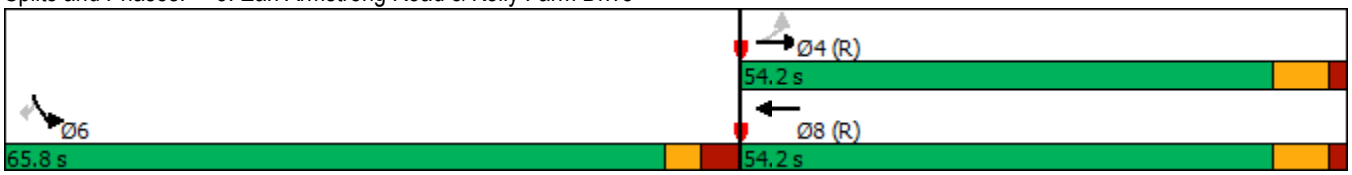


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	25	589	729	38	25	24
Future Volume (vph)	25	589	729	38	25	24
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	40.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.993			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1558	3144	3203	0	1729	1547
Flt Permitted	0.361				0.950	
Satd. Flow (perm)	592	3144	3203	0	1729	1547
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			5			24
Link Speed (k/h)		50	50		50	
Link Distance (m)		222.0	528.5		431.1	
Travel Time (s)		16.0	38.1		31.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	11%	10%	7%	11%	0%	0%
Adj. Flow (vph)	25	589	729	38	25	24
Shared Lane Traffic (%)						
Lane Group Flow (vph)	25	589	767	0	25	24
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	24.8	24.8	24.8		33.8	33.8
Total Split (s)	54.2	54.2	54.2		65.8	65.8
Total Split (%)	45.2%	45.2%	45.2%		54.8%	54.8%
Maximum Green (s)	47.4	47.4	47.4		59.0	59.0
Yellow Time (s)	5.0	5.0	5.0		3.2	3.2
All-Red Time (s)	1.8	1.8	1.8		3.6	3.6
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.8	6.8	6.8		6.8	6.8
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	C-Max	C-Max	C-Max		None	None
Walk Time (s)	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0		20.0	20.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	105.8	105.8	105.8		10.0	10.0
Actuated g/C Ratio	0.88	0.88	0.88		0.08	0.08
v/c Ratio	0.05	0.21	0.27		0.17	0.16
Control Delay	2.5	2.2	7.0		54.3	21.2
Queue Delay	0.0	0.0	0.0		0.0	0.0

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Total Delay	2.5	2.2	7.0		54.3	21.2
LOS	A	A	A		D	C
Approach Delay		2.2	7.0		38.1	
Approach LOS		A	A		D	
Queue Length 50th (m)	0.9	13.0	59.6		5.1	0.0
Queue Length 95th (m)	2.4	17.0	m61.2		13.2	7.7
Internal Link Dist (m)		198.0	504.5		407.1	
Turn Bay Length (m)	60.0				40.0	
Base Capacity (vph)	522	2773	2826		850	772
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.05	0.21	0.27		0.03	0.03

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 59.5 (50%), Referenced to phase 4:EBTL and 8:WBT, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.27			
Intersection Signal Delay: 6.0		Intersection LOS: A	
Intersection Capacity Utilization 42.2%		ICU Level of Service A	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 8: Earl Armstrong Road & Kelly Farm Drive

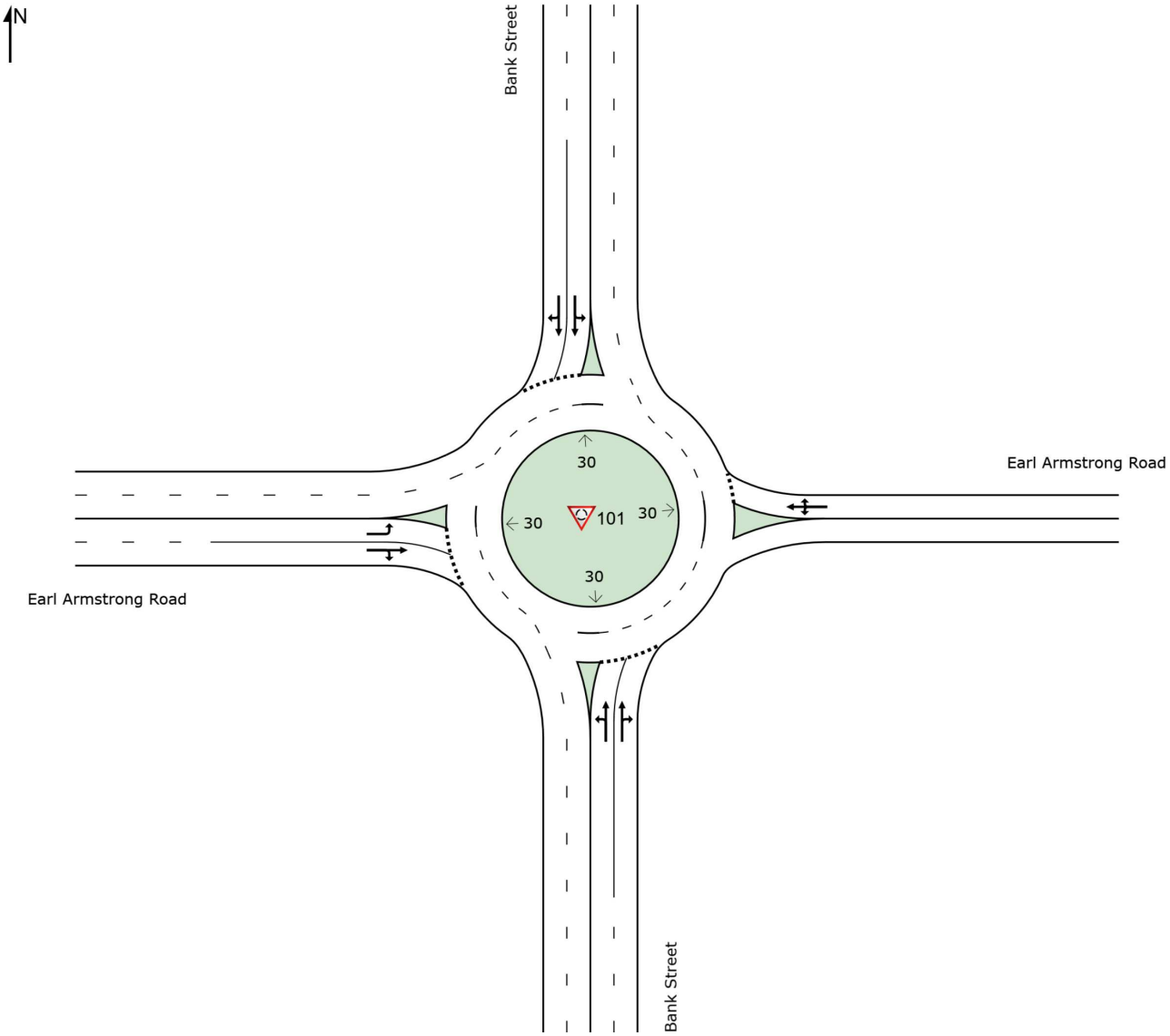


SITE LAYOUT

Site: 101 [Bank & Earl Armstrong (Site Folder: TT 2036 w Ext PM)]

Bank Street & Earl Armstrong Road
Future (2036) Total Traffic with Earl Armstrong Extension
PM Peak Hour
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [Bank & Earl Armstrong (Site Folder: TT 2036 w Ext PM)]

Bank Street & Earl Armstrong Road
Future (2036) Total Traffic with Earl Armstrong Extension
PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bank Street														
3	L2	29	0.0	29	0.0	0.526	11.8	LOS B	3.6	28.6	0.68	0.80	1.01	51.8
8	T1	741	4.0	741	4.0	0.526	11.7	LOS B	3.6	28.6	0.66	0.79	1.00	51.7
18	R2	86	31.0	86	31.0	0.526	12.5	LOS B	3.5	28.3	0.64	0.77	0.98	49.5
Approach		856	6.6	856	6.6	0.526	11.8	LOS B	3.6	28.6	0.66	0.79	1.00	51.5
East: Earl Armstrong Road														
1	L2	120	9.0	120	9.0	1.272	155.1	LOS F	69.7	569.2	1.00	4.12	10.69	17.4
6	T1	682	9.0	682	9.0	1.272	155.1	LOS F	69.7	569.2	1.00	4.12	10.69	17.4
16	R2	16	5.0	16	5.0	1.272	154.9	LOS F	69.7	569.2	1.00	4.12	10.69	17.3
Approach		818	8.9	818	8.9	1.272	155.1	LOS F	69.7	569.2	1.00	4.12	10.69	17.4
North: Bank Street														
7	L2	11	18.0	11	18.0	0.781	27.0	LOS D	8.4	67.7	0.85	1.25	2.07	42.7
4	T1	997	7.0	997	7.0	0.781	25.4	LOS D	8.8	70.6	0.85	1.25	2.06	43.6
14	R2	56	4.0	56	4.0	0.781	24.2	LOS C	8.8	70.6	0.85	1.25	2.06	43.1
Approach		1064	7.0	1064	7.0	0.781	25.3	LOS D	8.8	70.6	0.85	1.25	2.06	43.6
West: Earl Armstrong Road														
5	L2	31	2.0	31	2.0	0.070	9.0	LOS A	0.2	1.8	0.68	0.68	0.68	50.3
2	T1	533	16.0	533	16.0	1.291	172.8	LOS F	51.2	437.8	1.00	3.88	10.82	16.1
12	R2	50	3.0	50	3.0	1.291	171.9	LOS F	51.2	437.8	1.00	3.88	10.82	16.0
Approach		614	14.2	614	14.2	1.291	164.5	LOS F	51.2	437.8	0.98	3.72	10.30	16.7
All Vehicles		3352	8.7	3352	8.7	1.291	79.0	LOS F	69.7	569.2	0.86	2.29	5.41	26.8

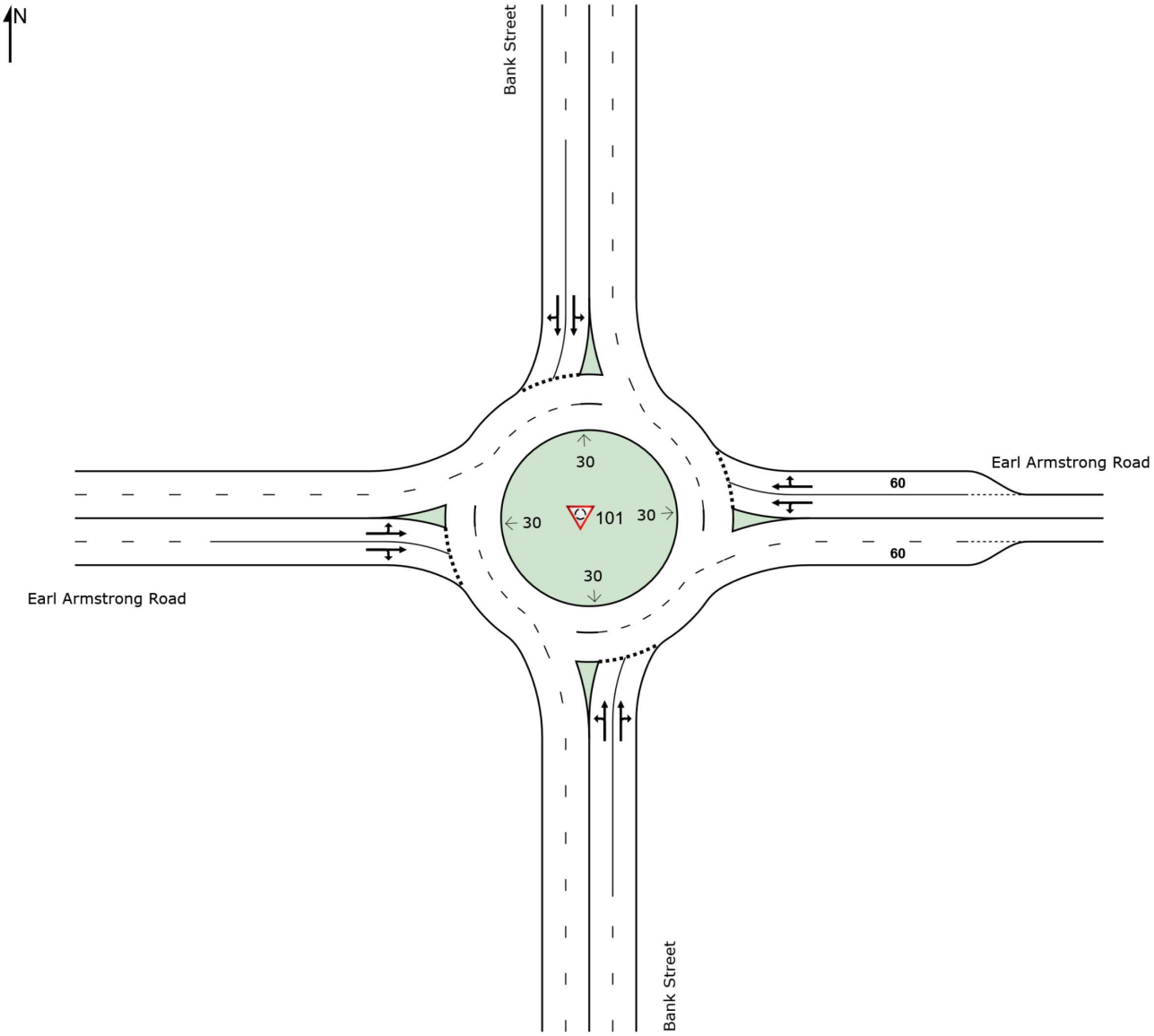
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [Bank & Earl Armstrong (w Mods) (Site Folder: TT 2036 w Ext PM)]

Bank Street & Earl Armstrong Road
Future (2036) Total Traffic with Earl Armstrong Extension
PM Peak Hour (with Modifications)
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Organisation: ARCADIS U.S., INC. | Licence: PLUS / 1PC | Created: October 19, 2025 9:06:48 PM
Project: C:\Users\pascolob9709.ARCADIS\ARCADIS\145172 Cattizone Parcel 4858 Bank St - Internal Documents\6.0_Technical\6.23_Traffic \05_Analytic Models\CattizoneLands_Future_2025-10-18.sip9

MOVEMENT SUMMARY

Site: 101 [Bank & Earl Armstrong (w Mods) (Site Folder: TT 2036 w Ext PM)]

Bank Street & Earl Armstrong Road
Future (2036) Total Traffic with Earl Armstrong Extension
PM Peak Hour (with Modifications)
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bank Street														
3	L2	29	0.0	29	0.0	0.592	15.0	LOS B	4.4	34.4	0.75	0.93	1.28	49.6
8	T1	741	4.0	741	4.0	0.592	14.8	LOS B	4.4	34.4	0.73	0.92	1.28	49.6
18	R2	86	31.0	86	31.0	0.592	19.5	LOS C	4.2	34.6	0.72	0.91	1.27	47.6
Approach		856	6.6	856	6.6	0.592	15.3	LOS C	4.4	34.6	0.73	0.92	1.28	49.4
East: Earl Armstrong Road														
1	L2	120	9.0	120	9.0	0.670	21.4	LOS C	4.9	40.0	0.79	1.05	1.61	44.9
6	T1	682	9.0	682	9.0	0.670	20.3	LOS C	5.0	41.2	0.78	1.04	1.60	46.0
16	R2	16	5.0	16	5.0	0.670	19.4	LOS C	5.0	41.2	0.78	1.04	1.59	45.6
Approach		818	8.9	818	8.9	0.670	20.4	LOS C	5.0	41.2	0.78	1.04	1.60	45.8
North: Bank Street														
7	L2	11	18.0	11	18.0	0.912	47.6	LOS E	12.8	103.3	0.92	1.63	3.23	34.7
4	T1	997	7.0	997	7.0	0.912	45.2	LOS E	13.7	109.9	0.92	1.64	3.25	35.5
14	R2	56	4.0	56	4.0	0.912	43.3	LOS E	13.7	109.9	0.93	1.66	3.27	35.4
Approach		1064	7.0	1064	7.0	0.912	45.1	LOS E	13.7	109.9	0.92	1.64	3.25	35.5
West: Earl Armstrong Road														
5	L2	31	2.0	31	2.0	0.956	62.3	LOS F	12.3	105.1	0.91	1.81	3.97	30.4
2	T1	533	16.0	533	16.0	0.956	52.9	LOS F	12.3	105.1	0.88	1.57	3.25	33.3
12	R2	50	3.0	50	3.0	0.488	19.2	LOS C	2.1	17.3	0.78	0.92	1.26	45.3
Approach		614	14.2	614	14.2	0.956	50.6	LOS F	12.3	105.1	0.87	1.53	3.13	33.8
All Vehicles		3352	8.7	3352	8.7	0.956	32.5	LOS D	13.7	109.9	0.83	1.29	2.32	40.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix F Transit Service Maps

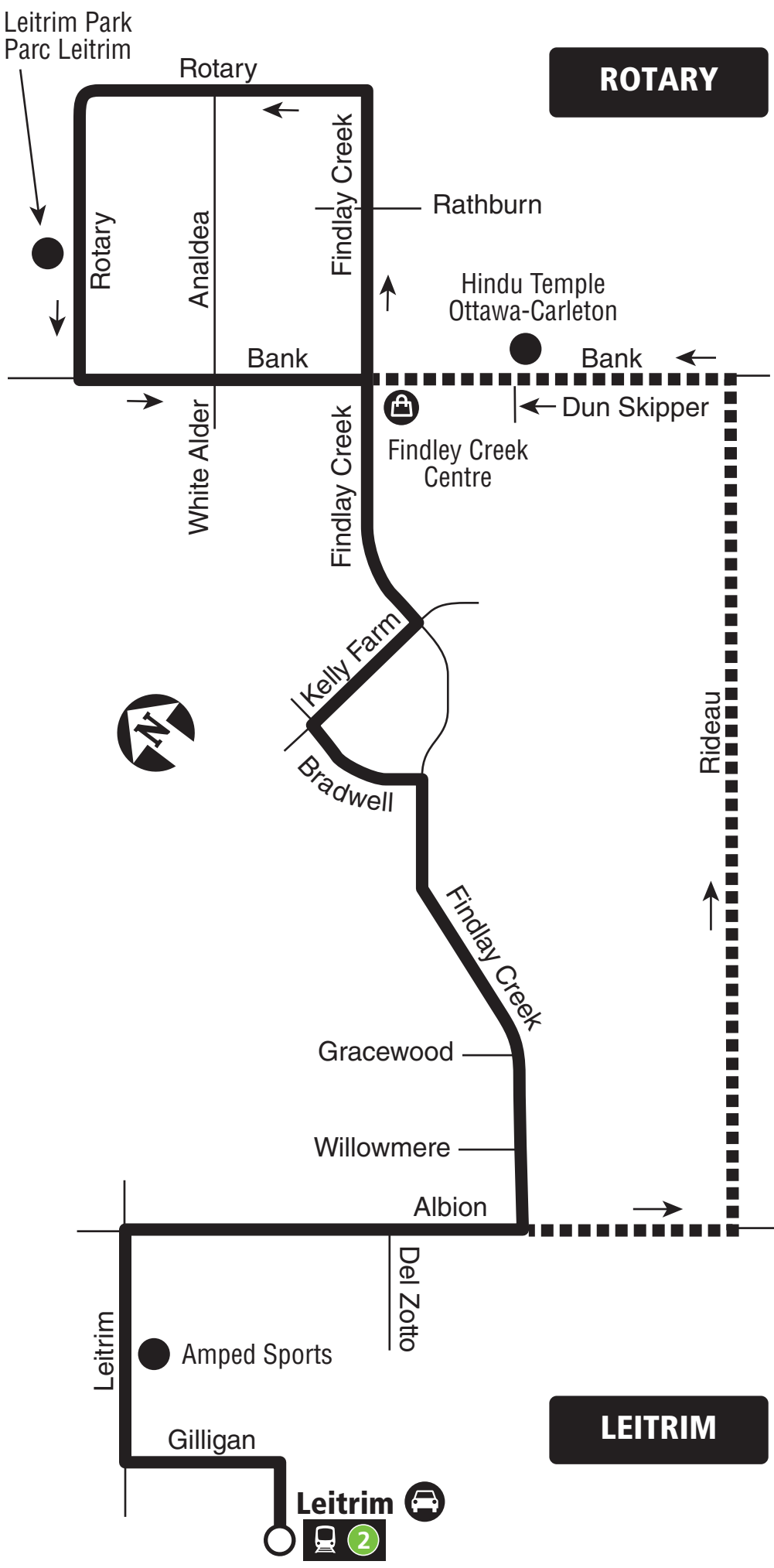
93

ROTARY

LEITRIM

Local

7 days a week / 7 jours par semaine
All day service
Service toute la journée



04.2025

- Station
- Some Sunday trips / Quelques trajets le dimanche
- Shopping Centre / Centre commercial
- Park & Ride / Parc relais

2025.04

This route starts on April 27, 2025 when the New Ways to Bus network comes into effect.

Ce circuit sera mis en service le 27 avril 2025, lorsque le réseau L'autobus réinventé entrera en vigueur.

Customer Service / Service à la clientèle **613-560-5000**

Security / Sécurité **613-741-2478**

OC Transpo **octranspo.com**

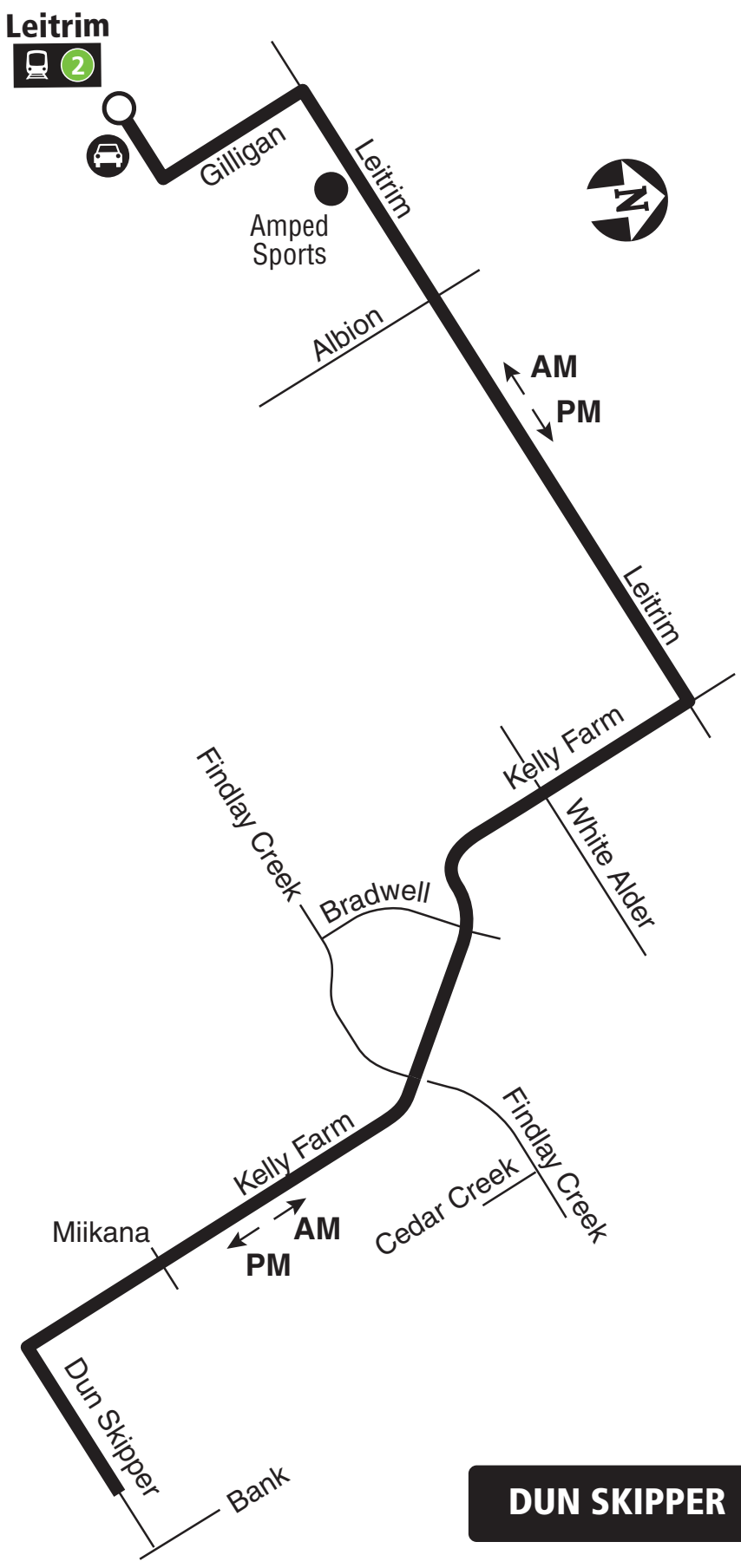
94

DUN SKIPPER
LEITRIM

Local

Monday to Friday / Lundi au vendredi
Peak periods only
Périodes de pointe seulement

LEITRIM



DUN SKIPPER

04.2025

Station

Park & Ride / Parc relais

2025.04

This route starts on April 27, 2025 when the New Ways to Bus network comes into effect.

Ce circuit sera mis en service le 27 avril 2025, lorsque le réseau L'autobus réinventé entrera en vigueur.

Customer Service / Service à la clientèle **613-560-5000**

Security / Sécurité **613-741-2478**

OC Transpo **octranspo.com**

304

Local

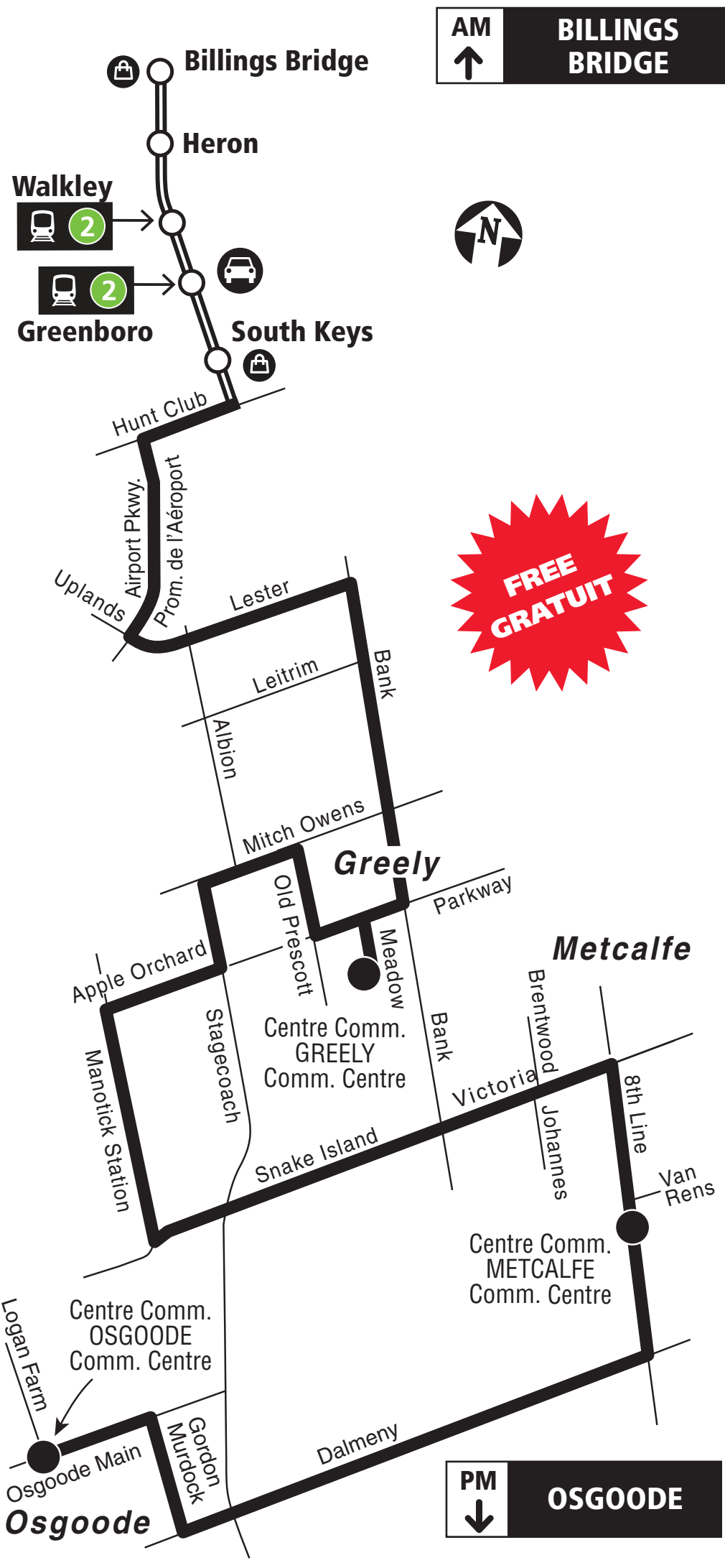
BILLINGS BRIDGE

METCALFE, GREELY OSGOODE

Thursday only / Jeudi seulement

Selected time periods

Périodes sélectionnées



Transitway & Station

Park & Ride / Parc relais

Shopping Centre / Centre commercial

2020.04

Schedule / Horaire.....613-560-1000

Text / Texto 560560

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

Customer Relations
Service à la clientèle **613-560-5000**

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

Security / Sécurité **613-741-2478**

Effective May 3, 2020

En vigueur 3 mai 2020

OC Transpo

INFO 613-560-5000
octranspo.com

Appendix G Multi-Modal Level of Service Analyses

Multi-Modal Level of Service - Segments Form

Project: S-4 Leitrim West of Bank Lands CTS
Consultant: Arcadis
Date: Oct 2, 2025
Scenario: Existing

	Segment Name	Bank - Dun Skipper to Rideau				Kelly Farm - Dun Skipper to Paakanaak/Rallidale			
	OP Transect / Policy Area	Greenbelt or Rural				Outer Urban or Suburban			
	Segment Component	Majority (>50%)		Critical		Majority (>50%)		Critical	
	Side of Street	W or N	E or S	W or N	E or S	W or N	E or S	W or N	E or S
Pedestrian	PLOS Inputs								
	Posted Speed (km/h)	80 km/h		80 km/h		50 km/h		50 km/h	
	Two-Way ADT	13,950		13,950		1,060		1,060	
	Pedestrian Facility	None	None	None	None	Sidewalk	Sidewalk	Sidewalk	Sidewalk
	Does the facility meet the TMP Sidewalk or MUP Policy? If not, for MUPs, does the location have a low volume of peak daily users AND are pedestrian volumes likely less than 20% of total users?	No	No	No	No	Yes	Yes	Yes	Yes
	Facility Width (m)	-	-	-	-	2.00m	2.00m	2.00m	2.00m
	Offset from Motor Vehicle Travel Lanes (m)	-	-	-	-	1.5-2.99m	1.5-2.99m	1.5-2.99m	1.5-2.99m
	Presence of Adjacent Parking?	-	-	-	-	-	-	-	-
	General Purpose Curb Lane ADT	-	-	-	-	≤ 3000	≤ 3000	≤ 3000	≤ 3000
	Max. Distance between Controlled Crossings (m)	-	-	-	-	-	-	-	-
	Score	0.00	0.00	0.00	0.00	5.00	5.00	5.00	5.00
	PLOS	F	F	F	F	A	A	A	A
	Target PLOS	D				C			
Bicycle	BLOS Inputs								
	Cycling Route Classification	Elsewhere				Elsewhere			
	Cycling Facility	Shared Operating Space	Shared Operating Space	Shared Operating Space	Shared Operating Space	Shared Operating Space	Shared Operating Space	Shared Operating Space	Shared Operating Space
	Is the minimum level of separation provided according to OTM Book 18 Pre-Selection Nomograph - Rural Context (Figure 5.6)? (for paved shoulders)	-	-	-	-	-	-	-	-
	Facility Operation	-	-	-	-	-	-	-	-
	Pedestrian/Cyclist Volume	-	-	-	-	-	-	-	-
	Facility Width	-	-	-	-	-	-	-	-
	Boulevard/Buffer Width (excluding curb)	-	-	-	-	-	-	-	-
	Unsignalized Roadway Crossing Type (where cyclists are required to yield)	None	None	None	None	None	None	None	None
	Number of Travel Lanes at Crossing	-	-	-	-	-	-	-	-
	Crossing includes Median Refuge (≥ 2.7m)	-	-	-	-	-	-	-	-
	Cross-street Posted Speed (km/h)	-	-	-	-	-	-	-	-
	Cycling Path Blockages (e.g. bus stops and/or loading zones)	Rare	Rare	Rare	Rare	Rare	Rare	Rare	Rare
	Score	0.75	0.75	0.75	0.75	1.60	1.60	1.60	1.60
	BLOS	E	E	E	E	D	D	D	D
	Target BLOS	D				C			
Transit	TLOS Inputs								
	Transit Facility	Mixed Traffic				Select Transit Designation			
	Facility Type	Mixed Traffic	Mixed Traffic			Mixed Traffic	Mixed Traffic		
	Expected Transit Running Time	Slightly Impeded	Slightly Impeded			Slightly Impeded	Slightly Impeded		
	Transit Travel Speed (if available)	Enter Speed (if available)	Enter Speed (if available)			Enter Speed (if available)	Enter Speed (if available)		
	TLOS	C	C			C	C		
	Target TLOS	E (D for frequent transit routes)				-			
Public Realm	PRLOS Inputs								
	Context	Other Streets	Other Streets			Other Streets	Other Streets		
	Inner Boulevard Width	≤ 0.6m	≤ 0.6m			2.0-3.99m	2.0-3.99m		
	Middle Boulevard Width	≤ 0.5m	≤ 0.5m			≤ 0.5m	≤ 0.5m		
	Outer Boulevard (Frontage) Width	≥ 3.0m	≥ 3.0m			≥ 3.0m	≥ 3.0m		
	Transit Route on Segment?	Yes	Yes			No	No		
	Bus Stop Elements	No platform, landing zone or shelter	No platform, landing zone or shelter			-	-		
	Number of Midblock Traffic Lanes (both travel directions)	≤ 2				≤ 2			
	Score	-	8.10			24.60	24.60		
	PRLOS	-	E			B	B		
		E				B			

Multi-Modal Level of Service - Intersections Form

Project: S-4 Leitrim West of Bank Lands CTS
Consultant: Arcadis
Date: Oct 2, 2025
Scenario: Existing AM

	Intersection Name	**Bank Street & Miikana Road/Blais Road**				**Bank Street & Dun Skipper Drive**			
	OP Transect / Policy Area	**Mainstreet Corridor (outside a Hub)**				**Mainstreet Corridor (outside a Hub)**			
Pedestrian	**PLOS Inputs**								
	Pedestrians Crossing the	**North Leg**	**South Leg**	**East Leg**	**West Leg**	**North Leg**	**South Leg**	**East Leg**	**West Leg**
	Number of Travel Lanes Crossed	6	5	1-3	4	1-3	1-3	No Crosswalk	1-3
	Median Refuge (≥2.7m)	No	No	No	No	No	No	-	No
	Crosswalk Treatment	Zebra Stripe Hi-Vis Markings	Zebra Stripe Hi-Vis Markings	Zebra Stripe Hi-Vis Markings	Zebra Stripe Hi-Vis Markings	Zebra Stripe Hi-Vis Markings	Zebra Stripe Hi-Vis Markings	-	Zebra Stripe Hi-Vis Markings
	Signal Cycle Length (sec)	130.0				130.0			
	Effective Walk Time (sec)	77.4	77.4	27.4	27.4	75.3	75.3	-	24.4
	Conflict with Right-Turn Vehicles (For PLOS & BLOS)	**WBR**	**EBR**	**NBR**	**SBR**	**WBR**	**EBR**	**NBR**	**SBR**
	Right-Turn Geometry	Right-Turn With No Channel	Right-Turn With No Channel	Right-Turn With No Channel	Smart Channel w/ Raised Crossing	No Right-Turn / Prohib.	Right-Turn With No Channel	No Right-Turn / Prohib.	Right-Turn With No Channel
	Right-Turn Signal Phasing	Permissive	Permissive	Permissive	-	-	Permissive	-	Permissive
	Right-Turn Volume	≤ 150 veh/h	≤ 150 veh/h	≤ 150 veh/h	> 150 to 300 veh/h	-	≤ 150 veh/h	-	≤ 150 veh/h
	Right-Turn Effective Corner Radius	≤ 8m	≤ 8m	≤ 8m	-	-	> 8m	-	> 8m
	Cross-street Posted Speed (km/h)	50 km/h		80 km/h		50 km/h		80 km/h	
	Conflict with Left-Turn Vehicles (For PLOS & BLOS)	**EBL**	**WBL**	**SBL**	**NBL**	**EBL**	**WBL**	**SBL**	**NBL**
	Left-Turn Signal Phasing	Perm or Prot+Perm	Perm or Prot+Perm	Perm or Prot+Perm	Perm or Prot+Perm	Perm or Prot+Perm	No Left-Turn / Prohib.	No Left-Turn / Prohib.	Perm or Prot+Perm
	Left-Turn Volume	> 100 veh/h	≤ 50 veh/h	≤ 50 veh/h	≤ 50 veh/h	> 50 to 100 veh/h	-	-	≤ 50 veh/h
	Left-Turn Opposing Lanes	-	-	-	-	≤ 1	-	-	-
	Score	**2.65**	**3.45**	**4.20**	**3.45**	**4.80**	**4.65**	**-**	**4.05**
	PLOS	**C**	**C**	**B**	**C**	**A**	**A**	**-**	**B**
		C				**A**			
	Target PLOS	**B**				**B**			
Bicycle	**BLOS Inputs**								
	Cycling Route Classification	**Elsewhere**				**Elsewhere**			
	Cyclists Crossing the	**North Leg**	**South Leg**	**East Leg**	**West Leg**	**North Leg**	**South Leg**	**East Leg**	**West Leg**
	Type of Cycling Facility Across Leg	Crossride	Crossride	Crossride	Crossride	Crossride	Mixed Traffic		Crossride
	Two-Way ADT (in Cyclist Travel Direction)	3,056		14,720		1,533		15,622	
	Floating Bike Lane or Right-Turn Lane Crossover Approaching the Crossing?	No	No	No	No	No	No		No
	Crossride Operation	Unidirectional	Unidirectional	Unidirectional	Unidirectional	Unidirectional	-	-	Unidirectional
	Target Crossride Setback Met?	Yes	Yes	Yes	-	-	-	-	No
	Right-Turn Vehicle Volume from Adjacent Roadway > 100 veh/h?	-	-	-	-	-	-	-	-
	Cyclist Left-Turn Operation	**WBL**	**EBL**	**NBL**	**SBL**	**WBL**	**EBL**	**NBL**	**SBL**
	Cyclist Left-Turn Treatment Type	Protected Corner	Protected Corner	Protected Corner	Protected Corner	No Left-Turn	General Purpose Through-Left or Single Left-Turn Lane	Protected Corner	No Left-Turn
	Vehicle Lanes Crossed by Cyclists	-	-	-	-	-	One Lane Crossed	-	-
	Score	**100**	**140**	**140**	**130**	**150**	**50**	**-**	**130**
	BLOS	**B**	**A**	**A**	**A**	**A**	**D**	**-**	**A**
		A				**B**			
	Target BLOS	**C**				**C**			
Transit	**TLOS Inputs**								
	Transit Facility	**Mixed Traffic**				**Mixed Traffic**			
	Vehicles Travelling	**Southbound**	**Northbound**	**Westbound**	**Eastbound**	**Southbound**	**Northbound**	**Westbound**	**Eastbound**
	Average Transit Delay (if available)	≤ 10 sec	11-20 sec			≤ 10 sec	≤ 10 sec		
	Example Transit Priority Treatment	-	-			-	-		
	TLOS	**A**	**B**	**-**	**-**	**A**	**A**	**-**	**-**
		A				**A**			
	Target TLOS	**E (D for frequent transit routes)**				**E (D for frequent transit routes)**			
Auto	**AutoLOS Inputs**								
	Overall Intersection Volume to Capacity Ratio	0 to 0.60				0 to 0.60			
	Individual Movements V/C Ratios and Queue Lengths	See Separate Traffic Operations Table				See Separate Traffic Operations Table			
	AutoLOS	**A**				**A**			
	Target AutoLOS	**E**				**E**			

Multi-Modal Level of Service - Segments Form

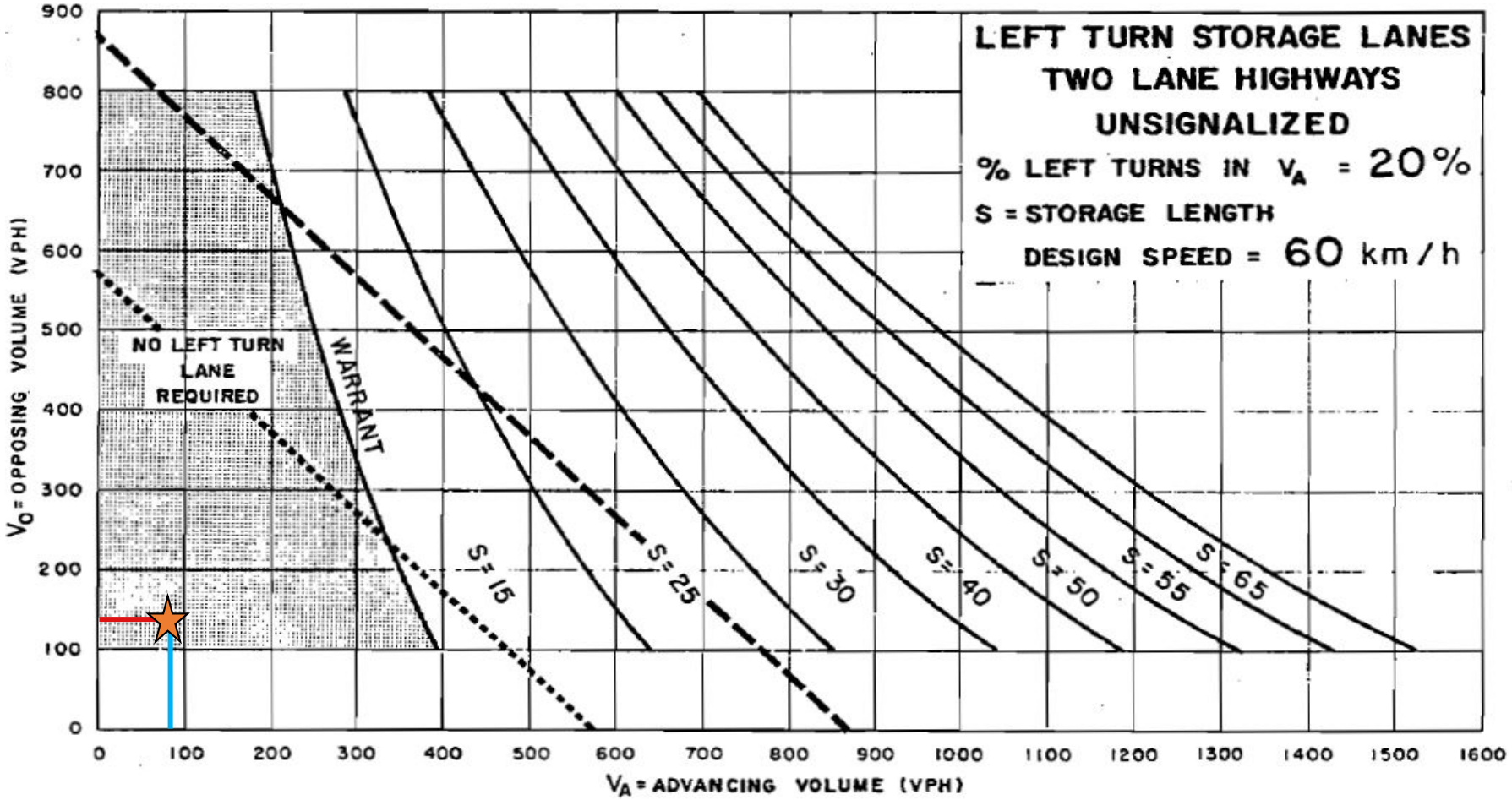
Project: S-4 Leitrim West of Bank Lands CTS
Consultant: Arcadis
Date: Aug 26, 2026
Scenario: Future (2036) Total Traffic with Earl Armstrong Road Extension

	Segment Name	**Earl Armstrong Road - Western Site Limits to Bank Street**			
	OP Transect / Policy Area	**Outer Urban or Suburban**			
	Segment Component	**Majority (>50%)**		**Critical**	
	Side of Street	**W or N**	**E or S**	**W or N**	**E or S**
Pedestrian	**PLOS Inputs**				
	Posted Speed (km/h)	60 km/h		60 km/h	
	Two-Way ADT	13,420		13,420	
	Pedestrian Facility	Sidewalk	Sidewalk	Sidewalk	Sidewalk
	Does the facility meet the TMP Sidewalk or MUP Policy? If not, for MUPs, does the location have a low volume of peak daily users AND are pedestrian volumes likely less than 20% of total users?	Yes	Yes	Yes	Yes
	Facility Width (m)	1.80m	1.80m	1.80m	1.80m
	Offset from Motor Vehicle Travel Lanes (m)	≥ 3.0m	≥ 3.0m	≥ 3.0m	≥ 3.0m
	Presence of Adjacent Parking?	No	No	No	No
	General Purpose Curb Lane ADT	-	-	-	-
	Max. Distance between Controlled Crossings (m)	≤ 200m	≤ 200m	≤ 200m	≤ 200m
	Score	**4.25**	**4.25**	**4.25**	**4.25**
	PLOS	**B**	**B**	**B**	**B**
	Target PLOS	**C**			
Bicycle	**BLOS Inputs**				
	Cycling Route Classification	**Elsewhere**			
	Cycling Facility	Cycle Track	Cycle Track	Cycle Track	Cycle Track
	Is the minimum level of separation provided according to OTM Book 18 Pre-Selection Nomograph - Rural Context (Figure 5.6)? (for paved shoulders)	-	-	-	-
	Facility Operation	Unidirectional	Unidirectional	Unidirectional	Unidirectional
	Pedestrian/Cyclist Volume	-	-	-	-
	Facility Width	1.8m-2.09m	1.8m-2.09m	1.8m-2.09m	1.8m-2.09m
	Boulevard/Buffer Width (excluding curb)	≥ 1.5m	≥ 1.5m	≥ 1.5m	≥ 1.5m
	Unsignalized Roadway Crossing Type (where cyclists are required to yield)	Cross-Street	Cross-Street	Cross-Street	Cross-Street
	Number of Travel Lanes at Crossing	4-5	4-5	4-5	4-5
	Crossing includes Median Refuge (≥ 2.7m)	No	Yes	Yes	No
	Cross-street Posted Speed (km/h)	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h
	Cycling Path Blockages (e.g. bus stops and/or loading zones)	-	-	-	-
	Score	**3.83**	**3.98**	**3.98**	**3.83**
	BLOS	**B**	**B**	**B**	**B**
	Target BLOS	**C**			
Transit	**TLOS Inputs**				
	Transit Facility	**Mixed Traffic**			
	Facility Type	Mixed Traffic	Mixed Traffic		
	Expected Transit Running Time	Slightly Impeded	Slightly Impeded		
	Transit Travel Speed (if available)	Enter Speed (if available)	Enter Speed (if available)		
	TLOS	**C**	**C**		
	Target TLOS	**E (D for frequent transit routes)**			
Public Realm	**PRLOS Inputs**				
	Context	Other Streets	Other Streets		
	Inner Boulevard Width	2.0-3.99m	2.0-3.99m		
	Middle Boulevard Width	≤ 0.5m	≤ 0.5m		
	Outer Boulevard (Frontage) Width	2.0-2.99m	2.0-2.99m		
	Transit Route on Segment?	Yes	Yes		
	Bus Stop Elements	Curbside platform with shelter (island style)	Curbside platform with shelter (island style)		
	Number of Midblock Traffic Lanes (both travel directions)	4			
	Score	**21.60**	**21.60**		
	PRLOS	**B**	**B**		
		B			

Multi-Modal Level of Service - Intersections Form
Project: S-4 Leitrim West of Bank Lands CTS
Consultant: Arcadis
Date: Aug 26, 2026
Scenario: Future (2036) Total Traffic with Earl Armstrong Road Extension

	Intersection Name	Bank Street & Miikana Road/Blais Road				Bank Street & Dun Skipper Drive				Earl Armstrong Road Extension & Bank Street				Earl Armstrong Road Extension & Kelly Farm Drive			
	OP Transect / Policy Area	Mainstreet Corridor (outside a Hub)				Mainstreet Corridor (outside a Hub)				Outer Urban or Suburban				Outer Urban or Suburban			
Pedestrian	PLOS Inputs																
	Pedestrians Crossing the:	North Leg	South Leg	East Leg	West Leg	North Leg	South Leg	East Leg	West Leg	North Leg	South Leg	East Leg	West Leg	North Leg	South Leg	East Leg	West Leg
	Number of Travel Lanes Crossed	6	5	1-3	4	4	1-3	No Crosswalk	1-3	5	5	5	6	1-3	No Crosswalk	5	5
	Median Refuge (≥2.7m)	No	No	No	No	No	No	-	No	No	No	No	No	No	-	No	No
	Crosswalk Treatment	Zebra Stripe Hi-Vis Markings	Zebra Stripe Hi-Vis Markings	Zebra Stripe Hi-Vis Markings	Zebra Stripe Hi-Vis Markings	Zebra Stripe Hi-Vis Markings	Zebra Stripe Hi-Vis Markings	-	Zebra Stripe Hi-Vis Markings	Zebra Stripe Hi-Vis Markings	Zebra Stripe Hi-Vis Markings	Zebra Stripe Hi-Vis Markings	Zebra Stripe Hi-Vis Markings	Zebra Stripe Hi-Vis Markings	-	Zebra Stripe Hi-Vis Markings	Zebra Stripe Hi-Vis Markings
	Signal Cycle Length (sec)	80.0				90.0				110.0				60.0			
	Effective Walk Time (sec)	7.0	7.0	7.0	7.0	50.2	50.2	-	10.5	22.8	22.8	18.5	18.5	7.0	-	8.4	7.0
	Conflict with Right-Turn Vehicles (For PLOS & BLOS)	WBR	EBR	NBR	SBR	WBR	EBR	NBR	SBR	WBR	EBR	NBR	SBR	WBR	EBR	NBR	SBR
	Right-Turn Geometry	Right-Turn With No Channel	Right-Turn With No Channel	Right-Turn With No Channel	Smart Channel w/ Raised Crossing	No Right-Turn / Prohib.	Right-Turn With No Channel	No Right-Turn / Prohib.	Right-Turn With No Channel	Right-Turn With No Channel	Right-Turn With No Channel	Right-Turn With No Channel	Right-Turn With No Channel	Right-Turn With No Channel	No Right-Turn / Prohib.	No Right-Turn / Prohib.	Right-Turn With No Channel
	Right-Turn Signal Phasing	Permissive	Permissive	Permissive	-	-	Permissive	-	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	-	-	Permissive
	Right-Turn Volume	≤ 150 veh/h	≤ 150 veh/h	≤ 150 veh/h	> 150 to 300 veh/h	-	≤ 150 veh/h	-	≤ 150 veh/h	≤ 150 veh/h	≤ 150 veh/h	≤ 150 veh/h	≤ 150 veh/h	≤ 150 veh/h	-	-	≤ 150 veh/h
	Right-Turn Effective Corner Radius	≤ 8m	≤ 8m	≤ 8m	-	-	≤ 8m	-	≤ 8m	> 8m	> 8m	> 8m	> 8m	> 8m	-	-	> 8m
	Cross-street Posted Speed (km/h)	50 km/h		80 km/h		50 km/h		80 km/h		50 km/h		50 km/h		50 km/h		50 km/h	
	Conflict with Left-Turn Vehicles (For PLOS & BLOS)	EBL	WBL	SBL	NBL	EBL	WBL	SBL	NBL	EBL	WBL	SBL	NBL	EBL	WBL	SBL	NBL
	Left-Turn Signal Phasing	Perm or Prot+Perm	Perm or Prot+Perm	Perm or Prot+Perm	Perm or Prot+Perm	Perm or Prot+Perm	No Left-Turn / Prohib.	No Left-Turn / Prohib.	Perm or Prot+Perm	Perm or Prot+Perm	Perm or Prot+Perm	Perm or Prot+Perm	Perm or Prot+Perm	Perm or Prot+Perm	No Left-Turn / Prohib.	Perm or Prot+Perm	No Left-Turn / Prohib.
	Left-Turn Volume	> 100 veh/h	≤ 50 veh/h	≤ 50 veh/h	≤ 50 veh/h	> 100 veh/h	-	-	> 50 to 100 veh/h	≤ 50 veh/h	> 50 to 100 veh/h	≤ 50 veh/h	≤ 50 veh/h	≤ 50 veh/h	-	≤ 50 veh/h	-
	Left-Turn Opposing Lanes	-	-	-	-	-	-	-	≥ 2	-	≥ 2	-	-	-	-	-	-
	Score	2.35	3.15	4.35	3.60	4.15	4.80	-	4.15	3.15	2.95	3.15	2.55	4.50	-	3.45	3.30
	PLOS	D	C	B	B	B	A	-	B	C	C	C	C	A	-	C	C
		C				B				C				B			
	Target PLOS	B				B				C				C			
Bicycle	BLOS Inputs																
	Cycling Route Classification	Elsewhere				Elsewhere				Elsewhere				Elsewhere			
	Cyclists Crossing the:	North Leg	South Leg	East Leg	West Leg	North Leg	South Leg	East Leg	West Leg	North Leg	South Leg	East Leg	West Leg	North Leg	South Leg	East Leg	West Leg
	Type of Cycling Facility Across Leg	Crossride	Crossride	Crossride	Crossride	Crossride	Crossride		Crossride	Crossride	Crossride	Crossride	Crossride	Crossride		Crossride	Crossride
	Two-Way ADT (in Cyclist Travel Direction)	24,040		3,370		1,533		15,622		19,200		14,320		490		13,810	
	Floating Bike Lane or Right-Turn Lane Crossover Approaching the Crossing?	No	No	No	No	No	No		No	No	No	No	No	No		No	No
	Crossride Operation	Unidirectional	Unidirectional	Unidirectional	Unidirectional	Unidirectional	Unidirectional	-	Unidirectional	Unidirectional	Unidirectional	Unidirectional	Unidirectional	Unidirectional		Unidirectional	Unidirectional
	Target Crossride Setback Met?	Yes	Yes	Yes	-	-	Yes	-	No	No	No	No	No	No	-	-	No
	Right-Turn Vehicle Volume from Adjacent Roadway > 100 veh/h?	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cyclist Left-Turn Operation	WBL	EBL	NBL	SBL	WBL	EBL	NBL	SBL	WBL	EBL	NBL	SBL	WBL	EBL	NBL	SBL
	Cyclist Left-Turn Treatment Type	Protected Corner	Protected Corner	Protected Corner	Protected Corner	No Left-Turn	General Purpose Through-Left or Single Left-Turn Lane	Protected Corner	No Left-Turn	Protected Corner	Protected Corner	Protected Corner	Protected Corner	No Left-Turn	Protected Corner	No Left-Turn	Protected Corner
	Vehicle Lanes Crossed by Cyclists	-	-	-	-	-	One Lane Crossed	-	-	-	-	-	-	-	-	-	-
	Score	100	140	140	130	110	100	-	90	140	100	140	140	140	-	150	140
	BLOS	B	A	A	A	B	B	-	C	A	B	A	A	A	-	A	A
		A				B				A				A			
	Target BLOS	C				C				C				C			
Transit	TLOS Inputs																
	Transit Facility	Mixed Traffic				Mixed Traffic				Mixed Traffic				Mixed Traffic			
	Vehicles Travelling:	Southbound	Northbound	Westbound	Eastbound	Southbound	Northbound	Westbound	Eastbound	Southbound	Northbound	Westbound	Eastbound	Southbound	Northbound	Westbound	Eastbound
	Average Transit Delay (if available)	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
	Example Transit Priority Treatment	No transit priority measures and long cycle length	No transit priority measures and long cycle length	No transit priority measures and long cycle length	No transit priority measures and long cycle length	No transit priority measures and long cycle length	No transit priority measures and long cycle length	No transit priority measures and long cycle length	No transit priority measures and long cycle length	No transit priority measures and long cycle length	No transit priority measures and long cycle length	No transit priority measures and long cycle length	No transit priority measures and long cycle length	No transit priority measures and long cycle length	No transit priority measures and long cycle length	No transit priority measures and long cycle length	No transit priority measures and long cycle length
	TLOS	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
		E				E				E				E			
	Target TLOS	E (D for frequent transit routes)				E (D for frequent transit routes)				E (D for frequent transit routes)				E (D for frequent transit routes)			
Auto	AutoLOS Inputs																
	Overall Intersection Volume to Capacity Ratio	0 to 0.60				0.71 to 0.80				0.61 to 0.70				0 to 0.60			
	Individual Movements V/C Ratios and Queue Lengths	See Separate Traffic Operations Table				See Separate Traffic Operations Table				See Separate Traffic Operations Table				See Separate Traffic Operations Table			
	AutoLOS	A				D				B				A			
	Target AutoLOS	E				E				E				E			

Appendix H Left-Turn Warrant Analysis



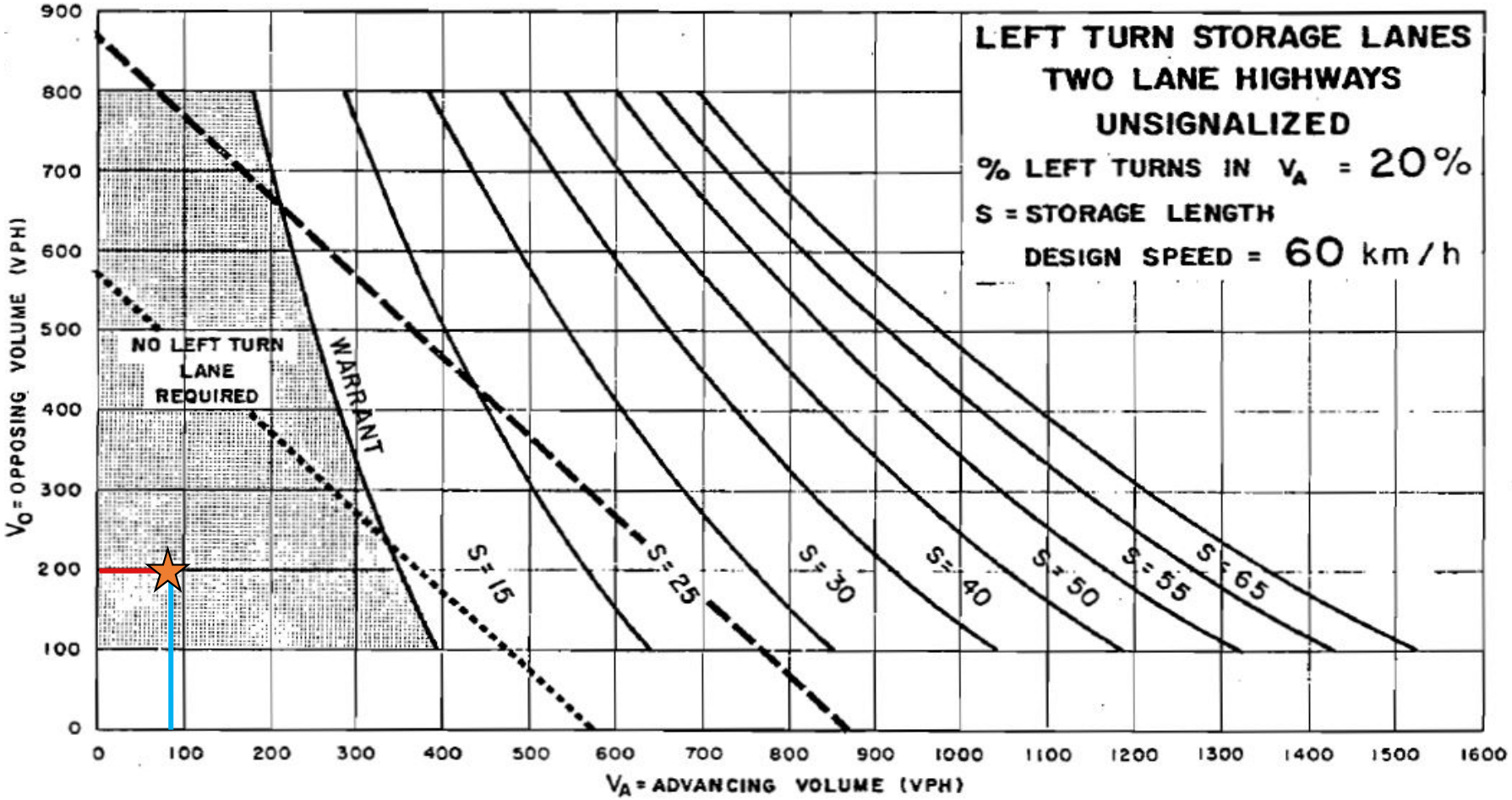
TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

Opposing Volume

Advancing Volume

Kelly Farm Drive & Dun Skipper Drive | Eastbound Left-Turn | AM Peak Hour



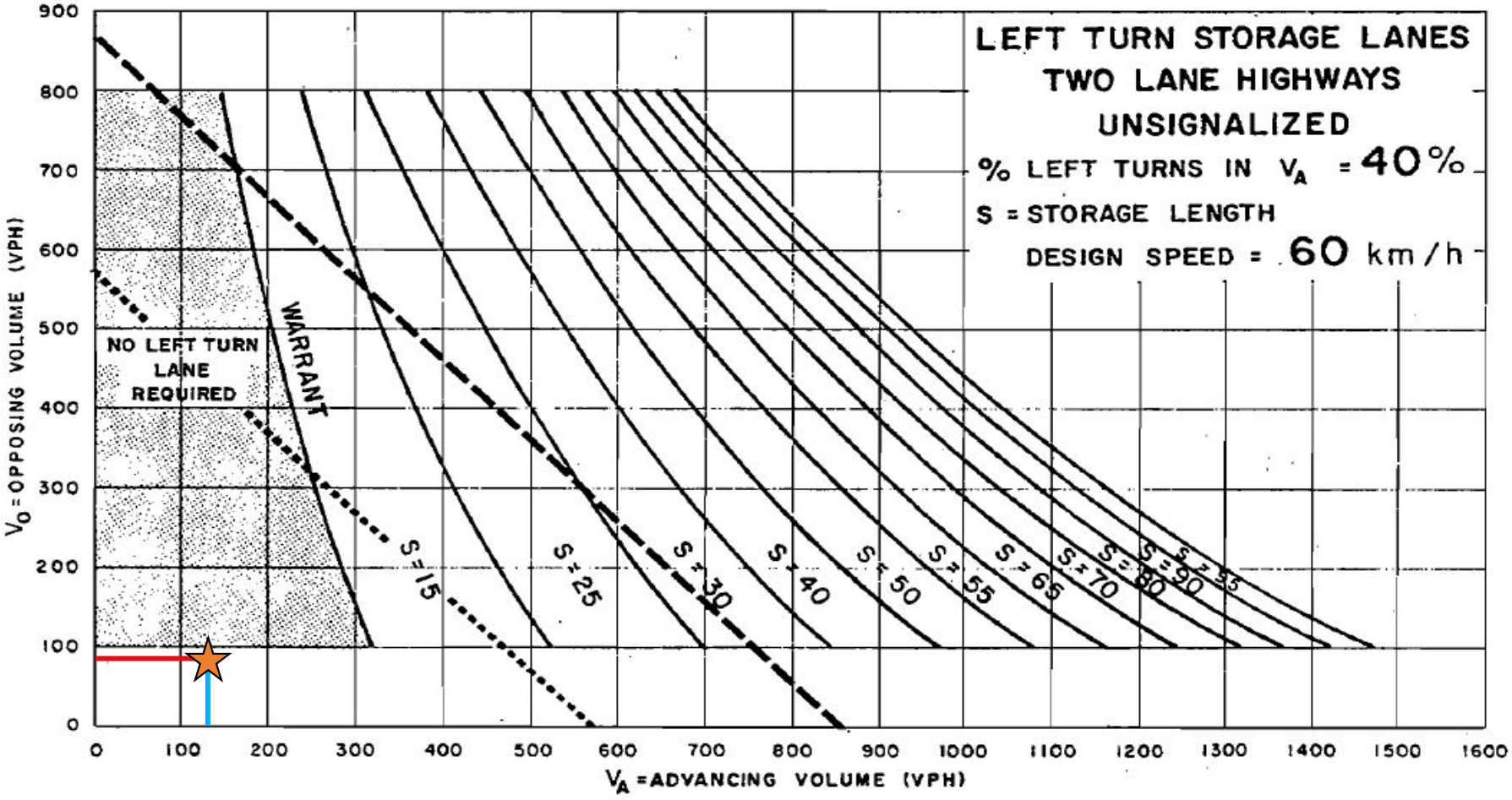
TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

Opposing Volume

Advancing Volume

Kelly Farm Drive & Dun Skipper Drive | Eastbound Left-Turn | PM Peak Hour



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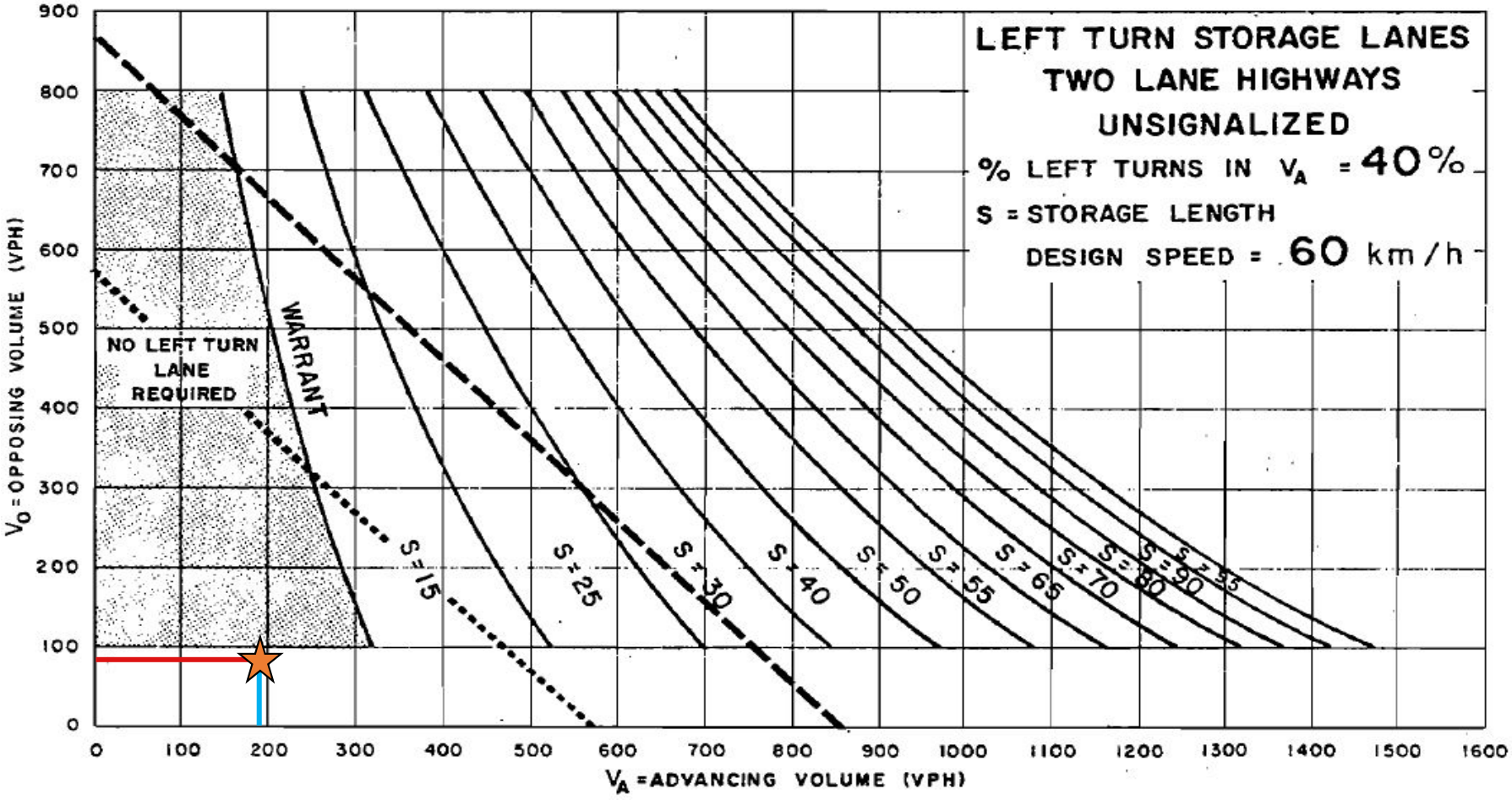
Opposing Volume

Advancing Volume

Kelly Farm Drive & Dun Skipper Drive | Westbound Left-Turn | AM Peak Hour



TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

Opposing Volume

Advancing Volume

Kelly Farm Drive & Dun Skipper Drive | Westbound Left-Turn | PM Peak Hour

Appendix I Transportation Demand Management

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

Legend

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

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

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

		TDM measures: *Residential developments*	Check if proposed & add descriptions
	1.	**TDM PROGRAM MANAGEMENT**	
	1.1	**Program coordinator**	
BASIC ★	1.1.1	Designate an internal coordinator, or contract with an external coordinator	☐ Not Applicable to Subdivisions
	1.2	**Travel surveys**	
BETTER	1.2.1	Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐
	2.	**WALKING AND CYCLING**	
	2.1	**Information on walking/cycling routes & destinations**	
BASIC	2.1.1	Display local area maps with walking/cycling access routes and key destinations at major entrances *(multi-family, condominium)*	☐ Not Applicable to Subdivisions
	2.2	**Bicycle skills training**	
BETTER	2.2.1	Offer on-site cycling courses for residents, or subsidize off-site courses	☐

			TDM measures: *Residential developments*	Check if proposed & add descriptions
		3.	**TRANSIT**	
		3.1	**Transit information**	
BASIC		3.1.1	Display relevant transit schedules and route maps at entrances *(multi-family, condominium)*	☐ Not Applicable to Subdivisions
BETTER		3.1.2	Provide real-time arrival information display at entrances *(multi-family, condominium)*	☐ Not Applicable to Subdivisions
		3.2	**Transit fare incentives**	
BASIC	★	3.2.1	Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit	☐ Under consideration
BETTER		3.2.2	Offer at least one year of free monthly transit passes on residence purchase/move-in	☐
		3.3	**Enhanced public transit service**	
BETTER	★	3.3.1	Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels *(subdivision)*	☐ If required
		3.4	**Private transit service**	
BETTER		3.4.1	Provide shuttle service for seniors homes or lifestyle communities (e.g. scheduled mall or supermarket runs)	☐ Not Applicable to Subdivisions
		4.	**CARSHARING & BIKESHARING**	
		4.1	**Bikeshare stations & memberships**	
BETTER		4.1.1	Contract with provider to install on-site bikeshare station (*multi-family)*	☐ Not Applicable to Subdivisions
BETTER		4.1.2	Provide residents with bikeshare memberships, either free or subsidized *(multi-family)*	☐ Not Applicable to Subdivisions
		4.2	**Carshare vehicles & memberships**	
BETTER		4.2.1	Contract with provider to install on-site carshare vehicles and promote their use by residents	☐ Not Applicable to Subdivisions
BETTER		4.2.2	Provide residents with carshare memberships, either free or subsidized	☐ Not Applicable to Subdivisions
		5.	**PARKING**	
		5.1	**Priced parking**	
BASIC	★	5.1.1	Unbundle parking cost from purchase price *(condominium)*	☐ Not Applicable to Subdivisions
BASIC	★	5.1.2	Unbundle parking cost from monthly rent *(multi-family)*	☐ Not Applicable to Subdivisions

			TDM measures: *Residential developments*	Check if proposed & add descriptions
		6.	**TDM MARKETING & COMMUNICATIONS**	
		6.1	**Multimodal travel information**	
BASIC	★	6.1.1	Provide a multimodal travel option information package to new residents	☑
		6.2	**Personalized trip planning**	
BETTER	★	6.2.1	Offer personalized trip planning to new residents	☐

Appendix J Swept Path Analysis

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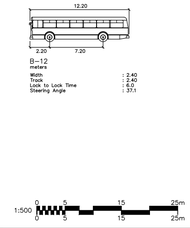
1521.2
Taylor
Abbey
Mia
Claudia
Nova
Benjamin
Wyatt



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Arcadis Professional Services (Canada) Inc.
formerly IBI Group Professional Services (Canada) Inc.

CLIENT
City of Ottawa

ISSUES

No.	DESCRIPTION	DATE

KEY PLAN
001

LEGEND

SEAL

PRIME CONSULTANT
ARCADIS
333 Preston Street - Suite 500
Ottawa ON K1S 5N4 Canada
tel 613 225 1311
www.arcadis.com

PROJECT
CONCEPT PLAN 16
4850 BANK STREET

PROJECT NO: 30258465	
DRAWN BY: **AS**	CHECKED BY: **BPN**
PROJECT MGR: ---	APPROVED BY: ---

SHEET TITLE
SWEPT PATH ANALYSIS (B-12)

SHEET NUMBER	ISSUE
01	1

SCALE CHECK 1 in

File Location: C:\Users\shahzada2750\ARCADIS\145172 Cattizone Parcel 4859 Bank St - Internal Documents\6.0_ Technical\6.23_ Traffic\02_Ref-Data\Site Plan\20226-08-12\Auto\TURN123169-CP16.dwg Last Saved: August 18, 2026 by shahzada2750 Plotted: Tuesday, August 18, 2026 16:30:17 by Shahzad, Ahmed

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1521.2
Taylor
Abbey
Mia
Claudia
Nova
Benjamin
Wyatt

CLIENT
City of Ottawa

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Arcadis Professional Services (Canada) Inc.
formerly IBI Group Professional Services (Canada) Inc.

ISSUES

No.	DESCRIPTION	DATE

KEY PLAN
001

LEGEND

SEAL

PRIME CONSULTANT
ARCADIS
333 Preston Street - Suite 500
Ottawa ON K1S 5N4 Canada
tel 613 225 1311
www.arcadis.com

PROJECT
CONCEPT PLAN 16
4850 BANK STREET

PROJECT NO: 30258465	
DRAWN BY: **AS**	CHECKED BY: **BPN**
PROJECT MGR: ---	APPROVED BY: ---

SHEET TITLE
SWEPT PATH ANALYSIS
(A-BUS)

SHEET NUMBER	ISSUE
02	1

SCALE CHECK
1 in

File Location: C:\Users\shahzada2750\ARCADIS\145172 Cattizone Parcel 4859 Bank St - Internal Documents\6.0_ Technical\6.23_ Traffic\02_Ref-Data\Site Plan\20226-08-12\AutoTURN\123169-CP16.dwg Last Saved: August 18, 2026 by shahzada2750 Plotted: Tuesday, August 18, 2026 16:30:25 by Shahzad, Ahmed

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Taylor
Abbey
Mia
Claudia
Nova
Benjamin
Wyatt
Taylor
Abbey
Abbey
Wyatt
Nova
Claudia
Benjamin
Wyatt
Nova
Claudia
Mia
Abbey
Taylor
11.50
0.80
8.40
HSU
Width : 2.60
Track : 2.60
Lock to Lock Time : 6.0
Steering Angle : 40.0
1:500
0 5 15 25m
0 5 15 25m

CLIENT
City of Ottawa

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Arcadis Professional Services (Canada) Inc.
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ISSUES

No.	DESCRIPTION	DATE

KEY PLAN
001

LEGEND

SEAL

PRIME CONSULTANT
ARCADIS
333 Preston Street - Suite 500
Ottawa ON K1S 5N4 Canada
tel 613 225 1311
www.arcadis.com

PROJECT
CONCEPT PLAN 16
4850 BANK STREET

PROJECT NO:
30258465

DRAWN BY:	CHECKED BY:
AS	**BPN**
PROJECT MGR:	APPROVED BY:
---	---

SHEET TITLE
SWEPT PATH ANALYSIS (HSU)

SHEET NUMBER
03

ISSUE
1

SCALE CHECK
10mm
1 in

File Location: C:\Users\shahzada2750\ARCADIS\145172 Cattizone Parcel 4859 Bank St - Internal Documents\6.0_ Technical\6.23_ Traffic\02_Ref-Data\Site Plan\2026-08-12\Auto\TURN123169-CP16.dwg Last Saved: August 18, 2026 by shahzada2750 Plotted: Tuesday, August 18, 2026 16:30:32 by Shahzad, Ahmed

Park
.42 Ha)

te: Park size
be finalized
sed on unit
unt

ture Road
nnection

9.00
34.00
18.00
18.00
18.00
33.00
33.00
18.00
14.75
37.69
3.50
7833.6
7429.4
1520.4
1521.2
4995.5
108.0
109.0
109.4
109.2
108
107.8
105.8

Taylor
Abbey
Mia
Claudia
Nova
Nova
Benjamin
Mia
Claudia
Abbey
Nova
Taylor
Abbey
Abbey
Wyatt
Taylor
Abbey
Abbey
Wyatt
Nova
Claudia
Benjamin
Wyatt
Nova
Claudia
Mia
Abbey
Taylor

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ISSUES

No.	DESCRIPTION	DATE

KEY PLAN
001

LEGEND

10.31
1.46
5.38
Wayne Titan

	meters
Width	2.58
Track	2.44
Lock to Lock Time	4.0
Steering Angle	45.0

1:500 0 5 15 25m

SEAL

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PROJECT
CONCEPT PLAN 16
4850 BANK STREET

PROJECT NO: 30258465	
DRAWN BY: **AS**	CHECKED BY: **BPN**
PROJECT MGR: ---	APPROVED BY: ---

SHEET TITLE
SWEPT PATH ANALYSIS
(WAYNE TITAN)

SHEET NUMBER	ISSUE
04	1

SCALE CHECK 1 in

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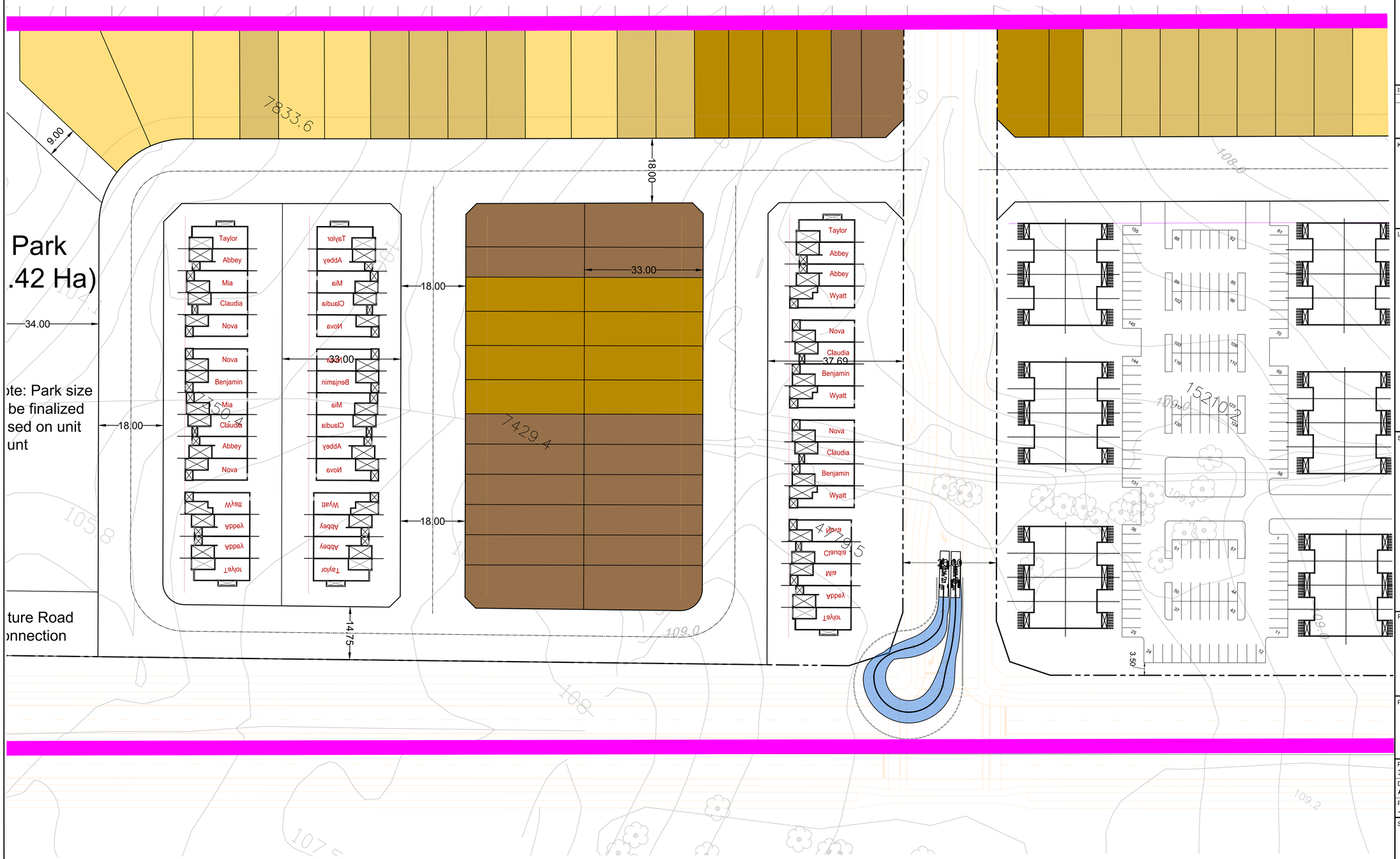

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ISSUES

No.	DESCRIPTION	DATE

KEY PLAN

001

LEGEND

SEAL

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tel 613 225 1311
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PROJECT

CONCEPT PLAN 16
4850 BANK STREET

PROJECT NO: 30258465	
DRAWN BY: **AS**	CHECKED BY: **BPN**
PROJECT MGR: ---	APPROVED BY: ---

SHEET TITLE

SWEPT PATH ANALYSIS
(AERIAL FIRETRUCK)

SHEET NUMBER	ISSUE
05	1

SCALE CHECK 10mm 1 in

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